NIAID	National Institute of Allergy and Infectious Diseases
NIH	National Institutes of Health
NIOSH	National Institute for Occupational Safety and Health
NM	Nanometer
NNRTI	Nonnucleoside reverse transcriptase inhibitors
NPIN	National Prevention Information Network
NTCA	National Tuberculosis Controllers Association
NTM	Nontuberculous mycobacteria
OR	Operating room
OSHA	Occupational Safety and Health Administration
PAPR	Powered air-purifying respirator
PCP	*Pneumocystis pneumonia*
PCR	Polymerase chain reaction
PE	Protective environment
PET	Permissible exposure time
PI	Protease inhibitor
PPD	Purified protein derivative
PPE	Personal protective equipment
QC	Quality control
QFT	QuantiFERON®-TB test
QFT-G	QuantiFERON®- TB Gold test
QLFT	Qualitative fit test
QNFT	Quantitative fit test
REL	Recommended exposure limit
RFLP	Restriction fragment length polymorphism
RNA	Ribonucleic acid
RZ	Rifampin and pyrazinamide
SARS	Severe acute respiratory syndrome
SGOT	Serum glutamic-oxalacetic transaminase*
SGPT	Serum glutamic-pyruvic transaminase†
SWPF	Simulated workplace protection factor
TB	Tuberculosis
TNF-α	Tumor necrosis factor-alpha

TU	Tuberculin unit
TST	Tuberculin skin test
UL	Underwriters Laboratories
UV	Ultraviolet
UVGI	Ultraviolet germicidal irradiation
VAV	Variable air volume
WHO	World Health Organization
WPF	Workplace protection factor

* Older term for AST.
† Older term for ALT.

Glossary of Definitions

acid-fast bacilli (AFB) examination	A laboratory test that involves microscopic examination of a stained smear of a patient specimen (usually sputum) to determine if mycobacteria are present. A presumptive diagnosis of pulmonary tuberculosis (TB) can be made with a positive AFB sputum smear result; however, approximately 50% of patients with TB disease of the lungs have negative AFB sputum smear results. The diagnosis of TB disease is usually not confirmed until *Mycobacterium tuberculosis* is identified in culture or by a positive nucleic acid amplification (NAA) test result.
administrative controls	Managerial measures that reduce the risk for exposure to persons who might have TB disease. Examples include coordinating efforts with the local or state health department; conducting a TB risk assessment for the setting; developing and instituting a written TB infection-control plan to ensure prompt detection, airborne infection isolation (AII), and treatment of persons with suspected or confirmed TB disease; and screening and evaluating health-care workers (HCWs) who are at risk for TB disease or who might be exposed to *M. tuberculosis.*
aerosol	Dispersions of particles in a gaseous medium (e.g., air). Droplet nuclei are an example of particles that are expelled by a person with an infectious disease (e.g., by coughing, sneezing, or singing). For *M. tuberculosis*, the droplet nuclei are approximately 1–5 μm. Because of their small size, the droplet nuclei can remain suspended in the air for substantial periods and can transmit *M. tuberculosis* to other persons.
air change rate	Ratio of the airflow in volume units per hour to the volume of the space under consideration in identical volume units, usually expressed in air changes per hour (ACH).
air change rate (equivalent)	Ratio of the volumetric air loss rate associated with an environmental control (or combination of controls) (e.g., an air cleaner or ultraviolet germicidal irradiation [UVGI] system) divided by the volume of the room where the control has been applied. The equivalent air change rate is useful for describing the rate at which bioaerosols are removed by means other than ventilation.
air change rate (mechanical)	Ratio of the airflow to the space volume per unit time, usually expressed in air changes per hour (ACH).
air changes per hour (ACH)	Air change rate expressed as the number of air exchange units per hour.
airborne infection isolation (AII) precautions	The isolation of patients infected with organisms spread through airborne droplet nuclei 1–5 μm in diameter. This isolation area receives substantial ACH (≥12 ACH for new construction since 2001 and ≥6 ACH for construction before 2001) and is under negative pressure (i.e., the direction of the air flow is from the outside adjacent space [e.g., the corridor] into the room). The air in an AII room is preferably exhausted to the outside, but can be recirculated if the return air is filtered through an high efficiency particulate respirator (HEPA) filter.
AII room	A room designed to maintain AII. Formerly called negative pressure isolation room, an AII room is a single-occupancy patient-care room used to isolate persons with suspected or confirmed infectious TB disease. Environmental factors are controlled in AII rooms to minimize the transmission of infectious agents that are usually spread from person-to-person by droplet nuclei associated with coughing or aerosolization of contaminated fluids. AII rooms should provide negative pressure in the room (so that air flows under the door gap into the room), an air flow rate of 6–12 ACH, and direct exhaust of air from the room to the outside of the building or recirculation of air through a HEPA filter.

American Institute of Architects/ Facility Guideline Institute (AIA/FGI)	A professional organization that develops standards for building design and construction, including ventilation parameters, and enforced by the Joint Commission on Accreditation of Healthcare Organizations.
American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE)	A professional organization that develops guidelines for building ventilation.
aminotransaminases	Also called transaminases. Used to assess for hepatotoxicity in persons taking antituberculosis medications and include aspartate amino transferase (AST), serum glutamic oxalacetic transaminase, formerly SGOT, and amino alanine transferase, formerly ALT.
aminotransferases	Also called transaminases. Used to assess for hepatotoxicity in persons taking antituberculosis medications and include aspartate amino transferase (AST) (formerly serum glutamic oxalacetic transaminase) and amino alanine transferase (ALT) (formerly serum glutamic pyruvic transaminase).
anaphylactic shock	An often severe and sometimes fatal systemic reaction upon a second exposure to a specific antigen (as wasp venom or penicillin) after previous sensitization that is characterized especially by respiratory symptoms, fainting, itching, and hives.
anemometer	An instrument used to measure the velocity (speed) of air.
anergy	A condition in which a person has a diminished ability to exhibit delayed T-cell hypersensitivity to antigens because of a condition or situation resulting in altered immune function. An inability to react to a skin test is called cutaneous anergy. Skin tests for anergy (i.e., control antigens) have poor predictive value and are not recommended.
anteroom	Small room leading from a corridor into an AII room. An anteroom is separated from both the AII room and the corridor by doors. An anteroom can act as an airlock, preventing the escape of contaminants from the AII room into the corridor.
apical	Relating to or located at the tip (an apex).
assigned protection factor (APF)	The minimum anticipated protection provided by a properly worn and functioning respirator or class of respirators.
asymptomatic	Neither causing nor exhibiting signs or symptoms of disease.
Bacille Calmette-Guérin (BCG)	A vaccine for TB named after the French scientists Calmette and Guérin used in most countries where TB disease is endemic. The vaccine is effective in preventing disseminated and meningeal TB disease in infants and young children. It may have approximately 50% efficacy for preventing pulmonary TB disease in adults.
baseline TB screening	Screening HCWs for LTBI and TB disease at the beginning of employment. TB screening includes a symptom screen for all HCWs, and tuberculin skin tests (TSTs) or blood assay for *Mycobacterium tuberculosis* (BAMT) for those with previous negative test results for *M. tuberculosis* infection.
baseline TST or baseline BAMT	The TST or BAMT is administered at the beginning of employment to newly hired HCWs. If the TST method is used, for HCWs who have not had a documented negative test result for *M. tuberculosis* during the preceding 12 months, the baseline TST result should be obtained by using the two-step method. BAMT baseline testing does not need the two-step method.

biological safety cabinet (BSC)	A ventilated box that provides HCWs with a degree of protection against hazardous aerosols that are generated within it. BSC is the principal device used to contain infectious splashes or aerosols generated by multiple microbiology processes. BSC provides physical barriers and directional airflow to carry hazards away from the HCW. Maintenance is an essential part of ensuring proper BCS function.
Biosafety in Microbiological and Biomedical Laboratories (BMBL)	A publication of the U.S. Public Health Service that describes the combinations of standard and special microbiology practices, safety equipment, and facilities constituting biosafety levels (BSLs) 1–4, which are recommended for work with various infectious agents in laboratory settings. The recommendations are advisory and intended to provide a voluntary guide or code of practice.
biosafety levels (BSLs)	Four BSLs are described in Section III of BMBL that comprise combinations of laboratory practices and techniques, safety equipment, and laboratory settings.
blinded independent duplicate reading (BIDR)	Process in which two or more TST readers immediately measure the same TST result by standard procedures, without consulting or observing one another's readings, and record results. BIDRs help ensure that TST readers continue to read TST results correctly.
blood assay for *Mycobacterium tuberculosis* (BAMT)	A general term to refer to recently developed in vitro diagnostic tests that assess for the presence of infection with *M. tuberculosis*. This term includes, but is not limited to, IFN-γ release assays (IGRA). In the United States, the currently available test is QuantiFERON®-TB Gold test (QFT-G).
BAMT converter	A change from a negative to a positive BAMT result over a 2-year period.
boosting	When nonspecific or remote sensitivity to tuberculin purified protein derivative (PPD) in the skin test wanes or disappears over time, subsequent TSTs can restore the sensitivity. This process is called boosting or the booster phenomenon. An initially small TST reaction size is followed by a substantial reaction size on a later test, and this increase in millimeters of induration can be confused with a conversion or a recent *M. tuberculosis* infection. Two-step testing is used to distinguish new infections from boosted reactions in infection-control surveillance programs.
bronchoscopy	A procedure for examining the lower respiratory tract in which the end of the endoscopic instrument is inserted through the mouth or nose (or tracheostomy) and into the respiratory tree. Bronchoscopy can be used to obtain diagnostic specimens. Bronchoscopy also creates a high risk for *M. tuberculosis* transmission to HCWs if it is performed on an untreated patient who has TB disease (even if the patient has negative AFB smear results) because it is a cough-inducing procedure.
case	A particular instance of a disease (e.g., TB). A case is detected, documented, and reported.
cavity (pulmonary)	A hole in the lung parenchyma, usually not involving the pleural space. Although a lung cavity can develop from multiple causes, and its appearance is similar regardless of its cause, in pulmonary TB disease, cavitation results from the destruction of pulmonary tissue by direct bacterial invasion and an immune interaction triggered by *M. tuberculosis*. A TB cavity substantial enough to see with a normal chest radiograph predicts infectiousness.
clinical examination	A physical evaluation of the clinical status of a patient by a physician or equivalent practitioner.

close contact (TB)	A person who has shared the same air space in a household or other enclosed environment for a prolonged period (days or weeks, not minutes or a couple hours) with a person with suspected or confirmed TB disease. Close contacts have also been referred to as high-priority contacts because they have the highest risk for infection with *M. tuberculosis*.
cluster (TB)	A group of patients with LTBI or TB disease that are linked by epidemiologic, location, or genotyping data. Two or more TST conversions within a short period can be a cluster of TB disease and might suggest transmission within the setting. A genotyping cluster is two or more cases with isolates that have an identical genotyping pattern.
combination product surgical mask/N95 disposable respirator	Product certified by CDC's National Institute for Occupational Safety and Health (NIOSH) and cleared by the Food and Drug Administration (FDA) that provides both respiratory protection and bloodborne pathogen protection.
constant air volume (CAV)	A descriptor for an air-handling system which, as the name implies, supplies and exhausts air at a constant flow rate. The flow rate does not change over time based on temperature load or other parameters.
contact (TB)	Refers to someone who was exposed to *M. tuberculosis* infection by sharing air space with an infectious TB patient.
contact investigation	Procedures that occur when a case of infectious TB is identified, including finding persons (contacts) exposed to the case, testing and evaluation of contacts to identify LTBI or TB disease, and treatment of these persons, as indicated.
contagious	Describes a characteristic of a disease that can be transmitted from one living being to another through direct contact or indirect contact; communicable. The agent responsible for the contagious character of a disease is also described as being infectious; the usual culprits are microorganisms.
contraindication	Any condition, especially any condition of disease, which renders a certain line of treatment improper or undesirable.
conversion	See TST conversion.
conversion rate	The percentage of a population with a converted test result (TST or BAMT) for *M. tuberculosis* within a specified period. This is calculated by dividing the number of conversions among eligible HCWs in the setting in a specified period (numerator) by the number of HCWs who received tests in the setting over the same period (denominator) multiplied by 100.
culture	Growth of microorganisms in the laboratory performed for detection and identification in sputum or other body fluids and tissues. This test usually takes 2–4 weeks for mycobacteria to grow (2–4 days for most other bacteria).
cough etiquette	See respiratory hygiene and cough ettiquette.
cross contamination	When organisms from one sample are introduced into another sample, causing a false-positive result.
delayed-type hypersensitivity (DTH)	Cell-mediated inflammatory reaction to an antigen, which is recognized by the immune system usually because of previous exposure to the same antigen or similar ones. Cell-mediated reactions are contrasted with an antibody (or humoral) response. DTH typically peaks at 48–72 hours after exposure to the antigen.
deoxyribonucleic acid	DNA fingerprinting is a clinical laboratory technique used to distinguish between different strains of *M. tuberculosis* and to help assess the likelihood of TB transmission.
differential pressure	A measurable difference in air pressure that creates a directional airflow between adjacent compartmentalized spaces.

directly observed therapy (DOT)	Adherence-enhancing strategy in which an HCW or other trained person watches a patient swallow each dose of medication. DOT is the standard care for all patients with TB disease and is a preferred option for patients treated for LTBI.
disposable respirator	A respirator designed to be used and then discarded; also known as a filtering-facepiece respirator. Respirators should be discarded after excessive resistance, physical damage, or hygiene considerations.
droplet nuclei	Microscopic particles produced when a person coughs, sneezes, shouts, or sings. These particles can remain suspended in the air for prolonged periods and can be carried on normal air currents in a room and beyond to adjacent spaces or areas receiving exhaust air.
drug-susceptibility test	A laboratory determination to assess whether an *M. tuberculosis* complex isolate is susceptible or resistant to antituberculosis drugs that are added to mycobacterial growth medium or are detected genetically. The results predict whether a specific drug is likely to be effective in treating TB disease caused by that isolate.
environmental control measures	Physical or mechanical measures (as opposed to administrative control measures) used to reduce the risk for transmission of *M. tuberculosis*. Examples include ventilation, filtration, ultraviolet lamps, AII rooms, and local exhaust ventilation devices.
epidemiologic cluster	A closely grouped series of cases in time or place.
erythema	Abnormal redness of the skin. Erythema can develop around a TST site but should not be read as part of the TST result.
expert TST trainer	A designated instructor who has documented TST training experience. This may include having received training on placing and reading multiple TST results.
exposed cohorts	Groups of persons (e.g., family members, co-workers, friends, club, team or choir members, persons in correctional facilities, or homeless shelter residents) who have shared the same air space with the suspected patient with TB disease during the infectious period. A person in the exposed cohort is a contact. See also contact and close contact.
exposure	The condition of being subjected to something (e.g., an infectious agent) that could have an adverse health effect. A person exposed to *M. tuberculosis* does not necessarily become infected. See also transmission.
exposure period	The coincident period when a contact shared the same air space as the index TB patient during the infectious period.
exposure site	A location that the index patient visited during the infectious period (e.g., school, bar, bus, or residence).
extrapulmonary TB	TB disease in any part of the body other than the lungs (e.g., kidney, spine, or lymph nodes). The presence of extrapulmonary disease does not exclude pulmonary TB disease.
false-negative TST or BAMT result	A TST or BAMT result that is interpreted as negative in a person who is actually infected with *M. tuberculosis*.
false-positive TST or BAMT result	A TST or BAMT result that is interpreted as positive in a person who is not actually infected with *M. tuberculosis*. A false-positive TST result is more likely to occur in persons who have been vaccinated with BCG or who are infected with nontuberculous mycobacteria (NTM).
facility	A physical building or set of buildings.
filtering-facepiece respirator	A type of air purifying respirator that uses a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

fit check	See user-seal check.
fit factor	A quantitative estimate of the fit of a particular respirator to a specific person; typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.
fit test	The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on a person. See also QLFT and QNFT.
flutter strips	Physical indicators used to provide a continuous visual sign that a room is under negative pressure. These simple and inexpensive devices are placed directly in the door and can be useful in identifying a pressure differential problem.
genotype	The DNA pattern of *M. tuberculosis* used to discriminate among different strains.
health-care–associated	Broader term used instead of "nosocomial."
health-care setting	A place where health care is delivered.
health-care workers (HCWs)	All paid and unpaid persons working in health-care settings.
heating, ventilating, or air conditioning (HVAC)	Mechanical systems that provide either collectively or individually heating, ventilating, or air conditioning for comfort within or associated with a building.
high efficiency particulate air (HEPA) filter	A filter that is certified to remove ≥99.97% of particles 0.3 μm in size, including *M. tuberculosis*–containing droplet nuclei; the filter can be either portable or stationary. Use of HEPA filters in building ventilation systems requires expertise in installation and maintenance.
high-pressure liquid chromatograph (HPLC)	Laboratory method used to identify *Mycobacterium* species by analysis of species-specific fatty acids called mycolic acids, which are present in the cell walls of mycobacteria.
human immunodeficiency virus (HIV) infection	Infection with the virus that causes acquired immunodeficiency syndrome (AIDS). A person with both LTBI and HIV infection is at high risk for developing TB disease.
hemoptysis	The expectoration or coughing up of blood or blood-tinged sputum; one of the symptoms of pulmonary TB disease. Hemoptysis can also be observed in other pulmonary conditions (e.g., lung cancer).
hypersensitivity	A state in which the body reacts with an exaggerated immune response to a foreign substance. Hypersensitivity reactions are classified as immediate or delayed, types I and IV, respectively. See also delayed-type hypersensitivity.
immunocompromised and immunosuppressed	Describes conditions in which at least part of the immune system is functioning at less than normal capacity. According to certain style experts, "immunocompromised" is the broader term, and "immunosuppressed" is restricted to conditions with iatrogenic causes, including treatments for another condition.
incentive	A gift given to patients to encourage or acknowledge their adherence to treatment.
incidence	The number of new events or cases of disease that develop during a specified period.
index case	The first person with TB disease who is identified in a particular setting. This person might be an indicator of a potential public health problem and is not necessarily the source case. See also source case or patient.
induration	The firmness in the skin test reaction; produced by immune-cell infiltration in response to the tuberculin antigen that was introduced into the skin. Induration is measured transversely by palpation, and the result is recorded in millimeters. The measurement is compared with guidelines to determine whether the test result is classified as positive or negative.

infection with *M. tuberculosis*	In some persons who are exposed to and who inhale *M. tuberculosis* bacteria, the bacteria are not promptly cleared by respiratory defense systems, and the bacteria multiply and are spread throughout the body, thereby infecting the exposed person. In the majority of persons who become infected, the body is able to fight the bacteria to stop the bacteria from growing, further establishing a latent state. The bacteria are inactive, but they remain alive in the body and can become active later. In other persons, the infection with *M. tuberculosis* can progress to TB disease more promptly. *M. tuberculosis* infection encompasses both latent TB infection and TB disease. See also latent TB infection and reinfection.
infectious	See contagious.
infectious droplet nuclei	Droplet nuclei produced by an infectious TB patient that can carry tubercle bacteria and be inhaled by others. Although usually produced from patients with pulmonary TB through coughing, aerosol-generating procedures can also generate infectious droplet nuclei.
infectious period	The period during which a person with TB disease might have transmitted *M. tuberculosis* organisms to others. For patients with positive AFB sputum smear results, the infectious period begins 3 months before the collection date of the first positive smear result or the symptom onset date (whichever is earlier) and ends when the patient is placed into AII or the date of collection for the first of consistently negative smear results. For patients with negative AFB sputum smear results, the infectious period extends from 1 month before the symptom onset date and ends when the patient is placed into AII (whichever was earlier).
interferon-γ release assays (IGRA)	A type of an ex vivo test that detects cell-mediated immune response to this cytokine. In the United States, QFT-G is a currently available IGRA.
isoniazid (INH)	A highly active antituberculosis chemotherapeutic agent that is a cornerstone of treatment for TB disease and the cornerstone of treatment for LTBI.
laryngeal TB	A form of TB disease that involves the larynx and can be highly infectious.
latent TB infection (LTBI)	Infection with *M. tuberculosis* without symptoms or signs of disease have manifested. See also Infection with *M. tuberculosis*.
manometer	An instrument used to measure pressure differentials (i.e., pressure inside an AII room relative to the corridor of the room).
Mantoux method	A skin test performed by intradermally injecting 0.1 mL of PPD tuberculin solution into the volar or dorsal surface of the forearm. This method is the recommended method for TST.
mask	A device worn over the nose and mouth of a person with suspected or confirmed infectious TB disease to prevent infectious particles from being released into room air.
mechanical ACH	Air change rate based on only the mechanical ventilation flowrates.
medical evaluation	An examination to diagnose TB disease or LTBI, to select treatment, and to assess response to therapy. A medical evaluation can include medical history and TB symptom screen, clinical or physical examination, screening and diagnostic tests (e.g., TSTs, chest radiographs, bacteriologic examination, and HIV testing), counseling, and treatment referrals.
meningeal TB	A serious form of TB disease involving the meningies, the covering of the brain. Meningeal TB can result in serious neurologic complications.
miliary TB	A serious form of TB disease sometimes referred to as disseminated TB. A dangerous and difficult form to diagnose of rapidly progressing TB disease that extends throughout the body. Uniformly fatal if untreated; in certain instances, it is diagnosed too late to save a life. Certain patients with this condition have normal findings or ordinary infiltrates on the chest radiograph.

mitogen	A substance that stimulates the growth of certain white blood cells. Mitogen is used as a positive control in BAMT tests.
multidrug-resistant tuberculosis (MDR TB)	TB disease caused by *M. tuberculosis* organisms that are resistant to at least INH and rifampin.
mycobacteria other than tuberculosis (MOTT)	See NTM.
Mycobacterium tuberculosis	The namesake member organism of *M. tuberculosis* complex and the most common causative infectious agent of TB disease in humans. In certain instances, the species name refers to the entire *M. tuberculosis* complex, which includes *M. bovis, M. african, M. microti, M. canetii, M. caprae,* and *M. pinnipedii.*
M. tuberculosis culture	A laboratory test in which the organism is grown from a submitted specimen (e.g., sputum) to determine the presence of *M. tuberculosis.* In the absence of cross-contamination, a positive culture confirms the diagnosis of TB disease.
N95 disposable respirator	An air-purifying, filtering-facepiece respirator that is ≥95% efficient at removing 0.3 μm particles and is not resistant to oil. See also respirator.
negative pressure	The difference in air-pressure between two areas. A room that is under negative pressure has a lower pressure than adjacent areas, which keeps air from flowing out of the room and into adjacent rooms or areas. Also used to describe a nonpowered respirator. See also AII and AII room.
nontuberculous mycobacteria (NTM)	Refers to mycobacterium species other than those included as part of *M. tuberculosis* complex. Although valid from a laboratory perspective, the term can be misleading because certain types of NTM cause disease with pathologic and clinical manifestations similar to TB disease. Another term for NTM is mycobacterium other than tuberculosis (MOTT). NTM are environmental mycobacteria.
nosocomial	Acquired in a hospital. The broader term "health-care–associated" is used in this report.
nucleic acid amplification (NAA)	Laboratory method used to target and amplify a single DNA or RNA sequence usually for detecting and identifying a microorganism. The NAA tests for *M. tuberculosis* complex are sensitive and specific and can accelerate the confirmation of pulmonary TB disease.
periodic fit testing	Repetition of fit testing performed in accordance with local, state, and federal regulations. Additional fit testing should be used when 1) a new model of respirator is used, 2) a physical characteristic of the user changes, or 3) when the user or respiratory program administrator is uncertain that the HCW is obtaining an adequate fit.
pleural effusion	Abnormal accumulation of fluid between the lining of the lung and the chest wall. Persons with TB pleural effusions might also have concurrent unsuspected pulmonary or laryngeal TB disease. These patients should be considered contagious until infectious TB disease is excluded.
polymerase chain reaction (PCR)	A system for in vitro amplification of DNA that can be used for diagnosis of infections.
positive predictive value of a TST	The probability that a person with a positive TST result is actually infected with *M. tuberculosis.* The positive predictive value is dependent on the prevalence of infection with *M. tuberculosis* in the population being tested and on the sensitivity and specificity of the test.

potential ongoing transmission	A risk classification for TB screening, including testing for *M. tuberculosis* infection when evidence of ongoing transmission of *M. tuberculosis* is apparent in the setting. Testing might need to be performed every 8–10 weeks until lapses in infection controls have been corrected, and no further evidence of ongoing transmission is apparent. Use potential ongoing transmission as a temporary risk classification only. After corrective steps are taken, reclassify the setting as medium risk. Maintaining the classification of medium risk for at least 1 year is recommended.
powered air-purifying respirator (PAPR)	A respirator equipped with a tight-fitting facepiece (rubber facepiece) or loose-fitting facepiece (hood or helmet), breathing tube, air-purifying filter, cartridge or canister, and a fan. Air is drawn through the air-purifying element and pushed through the breathing tube and into the facepiece, hood, or helmet by the fan. Loose-fitting PAPRs (e.g., hoods or helmets) might be useful for persons with facial hair because they do not require a tight seal with the face.
prevalence	The proportion of persons in a population who have a disease at a specific time.
protection factor	A general term for three specific terms: 1) APF, 2) SWPF, and 3) WPF. These terms refer to different methods of defining adequacy of respirator fit. See also APF, SWPF, and WPF.
pulmonary TB	TB disease that occurs in the lung parenchyma, usually producing a cough that lasts ≥3 weeks.
purified protein derivative (PPD) tuberculin	A material used in diagnostic tests for detecting infection with *M. tuberculosis*. In the United States, PPD solution is approved for administration as an intradermal injection (5 TU per 0.1 mL), a diagnostic aid for LTBI (see TST). In addition, PPD tuberculin was one of the antigens in the first-generation QFT.
qualitative fit test (QLFT)	A pass-fail fit test to assess the adequacy of respirator fit that relies on the response of the person to the test agent.
quality control (QC)	A function to ensure that project tools and procedures are reviewed and verified according to project standards.
QFT and QFT-G	Types of BAMT that are in vitro cytokine assays that detects cell-mediated immune response (see also DTH) to *M. tuberculosis* in heparinized whole blood from venipuncture. This test requires only a single patient encounter, and the result can be ready within 1 day. In 2005, QuantiFERON®-TB was replaced by QuantiFERON®-TB Gold (QFT-G), which has greater specificity because of antigen selection. QFT-G appears to be capable of distinguishing between the sensitization caused by *M. tuberculosis* infection and that caused by BCG vaccination.
quantitative fit test (QNFT)	An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.
recirculation	Ventilation in which all or the majority of the air exhausted from an area is returned to the same area or other areas of the setting.
recommended exposure limit (REL)	The occupational exposure limit established by CDC/NIOSH. RELs are intended to suggest levels of exposure to which the majority of HCWs can be exposed without experiencing adverse health effects.
reinfection	A second infection that follows from a previous infection by the same causative agent. Frequently used when referring to an episode of TB disease resulting from a subsequent infection with *M. tuberculosis* and a different genotype.

resistance	The ability of certain strains of mycobacteria, including *M. tuberculosis*, to grow and multiply in the presence of certain drugs that ordinarily kill or suppress them. Such strains are referred to as drug-resistant strains and cause drug-resistant TB disease. See also multidrug-resistant TB.
respirator	A CDC/NIOSH-approved device worn to prevent inhalation of airborne contaminants.
respiratory hygiene and cough etiquette	Procedures by which patients with suspected or confirmed infectious TB disease can minimize the spread of infectious droplet nuclei by decreasing the number of infectious particles that are released into the environment. Patients with a cough should be instructed to turn their heads away from persons and to cover their mouth and nose with their hands or preferably a cloth or tissue when coughing or sneezing.
respiratory protection	The third level in the hierarchy of TB infection-control measures after administrative and environmental controls is used because of the risk for exposure.
restriction fragment length polymorphism (RFLP)	A technique by which organisms can be differentiated by analysis of patterns derived from cleavage of their DNA. The similarity of the patterns generated can be used to differentiate strains from one another. See also genotype.
reversion	A subsequent TST or BAMT result that is substantially smaller than a previous test; reversion has been observed to be more likely when the intervening time between TSTs increases.
Rifampin	A highly active antituberculosis chemotherapeutic agent that is a cornerstone of treatment for TB disease.
screening (TB)	Measures used to identify persons who have TB disease or LTBI. See also symptom screen.
secondary (TB) case	A new case of TB disease that is attributed to recent transmission as part of the scenario under investigation. The period for "recent" is not defined but usually will be briefer than 2 years. Technically, all cases are secondary, in that they originate from other contagious cases.
simulated workplace protection factor (SWPF)	A surrogate measure of the workplace protection provided by a respirator.
smear (AFB smear)	A laboratory technique for preparing a specimen so that bacteria can be visualized microscopically. Material from the specimen is spread onto a glass slide and usually dried and stained. Specific smear, stain, and microscopy methods for mycobacteria are designed to optimally detect members of this genus. The slide can be scanned by light or fluorescent high-power microscopy. These methods require ongoing quality assurance for prompt and reliable results. The results for sputum smears usually are reported as numbers of AFB per high-powered microscopy field or as a graded result, from +1 to +4. The quantity of stained organisms predicts infectiousness. See also AFB.
source case or patient	The person or the case that was the original source of infection for secondary cases or contacts. The source case can be, but is not necessarily, the index case.
source case investigation	An investigation to determine the source case could be conducted in at least two circumstances: 1) when a health-care setting detects an unexplained cluster of TST conversions among HCWs or 2) when TB infection or disease is diagnosed in a young child. The purposes of a source case investigation are to ascertain that the source case has been diagnosed and treated, to prevent further *M. tuberculosis* transmission, and to ensure that other contacts of that source case are also evaluated and, if indicated, provided treatment.

source control	A process for preventing or minimizing emission (e.g., aerosolized *M. tuberculosis*) at the place of origin. Examples of source-control methods are booths in which a patient coughs and produces sputum, BSCs in laboratories, and local exhaust ventilation.
spirometry	A procedure used to measure time expired and the volume inspired, and from these measurements, calculations can be made on the effectiveness of the lungs.
sputum	Mucus containing secretions coughed up from inside the lungs. Tests of sputum (e.g., smear and culture) can confirm pulmonary TB disease. Sputum is different from saliva or nasal secretions, which are unsatisfactory specimens for detecting TB disease. However, specimens suspected to be inadequate should still be processed because positive culture results can still be obtained and might be the only bacteriologic indication of disease.
sputum induction	A method used to obtain sputum from a patient who is unable to cough up a specimen spontaneously. The patient inhales a saline mist, which stimulates coughing from deep inside the lungs.
supervised TST administration	A procedure in which an expert TST trainer supervises a TST trainee who performs all procedures on the procedural observation checklist for administering TSTs.
supervised TST reading	A procedure in which an expert TST trainer supervises a TST trainee who performs all procedures on the procedural observation checklist for reading TST results.
suspected TB	A tentative diagnosis of TB that will be confirmed or excluded by subsequent testing. Cases should not remain in this category for longer than 3 months.
symptomatic	A term applied to a patient with health-related complaints (symptoms) that might indicate the presence of disease. In certain instances, the term is applied to a medical condition (e.g., symptomatic pulmonary TB).
symptom screen	A procedure used during a clinical evaluation in which patients are asked if they have experienced any departure from normal in function, appearance, or sensation related to TB disease (e.g., cough).
targeted testing	A strategy to focus testing for infection with *M. tuberculosis* in persons at high risk for LTBI and for those at high risk for progression to TB disease if infected.
tuberculosis (TB) disease	Condition caused by infection with a member of the *M. tuberculosis* complex that has progressed to causing clinical (manifesting symptoms or signs) or subclinical (early stage of disease in which signs or symptoms are not present, but other indications of disease activity are present [see below]) illness. The bacteria can attack any part of the body, but disease is most commonly found in the lungs (pulmonary TB). Pulmonary TB disease can be infectious, whereas extrapulmonary disease (occurring at a body site outside the lungs) is not infectious, except in rare circumstances. When the only clinical finding is specific chest radiographic abnormalities, the condition is termed "inactive TB" and can be differentiated from active TB disease, which is accompanied by symptoms or other indications of disease activity (e.g., the ability to culture reproducing TB organisms from respiratory secretions or specific chest radiographic finding).
TB case	A particular episode of clinical TB disease. Refers only to the disease, not to the person with the disease. According to local laws and regulation, TB cases and suspect TB cases must be reported to the local or state health department.
TB contact	A person who has shared the same air space with a person who has TB disease for a sufficient amount of time to allow possible transmission of *M. tuberculosis*.

TB exposure incident	A situation in which persons (e.g., HCWs, visitors, and inmates) have been exposed to a person with suspected or confirmed infectious TB disease (or to air containing *M. tuberculosis*), without the benefit of effective infection-control measures.
TB infection	See LTBI.
TB infection-control program	A program designed to control transmission of *M. tuberculosis* through early detection, isolation, and treatment of persons with infectious TB. A hierarchy of control measures are used, including 1) administrative controls to reduce the risk for exposure to persons with infectious TB disease and screening for HCWs for LTBI and TB disease, 2) environmental controls to prevent the spread and reduce the concentration of infectious droplet nuclei in the air, and 3) respiratory protection in areas where the risk for exposure to *M. tuberculosis* is high (e.g., AII rooms). A TB infection-control plan should include surveillance of HCWs who have unprotected high-risk exposure to TB patients or their environment of care.
TB screening	An administrative control measure in which evaluation for LTBI and TB disease are performed through initial and serial screening of HCWs, as indicated. Evaluation might comprise TST, BAMT, chest radiograph, and symptom screening. See also symptom screen.
TB screening program	A plan that health-care settings should implement to provide information that is critical in caring for HCWs and information and that facilitates detection of *M. tuberculosis* transmission. The TB screening program comprises four major components: 1) baseline testing for *M. tuberculosis* infection, 2) serial testing for *M. tuberculosis* infection, 3) serial screening for signs or symptoms of TB disease, and 4) TB training and education.
TB risk assessment	An initial and ongoing evaluation of the risk for transmission of *M. tuberculosis* in a particular health-care setting. To perform a risk assessment, the following factors should be considered: the community rate of TB, number of TB patients encountered in the setting, and the speed with which patients with TB disease are suspected, isolated, and evaluated. The TB risk assessment determines the types of administrative and environmental controls and respiratory protection needed for a setting.
transmission	Any mode or mechanism by which an infectious agent is spread from a source through the environment or to a person (or other living organism). In the context of health-care–associated TB infection control, transmission is the airborne conveyance of aerosolized *M. tuberculosis* contained in droplet nuclei from a person with TB disease, usually from the respiratory tract, to another person, resulting in infection.
treatment for LTBI	Treatment that prevents the progression of infection into disease.
tuberculin skin test (TST)	A diagnostic aid for finding *M. tuberculosis* infection. A small dose of tuberculin is injected just beneath the surface of the skin (in the United States by the Mantoux method), and the area is examined for induration by palpation 48–72 hours after the injection. The indurated margins should be read transverse (perpendicular) to the long axis of the forearm. See also Mantoux method and PPD.
TST conversion	A change in the result of a test for *M. tuberculosis* infection wherein the condition is interpreted as having progressed from uninfected to infected. An increase of ≥10 mm in induration during a maximum of 2 years is defined as a TST conversion for the purposes of a contact investigation. A TST conversion is presumptive evidence of new *M. tuberculosis* infection and poses an increased risk for progression to TB disease. See also conversion rate.

tubercle bacilli	*M. tuberculosis* organisms.
tuberculin	A precipitate made from a sterile filtrate of *M. tuberculosis* culture medium.
tumor necrosis factor-alpha (TNF-α)	A small molecule (called a cytokine) discovered in the blood of animals (and humans) with tumors but which has subsequently been determined to be an essential host mediator of infection and inflammation. TNF-α is released when humans are exposed to bacterial products (e.g., lipopolysaccharide) or BCG. Drugs (agents) that block human TNF-α have been demonstrated to increase the risk for progression to TB disease in persons who are latently infected.
two-step TST	Procedure used for the baseline skin testing of persons who will receive serial TSTs (e.g., HCWs and residents or staff of correctional facilities or long-term–care facilities) to reduce the likelihood of mistaking a boosted reaction for a new infection. If an initial TST result is classified as negative, a second step of a two-step TST should be administered 1–3 weeks after the first TST result was read. If the second TST result is positive, it probably represents a boosted reaction, indicating infection most likely occurred in the past and not recently. If the second TST result is also negative, the person is classified as not infected. Two-step skin testing has no place in contact investigations or in other circumstances in which ongoing transmission of *M. tuberculosis* is suspected.
ulceration (TST)	A break in the skin or mucosa with loss of surface tissue.
ultraviolet germicidal radiation (UVGI)	Use of ultraviolet germicidal irradiation to kill or inactivate microorganisms.
UVGI lamp	An environmental control measure that includes a lamp that kills or inactivates microorganisms by emitting ultraviolet germicidal irradiation, predominantly at a wavelength of 254 nm (intermediate light waves between visible light and radiographs). UVGI lamps can be used in ceiling or wall fixtures or within air ducts of ventilation systems as an adjunct to other environmental control measures.
user-seal check	Formerly called "fit check." A procedure performed after every respirator is donned to check for proper seal of the respirator.
variable air volume (VAV)	VAV ventilation systems are designed to vary the quantity of air delivered to a space while maintaining a constant supply air temperature to achieve the desired temperature in the occupied space. Minimum levels are mechanical, and outside air is maintained.
vesiculation	An abnormal elevation of the outer layer of skin enclosing a watery liquid; blister.
wheal	A small bump that is produced when a TST is administered. The wheal disappears in approximately 10 minutes after TST placement.
workplace protection factor (WPF)	A measure of the protection provided in the workplace by a properly functioning respirator when correctly worn and used.

Appendix A. Administrative, environmental, and respiratory-protection controls for selected health-care settings

Setting	Administrative controls*	Environmental controls†	Respiratory-protection controls§
Settings in Which Patients with Suspected or Confirmed Infectious Tuberculosis (TB) Disease are not Expected to be Encountered			
Triage only: Initial evaluation of patients who will transfer to another setting	• Implement a written infection-control plan for triage of patients with suspected or confirmed TB disease. Update annually. • Promptly recognize and transfer patients with suspected or confirmed TB disease to a facility that treats persons with TB disease. • Before transferring the patient out of this setting, hold the patient in an area separate from health-care workers (HCWs) and other persons.	• Settings in which patients with suspected or confirmed TB disease are rarely seen and not treated do not need an airborne infection isolation (AII) room. • Place any patient with suspected or confirmed TB disease in an AII room if available or in a separate room with the door closed, away from others and not in a waiting area. • Air-cleaning technologies (e.g., high efficiency particulate air [HEPA] filtration and ultraviolet germicidal irradiation [UVGI] can be used to increase the number of equivalent air changes per hour [ACH]) (see Supplement, Environmental Controls).	• Settings in which patients with suspected or confirmed TB disease are rarely seen and not treated do not need a respiratory-protection program. • If the patient has signs or symptoms of infectious TB disease (positive acid-fast bacilli [AFB] sputum smear result), consider having the patient wear a surgical or procedure mask (if possible) during transport, in waiting areas, or when others are present.
Inpatient Settings in Which Patients with Suspected or Confirmed Infectious TB Disease are Expected to be Encountered			
	• Perform an annual risk assessment for the setting. • Implement a written infection-control plan for the setting and evaluate and update annually. • Provide TB training, education, and screening for HCWs as part of the infection-control plan. • Establish protocols for problem evaluation. • When possible, postpone nonurgent procedures that might put HCWs at risk for possible exposure to *M. tuberculosis* until patients are determined to not have TB disease or are noninfectious. • Collaborate with state or local health departments when appropriate.	• In settings with a high volume of patients with suspected or confirmed TB disease, at least one room should meet requirements for an AII room (see Supplement, Environmental Controls). • Air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (see Supplement, Environmental Controls).	• For HCWs, visitors,¶ and others entering the AII room of a patient with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn. • If the patient has signs or symptoms of infectious TB disease consider having the patient wear a surgical or procedure mask, if possible, (e.g., if patient is not using a breathing circuit) during transport, in waiting areas, or when others are present.
Patient rooms	• Place patients with suspected or confirmed TB disease in an AII room. • Persons infected with human immunodeficiency virus (HIV) or who have other immunocompromising conditions should especially avoid exposure to persons with TB disease.	• At least one inpatient room should meet requirements for an AII room to be used for patients with suspected or confirmed infectious TB disease (see Supplement, Environmental Controls). • Air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (Table 2).	• For HCWs, visitors,¶ and others entering the AII room of a patient with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, (e.g., if patient is not using a breathing circuit) during transport, in waiting areas, or when others are present.

Appendix A. (*Continued*) Administrative, environmental, and respiratory-protection controls for selected health-care settings

Setting	Administrative controls*	Environmental controls†	Respiratory-protection controls§
Inpatient Settings in Which Patients with Suspected or Confirmed Infectious TB Disease are Expected to be Encountered			
Emergency departments (EDs)	• Implement a written infection-control plan for triage of patients with suspected or confirmed TB disease. Update annually. • Patients with signs or symptoms of infectious TB disease should be moved to an AII room as soon as possible.	• In settings classified as medium risk or potential ongoing transmission, at least one room should meet requirements for an AII room to be used for patients with suspected or confirmed infectious TB disease (see Supplement, Environmental Controls; Table 2). • Air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (see Supplement, Environmental Controls).	• For HCWs, visitors,¶ and others entering the AII room of a patient with suspected or confirmed TB disease, at least N95 disposable respirators should be worn. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, (e.g., if patient is not using a breathing circuit) during transport, in waiting areas, or when others are present.
Intensive care units (ICUs)	• Place patients with suspected or confirmed infectious TB disease in an AII room, separate from HCWs and other patients, if possible.	• In settings with a high volume of patients with suspected or confirmed TB disease, at least one room should meet requirements for an AII room to be used for such patients (see Supplement, Environmental Controls; Table 2). • Bacterial filters should be used routinely in breathing circuits of patients with suspected or confirmed TB disease and should filter particles 0.3 µm in size in unloaded and loaded situations with a filter efficiency of ≥95%.	• For HCWs, visitors,¶ and others entering the AII room of a patient with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn. • If the patient has signs or symptoms of infectious TB disease and is suspected of being contagious (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible (e.g., if patient is not using a breathing circuit) during transport, in waiting areas, or when others are present.
Surgical suites	• Schedule a patient with suspected or confirmed TB disease for surgery when a minimum number of HCWs and other patients are present, and as the last surgical case of the day to maximize the time available for removal of airborne contamination (see Supplement, Environmental Controls; Table 1). For postoperative recovery, place patients in a room that meets requirements for an AII room.	• If a surgical suite has an operating room (OR) with an anteroom, that room should be used for TB cases. • If surgery is needed, use a room or suite of rooms that meet requirements for AII rooms (see Supplement, Environmental Controls). • If an AII or comparable room is not available for surgery or postoperative recovery, air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (see Supplement, Environmental Controls). • If the health-care setting has an anteroom, reversible flow rooms (OR or isolation) are not recommended by the American Institute of Architects or American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc. • Bacterial filters should be used routinely in breathing circuits of patients with suspected or confirmed TB disease and should filter particles 0.3 µm in size in an unloaded and loaded situation with a filter efficiency of ≥95%.	• For HCWs present during surgery of a patient with suspected or confirmed infectious TB disease, at least N95 disposable respirators, unvalved, should be worn. • Standard surgical or procedure masks for HCWs might not have fitting or filtering capacity for adequate protection. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, before and after the procedure. • Valved or positive-pressure respirators should not be used because they do not protect the sterile surgical field.

Appendix A. (*Continued*) Administrative, environmental, and respiratory-protection controls for selected health-care settings

Setting	Administrative controls*	Environmental controls†	Respiratory-protection controls§
Inpatient Settings in Which Patients with Suspected or Confirmed Infectious TB Disease are Expected to be Encountered			
Laboratories**	• Conduct a laboratory-specific risk assessment. • In general, biosafety level (BSL)-2 practices, procedures, containment equipment, and facilities are required for nonaerosol-producing manipulations of clinical specimens. BSL-3 practices, procedures, and containment equipment might be necessary for certain aerosol-generating or aerosol-producing manipulations.	• Environmental controls should meet requirements for clinical microbiology laboratories in accordance with guidelines by Biosafety in Microbiological and Biomedical Laboratories (BMBL) and the AIA. • Perform all manipulation of clinical specimens that could result in aerosolization in a certified class I or II biosafety cabinet (BSC).	• For laboratory workers who manipulate clinical specimens (from patients with suspected or confirmed infectious TB disease) outside of a BSC, at least N95 disposable respirators should be worn.
Bronchoscopy suites††	• Use a dedicated room to perform bronchoscopy procedures. • If a patient with suspected or confirmed infectious TB disease must undergo bronchoscopy, schedule the procedure when a minimum number of HCWs and other patients are present, and schedule the patient at the end of the day. • Do not allow another procedure to be performed in the bronchoscopy suite until sufficient time has elapsed for adequate removal of *M. tuberculosis*–contaminated air (Table 1).	• Bronchoscopy suites should meet requirements for an AII room to be used for patients with suspected or confirmed infectious TB disease (Table 2). • Air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (see Supplement, Environmental Controls). • Closing ventilatory circuitry and minimizing opening of such circuitry of intubated and mechanically ventilated patients might minimize exposure. • Keep patients with suspected or confirmed infectious TB disease in the bronchoscopy suite until coughing subsides.	• For HCWs present during bronchoscopic procedures of a patient with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn. Protection greater than an N95 (e.g., a full-facepiece elastomeric respirator or powered air-purifying respirator [PAPR]) should be considered. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, before and after the procedure.
Sputum induction and inhalation therapy rooms	• Implement a written infection-control plan in the setting. Update annually. • Use a dedicated room to perform sputum induction and inhalation therapy. • Schedule sputum induction and inhalation therapy when a minimum number of HCWs and other patients are present, and schedule the patient at the end of the day. • Do not perform another procedure in a booth or room where sputum induction or inhalation therapy on a patient with suspected or confirmed infectious TB disease was performed until sufficient time has elapsed for adequate removal of *M. tuberculosis*-contaminated air (Table 1).	• Perform sputum induction and inhalation therapy in booths with special ventilation, if possible. If booths are not available, sputum induction or inhalation therapy rooms should meet requirements for an AII room to be used for patients with suspected or confirmed infectious TB disease (Table 2). • Air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (see Supplement, Environmental Controls). • Keep patients with suspected or confirmed infectious TB disease in the sputum induction or inhalation therapy room after sputum collection or inhalation therapy until coughing subsides.	• For HCWs present during sputum induction and inhalation therapy of a patient with suspected or confirmed infectious TB disease, a respirator with a level of protection of at least N95 disposable respirators should be worn. Respiratory protection greater than an N95 (e.g., a full-facepiece elastomeric respirator or PAPR) should be considered (see Supplement, Respiratory Protection). • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, before and after the procedure.

Appendix A. (*Continued*) Administrative, environmental, and respiratory-protection controls for selected health-care settings

Setting	Administrative controls*	Environmental controls†	Respiratory-protection controls§
Inpatient Settings in Which Patients with Suspected or Confirmed Infectious TB Disease are Expected to be Encountered			
Autopsy suites	• Ensure proper coordination between attending physician(s) and pathologist(s) for proper infection control and specimen collection during autopsies performed on bodies with suspected or confirmed infectious TB disease. • Allow sufficient time to elapse for adequate removal of *M. tuberculosis*-contaminated air (Table 1) before performing another procedure.	• Autopsy suites should meet ACH requirements for an AII room to be used for bodies with suspected or confirmed TB disease (Table 2). • Air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (see Supplement, Environmental Controls). • Consider using local exhaust ventilation to reduce exposures to infectious aerosols and vapors from embalming fluids.	• For those present during autopsy on bodies with suspected or confirmed infectious TB disease, a respirator with a level of protection of at least an N95 should be worn. Protection greater than an N95 (e.g., a full-facepiece elastomeric respirator or PAPR) should be considered (see Supplement, Respiratory Protection), especially if aerosol generation is likely. • If another procedure cannot be delayed until sufficient time has elapsed for adequate removal of *M. tuberculosis*-contaminated air, staff should continue wearing respiratory protection while in the room (Table 1).
Embalming rooms	• Implement a written infection-control plan in the setting. Update annually.	• Embalming rooms should meet ACH requirements for an AII room to be used for bodies with suspected or confirmed TB disease (Table 2). • Air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (see Supplement, Environmental Controls).	• For staff present during embalming procedures on bodies with suspected or confirmed infectious TB disease, a respirator with a level of protection of at least N95 should be worn. Protection greater than an N95 (e.g., a full-facepiece elastomeric respirator or PAPR) should be considered (see Supplement, Respiratory Protection), especially if aerosol generation is likely. • If another procedure cannot be delayed until sufficient time has elapsed for adequate removal of *M. tuberculosis*-contaminated air, staff should continue wearing respiratory protection while in the room.
Outpatient Settings§§ in Which Patients with Suspected or Confirmed Infectious TB Disease are Expected to be Encountered			
	• Perform an annual risk assessment for the setting. • Develop and implement a written infection-control plan for the setting and evaluate and update annually. • Provide TB training, education, and screening for HCWs as part of the infection-control plan. • Establish protocols for problem evaluation. • Collaborate with state or local health departments when appropriate.	• Environmental controls should be implemented based on the types of activities that are performed. • Patients with suspected or confirmed infectious TB disease requiring transport should be transported as discussed below under Emergency Medical Services (EMS).	• For HCWs, visitors,¶ and others entering an AII room of a patient with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible (e.g., if patient is not using a breathing circuit), during transport, in waiting areas, or when others are present. • If risk assessment indicates that respiratory protection is needed, drivers or HCWs who are transporting patients with suspected or confirmed infectious TB disease in an enclosed vehicle should wear at least an N95 disposable respirator. The risk assessment should consider the potential for shared air.

Appendix A. (*Continued*) Administrative, environmental, and respiratory-protection controls for selected health-care settings

Setting	Administrative controls*	Environmental controls†	Respiratory-protection controls§
Outpatient Settings in Which Patients with Suspected or Confirmed Infectious TB Disease are Expected to be Encountered			
TB treatment facilities¶¶	• Physically separate immunosuppressed patients from those with suspected or confirmed infectious TB. • Schedule appointments to avoid exposing HIV-infected or other severely immunocompromised persons to *M. tuberculosis*.	• If patients with TB disease are treated in the clinic, at least one room should meet requirements for an AII room (Table 2). • Air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (see Supplement, Environmental Controls). • Perform all cough-inducing or aerosol-generating procedures by using environmental controls (e.g., booth) or in an AII room. • Keep patients in the booth or AII room until coughing subsides. • Do not allow another patient to enter the booth or AII room until sufficient time has elapsed for adequate removal of *M. tuberculosis*-contaminated air (see Supplement, Environmental Controls; Table 1).	• For HCWs, visitors,¶ and others entering the AII room of a patient with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, during transport, in waiting areas, or when others are present.
Medical offices and ambulatory-care settings	• Implement a written infection-control plan in the setting. Update annually.	• In medical offices or ambulatory-care settings where patients with TB disease are treated, at least one room should meet requirements for an AII room to be used for patients with suspected or confirmed infectious TB disease (Table 2).	• For HCWs in medical offices or ambulatory care settings with patients with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, during transport, in waiting areas, or when others are present.
Dialysis units	• Schedule dialysis for patients with TB disease when a minimum number of HCWs and other patients are present and at the end of the day to maximize the time available for removal of airborne contamination (Table 1).	• Perform dialysis for patients with suspected or confirmed infectious TB disease in a room that meets requirements for an AII room (Table 2). • Air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (see Supplement, Environmental Controls).	• For HCWs, visitors,¶ and others entering the AII room of a patient with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, during transport, in waiting areas, or when others are present. • If risk assessment indicates the need for respiratory protection, drivers or HCWs who are transporting patients with suspected or confirmed infectious TB disease in an enclosed vehicle should wear at least an N95 disposable respirator. The risk assessment should consider the potential for shared air.

Appendix A. (*Continued*) Administrative, environmental, and respiratory-protection controls for selected health-care settings

Setting	Administrative controls*	Environmental controls†	Respiratory-protection controls§
Outpatient Settings in Which Patients with Suspected or Confirmed Infectious TB Disease are Expected to be Encountered			
Dental-care settings	• If possible, postpone dental procedures of patients with suspected or confirmed infectious TB disease until the patient is determined not to have TB disease or to be noninfectious.	• Treat patients with suspected or confirmed infectious TB disease in a room that meets requirements for an AII room (Table 2). • Air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (see Supplement, Environmental Controls).	• For dental staff performing procedures on a patient with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn.
Nontraditional Facility-Based Settings			
	• Perform an annual risk assessment for the setting. • Develop and implement a written infection-control plan for the setting and evaluate and update annually. • Provide TB training, education, and screening for HCWs as part of the infection-control plan. • Establish protocols for problem evaluation. • Collaborate with state or local health departments when appropriate.	• Environmental controls should be implemented based on the types of activities that are performed (see Supplement, Environmental Controls). • Patients with suspected or confirmed infectious TB disease requiring transport should be transported as discussed in the EMS section.	• For HCWs, visitors,¶ and others entering the AII room of a patient with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible (e.g., if patient is not using a breathing circuit), during transport, in waiting areas, or when others are present.
EMS	• Include exposed emergency medical HCWs in the contact investigation of patients with TB disease if administrative, environmental, and respiratory-protection controls for TB infection control were not followed.	• Patients with suspected or confirmed infectious TB disease requiring transport should be transported in an ambulance whenever possible. The ambulance ventilation system should be operated in the non-recirculating mode, and the maximum amount of outdoor air should be provided to facilitate dilution. If the vehicle has a rear exhaust fan, use this fan during transport. Airflow should be from the cab (front of vehicle), over the patient, and out the rear exhaust fan. • If an ambulance is not used, the ventilation system for the vehicle should bring in as much outdoor air as possible, and the system should be set to non-recirculating. If possible, physically isolate the cab from the rest of the vehicle and have the patient sit in the back.	• If risk assessment indicates the need for respiratory protection, drivers or HCWs who are transporting patients with suspected or confirmed infectious TB disease in an enclosed vehicle should wear at least an N95 disposable respirator. The risk assessment should consider the potential for shared air. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, during transport, in waiting areas, or when others are present.

Appendix A. (*Continued*) Administrative, environmental, and respiratory-protection controls for selected health-care settings

Setting	Administrative controls*	Environmental controls†	Respiratory-protection controls§
Nontraditional Facility-Based Settings			
Medical settings in correctional facilities	• Follow recommendations for inpatient and outpatient settings as appropriate. In waiting rooms or areas, follow recommendations for TB treatment facilities. • If possible, postpone transporting patients with suspected or confirmed infectious TB disease until they are determined not to have TB disease or to be noninfectious.	• At least one room should meet requirements for an AII room (Table 2). • Air-cleaning technologies (e.g., HEPA filtration and UVGI) can be used to increase the number of equivalent ACH (see Supplement, Environmental Controls). • When transporting patients with suspected or confirmed infectious TB disease in a vehicle (ideally an ambulance), if possible, physically isolate the cab (the front seat) from rest of the vehicle, have the patient sit in the back seat, and open the windows.	• For HCWs or others entering the AII room of a patient with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, during transport, in waiting areas, or when others are present.
Home-based health-care and outreach settings	• Patients and household members should be educated regarding the importance of taking medications, respiratory hygiene and cough etiquette procedures, and proper medical evaluation. • If possible, postpone transporting patients with suspected or confirmed infectious TB disease until they are determined not to have TB disease or to be noninfectious. • Certain patients can be instructed to remain at home until they are determined not to have TB disease or to be noninfectious.	• Do not perform cough-inducing or aerosol-generating procedures unless appropriate environmental controls are in place (see Supplement, Environmental Controls), or perform those procedures outside, if possible.	• For HCWs entering the homes of patients with suspected or confirmed infectious TB disease, at least N95 disposable respirators should be worn. • For HCWs transporting patients with suspected or confirmed infectious TB disease in a vehicle, consider at least an N95 disposable respirator. • If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, during transport, in waiting areas, or when others are present.
Long-term–care settings (e.g., hospices and skilled nursing facilities)	• Patients with suspected or confirmed infectious TB disease should not be treated in a long-term–care setting, unless proper administrative and environmental controls and a respiratory-protection program are in place.	• Do not perform cough-inducing or aerosol-generating procedures unless appropriate infection controls are in place (see Supplement, Environmental Controls), or perform those procedures outside, if possible.	• If the patient has signs or symptoms of infectious TB disease (positive AFB sputum smear result), consider having the patient wear a surgical or procedure mask, if possible, during transport, in waiting areas, or when others are present.

* Administrative controls must be implemented to ensure the effectiveness of environmental controls and respiratory-protection programs, and should be in place for all settings where patients with suspected or confirmed TB disease are expected to be encountered. Administrative controls include a written TB infection-control plan (which should be reassessed at least annually), assignment of responsibility for the plan, setting risk assessment, HCW risk classification, HCW training and education, and a TB screening program to test HCWs for infection with *M. tuberculosis*.

† Environmental controls include local exhaust and general ventilation (i.e., achieving negative pressure), using AII rooms, and air-cleaning methods (i.e., HEPA filtration and UVGI).

§ All settings where patients with suspected or confirmed TB disease will be encountered need to have a respiratory-protection program. A respiratory-protection program might not be necessary for settings where patients with TB disease are not encountered or where a procedure exists for the prompt transfer of patients with suspected or confirmed TB disease to a setting where they can be evaluated.

¶ Visitors with suspected or confirmed TB disease should not have contact with patients, including contact with those who have suspected or confirmed TB disease.

** Laboratories that are not based in inpatient settings should observe the same TB infection-control measures as laboratories in inpatient settings.

†† Certain bronchoscopy suites are built to have positive pressure.

§§ Although the majority of these settings are routinely considered "outpatient," they might be part of inpatient services in certain settings. If so, follow the recommendations for inpatient settings for patient rooms.

¶¶ TB treatment facilities can include TB clinics, infectious disease clinics, or pulmonary clinics.

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.)

Year	No. patients 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 classification?

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

_____ 10) Depending on the number of TB patients evaluated in 1 year, what is the risk classification 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., high efficiency particulate air [HEPA] filtration and ultraviolet 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

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

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 _____

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

_____ h. Is qualitative fit testing used? Method _____

_____ i. Is quantitative fit testing used?

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

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)*

Setting	Risk classification†		
	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

Appendix E. (*Continued*) Tuberculosis (TB) Internet addresses

State/Area TB and HIV Websites

Alabama ..... http://www.adph.org
Arizona ..... http://www.hs.state.az.us/phs/oids/tuberculosis/index.htm
Arkansas..... http://www.epi.alaska.gov
California ..... http://www.dhs.ca.gov/ps/dcdc/TBCB/tubindex.htm
Colorado ..... http://www.cdphe.state.co.us/dc/tb/tbhome.asp
Connecticut..... http://www.dph.state.ct.us
Delaware..... http://www.state.de.us/dhss/dph/dpc/tuberculosis.html
Florida ..... http://www.doh.state.fl.us/disease_ctrl/tb/WorldTBDay/2004/WTD2004main.html
Georgia..... http://www.health.state.ga.us/epi
Hawaii..... http://www.hawaii.gov/doh/resource/comm_dis/tb/index.htm
Indiana..... http://www.in.gov/isdh/programs/tb
Iowa..... http://www.idph.state.ia.us/ch/tb_control.asp
Kansas..... http://www.kdhe.state.ks.us/tb/index.html
Kentucky..... http://www.chs.state.ky.us/publichealth/TB.htm
Louisiana ..... http://www.oph.dhh.state.la.us/tuberculosis/index.html
Maine..... http://www.maine.gov/dhs/boh/ddc/tuberculosis.htm
Maryland..... http://www.edcp.org/tb/index.html
Massachusetts..... http://www.state.ma.us/dph/cdc/tb
Michigan ..... http://www.michigantb.org
Minnesota ..... http://www.health.state.mn.us/tb
Montana..... http://www.dphhs.state.mt.us
Nebraska ..... http://www.hhs.state.ne.us/cod/Tuberculosis/tbindex.htm
Nevada http://www.health2k.state.nv.us
New Hampshire..... http://www.dhhs.state.nh.us/DHHS/DHHS_SITE/default.htm
New York City..... http://www.nyc.gov/html/doh/html/tb/tb.html
North Carolina ..... http://www.schs.state.nc.us/epi/tb
North Dakota ..... http://www.ndmtb.com
Ohio..... http://www.odh.state.oh.us
Oklahoma ..... http://www.health.state.ok.us
Oregon..... http://www.dhs.state.or.us/publichealth/tb
Pennsylvania..... http://www.dsf.health.state.pa.us
Puerto Rico..... http://www.salud.gov.pr
Rhode Island ..... http://www.health.ri.gov/disease/communicable/tb_data.htm
South Carolina..... http://www.scdhec.net/hs/diseasecont/tb/html
South Dakota..... http://www.state.sd.us/doh/tb
Tennessee http://www2.state.tn.us/health/CEDS/index.htm
Texas ..... http://www.dshs.state.tx.us/idcu/disease/tb
Utah..... http://health.utah.gov/els/hivaids/tb/tbrefugee.html
Virginia..... http://www.vdh.virginia.gov/epi/tb
Washington..... http://www.doh.wa.gov/cfh/tb
Wisconsin ..... http://dhfs.wisconsin.gov/tb
Wyoming..... http://www.wdh.state.wy.us/tb

Appendix F. Quality control (QC) procedural observation checklists

Quality Control (QC) Procedural Observation Checklist for Placing Tuberculin Skin Tests (TSTs) — Mantoux Method

Date _____ *Trainer (QC by)* _____ *Trainee (TST placed by)* _____

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

1. Preliminary

_____ Uses appropriate hand hygiene methods before starting.
_____ Screens patient for contraindications (severe adverse reactions to previous TST).*
_____ Uses well-lit area.

2. Syringe† filled with exactly 0.1 mL of 5 tuberculin units (TU) purified protein derivative (PPD) antigen§

_____ Removes antigen vial from refrigeration and confirms that it is 5 TU PPD antigen.¶
_____ Checks label and expiration date on vial.
_____ Marks opening date on multidose vial.
_____ Fills immediately after vial removed from refrigeration.
_____ Cleans vial stopper with antiseptic swab.
_____ Twists needle onto syringe to ensure tight fit.
_____ Removes needle guard.
_____ Inserts needle into the vial.
_____ Draws slightly over 0.1 mL of 5 TU PPD into syringe.
_____ Removes excess volume or air bubbles to exactly 0.1 mL of 5 TU PPD while needle remains in vial to avoid wasting of antigen.
_____ Removes needle from vial.
_____ Returns antigen vial to the refrigerator immediately after filling.

3. TST administration site selected and cleaned

_____ Selects upper third of forearm with palm up ≥2 inches from elbow, wrist, or other injection site.**
_____ Selects site free from veins, lesions, heavy hair, bruises, scars, and muscle ridge.
_____ Cleans the site with antiseptic swab using circular motion from center to outside.
_____ Allows site to dry thoroughly before administering antigen.

4. Needle inserted properly to administer antigen

_____ Rests arm on firm, well-lit surface.
_____ Stretches skin slightly.††
_____ Holds needle bevel-up and tip at 5°–15° angle to skin.
_____ Inserts needle in first layer of skin with tip visible beneath skin.
_____ Advances needle until entire bevel is under the first layer of skin.
_____ Releases stretched skin.
_____ Injects entire dose slowly.
_____ Forms wheal, as liquid is injected.
_____ Removes needle without pressing area.
_____ Activates safety feature of device per manufacturer's recommendations, if applicable.
_____ Places used needle and syringe immediately in puncture-resistant container without recapping needle.
_____ Immediately measures wheal to ensure 6–10 mm in diameter (Actual wheal measurement _____mm).
_____ If blood or fluid is present, blots site lightly with gauze or cotton ball.
_____ Discards used gauze or cotton ball according to local standard precautions.
_____ If the TST is administered incorrectly (too deeply or too shallow) and the wheal is inadequate (<6 mm), a new TST should be placed immediately. Applying the second TST on the other arm or in a different area of the same arm (at least 2 inches from the first site) is preferable so that the TST result will be easier to read.
_____ Documents all information required by the setting (e.g., date and time of TST placement, person who placed TST, location of injection site and lot number of tuberculin).
_____ Uses appropriate hand hygiene methods after placing TST.

5. Explanation to the client regarding care instructions for the injection site

_____ The wheal (bump) is normal and will remain about 10 minutes.
_____ Do not touch wheal; avoid scratching.
_____ Avoid pressure or bandage on injection site.
_____ Rare local discomfort and irritation does not require treatment.
_____ May wash with soap and water (without pressure) after 1 hour.
_____ No lotions or liquids on site, except for light washing, as above.
_____ Keep appointment for reading.

* Severe adverse reactions to the TST are rare but include ulceration, necrosis, vesiculation, or bullae at the test site, or anaphylactic shock, which is substantially rare. These reactions are the only contraindications to having a TST administered.

† Use a ¼–½-inch 27-gauge needle or finer, disposable tuberculin (preferably a safety-type) syringe.

§ Prefilling syringes is not recommended. Tuberculin is absorbed in varying amounts by glass and plastics. To minimize reduction in potency, tuberculin should be administered as soon after the syringe has been filled as possible. Following these procedures will also help avoid contamination. Test doses should always be removed from the vial under strictly aseptic conditions, and the remaining solution should remain refrigerated (not frozen). Tuberculin should be stored in the dark as much as possible and exposure to strong light should be avoided. **SOURCE:** American Thoracic Society, CDC, Infectious Disease Society of America. Diagnostic standards and classification of tuberculosis in adults and children. Am J Respir Crit Care Med 2000;161:1376–95.

¶ Preventing tuberculin antigen and vaccine (e.g., Td toxoid) misadministration is important. Measures should include physical separation of refrigerated products, careful visual inspection and reading of labels, preparation of PPD for patient use only at time of testing, and improved record keeping of lot numbers of antigens, vaccines, and other injectable products. **SOURCE:** CDC. Inadvertent intradermal administration of tetanus toxoid–containing vaccines instead of tuberculosis skin tests. MMWR 2004;53:662–4.

** If neither arm is available or acceptable for testing, the back of the shoulder is a good alternate TST administration site. **SOURCE:** National Tuberculosis Controllers Association, National Tuberculosis Nurse Consultant Coalition. Tuberculosis nursing: a comprehensive guide to patient care. Smyrna, GA: National Tuberculosis Controllers Association; 1997.

†† Stretch skin by placing nondominant hand of health-care worker (HCW) on patient's forearm below the needle insertion point and then applying traction in the opposite direction of the needle insertion. Be careful not to place the nondominant hand of the HCW opposite the administration needle if the patient is likely to move during the procedure, which might cause an accidental needle-stick injury to the HCWs. In children and others who are likely to move during the procedure, certain trainers prefer stretching the skin in the opposite direction of the needle insertion by placing the nondominant hand of the HCW under the patient's forearm. This method should not be used for persons with poor skin turgor.

Appendix F. (*Continued*) Quality control (QC) procedural observation checklists

Quality Control (QC) Procedural Observation Checklist for Reading Tuberculin Skin Test (TST) Results — Palpation Method

Date _____ Trainer (QC by) _____ Trainee (TST placed by) _____

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

1. Preliminary

_____ Uses appropriate hand hygiene methods before starting.
_____ Keeps fingernails shorter than fingertips to avoid misreading TST result.
_____ Keeps TST reading materials at hand (eyeliner pencil or ballpoint pen,* and ruler).
_____ Uses well-lit area.
_____ Inspects for the site of the injection.

2. Palpate — finding margin ridges (if any)

_____ Palpates with arm bent at elbow at a 90° angle.
_____ Lightly sweeps 2-inch diameter from injection site in four directions.
_____ Uses zigzag featherlike touch.
_____ Repeats palpation with arm bent at elbow at a 45° angle to determine presence or absence of induration.

If induration is present, continue with these steps†:

3. Placing marks

_____ Holds palm over injection site.
_____ Cleanse site with antiseptic swab using circular motion from center to outside.
_____ Uses fingertips to find margins of the induration.
_____ Marks the induration by placing small dots on both sides of the induration.
_____ Inspects dots, repeats finger movements toward indurated margin, and adjusts dots if needed.
_____ Marks dots transverse (perpendicular) to long axis of forearm.

4. Placing and reading ruler

_____ Places the "0" ruler line inside the edge of the left dot. Reads the ruler line inside right dot edge (uses lower measurement if between two gradations on millimeter scale) (Figure 1).
_____ Uses appropriate hand hygiene methods after reading TST result.

5. Documenting results

_____ Records all TST results in millimeters, even those classified as negative. Does not record only as "positive" or "negative." Records the absence of induration as "0 mm."
_____ Correctly records results in mm; only a single measured induration in mm should be recorded.
Trainee's measurement _____ mm.
Trainer's (gold standard) measurement _____ mm.
Trainee's result within 2 mm of gold standard reading?§
Yes _____ No _____

NOTE: In rare instances, the reaction might be severe (vesiculation, ulceration, or necrosis of the skin). Report severe adverse events to the FDA MedWatch Adverse Events Reporting System (AERS), telephone: 800-FDA-1088; fax: 800-FDA-0178; http://www.fda.gov/medwatch report form 3500, Physicians' Desk Reference.

* A fine-tipped eyeliner pencil or ballpoint pen can be used as a marker. An eyeliner pencil is useful for TST training and for blinded independent duplicate readings (BIDRs) because the dots are easy to remove with a dot of lubricant (e.g., baby oil). Alternative TST result reading methods have been described, including the pen method.
† If induration is not present, record the TST result as 0 mm and go to the end of this form (Documenting results).
§ For example, if the TST trainer reads the TST result (the gold standard reading) as 11 mm, the trainee's TST reading should be between 9–13 mm to be considered correct.

Appendix G. Model framework for medical evaluation request and questionnaire for users of N95 disposable respirators

Medical Evaluation Request

1. Today's date _____
2. Your name _____
3. Your age (to nearest year) _____
4. Sex _____ Male _____ Female
5. Your height _____ feet _____ inches
6. Your weight _____ pounds
7. Your job title _____

8. A phone number where you can be reached by the health-care professional who reviews this questionnaire (include area code)
_____
9. The best time to phone you at this number _____
10. Has your employer told you how to contact the health-care professional who will review this questionnaire? ___ Yes ___ No
11. Check the type of respirator you will use (check all that apply)
    - _____ N-, R-, or P-disposable respirator (filter-mask, noncartridge type only)
    - _____ Half-facepiece type
    - _____ Full-facepiece type
    - _____ Powered air-purifying respirator (PAPR) – tight-fitting
    - _____ PAPR – loose-fitting
    - _____ Other type (supplied-air or self-contained breathing apparatus)
12. Have you worn a respirator? _____ Yes _____ No
    If "yes," what types? _____

Questionnaire for Users of N95 Respirators

Yes	No	
___	___	1. Do you currently or have you smoked tobacco during the previous month? If "yes"
		a. At what age did you start smoking? _____
		b. How long ago did you quit smoking? _____
		c. How many packs per day did or do you smoke? _____
		2. Have you ever had any of the following conditions?
___	___	a. Seizures (fits)
___	___	b. Diabetes (sugar disease)
___	___	c. Allergic reactions that interfere with your breathing
___	___	d. Claustrophobia (fear of closed-in places)
___	___	e. Trouble smelling odors
		3. Have you ever had any of the following pulmonary or lung problems?
___	___	a. Asbestosis
___	___	b. Asthma
___	___	c. Chronic bronchitis
___	___	d. Emphysema
___	___	e. Pneumonia
___	___	f. Tuberculosis
___	___	g. Silicosis
___	___	h. Pneumothorax (collapsed lung)
___	___	i. Lung cancer
___	___	j. Broken ribs
___	___	k. Any chest injuries or surgeries
___	___	l. Any other lung problem that you have been told about
		4. Do you currently have any of the following symptoms of pulmonary or lung illness?
___	___	a. Shortness of breath
___	___	b. Shortness of breath when walking quickly on level ground or walking up a slight hill or incline
___	___	c. Shortness of breath when walking with other people at an ordinary pace on level ground
___	___	d. Have to stop for breath when walking at your own pace on level ground
___	___	e. Shortness of breath when washing or dressing yourself

Yes	No	
		4. (*Continued*)
___	___	f. Shortness of breath that interferes with your job
___	___	g. Coughing that produces phlegm (thick sputum)
___	___	h. Coughing that wakes you early in the morning
___	___	i. Coughing that occurs primarily when you are lying down
___	___	j. Coughing up blood in the last month
___	___	k. Wheezing
___	___	l. Wheezing that interferes with your job
___	___	m. Chest pain when you breathe deeply
___	___	n. Any other symptoms that you think might be related to lung problems
		5. Have you ever had any of the following cardiovascular or heart problems?
___	___	a. Heart attack
___	___	b. Stroke
___	___	c. Angina
___	___	d. Heart failure
___	___	e. Swelling in your legs or feet (not caused by walking)
___	___	f. Heart arrhythmia (heart beating irregularly)
___	___	g. High blood pressure
___	___	h. Any other heart problem that you have been told about
		6. Have you ever had any of the following cardiovascular or heart symptoms?
___	___	a. Frequent pain or tightness in your chest
___	___	b. Pain or tightness in your chest during physical activity
___	___	c. Pain or tightness in your chest that interferes with your job
___	___	d. In the previous 2 years, have you noticed your heart skipping or missing a beat?
___	___	e. Heartburn or indigestion that is not related to eating
___	___	f. Any other symptoms that you think might be related to heart or circulation problems
		7. Do you currently take medication for any of the following problems?
___	___	a. Breathing or lung problems
___	___	b. Heart trouble
___	___	c. Blood pressure
___	___	d. Seizures (fits)
		8. If you have used a respirator, have you ever had any of the following problems? (If you have never used a respirator, check here ___ and go to question 9.)
___	___	a. Eye irritation
___	___	b. Skin allergies or rashes
___	___	c. Anxiety
___	___	d. General weakness or fatigue
___	___	e. Any other problem that interferes with your use of a respirator
___	___	9. Are you currently taking any medications? If yes, list here _____ _____ _____ _____
___	___	10. Would you like to talk with the health-care professional who will review this questionnaire about your answers to this questionnaire?

Please explain "yes" answers (use back of form if necessary)

_____
_____
_____
_____
_____

Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-Care Settings, 2005

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TB Elimination
Diagnosis of Tuberculosis Disease

When Should You Suspect Tuberculosis (TB)?

TB is a disease caused by *Mycobacterium tuberculosis*. TB disease should be suspected in persons who have the following symptoms:

- Unexplained weight loss
- Loss of appetite
- Night sweats
- Fever
- Fatigue

If TB disease is in the lungs (pulmonary), symptoms may include:

- Coughing for ≥3 weeks
- Hemoptysis (coughing up blood)
- Chest pain

If TB disease is in other parts of the body (extrapulmonary), symptoms will depend on the area affected.

How Do You Evaluate Persons Suspected of Having TB Disease?

A complete medical evaluation for TB includes the following:

1. Medical History

Clinicians should ask about the patient's history of TB exposure, infection, or disease. It is also important to consider demographic factors (e.g., country of origin, age, ethnic or racial group, occupation) that may increase the patient's risk for exposure to TB or to drug-resistant TB. Also, clinicians should determine whether the patient has medical conditions, especially HIV infection, that increase the risk of latent TB infection progressing to TB disease.

2. Physical Examination

A physical exam can provide valuable information about the patient's overall condition and other factors that may affect how TB is treated, such as HIV infection or other illnesses.

3. Test for TB Infection

The Mantoux tuberculin skin test (TST) or the TB blood test can be used to test for *M. tuberculosis* infection. Additional tests are required to confirm TB disease. The Mantoux tuberculin skin test is performed by injecting a small amount of fluid called tuberculin into the skin in the lower part of the arm. The test is read within 48 to 72 hours by a trained health care worker, who looks for a reaction (induration) on the arm.

The TB blood test measures the patient's immune system reaction to *M. tuberculosis*.

4. Chest Radiograph

A posterior-anterior chest radiograph is used to detect chest abnormalities. Lesions may appear anywhere in the lungs and may differ in size, shape, density, and cavitation. These abnormalities may suggest TB, but cannot be used to definitively diagnose TB. However, a chest radiograph may be used to rule out the possibility of pulmonary TB in a person who has had a positive reaction to a TST or TB blood test and no symptoms of disease.

National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
Division of Tuberculosis Elimination
CDC
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5. Diagnostic Microbiology

The presence of acid-fast-bacilli (AFB) on a **sputum smear** or other specimen often indicates TB disease. Acid-fast microscopy is easy and quick, but it does not confirm a diagnosis of TB because some acid-fast-bacilli are not *M. tuberculosis*. Therefore, a **culture** is done on all initial samples to confirm the diagnosis. (However, a positive culture is not always necessary to begin or continue treatment for TB.) A positive culture for *M. tuberculosis* confirms the diagnosis of TB disease. Culture examinations should be completed on all specimens, regardless of AFB smear results. Laboratories should report positive results on smears and cultures within 24 hours by telephone or fax to the primary health care provider and to the state or local TB control program, as required by law.

6. Drug Resistance

For all patients, the initial *M. tuberculosis* isolate should be tested for drug resistance. It is crucial to identify drug resistance as early as possible to ensure effective treatment. Drug susceptibility patterns should be repeated for patients who do not respond adequately to treatment or who have positive culture results despite 3 months of therapy. Susceptibility results from laboratories should be promptly reported to the primary health care provider and the state or local TB control program.

Additional Information

1. American Thoracic Society (ATS) and CDC. Diagnostic standards and classification of tuberculosis in adults and children. (PDF) *Am J Respir Crit Care Med 2000*; 161. http://ajrccm.atsjournals.org/cgi/content/full/161/4/1376

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