8-8-2024

UCSF Tuberculosis (TB) Control Plan

I. Purpose

The goal of this control plan is to outline the infection prevention and control mitigation strategies to prevent the spread of tuberculosis (TB) in the healthcare setting, including early identification of suspected or confirmed cases, isolation using appropriate engineering controls and personal protective equipment (PPE), and exposure follow-up as needed.

This TB control plan, which summarizes the strategies to prevent the spread of TB in the healthcare setting, complements the UCSF Health Aerosol Transmissible Disease (ATD) Exposure Control Plan Policy 3.1.2.

II. Program Administration

Hospital Epidemiology and Infection Prevention (HEIP) is coordinated by the System Director, Medical Directors, and Associate and Assistant Medical Directors who are responsible for designing, implementing, evaluating, and maintaining the UCSF Tuberculosis (TB) Control Plan in collaboration with Environment, Health, and Safety which oversees the UCSF Health Aerosol Transmissible Disease Exposure Plan and Respiratory Protection Program.

HEIP collaborates with representatives from many groups including but not limited to Occupational Health Services, Nursing, Hospital Administration, Emergency Services, Environment, Health and Safety, Facilities Management, Patient Access Services, Hospitality Services, and the Clinical Laboratory. Input from other departments/individuals with required expertise is sought as needed.

III. UCSF Health Aerosol Transmissible Disease Exposure Control Plan

See the UCSF Health Aerosol Transmissible Disease (ATD) Exposure Control Plan Policy 3.1.2 under Environment of Care for additional background and details.

IV. Contacts

1. Contact the adult or pediatric ID services for clinical guidance.
2. Contact Hospital Epidemiology and Infection Prevention (HEIP) to report suspected or confirmed TB cases which include patients with signs/symptoms compatible with TB, who are undergoing an evaluation for TB, have been started on directed antibiotic therapy, and/or have a confirmed diagnosis.
3. Public Health Department:
   For Moffitt-Long, Mission Bay including BCH-San Francisco, and Mount Zion medical centers, contact the San Francisco Department of Public Health (SFDPH) Communicable Disease Control at (628) 206-3398 to make an initial report within 24 hours of diagnosis Monday to Friday 8:00AM-5:00PM. At other times, call the SFDPH On-Call Communicable Disease Provider at (415) 918-5735 for urgent reporting.

V. **Risk Assessment**

1. Incidence of TB in the San Francisco County and California (per 100,000 population)

	San Francisco County	California state
2022	6.9	4.7
2023	8.1	5.4

2. Number of patients with confirmed TB at UCSF Health (West Bay only)

	Inpatients	Outpatients	Number of TB patients with possible patient and/or employee exposures
2022	13 (11 pulmonary)	5 (1 pulmonary)	10
2023	10 (8 pulmonary)	8 (4 pulmonary)	12

VI. **Early identification of patients with known or suspected TB**

A. Rapid and appropriate identification of individuals who are potentially contagious for tuberculosis (TB) and institution Airborne isolation are the most effective means of reducing the risk of transmission of TB.

In order to rapidly identify and facilitate the isolation of patients who are possibly infectious, patients presenting to the Emergency Department and ambulatory clinics should be asked about the presence of cough, fever, and other symptoms that could be compatible with TB as well as possible TB risk factors including residence in or travel to higher endemic areas and history of prior latent TB.

B. Diagnosis

a. The diagnosis of TB can be challenging. Rapid bacteriologic evaluation of patients with signs and symptoms suggestive of TB include:

i. Tuberculin skin test (TST, also referred to as a PPD)
ii. Quantiferon TB Gold Plus
iii. The sputum acid-fast bacilli (AFB) smears and cultures from respiratory samples and non-respiratory samples such as cerebral spinal fluid, pleural fluid, ascites fluid, gastric aspirates, and other tissue
    1. AFB smears are read daily, including weekends and holidays.
iv. Mycobacterium TB PCRs from respiratory samples and non-respiratory samples
v. Positive AFB smears, culture, and *Mycobacterium tuberculosis* PCR results appear on an automatically generated Epic report and are reviewed each working day by HEIP.
vi. Metagenomics
    1. Plasma and CSF metagenomic next generation sequencing (mNGS)
vii. The Pathology department notifies Infection Control of any specimens that show necrotizing granulomas and/or are AFB smear-positive.

VII. Management of patients with possible or confirmed infectious TB

Generally, patients with pulmonary, laryngeal, and disseminated TB are infectious to other people. In general, patients with extrapulmonary TB are not considered infectious unless they are undergoing procedures that could generate infectious aerosols, such as wound irrigation.

A. Management in the Emergency Department (ED)

ED protocol for patients with suspected or confirmed infectious TB:

1) Place a surgical mask on the patient assuming no clinical and/or patient is >=2 years of age.
    a. Instruct the patient to keep the mask on until his/her physician instructs him/her to remove the mask.
2) Notify the charge nurse immediately that an Emergency Department negative pressure Airborne Infection Isolation room (AIIR) is required for this patient.
    a. If an isolation room is not immediately available, place the patient in a private room with the door closed. Transfer to an AIIR as soon as available. Instruct patient to keep mask on.
    b. While the patient is an AIIR/negative pressure isolation room, keep the door to the room closed.
3) Place an Airborne Isolation sign on the door and enter an order for Airborne Isolation.
    a. All personnel entering the room must wear appropriate respiratory protective equipment, i.e., a fit-tested N95 respirator or powered air purifying respirator (PAPR).
4) Patients with suspected infectious pulmonary, laryngeal, or disseminated TB who are admitted to the hospital must be admitted to an AIIR and must wear a surgical mask during transport. Contact Patient Access Services for appropriate room placement.

B. Management in Ambulatory clinics

Providers or designee at the clinic practice are responsible for ensuring the following for possible or confirmed infectious TB:

1) Airborne Isolation must be initiated promptly for patients with possible TB including those with consistent signs and symptoms and confirmed TB.
    a. Airborne Infection Isolation room (AIIR) is required for patients with suspected or confirmed infectious TB.
    b. If an isolation room is not immediately available, place the patient in a private room with the door closed. Transfer to an AIIR as soon as available.
    c. Instruct the patient to keep mask on assuming no clinical contraindications and patient is ≥ 2 years of age.
    d. When the patient is an AIIR/negative pressure isolation room, keep the door to the room closed.
    e. Place an Airborne Isolation sign on the door and enter an order for Airborne Isolation.
    f. All personnel entering the room must wear appropriate respiratory protective equipment, i.e., a fit-tested N95 respirator or powered air purifying respirator (PAPR).

C. Management of hospitalized patients

Patient care teams are responsible for ensuring that Airborne Isolation is implemented for patients with suspected or confirmed pulmonary, laryngeal, or disseminated TB as follows:

1. Initiating isolation

If the diagnosis of pulmonary, laryngeal, or disseminated tuberculosis is a reasonable possibility, the patient must be placed in a negative pressure Airborne Infection Isolation room (AIIR). Airborne Isolation must be ordered, implemented, and maintained until the possibility of tuberculosis is excluded or until isolation discontinuation criteria are met.

2. TB isolation policies and procedure

i. Patients must remain in an AIIR room until active pulmonary, laryngeal, disseminated TB has been ruled out or the criteria cited under discontinuation of TB isolation have been met.

ii. Patients should be educated about the reasons for Airborne Isolation.
iii. Doors to the AIIRs must remain closed at all times except when health care personnel or patients must enter or exit the room. This procedure must also be followed for the doors of the anteroom of isolation rooms.
iv. An Airborne Isolation sign must be visible outside the anteroom or, for those rooms without an anteroom, outside the door of the patient's room.
v. Employees entering an AIIR must wear either an N95 respirator that they have been fit-tested to or a powered air purifying respirator (PAPR). Individuals must be medically cleared (through Occupational Health Services) and fit tested before wearing an N95 respirator.
    a. Fit testing should be done before using a new N95 model, annually and whenever physical changes have occurred as follows: "whenever an employee reports, or the employer or the physician or other licensed health care professional makes visual observations of changes in the employee's physical condition that could affect respirator fit (e.g., facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight)." For more information, refer to this website.
    b. A "fit check" must be performed each time the N95 respirator is worn. The "fit check" procedure is demonstrated to employees at the time they are fit tested for an N95 respirator mask.
vi. Visitors should be offered an N95 respirator and shown how to wear it by healthcare personnel. It is not necessary for visitors to be fit tested prior to wearing a N95 respirator.
vii. The healthcare provider/designee must notify the Pathology Department prior to autopsy procedures for deceased patients with suspected or confirmed TB.
viii. The AIIR, procedure room, etc. where a TB patient has resided is considered contaminated (with TB organisms) for at least the time needed to achieve >99.9% removal efficiency after the patient leaves (the default is one hour for most rooms but can be shorter for rooms with higher air changes per hour) and should remain vacant with doors closed for that interval of time. Surfaces can be cleaned with routine hospital-approved disinfectants (refer to the HEIP website for list of approved environmental disinfectants).

3. ***Transport of TB patients***
    i. The patient should remain in his/her room at all times with the doors closed unless emergency diagnostic or therapeutic procedures (e.g., CT scan, surgery, etc.) are required and cannot be performed in the patient's room. When leaving his/her room, the patient must wear a surgical mask assuming no medical contraindications and/or patient is <2 years of age. The area to which the patient is being transported must be notified that the patient is on Airborne Isolation so that appropriate accommodations can be made. If possible, patients on Airborne Isolation should be scheduled at the end of the day and/or when waiting areas are not crowded.
    i. Ventilated patients who need to travel to other areas for diagnostic testing should have a **bacterial expiratory filter** placed prior to the exhalation valve of the portable ventilator or between the end of the endotracheal tubing and Ambu bag. In most cases, patients will be transported using a portable ventilator.
    ii. Patients traveling to the Operating Room must be transported directly to the OR from his/her room. If possible, patients on Airborne Isolation should be scheduled at the end of the day. If needed, patients should be recovered in a postoperative AIIR, if available, or in the OR then directly transported back to his/her inpatient AIIR.

4. ***Discontinuation of TB isolation***
    i. Contact HEIP for approval prior to discontinuing Airborne Isolation.
    ii. TB isolation can generally be discontinued if at least one of the following criteria is met:
    a. TB has been ruled out as a diagnosis, and alternate diagnosis is documented in the record

b. For adult services patients who are >=18 years of age, three sputum specimens are obtained at least 8 hours apart and at least two are Mycobacterium tuberculosis PCR-negative and/or three are AFB sputum smear-negative, AND TB is no longer suspected. (Note: If possible, at least one specimen should be an early morning specimen). See Algorithm for Active Pulmonary TB Infection Evaluation here.
    - For BCH-San Francisco patients, consult HEIP to determine whether this protocol can be used.

c. For patients with confirmed TB, Airborne Isolation can generally be discontinued:
    - If AFB smear-negative, following ≥5 days of effective anti-tuberculosis therapy and the patient is clinically improving.
    - If AFB smear-positive, following ≥14 days of effective anti-tuberculosis therapy (preferably by directly observed therapy [DOT]), the patient is clinically improving, and has 3 sputum specimens that are AFB smear-negative.

5. Hospital discharge

For hospitalized patients, prior to hospital discharge or transfer the primary team must obtain approval from the SFDPH TB Controller (628-206-8524 during working hours [Monday-Friday 8:00am-5:00pm]. Download the hospital discharge approval form here.

VIII. Follow-up of potential healthcare personnel and patient exposures

1. HEIP

- Reviews the chart including history, encounter history, and isolation status and summarizes case.
- Confers with the patient's healthcare team to ensure implementation of appropriate isolation.
- Reviews the patient's status with the patient's attending physician or designee.
- Determines the period of infectivity in conjunction with SFDPH TB Control.
- Determines whether any potential exposure to hospital personnel occurred.
- Determines whether any potential exposure to patients occurred.
- Reports exposures to the Occupational Health Service.
- Works with OHS, leadership of impacted areas, and the DPH to coordinate notification and follow-up of exposed patients.

2. Occupational Health Service (OHS)

- Contacts the director(s) of the department(s) with exposed employees that a TB exposure has occurred in their department, giving the name and medical record number (MRN) of the patient, exposure time period, and criteria.
- Records all exposures and exposed employee information.
- Arrange for post-exposure follow-up of healthcare personnel as appropriate, including Tuberculin Skin Testing (TST) or Interferon Gamma Release Assay (IGRA) and additional evaluation as warranted based on test results and symptoms.
- Records all employee TB test conversions resulting from a specific identified TB exposure.
- Reports all TB conversions following occupational exposure to HEIP for appropriate follow-up action.
- Ensure that employees with TB disease are non-infectious prior to returning to work.
- Counsel employees with latent TB infection (LTBI) or TB the importance of completing therapy to protect the employee's health and to reduce the risk to others.

IX. Engineering controls

A. Airborne Infection Isolation rooms (AIIRs)

1. There are AIIRs located at the ML, MZ, and MB hospitals. AIIR engineering controls include:

- A minimum of 12 air changes/hour (ACH). Portable HEPA filter equipment can be used to supplement existing ventilation to achieve the 12 ACH requirements.
- Air pressure within the AIIR is at negative pressure relative to surrounding rooms and corridors.
- Doors and windows of AIIRS are kept closed except when doors are opened for entering or exiting or when windows are part of the ventilation system being used to achieve negative pressure.
- AIIRs must be monitored using an alarmed continuous monitoring system or checked daily by Facilities to confirm negative air pressure as demonstrated visually by smoke trails or other devices.
- See UCSF Health ATD Exposure Control Plan for additional details.

B. Regular monitoring and maintenance of engineering controls

- Engineering controls, including all negative air pressure areas of the hospital and HEPA filtration systems, undergo regular monitoring and maintenance by Facilities Services and contracted vendors.
- AII rooms occupied by patients with known or suspected infectious TB that are not on a continuous monitoring system are tested prior to patient admission and on a daily basis while occupied by a patient on Airborne Isolation.
- Unit nursing staff are responsible for requesting verification of room negative air pressure prior to a admitting patient on Airborne Isolation into the room by submitting a ticket to "activate isolation rooms for patient use (Negative Pressure Room)" into the UCSF Medical Center Support Services (MCSS) here.

X. High-Risk Procedures

A. High-risk procedures should be performed only when necessary on a patient who is suspected of having pulmonary or laryngeal TB.
B. See UCSF Health ATD Policy for additional details.

<u>Sputum Induction</u>

1. Patients with diagnosed or suspected TB must be induced in the patient's AIIR.
2. For inpatients with low suspicion for TB, sputum induction can be performed in a private or semi-private room if the patient is the sole occupant of the room.
3. Ambulatory patients should be induced in the sputum induction booth located at A677, ideally scheduled for the end of the day.

<u>Bronchoscopy</u>

1. Patients with diagnosed or suspected TB requiring bronchoscopy must have the procedure performed in an AIIR (e.g., Bronchoscopy Suite).
2. Patients must remain in the room until coughing has subsided. Advise the patient to cover his/her mouth and nose with a tissue when coughing.
3. Patients must wear a surgical mask during transport back to his/her room unless there are medical contraindications or the patient is <2 years of age.
4. The procedure room should not be used for at least one hour following bronchoscopy to allow sufficient time for appropriate ventilation.

<u>Autopsy</u>

1. Autopsy procedures on patients with suspected or diagnosed TB should be performed in a manner that minimizes aerosolization of tissue and body fluids.
2. Tissues and organs should be fixed prior to cutting, if possible.

3. A PAPR should be worn during autopsy procedures for patients with suspected or diagnosed TB unless documentation of an exception has occurred and is on file with the Safety Officer (see UCSF Health Aerosol Transmissible Disease (ATD) Exposure Control Plan Policy 3.1.2).
4. The autopsy room is negatively pressurized. It should remain empty for at least one hour following completion of the autopsy.

XI. Respiratory Protection

A. Cough Etiquette/Respiratory Hygiene

1. To prevent the transmission of respiratory infections in the healthcare settings, the following infection control measures should be implemented at the first point of contact with a potentially infected person. They should be incorporated into infection control practices as one component of Standard Precautions. Refer to the Infection Prevention: Standard Precautions and Transmission-Based Isolation Policy 1.1 for more information.
    a. Visual Alerts (in appropriate languages) should be posted at the registration areas of ambulatory clinics instructing patients and persons accompanying them (e.g., family, friends) to inform healthcare personnel of symptoms of a respiratory infection when they first register for care and to practice Respiratory Etiquette.
    b. Cough Etiquette/Respiratory Hygiene: The following measures to contain respiratory secretions are recommended for all individuals with signs and symptoms of a respiratory infection.
        - Cover the nose/mouth when coughing or sneezing.
        - Use tissues to contain respiratory secretions and dispose of them in the nearest waste receptacle after use.
        - Perform hand hygiene after having contact with respiratory secretions and contaminated objects/materials**.**
    c. Ensure the availability of materials for adhering to Respiratory Etiquette in waiting areas for patients and visitors.
        - Provide tissues and no-touch receptacles for used tissue disposal.
        - Provide conveniently located dispensers of alcohol-based hand rub (Purell).
        - Where sinks are available, ensure that supplies for hand washing (i.e., soap, disposable towels) are consistently available.
2. Masking and separation of persons with respiratory symptoms
    a. Offer masks to persons who are coughing. Either procedure masks (i.e., with ear loops) or surgical masks (i.e., with ties) may be used to contain respiratory secretions. When space and chair availability permit, encourage coughing persons to sit at least three feet away from others in common waiting areas.

B. UCSF Health Respiratory Program

1. The use of respirators (fit- tested N95 or PAPR) is required for all healthcare personnel entering rooms where patients with known or suspected of having active TB are being isolated, present during cough-inducing or aerosol-generating procedures performed on such patients, or participating in other high-risk procedures.
2. Personnel must be medically cleared by Occupational Health Services and fit tested by a representative of the Environmental Health & Safety or trained designee prior to use of a N95 respirator.
3. Details of the UCSF Respiratory Protection Program are included in the UCSF Health Respiratory Protection Program Environment of Care Policy 1.1.2 and additional resources are available on the Environmental Health & Safety website here https://ehs.ucsf.edu/respiratory-protection-program-resources.

4. Use of a PAPR (powered air purifying respirator) does not require fit testing prior to use. PAPRs can be obtained from UCSF Material Services at these numbers:
    a. Mission Bay = 415-476-1116
    b. Mt Zion = 415-885-7255
    c. Moffitt-Long = 415-353-1837

Medical screening

1. UCSF employees must be medically screened prior to use of an N95 respirator. Initial screening consists of a written questionnaire distributed and evaluated by Occupational Health Services. Additional screening, including physical assessment and spirometry may be necessary for employees who cannot be cleared by questionnaire. Refer to the UCSF Health Respiratory Protection Program Policy 1.1.2 for details.

Fit testing and education

1. Fit testing and basic education regarding use of the N95 respirators (fit-check, when to be refit-tested, etc.) will be provided by Environment, Health, and Safety staff or their trained designee(s) following medical screening clearance.

XII. Healthcare personnel training and education

All health care personnel with patient contact receive yearly education on TB, including concepts regarding the pathogenesis of and occupational risk for TB, work practices that reduce the likelihood of transmitting and acquiring TB, explanation of TST, treatment of active and latent TB, and symptoms of TB.

XIII. Screening of UCSF employees and non-employee healthcare personnel

All health care personnel are counseled about the increased risk to immunocompromised persons for developing active TB.

A. Policy and procedures

1. **Pre-placement and annual TB screening:** All UCSF Medical Center and campus personnel will participate in TB screening upon hire. Individuals with a history of a previous positive TB test without documented of treatment for latent TB will complete a symptom review annually.
2. All UCSF Health staff and learners will be required to complete an annual TB symptom screening questionnaire on the OHS Portal.
3. Only staff/learners identified by OHS as working in high-risk areas or roles and as having a negative TB skin test (PPD) the previous year will be required to complete both the annual TB symptom screening questionnaire AND an annual TB skin test (PPD). This includes staff/learners working in these roles/areas:

INCLUSION IN ANNUAL TB SKIN TESTING PROGRAM
Emergency Department (clinicians only)
Homeless Services
Pulmonary provider
Head and Neck Cancer provider
Pediatric OHNS provider
Speech and Language Pathology
Endoscopy and Fluoroscopy
Dialysis staff
Clinical Microbiology Laboratory staff
Employees performing sputum induction

Homecare Services
Clinicians based on 10L or any ICU
Voice and Swallowing
Interventional Pulmonary Mount Zion
Respiratory Care practitioners
Performs intubation/extubation
Tuberculosis research laboratories
GME resident/fellow

4. See Aerosol Transmissible Disease Exposure Control Plan Environment of Policy 3.1.2Care for additional details.

XIV. Coordination with the Department of Public Health

A. HEIP will report patients with suspected or confirmed active TB infection to SFDPH.

B. See above for requirements prior to discharge or transfer of patients with suspected or confirmed TB.