

**EAST CAROLINA UNIVERSITY**  
**INFECTION CONTROL PLAN**

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East Carolina University Tuberculosis Control Plan

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Approved by:

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Vice Chancellor Health Sciences

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Director, Prospective Health

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Infection Control Nurse

## I. Introduction

Transmission of *Mycobacterium tuberculosis* (MTB) is a recognized risk to patients and health care workers in health-care facilities. Transmission is more likely to occur from patients who have unrecognized pulmonary or laryngeal TB, who are not on effective anti-tuberculosis therapy, and who have not been placed in TB isolation. Patients who have multi-drug resistant *Mycobacterium tuberculosis* (MDR-TB) can remain infectious for prolonged periods, which increases the risk for nosocomial and/or occupational transmission of *M. tuberculosis*.

## II. Purpose and Responsibility Statement

- **Purpose**

The purpose of this plan is to reduce the transmission to health care workers, patients, students, and visitors. This Tuberculosis Exposure Control Plan is based on CDC's "Guidelines for Preventing the Transmission of *M. tuberculosis* in Healthcare Facilities, 1994" revised in 2005. Refer to Appendix A for definitions in this document.

- **Overview of Control Measures**

The key to preventing nosocomial transmission of tuberculosis is early detection, isolation, and treatment of persons with active tuberculosis. As required by the Centers of Disease Control and Preventive (CDC) and Occupational Safety and Health Administration (OSHA), the East Carolina University's Tuberculosis Control Plan is based on a hierarchy of control measures.

The first and most important level of the Plan is the use of administrative measures to reduce the risk of exposure to persons with infectious tuberculosis. Included in this Plan are written policies and protocols to ensure the rapid detection, isolation, diagnostic evaluation, and treatment of persons likely to have tuberculosis.

The second level of the Plan is the use of engineering controls to prevent the spread and reduce the concentration of infectious droplet nuclei.

The third level of the Plan is the use of CDC-NIOSH approved respiratory protective equipment in circumstances in which there is still a risk for exposure to MTB.

- **Risk Assessment**

A risk assessment is conducted regularly/annually to assess the likelihood of tuberculosis transmission in the East Carolina University clinics and the surrounding community. Each MTB infected patient incident that results in potential staff exposure will be investigated. At yearly intervals, a written assessment is provided to the ECU Infection Control Committee. Included will be

an analysis of any nosocomial exposures, review of factors leading to exposures, and recommendations for preventing exposure in the future.

The Office of Prospective Health will maintain the records of the results of evaluations of all health care workers with occupational exposure to MTB and results of all TSTs placed for screening purposes (new employees, routine screening of current employees).

On a quarterly basis, Prospective Health will provide a report to the ECU Infection Control Committee that will include:

- The number of ECU Employees/medical student exposures.
- The number of ECU employees/students that have Tuberculin Skin Test (TST) placed for annual surveillance.
- The number of persons converting their TST after known exposure.
- Employee/non-employed workers/students that have acquired active tuberculosis.

On an annual basis, Prospective Health will provide an epidemiologic summary of TST conversions, by occupation.

It is the responsibility of all department supervisors within the ECU system to evaluate each employee's **competence, performance, and compliance** with ECU Infection Control policies. Compliance includes but is not limited to measures listed in the mandated Bloodborne Pathogen Exposure Control Plan, the Tuberculosis Control Plan, and adherence to other East Carolina University Infection Control Policies. If an employee does not comply, the manager should follow disciplinary action as defined in the ECU Personnel Policy Manual. It is important that employees and department managers collaborate to implement infection control policies and to identify and improve policy and procedures to enhance the prevention of transmission of tuberculosis and other infectious diseases within the ECU settings.

The ECU Infection Control Nurse is responsible for the education of employees, the development of policies and procedures, monitoring clinical sites' implementation, and follow-up of exposures. Follow-up of exposures includes notifying the department manager that their staff has been potentially exposed to an infectious tuberculosis patient. The managers will document the names of those employees who were potentially exposed and will send those employees to Prospective Health for skin testing. The Infection Control Nurse and /or other Prospective Health staff will provide education for ECU employees during initial orientation.

Annual Bloodborne Pathogen and Tuberculosis education sessions are offered for ECU employees, non-employee workers, and medical students. Documentation of

employee's attendance at all training sessions is maintained by the Prospective Health; other ECU healthcare students will be provided this training by their faculty, who will maintain student attendance records.

Prospective Health will evaluate employees for ability to wear TB respiratory protection, via Respiratory Clearance questionnaire. (Refer to Appendix H). If needed, Prospective Health will evaluate employees via physical examination for respiratory clearance after review of their questionnaire. (Refer to Appendix D). The TB and other infectious agent Respiratory Protection Program is administered by Biological Safety. The Biological Safety Officer or designee will provide fit testing of respiratory protection devices and education in their use and care under the TB Respiratory Protection Policy.

### **III. Employee Health Responsibilities**

- **Screening of New Employees for Tuberculosis**

At orientation, via the Basic Health History form, all new health care employees are evaluated for a history of tuberculosis. The following information is obtained from all employees:

- History of TST placement and results.
- History of treatment if any, for a positive TST (history will include dates and types of treatments, including specific drug(s) and any side effects.
- History and results of most recent chest radiographs is obtained.

During the initial screening of new Health Care Workers, a two-step TST is done if there has not been a TST done within the previous year. Health care workers will have a single step TST if there is a previous documented TST within the prior 12 months (Refer to Appendix C for guidelines on reading). In accordance with OSHA requirements, employees are assessed for the ability to wear respiratory protective devices (Appendix H) and cleared for respirator use by representatives from Prospective Health.

A TST (Mantoux PPD) is placed on ALL Health Care Worker employees unless one of the following is met:

- History of treatment for tuberculosis infection or disease.
- Documented allergy or severe local reaction to TST
- Current treatment with anti-tuberculous drugs.

A TST is placed on employees who have uncertain histories of a positive TST or a history of having received BCG immunization. Use of antigens for anergy testing is not done routinely but may be considered on a case-by-case basis. Alternate means of monitoring will be used.

All TSTs are placed and read within 48-72 hours by a representative of

Prospective Health per CDC guidelines (enforced by OSHA).

A Quantiferon or similar blood test for *m. tuberculosis* will be used in cases of ambiguous reactions as clinically indicated.

Health care workers will be counseled about the following:

- Tuberculin Skin Testing.
- Signs and symptoms consistent with active tuberculosis, i.e., cough greater than two (2) weeks, fever, night sweats, and unexplained weight loss.
- The need to report all tuberculosis exposures to Prospective Health Division.

A new employee with a positive TST is evaluated for the possibility of active tuberculosis by history of symptoms and by chest x-ray, unless documentation of a recent chest x-ray is provided. New employees with a recent or newly recognized skin test conversion will have a chest x-ray performed to rule out infection.

- **Annual Screening of Employees**

The following employees and students have duties that may potentially expose them to MTB: Clinical employees and students of the School of Medicine, School of Allied Health, School of Nursing, ECU Student Health Center, Brody Housekeeping, or Brody Facilities Services. These preceding employees will have TSTs placed at least yearly, or more often if necessary based on risk assessment. Other ECU employees who *may* have job duties that put them at risk and may have TST done include: ECU Police stationed at Brody (declined by Captain Stroud) and Department of Comparative Medicine (animal contact). NOTE: Health Science Facilities Services do not enter occupied patient exam rooms but require skin tests to enter the animal facility.

Exclusion criteria for TST annual surveillance are known past positive or significant allergic reaction in past testing.

Medical students will be followed by Student Health for annual (interval) surveillance. Post exposure evaluations are handled by Prospective Health and/or Student Health Services for exposures occurring at BSOM or Vidant Health. ECU students in health care disciplines other than School of Medicine will follow the directions of their school and/or department regarding medical surveillance screening and post-exposure follow up. If such a student is notified that they have been exposed to MTB, they should report the incident to their responsible faculty representative and report to ECU Student Health for post exposure evaluation; this includes a baseline and 8-week TST.

If an employee converts from a negative to a positive tuberculin skin test the Prospective Health Nurse will take a brief health history and history of exposure

(if known) and a chest x-ray will be obtained. The employee is counseled regarding the results of the workup, need for therapy for latent TB, and determination of whether this is secondary to an occupational exposure.

If occupational exposure at ECU is documented, the employee will be treated by Prospective Health. If no occupational exposure is documented, the employee is referred to the county Public Health Center of residence or their personal physician.

Health care workers with suspected active tuberculosis are relieved from work until active disease is ruled out by appropriate medical and microbiologic studies. Grounds for removing an employee from work may include, but may not be limited to, the development of signs and symptoms suggestive of active tuberculosis, and/or a chest radiograph consistent with tuberculosis. The employee will be counseled regarding the infectivity of active tuberculosis and the risk to others.

### **Termination Screening for Tuberculosis**

- If notified by the department, BSOM health care workers/employees will have a TST done within 30 days of resignation/retirement or termination.
- **Evaluation of the Pregnant Employee**

Pregnancy is not a contraindication to placement of TST. The same TST placement guidelines will apply to the pregnant as to the non-pregnant health care worker. Health care workers who need prophylactic therapy or require therapy for active tuberculosis are handled on an individual basis in conjunction with their primary physician. In general, pregnant females with active tuberculosis are counseled to undergo appropriate therapy.

- **Outbreak and Exposure Investigations**

Patients who are seen in the ECU Clinics are evaluated for notable sign and symptoms of tuberculosis as outlined in the Policy: "Identification of Patients with Potential Tuberculosis and Other Communicable Illnesses". If a patient exhibits symptoms consistent with a potential transmissible respiratory pathogen, respiratory isolation procedures should be initiated. This includes masking the patient and making sure that the patient is evaluated quickly and leaves the clinic as soon as possible by healthcare personnel wearing appropriate respiratory protection, preferably in a negative pressure exam room. If these procedures are maintained during the patient's clinic visit, unprotected staff and patient exposure should be rare.

Reports of AFB smears and TB cultures performed by the Vidant Health Microbiology Lab are sent to ECU Infection Control on a weekly basis. The Infection Control Nurse will review the reports to monitor whether ECU patients seen in the clinic have demonstrated *Mycobacterium tuberculosis*. Infection Control will be notified in the event that health care worker and/or patient exposures may have occurred. The department managers of the exposed healthcare workers and the physicians of any exposed patients will be notified. The department managers will compile a list of staff who may have worked with/been exposed to the source patient. Employees determined to have been in contact with the source patient are asked to report to Prospective Health for further evaluation. ECU Infection Control will notify student instructors in the Schools of Nursing and Allied Health of possible student exposure. Students are referred to Student Health Services for evaluation.

Infection Control will notify the attending physicians of any patients exposed to active tuberculosis. It is the responsibility of the patient's primary physician to notify the exposed patient and arrange for appropriate follow-up. In the event that those potentially exposed cannot be precisely identified (e.g., source case is an employee who works in an open area), a system of evaluating close contacts may be employed. If close contacts reveal evidence of TST conversion, then progressively wider circles of individuals with lower amount of exposure are evaluated until evidence of transmission is not found.

If the source person with active tuberculosis is an ECU employee/student, the department manager is asked to assist Infection Control in identifying the potential contacts within the department and provide a list of those contacts to Prospective Health or other appropriate agency. ECU Infection Control will notify the appropriate public health department so that community contact investigations may be initiated.

When the source patient is known, the drug susceptibility pattern of MTB isolated will be used to determine the appropriate preventive therapy.

ECU Infection Control and/or admitting clinical personnel will notify Vidant Health Bed Control and Vidant Health Epidemiology of patients being admitted to Vidant Health (through ECU clinics) who may have active tuberculosis. This will allow the patients to be assigned respiratory isolation rooms.

ECU Infection Control will notify the appropriate Emergency Medical Services agencies of possible tuberculosis exposure of their employees. It is the responsibility of EMS providers to contact potentially exposed employees and arrange appropriate evaluation.

Infection Control will notify any contract workers for outside agencies of possible tuberculosis exposure. It is the responsibility of the outside contract agency to

arrange appropriate medical evaluation for their exposed employee.

All exposed employees/students will have a TST placed as soon as feasible following an exposure. If negative, a follow-up TST is placed approximately 8 weeks later (If the exposure is reported more than two weeks after the exposure incident, the employee will test at 8 weeks only.) Additional tests may be performed depending on the presence of signs and/or symptoms suggestive of active tuberculosis.

- **Tuberculin Skin Testing**

All TSTs are placed using the Mantoux method. Standard criteria are used to place, read and interpret TSTs (refer to Appendix B, “Placement and Reading of the TST” and Appendix C, “Criteria for Tuberculosis Positivity”).

Results of TST are recorded in the individual health care worker’s employee health chart.

**Note:** a 5mm reaction is considered a positive after a known exposure.

For TST results greater than 15mm induration, topical treatment with a steroidal cream may be recommended.

- **Evaluation of Employees/Students With Newly Recognized Positive TST Results or TST Conversions**

For any employee with a newly recognized positive TST or skin test conversion, a history is obtained in order to determine the potential source of tuberculosis exposure (a skin test conversion is defined as a positive TST after a negative TST previously or a 10mm or greater increase in size over 1-2 years). A medical evaluation will be performed to rule out active TB. An employee with a newly recognized positive TST or a TST conversion is counseled about latent tuberculosis infection, the possible development of active disease, the need for treatment, and to report any suspicious sign and/or symptoms to Prospective Health.

- **Employee Health Services Coverage**

Prospective Health will evaluate exposed ECU clinical employees. BSOM medical students identified in an exposure event may be evaluated by Student Health Services or Prospective Health. Other Health Science students are evaluated by Student Health Services post-exposure. The parent organization of exposed contractual personnel or non-ECU students will provide followup services to their employee or students post-exposure.

- **Treatment of Latent Tuberculosis in Health Care Worker Employees**



Current CDC recommendations are followed in evaluating TST size and determining the appropriateness of prophylactic treatment of latent tuberculosis.

Isoniazid (INH), 300mg daily for nine (9) months is the treatment of choice for latent tuberculosis. Another recently approved regimen is 12 weeks of therapy (once-weekly) with the combination of INH 900 mg and rifapentine 900 mg. This regimen must be supervised by a nurse from the county health department. Four months of rifampin 600 mg per day or six months of INH 300 mg per day are other acceptable regimens. A two-month regimen of pyrazinamide and rifampin is another regimen that has been approved for use at the Pitt County Health Department. Employees who convert their TST after exposure to a patient known to be INH-resistant *M. tuberculosis* are offered an alternative drug for prophylaxis. Standard recommendations are used in providing follow-up of health care workers taking treatment for latent Tuberculosis.

Prospective Health will provide treatment of latent TB for occupational exposures. Others will be referred to the appropriate local Public Health Center or personal physician. Prospective Health will request communication with the Public Health Center, or treating physicians, regarding compliance with treatment (Appendix E).

If a known anergic health care worker is exposed to an infectious tuberculosis patient, they will be monitored for development of fever or symptoms of TB. Prospective Health will consult Infectious Disease if needed.

The decision to use preventive therapy during pregnancy is made on a case-by-case basis depending on the estimated risk of progression to active disease. The decision to use preventive therapy on these employees will be made in consultation with employee's primary physician with advice of Infectious Disease as needed.

- **Treatment of Health Care Workers with Active Tuberculosis**

Health care workers with possible or documented active tuberculosis are immediately removed from all ECU activities. When indicated, hospitalization is recommended. (Refer to Work Restriction Policy for Personnel).

All health care workers with active tuberculosis due to occupational exposure will be referred to Infectious Disease. Others will be referred to their personal physician or to the Public Health Center of their residence. Health care workers refusing therapy are reported to the appropriate public health department under North Carolina Administrative Code (15A NCAC 19A.2005 and 15A NCAC 19D.0100-.0408).

All health care workers with active tuberculosis must be evaluated by Prospective Health prior to returning to work. Prior to returning to work, the employee must have ALL of the following documented.

- Appropriate therapy for at least 2-3 weeks.
- Clinical improvement.
- Sputum smears x 2 negative for acid fast bacilli or ↓ AFB.
- Stable or improved chest radiograph.

- **Immunocompromised Health Care Workers**

Immunocompromised health care workers are counseled regarding their risk for acquiring tuberculosis. Initial and annual TST may be placed together with controls

Immunocompromised health care workers may request reassignment from areas where patients with tuberculosis frequently receive care, if their level of susceptibility makes continued exposure an immediate threat to life and health in the opinion of their treating physician. Reassignment will be considered consistent with ECU Human Resources Policy.

#### **IV. Management of Patients With Known or Suspected Tuberculosis**

- **Recognition of Patients With Potential Tuberculosis**

A diagnosis of tuberculosis should be considered in any patient with persistent cough (greater than two weeks duration), or symptoms of productive cough, purulent sputum, fever, night sweats, hemoptysis (blood in sputum), recent weight loss and chest radiograph changes (upper lobe infiltrates, cavitation, or granulomatous disease). The presence of any symptom indicates “suspect tuberculosis”, any “suspect TB” patient will be placed on respiratory isolation until active tuberculosis is excluded. Refer to Infection Control Policy, “Identification of Patients with Potential Tuberculosis and Other Communicable Respiratory Illnesses”. Groups at high risk for tuberculosis include: the socioeconomically disadvantaged, HIV infected person, homeless persons, elderly, residents of long-term care facilities, migrant workers and/or immigrants from countries with high endemic rates of tuberculosis, (e.g. Asia, Africa, the Caribbean, and Latin America) persons who have been incarcerated, immune compromised persons, solid organ transplant, persons with a history of a positive tuberculin skin test, contacts of persons who have had active tuberculosis, and persons with a history of alcohol and drug abuse. In North Carolina, prevalence of tuberculosis increases with age and is especially high in non-whites, males, and persons greater than age 60 years.

Appropriate diagnostic studies should be conducted on all patients with signs

and/or symptoms consistent with tuberculosis (suspect TB): these include tuberculin skin test with controls, sputum for Mycobacterial smears and cultures, and chest radiographs. Sputum culture should be done on three separate, consecutive AM specimens. All patients with a positive tuberculin test or chest x-ray suggestive of infectious tuberculosis should be evaluated for active tuberculosis. Patients with symptoms *suggesting a possible diagnosis* of tuberculosis should be identified so they can be masked before or immediately upon arrival to ECU clinics.

For current Tuberculosis treatment guidelines consult the latest CDC guidelines, or other clinical resources.

- **Management of Patients in the ECU Clinics**

Patients with signs and symptoms suggestive of tuberculosis should be evaluated promptly to minimize the time spent in the waiting room and clinical exam room. Intake personnel should recognize signs and symptoms of tuberculosis, consult with the Lead Nurse of the clinic for evaluation, and provide the patient a surgical mask to wear while the diagnostic evaluation is being conducted. It is the responsibility of the clinic to provide respiratory protection to personnel who are responsible for evaluating patients for active tuberculosis. TB precautions will consist of the following:

- Placement of the patient in the clinical exam room as soon as possible, preferably in a negative pressure exam room.
- Patients should wear a surgical mask (the nurse would provide instruction on proper mask use).
- If patients must remove their masks to facilitate respiratory clearance, they should cover their mouth and nose with a tissue while sneezing or coughing.
- Healthcare personnel will wear appropriate respiratory protection during the evaluation.

Patients who are known to have active tuberculosis and have not completed therapy, should be handled with these precautions until they are documented to be non-infectious by two (2) negative AFB smears obtained on separate dates. Whenever possible, patients with active *M. tuberculosis* should have appointments scheduled to avoid exposing HIV infected or otherwise severely immune compromised persons.

Pediatric patients with suspected or confirmed tuberculosis should be evaluated for potential infectiousness according to the same criteria as adults. Children who may be infectious should be placed in isolation until they are determined to be non-infectious. The source of infection for a child with tuberculosis should be evaluated for TB as soon as possible. Until they have been evaluated, the adults

should wear surgical mask in the clinical area.

- **Cough Inducing Procedures**

Cough inducing procedures should not be performed on patients who may have active tuberculosis unless absolutely necessary. Sputum specimens may be collected for AFB examination. Some basic principles for obtaining sputum specimens of sufficient quality and quantity include:

- Collect sputum when the patient first arises because bronchial secretions tend to accumulate during the night. Collect for three (3) consecutive days.
- Specimen should not contain saliva.
- Have the patient rinse their mouth. Use sterile water rather than mouth wash or toothpaste because these substances may decrease viability or microorganism.
- The patient should be positioned either upright in a chair or standing for coughing and expectorating sputum specimen.
- If the patient has an incision or localized area of discomfort, have the patient place hands firmly over the affected area.
- Adequate cough is essential in production of mucus. Simple clearing of the throat is unacceptable.
- Two (2)-10 milliliters (1-2 tsp) is required to insure accurate analysis of specimen.
- Positioning and deep breathing and coughing exercises may improve the patient's ability to cough productively.

- **Laboratory Diagnosis**

All ECU patient sputum specimens for AFB are sent to the Vidant Health Microbiology Laboratory, which uses the most rapid or sensitive test available for identification of Mycobacteria (florescent microscopy for AFB smears)

AFB smears are done 7 days per week. The confirmatory Mycobacterial culture, which often needs to be repeated, is usually not available for four (4) weeks and may take as long as six (6) weeks. Drug susceptibility takes a minimum of two (2) weeks from isolation of organism.

- **Public Health Center Reporting**

All positive cultures and smears for *M. tuberculosis* are reported by the Vidant Health microbiology laboratory, to the North Carolina State Laboratory. The local Health Department is notified by telephone when a patient is known to have an active infection with *M. tuberculosis*. ECU Infection Control is responsible for completing North Carolina Communicable Disease report card and sending it to the appropriate Public Health Center when a patient seen by ECU is diagnosed with tuberculosis based on culture or smear.

- **Additional Considerations for Selected Areas**

Dental Clinic: No specific dental procedures have been classified as cough inducing; however, since aerosols of oral fluids and materials may be generated, and, on occasion, coughing may be stimulated by oral manipulations, additional considerations appear prudent in a dental setting. Dental Health care workers should routinely ask all patients about a history of TB disease and symptoms suggestive of tuberculosis. A questionnaire is filled out by the patient and reviewed by the staff. (Refer to Appendix F).

Patients with a suspicious history and symptoms should promptly be referred for evaluation for possible infectiousness. Elective dental treatment should be delayed for patients known or suspected to have tuberculosis until the patient is no longer infectious. If urgent dental care must be provided for a patient with known or suspected tuberculosis, full respiratory isolation practices must be employed.

## V. **Education**

- **Training Requirements**

All health care workers will receive education about tuberculosis that is appropriate to their job category, at the time of hire and yearly. The following elements should be included in the education of all health care workers.

- The basic concepts of tuberculosis transmission, pathogenesis, and diagnosis, including the difference between latent tuberculosis infection and active tuberculosis disease, the signs and symptoms of tuberculosis, and the possibility of re-infection in persons with a positive TST.
- The potential for occupational exposure to persons with infectious tuberculosis in ECU clinical areas, including the prevalence of tuberculosis in the community and the ECU clinical area, ways to appropriately isolate patients with active tuberculosis and situations with increased risk of exposure to tuberculosis.

- Infection control that reduce the risk of transmission of tuberculosis, including the hierarchy of tuberculosis control measures and the written policies and procedures of East Carolina University
- The purpose of TST, the significance of a positive results and the importance of participation in the skin test program.
- The use of preventive therapy for latent tuberculosis infection. Indications, use, and effectiveness, including the potential adverse effects of drugs.
- The responsibility of the health care worker to seek medical evaluation promptly if symptoms develop that may be due to tuberculosis or if TST conversion occurs.
- The drug therapy used for active tuberculosis.
- The importance of notifying Prospective Health if diagnosed with active tuberculosis so appropriate contact investigation can be instituted.
- The policies of East Carolina University regarding confidentiality of health care workers records.
- The higher risk posed by tuberculosis in individuals with HIV infection or other causes of severely impaired cell-mediated immunity, including:
  - The more frequent and rapid development of clinical tuberculosis after infection with *M. tuberculosis*.
  - The differences in the clinical presentation of disease.
  - The high mortality rate associated with MDR-TB disease in such individuals.
  - Reduced skin test reactivity as cellular function declines.

## **VI. Engineering Controls**

- A. The 2005 CDC Guidelines state that medium risk settings like BSOM outpatient clinics should have “at least one airborne isolation infection (AII) room in each functional unit. Outpatients with suspected or confirmed infectious TB should remain in AII rooms until they are transferred or their visit is complete”. Suspect patients would be those being evaluated for undiagnosed chronic cough and hemoptysis. AII rooms or equivalent exist in most BSOM clinics, which evaluate patients for chronic cough and/or pneumonia infection.
- B. AII rooms in existing health care settings should have an airflow of > 6 ACH.

When feasible, the airflow should be increased to 12 ACH. New construction or renovation of health care settings should be designed so that AII rooms achieve an airflow rate of > 12 ACH. ECU BSOM AII rooms have single-pass, non-recirculating systems that exhaust air to the outside. The system should maintain the room under negative pressure at all times. The variable air volume minimum set point must be adequate to maintain the recommended mechanical and outdoor ACH and a negative pressure > 0.01 inch of water gauge compared to adjacent areas.

- C. ECU Facilities Maintenance will regularly monitor AII rooms and their control systems to ensure proper operation and maintenance.

Clinical staff will monitor and document negative pressure of AII rooms, by recording a visual check of gauge readings 1) monthly and 2) before occupancy of a patient with suspected or confirmed TB or other infectious respiratory disease. If the AII does not have a gauge, monthly smoke tests will be performed by clinic staff after training by Infection Control or Biological Safety. Results will be recorded in a retrievable document (Appendix K). If the AII visual gauge check or smoke test is not consistent with a negative room pressure, Facilities Services HVAC should be contacted.

Doors to AII rooms will be kept closed except when patients or HCWs must enter or exit the room. Some AII rooms have fans controlled by switches within the room. These fans must remain “on” at all times to ensure adequate negative pressure.

- D. After a patient with known or suspected tuberculosis leaves the room, it **should not be re-occupied** until sufficient air change occurs to clear the airborne infectious agent from the air. A negative pressure room should not be reused for at least 30 minutes. An exam room, which is not a negative pressure room, should not be reused for 2-4 hours. The room should be posted with a red warning sign (Appendix L) until this interval has passed. Healthcare personnel may re-enter before these intervals if respiratory protection is worn.

## VII. Respiratory Protection

See Respiratory Protection Program Policy for Tuberculosis and Other Infectious Agents

### A. Respiratory Protection

Respiratory protection (N-95 respirator or powered air-purifying respirator PAPR) will be used to avoid exposure to airborne infectious agents, like tuberculosis. Healthcare personnel should don respiratory protection when evaluating patients either known or suspected to have airborne infection, e.g. infectious tuberculosis. Use of respiratory protection should begin as soon as the diagnosis is considered, not delayed until diagnosis is verified.

B. Program Evaluations

The Respiratory Protection Program is evaluated at least annually. Elements of the program that are evaluated include: work practices and acceptance of respiratory protective devices, including comfort and interference with duties. The annual program evaluation will be performed at the end of each calendar year by Biological Safety. Results will be presented to the Infection Control Committee for clinical issues and/or to the Biological Safety Committee for research use issues.



## APPENDIX A

### Definitions

**AEROSOLS**-Aerosols refer to the suspension in air of solid particles (such as tuberculous bacteria).

**Air-purifying respirator**- means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

**AFB ISOLATION (FOR KNOWN OR SUSPECTED ACTIVE TUBERCULOSIS)**-AFB isolation (for known or suspected active tuberculosis) refers to the use of specialized respiratory protection procedures and devices and engineering controls designed to minimize the potential for cross-transmission of *M. tuberculosis*.

**ANERGY**-Patients who exhibit anergy demonstrate no reaction to ALL skin tests (TST, mumps, Candida, and tetanus). Anergy may mean that the patient has overwhelming infection with *M. tuberculosis* and/or depressed cell-mediated immunity due to another medical disorder (such as sarcoidosis or HIV infection) and their TST may be negative.

**BCG**- (bacillus Calmette-Guerin) is a live attenuated strain of tubercle bacilli used in both U.S. and in some parts of the world to immunize individuals. This vaccine provides partial protection against the acquisition of *M. tuberculosis* and subsequent development of disease. It is administered by intradermal inoculation or scarification. Rarely, in immunocompromised individuals, the vaccine may cause disease indistinguishable from that caused by *M. tuberculosis*.

**COUGH INDUCING PROCEDURES**-includes procedures that involve instrumentation of the lower respiratory tract to induce coughing. These procedures increase the probability of droplet nuclei expelled into 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 (such as irrigation to tuberculous abscesses, homogenizing or lyophilizing tissue) may increase the probability of droplet nuclei being expelled into the air. In these cases, the guidelines indicated for cough-inducing procedures must be followed.

**EXPOSURE**-Exposure is defined as sharing the same, confined air space (entering the room, giving direct care or conversing) with a patient known to have active infection with *M. tuberculosis* (pulmonary, laryngeal, open wound) without the use of a respiratory protection device. If the exposure occurred in a non-confined space (open waiting room, cafeteria) exposure will initially be considered to involve only the most intensively exposed person. If evaluation of these persons reveals TST conversion, less intensively exposed persons are evaluated progressively.

**HEALTH CARE WORKER**-this term refers to all paid and unpaid persons working at East Carolina University and off- site clinical areas who have the potential for exposure to *M. tuberculosis*, including, but not limited to:

Physicians, nurses, aides, technicians, laboratory technicians, morgue personnel, funeral home personnel, dental workers, students, part time personnel, temporary staff not employed by East Carolina and persons not directly involved with patients, but who have potential occupational exposure to *M. tuberculosis* (housekeeping, maintenance, clerical and janitorial staff, and volunteers). Health care workers are considered to be at risk of occupationally acquired TB if

they have direct contact with patients as part of their employment duties. Direct contact is defined as entering patient care rooms and/or conversing in person with patients.

**HEPA FILTER**-HEPA filter refers to a filter with the ability to capture 99.97% particles greater than or equal to 0.3 microns in diameter in a single pass. It may be used in ventilation ducts and portable room ventilation devices.

**INFECTION CONTROL NURSE**-Refers to ECU Infection Control Nurse, Sharon Shipley,(744-3202).

**LATENT-TUBERCULOSIS INFECTION**-Refers to persons infected with *M. tuberculosis* as evidenced by a positive TST but without evidence of active disease (tuberculous disease).

**MULTI-DRUG RESISTANT (MDR)**-Isolates of *M. tuberculosis* are considered multi-drug resistant if they are resistant to Isoniazid and Rifampin or other first-line anti-TB drugs.

**MYCOBACTERIUM**-Mycobacterium refers to a group of microorganisms. These include *M. tuberculosis* (MTB), the agent which causes tuberculosis, and mycobacterium other than tuberculosis (MOTT). MOTT may cause illness in humans, including pulmonary and systemic disease, especially in patients infected with HIV. MOTT is acquired from the environment and not via person-to-person spread. Respiratory isolation is NOT required for patients infected with MOTT (such as: Mycobacterium avium complex (MAC)).

**OUTBREAK or EXPOSURE INVESTIGATION**-This refers to the investigation of possible transmission of *M. tuberculosis* between patients, healthcare workers, and/or visitors.

**Powered air-purifying respirator (PAPR)**- means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

**PPD** (purified protein derivative) is an agent used in skin test preparations to aid in determining whether persons have been infected with *M. tuberculosis*. This agent is injected intra-dermal at a dose of five (5) tuberculin units (5TU). A "positive" reaction indicates tuberculous infection but does NOT necessarily imply disease. Skin reactions a small size may also result from a person's prior exposure to MOTT or to BCG. Refer to Appendix E and F.

**PROSPECTIVE HEALTH OFFICE**-Refers to the ECU office responsible for Employee Health, Infection Control, Biological Safety, and Radiation Safety. Paul Barry, MD, Interim Director (744-2070)

**Qualitative fit test (QLFT)**-means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

**RESPIRATORY ISOLATION (FOR KNOWN OR SUSPECTED ACTIVE TUBERCULOSIS)**-Respiratory isolation (for known or suspected active tuberculosis) refers to the use of specialized respiratory protection procedures and devices and engineering controls designed to minimize the potential for cross-transmission of *M. tuberculosis*. Rooms used to house patients on tuberculosis/respiratory isolation must meet the following criteria:

Private room, negative pressure with respect to the corridor, directly exhaust to the outside, and >12 air exchanges per hour.

**RESPIRATORY PROTECTION**-Refers to the use of CDC-NIOSH disposable N95 filter half-masks, HEPA filter power purifying respirators (PAPR). These masks are for use when entering rooms of patients known or suspected to have tuberculosis and when performing procedures that induce droplet nuclei on individuals who have known or suspected tuberculosis.

**TST (Tuberculin Skin Test)** – is the standard method for determining whether a person is infected with *Mycobacterium Tuberculosis*.

**TUBERCULOSIS DISEASE**-Refers to persons with evidence of active disease due to *M. tuberculosis*. Such evidence includes, but is not limited to, the following: A chest radiograph with evidence of active tuberculosis, a sputum smear with evidence of tuberculous bacteria, a culture of *M. tuberculosis* from any body site, and a positive TST with symptoms of active infection. Such symptoms include, but are not limited to fever, weight loss, night sweats, cough, and chills.

## **APPENDIX B**

### **Placement and Reading of the TST**

1. All TSTs placed at East Carolina University will use intracutaneous (Mantoux) administration of a measure amount of purified protein derivative (PPD)
2. One-tenth milliliter of PPD (5TU) is injected into either the volar or dorsal surface of the forearm. A discrete, pale elevation of the skin (a wheal) 6 to 10mm in diameter should be produced.
3. The Prospective Health will read all TST tests between 48 to 72 hours after injection.
4. The basis of the reading is the presence or absence of induration.
5. The transverse diameter of induration is recorded in millimeters. The interpretation of the TST is based on Appendix F.
6. If a new employee has not had a TST within the previous year prior to employment, a two (2)-step TST is done.
  - Step one (1) is to have an initial TST. If the first skin test is negative, a repeat TST is done one (1) to three (3) weeks after the initial TST

TST readings are documented 48-72 hours after each skin test.

## APPENDIX C

### Criteria for Tuberculin Positivity, by Risk Group, ATS 2000

#### I. Chart for Criteria for Tuberculin Positivity

Reaction $\geq$ 5 mm of Induration	Reaction $\geq$ 10 mm of Induration	Reaction $\geq$ 15 mm of induration
Human immunodeficiency virus (HIV) positive persons	Recent immigrants (i.e. with the last yr) from high prevalence countries	Persons with no risk factors for TB
Recent contacts of tuberculosis (TB) case patients	Injection drug users	
Fibrotic changes on chest radiograph consistent with prior TB	Residents and employees <sup>f</sup> of the following high-risk congregate settings: prisons and jails, nursing homes and other long-term facilities for the elderly, hospitals and other health care facilities, residential facilities for patients with acquired immunodeficiency syndrome (AIDS), and homeless shelters	
Patients with organ transplants and other immunosuppressed patients (receiving the equivalent of $\geq$ 15 mg/d of prednisone for 1 month or more)*	<p>Mycobacteriology laboratory personnel</p> <p>Persons with the following clinical conditions that place them at high risk: Silicosis, diabetes mellitus, chronic renal failure, some hematologic disorders (e.g., leukemias and lymphomas), other specific malignancies (e.g., carcinoma of the head or neck and lung), weight loss of <math>\geq</math> 10% of ideal body weight, gastrectomy, and jejunioileal bypass.</p> <p>Children younger than 4 yr of age or infants, children and adolescents exposed to adults at high risk.</p>	

\* Risk of TB in patients treated with corticosteroids increases with higher dose and longer duration.

<sup>f</sup> For persons who otherwise at low risk and are tested at the start of employment, a reaction of  $\geq$  15 mm induration is considered positive.

Source: Adapted from Centers for Disease Control and Prevention. Screening for tuberculosis and tuberculosis infection in high-risk populations: recommendations of the Advisory Council for the Elimination of Tuberculosis. M.M.W.R. 1995; 44 (No. RR-11): 19-34.

#### II. Recent Converters (MMWR 2000, 49 RR06; 1-54).

- $>10$ mm increase within a two (2) year period is classified as positive for healthcare worker.
- $>15$ mm increase within a two (2) year period is classified as positive for others.

**NOTE:**  $> 5$ mm increase over baseline following a known exposure is classified as positive.



**APPENDIX D**  
**East Carolina University**  
**Office of Prospective Health**  
**Annual Employee Fit Testing Update**

Employee Name: \_\_\_\_\_ Date of Birth: \_\_\_\_\_

Job Title/Dept: \_\_\_\_\_/\_\_\_\_\_ Orig Date of OSHA Questionnaire: \_\_\_\_\_

Check one of the following:

\_\_\_\_\_ Since my last fit test, **there have been no** significant changes in my health status.

\_\_\_\_\_ I **have had a change** in my health status since completing the OSHA Respirator Medical Evaluation Questionnaire, as indicated by a YES response below. I will need to discuss any change in status with the medical evaluator prior to my annual scheduled respiratory fit test.

If YES to any, please explain:

Medication changes	___NO	___YES	_____
Smoking changes	___NO	___YES	_____
Pulmonary status	___NO	___YES	_____
Cardiac status	___NO	___YES	_____
BP change	___NO	___YES	_____
Other health changes	___NO	___YES	_____

\_\_\_\_\_  
Signature of Employee Date

To be completed by the medical evaluator:

\_\_\_\_\_ Approved for fit testing  
\_\_\_\_\_ Approved for fit testing with consent from employee's personal medical provider  
\_\_\_\_\_ Not approved for fit testing

\_\_\_\_\_  
Signature of Medical Evaluator Date

**FIT TEST**

After medical clearance via OSHA questionnaire (all negative responses or cleared by medical professional if positive response(s)), or no change in health status during the last year, fit testing will be performed. Men with beards, and anyone who cannot pass the fit test will use a powered air purifying (helmet) respirator.

**Respirator To Be Used**

\_\_\_\_\_ 3M N95, size (circle) Small Regular Recommend Re-Evaluation for Fit Test  
\_\_\_\_\_ 12 months  
\_\_\_\_\_ Powered Air Purifying Respirator (PAPR) \_\_\_\_\_ Other \_\_\_\_\_  
\_\_\_\_\_ Using PAPR, no reevaluation needed

\_\_\_\_\_  
Prospective Health Staff Date

8/15/14

RESPIRATORY PROTECTION TRAINING  
FOR DISPOSABLE N95 RESPIRATORS FOR TUBERCULOSIS OR OTHER AIRBORNE  
INFECTIOUS AGENTS

M. tuberculosis is carried through the air in either infectious droplets or as airborne bacterial particles. These droplets and particles may be generated when a person with infectious TB disease coughs, speaks, sings or spits. In an occupational setting, workers in close contact with persons with infectious tuberculosis disease are at increased risk of infection with TB. Certain high hazard medical procedures which are cough-inducing (e.g., bronchoscopy, suctioning) may further increase the risk of infection to health care workers. When it is not possible to avoid exposure by other means, respiratory protection (use of a mask) is required.

The **3M N95** (half-mask filtering face piece) Respirators have been approved by the Office of Prospective Health for use as required by the Tuberculosis Control Plan. Any respirator used at ECU for the protection against Tuberculosis must be approved by the Office of Prospective Health. Before use, you must receive medical clearance and be fit tested by the Office of Prospective Health. Should you experience any problem using this respirator, inform your supervisor or the Office of Prospective Health (744-2070) immediately.

I. Use of disposable N95 respirator mask.

1. Follow all instructions and be aware of the limitations regarding use of these respirators. Failure to wear mask during all times of exposure can reduce effectiveness and result in sickness or death.
2. If the respirator becomes damaged or breathing becomes difficult, leave the contaminated area and discard and replace the respirator.
3. These respirators are **NOT** for use against gases, vapors, asbestos, sandblasting, paint spraying operations, or atmospheres containing less than 19.5% oxygen.
4. Do not use if you have a beard, other facial hair, or a condition that prevents a complete seal between your face and the edge of the respirator.

II. Fit check your mask each time respirator is worn.

1. Gently pre-bend nosepiece to conform mask to face.
2. Separate the headbands with index fingers.
3. Cup the mask under the chin and bring the headbands over the head. Place the first band at the neck. Pull the remaining band up and place at the crown.
4. Form the nosepiece tightly across bridge of nose and face. Adjust mask to achieve a facial seal.
5. Face seal should be checked to assure proper fit. Adjust nosepiece if there is air leakage around the nose. Reposition bands to secure facial seal around edges of respirator.
6. Any mask which appears to be physically defective (torn material, broken straps) should not be used.

III. Storage and Disposal

The N95 masks are designed to be a reusable/disposable negative pressure respirator. These masks will be treated as disposable for use at East Carolina University. This eliminates problems associated with storage and reuse.

8/15/14

**APPENDIX E**

**ECU Division of Prospective Health  
TB skin test convertor/reactor**

Employee\_\_\_\_\_

TST reaction\_\_\_\_\_

Chest x-ray\_\_\_\_\_

History\_\_\_\_\_

---

This patient is being referred for \_\_\_\_\_INH prophylaxis  
\_\_\_\_\_TB treatment

\_\_\_\_for know exposure which occurred in the course of their work as a Health Care worker

\_\_\_\_for unknown source exposure detected on periodic TST skin testing

Please let us know the results of your evaluation.

\_\_\_\_INH prophylaxis prescribed. Dose 300 mg/D. Duration 6 to 12 months

\_\_\_\_Prophylaxis recommended but patient declined

\_\_\_\_Prophylaxis not indicated or contraindicated

Return to Lori White, RN  
Employee Health Nurse  
Prospective Health  
Warren Life Sciences Building  
Room 190



**APPENDIX F**  
**Dentistry**

NAME: \_\_\_\_\_ SSN \_\_\_\_\_ DOB \_\_\_\_\_

DENTAL HISTORY

When was your last dental appointment? \_\_\_\_\_

What were you seen for? \_\_\_\_\_

Are you having any dental problems now? \_\_\_\_\_

MEDICAL HISTORY

Medical Doctors Name: \_\_\_\_\_ Address: \_\_\_\_\_ Last seen \_\_\_\_\_

Have you been hospitalized for any reason? If so, when and for what reason? \_\_\_\_\_

PLEASE CIRCLE ANY OF THE FOLLOWING CONDITIONS THAT YOU HAVE (OR HAVE HAD)

- |  |                                     |
|--|-------------------------------------|
| heart murmur, heart valve problems         | kidney in facton/disease            |
| heart surgery/heart attack                 | thyroid problems                    |
| angina or chest pain                       | seizures (epilepsy)                 |
| rheumatic fever                            | syphilis, gonorrhea, genital herpes |
| high or low blood pressure                 | HIV+ or AIDS                        |
| stroke                                     | drug addiction or alcohol addiction |
| breathing problems/emphysema/lung problems | blood disorders/anemia/hemophilia   |
| tuberculosis (TB)                          | blood transfusions                  |
| asthma                                     | tumors or growths                   |
| allergies or hayfever                      | arthritis                           |
| pneumonia                                  | hip, knee or joint replacement      |
| stomach or intestinal disorders/ulcers     | skin disease                        |
| cancer/x-ray treatments/chemotherapy       | phobias/anxieties/depression        |
| diabetes or blood sugar problems           | bad cough that will not go away     |
| hepatitis/jaundice/liver problems          | WOMEN: are you pregnant/_____       |

Please list any condition(s) that you may have that are not listed above: \_\_\_\_\_

Please list any medications that you are allergic to (or allergies) \_\_\_\_\_

Have you ever had a bad experience with local or general anesthesia? \_\_\_\_\_

Please list all medications that you are taking: \_\_\_\_\_

Date: \_\_\_\_\_ Your Signature: \_\_\_\_\_

MEDICAL SUMMARY

MEDICAL ALERT

UPDATES

**APPENDIX G**  
**EXPOSURE DETERMINATION**

- A. East Carolina University's compliance program for the OSHA Tuberculosis Standard includes exposure Determination. Exposure Determination includes Staff/students who:
1. Enter an AFB isolation room or area in use for TB isolation.
  2. Are present during the performance of procedures or services for an individual with suspected or confirmed infectious TB who is not masked.
  3. Transport an individual with suspected or confirmed infectious TB in an enclosed vehicle (e.g., ambulance, helicopter) or who transport an individual with suspected or confirmed infectious TB within the facility when that individual is not masked.
  4. Repair, replace, or maintain air systems or equipment that may reasonably be anticipated to contain aerosolized *M. tuberculosis*.
  5. Work in a residence where an individual with suspected or confirmed infectious TB is known to be present.
- B. List of all job classifications in which employees have occupational exposure:
1. ECU is very diversified in its mission. Staff may have the same licensure or job but have different levels of potential exposure. Therefore, job titles will be listed under the list in which **some** employees have occupational exposure.
  2. List of all job classifications in which **some** employees may have occupational exposure.
    - Registered Nurses
    - Facilities Maintenance Personnel, e.g. HVAC Mechanics
    - Licensed Practical Nurse
    - Nursing Assistants
    - Medical Office Assistants
    - Physicians
    - Physician Extender I-III
    - Medical Students
    - Dentist
    - Dental Hygienist
    - Physical Therapist
    - Physical Therapy Assistant
    - Ultrasound Technician
    - Security Guard
    - Medical Illustrator
    - Patient Service Representative
    - Phlebotomist

- C. List of all task and procedures or groups of closely related tasks and procedures in which occupational exposure occurs and that are performed by employees in job classifications listed in which **some** employees have occupational exposure:

Employees listed have job duties that require face-to-face, patient-to-health care worker contact, typically within 3 feet or in an enclosed space or room of 12x12 feet or less.

**Appendix H**  
**ECU OSHA Questionnaire For Respirator Use for Tuberculosis or other Airborne Infectious Agents**

Can you read (circle one): Yes/No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

**Part A. Section 1.** (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date: \_\_\_\_\_
2. Your name: \_\_\_\_\_
3. Your age (to nearest year): \_\_\_\_\_
4. Sex (circle one): Male/Female
5. Your height: \_\_\_\_\_ ft. \_\_\_\_\_ in.
6. Your weight: \_\_\_\_\_ lbs.
7. Your job title: \_\_\_\_\_
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): \_\_\_\_\_
9. The best time to phone you at this number: \_\_\_\_\_
10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No
11. Check the type of respirator you will use (you can check more than one category):
  - a. \_\_\_\_\_ N, R, or P disposable respirator (filter-mask, non-cartridge type only).
  - b. \_\_\_\_\_ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
12. Have you worn a respirator (circle one): Yes/No  
  
If "yes," what type(s): \_\_\_\_\_  
\_\_\_\_\_

**Part A. Section 2.** (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you *currently* smoke tobacco, or have you smoked tobacco in the last month: Yes/No
2. Have you *ever had* any of the following conditions?
  - a. Seizures: Yes/No
  - b. Diabetes (sugar disease): Yes/No
  - c. Allergic reactions that interfere with your breathing: Yes/No
  - d. Claustrophobia (fear of closed-in places): Yes/No
  - e. Trouble smelling odors: Yes/No
3. Have you *ever had* any of the following pulmonary or lung problems?
  - a. Asbestosis: Yes/No
  - b. Asthma: Yes/No
  - c. Chronic bronchitis: Yes/No
  - d. Emphysema: Yes/No
  - e. Pneumonia: Yes/No
  - f. Tuberculosis: Yes/No
  - g. Silicosis: Yes/No
  - h. Pneumothorax (collapsed lung): Yes/No
  - i. Lung cancer: Yes/No
  - j. Broken ribs: Yes/No
  - k. Any chest injuries or surgeries: Yes/No
  - l. Any other lung problem that you've been told about: Yes/No
4. Do you *currently* have any of the following symptoms of pulmonary or lung illness?
  - a. Shortness of breath: Yes/No
  - b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No
  - c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No
  - d. Have to stop for breath when walking at your own pace on level ground: Yes/No
  - e. Shortness of breath when washing or dressing yourself: Yes/No
  - f. Shortness of breath that interferes with your job: Yes/No
  - g. Coughing that produces phlegm (thick sputum): Yes/No
  - h. Coughing that wakes you early in the morning: Yes/No
  - i. Coughing that occurs mostly when you are lying down: Yes/No
  - j. Coughing up blood in the last month: Yes/No
  - k. Wheezing: Yes/No
  - l. Wheezing that interferes with your job: Yes/No
  - m. Chest pain when you breathe deeply: Yes/No
  - n. Any other symptoms that you think may be related to lung problems: Yes/No
5. Have you *ever had* any of the following cardiovascular or heart problems?
  - a. Heart attack: Yes/No
  - b. Stroke: Yes/No
  - c. Angina: Yes/No

- d. Heart failure: Yes/No
  - e. Swelling in your legs or feet (not caused by walking): Yes/No
  - f. Heart arrhythmia (heart beating irregularly): Yes/No
  - g. High blood pressure: Yes/No
  - h. Any other heart problem that you've been told about: Yes/No
6. Have you *ever had* any of the following cardiovascular or heart symptoms?
- a. Frequent pain or tightness in your chest: Yes/No
  - b. Pain or tightness in your chest during physical activity: Yes/No
  - c. Pain or tightness in your chest that interferes with your job: Yes/No
  - d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
  - e. Heartburn or indigestion that is not related to eating: Yes/No
  - f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No
7. Do you *currently* take medication for any of the following problems?
- a. Breathing or lung problems: Yes/No
  - b. Heart trouble: Yes/No
  - c. Blood pressure: Yes/No
  - d. Seizures (fits): Yes/No
8. If you've used a respirator, have you *ever had* any of the following problems?  
(If you've never used a respirator, check the following space and go to question 9:)
- a. Eye irritation: Yes/No
  - b. Skin allergies or rashes: Yes/No
  - c. Anxiety: Yes/No
  - d. General weakness or fatigue: Yes/No
  - e. Any other problem that interferes with your use of a respirator: Yes/No
9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-face piece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you *ever lost* vision in either eye (temporarily or permanently): Yes/No

11. Do you *currently* have any of the following vision problems?

- a. Wear contact lenses: Yes/No
- b. Wear glasses: Yes/No
- c. Color blind: Yes/No
- d. Any other eye or vision problem: Yes/No

12. Have you *ever had* an injury to your ears, including a broken ear drum: Yes/No

13. Do you *currently* have any of the following hearing problems?
- Difficulty hearing: Yes/No
  - Wear a hearing aid: Yes/No
  - Any other hearing or ear problem: Yes/No
14. Have you *ever had* a back injury: Yes/No
15. Do you *currently* have any of the following musculoskeletal problems?
- Weakness in any of your arms, hands, legs, or feet: Yes/No
  - Back pain: Yes/No
  - Difficulty fully moving your arms and legs: Yes/No
  - Pain or stiffness when you lean forward or backward at the waist: Yes/No
  - Difficulty fully moving your head up or down: Yes/No
  - Difficulty fully moving your head side to side: Yes/No
  - Difficulty bending at your knees: Yes/No
  - Difficulty squatting to the ground: Yes/No
  - Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No
  - Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

**Part B** Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

- In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No
 

If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No
- At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No
 

If "yes," name the chemicals if you know them: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_
- Have you ever worked with any of the materials, or under any of the conditions, listed below:
  - Asbestos: Yes/No
  - Silica (e.g., in sandblasting): Yes/No
  - Tungsten/cobalt (e.g., grinding or welding this material): Yes/No
  - Beryllium: Yes/No
  - Aluminum: Yes/No
  - Coal (for example, mining): Yes/No
  - Iron: Yes/No
  - Tin: Yes/No
  - Dusty environments: Yes/No
  - Any other hazardous exposures: Yes/No

If "yes," describe these exposures: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. List any second jobs or side businesses you have: \_\_\_\_\_  
\_\_\_\_\_

5. List your previous occupations: \_\_\_\_\_  
\_\_\_\_\_

6. List your current and previous hobbies: \_\_\_\_\_  
\_\_\_\_\_

7. Have you been in the military services? Yes/No

If "yes," were you exposed to biological or chemical agents (either in training or combat):  
Yes/No

8. Have you ever worked on a HAZMAT team? Yes/No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No

If "yes," name the medications if you know them: \_\_\_\_\_

10. Will you be using any of the following items with your respirator(s)?

- a. HEPA Filters: Yes/No
- b. Canisters (for example, gas masks): Yes/No
- c. Cartridges: Yes/No

11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?

- a. Escape only (no rescue): Yes/No
- b. Emergency rescue only: Yes/No
- c. Less than 5 hours *per week*: Yes/No
- d. Less than 2 hours *per day*: Yes/No
- e. 2 to 4 hours per day: Yes/No
- f. Over 4 hours per day: Yes/No

12. During the period you are using the respirator(s), is your work effort:

- a. *Light* (less than 200 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: \_\_\_\_\_ hrs. \_\_\_\_\_ mins.

Examples of a light work effort are *sitting* while writing, typing, drafting, or performing light assembly work; or *standing* while operating a drill press (1-3 lbs.) or controlling machines.



b. *Moderate* (200 to 350 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: \_\_\_\_\_ hrs. \_\_\_\_\_ mins.

Examples of moderate work effort are *sitting* while nailing or filing; *driving* a truck or bus in urban traffic; *standing* while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; *walking* on a level surface about 2 mph or down a 5-degree grade about 3 mph; or *pushing* a wheelbarrow with a heavy load (about 100 lbs.) on a level surface. c. *Heavy* (above 350 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: \_\_\_\_\_ hrs. \_\_\_\_\_ mins.

Examples of heavy work are *lifting* a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; *shoveling*; *standing* while bricklaying or chipping castings; *walking* up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No

If "yes," describe this protective clothing and/or equipment: \_\_\_\_\_

14. Will you be working under hot conditions (temperature exceeding 77 deg. F): Yes/No

15. Will you be working under humid conditions: Yes/No

16. Describe the work you'll be doing while you're using your respirator(s):

\_\_\_\_\_  
\_\_\_\_\_

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

\_\_\_\_\_  
\_\_\_\_\_

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance: \_\_\_\_\_

Estimated maximum exposure level per shift: \_\_\_\_\_

Duration of exposure per shift: \_\_\_\_\_

Name of the second toxic substance: \_\_\_\_\_

Estimated maximum exposure level per shift: \_\_\_\_\_

Duration of exposure per shift: \_\_\_\_\_

Name of the third toxic substance: \_\_\_\_\_

Estimated maximum exposure level per shift: \_\_\_\_\_

Duration of exposure per shift: \_\_\_\_\_

The name of any other toxic substances that you'll be exposed to while using your respirator:

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19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

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[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998; 76 FR 33607, June 8, 2011]

**Appendix I**  
**2017 Tuberculosis Risk Assessment**  
**For East Carolina University Brody School of Medicine Clinics**

The incidence of MTB in North Carolina during the year 2017 was 218 cases or 2.1 cases/100,000 compared to a national rate of 2.8 cases/100,000. N.C. is ranked 21st in the nation when compared to the other states and the District of Columbia. Pitt County reported 2 cases in 2017 or 1.1 cases/100,000. In 2017 there were two cases of active TB reported in the Brody School of Medicine clinics. The ECU Brody School of Medicine Clinics has a high incidence of immunocompromised patients. According to the CDC Risk Classifications for health-care settings that serve communities with high incidence of MTB (Appendix J), ECU Brody School of Medicine Clinics is classified as medium risk and will adhere to the CDC Guidelines for Preventing the Transmission of MTB in Health-Care Settings, 2005, for outpatient facilities with a medium risk classification as outlined in the East Carolina University Tuberculosis Control Plan and Respiratory Control Program.

## Appendix J

### Appendix C. Risk classifications for health-care settings that serve communities with high incidence of tuberculosis (TB) and recommended frequency of screening for *Mycobacterium tuberculosis* infection among health-care workers (HCWs)\*

Setting	Risk classification <sup>†</sup>		
	Low risk	Medium risk	Potential ongoing transmission <sup>§</sup>
Inpatient <200 beds	<3 TB patients/year	≥3 TB patients/year	Evidence of ongoing <i>M. tuberculosis</i> transmission, regardless of setting
Inpatient ≥200 beds	<6 TB patients/year	≥6 TB patients/year	
Outpatient; and nontraditional facility-based	<3 TB patients/year	≥3 TB patients/year	
TB treatment facilities	Settings in which <ul style="list-style-type: none"> <li>• persons who will be treated have been demonstrated to have latent TB infection (LTBI) and not TB disease</li> <li>• a system is in place to promptly detect and triage persons who have signs or symptoms of TB disease to a setting in which persons with TB disease are treated</li> <li>• no cough-inducing or aerosol-generating procedures are performed</li> </ul>	Settings in which <ul style="list-style-type: none"> <li>• persons with TB disease are encountered</li> <li>• criteria for low risk is not otherwise met</li> </ul>	
Laboratories	Laboratories in which clinical specimens that might contain <i>M. tuberculosis</i> are not manipulated	Laboratories in which clinical specimens that might contain <i>M. tuberculosis</i> are manipulated	
<b>Recommendations for Screening Frequency</b>			
Baseline two-step TST or one BAMT <sup>¶</sup>	Yes, for all HCWs upon hire	Yes, for all HCWs upon hire	Yes, for all HCWs upon hire
Serial TST or BAMT screening of HCWs	No**	Every 12 months <sup>††</sup>	As needed in the investigation of potential ongoing transmission <sup>§§</sup>
TST or BAMT for HCWs upon unprotected exposure to <i>M. tuberculosis</i>	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 <i>M. tuberculosis</i> ) <sup>¶¶</sup>		

\* Health-care workers (HCWs) refers to all paid and unpaid persons working in health-care settings who have the potential for exposure to *M. tuberculosis* through air space shared with persons with TB disease.

<sup>†</sup> Settings that serve communities with a high incidence of TB disease or that treat populations at high risk (e.g., those with human immunodeficiency virus infection or other immunocompromising conditions) or that treat patients with drug-resistant TB disease might need to be classified as medium risk, even if they meet the low-risk criteria.

<sup>§</sup> A classification of potential ongoing transmission should be applied to a specific group of HCWs or to a specific area of the health-care setting in which evidence of ongoing transmission is apparent, if such a group or area can be identified. Otherwise, a classification of potential ongoing transmission should be applied to the entire setting. This classification should be temporary and warrants immediate investigation and corrective steps after a determination has been made that ongoing transmission has ceased. The setting should be reclassified as medium risk, and the recommended timeframe for this medium risk classification is at least 1 year.

<sup>¶</sup> 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 (e.g., 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*.

\*\* HCWs whose duties do not include contact with patients or TB specimens do not need to be included in the serial TB screening program.

<sup>††</sup> The frequency of testing for infection with *M. tuberculosis* will be determined by the risk assessment for the setting.

<sup>§§</sup> 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.

<sup>¶¶</sup> Procedures for contact investigations should not be confused with two-step TST, which is used for newly hired HCWs.

## Appendix K

### Airborne Infection Isolation (AII) Room Log (Negative Pressure room)

Perform monthly gauge readings. Reading should be 0.01 or greater. Reading will vary with door opening and closing. Wait several minutes after door has closed to read gauge.

\*If AII room does not have a gauge, perform monthly smoke test.\*

Year _____ Month	Gauge Reading ( $\geq 0.01$ ) $\checkmark$	Smoke Test (if no gauge) Pass/Fail	Date Facilities notified of failures	Date problem corrected
<b>January</b>				
<b>February</b>				
<b>March</b>				
<b>April</b>				
<b>May</b>				
<b>June</b>				
<b>July</b>				
<b>August</b>				
<b>September</b>				
<b>October</b>				
<b>November</b>				
<b>December</b>				

\*Doors to AII rooms must remain closed except to enter and exit the room.

If the fan is controlled by a switch in the room, the fan must remain on at all times to ensure adequate negative pressure.

# ISOLATION

## Attention: Housekeeping

Use Standard Precautions, AND

*Contact Precautions (GLOVES AND GOWN)*

and/or

*Airborne Precautions (MASK)*

Until \_\_\_\_\_ AM/PM

Negative Pressure Room – Wait 30 minutes

Non-Negative Pressure Room – Wait 2 hours