



Flagstaff Medical Center
Northern Arizona Healthcare

HOSPITAL
GUIDELINES OF PRACTICE

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EFFECTIVE DATE:

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TITLE:

TUBERCULOSIS (TB) CONTROL PLAN

PURPOSE

The TB Control Plan for Flagstaff Medical Center has been established to minimize the risk of transmission of tuberculosis (TB) in our health care setting through early detection, isolation, treatment, and safe transport of persons with suspected and/or active TB, purified protein derivative (PPD) skin testing programs, and health care worker (HCW) education.

DEFINITION

Health Care Worker (HCW) – Employees, physicians, EMS, and volunteers.

AUTHORITY AND RESPONSIBILITY

Flagstaff Medical Center Administration has the responsibility to ensure that a comprehensive TB Control Plan, which meets federal and state requirements, is established and implemented. Authority and responsibility for overall coordination of the TB Control Plan is then delegated to the Infection Prevention Committee.

The Infection Prevention Committee will have responsibility for the design, implementation, maintenance, and review of the TB Control Plan.

The Infection Control Practitioner (ICP), under the direction of the Infection Prevention Committee, is responsible to coordinate, develop, and maintain all aspects of the TB Control Plan and is the designated TB contact person. This individual is authorized to delegate specific responsibility for the management of the plan and its requirements to Department Directors/employees.

All employees are responsible for strict adherence/compliance to all elements of the TB Control Plan.

RISK ASSESSMENT

The TB Control Plan is based on an annual risk assessment, which evaluates the risk of TB transmission in each department at Flagstaff Medical Center (FMC) with appropriate infection control interventions. The risk assessment includes an evaluation of community prevalence of TB, the number of TB patients identified or suspected of having TB, TB skin testing (TST) conversion data for employees, review of volunteer screening for signs or symptoms of TB, and any evidence of patient-to-patient or employee/patient transmission. Risk assessment will be repeated annually to determine the risk category at FMC. Refer to attachment – Annual Risk Assessment Summary.

Risk Classifications Include:

Low Risk (Inpatient ≥ 200 Beds)

- <6 TB patients/year
- Persons who will be treated have been demonstrated to have latent TB infection (LTBI) and not TB disease
- A system is in place to promptly detect and triage persons who have signs and symptoms of disease to a setting in which persons with TB disease are treated
- No cough-inducing or aerosol-generating procedures are performed
- Lab in which clinical specimens that might contain M. tuberculosis are not manipulated

Medium Risk (Inpatient ≥ 200 Beds)

- ≥ 6 TB patients/year
- Settings in which person with TB disease are encountered, criteria for low risk is not otherwise met.
- Lab in which clinical specimens that might contain M. tuberculosis are manipulated

APPROVED BY/TITLE:

William T. Brule

DATE REVIEWED:

02/08/11

DATE REVISED:

Ongoing Transmission

- Evidence suggestive of person to person transmission during the proceeding year. Evidence includes 1) clusters of TST or blood assay for M. Tuberculosis BAMT conversions, 2) HCW with confirmed TB disease, 3) increased rates of TST or BAMT conversions, 4) unrecognized TB disease in patients or HCWs, or 5) recognition of an identical strain of M. tuberculosis in patients or HCWs with TB disease identified by DNA fingerprinting.
- Evidence suggestive of patient to HCW transmission during the proceeding year (evidence includes above)
- Evidence suggestive of HCW to HCW transmission during the proceeding year (evidence includes above)

In uncertainty exists regarding whether to classify a setting a low risk or medium risk the setting typically should be classified as medium risk.

TB Screening Procedures for Settings (or HCWs) Classified as **Low Risk**

- Baseline two-step TST or one BAMT; all HCWs should have a baseline two-step tuberculin skin test (TST) or one blood assay for M. tuberculosis (BAMT) result at each new health-care setting, even if the setting is determined to be low risk. In certain settings, a choice might be made to not perform baseline TB screening or serial TB screening for HCWs who 1) will never be in contact with or have shared air space with patients who have TB disease (i.e., telephone operators who work in a separate building from patients) or 2) will never be in contact with clinical specimens that might contain M. tuberculosis. Establishment of a reliable baseline result can be beneficial if subsequent screening is needed after an unexpected exposure to M. tuberculosis. All HCWs should receive baseline TB screening upon hire, using two-step TST or single BAMT to test for infection with M. tuberculosis.
- No Serial TST or BAMT screening of HCWs (after baseline testing for infection with *M. tuberculosis*, additional TB screening is not necessary unless an exposure to *M. tuberculosis* occurs).
- TST OR BAMT for HCWs upon unprotected exposure to *M. tuberculosis*; perform a contact investigation (i.e., administer one TST as soon as possible at the time of exposure, and, if the TST result is negative, place another TST 8-10 weeks after the end of exposure to *M. tuberculosis*).

TB Screening Procedures for Settings (or HCWs) Classified as **Medium Risk**

- Baseline two-step TST or one BAMT; all HCWs should have a baseline two-step tuberculin skin test (TST) or one blood assay for M. tuberculosis (BAMT) result at each new health-care setting, even if the setting is determined to be low risk. In certain settings, a choice might be made to not perform baseline TB screening or serial TB screening for HCWs who 1) will never be in contact with or have shared air space with patients who have TB disease (i.e., telephone operators who work in a separate building from patients) or 2) will never be in contact with clinical specimens that might contain M. tuberculosis. Establishment of a reliable baseline result can be beneficial if subsequent screening is needed after an unexpected exposure to M. tuberculosis. All HCWs should receive baseline TB screening upon hire, using two-step TST or single BAMT to test for infection with M. tuberculosis.
- Employees having direct patient care will have TST every 12 months. Non-employed physicians will continue to have screening by TST, BAMT, or history questionnaire (if previously TST positive) every two years per credentialing requirement.
- TST OR BAMT for HCWs upon unprotected exposure to *M. tuberculosis*; perform a contact investigation (i.e., administer one TST as soon as possible at the time of exposure, and , if the TST result is negative, place another TST 8-10 weeks after the end of exposure to *M. tuberculosis*).

TB Screening Procedures for Settings (or HCWs) Classified as Potential **Ongoing Transmission**

- Baseline two-step TST or one BAMT; all HCWs should have a baseline two-step tuberculin skin test (TST) or one blood assay for M. tuberculosis (BAMT) result at each new health-care setting, even if the setting is determined to be low risk. In certain settings, a choice might be made to not perform baseline TB screening or serial TB screening for HCWs who 1) will never be in contact with or have shared air space with patients who have TB disease (i.e., telephone operators who work in a separate building from patients) or 2) will never be in contact with clinical specimens that might contain M. tuberculosis. Establishment of a reliable baseline result can be beneficial if subsequent screening is needed after an unexpected exposure to M. tuberculosis. All HCWs should receive baseline TB screening upon hire, using two-step TST or single BAMT to test for infection with M. tuberculosis.

- As needed in the investigation of potential ongoing transmission (during an investigation of potential ongoing transmission of *M. tuberculosis*, testing for *M. tuberculosis* infection should be performed every 8-10 weeks until lapses in infection controls have been corrected and no further evidence of ongoing transmission is apparent.)
- TST OR BAMT for HCWs upon unprotected exposure to *M. tuberculosis*; perform a contact investigation (i.e., administer one TST as soon as possible at the time of exposure, and, if the TST result is negative, place another TST 8-10 weeks after the end of exposure to *M. tuberculosis*).

PATIENT SCREENING

Patient Assessment

All patients **suspicious** for TB should have appropriate precautions taken to prevent airborne transmission until TB is diagnosed or ruled out.

Prevention of TB transmission is dependent upon rapid identification of known and suspected cases of TB, prompt application of TB precautions, and prompt initiation of treatment.

Pulmonary TB is always possible in patients with undiagnosed respiratory systems. Findings suspicious for TB are persistent cough (>3 weeks duration) or other signs and symptoms compatible with TB such as complaints of blood sputum, night sweats, weight loss, anorexia or fever. A chest x-ray with pulmonary cavitation or hilar/mediastinal adenopathy, with or without pleural/pericardial effusion, apical infiltration is also an indication of TB.

When patients medical histories are taken routinely ask about 1) a history of TB exposure, infection, or disease; 2) symptoms or signs of TB disease; and 3) medical conditions that increase their risk for TB disease (below). This is documented in the computer.

Population groups known to have a high incidence of TB include certain ethnic groups, prison inmates, alcoholics, intravenous drug users, HIV positive individuals, the elderly, foreign-born persons from areas of the world with high prevalence of TB, and persons living in the same household as the groups.

Infectiousness

Potential TB patient should be considered infectious if they:

- are coughing
- are undergoing cough – inducing or aerosol – generating procedures
- have sputum smears positive for acid fast bacilli
- are not receiving therapy
- have just started therapy
- have poor clinical response to therapy

Non-Infectious Confirmed Case

Patients are no longer considered infectious if they meet **ALL** of these criteria:

- are on adequate therapy x 2 weeks with a significant clinical response to therapy
- have had three consecutive negative sputum smear results

Non-Infectious Suspected Case

- negative sputum smear x 3 (must be collected 12 hours apart and 2 specimens have to be early a.m. specimens)
- negative bronchoscopy specimen smear and 2 negative sputum smears
- negative PPD
- other diagnosis explaining symptoms

A Triage Plan has been set up to use in the Emergency Department, Outpatient Clinics, and admitting areas to aid in the early detection of active TB and to remove the patient from other persons.

- a. Employees who first come into contact with the patient will be trained to ask appropriate questions and/or make observations, which will help recognize and detect patients with signs and symptoms suggestive of TB.
- b. **All patients with a cough and/or fever should use respiratory hygiene/cough etiquette by putting on a mask and sanitize their hands as they enter the building.**

- c. All patients with a chief complaint of cough or those with an observed cough should be asked how long they have had the cough.
- d. If the cough has been present for three weeks an assessment should be made by a designated trained health care provider to evaluate for TB exposure, health history, etc.
- e. If the patient is at risk for TB or if symptoms are suggestive of TB remove the patient from the open waiting room and place patient in ED Exam Room POU #25 or Room 6 or 7 (negative pressure rooms).
- f. Provide tissues with instructions for patient to cover mouth when coughing or sneezing.
- g. Chest x-ray and any additional work-up as ordered by physician should be done as soon as possible.
- h. PPD skin testing will be done as ordered by physician.

Diagnostic Procedures – Should be done in Endoscopy negative pressure procedure rooms.

Any employee who performs procedures that involve instrumentation of the lower respiratory tract or cough-inducing procedures on a patient with suspected or known TB must wear the N95 mask. These procedures may include endotracheal intubation and suctioning, diagnostic sputum induction, aerosol treatments, etc.

GUIDELINES FOR HANDLING PATIENTS WITH SUSPECTED/ACTIVE TUBERCULOSIS

All patients who are **suspected or confirmed of infectious TB** should be instructed to wear a surgical mask until they are placed in the appropriate negative air pressure room. They are maintained in airborne isolation until proven non-infectious.

Hospital Setting – Private Room

Engineering Controls – Purpose: Reduce or eliminate TB droplet nuclei in the air.

Airborne isolation is maintained in specific rooms that meet CDC criteria, i.e. Airborne Infectious Isolation (All), 12 air exchanges per hour, and air exhausted to outside. Please see the attachment for a list of these rooms.

- a. Monitoring and maintenance of engineering controls is completed by Plant Operations.
- b. The admitting nurse or the nurse on duty, when diagnosis is suspect, telephones Plant Operations when placing a patient in an Airborne Infectious Isolation room.
- c. Plant Operations checks and establishes that the negative pressure is in effect each day when the room is in use, and once per month when the room is **NOT** in use. Plant Operations maintains a log.
- d. Preventive maintenance is done quarterly (every 3 months) and documented.
- e. Annually the isolation room is tested to meet the criteria of an isolation room. This is arranged by Plant Operations.

All Airborne Infectious Isolation rooms are kept under constant negative air pressure. Rooms that have alarms may be turned off to facilitate use of the negative pressure rooms by patients not needing respiratory isolation. Plant Operations **will be notified when the patient is admitted to the Airborne Infectious Isolation room and when the patient is discharged out of the room.**

Staff who enter the room must be fit tested and wear an N95 mask. These are available in the Pyxis System or through Stores.

- a. While in the room, the patient need not wear a mask but should be counseled on mechanisms to contain secretions (i.e. using tissue to cover mouth when coughing). Oral secretions are to be coughed or spit into tissues held close to the mouth and then discarded in a red biohazard bag at the bedside.

Visitors (visits) should be held to a minimum. Visitors should be given instruction on proper use of respiratory protection devices (N95) and instructed on obtaining a proper seal and to utilize them when in the patient's room. Visitors do not need to be included in the respiratory protection program for fit testing, medical screening, etc.

Transportation Within the Facility

- a. Limit Transport – If the patient must leave the room, he/she wears a properly fitted surgical mask, which covers both nose and mouth.

- b. Diagnostic or treatment procedures that stimulate coughing on known or suspected infectious TB patients are performed in a negative air pressure room.
- c. **Strategy for Managing TB Patients and Preventing Airborne Transmission in Operating Rooms:** If emergency surgery is indicated for a patient with active TB, schedule the TB patient as the last surgical case to provide maximum time for adequate ACH. Operating Room personnel must be fit tested and wear an N95 mask. Keep the Operating Room door closed after the patient is intubated, and allow adequate time for sufficient ACH to remove 99% airborne particles (20 minutes for 26 ACH).

Extubate the patient in the Operating Room or allow the patient to recover in a negative pressure room. Breathing circuit filters with 0.1-0.2µm pore size can be used as an adjunct infection control measure.

When possible, postpone non-urgent procedures on patients with suspected or confirmed TB disease until the patient is determined to be noninfectious or determined to not have pulmonary TB disease.

- Respiratory protection must be worn when entering the room of a patient with known or suspected infectious pulmonary tuberculosis. Only staff that has been fit tested with an N95 TB mask will be allowed to care for a known or suspected TB patient.
- **Laboratory Specimens:** Sputum specimens from patients with active or suspected pulmonary tuberculosis should be handled with care. An impervious sputum container with a tight fitting lid should be used and it should be appropriately labeled to alert Laboratory personnel.
- **Sign:** An Airborne Infectious Isolation (All) should be placed at the patient's room by the patient's nurse. Do not remove the signage until the room has been cleaned by EVS staff.
- **Terminal Disinfection:** Do not admit a new patient to a room which has been used for TB precautions for a minimum of two hours.

- d. Hands must be washed thoroughly prior to entering or leaving AFB isolation room.

Transfer of Patient from Other Facilities

Transfer is necessary only when active tuberculosis is suspected. This would be suspected in one of the following cases:

- A positive PPD plus an abnormal chest x-ray consistent with pneumonia or TB
- A chest x-ray suggestive of pulmonary tuberculosis regardless of the PPD
- Positive PPD with signs and symptoms of TB

NOTE: A positive PPD with a chest x-ray not consistent with pulmonary tuberculosis and no signs or symptoms of TB is not an indication for transfer. In this case, the positive PPD does not indicate active pulmonary tuberculosis disease.

Method of Transfer

- Patient wears a surgical mask during transfer.
- If the patient is an outpatient, is stable and ambulatory, and has been living with an adult family member continuously, he or she may be transferred with that family member. The family member should understand that the patient may be contagious but that this contagious condition had been going on for a long time. Minors under 18 may not accompany the transfer.
- If the patient is transferred by an FMC vehicle such as a van/ambulance/helicopter, the entire crew must wear N95 filter respirators (i.e. Particulate Respiratory Type N95) during transfer. After the transfer, the vehicle should be aerated according to manufacturer's recommendations. During that time, the vehicle must be fully aired with all doors open. The transferring organization is notified of this limitation in advance. The vehicle is wiped down with an EPA approved disinfectant.

Transfer of Patient to Another Facility

Notify facility of suspected or conformed diagnosis of TB. Confirm that facility has negative air pressure room available.

Place surgical mask on patient and instruct them to leave mask on until in isolation room.

CRITERIA FOR DISCONTINUING TB ISOLATION

(Isolation does not preclude discharge from the hospital).

AFB isolation precautions may be discontinued when the following criteria have been met:

- a. Minimum of two weeks on anti-tuberculosis therapy
- b. Clinical improvement
- c. Three consecutive negative sputum smears collected on different days, or resolution of cough and unable to obtain sputum for microbiological analysis, or has significant reduction in AFB on smear on three sequential days and has an antibiotic susceptibility test to this organism that indicates sensitivity to the drugs being utilized
- d. TB diagnosis is excluded.

HOUSEKEEPING/INSTRUMENT CLEANING, DISINFECTION AND STERILIZATION

- a. Housekeeping personnel shall be instructed as to the proper precautions and protective cleaning to be used. Only designated housekeeping staff that have passed the fit test procedure are to go into AFB/All ISOLATION rooms.
- b. Routine daily cleaning procedures shall be conducted by housekeeping personnel as near normal as possible.
- c. Housekeeping is to be notified when patient is discharged. The room will then be thoroughly cleaned with the approved cleaning solution (including floors, walls, curtains, etc.). Housekeeping personnel are to wear the appropriate protective apparel, including an N95 mask while cleaning.
- d. All disposable items are to be discarded in the regular waste bags.
- e. Non-disposable items are to be cleaned with the approved cleaning solution prior to leaving the room.
- f. Cleaning cloths are to be discarded in the red regular bag. Mop heads are to be placed in a yellow biohazard bag and then laundered and thoroughly dried. All clean equipment is to be disinfected before leaving the room.
- g. Reusable sterile instruments will be processed through SPD, single patient items will be discarded in the appropriate waste container, all sharps are discarded in the regulated sharps container.
- h. Non-invasive flexible and rigid endoscopes that may come in contact with mucous membranes but do not ordinarily penetrate body surfaces should be sterilized or subjected to high-level disinfection.
- i. Items that either do not ordinarily touch the patient or touch only intact skin are to be cleaned with the approved cleaning disinfectant.

EMPLOYEE SCREENING

All employees and volunteers receive TB screening at least annually per Risk Management. Departments to have TST are employees having direct patient care, Nutrition Services, Environmental Services, Security, Facilities, Respiratory Therapy, Endoscopy, Laboratory, Behavioral Health, and Home Health. (See Employee Health – TB Testing Policy HR 8-0A.)

RESPIRATORY PROTECTION PROGRAM

Health care workers who have contact with known or suspected TB patients will follow the following Respiratory Protection Program:

- a. Any health care worker who enters the room or comes in contact with a person who is a known or suspected TB patient must wear a NIOSH approved mask (Particulate Respiratory Type N95).
- b. These health care workers are to have completed a medical evaluation and pass the fit test procedure, which is given by an individual who is competent and trained in fit testing.

Staff members who cannot pass the fit test must not perform work which requires a Particulate Respiratory Type N95 mask. (See Employee Health –Respiratory Fit Test HR 8-OE).

Staff members may not waive their right to wear proper respiratory protection.

- c. A fit check is to be performed by the wearer each time the N95 is put on.

The Infection Prevention Committee at FMC will determine annually the current risk assessment.

- d. Cough inducing procedures should not be performed on patients who may have infectious TB unless absolutely necessary.
- e. Notification of the patient's status (i.e. suspect case and/or known TB case) should be communicated to transport (air and ground) health care workers and to the receiving hospital prior to transport. The receiving hospital must have appropriate care available for TB patients as established by OSHA and must agree to accept the patient.
- f. Failure to use or comply with the respiratory protection program will result in administrative review.

EDUCATION/TRAINING

Patient/Family education is to be documented in the patient's medical record and is to include:

- a. Mode of transmission of bacteria aerosols from cough, sneezing, talking
- b. Use of tissue for covering nose and mouth when coughing or sneezing
- c. AFB isolation requirements
- d. Use of surgical mask for patient transportation
- e. Treatment regimen and need for compliance (i.e. risk for development of multi-drug resistant TB)
- f. Testing procedure (i.e. diagnostic tests, skin testing, etc.)

Volunteers

- a. Volunteers will receive training on an annual basis, which will include the basic concepts of TB transmission, signs and symptoms, and situations with increased risk of exposure to TB.
- b. Volunteers are not to have direct contact with suspected or known TB patients (according to HR Policy 8.0A).

Employee Training

- a. Education and training will be provided annually to all employees regarding TB transmission, signs/symptoms and diagnosis of TB, precautions to prevent the spread of TB, employee TB screening, and protection for health care workers, including personal respiratory protection through the mandatory module.
- b. Each Charge Nurse will in-service new employees on type of isolation room available on unit.
- c. All employees will be instructed basis about the responsibility of the health care worker to seek medical evaluation if a significant exposure to an individual with TB occurs, or if symptoms develop, or if PPD conversion occurs. Also discussed will be the responsibility of FMC to maintain the confidentiality of the health care worker while assuring that the health care worker receives appropriate therapy and is non-infectious before returning to work.

REPORTING

- a. All suspected or confirmed cases of TB will be reported to Infection Prevention. Infection Prevention will notify the local County Health Department, TB Control of pending discharge.
- b. The ICP will submit a written report to the Arizona Department of Public Health and the local health department utilizing the appropriate forms. The local health department will contact appropriate State Public Health Department if another state is involved.
- c. Discharge planning will be done with the local public health department to ensure continuity of outpatient treatment and medical follow-up.

PROGRAM EVALUATION

- a. The effectiveness of the Tuberculosis Control Program will be evaluated at least annually by the Infection Prevention Committee and revised as necessary.
- b. The evaluation will include a review of information on PPD conversions within FMC and on other risk assessment information.

ATTACHMENTS

Definitions
Negative Pressure Rooms/Airborne Infectious Isolation (AII) Rooms
Annual Risk Assessment Summary
Tuberculosis & Airborne Isolation Clinical Algorithm
TB Precautions in General Areas of the Hospital

REFERENCES

- Centers for Disease Control and Prevention. Guidelines for Preventing Transmission of Tuberculosis in Health Care Facilities, Final. Federal Register October 28, 1994: 59 FR54242.
- CDC. Guidelines for Environmental Infection Control in Health Care Facilities, June 6, 2003: Vol. 52 No. RR-10.
- Hospital Infection Control Practices Advisory Committee (HICPAC) Recommendations for Isolation Precautions in Hospital, from Centers for Disease Control and Prevention, Public Health Services, U.S. Department of Health and Human Services, Am J Infect Control 24:24-52, 1996.
- Centers for Disease Control. Guidelines for Preventing Transmission of Tuberculosis in Health Care Settings with Special Focus in HIV-Related Issues. MMWR 1990: 39 (no. RR-17): 1-29.
- Prevention and Control of Tuberculosis in Facilities Providing Long-Term Care to the Elderly; Recommendations of the Advisory Committee for Elimination of Tuberculosis; MMWR July 13, 1990 / Vol. 39 / No RR 10.
- Core Curriculum of Tuberculosis What the Clinical Should Know, 4th Edition, 2000, Centers for Disease Control and Prevention.
- TB Respiratory Protection Program in Health Care Facilities, U.S. Department of Health and Human Services – 1999.
- OSHA Occupation Exposures to Tuberculosis; proposed rule – 62:54159-54309
- OSHA Fact Sheet January 1, 1993 Enforcement Policy on Tuberculosis No. 93 – 43
- OSHA Regulations (Standards – 29 CFR) Respiratory Protection for M. Tuberculosis 1910.139.
- OSHA Standard Interpretation and Compliance Letters April 12, 1999.
- Control of Communicable Diseases Manual, 17th Edition, pp. 521-530.
- Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health Care Settings, 2005. MMWR Dec. 30, 2005/vol/54/No.RR.17.

DEFINITIONS

This contains some of the terms used in accordance with TB. The definitions given are not dictionary definitions, but are those most applicable to usage relating to TB.

Acid-fast bacilli (AFB): Bacteria that retain certain dyes after being washed in an acid solution. Most acid-fast organisms are mycobacteria. When AFB are seen on a stained smear of sputum or other clinical specimen, a diagnosis of TB should be suspected; however, the diagnosis of TB is not confirmed until a culture is grown and identified as *M. Tuberculosis*.

Aerosol: The droplet nuclei that are expelled by an infectious person (i.e. by coughing or sneezing); these droplet nuclei can remain suspended in the air and can transmit *M. Tuberculosis* to other persons.

Airborne Infectious Isolation (All): All rooms are used to separate patients who probably have infectious TB from other persons, provide an environment in which environmental factors are controlled to reduce the concentration of droplet nuclei, and prevent the escape of droplet nuclei from such rooms into adjacent areas using directional airflow.

Alveoli: The small air sacs in the lungs that lie at the end of the bronchial tree; the site where carbon dioxide in the blood is replaced by oxygen from the lungs and where TB infection usually begins.

Energy: The inability of a person to react to skin-test antigens (even if the person is infected with the organisms tested) because of immunosuppression.

Asymptomatic: Without symptoms, or producing no symptoms.

Bacillus of Calmette and Guerin (BCG) vaccine: A TB vaccine used in many parts of the world.

BAMT: The whole blood interferon gamma release assay (IGRA), QuantiFERON-TB Gold test (QFT-G) (Cellestis Limited, Carnegie, Victoria, Australia), is Food and Drug Administration (FDA) approved in vitro cytokine-based assay for cell-mediated immune reactivity to *M. tuberculosis* and might be used instead of TST in Tb screening programs for HCWs. This IGRA is an example of a blood assay for *M. tuberculosis* (BAMT).

Booster phenomenon: A phenomenon in which some persons (especially older adults) who are skin tested many years after infection with *M. Tuberculosis* have a negative reaction to an initial skin test, followed by a positive reaction to a subsequent skin test. The second (i.e. positive) reaction is caused by a boosted immune response. Two-step testing is used to distinguish new infections from boosted reaction (see Two-step testing).

Bronchoscopy: A procedure for examining the respiratory tract that requires inserting an instrument (a bronchoscope) through the mouth or nose and into the trachea. The procedure can be used to obtain diagnostic specimens.

Cavity: A hole in the lung resulting from the destruction of pulmonary tissue by TB or other pulmonary infections or conditions. TB patients who have cavities in their lungs are referred to as having cavitory disease and they are often more infectious than TB patients without cavitory disease.

Chemotherapy: Treatment of an infection or disease by means of oral or injectable drugs.

Cluster: Two or more PPD skin test conversions occurring within a 3-month period among HCWs in a specific area or occupational group, and epidemiologic evidence suggests occupational (nosocomial) transmission.

Contact: A person who has shared the same air with a person who has infectious TB for a sufficient amount of time to allow possible transmission of *M. Tuberculosis*.

Culture: The process of growing bacteria in the laboratory so that organism can be identified.

Droplet nuclei: Microscopic particles (i.e. 1-5 microns in diameter) produced when a person coughs, sneezes, shouts, or sings. The droplets produced by an infectious TB patient can carry tubercle bacilli and can remain suspended in the air for prolonged periods of time and be carried on normal air currents in the room.

Drug resistance, acquired: A resistance to one or more anti-TB drugs that develops while a patient is receiving therapy and which usually results from the patient's non-adherence to therapy or the prescription of an inadequate regimen by a health care provider.

Drug resistance, primary: A resistance to one or more anti-TB drugs that exists before a patient is treated with the drug(s). Primary resistance occurs in person exposed to and infected with a drug-resistant strain of *M. Tuberculosis*.

First-line drugs: The most often used anti-TB drugs (i.e. INH, rifampin, pyrazinamide, ethambutol, and streptomycin).

Fomites: Linens, books, dishes, or other objects used or touched by a patient. These objects are not involved in the transmission of *M. Tuberculosis*.

Human immunodeficiency virus (HIV) infection: Infection with the virus that causes acquired immunodeficiency syndrome (AIDS). HIV infection is the most important risk factor for the progression of latent TB infection to active TB.

Immunosuppressed: A condition in which the immune system is not functioning normally (i.e. severe cellular immunosuppression resulting from HIV infection or immunosuppressive therapy). Immunosuppressed persons are at greatly increased risk for developing active TB after they have been infected with *M. Tuberculosis*. No data is available regarding whether these persons are also at increased risk for infection with *M. tuberculosis* after they have been exposed to the organism.

Induration: An area of swelling produced by an immune response to an antigen. In tuberculin skin testing or anergy testing, the diameter of the indurated areas is measured 48-72 hours after injection, and the result is recorded in millimeters.

Intradermal: Within the layers of the skin.

Latent TB infection: Infection with *M. tuberculosis*, usually detected by a positive PPD skin-test result in a person who has no symptoms of active TB and who is not infectious.

M. tuberculosis: *Mycobacterium tuberculosis* – The initial infection usually goes unnoticed; tuberculin skin test sensitivity appears within a few weeks. Early lung lesions commonly heal, leaving no residual changes except occasional pulmonary or trachea bronchial lymph node calcifications. Approximately 90-95% of those initially infected enter this latent phase from which there is lifelong risk of reactivation. In approximately 5% of apparently normal hosts and as many as 50% of persons with advanced HN infection, the initial infection may progress directly to pulmonary tuberculosis. Extrapulmonary tuberculosis is much less common than pulmonary. It may affect any organ or tissue. Extrapulmonary tuberculosis occurs more frequently among persons who are infected with HN, but pulmonary tuberculosis remains the most common type of tuberculosis in this group worldwide.

Mantoux test: A method of skin testing that is performed by injecting 0.1 mL of PPD-tuberculin containing 5 tuberculin units into the dermis (i.e. the second layer of skin) of the forearm with a needle and syringe. This test is the most reliable and standardized technique for tuberculin testing (see Tuberculin skin test and Purified Protein Derivative (PPD) – tuberculin test).

Multi drug-resistant tuberculosis (MDR-TB): Active TB caused by *M. tuberculosis* organisms that are resistant to more than one anti-TB drug; in practice, often refers to organisms that are resistant to both INH and rifampin with or without resistance to other drugs (see drug resistance, acquired and drug resistance, primary).

Mycobacterium tuberculosis active disease: Positive PPD and signs and symptoms of disease (i.e. night sweats, coughing greater than 3 weeks, weight loss, anorexia and fever). Presence of tubercle bacilli in the sputum and also on the nature of change seen on chest radiographs. Abnormal x-ray densities indicative of pulmonary infiltration, cavitation and fibrosis can occur before clinical manifestations. Mode of transmission: Tubercle bacilli in airborne droplet nuclei produced by people with pulmonary or laryngeal tuberculosis during expiratory efforts, such as coughing, singing or sneezing.

Mycobacterium tuberculosis infection: Positive PPD, no signs and symptoms of active disease (i.e. night sweats, coughing greater than 3 weeks, weight loss, anorexia or fever). Not contagious.

Positive PPD reaction: A reaction to the purified protein derivative (PPD) tuberculin skin test that suggests the person tested is infected with *M. tuberculosis*. The person interpreting the skin test reaction determines whether it is positive on the basis of the size of the induration and the medical history and risk factors of the person being tested.

Purified protein derivative (PPD) – tuberculin test conversion: A change in PPD test results from negative to positive. A conversion within a 2-year period is usually interpreted as a new M. Tuberculosis infection, which carries an increased risk for progression to active disease. A booster reaction may be misinterpreted as a new infection (see Booster phenomenon in two-step testing).

Purified protein derivative (PPD) – tuberculin test: A method used to evaluate the likelihood that a person is infected with M. tuberculosis. A small dose of tuberculin (PPD) is injected just beneath the surface of the skin, and the area is examined 48-72 hours after the injection. A reaction is measured according to the size of the induration. The classification of a reaction as positive or negative depends on the patient's medical history and various risk factors (see Mantoux test).

TB infection: A condition in which living tubercle bacilli are present in the body but the disease is not clinically active. Infected persons usually have positive tuberculin reactions, but they have no symptoms related to the infection and are not infectious. However, infected persons remain at lifelong risk for developing disease unless preventative therapy is given.

TST: The term "tuberculin skin tests" (TSTs) is used instead of purified protein derivative (PPD).

Tuberculosis (TB): A clinically active, symptomatic disease caused by an organism in the M. tuberculosis complex (usually M. tuberculosis or, rarely, M bovis or M. africanum).

Two-step testing: A procedure used for the baseline testing of persons who will periodically receive tuberculin skin tests (i.e. HCWs) to reduce the likelihood of mistaking a boosted reaction for a new infection. If the initial tuberculin test result is classified as negative, a second test is repeated 1-3 weeks later. If the reaction to the second test is positive it probably represents a boosted reaction. If the second test result is also negative the person is classified as not infected. A positive reaction to a subsequent test would indicate new infection (i.e. a skin test conversion) in such a person.

Virulence: The degree of pathogenicity of a microorganism as indicated by the severity of the disease produced and its ability to invade the tissues of a host. M. tuberculosis is a virulent organism.

NEGATIVE PRESSURE ROOMS/AIRBORNE INFECTIOUS ISOLATION (AII) ROOMS

- PACU – Room 6
- Pre-Op – Room 14
- ICU North – Room 1014
- ICU South – Room 1007
- ICU 2nd Floor – Room 2010
- CV – ICU 2nd Floor – Room 2011
- SDU – Room 2039
- PEDS 2049 and 2050
- PICU 2054
- ED; and POU 25 and Rooms 6 and 7
- 3 South – Room 3069 and 3084
- 3 North – Room 3024
- Special Care Nursery – Room 17
- WIC 3rd Floor – Room 3507
- WIC 2nd Floor – Room 3506
- Endoscopy Procedure Rooms 1 and 2
- Humphreys – 3rd Floor – 3604

Annual Risk Assessment Summary

Date of Report: _____

For Calendar Year: _____

State/County Data	Year	Year	Year
Number of new cases of TB reported			
Single drug resistant cases			
Multi-drug resistant cases			
TB cases in local county			

Comments: _____

Patient Data	Year	Year	Year
Number of suspected/active TB Patients			
Number transferred due to suspected/active TB			

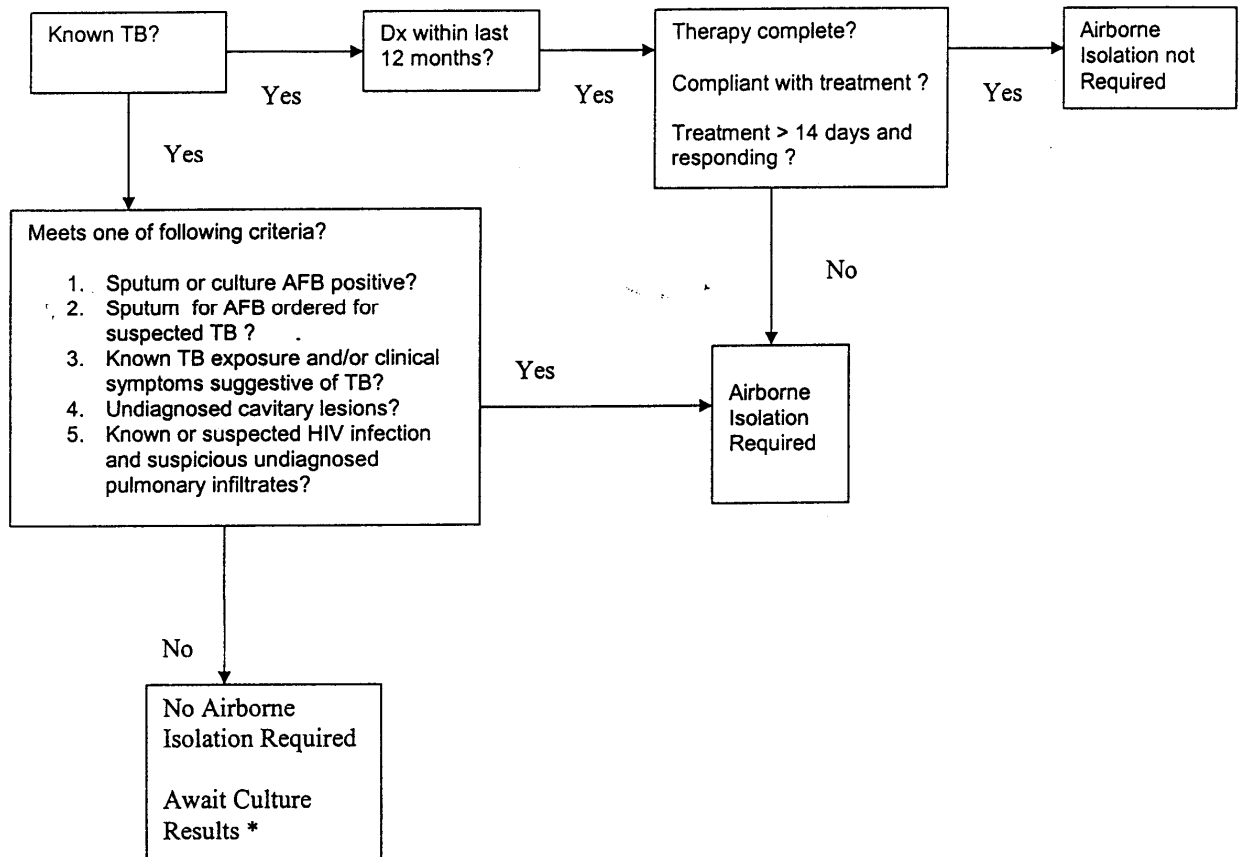
Comments: _____

Employee Data	Year	Year	Year
Number of staff started work with positive PPD			
Number of staff converted PPD to positive			
Number of staff recommended for TB therapy course			
Number of staff that completed prescribed course			
Number currently receiving TB therapy with supervision			
Number of staff PPD conversion linked to work related exposure			
Number of staff fit tested			

Comments: _____

Risk category determination based on _____ calendar year

Tuberculosis & Airborne Isolation Clinical Algorithm



* Culture results may take up to 8 weeks

TB PRECAUTIONS IN GENERAL AREAS OF THE HOSPITAL

Patients with signs or symptoms suggestive of TB should be evaluated and transported promptly to minimize the amount of time they are in areas without negative pressure ventilation. TB precautions should be followed while diagnostic evaluations are conducted for these patients.

TB precautions in the general areas of the hospital should include:

1. Placing patients in a separate area apart from other patients, and not in open waiting areas (ideally, in a room or enclosure meeting TB isolation requirement);
2. Providing patients surgical masks* to wear and instructing them to keep their masks on; and
3. Providing patients tissues and instructing them to cover their mouths and noses with the tissue when coughing or sneezing.

*Surgical masks are designed to prevent the respiratory secretions of the person wearing the mask from entering the air. To reduce expulsion of droplet nuclei into the air, patients suspected of having TB should wear surgical masks when not in TB isolation rooms. These patients do not need to wear particulate respirators, which are designed to filter the air before it is inhaled by the person wearing the respirator. Patients suspected of having or known to have TB should never wear a respirator that has an exhalation valve, because this type of respirator does not prevent expulsion of droplet nuclei into the air.

Reference: CDC Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Healthcare Facilities, 1994. MMWR 1994; 42(RR-13): i-v, 1-132