

**CALIFORNIA DEPARTMENT OF HEALTH  
SERVICES  
(CDHS)**

**CALIFORNIA TUBERCULOSIS  
CONTROLLERS ASSOCIATION  
(CTCA)**

**JOINT GUIDELINES**

**PREVENTION AND CONTROL OF  
TUBERCULOSIS  
IN  
CALIFORNIA LONG-TERM HEALTH CARE  
FACILITIES**



California  
Department of  
Health Services



CDHS/CTCA JOINT GUIDELINES  
PREVENTION AND CONTROL OF TUBERCULOSIS  
IN CALIFORNIA LONG-TERM HEALTH CARE FACILITIES

DEPARTMENT OF HEALTH SERVICES  
DIVISION OF COMMUNICABLE DISEASE CONTROL  
Tuberculosis Control Branch

ARNOLD SCHWARZENEGGER  
GOVERNOR  
STATE OF CALIFORNIA

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Kimberly Belshé, Secretary  
Health and Human Services Agency

Sandra Shewry, Director  
Department of Health Services

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Prevention and Control of Tuberculosis in California Long-Term Health Care Facilities

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## 1. INTRODUCTION

The guidelines for the *Prevention and Control of Tuberculosis in California Long-Term Health Care Facilities* were developed jointly by the California Department of Health Services (CDHS)(Licensing and Certification Program and Tuberculosis Control and Infectious Diseases Branches of the Division of Communicable Disease Control) and the California Tuberculosis Controllers Association (CTCA). Long-term care facilities are those health care facilities licensed by the Licensing and Certification (L&C) Program under Section 1418 of the Health and Safety (H&S) Code, including Skilled Nursing Facilities (SNF), Acute Care Hospital Distinct Part SNFs (DP/SNF) and all types of Intermediate Care Facilities for the Developmentally Disabled (ICF-DD).

The recommendations contained in these guidelines are intended to be advisory. However, requirements of the California Code of Regulations (CCR), Title 22, and of the California Occupational Safety and Health Administration (Cal/OSHA) are cited when applicable. These guidelines replace *Guidelines for Screening Employees and Residents of Skilled Nursing Facilities* issued in April 2002 ([www.ctca.org](http://www.ctca.org)).

The purpose of these guidelines is to provide persons responsible for infection control and employee health with sufficient information with which to: (1) design and implement a program for screening residents and employees for tuberculosis; (2) reduce transmission through the prompt detection and management of active tuberculosis disease; (3) request consultation from the local health department, and (4) comply with state and federal regulations.

Questions related to long-term care tuberculosis screening programs should be directed to Chris Cahill M.S., R.N. ([ccahill@dhs.ca.gov](mailto:ccahill@dhs.ca.gov)) or Jon Rosenberg, M.D. ([jrosenbe@dhs.ca.gov](mailto:jrosenbe@dhs.ca.gov)), at (510) 540-2566. Questions related to the medical management of tuberculosis infection or disease should be referred to the tuberculosis controller at the local county health department.

## 2. OVERVIEW OF TUBERCULOSIS

Tuberculosis (TB) is a disease caused by *Mycobacterium tuberculosis* bacteria (MTb). These bacteria primarily cause disease in the lungs but just about any organ of the body can be infected. In 2003 there were 3,227 cases of TB in California, the second highest rate in the United States. Each year about 50 cases of active TB disease occur in California long-term health care facilities.

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#### 2.1 Transmission of Tuberculosis

Transmission occurs when a person inhales air contaminated with MTb bacteria that have been forced from the lungs of persons with active TB pulmonary disease when they talk, cough, sing, or shout. Most of the inhaled bacteria that reach the alveoli of the lungs are ingested and destroyed by macrophages (white blood cells). TB can also cause disease in the kidneys, spine, bones, and other organs. Unless the person also has lung disease, MTb can not be transmitted to other persons from these infected body sites.

#### 2.2 Latent Tuberculosis Infection (LTBI)

MTb bacteria that survive macrophage ingestion remain dormant in the lungs (and other organs) but viable (alive) for many years. This is referred to as latent tuberculosis infection (LTBI). Infection generally results in the conversion of the tuberculin skin test (TST) from negative to positive. Persons who have a positive TST and who have strong immune systems may not develop active disease for many years, sometimes a life-time. Persons with LTBI are asymptomatic (have no symptoms of disease), have a normal chest radiograph (CXR), and can not transmit MTb bacteria to other persons. However, infected persons are at risk of progressing from LTBI to active disease unless they receive anti-tuberculosis treatment.

#### 2.3 Active TB Disease

##### 2.3a Risk Factors for Active TB Disease in Persons with LTBI

Persons with LTBI are at increased risk for progression to active disease if they have any of the following:

- Recent contact with a person with active pulmonary TB disease,
- Recent (within two years) TST conversion from negative to positive (active disease may occur in up to five percent of recently infected persons),
- Human immunodeficiency virus (HIV) infection,
- Injection drug use, regardless of HIV serostatus,
- Diabetes mellitus (especially insulin-dependent),
- Silicosis,
- End-stage renal disease,
- Chronic immunosuppression (e.g., transplant recipients, prolonged corticosteroid treatment, or other immunosuppressive therapy),
- Hematologic or reticuloendothelial diseases (e.g., leukemia and Hodgkins' disease),
- Malnutrition and clinical situations associated with rapid weight loss (e.g., cancers of the head and neck, intestinal bypass or gastrectomy, chronic malabsorption and low body weight (more than ten percent below ideal body weight),
- Radiographic findings consistent with old or healed lesions in the lung.

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#### 2.3b Symptoms of Active Pulmonary TB Disease

The symptoms of active pulmonary TB disease may develop slowly and be difficult to differentiate from other lung diseases such as pneumonia and exacerbation of chronic obstructive lung disease. The symptoms of active pulmonary TB disease include, but may not be limited to:

- Cough, generally producing sputum, that lasts longer than three weeks,
- Hemoptysis (coughing up blood),
- Unexplained or new onset of fever, sweating at night, weight loss, anorexia (loss of appetite), fatigue, chest pain, and
- A recurrent diagnosis of pneumonia or a pneumonia that does not improve within two weeks after antibiotic therapy is initiated.

#### 2.3c Diagnosis of Active Pulmonary TB Disease

Persons with active pulmonary TB disease usually have: (1) one or more symptoms, (2) an abnormal CXR, and (3) a positive sputum (acid fast bacilli or AFB) smear and/or culture. The TST may be negative in those with suppressed immune systems. A sputum smear may or may not be positive depending on the extent of active disease. A positive smear also may, on occasion, be due to infection with other non-tuberculosis *Mycobacterium* species such as *Mycobacterium avium-complex* or *Mycobacterium kansasii*. A positive sputum culture or nucleic acid amplification test (NAAT) are the only laboratory studies currently available that can confirm the diagnosis of active pulmonary TB disease.

#### 2.3d Exposure to Active Pulmonary TB Disease

Long-term health care facilities should be aware that any resident, employee, volunteer, family member or visitor may, at any time, develop active disease and expose many persons in the facility to TB. An employee or resident is considered exposed if there has been significant or prolonged contact (shared air space) with a person whose sputum culture or NAAT is positive for MTb and who has not received adequate anti-tuberculosis treatment. Factors that influence the significance of the exposure include:

- Duration of contact,
- Proximity of contact,
- Use of control measures such as Airborne Infection Isolation Room (AIIR) and respiratory protection including a fit-tested N-95 respirator, and
- Infectiousness of source patient, including symptoms, particularly cough, and the extent of disease (as evidenced by positive AFB smears and CXR findings).

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### 2.4 Tuberculosis Skin Test (TST)

Persons with LTBI generally have a positive TST within two to ten weeks after they have been exposed to someone with active pulmonary TB disease. The TST is performed using the Mantoux method of intradermally injecting five (0.1 cc) tuberculin units (TU) of protein purified derivative (PPD) into volar aspect (palm side) of the forearm. Multiple puncture skin testing devices should never be used. Persons previously vaccinated with bacille Calmette-Guerin (BCG) should be included in the TST screening program.

A **two-step TST** should be administered to new employees and residents who have never been tested **or** if more than 12 months have elapsed since the last documented negative TST. This requires that the first TST, if interpreted as negative, be followed by a second TST administered one to three weeks after the first. This method of screening is recommended because the immune response of persons previously infected with MTb may wane (decline) over time and the second TST acts as an immune system "booster." The two-step procedure reduces the likelihood of mistaking a positive TST reaction for new TB infection (conversion). Because a boosted reaction can persist for many months, persons who have documentation of a single negative TST within the previous 12 months only need a single TST.

### 2.5 TST procedures

- The TST should be administered by a licensed health care professional specifically trained to apply and interpret the results.
- The TST should be recorded in millimeters of induration (not negative or positive). A documented prior TST means there is written documentation of all the following: date administered and read, millimeters of induration, test method (i.e., Mantoux), and provider's name.
- Employees should be given written notification of the interpretation of the TST results. The notification should include a statement conveying that:

HIV infection and other medical conditions may cause a TST to be negative, even though you may be infected with tuberculosis. Please consult with your health care provider should you have concerns.
- TST positive new employees and residents classified as reactors (TST conversion date undetermined) or converters should be referred to their primary care physician or the local health department for LTBI treatment recommendations.
- TST positive employees and residents classified as converters should be reported to the local health department, if required by local ordinance.
- Employee TST conversions should be recorded on the OSHA 200 log. New employees classified as TST reactors do not have to be recorded on the OSHA Log.
- Volunteers and physicians, regardless of the number of hours each week they are present in the facility, should be included in the tuberculosis screening program.

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### 2.6 Interpreting TST Results

A TST reaction of five millimeters (mm) or more of induration is considered positive in persons who meet any of the following criteria:

- Recent contact with a case of active pulmonary TB disease,
- Abnormal chest CXR consistent with pulmonary TB disease,
- Known or suspected to be infected with HIV, and
- Immunosuppression (persons who have had recent organ transplant or who require prednisone equivalent to or greater than 15 mg by mouth every day for one or more months).

A TST reaction of ten mm or more induration is considered positive for all other persons.

A TST conversion is defined as an increase in induration of at least ten mm within a two year period. However, for persons in recent contact with a case of active pulmonary TB disease, a TST conversion is defined as an increase of from less than five mm induration on the first TST to a reaction of greater than or equal to five mm on the second TST administered eight to ten weeks after the last date of exposure.

As with any test there is a risk of false negative results and a negative TST may not exclude LTBI. Regardless of the TST results, if an employee or resident is symptomatic, a CXR and, if indicated, bacteriological studies of sputum should be obtained.

### 2.7 In Vitro Laboratory Diagnostic Test

For years the TST has been the basic screening test for tuberculosis infection. Limitations of the TST include the need to measure the response within 48-72 hours after application as well as inaccuracies and errors in measurement. In 2005, the Food and Drug Administration approved an in vitro laboratory diagnostic test to diagnose LTBI. The currently approved test is QuantiFERON-TB-Gold (Cellestis Ltd.).\* Advantages over TST include that it is more specific, needs only a single contact, and the elimination of reader inaccuracies in measurements. Limitations of the current in vitro laboratory test include the need to draw blood and process it within 12 hours after collection as well as current limited laboratory and clinical experience with the test. Guidelines for using the in vitro test are available from the Centers for Disease Control and Prevention (CDC), reference 9. Use of the in vitro test for screening employees would require a grant of program flexibility from Licensing and Certification, since TST is required by regulation (CCR, Title 22, Section 72535). Use of the in vitro test for screening residents on admission requires only approval by the patient care policy committee [CCR, Title 22, 72523 (c) (2) (C)].

\*The use of commercial names is not an endorsement of a product.

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### **3. REPORTING REQUIREMENTS**

The local health department should be consulted for guidance on evaluating and managing exposed residents and employees following the identification of a suspected or confirmed case of active TB disease in the facility.

The local health department (CCR, Title 17, Section 2500) and the Licensing and Certification district office with jurisdiction over the facility (CCR, Title 22, Section 72541) must be notified within one working day of identifying any employee or resident with suspected or confirmed active pulmonary TB disease. The facility medical director or other professional designee should document all recommendations made by the local health department.

If required by local ordinance, persons who convert their TST from negative to positive should be reported to the local health department. Upon a report of a suspect or confirmed case of active disease or a cluster of recent TST conversions, the local health department may initiate an investigation in order to:

- Identify those persons who are at risk for infection due to exposure and to ensure adequate evaluation and/or treatment, and
- Identify the source person with active pulmonary TB disease when a cluster(s) of TST conversions occur.

The H&S Code, Section 121365 states that each local health officer (TB Controller) is directed to use every available means to ascertain the existence of, and immediately investigate all suspected or confirmed cases of tuberculosis disease in their jurisdiction, and to ascertain the sources of those infections.

### **4. RESIDENT SCREENING PROGRAM (SEE TABLE IN SECTION 12.1)**

#### **4.1 New Admission Screening Program**

New admissions are required by CCR, Title 22, Section 72523 to be screened for tuberculosis. However, these regulations vary depending upon the type of licensed facility. Screening for SNF residents is required by CCR, Title 22, Section 72523(c)(2)(C). Screening for intermediate care facilities is required by CCR, Title 22, Section 73519(c).

#### **4.1a Symptom-Screen and Chest Radiograph (CXR)**

To help exclude active TB disease, all new residents, regardless of length of stay, should be screened for symptoms as soon as possible, but no later than 72 hours after admission, using the assessment questionnaire in Appendix 12.2, or a similar tool.

A CXR should be obtained as soon as possible after admission if the resident is symptomatic (i.e., resident has one or more unexplained symptoms identified on question one of the assessment questionnaire in Appendix 12.2).

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Unless there is documentation of a CXR obtained within 90 days prior to admission, a CXR should also be obtained if the resident has a:

- History of active TB disease,
- Documented history of a positive TST,
- Positive TST on admission, or
- An adequate symptom assessment cannot be obtained.

If either the symptom-screen questionnaire or the CXR suggests the possibility of active pulmonary TB disease, the resident should be medically evaluated as soon as possible.

#### 4.1b Admission TST

To identify residents who may have LTBI and to establish a baseline for future testing, all new admissions should have a two-step TST. An admission TST is not required if:

- The anticipated length of stay is five or fewer days,
- There is written documentation of a positive TST,
- There is written documentation of a negative two-step TST within 90 days prior to admission, or
- There is a history of active TB disease documented in the medical record.

A two-step TST is recommended for new admissions unless the resident had a negative TST documented within the previous 12 months. The first TST should be administered within five days after admission. If the first TST is negative, the second TST (to complete the two step process) should be administered within one to three weeks after the first TST.

#### 4.2 Annual Resident Screening Program

Residents who have a negative TST on admission and who remain in the facility longer than one year should have a single TST annually. Residents with a positive TST on admission should have an annual symptom-screen questionnaire; a routine annual CXR or TST is not recommended for those with a positive TST on admission. However, a CXR should be obtained if a resident with a negative TST on admission subsequently develops a positive TST (see 4.4 below).

#### 4.3 Post-exposure Resident Screening Program

Following notification of the local health department (see 3. Reporting Requirements, above), at a minimum all residents exposed to a confirmed case of active pulmonary and/or laryngeal TB disease should receive a symptom-screen questionnaire. Symptomatic residents should have a CXR immediately and receive a medical evaluation. Asymptomatic residents whose most recent TST was negative should be tested as follows:

- If a TST was negative within three months prior to the last exposure date, test the resident in eight to ten weeks following the last exposure date.

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- If a TST was negative more than three months prior to the last exposure date, apply a TST as soon as possible. If the new TST is negative, repeat the TST in eight to ten weeks following the last exposure date.

#### 4.4 Resident TST Conversions

TST converters should have a CXR within seven days if asymptomatic, and as soon as possible (within one day) if the resident has symptoms of active disease. The radiology request should state that the resident is a recent TST converter. If the medical director or the attending physician excludes active TB disease, treatment for LTBI should be considered based upon recommendations by the local health department.

#### 4.5 Residents with Suspected Active TB Disease

If active TB disease is suspected in a resident, the facility should:

- Transfer the resident as soon as possible (within three to five hours) to an acute care hospital, unless an AIIR that meets Cal/OSHA requirements (CCR, Title 8, Section 5141(a)) is available in the facility,
- Restrict the resident to a single room with the door closed until transfer is complete,
- Instruct the resident to wear a surgical mask over the nose and mouth, if possible, until transfer is complete,
- Notify the receiving hospital and transportation service of the diagnosis prior to transfer,
- Notify the resident's family member or conservator. The facility must notify the local health department and the L & C district office within one working day (see 3 Reporting Requirements, above).

Employees should be instructed to wear an N-95 respirator when entering the resident's room. If N-95 respirators are not available, instruct employees to wear a surgical mask tightly over their nose and mouth when entering the room. Surgical masks do not meet the Cal/OSHA respiratory protection program requirements, but may afford some protection.

## **5. ADMISSION AND MANAGEMENT OF RESIDENTS WITH ACTIVE TB DISEASE**

Patients with suspected or confirmed active disease cannot be discharged from an acute care hospital until the local health department approves a discharge plan (H&S Code Section 121361-2). Admission to a facility can be approved if diagnostic testing and medical evaluation determine that the patient is no longer infectious, or if the facility has an AIIR that meets Cal/OSHA requirements [CCR, Title 8, Section 5141(a)].

#### 5.1 Admission of Residents who had Positive AFB Sputum Smears

Residents with positive sputum AFB smears prior to admission (final culture and sensitivity results are either known or pending at the time of admission) may be admitted only when they are determined to be non-infectious by meeting all of the following criteria:

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- Have three consecutive negative sputum smears collected on three different days prior to admission,
- Complete at least two weeks of multi-drug anti-tuberculosis treatment to which the organism is likely to be susceptible,
- Exhibit clinical improvement, and
- Have close medical supervision including directly-observed therapy (DOT) until the local health department determines that anti-tuberculosis medications are no longer necessary.

#### 5.2 Admission of Residents with Negative Sputum AFB Smears

Residents with negative AFB sputum smears (final culture and sensitivity results are either known or pending at the time of admission) may be admitted only when they are determined to be non-infectious by meeting all of the following criteria:

- Have three consecutive negative sputum smears collected on three different days prior to admission,
- Complete at least four days of multi-drug anti-tuberculosis treatment to which the organism is likely to be susceptible to,
- Exhibit clinical improvement, and
- Have close medical supervision including DOT until the local health department determines that anti-tuberculosis medications are no longer necessary.

#### 5.3 Management of Residents with Active Pulmonary TB Disease

Local health officers are responsible for continued oversight of TB patients in nursing homes to ensure they remain noncommunicable (CCR, Title 17, Section 2624). Health departments should be consulted when questions or problems arise in management of residents with active TB disease. The management of residents with active TB disease should include:

- Administration of TB medication by DOT until completion of therapy,
- If recommended by the local health officer, the collection of at least one sputum specimen per month for smear and culture until two consecutive monthly cultures have been documented to be negative (CTCA/CDHS, 2003), and
- Evaluation at least every 30 days by the attending physician or the facility medical director.

Isolation of the patient and the use of other personal protective equipment for staff such as N-95 respirators are not necessary as long as the resident remains asymptomatic and the sputum AFB smears are negative. The local health officer must be notified when persons with known or suspected active TB disease: (1) change health care providers, (2) fail to keep a medical appointment, (3) relocate to another jurisdiction or are transferred to another facility, (4) are noncompliant or unable to tolerate the anti-tuberculosis therapy, and/or (5) discontinue treatment (H&S Code Section 121362).

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Long-term health care facilities must notify the local health officer and provide a written treatment plan before discharging a resident with known or suspected TB (H&S Code Section 121361.2). The resident can be discharged only after the health officer approves the written treatment plan. However, when the resident is being transferred to a general acute care hospital due to an immediate need for a higher level of care, notification and written treatment plan must be submitted to the health officer, but the transfer can occur without health officer approval.

## **6. RESIDENT RECORDKEEPING**

All TST and CXR results should be recorded in the resident's medical record. It is recommended that a separate log also be maintained. This log may be invaluable if case contact investigation is necessary. The log should be easily retrievable for reference by licensed nurses working in the facility, local health department investigators, and L&C health facility evaluator nurses, and include:

- Resident's name,
- Resident's date of birth,
- Date of admission and discharge,
- Date and results (in millimeters of induration) of TST results,
- Date and results of annual or periodic TST results,
- Date and results of the admission chest CXR and any follow-up CXR related specifically to diagnosing active TB disease, and
- Dates and results of sputum smears and cultures, if applicable.

## **7. EMPLOYEE SCREENING PROGRAM (SEE TABLE IN SECTION 12.1)**

The CCR, Title 22, Section 72535 (b) requires that employees working in health care facilities, including long-term health care facilities, be screened for tuberculosis. Cal/OSHA issued an *Interim Tuberculosis Control Enforcement Guideline* in March 1997 requiring all health care facilities to develop, implement, annually review and revise as necessary, a tuberculosis exposure control plan which includes an annual TST and a symptom-screen questionnaire. The exposure control plan is to be available to employees at all times. Although physicians and volunteers are not considered employees, they should be included in the tuberculosis screening program or present proof of a recent (within one year) TST.

### **7.1 New Employee Symptom-Screen Questionnaire**

To exclude active disease, all new employees (permanent, temporary, and contract staff) should have a symptom-screen questionnaire completed on the first day of employment. If the questionnaire is positive, (i.e., employee has one or more unexplained symptoms identified on question 1 of Appendix 12.2), the new employee should be excluded from work until active TB disease is ruled out by a medical evaluation.

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### 7.2 New Employee TST

To identify employees who may have LTBI and to establish a baseline for annual or exposure testing, all new employees should have a two-step TST. A TST is not required if there is:

- Written documentation of a positive TST (first or second step).
- Written documentation of a negative two-step TST within 90 days prior to employment.
- A documented history of active TB disease.

The first TST should be administered and interpreted prior to beginning work. Employees who have a negative reaction to the first TST and a negative symptom-screen questionnaire may start work before the second TST is administered. As an alternative, if the symptom-screen questionnaire is negative, the initial TST can be administered on the first day of employment and interpreted within 48 - 72 hours. If the first TST is negative, a second TST should be administered within one to three weeks. There is no need for the second TST if the employee had a documented single negative TST within the previous 12 months.

If the first or second TST is positive or there is written documentation of a previous positive TST result, the asymptomatic employee should have a baseline CXR within seven days or provide written documentation of a normal CXR taken not more than 90 days prior to hire. If asymptomatic and the CXR shows no evidence of active disease, the employee can be cleared to work. Employees who have a new positive TST or an abnormal CXR should be referred to a health care provider or the local health department for medical evaluation.

### 7.3 Annual Employee Screening Program

TST negative employees should have a single TST and a symptom-screen questionnaire annually. TST positive employees should receive a symptom-screen questionnaire annually. If the questionnaire is positive (i.e., employee has one or more unexplained symptoms identified on question 1 of Appendix 12.2), the employee should be excluded from work until active TB disease is ruled out by a medical evaluation. An annual CXR for TST-negative or asymptomatic TST-positive employees is no longer required.

### 7.4 Post-exposure Employee Screening

Following notification of the local health department (see 3. Reporting Requirements, above), at a minimum, all employees who have an exposure to a confirmed case of active pulmonary TB disease should receive a symptom-screen questionnaire. Symptomatic employees should have a CXR immediately and be referred for medical evaluation. Asymptomatic TST-negative employees should be tested as follows:

- If a TST was negative within three months prior to the last exposure date, test the employee in eight to ten weeks following the last exposure date.
- If a TST was negative greater than three months prior to the last exposure date, administer a TST as soon as possible. If the new TST is negative, repeat the TST in eight to ten weeks following the last exposure date.

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### **7.5 Employee TST Conversions**

Employees who convert their TST from negative to positive during employment should have a symptom-screen questionnaire and a CXR within one week and be referred as soon as possible to a health care provider or the local health department for treatment recommendations. Symptomatic employees (i.e., employee has one or more unexplained symptoms identified in question 1 on the assessment questionnaire in Appendix 12.2), should be excluded from work until active TB disease is ruled out by a medical evaluation.

### **7.6 Employees with Suspected or Confirmed Active TB Disease**

If the employee's primary care physician or the local health department suspects or diagnoses active pulmonary disease, all of the following criteria should be met before the employee returns to work:

- The employee completes at least two weeks of multidrug anti-tuberculosis treatment if at least one of three sputum AFB smears were positive, or four days of multidrug anti-tuberculosis treatment if all sputum AFB smears were negative,
- Has three consecutive negative AFB sputum smears collected on three different days,
- Exhibits clinical improvement,
- Has continued, close medical supervision,
- Adheres to the treatment regimen approved by the local health department, and
- Has written clearance to return to work from the local health department.

If a physician rules out active TB disease and provides written clearance, the employee may return to work.

## **8. EMPLOYEE TRAINING AND EDUCATION**

All employees should be trained annually in methods to identify, prevent, and control the transmission of tuberculosis. The training should be conducted by a health care professional using current literature such as guidelines published by the CDC or recommendations made by the local health department and the CTCA. All employees should have the opportunity for interactive questions and answers with the person conducting the training session. The training should be appropriate to the education level, literacy skills, and language ability of each employee. Cal/OSHA (CCR, Title 8, Section 3203(a)(7) requires the following topics to be included:

- Groups at occupational risk for tuberculosis, especially immunocompromised workers,
- Modes of transmission,
- Symptoms of tuberculosis disease,
- The employer's and employee's responsibility in complying with the facility exposure control procedures,
- Use and limitations of methods that will prevent exposure, including engineering controls, work practice controls, and personal protective equipment,
- Decontamination and disposal of personal protective equipment, and
- Tuberculosis screening and treatment of latent tuberculosis infection.

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Additional topics for education and training suggested by the CDC include:

- Information about the prevalence of disease in the community and facility,
- The ability of the facility to properly isolate residents who have active disease,
- Facility-specific written policies and procedures concerning the hierarchy of infection control measures,
- The responsibility that each employee has in seeking prompt medical evaluation if a positive skin test or if symptoms of active TB disease occur,
- The importance of notifying the facility if the health care worker, a family member, or close social contact is diagnosed with active disease so that contact investigation procedures can be initiated,
- That persons who have HIV infection or other causes of severely impaired immunity may progress to active disease more rapidly than other patients,
- That persons with a recent (within the past two years) TST conversion are more likely to develop tuberculosis disease,
- The high mortality rate associated with MDR-TB, and
- How drug resistance develops.

## **9. RETENTION OF RECORDS**

### 9.1 Training Records

Cal/OSHA requires that training records be maintained for a period of not less than three years. The records should include the employee's name, the dates of training, a summary of the training material, and the name of the professional who provided the training.

### 9.2 Employee Health Record

OSHA requires that employee health record be confidentially maintained for a period of 30 years following termination of employment. Information related to the employees' tuberculosis status should include, but not be limited to, the following:

- Name of employee,
- Date of birth,
- Date(s) of hire and termination,
- Date (approximate) of BCG vaccination (if applicable),
- Date(s) of TST,
- Result(s) of TST in millimeters of induration,
- Copies of CXR reports and other diagnostic reports (if applicable),
- Copies of medical recommendations (if applicable), and

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- Copies of clearance to return to work (if applicable).

### 10. REFERENCES

1. Cal/OSHA Interim Tuberculosis Control Enforcement Guidelines, Policy & Procedure C-47, Issue Date 12/1/92., Revised 8/1/94, 7/1/95, 4/11/97. This guideline is available at <http://www.dir.ca.gov/DOSHpol/P&PC-47.htm>.
2. CDHS/CTCA Guidelines for the Targeted Testing of Latent TB Infection in Adults and Children. Revised 11/9/01. This guideline is available at <http://www.ctca.org>
3. CDHS/CTCA Contact Investigations Guidelines. 9/12/98. This guideline is available at <http://www.ctca.org>
4. CTCA Source Case Investigations Guidelines. 4/24/01. This guideline is available at <http://www.ctca.org>
5. CTCA/CDHS Guidelines for the Treatment of Active TB Disease. 4/15/03. This guideline is available at <http://www.ctca.org>
6. Centers for Disease Control and Prevention. *Prevention and control of tuberculosis in facilities providing long-term care to the elderly*. MMWR 1990;39 (No RR-10).
7. Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health care facilities, 1994. MMWR 1994;43(No. RR-13).
8. Centers for Disease Control and Prevention. Guidelines for environmental infection control in health care facilities. MMWR 2003;52(No. RR-10).
9. Centers for Disease Control and Prevention. Guidelines for using the QuantiFERON<sup>®</sup>-TB test for diagnosing latent *Mycobacterium tuberculosis* infection. MMWR 2003; 52(RR-2);15-18.
10. Francis J. Curry National Tuberculosis Center, Institutional Consultation Services. Policy and Procedures for Tuberculosis Screening of Health-Care Workers. TB Exposure Control Plan: Template for the Clinic Setting. Both are available on the Francis J. Curry National Tuberculosis Center website ([www.nationaltbcenter.edu/ics.html](http://www.nationaltbcenter.edu/ics.html)).

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### 11. DEFINITION OF TERMS

**Airborne Infection Isolation Room (AIIR):** (formally called a negative pressure isolation room) a single-occupancy room used to isolate persons with suspected or confirmed infectious TB. The room's ventilation system should be designed to provide

- Negative pressure in the room (so that air flows under the door gap into the room);
- Air flow rate of six to twelve air changes per hour; **and**
- Direct exhaust of air from the room to the outside of the building or recirculation of air through a high efficiency particulate air (HEPA) filter

**BCG:** bacille Calmette-Guerin vaccine used in many parts of the world. BCG is rarely used in the United States.

**Baseline tuberculin skin test:** a TST provided to employees or residents to determine if the person was previously infected with *M. tuberculosis*

**Boosted TST reaction:** some persons who have had LTBI for many years have a negative reaction on an initial or first TST, followed by a positive (boosted) TST reaction on a subsequent test. This occurs because the immune system has developed decreased ability to recognize the TST material (PPD) over time. See **two-step tuberculin skin testing (TST)**.

**Clinical or medical evaluation:** an evaluation by a physician or equivalent practitioner to: (1) diagnose active or latent TB disease, (2) select the appropriate treatment for TB disease, and/or (3) determine if the disease is responding to anti-TB therapy. The evaluation may include the following:

- Medical history and TB symptom review
- Clinical and/or physical examination
- Screening and diagnostic tests (such as tuberculin skin tests, quantiFERON blood tests, chest x-rays, bacteriological examination, and HIV testing)
- Counseling
- Treatment referrals

**Contact:** a person who has been exposed to (shared air space with), (see **Exposure**, below) a person who has active pulmonary TB disease.

**Contact investigation:** procedures used to identify and clinically evaluate those exposed to (**contacts** of, see above) persons with active TB disease, in order to determine if they have been infected and have developed latent or active TB disease.

**Converter (TST converter):** a person whose TST induration increases at least ten millimeters (mm) from less than ten mm to ten mm or greater within a two-year period, regardless of age. For contacts to a TB case, a TST conversion is defined as a change from less than five mm induration on the initial TST to a reaction of greater than or equal to five mm on the second test.

**Culture:** see ***Mycobacterium tuberculosis* culture**.

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**Exposure:** Sharing air space with a person with active pulmonary TB disease so that there is an opportunity to inhale air containing MTb bacteria.

**False-negative TST reaction:** a negative TST reaction in a person who is infected with MTb. This can occur because: (1) the immune system has lost the ability to respond (anergy) to the TST material (PPD), (2) the infection occurred recently (within the past eight to ten weeks), or (3) the person is very young (less than six months old) and the immune system is underdeveloped.

**False-positive TST reaction:** a positive TST reaction in a person who is not infected with MTb. This is generally caused by (1) infection with a nontuberculosis *Mycobacterium* species (e.g., *M avium* complex, *M kansasii*) or (2) previous vaccination with BCG. However, the TST cannot distinguish between these different *Mycobacterium* species.

**High efficiency particulate air (HEPA) filter:** a filter that removes particles in the size range that contain the MTb bacterium.

**HEPA filter respirator (mask):** a mask used to reduce to number of MTb infectious particles inhaled by a health care worker.

**Human immunodeficiency virus (HIV) infection:** infection with the virus that causes acquired immunodeficiency syndrome (AIDS). HIV infection is the most important risk factor for the progression from LTBI to active TB disease.

**Immunosuppression:** a condition in which the immune system is functioning less effectively than normal. Immunosuppressed individuals are at increased risk of rapidly progressing from LTBI to active TB disease. The most common causes of immunosuppression are diseases such as HIV/AIDS and the administration of drugs such as steroids (e.g., prednisone) and cancer chemotherapy.

**Index case:** a person with active disease who is identified as the first case and who may be a source of exposure to others.

**Induration:** swelling that can be palpated (felt) at the TST injection site; the reaction size is the diameter of the indurated (swollen) area excluding redness and is measured in millimeters of induration.

**Intradermal:** TST is injected within the dermal layers of the volar aspect of the forearm skin.

**In vitro laboratory diagnostic test:** is a RD1 interferon-gamma-based test; commercial name of QuantiFERON-TB-Gold (Cellestis Ltd.).\*

**Isolation:** the separation of persons with active disease from other persons to prevent transmission, such as the placement of a person in a separate private room. In a health care facility this is usually accomplished by placing the patient in an **Airborne Infection Isolation Room (AIIR)** (see above).

\*The use of commercial names is not an endorsement of a product.

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**Latent tuberculosis infection (LTBI):** a condition in which living MTb bacteria are present in the body without producing disease. Persons with LTBI are not contagious, have no symptoms, and generally have a positive TST.

**Mantoux tuberculin skin test:** (see **tuberculin skin test** below).

**Mycobacterium tuberculosis (MTb):** the name of the bacterium that causes tuberculosis.

**Mycobacterium tuberculosis culture:** a laboratory test to determine the presence of *Mycobacterium tuberculosis*. A positive culture confirms the diagnosis of TB disease.

**Negative pressure isolation room:** See **Airborne Infection Isolation Room (AIIR)**.

**Purified protein derivative (PPD):** a commercial preparation of TST antigen.

**QuantiFERON-TB-Gold (Cellestis Ltd.)\*:** is a commercial invitro blood test to detect MTb infection.

**Reactor:** a person with a positive TST.

**Smear:** (also acid-fast bacilli [AFB] smear) a laboratory test that is done to determine if the *Mycobacterium* species bacteria are visible in sputum (or other material) with a microscope.

**Sputum:** material that is coughed up from deep within the lungs (not saliva or nasal secretions). **Sputum induction** is a medical procedure used to obtain sputum from a patient who is unable to cough up a specimen spontaneously.

**Transmission:** the way in which a disease, or a disease-causing organism such as MTb, is spread from one person to another. MTb is spread from one person to another through the air when a person with active disease coughs, sings, shouts, or speaks.

**Tuberculin skin test (TST):** the intradermal injection of purified protein derivative (PPD) into the dermis of the skin for the purpose of detecting LTBI. The TST is performed using the Mantoux method of injecting five (0.1 cc) tuberculin units (TU) of protein purified derivative (PPD) into the volar aspect (palm side) of the dermis of the forearm. The currently available commercial solutions are Aplisol and Tubersol.\*

**TB disease (active TB disease):** clinically active disease caused by MTb. Persons who have active TB usually have symptoms, and about 80 percent have a positive TST. TB disease of the lungs or larynx can be transmitted when a person with the disease coughs, sings, laughs, speaks, or breathes.

**Tuberculosis infection:** MTb bacteria are present in the individual without producing symptoms of disease; the infected person generally has a positive TST and a normal chest x-ray. The infection may be recent or may have been present for a long period of time.

**Two-step TST:** a series of two TSTs done one to three weeks apart if the first test is negative.

\* The use of commercial names is not an endorsement of a product.

## 12. APPENDICES

### 12.1 Summary of Tuberculosis Screening Recommendations

Category		Symptom screen	Chest X-Ray (CXR)	Tuberculin Skin Test (TST)
Resident	New Admission	Within 72 hours after admission	Immediate if symptomatic. Within 90 days prior to admission if (1) a history of active TB, (2) a history of positive TST, (3) admission TST is positive, or (4) adequate symptom-screen questionnaire can not be obtained	Within five days after admission, unless prior positive TST or length of stay is five days or less.  If first TST negative, a second TST should be administered one to three weeks after the first unless there is documentation of a previous negative TST within the past 12 months.
	Annual	Annually	None.* Immediate if symptomatic.	Annually, if last TST was negative.
Employee	New Hire	Complete on first day of employment	Within seven days of employment if TST positive and no CXR within previous 90 days. Immediate, if symptomatic. None if TST negative.	Within 90 days before or on first day of employment, unless prior positive TST.  If first TST negative, a second TST should be administered in one to three weeks after the first unless there is documentation of a previous negative TST within the past 12 months.
	Annual	Annually	None.* Immediate if symptomatic.	Annually, if last TST was negative.
Employee and Resident	Post-Exposure	After exposure to active TB disease	Immediate, if symptomatic.	If TST negative less than three months prior to last exposure date, repeat single TST in eight to ten weeks.  If TST negative greater than three months after last exposure date, do new baseline TST and a second TST eight to ten weeks after the exposure ended.

**Note:** \*TST converters should have a CXR within seven days if asymptomatic and within one working day if symptom-screen questionnaire indicates possible active TB disease.

## 12.2 Sample Tuberculosis Symptom-Screen Questionnaire

Name: \_\_\_\_\_

Date questionnaire administered: \_\_\_\_\_

Employee: YES NO

New employment date: \_\_\_\_\_

Employee identification number: \_\_\_\_\_

Resident: YES NO

Admission date: \_\_\_\_\_

Resident medical record number: \_\_\_\_\_

1. In the last year, have you had any of the following symptoms?

YES NO

- |                          |                          |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Coughing up blood   |
| <input type="checkbox"/> | <input type="checkbox"/> | Hoarseness lasting three weeks or more                    |
| <input type="checkbox"/> | <input type="checkbox"/> | Persistent cough lasting three weeks or more              |
| <input type="checkbox"/> | <input type="checkbox"/> | Unexplained, excessive fatigue                            |
| <input type="checkbox"/> | <input type="checkbox"/> | Unexplained, persistent fever lasting three weeks or more |
| <input type="checkbox"/> | <input type="checkbox"/> | Unexplained, excessive sweating at night                  |
| <input type="checkbox"/> | <input type="checkbox"/> | Unexplained weight loss                                   |

2. Have you ever been told by a doctor or other health care provider that you had active TB?

- Yes       No       Don't Know.

3. Have you ever been told by a doctor or other health care provider that your immune system is not working right or that you cannot fight infection?

- Yes       No       Don't Know

4. Have you had pneumonia in the past year?

- Yes       No       Don't Know

5. Have you ever lived with or had close contact with someone who has/had active tuberculosis disease?

- Yes       No       Don't Know

6. Have you ever been told that you have an abnormal chest x-ray?

- Yes       No       Don't Know

7. Have you ever worked where patients with active tuberculosis disease receive care or services?

- Yes       No       Don't Know

8. Have you ever worked, volunteered, or lived in any institution such as a jail, group home, or homeless shelter?

- Yes       No       Don't Know

9. Have you ever traveled outside the United States?

- Yes       No       If yes, identify city, country and approximate year: \_\_\_\_\_

10. Were you born in the United States?

- Yes       No       If no, identify country you were born in: \_\_\_\_\_

12.3 Sample Resident Tuberculosis Screening Record

Resident Name	Medical Record Number	Date Admission	Date 1 <sup>st</sup> TST	Result 1 <sup>st</sup> TST	Date 2 <sup>nd</sup> TST	Result 2 <sup>nd</sup> TST	Date Annual TST	Result TST	Date Annual TST	Result	Date CXR	Result CXR

12.4 Sample Employee Tuberculosis Screening Record

Employee Name	Employee Number	Date of Hire	Date 1 <sup>st</sup> TST	Result 1 <sup>st</sup> TST	Date 2 <sup>nd</sup> TST	Result 2 <sup>nd</sup> TST	Date Annual TST	Result TST	Date Annual TST	Result TST	Date CXR	Result CXR