Tuberculosis (TB) is a common communicable disease caused by the bacterium *Mycobacterium tuberculosis* and occasionally *Mycobacterium bovis*. It most commonly infects the lungs, but can infect almost any organ system in the body. In 2014, 51 (5.3 per 100,000 population) new cases of active TB were diagnosed in Fresno County. This is the second annual increase in cases from a 10 year low of 35 cases in 2012. Fresno County ranked 18th in incidence of active TB disease among the counties in California in 2013 according to the California Department of Public Health.

![Figure 1: TB Number of Cases and Rate in Fresno County, 2004-2014](image)

**Demographic Characteristics**

Of the 51 cases of TB disease in 2014, 27 (52.9%) were male and 24 (47.1%) were female. A total of 62.7% (n=32) of cases were over the age of 50 years old, as depicted in Figure 2. One TB disease patient was under the age of five. The average age of TB patients diagnosed in Fresno County in 2014 was 54.4 with a range in age from one year to 90 years. In 2014, 29.4% (n=15) of TB cases were among US-born residents, while the remaining 70.6% (n=36) were among foreign-born persons. The majority of foreign-born cases immigrated from Mexico.
and Laos. Others immigrated from Vietnam, Korea, Thailand, Philippines, Cambodia and India. Of these 36 foreign-born patients the average time in the US prior to diagnosis was 21.7 years, with a range from less than one year to 70 years.

As can be seen in Table 1 racial / ethnic disparities exist with respect to TB disease in Fresno County. While the overall incidence rate in 2014 was 5.3 per 100,000, the rates for black / African Americans, Asian / Pacific Islanders,
and Hispanic/Latinos were 4.23, 26.7, and 5.29 per 100,000 respectively. There were no cases of TB disease found in non-Hispanic whites in 2014. The percentage of the population represented by the races/ethnicities affected by TB disease in 2014 is also noted in Table 1.

### TABLE 1 Cases / Incidence by Race / Ethnicity

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Number of Cases</th>
<th>Incidence Rate</th>
<th>% of Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian/Pacific Islander</td>
<td>26</td>
<td>26.7</td>
<td>10.1%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>2</td>
<td>4.23</td>
<td>4.9%</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>23</td>
<td>5.29</td>
<td>51.6%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>51</td>
<td>5.29</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4 demonstrates the different occupational environments/status of the patients with TB disease in Fresno County in 2014. As can be seen 27 (52.9%) were retired, disabled, unemployed or not seeking employment, 7 (13.7%) were migrant/seasonal workers, 13 (25.5%) were employed in other occupations, 2 (3.9) were recent immigrants, and 2 (3.9%) were students or infants.

![Figure 4: TB Occupation Distribution of Cases in Fresno County, 2014](image-url)
Reports of TB disease to Fresno County Department of Public Health came from hospitals (35), private medical providers (7), reports from laboratories (5), Department of Public Health contact investigation (1), self-referral (1), immigration screening (1), and dialysis center screening (1).

Figure 5: TB Geographic Distribution of Cases by Zip Code, Fresno County, 2014
Pathology and Organism Characteristics

Sixteen (31.4%) of the 51 patients with TB had disease outside of the lung. These extra pulmonary sites of disease included lymph nodes, the pleura, bone, peritoneum, genitourinary system, and the meninges. Forty eight (94.1%) of the TB cases had lung involvement as noted in Figure 6.

Of the 51 cases of diagnosed TB disease in 2014, five (9.8%) had negative culture and two (3.9%) had drug sensitivity results pending at the time of this report. No patients had extensively drug resistant Tuberculosis (XDR-TB). Two had multi-drug resistant TB (MDR-TB). Resistance to isoniazid (INH) alone was found in two cases, and to pyrazinamide (PZA) alone in three cases.
Contributing Risk Factors

In general terms the main risk factors for acquiring TB infection include being foreign born, being a known contact to someone with active TB disease, homelessness, living or working in a correctional facility or long-term care facility, and substance abuse. Medical factors that increase the risk for progression from TB infection to TB disease include immunosuppression, diabetes mellitus, alcohol abuse, and smoking. In 2014, 28 (54.9%) Fresno County patients had medical conditions or behaviors that put them at increased risk for developing TB disease including alcohol abuse, diabetes mellitus, medication causing immunosuppression, renal disease, IV drug use, and smoking tobacco. Two patients were co-infected with HIV.

Tuberculosis Burden in Fresno County

In 2014, the Department’s TB Control Program provided treatment, contact investigation, and follow-up for the 51 County residents newly diagnosed with active TB. Staff continued to provide care for patients diagnosed prior to 2014 who had not yet completed treatment (standard treatment regimens are 6-12 months; drug resistant TB patients may be treated for two years and all require at least monthly visits). Additionally, 322 new patients were evaluated and determined to have inactive TB disease, a disease other than TB, or were still in the process of final diagnosis at the end of 2014. Department staff visit
pulmonary TB patients daily to observe them taking the TB medication to ensure that the medication is taken correctly. Approximately 5,718 such Directly Observed Therapy visits were provided in 2014.

Fresno County residents at high risk of developing TB include those with close contact to active TB patients and the homeless. Approximately 310 close contacts were evaluated for latent TB infection and approximately 835 TB screenings were completed in the homeless population.

The Department’s TB Control Program also conducted a large contact investigation involving a university setting.

In FY 13-14 the County on average expended $1,098 per TB client for treatment, contact investigation, or screening.

**Tuberculosis activity, world, national, and California**

Tuberculosis (TB) is one of the world’s deadliest diseases:

One third of the world’s population is infected with TB.

In 2013, 9 million people around the world became sick with TB disease and there were 1.5 million TB-related deaths worldwide.

TB is a leading killer of people who are HIV infected.

**National**

A total of 9,588 TB cases (a rate of 3.0 cases per 100,000 persons) were reported in the United States in 2013. Although the number of TB cases continued to decline, challenges remain that slow progress toward the goal of TB elimination in the US. TB still persists at greater incidence rates in specific populations. Foreign born persons and racial/ethnic minorities continue to be affected disproportionately.

**California**

TB has reached an all-time low in California. In 2013, a total of 2,169 cases were reported, a less than 1% decline from 2,189 cases in 2012.

California reports the most TB cases in the U.S. and has a case rate of 5.7 per 100,000, which is nearly twice the national case rate.

Despite the overall decline of TB cases in California, of 20 local health jurisdictions with at least 15 cases in 2013, 10 (50%) had an increase in cases between 2012 and 2013.

An estimated 2.4 million Californians are infected with TB and are at risk of becoming sick with TB in the future.
In 2013 there were 26 Multidrug Resistant (MDR) or Extensively Drug Resistant (XDR) TB cases in California. MDR organisms are resistant to the strongest two primary anti-tuberculosis medications available for treatment, and XDR organisms are resistant to those two medications as well as the two strongest secondary anti-tuberculosis medications available.

Despite the significant growth of MDR TB in some global regions, in California, MDR TB has remained a small proportion of TB cases, averaging between 1% and 2% of TB cases during 1995-2013.

Nearly half of California’s MDR cases have additional resistance, complicating treatment and increasing the risk of treatment failure and death (of those tested, 21% are resistant to all first line drugs, 17% are one resistant drug away from becoming XDR, and 3% are XDR).

Among persons treated for MDR TB in California, the chance of dying has dropped significantly. In 1995, more than 1 in 5 (20%) patients treated for MDR died compared to 1 in 35 (3%) in 2011.

Patients with XDR TB have few treatment options because the drugs that are most effective against TB will be ineffective against their disease. Nine XDR TB cases were reported in California between 2004 -2013.

Public Health Strategies to Control, Prevent, and Eliminate Tuberculosis Include:

1- Finding and adequately treating persons that have active disease
2- Identifying individuals who have been exposed to someone with TB disease, evaluating them for TB infection or TB disease, and treating them if they have either of these.
3- Screening individuals for TB infection that are known to be at higher risk for infection with TB or at higher risk for developing TB Disease if infected.
4- Applying control measures in high risk settings.

The FCDPH Chest Clinic Program identifies and treats TB disease, identifies and evaluates exposures to TB and offers treatment if needed, screens certain high risk populations, and assists the public with the application of control measures in high risk environments.

Title 17 of California Code of Regulations requires that notification be given to the county health department of all diagnosed or suspicious cases of tuberculosis by telephone or fax within one working day of identification.
California Health and Safety Code 121362 also requires that providers treating persons with active TB report to the local health officer any pertinent information the health officer requests.

Additional Information Available
If you have any questions regarding TB infection or disease or the control of TB in Fresno County please contact our Community Liaison Nurse at 559-600-3413.