

Tuberculosis in Santa Clara County: A Summary

Tuberculosis (TB) is a preventable and curable communicable disease that is the thirteenth leading cause of death worldwide and the second leading infectious killer after COVID-19 [1]. 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!

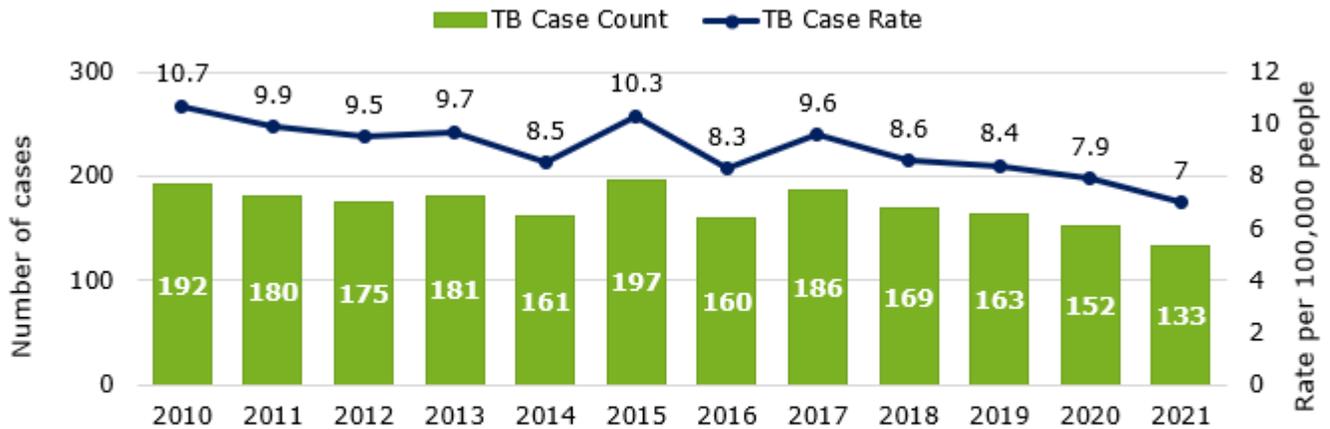
TB bacteria can infect anyone in close proximity to someone with infectious TB disease, regardless of their age, race, sex, or socioeconomic status. Latent TB Infection (LTBI), which is not contagious, occurs when individuals are infected with the bacteria that causes TB, but they do not yet have symptoms or evidence of TB disease. When the body's immune system can no longer contain the infection, the bacteria multiply and cause TB 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 undernutrition, HIV infection, and diabetes [2]. Certain behaviors, such as alcohol 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 2 billion people, are infected with *Mycobacterium tuberculosis* [2]. In 2020, 5.8 million people were reported with new TB diagnosis, which is an 18% decline in TB reporting compared to 2019. However, it is estimated that 9.9 million people developed TB disease and 1.3 million people died of TB disease in 2021. This was the first time since 2005 that there has been an increase in TB deaths. The COVID-19 pandemic significantly impacted essential TB services, including case finding, and reversed the reduction of TB disease burden. Most cases of TB disease occurred in South-East Asia (43%), Africa (25%), and the Western Pacific (18%). An estimated 8% of incident TB cases had HIV co-infection. Among incident TB cases, about 3-4% were estimated to have multidrug-resistant TB. The number of people treated for drug-resistant TB and prevention of TB disease decreased by 15% and 21%, respectively, between 2019 and 2020.

TB Cases and Rates

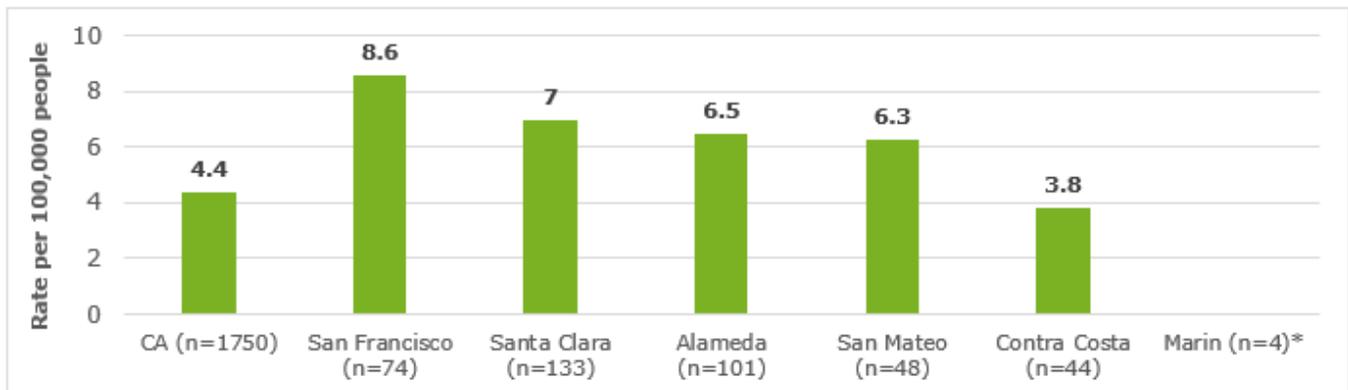
There were 133 cases of tuberculosis (TB) disease in Santa Clara County (SCC) in 2021, which is a 13% decrease compared to 2020 (152 TB cases) (Figure 1). This represents a case rate of 7.0 per 100,000 residents. This case rate is 1.6 times as high as the 2021 overall California rate (4.4 cases per 100,000 people) (Figure 2) and 2.9 times as high as the national rate (2.4 cases per 100,000 people) [3,4]. In 2021, SCC had the third highest case rate among all California jurisdictions, after Imperial and San Francisco counties [3].

Figure 1: Trends in TB Case Counts and Rates in Santa Clara County, 2010-2021



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: California Reportable Disease Information Exchange, 2010-2022. Data as of Feb 9, 2022 and are provisional; State of California, Department of Finance, Race/Ethnic Population with Age and Sex Detail, 2010-2060. Sacramento, California, July 2021; State of California, Department of Finance, E-2. California County Population Estimates and Components of Change by Year — July 1, 2010-2021. Sacramento, California, December 2021.

Figure 2: TB Case Rates for California and San Francisco Bay Area Counties, 2021



Source: California Department of Public Health, TB Control Branch.
*Rate is not calculated when the number of cases is less than 5

TB Cases by Race/Ethnicity

TB cases in SCC during 2021 occurred predominantly among Asian (81%) and Hispanic (14%) populations, with a small percentage in White (5%) and African-American/African-Ancestry (0.8%) populations (Figure 3).

In 2021, about 91% of TB cases occurred among persons born outside the U.S., primarily from the following countries: Vietnam (23%), India (17%), the Philippines (17%), China (14%), and Mexico (7%). Case rates vary considerably by country of origin, with the highest rate among those born in the Philippines (37.4/100,000 residents), Vietnam (30.9/100,000 residents), India (18.1/100,000 residents), and China (14.2/100,000 residents), which are much higher than the SCC overall case rate (7.0/100,000 residents) (Figure 4).

Length of Time in US

In 2021, about 21% of persons with TB in SCC who were born outside the U.S. had lived in the U.S. for less than 5 years. Most persons with TB (67%) had lived in the U.S. for at least 10 years.

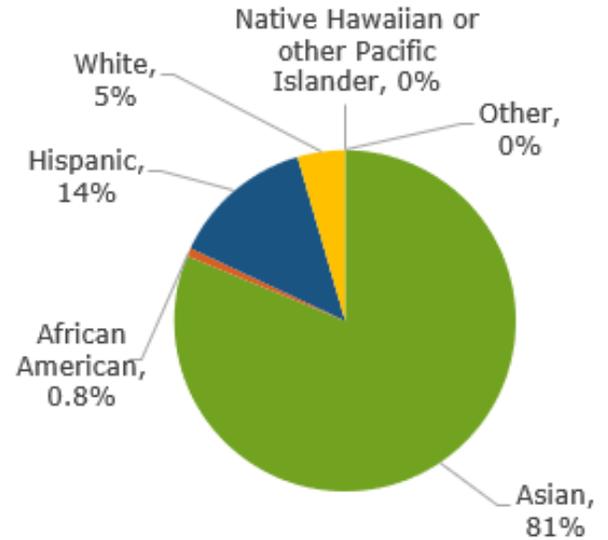
Age Group

In 2021, people over 65 years old accounted for most TB cases (38%), followed by people from 25-44 years old (32%) then 45-64 years old (29%). People less than 24 years old accounted for 1.6% of TB cases.

Medical Comorbidities

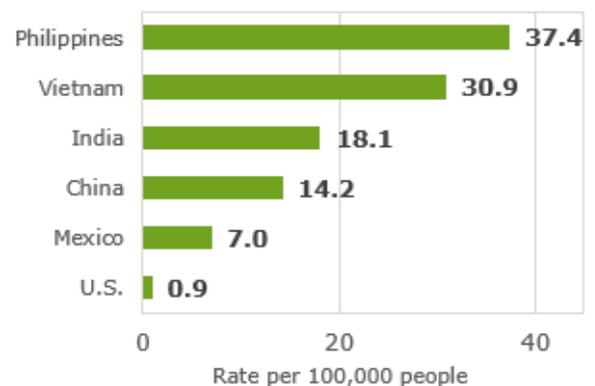
In 2021, 47% of people with TB in SCC had one or more medical conditions associated with an increased risk of progression from latent

Figure 3: TB Cases by Race/Ethnicity in Santa Clara County, 2021



Source: Santa Clara County Public Health Department, California Reportable Disease Information Exchange, 2022; Data as of February 9, 2022 and are provisional.

Figure 4: TB Rates by Country of Birth in Santa Clara County, 2021



Source: Santa Clara County Public Health Department, California Reportable Disease Information Exchange, 2022. Data as of February 9, 2022, and are provisional; U.S. Census, American Community Survey 5-Year Estimate, 2015-2019; State of California, Department of Finance, E-2. California County Population Estimates and Components of Change by Year — July 1, 2010–2021. Sacramento, California, December 2021.

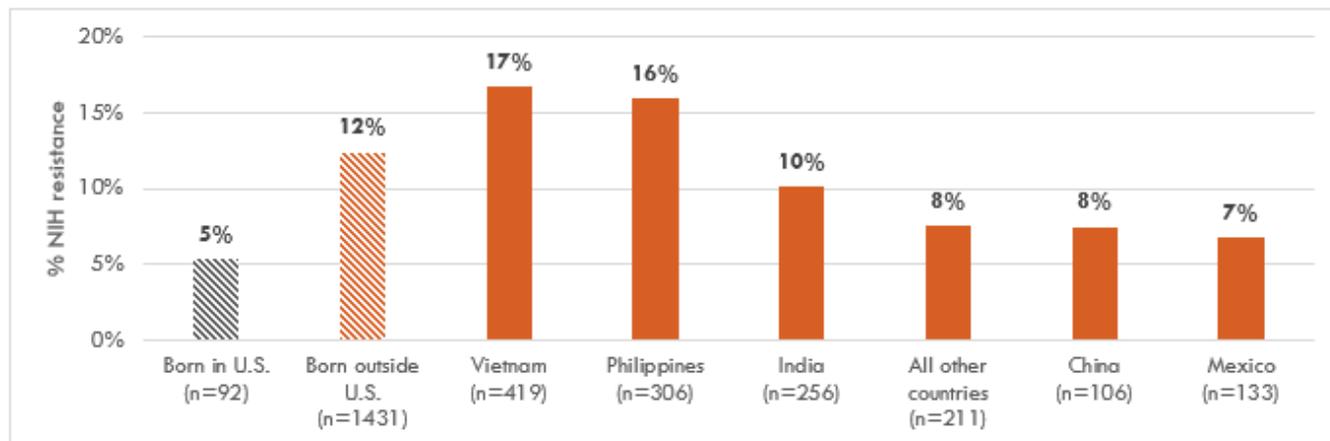
tuberculosis infection to TB disease. The most common comorbidity in 2021 was diabetes mellitus (28%). Other risk factors included smoking (13%), immunosuppression not related to HIV/AIDS (10%), end-stage renal disease (4%), drug use (2%), alcohol use (1%), and HIV infection (1%).

TB Drug Resistance

Isoniazid Resistance

Among people born outside the U.S. with culture-positive TB during 2010–2021, isoniazid (INH) resistance was present in 12% 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 (17%), the Philippines (16%), and India (10%). 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, 2010–2021



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, 2010–2022; Data as of 2/9/22 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. From 1993–2021, there have been 74 people diagnosed with MDR-TB in SCC: 30% were born in India, 26% were born in Vietnam, 16% were born in the Philippines, 7% were born in Mexico, 5% were born in the U.S., and 1% were born in China. 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 [5]. In 2021, NAATs were used for 87% of pulmonary TB cases, including 93% of smear-positive cases and 84% of smear-negative cases in SCC. 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, in addition to many other hospital and commercial laboratories.

Prevention

The California Department of Public Health estimates that in Santa Clara County, about 170,000 people have latent TB infection (LTBI) [6]. This represents a very large reservoir of individuals from which future cases of TB disease will develop. To significantly decrease the number of people with TB disease, more individuals with risk factors for TB should be 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 [7]. 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 [8]. Short-course regimens (i.e. isoniazid-rifapentine, which is given weekly for 12 weeks, rifampin, which is given daily for 4 months, or isoniazid plus rifampin, which is given daily for 3 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 [9,10,11].

References:

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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>