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Tuberculosis Control Plan

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I. Description

Describes the policies and procedures to prevent healthcare personnel (HCP) exposure to tuberculosis (TB).

II. Rationale

OSHA regulations require the employer to provide a written exposure control plan that covers the facilities' policies and procedures to prevent transmission of TB in the workplace. The Tuberculosis Control Plan is available on the UNC Medical Center Intranet page under Policies PolicyStat: UNC Medical Center, System Policies.

III. Policy

A. Management of Patients with Known or Suspected Tuberculosis

1. Identifying Patients with Potential Tuberculosis

a. A diagnosis of TB should be considered in patients of any age with persistent cough (>3 weeks duration) or other signs and symptoms compatible with TB such as complaints of hemoptysis, night sweats, weight loss, anorexia, or fever. All patients who have TB in their differential diagnosis should be placed on Airborne Precautions until active TB is excluded.

b. Groups at high risk for TB include the following: HIV-infected persons, immigrants from countries with high endemic rates of TB, persons who have

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been incarcerated, immunocompromised persons (e.g., solid organ transplant, persons on TNF-inhibitors), persons with a history of a positive tuberculin skin test (TST) or positive Interferon-Gamma Release Assays (IGRA), close contacts of persons who have had active TB including infants born to mothers with active TB disease, and homeless persons.

c. Appropriate diagnostic studies should be conducted on all patients with signs or symptoms consistent with TB. Such studies may include a TST, IGRA, sputum for mycobacterial smears and cultures, chest radiography, and chest tomography and/or chest MRI. Additional tests may also be necessary including: bronchoscopy, induced sputum for AFB smear and culture, gastric aspirate for AFB (pediatric patients), and/or bone marrow biopsy.

d. All patients with a positive TST or IGRA, and either symptoms/signs suggestive of active pulmonary TB or chest radiography suggestive of infectious TB should be evaluated for active TB and placed immediately on Airborne Precautions in an airborne infection isolation room (AIIR). It will be the responsibility of all Clinic Directors, the Director of Emergency Medicine, and inpatient Clinical/ Medical Directors to develop a mechanism for screening patients for active TB.

e. TB screening with the TST or IGRA may be performed without regard to the timing of SARS-CoV-2 vaccination in accordance with North Carolina Tuberculosis Control Program guidance.

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2. Laboratory Diagnostic Studies

a. The UNC Medical Center Clinical Microbiology Laboratory will utilize the most sensitive methods available for the detection and identification of mycobacteria (e.g., fluorescent microscopy for AFB smears).

b. Smears sent to the UNC Medical Center Clinical Microbiology Laboratory will be processed according to lab policy. Smears are processed Monday-Friday. Specimens received after 8:00am are processed the following processing day.

c. When collecting AFB smears, three samples should be collected at least eight hours apart. The laboratory does not routinely process smears on stools. Smears will be performed on all gastric aspirate samples that are sent for AFB culture; however, the smears have low sensitivity, so a negative result may not be used to rule out TB. Gastric aspirates should be collected on three separate mornings. See Attachment 2 - UNC Medical Center AFB Laboratory Procedures for specific lab procedures.

d. All first time positive smears and positive cultures for *M. tuberculosis* will be reported immediately to the requesting physician and to Infection Prevention via their electronic surveillance system.

e. All patients with *M. tuberculosis* will have their isolate tested by the UNC

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Medical Center Clinical Microbiology Laboratory for first-line drug susceptibilities. (INH, Rifampin, PZA, and Ethambutol). Results are generally available 2-3 weeks after an isolate is obtained. Any resistant isolate is sent to the NC State Laboratory of Public Health for confirmation and testing of second line drugs.

f. PCR testing is routinely performed on all first time smear-positive respiratory specimens, including specimens from patients with cystic fibrosis (CF). PCR is NOT routinely performed on smear-negative respiratory specimens or extra-pulmonary specimens independent of smear results, but can be requested by a clinician or Infection Preventionist (IP).

g. TB PCR is performed by the UNC Medical Center Clinical Microbiology Laboratory Monday – Friday. Results are generally available the same evening as the smear result. The sensitivity of TB PCR for smear-positive respiratory specimens is 97-100% whereas the sensitivity for one smear negative respiratory specimen is 72%. The sensitivity increases to 86% when testing two smear negative respiratory specimens.

h. The two types of tests that can be used to help detect TB infection are the TB Skin Test (TST) and the IGRA (interferon gamma release assay) TB blood test. A positive TST or TB blood test only indicates that a person has been infected with TB bacteria. It does not distinguish whether the person has latent TB infection (LTBI) or has progressed to TB disease. Other tests, such as a chest x-ray and sputum testing are needed to further evaluate whether the person has active TB disease.

i. A TB blood test (IGRA) collected through OHS or by Phlebotomy Service and is processed by McClendon Lab services Monday-Friday.

j. BCG, or Bacille Calmette-Guérin, is a vaccine for TB disease. Many persons born outside of the United States have been vaccinated with BCG. BCG vaccination may cause a positive reaction to the TB skin test, which may complicate decisions about prescribing treatment for LTBI. Unlike TB skin tests, IGRA are not affected by prior BCG vaccination and are not expected to give false-positive result in persons who have received prior BCG vaccination.

3. Inpatients Requiring Airborne Isolation

a. All patients with known or suspected pulmonary TB, laryngeal TB, or miliary TB.

b. Patients with known or suspected TB abscesses which are open/draining or who have wound drains in place (e.g., JP).

c. All patients with a gastric aspirate that is smear or culture positive for AFB.

d. Patients with cystic fibrosis (CF) and a first AFB positive isolate (smear or

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culture) must be placed on Airborne Precautions until TB is excluded.

e. Patients with known or suspected multidrug resistant TB (MDR-TB) or extensively drug resistant TB (XDR-TB) will remain on Airborne Precautions throughout their hospitalization because of the high frequency of treatment failure or relapse.

f. Patients with previously diagnosed pulmonary or laryngeal smear-negative, culture-positive TB readmitted to UNC Medical Center should be placed on Airborne Precautions until they have been on treatment for a minimum of 2 weeks and demonstrated clinical improvement.

g. Patients with previously diagnosed pulmonary or laryngeal smear-positive TB readmitted to UNC Medical Center should be placed on Airborne Precautions until they have met the Discontinuation of Isolation guidelines in this policy.

h. Pediatric patients with suspected or confirmed TB should be evaluated for potential infectiousness same as adults on the basis of symptoms, sputum AFB smears, radiographic findings, and other criteria. Those with pulmonary or laryngeal TB will be placed on Airborne Precautions until they are determined to be non-infectious. Consultation with a pediatric infectious disease specialist is recommended when TB in a child is suspected.

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4. Inpatients that do not Require Airborne Precautions

a. Patients with a recent history of Nontuberculous Mycobacteria (NTM), do not need isolation if the attending physician does not suspect or is not treating the patient for TB. If TB is suspected or in the differential diagnosis the patient must be placed on Airborne Precautions until diagnosed or ruled out. This is most commonly seen among HIV positive, immunosuppressed, and chronic lung disease patients.

b. CF patients with a documented history of NTM, do not need Airborne Precautions if the attending physician does not suspect or treat the patient for TB. If TB is suspected or in the differential diagnosis the patient must be placed on Airborne Precautions until diagnosed or ruled out. CF patients with a first time smear or culture positive for AFB positive must be placed on Airborne Precautions until TB is excluded.

c. For patients that have specimens for AFB lab tests ordered as a component of a procedural protocol (e.g., organ transplantation, CF/thoracic patient bronchoscopy), Airborne Precautions are not required, unless TB is suspected or in the differential diagnosis.

d. Patients with pleural TB who have negative sputum/respiratory smears, are considered to have extrapulmonary TB and Airborne Precautions are not needed unless the patient has a pleural drain in place.

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e. Patients with extrapulmonary TB that do not have any pulmonary involvement (i.e., ruled out by 3 negative respiratory specimen smears) and do not have a drain in place.

5. Isolation Guidelines

a. Airborne Precautions may be initiated by any Licensed Independent Practitioner (LIP), Registered Nurse (RN), or Infection Preventionist.

b. Medical care providers ordering Airborne Precautions and nursing staff will educate all patients placed on Airborne Precautions emphasizing the need to adhere to the UNC Medical Center isolation precautions guidelines.

c. Patients who refuse to adhere to Airborne Precautions will be reported to the Orange County Health Department. When applicable, legal action will be taken to enforce appropriate Airborne Precautions. UNC Hospital Police will aid in enforcing court ordered isolation. Alternatively, patients refusing to adhere to Airborne Precautions will be transferred to State facilities capable of managing such patients. Psychiatric consultation will be obtained to assist in such transfers.

d. Patients with known or suspected active TB should not ambulate outside the isolation room for therapeutic reasons. Infection Prevention must approve any exceptions to this policy.

e. Patients with known or suspected TB will be placed in Airborne Infection Isolation Rooms (AIIRs) that meet CDC recommendations. A list of rooms that meet CDC recommendations for AIIRs can be found on the Infection Prevention Website: Airborne Isolation Room Locations. Ventilation requirements will include: private room, negative air pressure (corridor positive with respect to the room), >6 air changes per hour (≥12 air changes per hour for new construction), and direct out-exhausted air. The corridor door must remain closed except when entering or exiting the room. Negative pressure should be monitored with a tissue test and recorded at least daily by nursing personnel in the electronic medical record while the room (inpatient, outpatient or procedural areas) is being used for Airborne Precautions. For isolation rooms with an anteroom, check the air pressure at the inner door of the anteroom. If positive or neutral pressure is detected in an AIIR, Maintenance department should be notified to correct the problem as soon as possible. While awaiting Maintenance, a portable high-efficiency particulate air (HEPA) unit should be placed inside the patient's room at the door. Portable HEPA units are available from Patient Equipment.

f. If, in the opinion of the patient's attending physician, moving the patient to an approved isolation room is medically contraindicated, the Medical Director (or designee) of Infection Prevention must be consulted. Infection Prevention will:

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(1) notify the appropriate nursing supervisor if moving the patient to a room meeting TB isolation ventilation requirements is medically contraindicated and (2) advise staff regarding appropriate engineering controls such as use of a portable HEPA unit, and modification of ventilation in the patient's room to optimize air change rates.

g. An approved portable HEPA unit will be placed in a single room in the following areas when occupied by a patient with known or suspected TB: certain intensive care unit rooms (when all AIIRs are occupied by patients requiring Airborne Precautions). Personnel entering such rooms will wear N95's or powered air-purifying respirators (PAPRs). The patient should be moved to an AIIR as soon as possible.

h. Approved portable HEPA units will be placed in a single room in the following areas when occupied by a patient with known or suspected TB: Operating Room (including Labor and Delivery Operating Rooms) and Diagnostic Procedure Areas. Personnel entering such rooms will wear N95's or PAPR. See special considerations for Operating Rooms and Procedural rooms.

i. Diagnostic procedures on patients with known or suspected active pulmonary TB should be performed in an AIIR whenever possible. If a required diagnostic procedure cannot be done in the AIIR (e.g., MRI):

    i. Efforts should be made to schedule the procedure at a time when it can be performed rapidly and when procedure areas are less crowded.

    ii. The patient shall wear a surgical mask covering the nose and mouth. The person(s) transporting the patient does not need to wear respiratory protection outside of the isolation room as long as the patient wears a mask. Notify Infection Prevention if the patient is unable to wear a mask so IP can assist with planning optimal infection prevention during the time the is patient is in the shared air space of the hospital's hallways (e.g., done within hours when people in hospital hallways are at a minimum, determine a route to the procedure that would limit exposing others while en route).

    iii. If the patient being transported requires mechanical or bag-mask ventilation, a heat moisture exchanger (HME) with filter will be applied to the exhalation port on the ventilator or on the endotracheal tube connector respectively.

    iv. The receiving area will be notified prior to transport by personnel at the site of the patient's origin that the patient is on Airborne Precautions. The order for Airborne Precautions can be seen in Epic by viewing the information in the patient header in the "Isolation" field.

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v. Rooms used by suspect TB patients that are *not* AIIRs (i.e., negative pressure) and in which there was *not* a portable HEPA unit in place during the patient's visit should be closed for a minimum of 3½ hours after the suspect patient leaves. Cleaning can be performed in this room after the 3½ hour closed time.

vi. MRI rooms have a minimum of 6 air exchanges per hour (ACH); therefore these MRI rooms need only be closed for a minimum of 70 minutes. Cleaning can be performed in the MRI rooms after the 70 minute closed time.

j. If the patient must temporarily leave the AIIR or upon discharge of the patient from the room, the door must be kept closed for a minimum of 30 minutes prior to anyone entering *without* wearing an N95 or PAPR. The 30 minute time period will allow the room ventilation system to remove any droplet nuclei.

k. **Pregnant patients** with known or suspected pulmonary TB, laryngeal TB, or miliary TB on Airborne Precautions may remove their surgical mask when medically necessary during labor and delivery when all others in the room are wearing respiratory protection (e.g., surgical masks for visitors, or N95, or PAPR for HCP). As soon as possible after delivery, the patient should don a surgical mask to limit exposure of the newborn to TB in the delivery room. The newborn will be housed in the Nursery/NCCC and may not visit or room-in with the mother until she has met the criteria as no longer infectious.

l. **Breastfeeding patients** with TB who have met the criteria to discontinue Airborne Precautions may breastfeed. Women with TB disease suspected of being contagious should refrain from breastfeeding or any other close contact with the infant because of potential transmission through respiratory tract droplets. She may pump breast milk that may then be fed to the infant by bottle by a noninfectious person. *Mycobacterium tuberculosis (MTB)* rarely causes mastitis or a breast abscess, but if a breast abscess caused by *M. tuberculosis* is present, breastfeeding should be discontinued until the mother no longer is contagious. If mother has mastitis caused by TB, she may pump breast milk to maintain supply but the milk must be discarded. Please refer to the Infection Prevention policy: Women's Hospital Maternal Units for additional information.

m. **Prisoners:** When a patient from a prison is on Airborne Precautions, the accompanying Department of Corrections personnel must wear an N95 or a PAPR while they are in the patient's room. Fit testing is the responsibility of the Department of Corrections.

n. Refer to Attachment 5 - Procedure for Instituting Airborne Precautions When the Patient is Housed in a Semi-Private Room.

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6. Isolation: Visitors

a. Patients with known or suspected TB will only be allowed a limited number of visitors. All visitors must be able to comply with Airborne Precautions. All visitors must wear surgical masks. Visitors should be instructed on use of the surgical mask and on Airborne Precautions. This includes 24-hour caregivers and other visitors who may stay in adult or pediatric patient rooms for extended periods of time.

b. Individuals visiting inpatients on Airborne Precautions for TB, who have any symptoms of TB including a mild non-productive cough ≥3 weeks duration, will be asked to provide written evidence that they do not have active TB. A physician or the local health department must provide the verification. Written verifications should include: 1) absence of the following symptoms: persistent cough (≥3 weeks duration), hemoptysis, night sweats, weight loss and fever; 2) a negative TST read by a trained HCP or IGRA; and 3) a negative chest radiograph if indicated. Visitors refusing to obtain the TB evaluation and verification of absence of disease will be barred from admittance to all UNC Medical Center facilities. UNC Hospital Police will have authority to enforce this provision.

c. For pediatric patients who have known or suspected TB, *ALL* household members and close contacts must provide written verification of the absence of disease prior to visitation *regardless of signs/symptoms of illness*. Primary caregivers (e.g., legal guardians/parents who live with the child) may visit before the evaluation is complete, but they must wear a surgical mask at all times when outside the child's room until they have documentation that they do not have active TB. The primary caregiver must initiate their TB evaluation within 3 working days of the child's admission.

    i. If there is a low likelihood of TB in a pediatric patient, the Infection Prevention Medical Director and/or Pediatric ID attending can decide whether screening is required for an asymptomatic primary caregiver. In this case, the caregiver must wear a mask when outside the patient's room and a symptom screen only will conducted.

    ii. If there is a high likelihood of TB in a pediatric patient, and/or positive symptoms in the primary caregiver, the caregiver will need further evaluation (e.g., TST or IGRA, chest x-ray).

    iii. If the primary caregiver cannot obtain verification through their own PCP or local health department, they may register as a UNC Medical Center patient and have the child's physician order an IGRA which can be obtained as a lab check-in test (with the consent of the child's physician). The child's physician must be willing to place the order for

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this test, perform a symptom screen and accept responsibility for any necessary referrals upon receipt of the test results for the primary caregivers. In some circumstances, legal and billing departments may waive the expense of this testing to parents without insurance.

d. If a primary caregiver, household member, or other close contact is found to have active TB, they may *not* visit until they have written documentation that they are no longer infectious. Their local health department or an attending physician of UNC Medical Center must provide the verification. If the primary caregiver has been released from home isolation, but is still undergoing directly observed therapy (DOT), the Orange County Health Department may assume responsibility for delivering and observing the administration of the antibiotics. This can be arranged by having the primary caregiver's local health department contact the Orange County Health Department.

7. Discontinuation of Isolation

a. Discontinuing isolation using these criteria requires the approval of the patient's attending physician.

b. For patients with suspected TB, Airborne Precautions may be discontinued: when a diagnosis other than pulmonary TB is confirmed **AND** TB is no longer considered in the differential diagnosis, **OR** when three sputum smears obtained ≥8 hours apart are all reported as negative by the Microbiology Laboratory **AND** TB is no longer considered in the differential diagnosis. Each failed sputum induction equals one negative smear. The sputum inductions must be done at least 8 hours apart (ideally, one of the three will be an early morning sample). Multiple bronchoscopy specimens obtained in one bronchial procedure count as one sample. For patients ≤ age 3, Airborne Precautions can be discontinued if a bronchoalveolar lavage (BAL) is negative for AFB by smear **AND** TB is no longer in the differential diagnosis.

c. For persons with suspected or known active pulmonary or laryngeal TB who are initially sputum smear negative, Airborne Precautions may be discontinued once the patient has been treated for a minimum of 2 weeks and has demonstrated clinical improvement.

d. For patients with a culture positive for AFB/mycobacteria, Airborne Precautions may be discontinued when the cultures are finalized as negative for *M. tuberculosis*.

e. For patients with an AFB positive smear on a respiratory sample, Airborne Precautions may be discontinued if the TB PCR is negative provided TB is no longer in the differential diagnosis. A negative PCR on a smear negative or smear indeterminate respiratory sample may not be used to discontinue Airborne Precautions.

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f. Patients with previously diagnosed pulmonary or laryngeal smear-positive TB should remain on Airborne Precautions until all of the following are met:

    i. They have two consecutive sputum specimens - collected at least 8 hours apart which are smear negative; **and**

    ii. They have been compliant for 2 weeks on TB medications to which the organism is judged to be susceptible; **and**

    iii. There is evidence of clinical response to TB treatment. (From 10A NCAC 41A.0205)

g. For pediatric patients, the specimens may be gastric aspirate when induced sputum cannot be obtained. Collect gastric aspirates on three separate mornings.

h. Infants should have:

    i. Clinical improvement

    ii. Two weeks of appropriate empiric therapy

i. For patients with soft tissue open/draining lesions with a positive smear for AFB, Airborne Precautions may be discontinued when the cultures are finalized as negative for *M. tuberculosis* or the lesions have closed, any drains have been removed and the lesion is no longer draining.

j. Patients with extrapulmonary TB with a drain in place (e.g. TB positive liver abscess with a JP drain) can have Airborne Precautions discontinued when:

    i. They have two samples collected at least 8 hours apart from draining wound which are negative for AFB; **and**

    ii. They have been compliant for 2 weeks on TB medications to which the organism is judged to be susceptible; **and**

    iii. There is evidence of clinical response to TB treatment **or**

    iv. The drain is removed and the wound is healed

k. For patients with soft tissue open/draining lesions culture positive for *M. tuberculosis*, Airborne Precautions may be discontinued when the patient is on two weeks of effective therapy, is improving clinically, and if initially smear-positive, two consecutive samples of wound drainage collected at least 8 hours apart are smear negative **or** when the wound is closed, no longer draining, and any drains have been removed.

l. For patients with extrapulmonary TB (e.g. TB meningitis), Airborne Precautions are not required unless they have symptoms of pulmonary or draining soft tissue TB infection.

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8. Discharge Planning

a. Will include at a minimum: 1) a confirmed appointment with a provider (e.g., the local health department) who follows the patient until cure, 2) sufficient medication to take until the outpatient appointment (health department provides free medication; patients should not be instructed to purchase any), 3) placement into case management of the local health department of the patient's county of residence. Appointments at UNC Medical Center clinics can only be made during normal business hours, so patients being discharged on weekends or after business hours should have their follow-up appointments made prior to discharge.

b. Patients who may be infectious at the time of discharge should only be discharged to facilities with TB isolation capabilities or to home. They should not be discharged to home if there are persons in the household who are at high risk for acquiring active TB (i.e., children less than or equal to 5 years of age, persons infected with HIV, or persons who are immunocompromised). Patients should use private transport to go home, but if patient must use public transportation (e.g., van), they must be instructed to wear a mask and keep it on for the duration of the trip. They should be instructed to refrain from going to public places prior to consulting with the health department.

c. It will be the responsibility of the physician who writes the discharge orders to adhere to these provisions.

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9. Reporting

Refer to the Infection Prevention policy: Reporting of Communicable Diseases)

a. Physicians are responsible for completing the **Communicable Disease Report Form** and ensuring that it is sent to Infection Prevention (via tube system #704, CB 7600, or Fax # 984-974-7719). Infection Prevention will send the form to the health department. The form is accessible on the Infection Prevention Intranet Website**.**

b. Infection Prevention personnel will contact the patient's local health department by telephone once a patient is known to be infectious with *M. tuberculosis*.

c. All positive cultures and smears for *M. tuberculosis* will be reported by the Clinical Microbiology Laboratory to the North Carolina State Division of Epidemiology on the day of recognition.

10. Management of Patients in Outpatient Care Services

For additional details, please refer to the Infection Prevention policy: Ambulatory Care Clinical Services**.**

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11. Additional Considerations for Selected Areas

a. **Operating Rooms and Procedural Areas**- Elective operative procedures on patients with known or suspected TB should be delayed until the patient is no longer infectious. When emergency cases must be performed, the doors to the operating room should be closed and traffic in and out of the room should be kept to a minimum. Attempts should be made to perform the procedure at a time when other patients are not present in the operative suite (i.e., end of day) and when a minimum number of personnel are present. A patient with known or suspected TB brought for surgery must go directly into an operating room. If the operating room is not ready to receive the patient, the patient must be placed in an AIIR in PACU. HCP present when operative procedures are performed on patients who may have infectious TB should wear an N95 or PAPR rather than a standard surgical mask. If PAPR is used, a surgical mask must be worn under the PAPR to protect the patient. The anesthesia machine should be equipped with a disposable anesthesia filter. Portable HEPA units will be used in the operating room (ideally, one HEPA unit at the patient's head and another HEPA unit at the entrance to the operating room).

b. **Autopsy Room** - The autopsy room should be at negative pressure with respect to adjacent areas, with room air exhausted directly to the outside of the building. A tissue test should be done to confirm negative pressure. Twelve (12) air changes per hour (ACH) are recommended. N95s or PAPRs should be worn by personnel while performing autopsies on patients who were known or suspected to have TB.

c. **Dental Clinic and School of Dentistry** - 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 HCP should routinely ask all patients about a history of TB disease and symptoms suggestive of TB. Patients with a history and symptoms suggestive of TB should be promptly referred for evaluation for possible infectiousness. Elective dental treatment should be delayed for patients known or suspected to have TB until the patient is no longer infectious. If urgent dental care must be provided for a patient with known or suspected TB, Airborne Precautions practices must be employed.

d. **Ground and Air Transport Service** - During transport of patients with known or suspected TB, the patient will wear a surgical mask. HCP will use N95s or PAPRs. The ambulance/helicopter windows should be kept down as much as possible to allow for dilution ventilation. If the patient being transported requires mechanical ventilation, a heat moisture exchanger (HME) will be applied to the exhalation port on the ventilator. If the patient requires bag-mask ventilation, the

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HME will be removed from the exhalation port on the ventilator and placed on the endotracheal tube connector.

e. **Obstetrical Patients** – TST and care of OB patients with suspected/known TB is outlined in the OB algorithms from the UNC Center for Maternal and Infant Health website.

f. **Home Health/Hospice** – Home Health and Hospice will be notified of patients with known/suspected TB at the time of the referral.

12. Cough-Inducing Procedures

a. Procedures that involve instrumentation of the lower respiratory tract or induce cough may increase the probability of droplet nuclei being 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 (e.g., irrigation of tuberculous abscesses, homogenizing or lyophilizing tissue, and autopsy) may increase the probability of droplet nuclei being expelled into the air. In these cases, the guidelines indicated for aerosol-inducing procedures should be followed.

b. Cough-inducing procedures should not be performed on patients who may have active TB unless absolutely necessary.

c. All cough-inducing procedures performed on patients who may have infectious TB must be performed in an AIIR. In the outpatient setting, AIIRs are available in the Infectious Disease Clinic, Pediatric Specialty Clinics, Pulmonary Clinic, and ED. Refer to Airborne Isolation Rooms for a complete list of Airborne Precaution rooms within UNC Medical Center.

d. HCP will wear a N95 or PAPR when present where cough-inducing procedures are being performed on patients with known or suspected infectious TB.

e. After completion of cough-inducing procedures, patients with known or suspected infectious TB (including patients at high risk of TB such as HIV-infected patients) should remain in the AIIR and not return to common waiting areas. They will be given tissues and instructed to cover the mouth and nose when coughing. If they must recover from sedatives or anesthesia following procedures such as bronchoscopy, they must be monitored in a separate AIIR, and not in a common area such as a recovery room. Upon discharge from the hospital, instruct the patient to wear a surgical mask until they exit the hospital.

f. When a patient with known or suspected TB leaves an AIIR where a cough-inducing procedure has been done, at least 30 minutes should pass before the room is utilized for another patient or entered by staff not wearing N95s or PAPRs.

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B. Risk Assessment and Department Responsibilities

1. Risk Assessment

a. A retrospective evaluation of a sampling of patients from whom *M. tuberculosis* is isolated will be conducted by Infection Prevention periodically. A written assessment, including an analysis of any healthcare-associated exposures, review of factors leading to exposures, and recommendations for preventing exposure in the future, will be provided to the Hospital Infection Control Committee (HICC).

b. On an ongoing basis, the UNC Medical Center Occupational Health Service (OHS) will maintain records of the results of evaluations of all UNC Medical Center HCP and volunteers (except students) with occupational exposure to *M. tuberculosis*. On an annual basis, OHS will provide a report to the HICC that will include the number of UNC Medical Center HCP with occupational exposure, number of persons converting their TST/IGRA after a known exposure, and any persons who have acquired active TB.

c. On an ongoing basis, OHS will maintain records of the results of all TST/IGRAs placed for screening purposes (new HCP, routine screening of current HCP). On a yearly basis, OHS will provide a written breakdown of the TST/IGRA positive rate (positive TSTs/total TSTs) to include TST/IGRA conversion incidence by hospital location of employment or job description (whichever is more appropriate) to the HICC.

d. For UNC-CH HCP, University Employee Occupational Health Clinic (UEOHC) will maintain TB screening records.

2. Departmental Responsibilities

a. Departments with clinical staff have Departmental Safety Coordinators (DSCs) who attend quarterly training from Environmental Health and Safety which may include updates/revisions to the TB Control Plan. The DSCs are expected to communicate any updates to the staff in their departments.

b. Annual Learning Made Simple (LMS) training on TB covers topics as suggested by CDC guidelines and OSHA regulations.

c. UNC-CH DSC will receive monthly JC/OSHA compliance reports. The DSC will verify the accuracy of the report, assign new HCP to the appropriate work unit, and ensure HCP take the University's on-line training. UNC-CH HCP can view their compliance status at any time through the EHS Compliance Portal.

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d. Contracted HCP must comply with all aspects of this TB Control Plan. It is the responsibility of the contracted employee's employer to provide the required elements.

C. Education

1. Training Requirements

a. All HCP who have the potential for exposure to *M. tuberculosis* and all HCP located in healthcare facilities will receive education about TB that is appropriate to their job category. Training shall be conducted before initial assignment and annually. Training can be accomplished in a variety of mechanisms. For HCP of UNC Medical Center, this training is provided through the LMS system.

b. For UNC-CH HCP, training is provided through the University's on-line self-study course. New UNC-CH HCP are required to attend the University's Clinic Environmental Safety Orientation Class.

c. Although the level and detail of this education may vary according to the job description, the following elements should be included in HCP education.

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2. Elements of Education

a. Education will cover the following topics as outlined in the NC Tuberculosis Control Manual:

   i. TB transmission, signs and symptoms

   ii. The purpose and interpretation of the TB skin test (TST)

   iii. The principles and practices of TB infection control, including Airborne Precautions

   iv. Preventive and curative TB treatment

   v. HIV as a risk factor for developing TB

   vi. The importance of personal respiratory protection

   vii. TB reporting and confidentiality requirements

D. Occupational Health Responsibilities

1. Occupational Health Coverage

a. The following HCP will be evaluated by the UNC Medical Center OHS: UNC Medical Center HCP, house staff (physicians), volunteers and others that UNC

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Medical Center OHS contracts with to provide these services.

b. University personnel will receive services from University Employee Occupational Health Clinic (UEOHC).

c. All UNC students who obtain clinical experience at UNC clinical facilities shall receive their required initial screening through Campus Health Services (CHS) or another approved healthcare facility (e.g., health department or a primary care physician's office). The annual screening for UNC students who have had a positive TST will be conducted at CHS. UNC students with potential exposures will also be evaluated at CHS. If the student is on an away clinical rotation, the student will follow the recommendations of the occupational health team at that medical facility. However, the student must still contact the CHS physician on duty to help ensure all the necessary steps are done and if necessary, have the student follow up with CHS.

d. HCP who are contracted receive occupational health screening from their agency. All contract personnel who work directly with patients or in patient care, areas must meet the screening requirements described in this policy. It is the responsibility of the University or Medical Center department hiring these HCP to assure compliance with this policy.

e. It will be the responsibility of each of the different occupational health providers to meet the current OSHA tuberculosis standards of education, record keeping, screening, annual fit-testing and exposure evaluations. Within the University, this is a joint responsibility of UEOHC and the UNC Department of Environment, Health and Safety.

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2. Evaluation of newly hired HCP for latent and/or active TB

a. All HCP will be evaluated prior to New Employee Orientation (NEO) by OHS for symptoms of latent and/or active TB. The assessment and treatment of latent and active TB will be guided by the NC Tuberculosis Policy Manual (Tuberculosis Control, Epidemiology, and Communicable Disease Section, HHHS, 2010) and by the ATS/CDC guideline.

b. New hire and annual TB screening; prior to NEO all new HCP will be evaluated for TB by the following methods:

    i. Questionnaire regarding symptoms

    ii. Obtain history of two-step testing done within a 12-month period (may be at any time before employment). Document the year testing was completed.

    iii. Placement of a tuberculin skin test unless TST or IGRA was obtained

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within 12 months of hire. Must be reported on an official document that is completed and signed by another Occupational Health office or licensed health care provider.

iv. If no history of two-step testing and no TST/IGRA done within 12 months of hire, OHS will perform two-step TST or IGRA.

v. For foreign-born HCP (if applicable), obtain history of BCG vaccine, previous TST or IGRA results, CXR documentation and/or treatment for LTBI.

c. HCPs, who have received BCG vaccine, will be tested with an IGRA unless they have documentation of a previous IGRA within the last 12 months. The IGRA is the preferred method of testing for HCP who have a known or possible past history of BCG vaccine.

i. Contraindications to TST include the following:

- Immediate hypersensitivity to a previous TST.
- Written verification of a previous TST with ≥10 mm induration, and history of therapy for LRTI or active TB.
- Pregnancy is NOT a contraindication to a TST.

ii. For University HCP, TSTs are placed and read by UEOHC unless specific arrangements, approved by the UNC Department of Environment, Health and Safety (UNC-EHS), are made.

iii. All HCP will be counseled at the time of initial evaluation regarding the need to report all TB exposures to their Occupational Health Provider (OHP) and if they need to obtain further TST or IGRA testing for lab personnel working with TB samples. All HCP will be counseled regarding the need to report to their OHP the development of signs and symptoms consistent with active tuberculosis including cough >3 weeks, fever, night sweats, and unexplained weight loss.

iv. HCP with a reactive TST of unknown duration, a TST >5 mm, positive IGRA, past history of LTBI prophylaxis, or symptomatic for possible TB will be evaluated for the possibility of active TB. An evaluation may include a baseline chest radiograph and the collection of three sputa for AFB smear and culture based on the presence of symptoms. Sputa will be collected in the ID Clinic, in the Pulmonary Clinic in the ACC, or any other room meeting airborne isolation standards.

v. HCP with reactive TST or positive IGRA will be offered HIV testing.

vi. HCP with suspected active TB will be relieved from work until active disease is ruled out by appropriate medical and microbiologic studies.

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The HCP will be counseled regarding the infectivity of active TB and the risk to others. Grounds for removing a HCP from work may include, but not be limited to, the development of signs or symptoms suggestive of active TB and/or a chest radiograph consistent with active TB.

vii. In accordance with the Environmental Health and Safety policy: Respiratory Protection Program, HCP must be assessed for the ability to wear respiratory protective devices. For UNC Medical Center personnel, this is the joint responsibility of OHS and the Environmental Health and Safety Department. For University personnel, the respiratory protection program is the responsibility of UEOHC and the UNC Department of Environment, Health and Safety.

viii. Annual fit testing for N95 respirators is required by Federal OSHA law. Healthcare facilities should be compliant with current OSHA regulations.

ix. Evaluation of the Pregnant Employee

- TB testing is recommended for all pregnant women
- Pregnancy is not a contraindication to placement of a TST or a collection of IGRA. The same TST placement guidelines will apply to the pregnant HCP as apply to the non-pregnant HCP.
- Pregnant HCP, if requesting counseling, will be notified that TB may progress more rapidly in pregnant individuals.
- HCP who meet the recommendations for therapy of latent tuberculosis infection (LTBI) or require therapy for active TB will be handled on an individual basis in conjunction with the patient and their primary physician. INH and rifampin have been demonstrated to be safe in pregnancy by large-scale field trials. There is no evidence that these agents cause infertility, fetal loss, or are teratogenic or oncogenic. In general, pregnant HCP who meet the criteria for therapy of LTBI will be counseled to undergo such therapy. Pregnant females with active TB will be counseled to undergo appropriate therapy and cannot work until they are no longer deemed infectious and are cleared by OHS.

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3. Screening of Exposed HCP

a. Identify and notify exposed HCP.

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i. Records of all patients from whom *M. tuberculosis* (MTB) is isolated will be reviewed by Infection Prevention to ascertain that proper infection prevention procedures were maintained throughout hospitalization and during outpatient visits. In the event that HCP or other patients experienced respiratory exposure to an infectious patient or HCP, every attempt will be made to notify exposed HCP and patients. Infection Prevention will notify supervisors of the potential exposure for their personnel, when help is needed identifying possibly exposed HCP. Infection Prevention will notify the patient's physician if a patient was exposed. It will be the responsibility of an exposed patient's primary UNC Medical Center physician to notify an exposed patient and arrange for appropriate follow-up. The local health department will be notified by Infection Prevention of positive TB culture results of HCP and source patient information. Evaluation of community exposures will be considered the responsibility of the local health department.

ii. In the event that it is difficult to define precisely those who are potentially exposed (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 amounts of exposure will be evaluated until evidence of transmission is not found. The use of this concentric circle approach will be the responsibility of the Medical Directors of Occupational Health and Infection Prevention.

iii. Infection Prevention will notify Campus Health Services of a student's possible healthcare exposure. Campus Health Services will notify the designated representative for each health science or allied health science school who will inform clinical instructors of potential student exposures so follow-up can be arranged.

iv. Infection Prevention will notify University Employee Occupational Health of possible healthcare-associated exposure for University personnel (including names, if documented on the medical record).

v. Infection Prevention will notify the Orange County emergency medical service of possible healthcare-associated exposure of their HCP while performing patient transport to UNC Medical Center. It will be the responsibility of the EMS providers to contact the individuals and arrange appropriate evaluation. EMS personnel outside of Orange County will be notified by their county local health department.

vi. Infection Prevention will notify the department employing an outside

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contractor or outside student agency of possible healthcare-associated exposure. The contracting department will notify the outside contractor or student agency. It will be the responsibility of the outside contractor or student agency to contact exposed individuals and arrange appropriate evaluation.

4. Assessment of HCP by Occupational Health Services:

a. Post Exposure Evaluation

i. All HCP (unless concentric circle approach used) who meet the definition of exposure to a person with active TB will be offered evaluation in OHS. Contact of HCP and/or managers will be by Infection Prevention. HCP will be advised to follow-up with their OHS provider. Exposure evaluation consists of screening questionnaire, baseline TST/IGRA placed and follow-up TST/IGRA placed within 8-10 weeks post exposure. A screening chest x-ray will be performed as deemed necessary by OHS Medical Director or designee.

ii. As with TST, live virus vaccines might affect IGRA test results. However, the effect of live virus vaccination on IGRAs has not been studied. IGRA testing should be done on the same day as live virus vaccination or 4-6 weeks after the administration of live virus vaccines.

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E. Treatment of Active Tuberculosis

1. Treatment will be guided by the ATS/CDC guidelines and the NC TB Manual.

a. HCP with possible or documented active TB will immediately be relieved from all work activities by their OHP. When indicated, hospitalization will be recommended. Leave from work will be handled according to personnel policies.

b. All HCP with active TB will be given anti-tuberculosis therapy based on current CDC and NC TB manual recommendations. In general, a four-drug regimen will be used, pending susceptibility testing of the infecting strain. The personnel's OHP is responsible to notify the health department in the county where the HCP with positive TB results resides so that appropriate community exposures can be investigated. Directly observed therapy (DOT) will be performed or arranged by the local health department.

c. HCP refusing therapy will be relieved of all work activities and reported to the health department.

d. All HCP with active TB will be counseled regarding the risk of disease among

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household contacts. Pregnant HCP will be counseled regarding the risks to their fetus.

2. Return to Work for Healthcare Personnel with Active Tuberculosis
    a. All HCP with recent active TB must be evaluated by their OHS prior to returning to work.
    b. Prior to returning to work, the HCP must have all of the following documented:
        i. Appropriate therapy for at least 2 weeks
        ii. Clinical improvement
        iii. Sputum smears consecutively negative x 2 for mycobacteria (if smear-positive initially).
        iv. Stable or improved chest radiograph
    c. Immunocompromised HCP
        i. Counseling via the OHS will be available for immunocompromised HCP regarding their risks for acquiring TB.
        ii. Immunocompromised HCP will be offered reassignment from areas where patients with *M. tuberculosis* frequently receive care (ID Clinic/Pulmonary units).

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F. Engineering Controls

1. Isolation Rooms that Meet CDC Recommendations
    a. Refer to Airborne Isolation Rooms for a complete list of Airborne Infection Isolation Rooms (AIIR) within UNC Medical Center, which is kept by the Patient Logistics Center, Plant Engineering, and Infection Prevention. Plant Engineering will evaluate the AIIR every 12 months to verify ventilation meets the CDC recommendations.
2. Use of Portable HEPA Units / Local Exhaust Ventilation Devices
    a. All cough inducing procedures should ideally be performed in rooms that meet the ventilation requirements for Airborne Precautions.
    b. For rooms that do not meet the ventilation requirements for Airborne Isolation, portable HEPA units will be used for cases having known or suspected pulmonary TB or when a body cavity infected with *M. tuberculosis* is entered or disrupted. The units will be turned on to the highest setting prior to initiating the procedure. Ideally, one unit will be placed near the patient's head and one unit will be placed near the entrance door. The unit

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should run for 30 minutes following the patient leaving the room prior to HCP entering without proper respiratory protection.

G. Respiratory Protection

1. All HCP entering an enclosed area of a patient who has known or suspected TB or who are present when cough inducing procedures are performed on patients with known or suspected TB will wear a respiratory protective device (respirator) meeting OSHA recommended performance criteria (e.g., N95 or PAPR). Such a device should be placed prior to entering the room and removed only after leaving the room. HCP who must wear a respirator will be included in the Respiratory Protection Program and complete annual fit testing and training.
2. Policies and procedures regarding the use of respirators are incorporated in the Respiratory Protection Program.

H. Respiratory Protection Program

1. Assignment of responsibility: UNC Medical Center Industrial Hygienist, Department of Environmental Health and Safety will manage the UNC Medical Center program. The Respiratory Protection Program for UNC-CH HCP is managed by the UNC-CH Department of Environment, Health and Safety.
2. For UNC Medical Center HCP, Departmental Safety Coordinators (DSC) will be trained by the Industrial Hygienist to fit test designated HCP within their departments. Qualitative fit testing (i.e., Saccharin Taste Test) will be utilized. Respirator fit testing of UNC-CH HCP will be performed by UEOHC and the UNC-CH Department of Environment, Health and Safety. A quantitative fit-testing method will be utilized for University HCP.
3. Fit testing will be limited to personnel who require the use of respirators (e.g., staff who work in an area with an AIIR). These personnel will be limited to locations where known or suspected patients with TB are most concentrated (Pulmonary/Infectious Disease Service, nursing units and all Bronchoscopy suites). Staff in these areas will be fit-tested annually for an N95 respirator.
4. Medical Screening: HCP will be evaluated to determine whether fit testing is safe. The screening process will be performed utilizing a general screening questionnaire for medical conditions that may compromise the safety of fit testing or respirator use. The questionnaire will be given to all HCP at the time of employment and will be reviewed by the Medical Director of the Occupational Health Provider or their designee. The Medical Director or their designee will identify HCP who need further evaluation, which may include a physical examination, using the Respirator Medical Evaluation and Respiratory Protection Data forms available from OHS. If you are required to use a respirator in your workplace, a medical screening/evaluation is required once, prior to

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initial fit testing and use. However, the medical evaluation may need to be repeated if you, your supervisor, or your respiratory program administrator recognizes signs or symptoms that may affect your ability to use the assigned respirator. Additionally, if a physician or other licensed healthcare professional determines that a condition exists you may need another medical evaluation.

5. Fit testing: A fit test is used to determine whether a respiratory protective device adequately fits a particular HCP. Fit tests can detect only the face seal leakage that exists at the time of the fit testing. Face seal leakage can result from factors such as incorrect face-piece size or shape, incorrect or defective face piece sealing-lip, beard growth on a wearer, perspiration or facial oils that can result in face-piece slippage, failure to use all the head-straps, incorrect positioning of a face-piece on a wearer's face, incorrect head-strap tension or position, improper mask maintenance, and mask damage. HCP who fail the fit test will be re-fitted using another type of respirator that meets OSHA requirements. HCP using N95s for protection against *M. tuberculosis* are fit-tested initially upon hiring, annually, and as specified by the Environmental Health and Safety policy: Respiratory Protection Program.

6. Respirator training shall include: an explanation of the operation, capabilities and limitations of the respirator provided; instruction in how the respirator wearer should inspect, don, fit check, and correctly wear their provided respirator; an opportunity for each wearer to handle the respirator, learn how to don and wear it properly (i.e., achieve a proper face-seal fit on the wearer's face) and check important parts; explanation of why a particular type of respirator was chosen, the need for re-evaluation when there is a change in facial hair or facial structure, how the respirator is properly maintained and stored, and the capabilities and limitations of the respirator provided; and instruction in how to recognize an inadequately functioning respirator.

7. HCP may use either reusable (i.e., a powered air-purifying respirator, or PAPR) or disposable TB respirators (i.e., N95 respirator) when entering Airborne Precautions rooms. Environmental Health and Safety and the UNC Department of Environment, Health and Safety will provide a list of approved reusable TB respirators for use by HCP. The manufacturer's recommendations regarding care and timing of filter replacements should be followed for reusable respirators. It will be the responsibility of the person using the reusable respirator to adhere to the appropriate maintenance program. In general, reusable respirators should be cleaned after use in a Contact Precaution room, daily or when visibly soiled with an EPA-registered hospital disinfectant.

8. Respirator inspection, cleaning maintenance, and storage: Manufacturer's instructions for inspection, cleaning, and maintenance of respirators should be followed to ensure that the respirator continues to function properly. Replacement filters for reusable respirators (i.e., PAPR) will be changed by Environmental Health and Safety.

9. N95 respirators should be disposed of following each use immediately upon leaving

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the patient room. Damaged or visibly soiled N95s should be immediately disposed of in a regular waste receptacle. The reusable respirator equipment (i.e., PAPR) shall be cleaned and disinfected with an EPA-registered disinfectant after each use. Disposable PAPR head covers/cuffs should be immediately disposed of following each use upon leaving the patient room.

10. During an emergency (e.g., shortage caused by pandemic), respirators may be allowed to have extended or limited use per CDC recommendations and with consultation from Infection Prevention.
11. The Respiratory Protection Program will be evaluated at least annually by Environmental Health and Safety. Elements of the program that should be evaluated include work practices and interference with duties.

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V. Related Policies

Environmental Health and Safety Policy: Respiratory Protection Program

Infection Prevention Policy: Ambulatory Care Clinical Services

Infection Prevention Policy: Reporting of Communicable Diseases

Infection Prevention Policy: Women's Hospital Maternal Units (3WH, L&D, 5WH, NBN & NCCC)

Nursing Policy: Intradermal Injections

Respiratory Care Policy: Sputum Induction

Attachments

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01: Abbreviations and Definitions

02: UNC Medical Center AFB Laboratory Procedures

03: Summary of Interpretation of Skin Tests

04: Protocol for Early Identification of Patients with Suspected Tuberculosis - Outpatient Care Services

05: Procedure for Instituting Airborne Precautions When the Patient is Housed in a Multi-Bed Room

Approval Signatures

Step Description	Approver	Date
Policy Stat Administrator	Kimberly Novak-Jones: Nurse Educator	09/2021
	Thomas Ivester: CMO/VP Medical Affairs	09/2021
	Emily Vavalle: Dir Epidemiology	09/2021
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