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01.21 – Tuberculosis (TB) Control Program

Purpose To achieve early detection, isolation, and treatment of persons with active TB to minimize the risk of TB transmission in UTMB healthcare facilities and to provide timely reporting to the appropriate local health authorities.

Audience All employees of UTMB hospitals, clinics, contract workers, volunteers, and students

Definitions

1. Multidrug resistant (MDR) TB is a strain that is resistant to at least 2 of the most effective drugs for treatment of TB: isoniazid and rifampin.
2. Extensively drug resistant (XDR) TB is a strain that is resistant to isoniazid, rifampin, any fluoroquinolone, and any of the second-line injectable anti-TB drugs (amikacin, kanamycin, or capreomycin).
3. Extrapulmonary refers to anything that is situated or occurs outside of the lungs.
4. Concomitant means existing or occurring at the same time as something else. It's often used to describe a condition or treatment that happens concurrently with another, particularly in the context of clinical trials or when managing multiple health issues.

Policy **UTMB will utilize the following hierarchy of controls to prevent transmission of tuberculosis in its healthcare facilities.**

1. **Administrative measures** to reduce the risk of exposure to persons with infectious TB include the following:
 - a. Assign responsibility for TB infection control in the healthcare setting. Protocol development will apply epidemiology-based prevention principles, including the use of setting-related TB infection-control data;
 - b. Protocols are based upon a TB risk assessment of the UTMB healthcare system;
 - c. Recommended laboratory processing, testing, and reporting of results are available;
 - d. Effective work practices will be implemented for managing patients who may have TB disease;
 - e. Protocols for cleaning, disinfection and sterilization of equipment that might be contaminated (e.g. endoscopes) are in place.
 - f. Health care workers, patients, and visitors will be educated and counseled as needed about TB infection and TB disease;
 - g. Healthcare workers who have been exposed to TB disease will be evaluated and follow-up testing provided as indicated;
 - h. Remind patients and staff of proper cough etiquette (covering mouth when coughing) and respiratory hygiene; and

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- i. Coordinate efforts between local and state health departments, the Texas Department of Criminal Justice (TDCJ), other and high-risk healthcare and congregate settings.
- 2. Use of environmental controls** to prevent the spread and reduce the concentration of infectious droplet nuclei. This includes:
 - a. Primary environmental controls consist of 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.
 - b. Secondary environmental controls consist of controlling the airflow to prevent contamination of air in areas adjacent to the source airborne infection isolation (AII) rooms; and cleaning the air by using high efficiency particulate air (HEPA) filtration, or ultraviolet germicidal irradiation.
- 3. Use of personal respiratory protective equipment.**
 - a. Implementing a respiratory protection program;
 - b. Training health care workers on respiratory protection; and
 - c. Educating patients on respiratory hygiene and the importance of cough etiquette procedures.

Administrative Controls

1. Responsibility

The Infection Control Committee (ICC) will provide oversight for the TB Control Program. It is the responsibility of the Department of Infection Control and Healthcare Epidemiology (ICHE), in conjunction with Business Operations and Facilities Division (BOF), Environmental Health and Safety Department (EHS), and Employee Health Department to develop and maintain protocols as appropriate to their scope of responsibility.

2. Risk Assessment

- a. **Purpose:** The purpose of the risk assessment is to evaluate risk for TB transmission in UTMB facilities by reviewing the number of cases of infectious tuberculosis, the number of exposure events, and the prevalence of latent infection including post-exposure infection among healthcare workers.
- b. **TB control plan:** the plan will be reviewed and updated every two years, or more frequently if necessary.
- c. **Case Surveillance:**
 - Data on the number of active TB cases among patients and HCWs are collected, reviewed, and used to:
 - Identify potential nosocomial transmission to a patient
 - Assess the level of potential occupational risk

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- QuantiFeron-TB Gold (QFT®): an interferon-gamma (IFN-γ) release assay, commonly known as an IGRA. **IGRA is the preferred method of testing.** TB skin testing (TST) is an available alternative.

d. **Analysis of HCW TB Skin Test/IGRA Data**

- Results of employees' tests are maintained in a retrievable database by Employee Health.
- Any time a cluster of test conversions is noted, further evaluation is indicated.
- HCW's/Employees (including physicians), who do not follow the approved screening process (e.g. post-exposure screening), are considered out of compliance with hospital protocol. When delinquent, the employee and supervisor will receive written notification. Failure to comply will result in disciplinary action.

e. **Frequency of screening for healthcare workers**

All healthcare workers:

- Are screened upon hire by IGRA. A 2-step TB skin test (TST) is required if the IGRA cannot be performed. New employees with a positive test are evaluated for active disease and for prophylaxis of latent TB.
- Serial screening by IGRA or TST will not be required.
- Post-exposure screening is required. If the employee is known to be IGRA or TST-positive, only a symptom screen is required. An exposure is determined by infectiousness of patient and absence of PPE.
- Healthcare workers known to have a positive TST or IGRA will review symptoms annually. No additional follow-up is required unless symptoms of active disease develop.
- Exposures will be investigated to determine the reason for the event and to review any conversions (latent TB) or active disease related to the exposure. The investigation may include serial screening of healthcare workers for a limited time.
- Refer to Appendix C for compliance expectations for employees
- Refer to Appendix D for compliance expectations for students

3. Availability of laboratory processing, testing and reporting of results

- a. Polymerase chain reaction (PCR)-also referred to as nucleic acid amplification test (NAAT)
- The *M. tuberculosis* PCR will detect DNA of an organism in the *Mycobacterium tuberculosis* complex. It is used to estimate the infectiousness of a patient with known or suspected TB and is the basis for determining the need for airborne isolation.

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- The PCR test should always be used in conjunction with the acid-fast bacilli (AFB) culture. This test is performed 7 days a week on the Galveston campus. Specimens from other UTMB hospitals may be transported to the main campus.
 - Acceptable specimens include upper respiratory (Sputum, BAL, Bronchial Washing), gastric lavage, urine, other body fluids (e.g.- peritoneal fluid), feces (HIV+ patients). Swab specimens are suboptimal and should not be submitted.
- b. Acid fast bacilli (AFB) cultures and smears should be ordered in addition to the PCR. Smear results of sputum are available within 24 hours of specimen collection.
 - c. Sensitivity testing: all sensitivity testing is done through reference testing.
 - d. QuantiFeron-TB Gold (QFT®): an interferon-gamma (IFN- γ) release assay, commonly known as an IGRA, is blood test used as the preferred method of screening. An alternative method is the tuberculin skin test (TST or Mantoux).

4. Work practice controls

- a. Respiratory hygiene and cough etiquette
 - Visual alerts or reminders for coughing patients to do the following:
 - Provide surgical or procedure mask for patient to wear until assessed
 - Provide tissues to clear secretions as necessary
 - Instruct patient to use the nearest waste receptacle to dispose of used tissues
 - Instruct patient to perform hand hygiene after disposing of tissue
 - Move to a private room as soon as possible. Implement the appropriate level of isolation precautions (Airborne Precautions for possible TB, Droplet Precautions for respiratory infections likely caused by a virus).
- b. Screen patients for possible tuberculosis (and implement isolation precautions as described in the following section (IV.C)).
 - Staff are aware of screening criteria.
 - Pulmonary TB should always be included in the differential diagnosis of persons with signs and symptoms suggestive of TB and appropriate diagnostic measures should be used.
 - Signs/symptoms that are suggestive of TB include:
 - Persistent cough > 2 weeks duration
 - Bloody sputum
 - Night sweats
 - Weight loss
 - Anorexia
 - Fever

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- Groups with a higher prevalence of TB infection include:
 - Medically underserved populations
 - Homeless persons
 - Current or past prison inmates
 - Alcoholics
 - Injecting drug-users
 - Elderly
 - Foreign-born persons from areas with high TB incidence
 - Contacts to persons with active TB
- Groups with a higher risk of progressing from latent TB infection to active disease include:
 - Persons with HIV infection, silicosis, S/P gastrectomy or jejuno-ileal bypass surgery, >10% below body weight, chronic renal failure, diabetes mellitus, immunosuppressed due to medication, and those with some malignancies
 - Persons who have been infected within the past two years. Infants and very young children are at increased risk, and it is important to evaluate them for clinical reasons. They typically do not require isolation precautions.
 - Persons with fibrotic lesions on chest x-ray
- If patients with previously diagnosed TB: place in Airborne Precautions unless confirmation of adequate treatment to render the patient non-infectious is available.

Isolation

Initiation of Airborne Precautions (see Appendix A for location-specific instructions)

1. All patients with suspected or confirmed TB should be evaluated for potential infectiousness and those with pulmonary or laryngeal TB should be placed in Airborne Precautions until they are determined to be non-infectious. Place isolation order in the electronic medical record (EMR) or call ICHE (409-772-3192 or page 409-643-3133) to request assistance.
2. Patients with extrapulmonary TB are usually not infectious unless they have concomitant pulmonary disease, non-pulmonary disease located in the oral cavity or the larynx, or extrapulmonary disease that includes an open abscess or lesion in which the concentration of organisms is high, especially if drainage from the abscess or lesion is extensive, or if aerosolization of drainage fluid is performed. Persons with TB pleural effusions might also have concurrent unsuspected pulmonary or laryngeal TB disease. These patients should be considered infectious until pulmonary TB disease is excluded. Patients with suspected TB pleural effusions or extrapulmonary TB disease should be considered pulmonary TB suspects until concomitant pulmonary disease is excluded.
3. Place in airborne infection isolation room (AIIR), a negative-pressure room, as soon as possible. If no AIIR is available, keep the patient in a private room until transfer to another location can be arranged or TB is excluded. Keep the door closed. Request that the patient wear a surgical or procedure

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mask if feasible until the transfer is complete. All staff members will wear an N-95 respirator or powered air purifying respirator (PAPR) when in the patient's room. See IHOP 08.01.29 Respiratory Protection

4. All locations: general protocol
 - a. Post Airborne Precautions sign on door.
 - b. Healthcare workers who enter an AIIR must have been evaluated and trained for the appropriate level of PPE (see section II)
 - c. Visitors must be minimized and those who enter an AIIR must don a surgical or procedure mask. Nursing staff should instruct visitors in its use. Visitors are generally not screened and trained to use an N95 respirator.
 - d. Patients in airborne precautions should be educated about TB transmission and taught to contain secretions from coughing or sneezing as well as the importance of taking medication.
 - e. Patients in airborne precautions should remain in negative air pressure isolation room with door closed. The door should be opened only for staff and visitors to enter and exit.
 - f. Transporting the TB patient outside isolation room should occur only when medically essential procedures cannot be performed in the isolation room.
 - The patient must wear a surgical or procedure mask when outside the isolation room; the transporter does not need to wear a respirator except when inside the actual isolation room. If the patient is masked, the transporter is not masked.
 - Timing of transport should be planned to occur when the procedure can be performed rapidly, and the patient does not have to wait in a crowded area (to avoid potentially infecting other patients).
 - g. Hand hygiene: either alcohol-based hand sanitizer or handwashing with soap and water is acceptable.
 - h. Environment: hospital grade disinfectants are used which are rated as anti-tuberculocidal (may also be described as antimycobacterial).
 - i. Equipment: All reusable equipment is cleaned and disinfected or sterilized sufficiently to remove and inactivate mycobacteria in accordance with infection control policies:
 - 01.05.02 – Infection Control Policy on Sterilization of Semi-Critical and Critical Medical Devices
 - 01.05.04 – High Level Disinfection of Semi-Critical Medical Devices
 - 01.05.06 – Cleaning Disinfection and Storage of Noncritical Patient Care Equipment
 - j. Education: All health-care workers will receive education about TB that is appropriate to their job category. Specific information and training about occupational hazards and required protective measures will be provided to new employees before the initial assignment and annually to all

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employees. This training will occur upon hire through general orientation, department orientation, and annually by on-line training for isolation precautions.

Diagnostic Testing

Laboratory tests

1. Initial diagnostic tests should include PCR as well as AFB culture (and smear)
2. PCR: The PCR is used to diagnose and identify infectiousness of TB. A positive PCR indicates the presence of *M. tuberculosis*.
3. Acid fast bacilli (AFB) smear and culture
 - a. 3 specimens should be taken at least 8 hours apart, with one specimen preferably collected in early morning.
 - b. A positive AFB smear is interpreted as infectiousness. 3 negative smears indicate non-infectiousness.
 - c. The AFB culture is required to confirm the diagnosis of tuberculosis and to perform sensitivity testing on the isolate.
 - d. Patient with previous diagnosis of nontuberculous mycobacterial or nocardial infection: consult director of ICHE or infectious diseases specialist to determine isolation status.
4. IGRA is performed on a blood sample by the laboratory test. Unlike the TB skin test, it is unaffected by previous vaccination with Bacille-Calmette Guerin (BCG). Like the TST, IGRAs cannot distinguish between active tuberculosis disease and latent TB infection, and is intended for use with risk assessment, radiography, and other medical and diagnostic evaluations.
5. Radiographic evidence: chest film and/or CT: 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.
6. TB skin test (TST) with purified protein derivative (PPD) is administered by trained nursing staff.
 - a. The size of induration is measured at 48 and 72 hours and recorded in the EMR. Do not report as “positive” or “negative”, but in millimeters.
 - b. TST positivity, including the size of induration, should not be interpreted as being indicative of active disease and/or infectiousness
 - c. A negative TST does not rule out active TB.

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Surveillance and Reporting to Public Health

The ICHE department utilizes Epic Bugsy to identify and review Microbiology test results. The IP on call will utilize alerts to assure positive PCR and AFB smears/cultures are reviewed promptly and isolation initiated as indicated. IPs can initiate an isolation order based on findings.

- a. Isolation on inpatients may be ordered and discontinued by a physician or IP.
- b. The HCE isolation flag in the EMR can only be initiated and resolved by an IP. Clinicians who wish to have an isolation flag removed may contact ICHE via phone during regular working hours or by pager after hours. An IP will review the chart to determine if criteria are met. If uncertain, the IP will consult the director.
- c. IPs review isolation on their assigned units to validate appropriateness.
- d. ICHE will report suspected/confirmed cases to the local health authority, providing all necessary documentation requested.
- e. ICHE will review the chart to identify possible exposures if isolation was not initiated promptly for an infectious patient.

Treatment

Acceptable anti-tuberculous drug regimen will be ordered following UTMB protocol. Expert consultation may be sought through infectious disease or pulmonary service. First line of drugs typically includes isoniazid, rifampin, pyrazinamide and ethambutol.

Note: one-drug therapy (e.g., isoniazid) is used for treatment of latent TB and should not be misinterpreted as indicative of active disease.

Environmental Controls

1. Building design utilizes Facility Guidelines Institute (FGI) guidelines to reduce risk of TB transmission in patient care areas
2. Engineering controls, including the number and location of AIIRs, are evaluated at least annually in conjunction with Business Operations and Facilities (BOF) division (aka Property Services).
3. Ventilation accomplishes the dilution and removal of contaminants from the air and provides for room airflow, velocity (cfm) and patterns that meet current federal, state and local regulations.
 - a. General ventilation reduces the concentration of contaminants in the air throughout the main hospital.
 - Recirculating System only a small portion of the total room or area exhaust is discharged to the outside. This volume of exhaust air is then replaced with fresh outside air. The resulting mixture is then recirculated to the rooms or areas serviced by the system.
 - Ventilation Rates of a minimum of 12 air changes per hour (ACH) for Isolation, Treatment rooms and ICU's are maintained.
 - Room airflow Patterns are designed to prevent stagnation of the air and prevent "short circuiting" of the supply to the exhaust (i.e. passage of air directly from the air intake to the air exhaust).

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- b. Airborne infection isolation room (AIIR): provides environment that will allow reduction of the concentration of droplet nuclei through various engineering controls:
 - Maintain negative pressure. See location-specific procedures for monitoring.
 - Minimum requirement of 12 air changes/hour
 - Air from AIIRs is exhausted to the outside in accordance with federal, state, and local regulation. (DSHS: exhaust through the roof and 25 feet from air exhaust.). When this is not feasible, exhaust must be HEPA filtered.
 - An anteroom may increase the effectiveness of the isolation room by serving as an airlock to minimize the potential for droplet nuclei to escape into the corridor when the door is opened. Absence of an anteroom does not preclude the use for a patient in Airborne Precautions.
- c. Monitoring
 - Jennie Sealy and LCC: negative pressure rooms are monitored electronically when the room is in isolation mode. An alarm will sound if negative pressure is lost. ADC: digital monitors are mounted outside the door. CLC: digital monitors are mounted outside each door and negative pressure is monitored electronically. An alarm will sound if negative pressure is lost.
 - BOF will check twice a year to ensure that proper pressure relationships exist
 - Nursing will check negative pressure rooms daily with 1-ply tissue or vane meters. A maintenance request will be entered online if the room is not negative.
- 4. Engineering Controls in Pathology
 - a. All clinical laboratories are maintained under negative pressure
 - b. AFB laboratory:
 - Negative pressure
 - Cultures are handled in a biosafety cabinet
 - Staff wear an N95 respirator
 - c. Centrifugation must be performed in sealed screw-capped tubes enclosed within sealed safety centrifuge carries (i.e., double closure system) to minimize aerosol hazards.
 - d. Autopsy room: negative pressure and use of appropriate PPE.

Discontinuing Isolation

1. Discontinuation of TB Isolation

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- a. Continue Airborne Precautions until the patient is determined to be noninfectious, TB is ruled out, or the patient is discharged from the hospital.
- b. For patients with suspected pulmonary TB, airborne precautions will continue until the patient **has one negative PCR** on sputum samples, and after considering all other clinically relevant information. In some cases, results of additional PCR, AFB smears and culture results may be required before discontinuing airborne precautions; this decision may be guided by infectious disease specialists.
- c. For patients with PCR for AFB or culture confirmed pulmonary TB: Airborne precautions should continue until symptoms improve, the patient has complied with an adequate TB treatment regimen for at least 2 weeks, and patient has **two negative PCR or 3 negative smears** on sputum samples which are obtained at least 8 hours apart. Extrapulmonary TB: evaluate for concomitant pulmonary infection.
- d. For patients with extrapulmonary TB in a wound, airborne isolation may be discontinued if the wound is completely covered or the wound has healed completely. If the wound is not healed and the PCR is not done or is positive, airborne isolation must remain in place and appropriate PPE worn, including during any wound care procedures. If the patient has a roommate, all wound care should be conducted in a separate exam room to minimize exposure risk. Once the patient has **one negative PCR** result from the extrapulmonary site, isolation may be discontinued.
- e. When an infectious patient is discharged, leave the Airborne Precautions sign on the door until Environmental Services (EVS) has finished the terminal clean. This gives the HVAC system time to clear droplet nuclei.
- f. ICHE will notify the local health authority when patient is discharged. If patient leaves against medical advice, contact ICHE via pager (409-643-3133) to assure notification of public health agency.

Investigations 1. Identifying and investigating Exposures

- a. An exposure is unprotected contact with a patient who has active pulmonary or laryngeal tuberculosis and is determined to be infectious either by positive PCR or positive AFB smears. In general, extrapulmonary TB is not transmitted to others, though situations where employees may have been exposed by aerosolization during activities such as wound irrigation will be reviewed.
- b. Exposures may be identified by ICHE personnel when reviewing medical records of patients identified as having active tuberculosis or confirmed by ICHE when employees or clinical managers' report potential exposures.
- c. Exposures of employees and/or students will be managed as follows. See Appendix C and D:

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- ICHE will coordinate an investigation with clinical managers, physicians, Employee Health, Student Health, and public health as needed to identify persons who were exposed and to recommend follow-up.
 - ICHE will obtain a list of exposed employees from clinical managers and faculty
 - ICHE will provide a list a list of exposed employees to Employee Health
 - ICHE will provide a list of any students identified as exposed to Student Health
 - The exposed employee/student will report to Employee Health/Student Health for testing as instructed.
 - The employee/student will be tested by IGRA (preferred) or TB skin test
 - The exposed employee/student will be counseled to report signs and symptoms of TB.
 - TB screen test conversions will be followed by chest radiograph and referred to either public health or their personal healthcare provider to be evaluated for prophylaxis.
 - Employees/students who have a chest radiograph or signs/symptoms of active TB will be restricted from work until evaluated and cleared for duty
2. First responder exposures: The local health authority and the agency's safety officer will be informed when a patient identified as infectious has been transported to UTMB to determine if an unprotected exposure occurred.
 3. Other facilities: ICHE will notify the infection preventionist of a facility that either transferred a previously unidentified infectious patient to a UTMB facility or if UTMB transferred an infectious patient to another facility prior to identifying the infection.
 4. Patient exposures
 - a. ICHE will contact the clinical manager of the area where exposures might have occurred to define what constitutes an exposure and to develop an action plan for notification and evaluation of the patients involved. A template for written notification will be provided.
 - b. ICHE will inform the local health authority of an exposure event involving patients.
 - c. The clinical manager or patient's physician will notify patients who were potentially exposed to provide guidance and options for follow-up.
 - Patients will be instructed where to report for IGRA (preferred) or TST.

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- If feasible, the test should be done as soon as possible after the exposure and repeated 3 months later if the baseline is negative.
- This will be done at no cost to the patient if performed at a UTMB facility or a public health department.
- Patients who convert (either known negative baseline or unknown status at the time of exposure) will be evaluated as follows by a healthcare provider:
 - Evaluation for active versus latent TB. It is unlikely that a patient recently exposed would have active TB. The infection will be reported as required by law.
 - Patients with latent TB will be evaluated for treatment (prophylaxis). Patients may receive treatment for latent TB from their treating physician or through their local health department.
- Investigation of cluster of TB conversions among personnel
 - A cluster is ≥ 2 conversions from the same department or assigned to work in the same area.
 - Investigate to determine if they have had known contact with a patient identified with TB. The public health department may be able to confirm if any household contacts of the patient who might have visited the patient also have active disease.
 - If no patient source is identified, determine if a staff member in the area has exhibited signs/symptoms of active TB.
 - If no source is identified, additional testing in 3-6 months may be advisable to determine if transmission is ongoing.
 - Determine if environmental controls or work practices may have been inadequate.
- Investigation of possible nosocomial transmission of tuberculosis to a patient if one or more recently treated patients are identified with new cases of TB. Determine if the following types of contact might have occurred:
 - admitted to same room or area
 - received same procedure
 - were in same treatment area on the same day.
 - Take the following steps if the above suggests transmission has occurred:
 - Conduct a problem evaluation to determine possible causes of the transmission:
 - Determine which additional patients or HCWs may have been exposed and evaluate with IGRA (preferred) or TST
 - Consult with the public health department for assistance in community contact investigation

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Plan for Drug Resistant TB

1. Precautions
 - a. If MDR or XDR are suspected, contact Infection Control at 409-772-3192 or page 409-643-3133 after hours.
 - b. IC will educate staff about the importance of containment.
 - c. IC will monitor to assure isolation precautions are followed and the room is checked daily for negative pressure.
 - d. IC will inform Galveston County Health Authority.
2. Treatment: Infectious Diseases Service should be consulted for treatment.

References

1. CDC/Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health Care Facilities, 2005
2. CDC/Core Curriculum on Tuberculosis/4th Edition, 1995
3. Mycobacterium Tuberculosis and Nontuberculosis Mycobacteria/APIC Infection Control and Applied Epidemiology/Chapter 68/1996
4. Tuberculosis Screening, Testing, and Treatment of U.S. Health Care Personnel: Recommendations from the National Tuberculosis Controllers Association and CDC, 2019

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Appendix A Location specific instructions

1. Emergency department

- Provide surgical or procedure mask to patients based on triage screening
- Implement Airborne Precautions if screening at triage or subsequent assessment and/or diagnostic tests (e.g. suspicious chest radiograph) as soon as TB becomes a consideration.
- Place patient in an AIIR as soon as possible. Keep the door closed until the patient is transferred to an AIIR.
- Communicate isolation status as a part of the admission process to assure the patient is transferred to an AIIR.

2. Procedure areas

- Bronchoscopy: perform in an AIIR
- Cough induction: perform in an AIIR
- Surgery
 - Elective procedures on patients with TB should be delayed until the patient is no longer infectious.
 - A bacterial filter placed on the patient endotracheal tube or at the expiratory side of the breathing circuit of the anesthesia machine may be useful in reducing the risk of contamination of anesthesia equipment or discharge of tubercle bacilli into the ambient air when anesthesia is being administered to a patient with possible TB. Options for emergent procedure: call ICHE.
 - PACU: The pulmonary TB patient should be monitored during recovery in an individual room meeting AIIR requirements

3. Inpatient units

- Admit patient to an AIIR. If none is available, contact Infection Control and Healthcare Epidemiology to discuss options.
- An infection preventionist (IP) will assist in determining the need for Airborne Precautions
- **Jennie Sealy and League City Campus (LCC)**
 - Nursing staff must log into the room system and place the room in isolation mode. A Clinical Operations Administrator (COA) can assist if the nurse is not familiar with the system.
 - AIIRs are monitored electronically to ensure the room remains in negative pressure. An alarm sounds if negative pressure is lost.
 - A visual check using the tissue test or a vane meter should be performed daily by Nursing staff while the room is in use as an AIIR.

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- When Airborne Precautions are discontinued, discontinue isolation mode for room online.
- **Clear Lake Campus (CLC)**
 - Nursing staff must place the room in negative pressure mode using the digital monitoring screen located outside each room. A Clinical Operations Administrator (COA) can assist if the nurse is not familiar with the system.
 - AIIRs are monitored electronically to ensure the room remains in negative pressure. An alarm sounds if negative pressure is lost.
 - A visual check using the tissue test or a vane meter should be performed daily by Nursing staff while the room is in use as an AIIR.
 - When Airborne Precautions are discontinued, discontinue isolation mode for room online.
- **John Sealy**
 - Notify Infection Control and Healthcare Epidemiology as the current hospital is undergoing renovation. In the meantime, patients needing AIIR will be moved to Jennie Sealy Hospital AIIR.
- **Hospital Galveston (TDCJ)**
 - Notify BOF when the AIIR room is put into use for airborne isolation.
 - Correctional Officers should follow isolation instructions as posted.
 - A visual test using the tissue test or a vane meter should be performed daily by Nursing staff while the room is in use as an AIIR
- **Angleton Danbury Campus (ADC)**
 - Admit patient to AIIR. Notify BOF.

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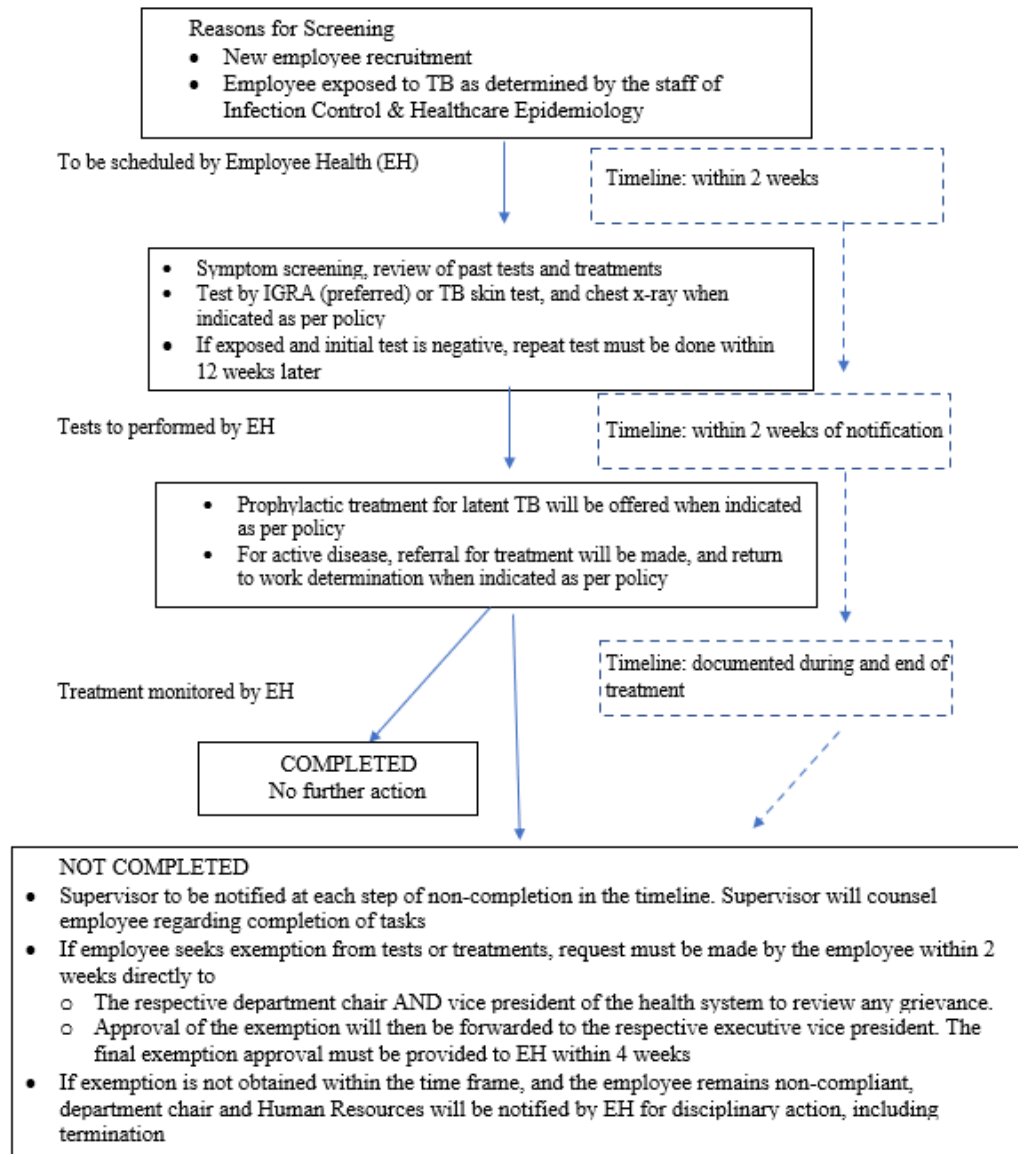
Appendix B Cough-Inducing Procedures

- General Guidelines: Procedures that involve instrumentation of the lower respiratory tract or induce cough may increase the probability of droplet nuclei being expelled in the air. These cough-inducing procedures include endotracheal intubation and suctioning, diagnostic sputum induction, aerosol treatments (including pentamidine therapy) and bronchoscopy. Other procedures that may generate aerosols (e.g., irrigation of tuberculous abscesses, homogenizing or lyophilizing tissue) are also included in these recommendations.
 - Do not perform on patients who may have infectious TB unless absolutely necessary.
 - Use local exhaust ventilation devices (e.g., booths or special enclosure) or, a room in a room that meets the ventilation requirements for TB isolation on patients with infectious TB.
 - During cough-inducing procedures HCWs will wear respiratory protection.
 - Keep patients in the isolation room or enclosure until coughing subsides. Give tissues and instructions to cover their mouth and nose when coughing. Post sedatives or anesthesia, monitor in a TB isolation room and not in recovery areas with other patients.
 - Before the booth, enclosure, or room is used for another patient, adequate time should be allowed to pass so that any droplet nuclei that have been expelled in the air are removed. This time will vary according to the efficiency of the ventilation system used.
- 1. Additional Considerations for Bronchoscopy If performing bronchoscopy in positive pressure rooms (such as Operating Rooms) is unavoidable, TB should be ruled out before the procedure. If bronchoscopy is being performed for diagnosis of pulmonary disease that may include TB, it should be performed in an AIIR.
 - a. Special Considerations for the Administration of Aerosolized Pentamidine (AP)
 - All patients should be screened for active TB before prophylactic AP therapy is initiated. Screening should include medical history, PPD, and a chest radiograph.
 - Before each AP treatment patients should be screened for symptoms suggestive of TB, such as development of productive cough.
- 2. Clinics/Urgent Care Centers
 - a. Provide surgical or procedure mask to patients based on triage screening
 - b. Follow Respiratory Hygiene protocol for coughing patient (i.e., cover the cough).

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- c. Implement Airborne Precautions if screening at triage or subsequent assessment and/or diagnostic tests (e.g. suspicious chest radiograph) as soon as TB becomes a consideration.
- d. Place patient in an AIIR as soon as possible. If no AIIR is available, keep the door closed and arrange transfer to an ED or direct hospital admission. Communicate isolation status. Mask the patient if feasible. For patients previously diagnosed with TB: unless an AIIR is available for examination of the patient, arrange appointments after the patient has been treated adequately to be rendered noninfectious.
- e. If a patient with possible TB has been treated in a room other than an AIIR, leave room closed/out of service for 2 hours to allow for an adequate number of air changes to remove droplet nuclei. After that, the room should be cleaned. There is no additional treatment for the room other than a terminal clean.
- f. An IGRA or TB skin test may be useful to assess the patient for latent TB prior to initiation of immunosuppressive therapy including corticosteroids. This identifies the patient at risk for progression from latent to active TB.

Appendix C Tuberculosis (TB) Screening and Treatment Algorithm for New Hires, and after Exposure Among Employees



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Appendix D **Tuberculosis (TB) Exposure and Treatment Policy for Students (Student Health)**

Purpose

To ensure accurate and up-to-date TB screening and treatment for UTMB student in accordance with the UTMB Infection Control & Healthcare Epidemiology policy.

Policy

- Upon admission, each UTMB STUDENT will be required to submit proof of TB screening by Quantiferon (QFT) Gold (only) within 3 months PRIOR to the start the of classes.
- Student with a documented positive QFT Gold and who have had antibiotic treatment for latent or active TB will be required to annually submit screening form annually for the presence of symptoms of active tuberculosis. Students who do not follow through the policy will be subject to disciplinary actions.
- All new positive QFT's and cultures will be reported to the Department of Health in accordance with current regulations.

Procedures

1. All new incoming student will complete a TB evaluation questionnaire and a QFT Gold lab test.
2. All current students will complete **an Annual TB screening form**, and this will be done annually.
3. All student with a history of a positive PPD skin test/positive QFT and who have taken antibiotics for latent TB will see a SHC provider/PCP and obtain an order for a chest x-ray.
4. The result of the QFT Gold will be documented in each student EPIC chart.
 - If a chest x-ray was performed, the radiology report will be signed/reviewed and by a provider and documented in the patient's EPIC chart.
 - Results will also be documented by the nursing staff and checked off in MY STAR that the student meet TB screening and immunization compliance.
5. Student with a history of positive QFT Gold will be counseled by SHC provider regarding signs and symptoms of tuberculosis and advised about follow up and treatment options.
6. In the event of exposure to active tuberculosis, or exposure to a patient with suspected active tuberculosis, exposed Student should be tested immediately after exposure. If the test is negative, a second test should be administered in three months. See exposure policy for more details.

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7. **Student who refuses TB screen or has positive QFT Gold or TB cultures but refuses treatment for latent or active TB will be required** to do the following:
 - No exemption is available for a student with active TB who refuses treatment or isolation until cleared to return to classes. Such student shall be reported to the respective Dean for termination.
 - For exemption from latent TB treatment or testing, obtain a TB Exemption Form from Student Health, and send it to the respective Dean for approval within 2 weeks of notification of the need for testing and/or treatment.
 - If full exemption approval is not obtained by Student Health within 4 weeks, the Dean shall pursue additional disciplinary action, including termination.
8. If an exemption is obtained, Student Health will determine individual follow up plan, including frequent in-person evaluations and tests.