LOS ANGELES COUNTY DEPARTMENT OF HEALTH SERVICES
HARBOR-UCLA MEDICAL CENTER

SUBJECT: TUBERCULOSIS (TB) EXPOSURE CONTROL POLICY **POLICY NO.** 353

CATEGORY: Provision of Care	**EFFECTIVE DATE:** 3/93
POLICY CONTACT: Kenneth Zangwill, MD	**UPDATE/REVISION DATE:** 5/22
REVIEWED BY COMMITTEE(S):	

PURPOSE:
To reduce the risk of exposure to and transmission of *Mycobacterium tuberculosis* (MTB) to persons in the health care facility.

POLICY:
Tuberculosis (TB) is an infectious disease requiring patient placement in Airborne Precautions. When the patient with suspected or confirmed TB is out of his/her negative pressure room, s/he must be masked with a surgical or N95 mask to prevent the organism from becoming airborne through coughing or breathing.

This policy is based on a three-level hierarchy of controls, including administrative, environmental, and respiratory protection. Each is a critical component of overall prevention and control.

PROCEDURE:

I. Administrative Controls:

1. Adherence, enforcement, and monitoring the compliance of these policies and procedures is the responsibility of the healthcare workers (HCW) and the department manager, or their designee;
   - HCW includes employees, contract staff, affiliates, volunteers, trainees, students, and other persons whose conduct, in the performance of work for Harbor-UCLA Medical Center (HUMC) is under its direct control, whether or not they receive compensation from the County. For this policy, HCWs include all who come in contact with patients as well as persons not directly involved in patient care (e.g., clerical, dietary, housekeeping, maintenance, and volunteers), but who have potential for exposure to MTB through air space shared with persons with infectious TB disease in the workplace.
2. Conducting a TB risk assessment to ensure prompt detection, placement in Airborne Precautions, and treatment of persons who have suspected or confirmed TB disease;
3. Ensuring the timely availability of recommended laboratory processing, testing, and reporting of results to the ordering physician, the TB Liaison nurse, and Infection Preventionists;

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4. Implementing effective work practices for the management of patients with suspected or confirmed TB disease;
5. Ensuring proper cleaning and sterilization or disinfection of potentially contaminated equipment;
6. Training and educating HCWs regarding TB, with a specific focus on prevention, transmission, and symptoms;
7. Screening and evaluating HCWs who are at risk for TB disease or who might be exposed to MTB (i.e. TB screening program);
8. Using appropriate signage advising respiratory hygiene and cough etiquette; and
9. Coordinating efforts with the local or state health departments as needed.

II. Employee Health Surveillance of HCWs for TB:

1. Employee Precautions / TB Surveillance in HCWs:
   - Employee Health is responsible for TB surveillance for HCWs.
   - Pre-employment TB screening using either:
     - Two-step Mantoux tuberculin skin test (TST) on all new hires
     - Interferon gamma release assay (IGRA), if available
     - Positive TST or IGRA must have a negative chest X-ray, or documentation of one, at or after the time of the first TST/IGRA positive. TST must be documented in millimeters; a history of positive is not considered sufficient. Self-testing is not permitted.
   - Annual risk assessment utilizes:
     - Symptom review and TST or IGRA for previously negative TSTs and/or IGRAs
     - Symptom review survey for HCWs with a previously positive TST or IGRA
   - Other testing includes:
     - Post-TST test conversion follow-up or referral (an IGRA is an acceptable alternative)
     - Post-exposure follow-up
     - Outbreak investigation with Infection Prevention and Control
     - Documentation and compliance with Cal/OSHA regulations
   - Respirator fit testing will be performed upon hire and annually for employees who have potential exposure to patients on Airborne Precautions.
     - All HCWs entering the negative pressure Airborne Precautions room must wear a properly fitted N95 respirator or equivalent (see Respiratory Protection Policy #478A).
   - Exposure is defined as close or prolonged contact with a person with pulmonary TB without wearing an N95 respirator or equivalent.
   - Employees who have unprotected contact with a patient or family member who is suspected or diagnosed with active pulmonary TB, must report to their supervisor and be evaluated by Employee Health (see ATD Policy #406B).

2. HCWs diagnosed with active TB disease will be allowed to return to work when:
   - HCW had three negative AFB sputum smear results collected at least 8 hours apart, with at least one being an early morning specimen because respiratory secretions pool overnight; and
   - HCW has responded to anti-tuberculosis treatments that are likely to be effective based on susceptibility results; and
   - A physician knowledgeable and experienced in managing TB disease determines that the HCW is noninfectious.

III. Environmental Controls:

- Primary environmental controls include controlling the source of infection by using local exhaust ventilation (e.g., hoods, tents, or booths) and diluting and removing contaminated air by using general ventilation.
- Secondary environmental controls consist of controlling the airflow to prevent contamination of air in areas adjacent to the source by Airborne Infection Isolation (AII) rooms and cleaning the air by using high-efficiency particulate air (HEPA) filtration or ultraviolet germicidal irradiation.

1. Airborne Infection Isolation (AII) Room Practices:
   - AII rooms should be single-patient rooms in which environmental factors and entry of visitors and HCWs are controlled to minimize disease transmission. This is also to minimize the possibility of patients with different strains from intermixing.
   - Cohorting is permissible in the very unusual situation such as when the source case of the patients' TB is known or highly suspected to be the same person (e.g., two admitted brothers exposed to their mother with TB).
   - AII HCWs who enter an AII room must wear at least an N95 disposable respirator (See Respiratory Protection Policy # 479A).
   - Visitors should be offered respiratory protection (i.e., surgical mask) and should be instructed by HCWs on the use of the mask before entering an AII room.
   - AII rooms have specific requirements for controlled ventilation, negative pressure, and air filtration. All AII room controls receive annual maintenance inspections by Facilities Management.
   - Each inpatient AII room should have a private bathroom.

2. Settings with AII Rooms:
   HCWs are to:
   - Keep doors to AII rooms closed except when patients, HCWs, or others must open the door to enter or exit the room;
   - Monitor and record the direction of airflow (i.e., negative pressure) in the room on a daily basis, while the room is being used for TB Airborne Precautions;
   - Perform diagnostic and treatment procedures (e.g., sputum collection and inhalation therapy) in an AII room;
   - Ensure patient adherence to Airborne Precautions. Educate patients (and family and visitors) who are placed in an AII room about MTB transmission and the reasons for Airborne Precautions; and
   - Ensure that patients with suspected or confirmed infectious TB disease who must be transported to another area outside of their negative pressure wear a surgical mask (or N95) (a surgical mask is preferred but if not available promptly, an N95 is an acceptable alternative);
   - Schedule procedures on patients with TB disease when a minimum number of HCWs and other patients are present, and ideally as the last procedure of the day to maximize the time available for removal of airborne contamination.
   - Discontinue Airborne Precautions according to pathogen-specific recommendations on the HUMC Intranet. Refer to Page 7 for additional requirements for discontinuing Airborne Precautions in patients with tuberculosis. The treating physician must write an order to discontinue Airborne Precautions. Do not use a negative pressure room for 1 hour after Airborne Precautions are discontinued. Do not remove Airborne Precautions sign from outside of room until 1 hour after Airborne Precautions are discontinued and terminal cleaning has been completed. During this time, keep the door closed, and wear respiratory protection while in the room, such as for cleaning,

removing items, etc. Sufficient time must be allowed to ventilate and filter the room air and clear airborne pathogens.

- **Note:** If a patient needing Airborne Precautions that was NOT wearing a mask (or N95 respirator) has been moved out of a non-negative pressure inpatient room, that room must remain empty for a minimum of a full hour. If there are other patients in a multiple-patient non-negative pressure room, these other patients can remain in the room without additional precautions or procedures. Workforce members should use an N95 respirator in that room for 1 hour until after the patient needing Airborne Precautions has been moved out. All of the additional requirements (above) must also be followed. If the patient was definitively ruled out for TB, then the above does not apply.

3. Respiratory Protection Controls: Use of Airborne protection can further reduce the risk of exposure of HCWs to infectious Airborne nuclei that have been expelled into the air from a patient with infectious TB disease (See Respiratory Protection Policy #479A). The following measures can be taken to reduce the risk of exposure:
   1) Implementing a respiratory protection program;
   2) Training HCWs on respiratory protection; and
   3) Training patients on respiratory hygiene and cough etiquette procedures.

IV. Patient Assessment and Placement of Suspected TB Patients:

1. Suspect Tuberculosis (TB). Patient may be defined as any of the following:
   - Known history of TB infection and have signs and symptoms consistent with TB;
   - Has a positive acid-fast bacilli (AFB) sputum smear;
   - Has a persistent cough lasting 3 or more weeks and 2 or more symptoms of pulmonary TB (e.g., bloody sputum, night sweats, weight loss, fatigue, fever, anorexia);
   - Has an abnormal chest x-ray suspicious of TB, even in the absence of pulmonary symptoms; and
   - Has been started on anti-TB medications for clinical suspicion of active pulmonary or laryngeal TB, but has completed less than 2 weeks of treatment.

2. **Emergency Department, Ambulatory Care, Outpatient screening (Triage/Intake) to identify Communicable TB patients:**
   - For many years, Harbor-UCLA used a screening tool during the ED triage process to preemptively identify adult patients at risk for TB. This was developed (and clinically validated) to facilitate the timeliness of diagnosis and to minimize the likelihood of staff exposure prior to diagnosis. The point-based screen was known as "Triage Criteria for Respiratory Isolation/TB Precautions (RIPT)". A positive screen resulted in immediate masking, an order for a chest radiograph, and placement in Airborne Precautions in anticipation of full clinical assessment. During the COVID pandemic, this tool was suspended since all patients with respiratory symptoms at this time are proactively masked, and universal masking among staff is also in force. The RIPT score will be revised and reconsidered for use in the future.

3. Pediatric Patients – TB in children may present differently than in adults and the RIPT score has not been validated in this population. TB should be suspected for any child with a positive PPD or IGRA

test, appropriate symptoms, clinical signs, epidemiologic exposure (including travel in high-risk areas), and/or chest x-ray abnormalities.

- Children generally have a minimal risk for transmission because their pulmonary lesions are usually small, the cough is not forceful, and few bacilli are aerosolized. Only Standard Precautions are required except for the following subpopulations, for whom Airborne Precautions are required:
  - ≥12 years of age;
  - with cavitary disease;
  - known to be AFB (+) in smears of sputum;
  - have laryngeal involvement or extensive pulmonary involvement (as determined by the clinician);
  - are suspected of having congenital disease and are undergoing procedures that involve the oropharyngeal airway (e.g. endotracheal intubation).

Airborne Precautions implies a single patient room. In addition to controlling environmental factors and entry of visitors and HCWs to minimize disease transmission, this minimizes the possibility of patients with different strains from intermixing. Cohorting is permissible in the very unusual situation, such as when the source case of the patients' TB is known or highly suspected to be the same person (e.g., two admitted brothers exposed to their mother with TB).

- HUMC has limited capacity to provide care for a child who requires intensive care and Airborne Precautions.
  - In this situation, the child should be transferred to a designated adult floor room with Airborne Precautions after consultation with unit Nurse Manager, or be transferred to another facility.
- Patient/Family/Household Contacts of Children Suspected of Having TB:
  - Parents and other family members accompanying the child must wear a surgical mask while in the facility until they have been evaluated by their health provider or the Health Department.
    - Instruct the parents/household contacts to refrain from visiting common areas in the facility (cafeteria, lounge).
    - Non-adherent family members or contacts should be excluded from hospital visitation until evaluation is complete and TB is excluded or treatment has rendered the contacts non-contagious.
  - If TB is suspected in an adolescent, the patient should wear a surgical mask while outside the negative pressure room (an N95 is acceptable if a surgical mask cannot be obtained in a timely fashion).
  - Staff entering the negative pressure room for Airborne Precautions must wear an N95 respirator and keep the door closed at all times except for entry and exit of the room.

4. Newborn nursery and visitation of babies born to mothers with suspected or confirmed active TB:
   - Visitation by the mother is dependent on a variety of factors:
     - If the mother has a (+) PPD or IGRA test, but a normal chest radiograph (i.e., latent TB), there are no restrictions to visitation with the mother, and rooming-in is allowed.
     - If the mother has signs or symptoms consistent with TB or a (+) chest radiograph, then:
       - No visitation is allowed until the mother and baby are receiving anti-TB medications appropriate for their individual clinical scenario.
       - At visitation, the mother must wear a surgical mask until she has been ruled out for active TB by her clinician. All visitation should occur in the nursery or another well-ventilated room, not the mother's room.

        - The mother does NOT need to be sputum AFB smear (-) or PCR (-) to visit her newborn in the nursery.
        - Full rooming-in is not allowed.
    - If there is a strong suspicion that the mother has multi-drug resistant disease, she cannot visit the baby, and a Pediatric Infectious Disease consultation must be obtained.
- If the mother wishes to breastfeed, the following procedures should be followed:
    - If the mother has no risk factors for drug-resistant TB, the mother may breastfeed in the nursery (or another well-ventilated room) ONLY if she and baby are currently taking anti-tuberculous medication, the mother wears a surgical mask, and the contact time with baby does not exceed 30 minutes in any one sitting.
    - If the mother has mastitis she may not breastfeed and also may NOT provide expressed milk until it has fully resolved.

5. Definition of a Positive PPD:
    - 5mm INDURATION (not erythema) if patient is:
        - Child ≤5 years of age
        - Close contacts with an infectious TB case
        - Children suspected to have TB disease
        - HIV positive
        - Immunosuppressed
    - 10mm INDURATION in all other patients

6. Reporting of TB Suspects or Active TB Cases:
   The physician is to report all suspect or confirmed TB cases to the TB Liaison Nurse at (424) 306-4474. The TB Liaison will report the suspects/cases to LA County TB Control.

V. Suspected or Confirmed TB Patient Controls:

1. Airborne Precautions
    - All adult or adolescent suspected or active cases of TB or "rule out pneumonia" patients must wear a surgical mask (or an N95 respirator if a surgical mask cannot be obtained in a timely fashion) while in the ED or clinic unless placed in a negative pressure room with the door closed and an Airborne Precautions sign on the door.
    - The mask may not be removed unless so instructed by the physician or nurse.
    - Visitors who enter the Airborne Precautions room must be instructed to wear their surgical masks while inside the room.
    - HCWs must wear a fitted N95 respirator mask while inside the room.
    - If the patient refuses to comply with TB exposure control precautions (wearing a mask, keeping the door closed) and there are no medical contraindications, the non-compliant patient may be asked by the care provider to wait outside the building. The decision of the health provider to exclude the non-compliant patient from inside the facility may require assistance of the Los Angeles County Sheriff's Department and/or public health authorities. If a rule out, suspect, or known case of TB is admitted, they must be admitted into a negative pressure room, with an Airborne Precautions sign posted at the door.

2. Cleaning the Airborne Precautions room after patient discharge:

- When a suspected TB patient is discharged from the Airborne Precautions room, the room may not be used for 60 minutes and the door should be closed to allow for clearance of potential aerosolized pathogens. Airborne Precautions signage should remain on the door until room has been empty for ≥ 1 hour.
- Environmental Services personnel must wear the N95 respirator, with the door closed, while cleaning the room during this time period.

3. Discontinuation of Airborne Precautions

For patients under evaluation for pulmonary TB:

- Any patient admitted for evaluation of possible pulmonary TB will remain in Airborne Precautions until a diagnosis of highly contagious TB is excluded by either one of the following:
    - Two negative GeneXpert MTB/RIF (PCR) results on sputum specimens collected at least 8 hours apart (including at least one early morning specimen).

      OR
    - Three negative AFB sputum smear results on sputum specimens collected at least 8 hours apart (including at least one early morning specimen).

For all patients, a total of three sputum specimens must be collected (at least 8 hours apart) for AFB sputum smear and mycobacterial culture. *Although the patient may be taken out of Airborne Precautions after two negative PCR tests, the culture is still required to be obtained for species identification and susceptibility testing, if applicable.*

- When Airborne Precautions decisions are based upon two negative PCR results, the final results of the three collected AFB sputum smears are not required prior to release from Airborne Precautions.

- When there is a discrepancy between PCR and AFB sputum smear results:
    - PCR positive / AFB smear negative → presume TB; maintain Airborne Precautions and consult Pulmonary (and/or ID service) to start multidrug TB treatment.
    - PCR negative / AFB smear positive → likely nontuberculous mycobacteria; with two negative PCR results, can discontinue Airborne Precautions. To aid in clinical decision-making, a second PCR should be performed on a second AFB smear-positive sputum specimen.

- Decisions regarding the need for continued Airborne Precautions should always occur in conjunction with other clinical and laboratory data.
    - If there is still sufficient clinical suspicion of pulmonary TB after two negative PCR results or three negative AFB smear results, then the patient should not be released from Airborne Precautions until they are on appropriate multidrug TB treatment for a minimum of 5 days and are clinically improving.

For patients with confirmed pulmonary TB:

- Patients with confirmed pulmonary TB who are on appropriate multidrug TB treatment and are admitted for any reason should remain in Airborne Precautions until three consecutive sputum

specimens are collected at least 8 hours apart (including at least one early morning specimen) are AFB smear negative.
  - PCR currently has no role in decisions regarding Airborne Precautions for patients with confirmed pulmonary TB.

4. Discharge to Home of Patients with Suspected or Confirmed TB Disease:

- If a hospitalized patient who has suspected or confirmed TB disease is deemed medically stable (including patients with positive AFB sputum smear results indicating pulmonary TB disease), the patient can be discharged from the hospital before converting the positive AFB sputum smear results to negative AFB sputum smear results, if the following parameters have been met:
  - A specific plan exists for follow-up care with the local TB Control program. **The TB Control Liaison must be notified and consulted prior to patient discharge;**
  - The patient has been started on a standard multidrug anti-tuberculosis treatment regimen, and Directly Observed Therapy (DOT) has been arranged;
  - Home-based infants and children aged <4 years or persons with immunocompromising conditions are screened for TB;
  - All immunocompetent household members have been previously exposed to the patient; and
  - The patient has agreed not to travel outside of the home except for health-care-associated visits until the patient has negative sputum smear results.

5. Powered Air Purifying Respirators (PAPRs) or Controlled Air-Purifying Respirator (CAPR) CalOSHA notes that this device is required for all personnel performing procedures on a person who is a case or suspected case of an aerosol transmissible disease, or on a specimen suspected of containing an aerosol transmissible pathogen-laboratory (ATP-L), as described in the ATD Policy # 406B, in which the potential for being exposed to aerosol transmissible pathogens is increased due to the reasonably anticipated generation of aerosolized pathogens. In certain situations in which a CPAR may not be available or if aerosol generation is not anticipated, and/or the situation is emergent, an N95 and face is acceptable.

   Such procedures include, but are not limited to, sputum induction, bronchoscopy, aerosolized administration of medications, and pulmonary function testing. High Hazard Procedures also include, but are not limited to, autopsy, clinical, surgical, and laboratory procedures that may aerosolize pathogens.

REFERENCES:

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8. WHO: https://www.who.int/publications/i/item/infection-prevention-and-control-of-epidemic-and-pandemic-prone-acute-respiratory-infections-in-health-care

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13. California Tuberculosis Controllers Association. Guidelines for Tuberculosis (TB) Screening and Treatment of Patients with Chronic Kidney Disease(CKD), Patients Receiving Hemodialysis (HD), Patients Receiving Peritoneal Dialysis (PD), Patients Undergoing Renal Transplantation and Workforce members of Dialysis Facilities. May 18, 2007
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