

Tuberculosis in Santa Clara County: A Summary

Tuberculosis (TB) is a preventable and curable communicable disease that remains one of the top ten causes of death in the world. TB is caused by the bacteria *Mycobacterium tuberculosis*, which can spread from person to person through the air when an individual with infectious TB disease coughs, sneezes, or speaks. Transmission occurs when others breathe in the bacteria while in close and prolonged contact with a person with infectious TB disease. Although TB commonly affects the lungs, it can affect any part of the body including lymph nodes, bones and joints, kidneys, and the brain. Fortunately, TB can be prevented, treated, and cured!

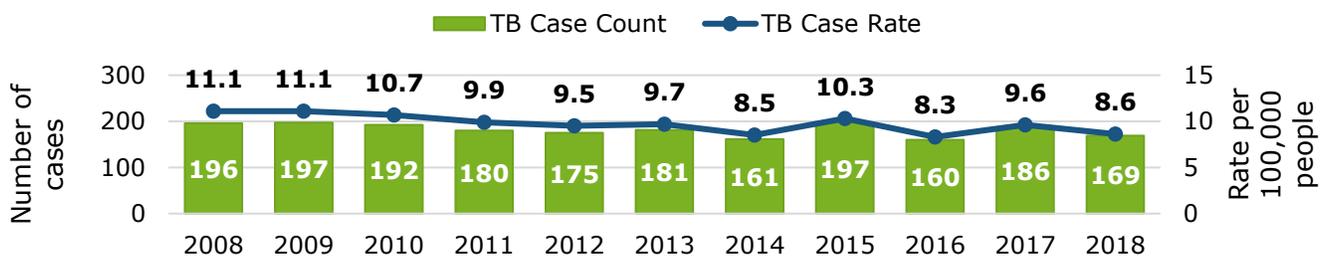
TB bacteria can infect anyone who lives, works, or breathes in close proximity to someone with infectious TB disease, regardless of their age, race, sex, or socioeconomic status. When individuals are infected with the bacteria that causes TB, but they do not yet have symptoms or evidence of TB disease, this is called latent TB infection (LTBI), which is not contagious. When the body's immune system can no longer contain the infection, the bacteria multiply and cause disease. Individuals with LTBI may become sick with TB disease within weeks to many years after becoming infected. Overall, 5-10% of people with LTBI develop TB disease over their lifetime; this risk is higher for those with risk factors for progression from LTBI to TB disease, such as immunosuppression, diabetes, and end-stage renal disease. Certain behaviors, such as alcohol or drug abuse, and smoking also increase an individual's risk for developing TB disease. If treatment is delayed, TB disease can cause serious illness and death.

The World Health Organization (WHO) estimates that one out of four people in the world, or 1.7 billion people, are infected with *Mycobacterium tuberculosis* [1]. During 2017, an estimated 10.0 million people developed TB disease and 1.3 million people died of TB disease. Most cases of TB disease occurred in South-East Asia (44%) and Africa (25%). An estimated 920,000 people with TB disease (9%) had HIV co-infection. There were 460,000 people estimated to have multidrug-resistant TB. Due to diagnosis and treatment of TB, about 54 million lives have been saved worldwide between 2000 and 2017.

TB Cases and Rates

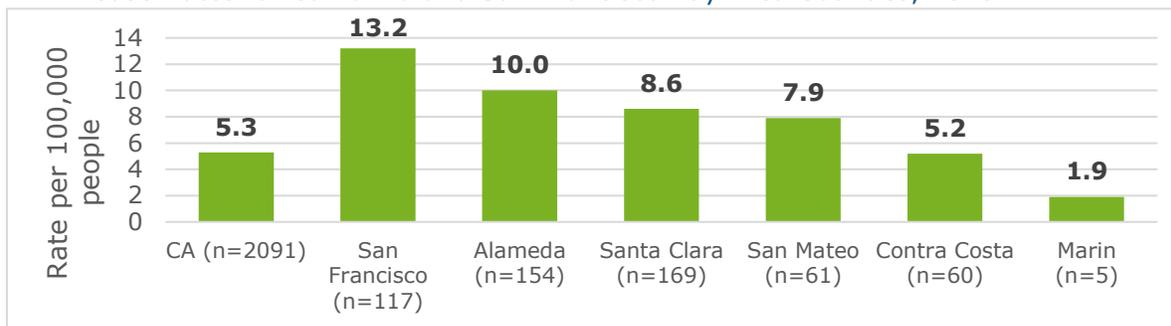
There were 169 cases of tuberculosis (TB) disease in Santa Clara County (SCC) in 2018, which decreased compared with 2017 (186 TB cases) (Figure 1). This represents a case rate of 8.6 per 100,000 residents. The case rate is 1.6 times as high as the overall California rate (5.3/100,000 people) (Figure 2) and 3.1 times as high as the national rate (2.8/100,000 people) [2,3]. SCC has the fourth highest number of cases among all jurisdictions in California, after Los Angeles, San Diego, and Orange counties [2].

Figure 1: Trends in TB Case Counts and Rates in Santa Clara County, 2008-2018



Cases meet the laboratory (positive culture, nucleic acid amplification test, or demonstration of acid-fast bacilli or granulomas when a culture was not obtained or is falsely negative), or clinical case definition, or are verified by provider diagnosis. Source: Santa Clara County Public Health Department, Tuberculosis Information Management System, 2007-2009; California Reportable Disease Information Exchange, 2010-2018. Data as of February 4, 2019, and are provisional; Department of Finance, Race/Ethnic Population with Age and Sex Detail, 2000-2010. Sacramento, California, September 2012; State of California, Department of Finance, E-2. California County Population Estimates and Components of Change by Year — July 1, 2010-2018. Sacramento, California, December 2018.

Figure 2: TB Case Rates for California and San Francisco Bay Area Counties, 2018



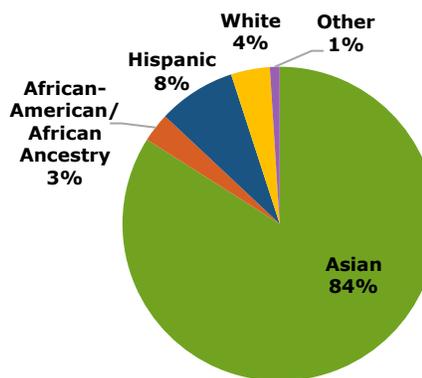
Source: California Department of Public Health, TB Control Branch.

TB Cases by Race/Ethnicity

TB cases in SCC during 2018 occurred predominantly among Asian (84%) and Hispanic (8%) populations, with a small percentage in White (4%), African-American/African-Ancestry (3%), and other (1%) populations (Figure 3).

In 2018, 95% of TB cases occurred among persons born outside the U.S., primarily from the following countries: Vietnam (24%), India (24%), the Philippines (14%), China (11%), and Mexico (7%). Case rates vary considerably by country of origin, with the highest rate among those born in the Philippines (39.1/100,000 residents), Vietnam (38.8/100,000 residents), India (30.7/100,000 residents), and China (22.5/100,000 residents), which is much higher than the overall case rate (Figure 4).

Figure 3: TB Cases by Race/Ethnicity in Santa Clara County, 2018



Source: Santa Clara County Public Health Department, California Reportable Disease Information Exchange, 2018; Data as of February 4, 2019, and are provisional.

Length of Time in US

Most persons with TB (74%) in SCC who were born outside the U.S. had lived in the U.S. for at least 5 years before developing TB, and 58% had lived in the U.S. for at least 10 years.

Age Group

In 2018, 63% of people with TB in SCC were between 25 and 64 years of age, and 28% were aged 65 years or older. Children less than 15 years of age accounted for 2% of TB cases, and young adults between ages 15 to 24 years accounted for 7% of TB cases.

Figure 4: TB Rates by Country of Birth Santa Clara County, 2018



Source: Santa Clara County Public Health Department, California Reportable Disease Information Exchange, 2018. Data as of February 4, 2019, and are provisional; U.S. Census, American Community Survey 1-Year Estimate, 2005-2017; State of California, Department of Finance, E-2. California County Population Estimates and Components of Change by Year — July 1, 2010-2018, December 2018.

Medical Comorbidities

In 2018, 43% of people with TB in SCC had one or more medical conditions associated with an increased risk of progression from latent tuberculosis infection to TB disease. The most common comorbidity in 2018 was diabetes mellitus (20%). Other risk factors included: immunosuppression not related to HIV/AIDS (e.g.

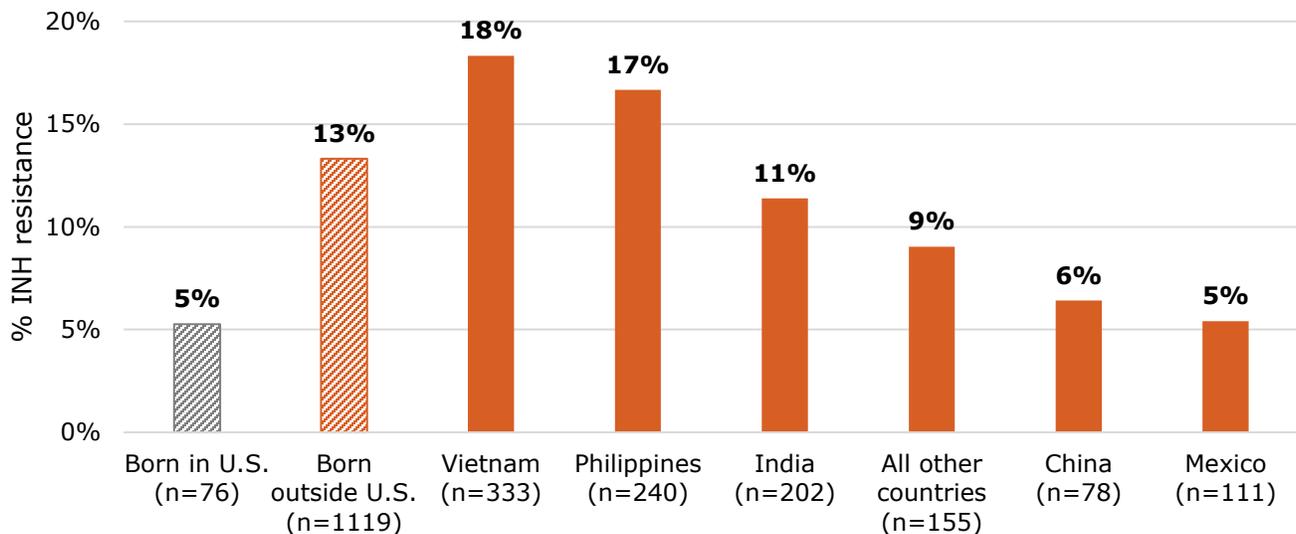
leukemia; lymphoma; cancer of the head, neck, or lungs; or medications that suppress the immune system, including chemotherapy, chronic systemic oral steroids, or TNF-alpha inhibitors) (11%); smoking (6%); drug use (5%); end-stage renal disease (4%); excess alcohol use (2%); and HIV infection (1%).

TB Drug Resistance

Isoniazid Resistance

Among people born outside the U.S. with culture-positive TB during 2010–2018, isoniazid (INH) resistance was present in 13% of those who had no prior history of TB (Figure 5) and 18% of those with a prior history of TB. Among people with culture-positive TB and no prior history of TB, isoniazid resistance rates were highest among those born in Vietnam (18%), the Philippines (17%), and India (11%). INH resistance was present in 5% of people born in the U.S. with culture-positive TB and no prior history of TB.

Figure 5: Percentage of INH Resistance per Country of Birth — Santa Clara County, 2010–2018



Cases are culture-positive with initial drug susceptibility testing done and no prior history of TB. Excludes cases with susceptibility testing not done or unknown for isoniazid. Source: Santa Clara County Public Health Department, California Reportable Disease Information Exchange, 2010-2018; Data as of February 4, 2019, and are provisional.

Multidrug-Resistant (MDR) TB and Extensively Drug-Resistant (XDR) TB

MDR-TB cases are resistant to both isoniazid and rifampin. Treatment of MDR-TB is more complicated and treatment duration is typically 18-24 months. There are currently four people with MDR-TB undergoing treatment in SCC, with two new cases reported during 2018. From 1993–2018, there have been 71 people diagnosed with MDR-TB in SCC: 31% were born in India, 24% were born in Vietnam, 17% were born in the Philippines, 7% were born in Mexico, and 6% were born in Peru. XDR-TB cases are resistant to both isoniazid and rifampin, fluoroquinolones, and second-line injectable drugs (i.e. amikacin, kanamycin, or capreomycin). There have been no known XDR cases in SCC.

Rapid Molecular Testing to Detect Mycobacterium Tuberculosis and Multidrug-Resistance

Nucleic acid amplification tests (NAATs) can lead to earlier diagnosis and treatment of people with TB as results can be obtained at least one week earlier than culture. Consequently, guidelines from the Centers for Disease Control and Prevention (CDC) recommend that NAATs be performed on at least one respiratory specimen for each patient with symptoms and signs of pulmonary TB for whom a diagnosis of TB is being considered but has not been established, and for whom the test result would alter case management or TB control activities [4]. In 2018, NAATs were used for 81% of pulmonary TB cases, including 97% of smear-positive cases and

81% of smear-negative cases in SCC. *Mycobacterium tuberculosis* was identified in 100% of smear-positive cases and 45% of smear-negative, culture-positive cases. Utilization of molecular tests for drug resistance (e.g. Xpert MTB/RIF) can also provide an early indication of possible rifampin resistance. As most people with rifampin resistance have multidrug resistance, this information can expedite initiation of an appropriate treatment regimen in consultation with the Public Health Department. The Xpert MTB/RIF assay is available through the Santa Clara County Public Health Laboratory.

Prevention

The California Department of Public Health estimates that of the 1.9 million residents of SCC, 8.5%, or over 160,000 people, have latent TB infection (LTBI). This represents a very large reservoir of individuals from which future cases of TB disease will develop. In order to significantly decrease the number of people with TB disease, it requires that more individuals with risk factors for TB are tested and treated for LTBI. In September 2016, the U.S. Preventive Services Task Force (USPSTF) issued new recommendations for screening asymptomatic adults at increased risk for LTBI [5]. This underscores the need for primary care providers to conduct targeted testing and treatment for LTBI as part of routine preventive care, similar to providing diabetes screening for adults who are overweight. Treatment for LTBI is very effective – it can decrease the risk of developing TB disease by over 90% when medications are taken as prescribed. Short-course regimens (i.e. isoniazid-rifapentine, which is given weekly for 12 weeks, or rifampin, which is given daily for 4 months) are preferred (except in persons for whom there is a contraindication, such as a drug interaction or contact to a person with drug-resistant TB) due to similar efficacy and higher treatment completion rates as compared with isoniazid given daily for 9 months [6,7,8].

References:

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3. Talwar A, Tsang CA, Price SF, et al. Tuberculosis – United States, 2018. MMWR, 2019; 68:257-262.
4. Centers for Disease Control and Prevention. Updated Guidelines for the Use of Nucleic Acid Amplification Tests in the Diagnosis of Tuberculosis. MMWR. 2009; 58:7-10.
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6. Sterling TR, Villarino ME, Borisov AS, et al. Three months of rifapentine and isoniazid for latent tuberculosis infection. N Engl J Med. 2011;365:2155-66.
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8. Centers for Disease Control and Prevention. Update of Recommendations for Use of Once-Weekly Isoniazid-Rifapentine Regimen to Treat Latent Mycobacterium tuberculosis Infection. MMWR. 2018;67:723-726.

Additional Resources:

- SCC Public Health Department: Residents: www.sccphd.org/tbinfo; Providers: www.sccphd.org/tb
- Centers for Disease Control and Prevention TB resources: <https://www.cdc.gov/tb/>
- California Department of Public Health Tuberculosis Control Branch: <https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/TBCB.aspx>
- Curry International Tuberculosis Center: <http://www.currytbcenter.ucsf.edu>
- California Tuberculosis Controllers Association (CTCA): <http://www.ctca.org>

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