



DEPARTMENT OF
HEALTH AND HUMAN SERVICES

Promoting and protecting health, well-being, self-sufficiency, and safety of all in Marin County.



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PUBLIC HEALTH ADVISORY

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Large Tuberculosis Outbreak in Marin County

Dear Colleagues:

This advisory provides updated clinical information about a large tuberculosis outbreak in Marin County.

Current Situation

In 2015, Marin County's Communicable Disease and Prevention Control (CDPC) unit began investigating an outbreak of *Mycobacterium tuberculosis* (Mtb). To date, we have treated seven confirmed cases of active tuberculosis related to this outbreak. The CDPC unit has investigated nearly 600 contacts and identified more than 70 persons with latent tuberculosis infection (LTBI). As of March 22, 2017, there have been no outbreak-related cases identified this year in Marin County.

Statewide, there are now 10 cases associated with this outbreak. 60% of cases were foreign-born; 70% of cases were males with a median age of 27 years old (range 18 to 67 years old). The median duration of infectious periods is 245 days. This outbreak has been associated with a rare TB genotype (G16246). 100% of cases have definite, probable or possible social and epidemiological linkages. They are part of complex and overlapping family, religious, occupational, and social networks. Many outbreak case-patients have been exposed to multiple cases, increasing their risk of infection. The majority (60%) were exposed to one patient with hyper-infectious TB and a lengthy infectious period.

Actions requested of providers

- Think (suspect) TB in anyone with suggestive history and symptoms.
 - [California TB Risk Assessment tools](#)
- Test for TB in adults, children and infants with suspected TB disease with skin testing, sputum smears, laboratory testing, and cultures, and radiographs as appropriate.
 - Remember that most children tend to show minimal or no symptoms when ill with TB.
- Treat active TB disease and TB infection in consultation with Marin County's CDPC unit (415 473 6862).
- Prevent TB through early identification and treatment of TB infection and disease.
- Report all TB suspects to Marin County's CDPC unit.

Background

TB is an airborne disease caused by the bacterium *Mycobacterium tuberculosis* (*M. tuberculosis*). It is spread primarily by droplet nuclei expelled by a person who has infectious TB disease. Tuberculosis (TB) is a leading cause of death worldwide. TB cases in California declined from 2,131 cases in 2015 to 2,073 cases in 2016. In 2016, 81% of California's TB cases occurred in persons who were born outside the U.S.

Risk factors for TB exposure include

- Close contacts of persons known or suspected to have TB disease;
- Foreign-born persons from areas that have a high incidence of TB disease;
- Persons who have prolonged, frequent visits to areas with a high prevalence of TB disease;
- Residents and employees of high-risk congregate settings (e.g., correctional facilities, long-term care facilities, and homeless shelters);
- Health-care workers who serve clients who are at increased risk for TB disease; and,
- Medically underserved, low-income populations, or persons who abuse drugs or alcohol.

The infectiousness of a person with TB disease is directly related to the number of tubercle bacilli that he or she expels into the air. Persons who expel many tubercle bacilli are more infectious than patients who expel few or no bacilli. There are multiple factors associated with infectiousness:

- The presence of a cough, especially lasting three weeks or longer.
- Respiratory tract disease, especially with the involvement of the larynx.
- Failure to cover the mouth and nose when coughing.
- Cavitation on chest radiograph.
- Positive culture for *M. tuberculosis*.
- Positive AFB (acid fast bacilli) sputum smear result.
- Cough-inducing or aerosol-generating procedures.

Environmental factors that enhance the probability that *M. tuberculosis* will be transmitted include

- Concentration of droplet nuclei - the more droplet nuclei in the air, the more probable it is that *M. tuberculosis* will be transmitted.
- Space - small, enclosed spaces allow for easier transmission.
- Ventilation - inadequate ventilation results in insufficient dilution or removal of droplet nuclei.
- Air circulation - recirculation of air containing droplet nuclei could aid in transmission.
- Air pressure - positive air pressure in infectious patient's room that allows droplet nuclei to flow to other areas.

The risk of TB transmission is increased with increased duration of exposure, increased frequency of exposure, and proximity to an infected person.

Clinical Presentation

TB is not as common as it once was in the United States; therefore, clinicians may not always consider the possibility of TB disease when evaluating patients who have TB symptoms. As a result, the diagnosis of TB disease can be delayed or overlooked.

The signs and symptoms of pulmonary TB disease may include the following:

- A cough (duration of ≥ 3 weeks)
- Chest pain
- Hemoptysis (coughing up blood)
- Loss of appetite
- Unexplained weight loss
- Night sweats
- Fever
- Fatigue

Extrapulmonary TB disease may cause symptoms related to the part of the body that is affected. It should be considered in the differential diagnosis of ill persons who have systemic symptoms and who are at high risk for TB. For example, renal TB may cause hematuria; TB meningitis may cause a headache or confusion; spinal TB may cause back pain, and laryngeal TB may cause hoarseness

Infection Prevention and Control

The best way to stop transmission is to isolate patients with suspected or confirmed infectious TB disease immediately and start effective TB therapy. Infectiousness declines rapidly after adequate therapy is started, as long as the patient adheres to the prescribed regimen.

Respirators are designed to protect HCWs and other individuals from inhaling droplet nuclei. Surgical masks are designed to reduce the number of droplets being exhaled into the air by persons with infectious TB disease when they breathe, talk, cough, or sneeze. Persons suspected or confirmed to have infectious TB disease should be given, and encouraged to use, a surgical mask to minimize the risk of expelling droplet nuclei into the air.

Patients can be considered noninfectious when they meet all of the following three criteria:

1. They have three consecutive negative AFB sputum smears collected in 8- to 24-hour intervals (at least one being an early morning specimen);
2. Their symptoms have improved clinically (for example, they are coughing less, and they no longer have a fever); and,
3. They are compliant with an adequate treatment regimen for two weeks or longer.

Testing

The Mantoux tuberculin skin test (TST) is used to determine if a person is infected with *M. tuberculosis*. In this test, purified protein derivative (PPD) is injected under the skin, which produces a T-cell mediated delayed-type hypersensitivity reaction if the person has been infected with *M. tuberculosis*. It takes 2 to 8 weeks after initial infection with *M. tuberculosis* for the immune system to be able to react to PPD and for the infection to be detected by the TST.

Interferon-gamma release assays (IGRA) detect the presence of *M. tuberculosis* infection by measuring the immune response to the TB proteins in whole blood. These tests cannot differentiate between LTBI and active TB disease. As with the TST, follow-up medical evaluation to rule out TB disease should be conducted on persons with positive test results.

Patients with positive IGRA or positive TST results (≥ 10 mm induration, or ≥ 5 mm induration in immunocompromised patients / TB contacts) should undergo a medical evaluation for TB, including clinical exam and appropriate radiographic studies.

Obtain the following laboratory tests for patients with suspected TB:

- Acid-fast bacilli (AFB) smear and culture - Using sputum obtained from the patient
- HIV serology in all patients with TB and unknown HIV status

All persons suspected of having TB disease at any site should have at least three sputum specimens examined by acid-fast bacilli (AFB) smear and culture. At least three consecutive sputum specimens are needed, each collected in 8- to 24-hour intervals, with at least one being an early morning specimen. Specimens should be obtained in an airborne infection isolation (AII) room or other isolated, well-ventilated area (e.g., outdoors).

The Centers for Disease Control and Prevention (CDC) recommends performing a nucleic acid amplification tests (i.e., Ribosomal RNA probes and DNA PCR assays) when the diagnosis of pulmonary TB is being considered but has not yet been established, and when the test result would alter case management or TB control activities. The CDC recommends performing the test on at least one respiratory specimen.

With pulmonary TB being the most common form of the disease, the chest radiograph is useful for diagnosis of TB disease. In pulmonary TB disease, radiographic abnormalities are often seen in the apical and posterior segments of the upper lobe or the superior segments of the lower lobe. However, lesions may appear anywhere in the lungs and may differ in size, shape, density, and cavitation, especially in HIV-positive and other immunosuppressed persons.

Selection of the most suitable test should be based on the reasons and the context for testing, test availability, and overall cost effectiveness of testing.

Treatment

Active tuberculosis cases are treated by the Marin County CDPC unit. Once a TB case has been reported, our CDPC unit staff will work with you to ensure that the patient completes treatment for their TB disease and that all contacts are promptly identified, evaluated, and treated, if necessary.

Primary care providers can treat latent tuberculosis infection in the community. The Centers for Disease Control and Prevention (CDC) has released [A Guide for Primary Health Care Providers](#) to assist providers. There are several regimens available for the treatment of LTBI. Providers should choose the appropriate regimen based on

- Drug susceptibility results of the presumed source case (if known);
- Coexisting medical illnesses; and
- Potential for drug-drug interactions.

The following regimens are used to treat LTBI.

- Isoniazid (INH)
- INH and Rifapentine (RPT)
- Rifampin (RIF)

Reporting

By state law, TB must be reported within one working day. Confidential Morbidity Reports (CMR) can be submitted [online](#), or the [CMR 110 B](#) can be faxed to 415 473 6855. For additional questions, please contact Terry Somers at 415 473 6862, tsomers@marincounty.org.

Additional Information

Centers for Disease Control and Prevention. [Tuberculosis](#).

California Department of Public Health. [Tuberculosis Control Branch](#).

[2016 Clinical Practice Guidelines for Diagnosis of Tuberculosis in Adults and Children](#).

[Curry International Tuberculosis Center \(CITC\) Warmline Service](#) provides clinical TB consultation, pediatric case consultation, and TB prevention recommendations to private- and public-sector clinicians free of charge.

Sincerely,

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