# Tuberculosis Exposure Control Plan for Long Term Care Facilities
# For Facility Use

## [1] Policy Introduction

*The aim of this Tuberculosis (TB) Exposure Control Plan is to reduce the risk of transmission of Mycobacterium tuberculosis at **[Facility name]**, in compliance with applicable standards, regulations, recommendations, and guidelines. In the event there is a breach in these measures, post-exposure follow-up and management will be provided as described later in this plan.*

## [2] Negative Pressure Rooms (check the option that applies):

- ☐ [**Facility Name**] has [insert number] airborne isolation/negative pressure rooms. Room numbers: _____

  (Facilities that have airborne isolation/negative pressure rooms must keep records demonstrating manufacturer's recommendations for maintenance and testing are being followed. Healthcare personnel (HCP) must be educated and understand the displays on the wall mounted monitors and know actions to be taken if they are out of range while in use.)

- ☐ [**Facility Name**] does not have airborne infection isolation/negative pressure rooms. Patients or residents requiring negative pressure rooms and airborne infection isolation will be transferred as soon as possible to the nearest facility with proper environmental controls.

## [3] Definitions:

**Acid Fast Bacilli (AFB):** Describes the special staining characteristics of mycobacteria (and some other organisms) in their ability to resist decolorization during staining when washed with an acid-alcohol solution; the terminology is frequently used as synonymous with mycobacteria.

**Airborne Infection Isolation (AII):** Precautions for patients infected with organisms spread through airborne droplet nuclei 1–5 $\mu$m in diameter. This isolation area receives a substantial number of air changes per hour (ACH,>12 for new construction) 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 airborne infection isolation room is preferably exhausted directly to the outside.

**Bacille Calmette-Guérin (BCG):** A live, attenuated strain of *Mycobacterium bovis* that is used in many parts of the world as a TB vaccine, named after the French scientists Calmette and Guérin. BCG has limited efficacy in preventing disease and is rarely used in the United States. The vaccine is effective in preventing disseminated and meningeal TB disease in infants and young children and is appropriately used in many other countries where TBD is endemic.

**Blood Assay for *Mycobacterium tuberculosis* (BAMT):** A general term to refer to recently developed in vitro diagnostic tests that might be used instead of Tuberculin Skin Test (TST) in TB screening programs to recognize latent, present or past, infection with *M. tuberculosis*. This term includes, but is not limited to, IFN-γ release assays (IGRA). In the United States, the currently available tests are QuantiFERON®-TB Gold (QFT-G) test or the T-Spot TB test.

**BAMT Conversion:** A change from a negative to a positive BAMT result.

**Boosting:** A phenomenon in which some persons who receive a TST many years after acquiring infection with *M. tuberculosis*, have a negative result to an initial TST, followed by a positive result to a subsequent TST. The second (i.e., positive) result is caused by a boosted immune response signifying prior sensitivity rather than from a new infection. Two-step testing is used to distinguish new infections from boosted reactions in TB infection-control screening programs that utilize TST for detecting *M. tuberculosis* (see Two-step skin testing).

**Droplet nuclei:** Airborne particles with an estimated size of 1-5 µm that can contain AFB; they are generated when persons who have pulmonary or laryngeal TB disease cough, sneeze, shout, or sing. Normal air currents can keep them airborne for prolonged periods and spread them throughout a room or building unless measures are taken to reduce risk of transmission.

**Fit check:** Procedure to determine if a respirator fits the wearer's face correctly; also known as "user seal-check" it should be performed each time the respirator is put on.

**Fit test:** A fit test is conducted to verify that a respirator is both comfortable and correctly fits the user. Fit test methods are classified as either qualitative or quantitative. A qualitative fit test is a pass/fail test that relies on the individual's sensory detection of a test agent, such as taste, smell, or involuntary cough (a reaction to irritant smoke). A quantitative fit test uses an instrument to numerically measure the effectiveness of the respirator.

**Latent TB infection (LTBI):** See TB Infection (TBI)**.**

**Mantoux method:** Tuberculin skin test performed by injecting 0.1 ml containing 5 tuberculin units purified protein derivative (TU PPD) intradermally into the volar or dorsal surface of the forearm to produce a wheal. The injection is made using a one-quarter to one-half-inch, 27-gauge needle and a tuberculin (preferable a safety-type) syringe. It is the recommended method for TST.

**Multidrug-resistant tuberculosis (MDR TB):** TB disease caused by *M. tuberculosis* bacteria that are resistant to isoniazid and rifampin.

***Mycobacterium tuberculosis (MTB):*** The bacterium that causes TBI and TB disease.

**N-95 respirator:** An air-purifying, filtering face piece respirator that is at least 95% efficient at removing 0.3 micron particles as designated by National Institute for Occupational Health and Safety (NIOSH); the "N" indicates it is not effective where oil may be present in the airborne environment. This respirator must be fit tested to the wearer's face.

**Negative pressure:** A room that is under negative pressure has a lower air pressure than adjacent areas, which keeps air from flowing out of the room and into adjacent rooms or areas.

**Nontuberculous mycobacteria (NTM):** Refers to mycobacterium species other than those included as part of *Mycobacterium tuberculosis* complex. Although valid from a laboratory perspective, the term can be misleading because certain types of NTM cause disease with pathological and clinical manifestations similar to TB disease.

**Powered Air-Purifying respirator (PAPR):** A respirator equipped with a facepiece, hood, or helmet, breathing tube, air-purifying filter, cartridge or canister, and a fan. Air is pulled through the air-purifying element and pushed through the breathing tube and into the facepiece, hood, or

helmet. PAPRs may be useful for people with facial hair or those that cannot be fitted or wear a tight-fitting respirator like the N-95.

**Purified protein derivative (PPD) tuberculin:** PPD is a purified preparation of the tuberculin protein that was developed in the 1930s and is administered as part of a TST.

**QuantiFERON®-TB/QuantiFERON®-TB Gold:** Types of BAMT that are *in vitro* cytokine assays that detect cell-mediated immune response 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 (**QFT**) 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 and some nontuberculous mycobacteria (NTM).

**Reinfection**: A second infection that follows recovery from a previous infection by the same causative agent.

**Relapse disease:** Recurring clinical infection caused by the same *M. tuberculosis* strain that caused the original infection, suggesting that complete eradication of tubercle bacteria was not achieved during the primary disease episode.

**Respiratory hygiene and cough etiquette:** Practices 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 people and cover their mouth and nose with their hands, elbow or preferably a tissue when coughing or sneezing, followed by hand hygiene. Alternatively, the patient with known or suspected TB should wear a mask when outside of a room with negative pressure ventilation.

**Suspect TB patient:** A person in whom a diagnosis of TB disease is being considered regardless of whether anti-TB therapy has been started. A person may be a suspected TB patient if they meet one or more of the following criteria:

- Coughing for >3 weeks and have one or more other sign or symptom of TB disease (loss of appetite, unexplained weight loss, night sweats, bloody sputum or hemoptysis, hoarseness, fever, fatigue, or chest pain.) **or**
- Has a positive TST or IGRA result and signs or symptoms of infection in the lung, pleura, or airways including larynx, **or**
- Has a positive AFB sputum smear result, **or**
- Has pending results from sputum mycobacterial culture or other test (e.g., Nucleic acid amplification or NAA test) for *M. tuberculosis*

The reporting of confirmed or suspected Tuberculosis by laboratories and clinical providers is mandated by both the State of Pennsylvania (35 P.S.§521.1 et seq., 28 Pa. Code § 27.81 et seq.) and the City of Philadelphia (Philadelphia Health Code § 6-104 et seq) law. Reports must be received at the Health Department within 24 hours of diagnosis, specimen collection or start of anti-TB treatment.

**TB disease**: TB disease is caused by bacteria called *Mycobacterium tuberculosis.* The bacteria can infect any part of your body, but they usually infect the lungs (pulmonary TB). Symptoms of pulmonary TB disease (or infection in the lung, pleura, or airways including larynx) include coughing for >3 weeks, loss of appetite, unexplained weight loss, night sweats, bloody sputum or

hemoptysis, hoarseness, fever, fatigue, or chest pain. TB disease of the lungs or larynx can be transmitted when a person with the disease coughs, sings, laughs, speaks, or breathes. Extrapulmonary disease occurs outside of the lungs and is usually not considered infectious unless it is also accompanied by pulmonary disease.

**TB exposure**: A situation in which persons (e.g., HCP, visitors, residents) have been exposed to an individual with suspected or confirmed infectious TB disease (or to air containing *M. tuberculosis)* without the benefit of effective infection control measures.

**TB Infection (TBI):** A condition following exposure to a person with infectious TB disease and subsequent infection with *M. tuberculosis* where the bacilli are alive but inactive in the body. People who have TBI but who do not have TB disease are asymptomatic (have no symptoms), do not feel sick, and cannot spread TB to other people. They usually have a positive TST or IGRA result. About 10% of infected adults will develop TB disease at some point in their lives, but the risk is considerably higher for persons who are immunosuppressed, especially persons infected with HIV. Persons with TBI may be given treatment to prevent the infection from progressing to disease.

**TB infection control program:** Early detection, isolation, and treatment of persons with infectious TB through a hierarchy of control measures, including use of 1) administrative controls to reduce the risk for exposure to persons with infectious 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, such as in airborne isolation rooms with negative pressure ventilation. A TB infection control plan should include surveillance of HCP who have unprotected high-risk exposure to TB patients or their environment of care.

**TB screening:** An administrative control measure in which evaluation for TBI and TB disease are performed through initial and serial screening of HCP, as indicated. Evaluation might be comprised of TST, BAMT, chest radiograph, and symptom screening.

**TST conversion:** A TST conversion is presumptive evidence of new *M. tuberculosis* infection and poses an increased risk for progression to TB disease. A change in the result of a test for *M. tuberculosis* infection wherein the condition is interpreted as having progressed from uninfected to infected. A measurement of $\geq$5 mm in induration is defined as a positive TST for the purposes of a contact investigation.

**Tuberculin skin test (TST):** A diagnostic test for infection with *M. tuberculosis*. In the United States, TST is administered as an intradermal injection of 0.1 ml containing 5 TU of PPD (Mantoux method) and induration is measured 48–72 hours later. See E. III for more details.

**Two-step skin testing:** Procedure used for the baseline skin testing of persons who will routinely receive TSTs (e.g., HCP or residents/patients of 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, the second step of a two-step TST should be administered 1–3 weeks after the first TST was administered. If the second TST result is positive, it probably represents a boosted reaction, indicating infection was most probably in the past (remote infection). If the second TST result is also negative, the person is classified as not infected or negative.

**Seal Check:** See “fit check” above

## [4] Tuberculosis Exposure Control Plan (TB-ECP):

### A. TB-ECP Plan Management

**I.** The TB-ECP is the responsibility of the Infection Control Committee; the contact person is the Infection Preventionist or Designee.

**II.** The written plan will be maintained as part of the Infection Control policy and procedure manual and will be updated as needed, but no less than every three years.

**III.** An annual Risk Assessment will be performed to evaluate the risk for transmission of *M. tuberculosis*. It will be formally reviewed and approved by the Infection Control Committee annually and whenever changes occur.

**IV.** Basic concepts of TB transmission, pathogenesis and disease are included in all new hire HCP orientations and in the mandatory annual Infection Control Training for all HCP who may have patient contact.

### B. Building Management

**I.** **[Facility Name]** will maintain paperwork related to evaluations of the ventilation system according to manufacturer's recommendations for maintenance and testing within the utilities management plan.

### C. Facility Infection Preventionist Responsibilities

**I.** Check to ensure proper measures are in place and being followed by all staff who care for residents with suspect or confirmed TB disease.

**II.** Ensure facility infection preventionist or designee communicates appropriate isolation protocols with transport staff and receiving facility.

### D. TB Risk Assessment

**I.** An annual TB risk assessment will be completed and documented by the Infection Preventionist or designee and included in this TB-ECP. Consult the local or state TB-control program to obtain epidemiologic surveillance data necessary to conduct a TB risk assessment for the healthcare setting. Link to the CDC Risk Assessment Tool: https://www.cdc.gov/tb/publications/guidelines/AppendixB_092706.pdf

**i.** **[Facility Name]** is "_____ Risk" as defined by the Centers for Disease Control and Prevention (CDC).

### E. Evaluation of Healthcare Personnel (HCP) for TB

**I.** Baseline TB Screening will be performed on all newly hired HCPs upon hire. If there is written documentation of a negative TB baseline screening within the past twelve (12) months, it will be documented and taken into consideration as follows:

**i.** A TST taken within 12 months can be used as the first test in the new hire two-step skin testing process per CDC guidelines. The written documentation (e.g., copy of screening form completed by another healthcare facility) must include worker's name, date test administered, manufacturer & lot number of testing agent, date test read, result and interpretation of reading, and the signatures of person(s) applying and reading the TST test.

**ii.** Using a BAMT (IGRA) for baseline testing does not require two-step testing. Additionally, TB blood tests are not affected by the BCG vaccine.

iii. The baseline TB screening proof will be filed in the employee's medical record with other information such as Hepatitis B screening or proof of vaccination.

II. Baseline testing for HCPs without proof of recent TB screening will be accomplished with a 2-step baseline TST (Mantoux PPD) or single baseline BAMT (IGRA, ex. QFT-G).

III. Interpretation for baseline TB screening:

i. **Mantoux Tuberculin Skin Testing Interpretation:** The three cut points below should be used to determine whether the skin test reaction is positive. A person with a positive reaction should be referred for a medical evaluation for TBI or TB disease and appropriate follow-up and treatment if necessary. A measurement below the defined cut point for each category is considered negative.

1. **Resource:** Fact Sheets | Testing & Diagnosis | Fact Sheet - Tuberculin Skin Testing | TB | CDC

ii. **Induration of ≥5 mm is considered positive in:**

1. Human immunodeficiency virus (HIV)-infected persons
2. Recent contacts of TB case patients
3. Persons with fibrotic changes on chest radiograph consistent with prior TB
4. Patients with organ transplants and other immunosuppressed patients (e.g., receiving the equivalent of 15 mg/d of prednisone for 1 month or more)

iii. **Induration of ≥ 10 mm is considered positive in:**

1. Recent immigrants (i.e., within the last 5 years) from countries with a high prevalence of TB
   - **Resource:** High burden TB countries - 2021 lists - TBFacts
2. Injection drug users
3. Residents and employees of the following high-risk congregate settings:
   - prisons and jails
   - nursing homes and other long-term facilities for the elderly
   - hospitals and other health care facilities
   - homeless shelters
4. Persons with the following clinical conditions that place them at high risk:
   - silicosis
   - diabetes mellitus
   - chronic renal failure
   - some hematologic disorders (e.g., leukemias and lymphomas)
   - other specific malignancies (e.g., carcinoma of the head, neck, or lung)
   - weight loss of 10% of ideal body weight
   - gastrectomy
   - jejunoileal bypass

iv. **Induration of ≥ 15 mm is considered positive in:**

1. Persons with no known risk factors for TB

**IV.** HCPs with a documented history of a positive TST or QFT-G will be given a questionnaire to detect symptoms of active TB and a baseline chest x-ray will be obtained

1. **Resource:https://www.cdc.gov/tb/topic/basics/signsandsymptoms.htm**

**V.** Annual HCP Evaluation for TB:

- **i.** Additional testing (e.g., annual) of HCPs after baseline is not recommended for settings classified as "Low Risk" unless an exposure to *M. tuberculosis* occurs and/or testing is required by law.
- **ii.** Requirement for annual skin testing has been discontinued due to changes of the guidelines by The Department of Licensing and Regulatory Affairs and updated CDC guidelines published in 2019 (Sosa et al, 2019).
- **iii.** Additional assessment will be required if there is potential exposure of a HCP to TB in the facility as outlined above.

**VI.** HCP TB screening test data will be analyzed:

- **i.** Infection Control will evaluate any conversion cases immediately.
- **ii.** Medical Records of TB patients will be reviewed by the infection control designee to evaluate need to modify protocol for detection and management of TB patients.
    1. All HCPs with newly recognized positive conversion (previously tested as negative) will be promptly evaluated for active TB and referred for appropriate treatment.

## F. Evaluation of Residents for TB

**I. Criteria for screening:**

- **i.** All residents will have TST performed following a physician order unless otherwise specified. The first TST will be given within 24 hours of admission by a licensed nurse. The TST will be read within 48-72 hours of administering. If no induration, a second TST will be performed ~2-3 weeks after the first TST. If induration is greater than 10 millimeters, the physician (or physician extender) will be notified and an order for a Chest X-Ray will be obtained. See E.III.
- **ii.** Based on the CDC guidelines, patients with a previously positive TB test should receive one chest radiograph to exclude TB disease, upon admission.
- **iii.** Patients who present with two or more of the following symptoms should be screened for possible TB disease:
    - Signs of infection in the lung, pleura, or airways (including larynx)
    - Coughing >3 weeks
    - Loss of appetite
    - Unexplained weight loss
    - Unexplained fever
    - Night sweats,
    - Coughing up blood (hemoptysis)
    - Hoarseness
    - Fatigue
    - Chest pain

## G. Initiation of treatment:

- **I.** Treatment of TB disease should involve PDPH TBC program and will follow CDC recommendations.
- **II.** Consideration should be given to consulting a pulmonary or infectious diseases specialist to coordinate treatment with TBC program
- **III.** When susceptibility results become available, the regimen may be adjusted appropriately.
- **IV.** Persons with asymptomatic TB infection should be advised of possibility of re-infection with another strain of *M. tuberculosis*.
- **V.** Persons with TB infection should receive counselling and be offered chemoprophylaxis to prevent progressions to TBD as per CDC recommendations.

## H. Initiation of isolation:

- **I.** Immediately place persons with suspected TB into a private room (isolation) with the door kept closed. Any nurse, physician, or the Infection Preventionist may initiate isolation upon suspicion of any communicable disease. An AII room should be used, if available.
    - **i.** If no AII rooms are available, **[Facility Name]** will make arrangements to transfer a known or suspected TB patient as soon as possible to a healthcare facility that has an AII Room.
- **II.** Post an isolation sign at the entry
- **III.** Any employee entering the isolation room must wear an N-95 respirator for which they have been specifically fit-tested, or a PAPR.
    - **i.** Patient should be instructed to cover their mouth and nose with a tissue when coughing or sneezing if able followed by hand hygiene, even while in the isolation room, to contain most droplets.
    - **ii.** The patient should also be masked with a hospital-provided surgical/procedure disposable mask when HCPs are present, if tolerable per the patient's condition.
- **IV.** Create a list of roommates and other residents and staff at the facility who may have been exposed for follow up testing. See I for more details.
- **V.** If it is necessary to transport the patient for a procedure or for other reasons, a regular disposable mask should be placed on the patient, covering the nose and mouth.
    - **i.** The transporter does not need to wear respiratory protection outside of the isolation room if the patient can wear a mask properly.
    - **ii.** Notify the transport service of suspected pulmonary TB prior when making transport arrangements and again at the time the transport team arrives to move the patient from the isolation room.
- **VI.** The number of persons entering the isolation room must be kept to a minimum and the door should remain closed.
- **VII.** Food and Nutrition may deliver the food tray to nursing personnel, who will don the appropriate respirator to deliver food tray.
- **VIII.** The Infection Preventionist or Designee will report patients with suspected or confirmed TB to PDPH.

## I. Exposure Investigation

- **I.** In the instance that persons with TB disease (index patient or HCP) were not recognized immediately and handled appropriately or if there was a break in protocol, the PDPH TBC program must be notified (**215-685-6873**). An exposure

investigation will be done collaboratively with the PDPH TBC program as coordinated by the Infection Preventionist/ Designee.

**II.** Infection Preventionist/ Designee will identify patients and HCPs who were exposed to the index person by reviewing the medical record and communicating with management in the respective area(s) or department(s).

**III.** The physician of any resident believed to have had exposure is contacted so that appropriate follow-up can occur.

**IV.** Managers of departments with HCP who had unprotected exposure to a patient with TB are notified and HCP are referred to the designated Occupational Health Clinic.

**V.** If transmission is suspected in the initial group, contact investigation will continue with lower risk exposures.

**VI.** Consultation with the PDPH TBC program or other persons with expertise in TB control will be coordinated by infection Preventionist/ Designee if deemed necessary.

### J. Respiratory Protection Program for TB

**I.** The Respiratory Protection Program for TB is required in order to ensure HCP safety when potentially exposed toTB, and to maintain compliance with OSHA recommendations.

**II.** The Infection Control Committee shall be responsible for ensuring appropriate program surveillance, policy review and update, supervision of equipment selection, purchase, and maintenance, HCP training, and all other aspects of the program.

**III.** The written program will be maintained in the Infection Control Manual.

- **i.** The program will be routinely evaluated for appropriateness and formally approved by the Infection Control Committee at least annually.

**IV.** Department managers are responsible for scheduling their HCP for OSHA required annual fit testing, when indicated.

- **i.** N-95 respirators will be fit tested prior to assignment for HCP whose job includes care for patients with known or suspected TB.
  1. The N-95 will be seal checked by the HCP each time the respirator is donned.
  2. HCPs unable to wear the N-95 respirator will not be allowed to enter airborne isolation rooms, unless a PAPR can be provided.
- **ii.** PDPH has a Respiratory Protection Program developed for COVID which can be used as a baseline to fulfill many requirements for a TB program.
  - **Resource:** https://hip.phila.gov/disease-control/healthcare-associated-infections-antibiotic-resistance/respiratory-protection-toolkit/
- **iii. Responsible Parties:**
  1. **[Facility Name]** Leadership
  2. Infection Preventionist or Designee
  3. **[Facility Name]** HCP
  4. Occupational Health Clinic

## [5] Resources/References:

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