

## Tuberculosis in Santa Clara County: A Summary

Tuberculosis (TB) is a preventable and curable communicable disease that remains one of the leading causes of death in the world. TB is caused by the bacteria *Mycobacterium tuberculosis* and spreads from person to person through the air when an individual with active, 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 active, 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 brain. With treatment, TB is treatable and curable.

TB can infect anyone who lives, works, or breathes in close proximity to someone with active, infectious TB, regardless of their age, race, sex, or socioeconomic status. Once someone becomes infected with TB, it can manifest in different ways. In most people, their immune system can keep the bacteria from growing but they will still show evidence of exposure or infection. This is what is called latent TB infection (LTBI), the bacteria are alive and remain in the body but are inactive and cannot be spread to others. Someone with LTBI, has a 10% chance of developing active TB disease over their lifetime.

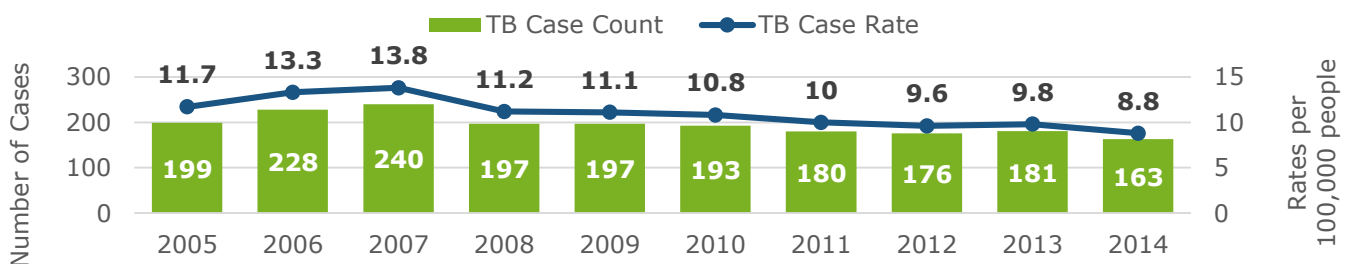
TB infection can progress to TB disease when the immune system becomes weakened and cannot fight off the bacteria. The immune system can be weakened by stress, poor nutrition, or a medical illness as diabetes, cancer, kidney disease, HIV, or other conditions or medications that weaken the immune system. Certain behaviors, such as smoking or substance abuse, also increase an individual's risk for developing active TB disease. If treatment is delayed, TB disease can cause serious illness or death.

It's estimated that one out of three people in the world, or over 2 billion people, are infected with *Mycobacterium tuberculosis*, with 9 million new cases and an estimated 1.5 million deaths in 2013. Although the number of deaths worldwide due to TB have declined, it continues to be the leading cause of death among people with HIV and one of the leading causes of death of women between the ages of 15-44. Multidrug resistant TB which is more costly, more difficult and complicated to treat affected almost 500,000 people worldwide. About 37 million lives have been saved worldwide between 2000 and 2013 due to TB diagnosis and treatment.

### TB Cases and Rates

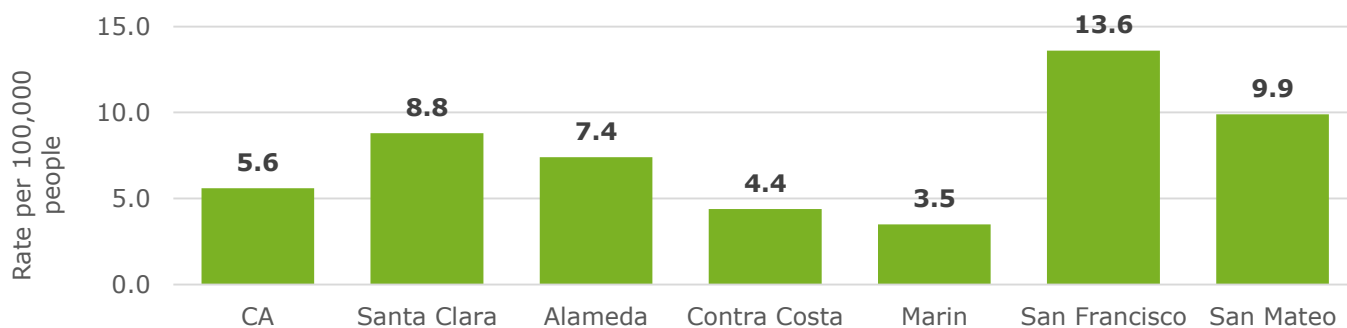
There were 163 cases of active tuberculosis (TB) in Santa Clara County in 2014, which is a 10% decline from 2013 (181 TB cases) (Figure 1). This represents a case rate of 8.8 per 100,000 residents, ranking Santa Clara County fourth among all jurisdictions in California (Figure 2). This case rate is still 1.5 times as high as the overall California rate (5.6) [1] and almost three times the national rate (3.0) [2].

Figure 1: Trends in TB Case Counts and Rates in Santa Clara County, 2005-2014



Source: 1. Tuberculosis Information Management System, 2003-2009; California Reportable Disease Information Exchange, 2010-2014; 2. Department of Finance, Race/Ethnic Population with Age and Sex Detail, 2000-2010. Sacramento, California, September 2012; 3. State of California, Department of Finance, State and County Population Projection, 2010-2060. Sacramento, California, January 31, 2013. Data as of February 6, 2015, and are provisional.

Figure 2: TB Case Rates for California and San Francisco Bay Area Counties, 2014



Source: California Department of Public Health TB Control Branch

### Length of time in US

While recent immigrants accounted for almost 1/3 of TB cases among foreign-born individuals, the majority (70%) of TB cases among foreign-born individuals occurred among those living in the U.S. for more than five years.

### TB Cases by Race/Ethnicity--Disparities persist

TB cases occurred predominantly among Asian (76%), and Hispanic (17%) populations with a small fraction in Black (4%) and White (3%) populations (Figure 3). In 2014, 88% of active TB cases were among foreign-born patients, primarily from the following countries: Vietnam, the Philippines, India, Mexico, and China. TB case rates have been consistently highest among Asians in SCC and the rate was 20.4 per 100,000 residents in 2014 (compared to overall case rate of 8.8).

However, case rates vary by country of origin with the highest rate among those born in the Philippines (57.6), Vietnam (40.2), and India (24.5) which are significantly higher than the overall population rate (Figure 4). Although overall numbers have declined, the TB rate among Hispanics has increased from 3.5 per 100,000 residents in 2013 to 5.3 in 2014.

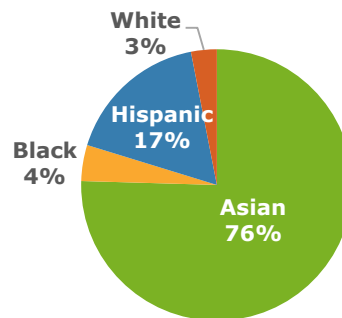
### Age Group

In 2014, the majority of TB cases (64%) were among people between 25 and 64 years of age. One out of 4 (25%) patients diagnosed with TB were older than 65 years of age. Children under age 15 years of age accounted for only 4% of TB cases, and young adults between ages 15 to 24 accounted for only 7% of TB cases.

### Site of TB Disease

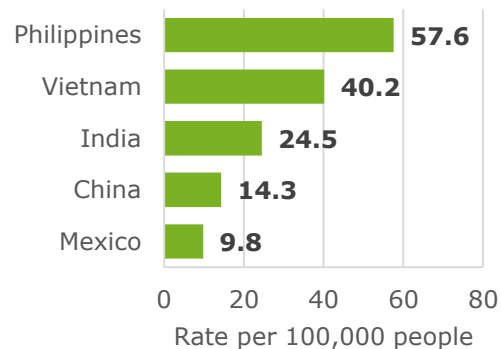
The majority of active TB cases were pulmonary (64%), 9% were pulmonary and extrapulmonary and 27% exclusively extrapulmonary. Extrapulmonary TB among patients in 2014 was identified in or involved the following sites: lymph nodes, pleura, the spine or bone, and meninges.

Figure 3: TB Cases by Race/Ethnicity in Santa Clara County, 2014



Source: California Reportable Disease Information Exchange, 2014; Data as of February 6, 2015, and are provisional.

Figure 4: TB rates by Country of Birth Santa Clara County, 2014



Source: 1. California Reportable Disease Information Exchange, 2014; Data as of February 6, 2015, and are provisional. 2. U.S. Census, American Community Survey 1-Year Estimate, 2013.

## Medical Comorbidities

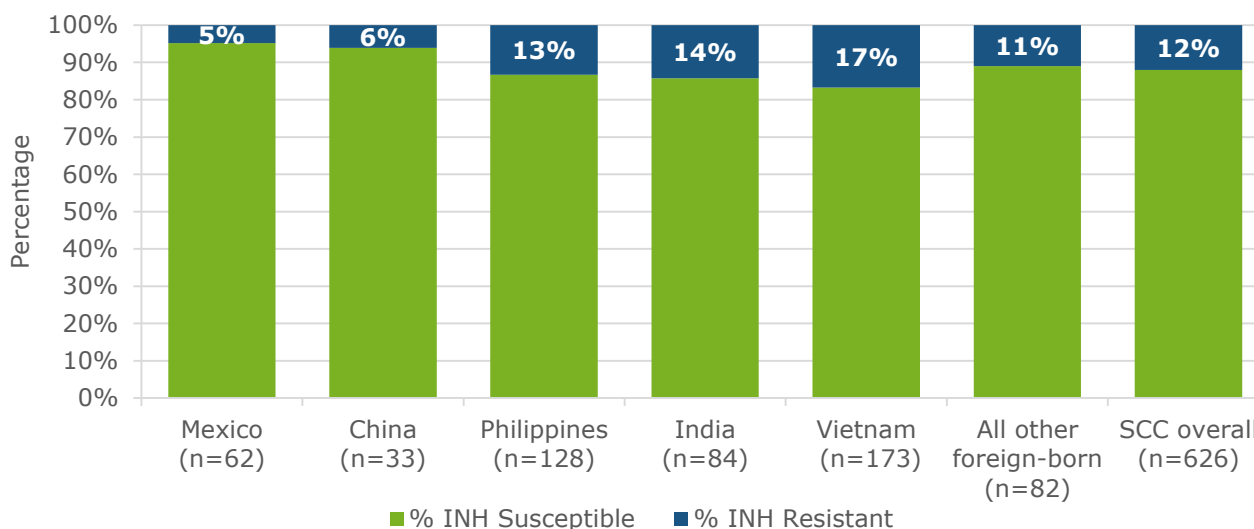
In 2014, 34% of patients with TB also had one or more medical conditions that increase the likelihood that TB would progress from latent to active TB disease. The most common comorbidity in 2014 was diabetes mellitus with 16% of TB cases reported having a new or known diagnosis of diabetes. A history of smoking is also common among TB cases and can accelerate progression from latent to active TB disease. In 2014, 12% of TB cases were current smokers. In 2014, 5% of active TB cases identified also had HIV, which is a significant increase from 1% in 2013. Those living with HIV are at an increased risk for rapid progression to TB disease. TB patients also had the following medical conditions that increase the likelihood for TB infection to progress to TB disease: immunosuppression not related to HIV/AIDS, history of TNF-alpha antagonist therapy, excess alcohol use, homelessness, history of organ transplantation, and end-stage kidney disease.

## TB Drug Resistance

### Isoniazid Resistance

In 2014, 11% of culture positive TB patients were resistant to at least one of the first line medications (isoniazid, rifampicin, pyrazinamide, or ethambutol); 10% of culture positive TB cases without prior history of TB were resistant to isoniazid (INH). Among culture-positive TB cases diagnosed between 2010 and 2014, isoniazid resistance rates were highest among individuals born in Vietnam (17%), India (14%), and the Philippines (13%) (Figure 4).

Figure 5: Percent of INH Resistance among Foreign-born TB Cases in Santa Clara County, 2010-2014



Source: Tuberculosis Information Management System, 2000-2009; California Reportable Disease Information Exchange, 2010-2014; Data as of February 6, 2015, and are provisional.

\* 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.

### Multi Drug Resistant (MDR) TB and Extensively Drug Resistant (XDR) TB

MDR TB cases are resistant to both isoniazid and rifampin and require at least 18-24 months of treatment. There are currently 4 patients with MDR TB undergoing treatment in SCC with 1 newly diagnosed patient in 2014. XDR TB cases are resistant to both first line drugs (isoniazid and rifampin), in addition to any fluoroquinolone and at least one of three injectable second line drugs (amikacin, kanamycin, or capreomycin). There were no XDR cases in Santa Clara County in 2014.

## Rapid Molecular Testing to Detect *Mycobacterium tuberculosis* and Drug Resistance

CDC guidelines recommend that nucleic acid amplification testing (NAAT) be performed on at least one respiratory specimen for each patient with signs and symptoms 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. NAAT was used for 37% of pulmonary cases with smear and culture positive TB. *Mycobacterium tuberculosis* (MTB) was identified in 90% of specimens tested. NAAT identified MTB in 60% of sputum smear negative and culture positive TB cases in 2014.

The Santa Clara County Public Health Laboratory now has GeneXpert available to rapidly detect MTB in smear negative or smear positive sputum specimens. Between September 2014 and March 6, 2015, more than 100 specimens were tested by GeneXpert at the Santa Clara County Public Health Laboratory with 25 positive for MTB, including 1 identified to be MDR TB.

### Santa Clara County Public Health Department

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#### REFERENCES:

1. TB in California, a snapshot, 2013. California Department of Public Health, Tuberculosis Control Branch, March, 2015.
2. Tuberculosis trends, United States 2014. MMWR, 2015; 64:265-9.
3. Centers for Disease Control and Prevention. Updated Guidelines for the Use of Nucleic Acid Amplification Tests in the Diagnosis of Tuberculosis. MMWR. January 16, 2009. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5801a3.htm>

#### ADDITIONAL RESOURCES:

- California Tuberculosis Controllers Association (CTCA): <http://www.ctca.org>
- California Department of Public Health Tuberculosis Control Branch: <http://www.cdph.ca.gov/programs/tb>
- Curry International Tuberculosis Center: <http://www.currytbcenter.ucsf.edu>
- Centers for Disease Control and Prevention TB resources: <http://www.cdc.gov/nchstp/tb/default.htm>

#### DATA SOURCES:

California Reportable Disease Information Exchange  
State of California Department of Finance  
Tuberculosis Information Management System

#### GLOSSARY:

TB Case: A TB case verified either by positive culture, positive smear, clinical definition, or provider diagnosis.  
Crude TB Rate: Number of TB cases per 100,000 people.