



Report on Tuberculosis in California, 2016

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State of California

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Link to 2016 state report tables: https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH/Document_Library/TBCB_Report_2016_Tables.xlsx

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Cover figure: The figure illustrates the proportion of cases from the six most common countries of origin of California's TB cases in each local health jurisdiction: China (blue), India (red), Mexico (green), Philippines (orange), Vietnam (teal), US (tan).



KAREN L. SMITH, MD, MPH
Director and State Public Health Officer

State of California—Health and Human Services Agency
California Department of Public Health



EDMUND G. BROWN JR.
Governor

August 22, 2017

Dear Colleagues,

It is with pleasure that I present to you the 2016 annual Report on Tuberculosis (TB) in California. It is through your dedicated efforts that TB disease continues to decline in our state. In the last decade the number of TB cases has fallen by nearly 25 percent, and the rate has declined by 30 percent.

While we acknowledge our many successes in finding and treating persons with active TB disease, we must now expand our attention to the more than 2 million Californians with latent TB infection (LTBI). Our goal of eliminating TB from California will depend on identifying and treating individuals with LTBI through a focus on those at highest risk. Achieving elimination will require working together with national, state and local partners, as well as private providers. Surveillance of LTBI diagnoses, including treatment outcomes, will ensure that we have the data we need to track our progress and identify challenges as we move toward our elimination goal.

We look forward to working with you over the coming year to establish these collaborations and develop new tools to aid us not only in sustaining our work to control TB disease, but to advance our shared vision of eliminating TB from our state.

Sincerely,

Jennifer Flood, M.D., M.P.H., Chief,
Tuberculosis Control Branch
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Introduction

Tuberculosis (TB) case reports are submitted to the California Department of Public Health (CDPH), TB Control Branch (TBCB), by 61 local health jurisdictions (58 counties, and the cities of Berkeley, Long Beach, and Pasadena). In 1993, the Centers for Disease Control and Prevention (CDC), in conjunction with state and local health departments, began using the Report of Verified Case of Tuberculosis (RVCT) to collect information on each case of TB. The RVCT includes demographic and clinical characteristics of TB cases, as well as information on drug resistance, risk factors for TB, and treatment outcomes. In 2009, CDC released an expanded RVCT that collects additional information to address the changing epidemiology of TB in terms of risk factors, new drug treatments, and enhanced laboratory capacity for diagnostic tests. California implemented this revised RVCT January 1, 2010.

CDPH Division of Communicable Disease Control implemented an internet-based surveillance system for reportable diseases including TB in January 2010. This system, California Reportable Disease Information Exchange (CalREDIE), allows all jurisdictions in California to submit TB case reports and access their local data on-line in a timely manner.

About this report

Compared to previous years' reports, we are presenting a streamlined version of the annual report with a newly added California TB Fact Sheet in place of an Executive Summary. Additionally, data tables and technical notes are not included in this document but are available online in Excel format at the following URL: [https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH Document Library/TBCB Report 2016 Tables.xlsx](https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/TBCB_Report_2016_Tables.xlsx)

Acknowledgment

TBCB would like to thank surveillance and reporting staff in all local reporting jurisdictions. Without their hard work we would not have data for this publication. We also acknowledge the support of our partners at CDC's Division of Tuberculosis Elimination.

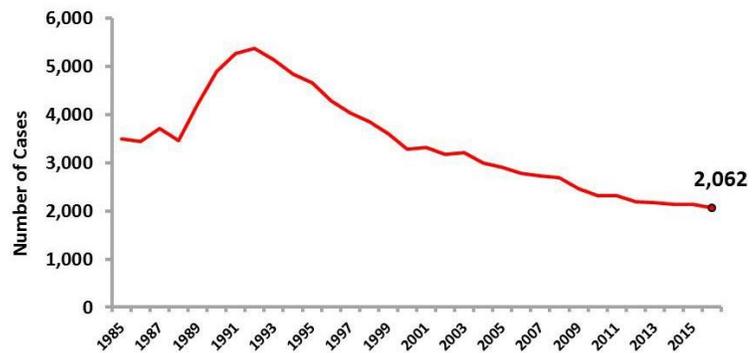
California TB Fact Sheet: 2016 Update

Active tuberculosis (TB) is an illness caused by the bacterium *Mycobacterium tuberculosis*. TB usually affects the lungs and spreads through the air when a person sick with TB coughs. Not everyone infected with the bacteria becomes sick. Those that have been infected but are not sick have latent tuberculosis infection (LTBI). Persons with LTBI can become sick with active TB in the future if they are not treated. The California Department of Public Health, Tuberculosis Control Branch works together with our local and national partners to prevent and control TB, including addressing racial and ethnic disparities in the disease, treatment and management of drug-resistant TB, and identifying and controlling outbreaks. These efforts, together with renewed focus on diagnosing and treating persons with LTBI will move us closer to a TB-free California.

California Overview

- In 2016, California reported 2,062 new active TB cases, compared with 2,131 cases in 2015.
- In 2016, California's annual TB incidence was 5.2 cases per 100,000 persons, which is nearly double the national incidence rate of 2.9.
- An estimated more than \$70 million was spent on medical management of TB cases in California during 2016.
- TB cases were reported in 50 of California's 61 (82%) local health jurisdictions, but 29 (48%) jurisdictions reported fewer than 5 cases.
- Among California's TB cases, an estimated 7% were imported from outside the United States, 13% resulted from recent transmission, and 80% were due to reactivation of LTBI.
- More than 2 million Californians (6% of the population) are estimated to have LTBI which can progress to active TB without diagnosis and treatment.

Reported TB Cases: California, 1985–2016



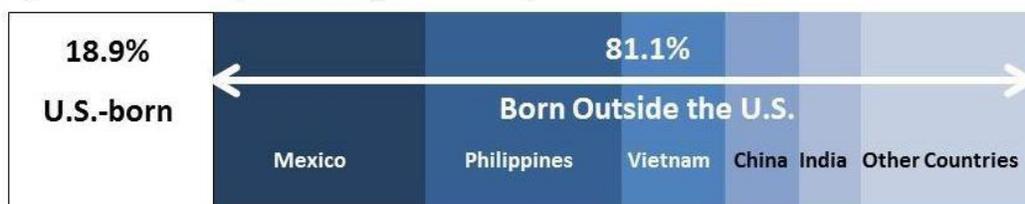
The resurgence of TB began in the 1980s and peaked in 1992. Case counts began decreasing again in 1993, and continued a downward trend through 2016.

Most Affected Populations

Persons Born Outside the U.S. Bear Significant Burden

- The TB rate among persons born outside of the United States (15.6 per 100,000) was 12 times higher than the rate among U.S.-born persons (1.3 per 100,000).
- In 2016, 81% of California's TB cases occurred in persons who were born outside the U.S.
- Persons born in Mexico, the Philippines, Vietnam, China, and India accounted for over 75% of TB cases in persons born outside the U.S.
- During 2007–2016, the percentage of foreign-born TB patients diagnosed less than one year after arriving in the U.S. decreased from 17% in 2007 to 11% in 2016. The median time to TB diagnosis after U.S. entry is 17 years.

Proportion of TB Cases by National Origin — California, 2016

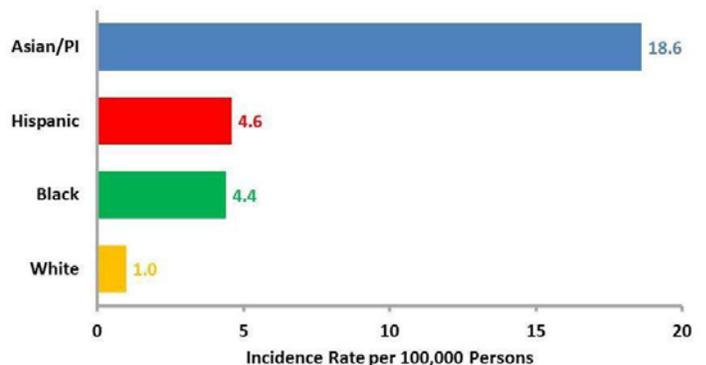


California TB Fact Sheet: 2016 Update

Racial/Ethnic Disparities Persist

- Racial/ethnic minorities continued to experience higher TB rates compared to whites. Rates among Asians and Pacific Islanders (18.6 per 100,000) were 19 times higher than among whites (1.0 per 100,000), while rates among blacks (4.4 per 100,000) and Hispanics (4.6 per 100,000) were four to five times higher.
- Asians and Pacific Islanders accounted for over half of California's TB cases. In 2016, 53% of TB cases occurred in Asians and Pacific Islanders, up from 46% in 2007.

TB Rates by Racial/Ethnic Group— California, 2016



Medical Comorbidities

- In 2016, 37% of adult TB patients had a medical comorbidity such as diabetes mellitus, end stage renal disease, HIV infection, or another condition that can increase the risk of progression from latent to active TB disease.
- The most common comorbidity was diabetes mellitus (27% of adult cases).
- HIV infection greatly increases a patient's risk for progression from LTBI to active TB disease, as well as for TB-related death.
- In 2016, 86% of patients with TB were tested for HIV. Of those tested, 75 (4.2%) were HIV-positive, up from 61 (3.2%) in 2015.

Children and Older Adults

- There were 34 TB cases among children less than 5 years of age in 2016, a decrease from 89 cases in 2007.
- The proportion of TB cases in older adults is growing. In 2016, 33% of TB cases were reported in persons 65 years of age or older, compared to 24% in this age category in 2007.
- Since 2007, the median age of all TB patients rose from 48 to 54 years, driven predominantly by the rising median age of foreign-born TB patients from 49 years in 2007 to 57 years in 2016.

Special Populations

- Congregate living situations such as correctional facilities and homeless shelters may pose challenges for TB control due to the potential for a large number of persons to be exposed and infected with TB.
- In 2016, 50 (2.4%) TB patients were residing in a correctional facility at the time of their diagnosis.
- Data on homeless shelter stays are not collected, however, 116 (6%) TB patients were homeless at some point in the year prior to their TB diagnosis in 2016.

Diagnosis and Management of TB

- The results of nucleic acid amplification (NAA) tests, used to identify *Mycobacterium tuberculosis*, can be available within hours after specimen collection, resulting in earlier detection and treatment of TB cases. In 2016, NAA tests were used in 64% of cases.
- Pulmonary disease was diagnosed in 82% of TB cases, indicating a risk of transmission to others; of those, 12% also had TB in another site. 18% of cases had only extrapulmonary disease.
- TB was diagnosed by laboratory findings in 85% of cases; 15% of cases were clinically confirmed.
- Of pulmonary TB cases with an abnormal chest x-ray, cavitation was seen in more than 18%, indicating more advanced disease.
- More than 91% of TB cases received at least some of their treatment via directly observed therapy.
- Sixty-three percent of TB patients had at least some of their care provided by a local health department; 29% received care only by their private provider.

California TB Fact Sheet: 2016 Update

TB Transmission is Occurring in California

- An estimated 13% of TB cases resulted from transmission of TB in California during 2012–2015.
- In 2016, transmission occurred in 11 new or ongoing confirmed TB outbreaks, each involving at least 4 persons.

Deaths Among Persons with TB

- During 2012–2014, 629 persons (10% of TB cases) died with TB.
- Of persons who died with TB, 22% died before receiving TB treatment.

Drug-Resistant TB

- Multidrug-resistant (MDR) TB is TB resistant to the two most potent first line drugs, isoniazid and rifampin. Extensively drug-resistant (XDR) TB is MDR TB additionally resistant to two classes of second line drugs, fluoroquinolones and injectables.
- Patients with MDR and XDR TB generally have poorer outcomes because the most effective TB drugs are ineffective against their disease.
- In 2016, there were 28 (1.8%) MDR TB cases in California compared with 23 (1.3%) cases in 2015.
- Despite a worldwide increase in MDR TB, the proportion of TB cases in California that are MDR has remained consistent (1–2%) since drug susceptibility data began being systematically collected in 1993.
- Since 1993, 22 XDR TB cases were reported in California.
- In 2016, a total of 174 (10.9%) cases had INH resistance, 28 (1.8%) had rifampin resistance, and 85 (5.4%) had PZA resistance.

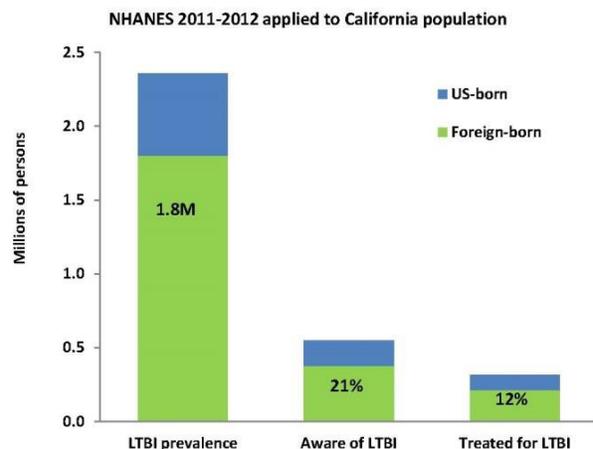
Outcomes of TB Treatment

- Among persons reported with TB in 2014 who started anti-TB treatment, 88% completed treatment; 7% died, 0.7% were lost, and 0.9% refused to complete treatment.
- Of TB patients for whom one year or less of treatment was recommended, 79% completed treatment in that time period.
- Reasons for extending treatment beyond 12 month among 220 cases for whom treatment continued beyond the one year indicated included: clinical indications (48%), adverse treatment events (22%), and rifampin resistance (7%).

Treating Latent TB Infection is Critical

- Approximately 80% of persons who become sick with TB have had longstanding infection, LTBI, before they develop disease. LTBI cannot be transmitted to others.
- There are estimated to be more than 2 million Californians who have LTBI, including 17.0% of the population born outside the U.S. and 1.9% of the population born in the U.S. Most are not aware of and have not been treated for LTBI and are at risk for progressing to active tuberculosis.
- LTBI is not currently a reportable condition in California. LTBI estimates were calculated 2011–2012 National Health and Nutrition Examination Survey results for race/ethnicity and nativity strata applied to 2016 California population data from the California Department of Finance.

Estimated TB infection, prevalence, awareness, treatment—California, 2016



California TB Fact Sheet: 2016 Update

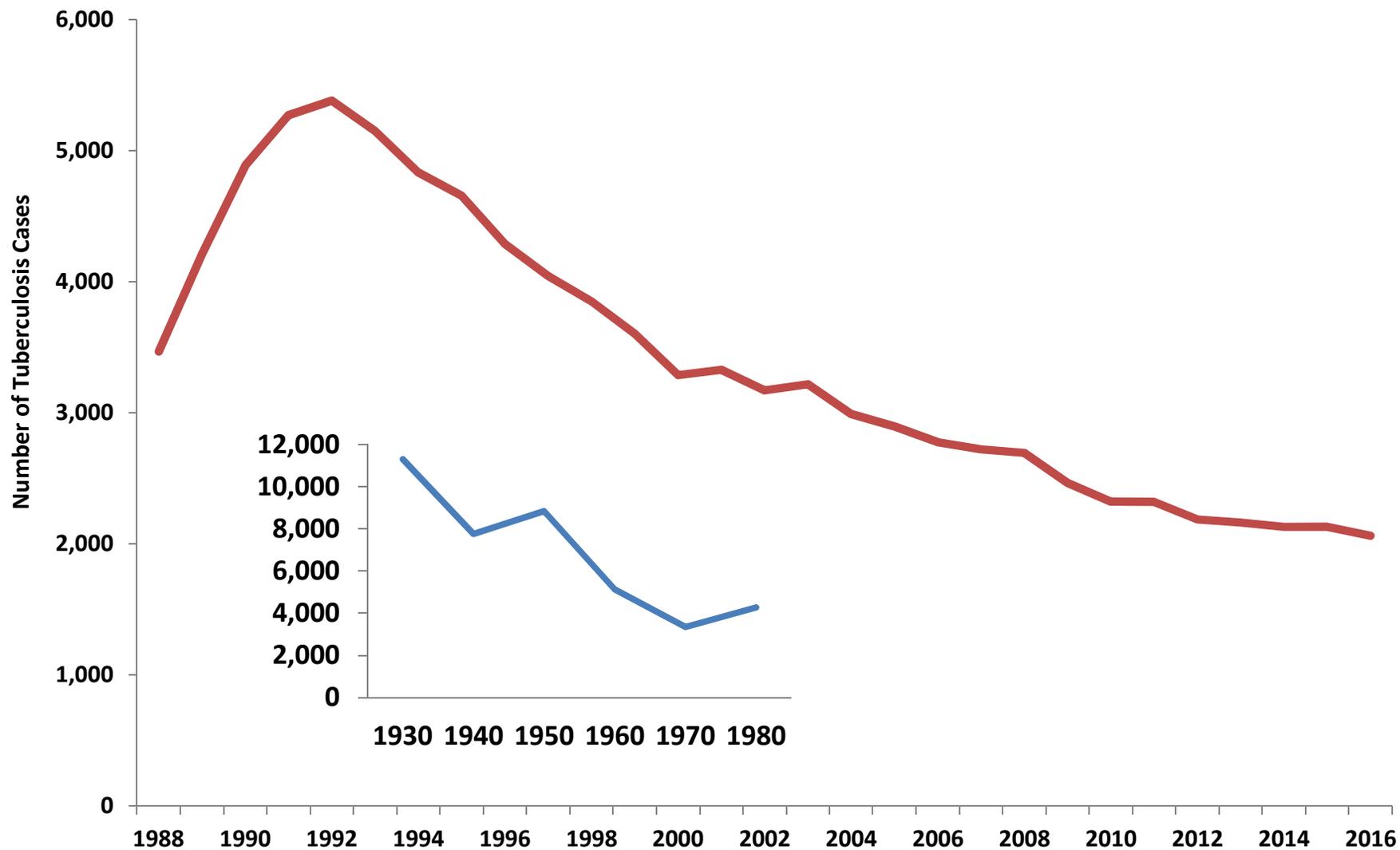
A Plan to Eliminate TB

- CDPH, in collaboration with the California TB Elimination Advisory Committee and the California TB Controllers Association, developed a TB Elimination Plan which outlines actions over 5 years to make progress toward eliminating TB from California. The plan is supported by diverse stakeholders across the state. The plan calls for making TB prevention a routine part of medical care by finding and testing Californians who are at risk for TB, optimizing treatment for LTBI, monitoring and evaluating LTBI testing and treatment, and ensuring that patients, clinicians, and public health programs have the tools and resources they need to prevent TB.

More information about tuberculosis:

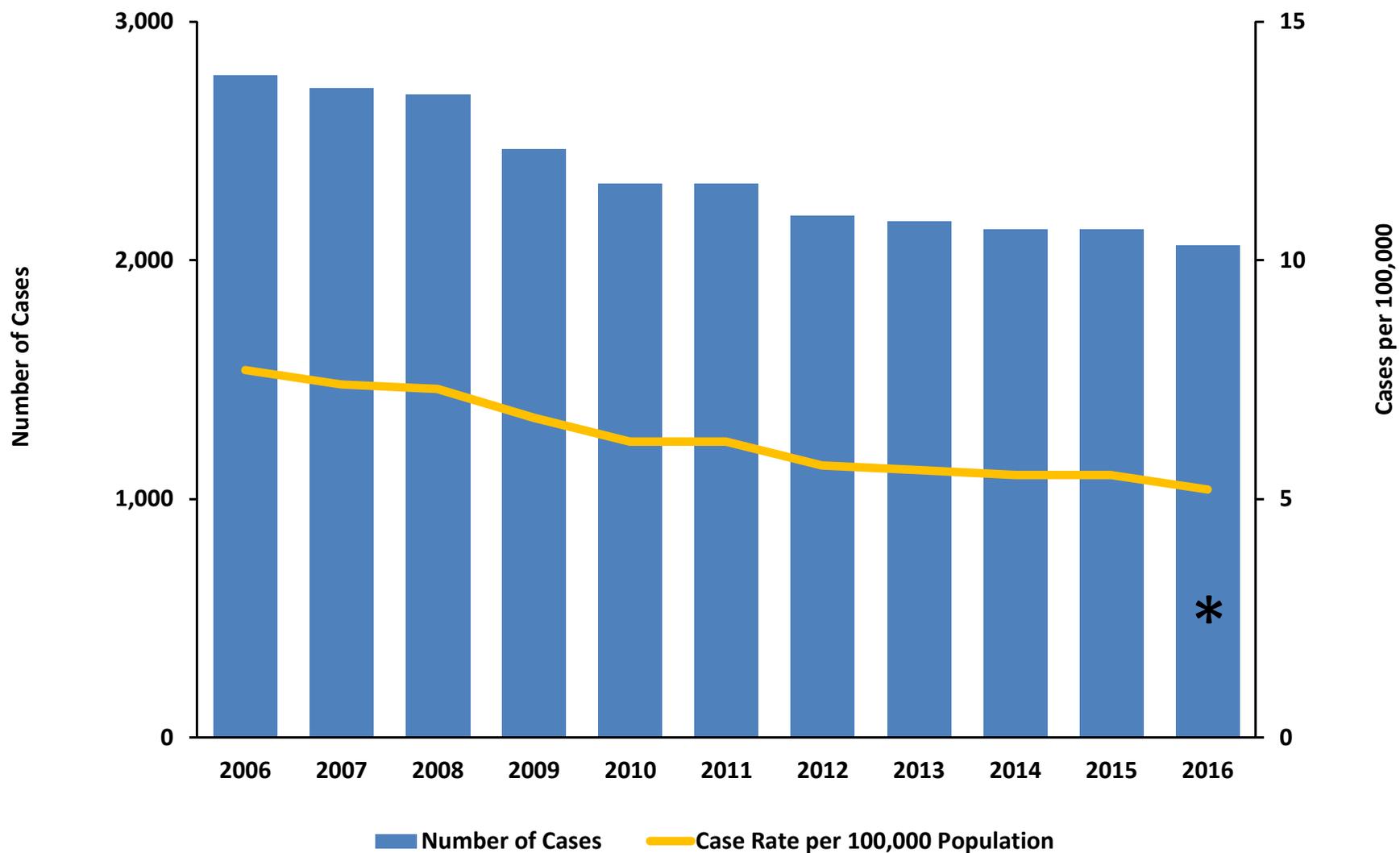
- Find more tuberculosis data: <https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/TB-Disease-Data.aspx>
- Read more about the plan to eliminate TB from California: <https://archive.cdph.ca.gov/programs/tb/Documents/TBCB-TB-Elimination-Plan-2016-2020.pdf>
- Who should be tested for LTBI? See the California TB Risk Assessment Tools: <https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/TB-Risk-Assessment.aspx>

Figure 1. Number of Tuberculosis Cases: California, 1930-2016



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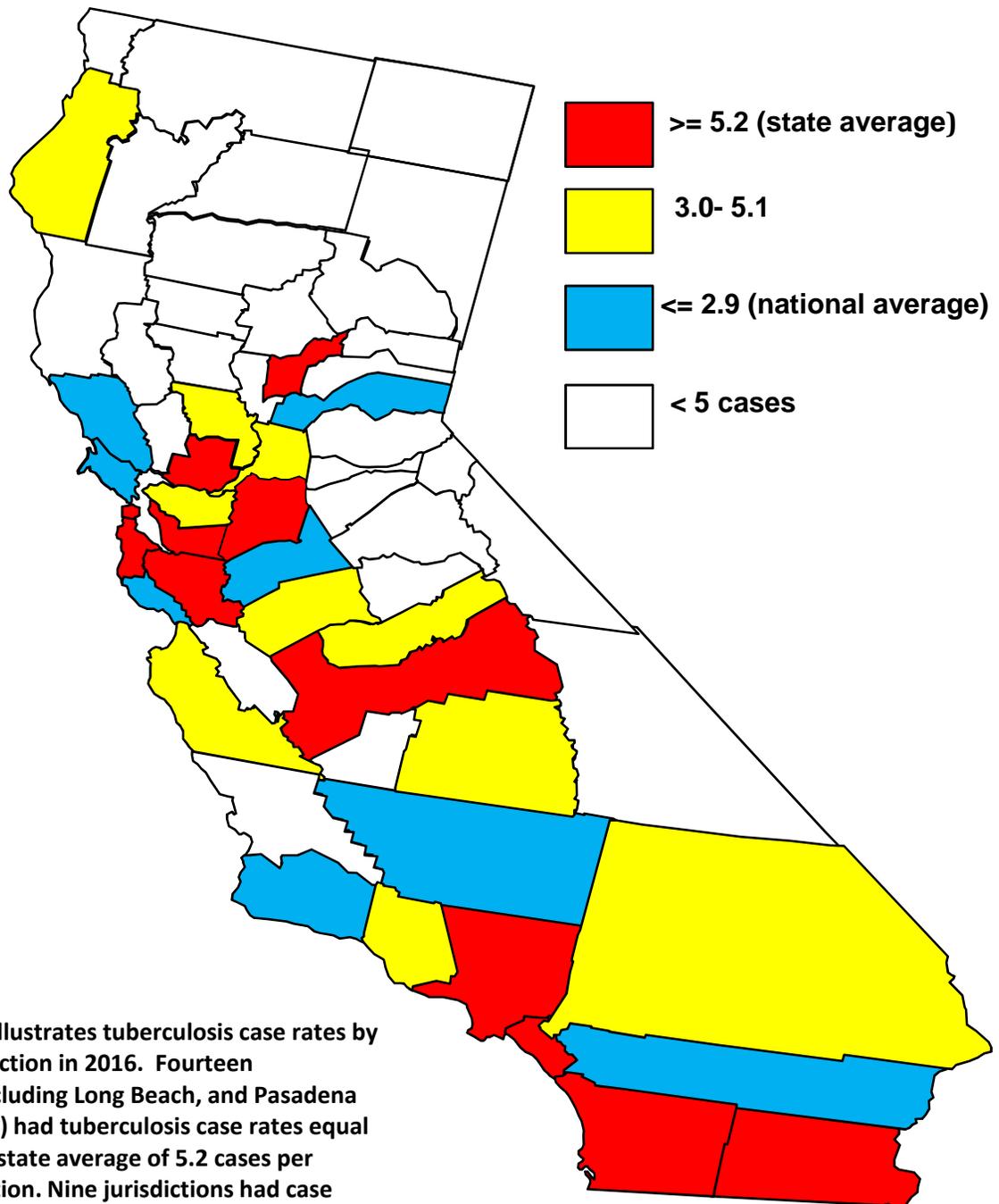
Figure 2. Number of Tuberculosis Cases and Case Rates: California: 2006-2016



* National Case Rate (2.9 per 100,000)

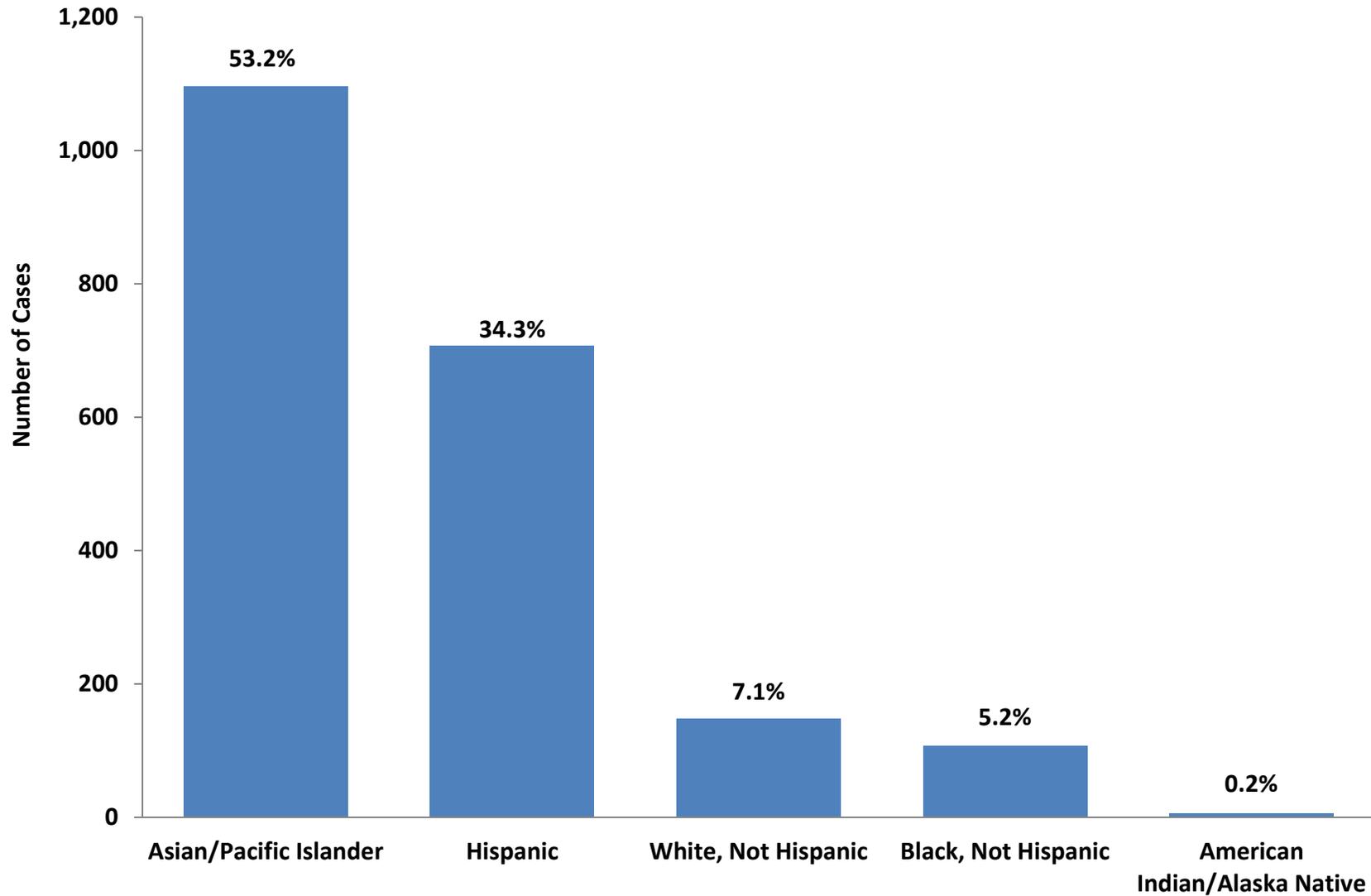
California Department of Public Health, Tuberculosis Control Branch

Figure 3. Tuberculosis in California, 2016



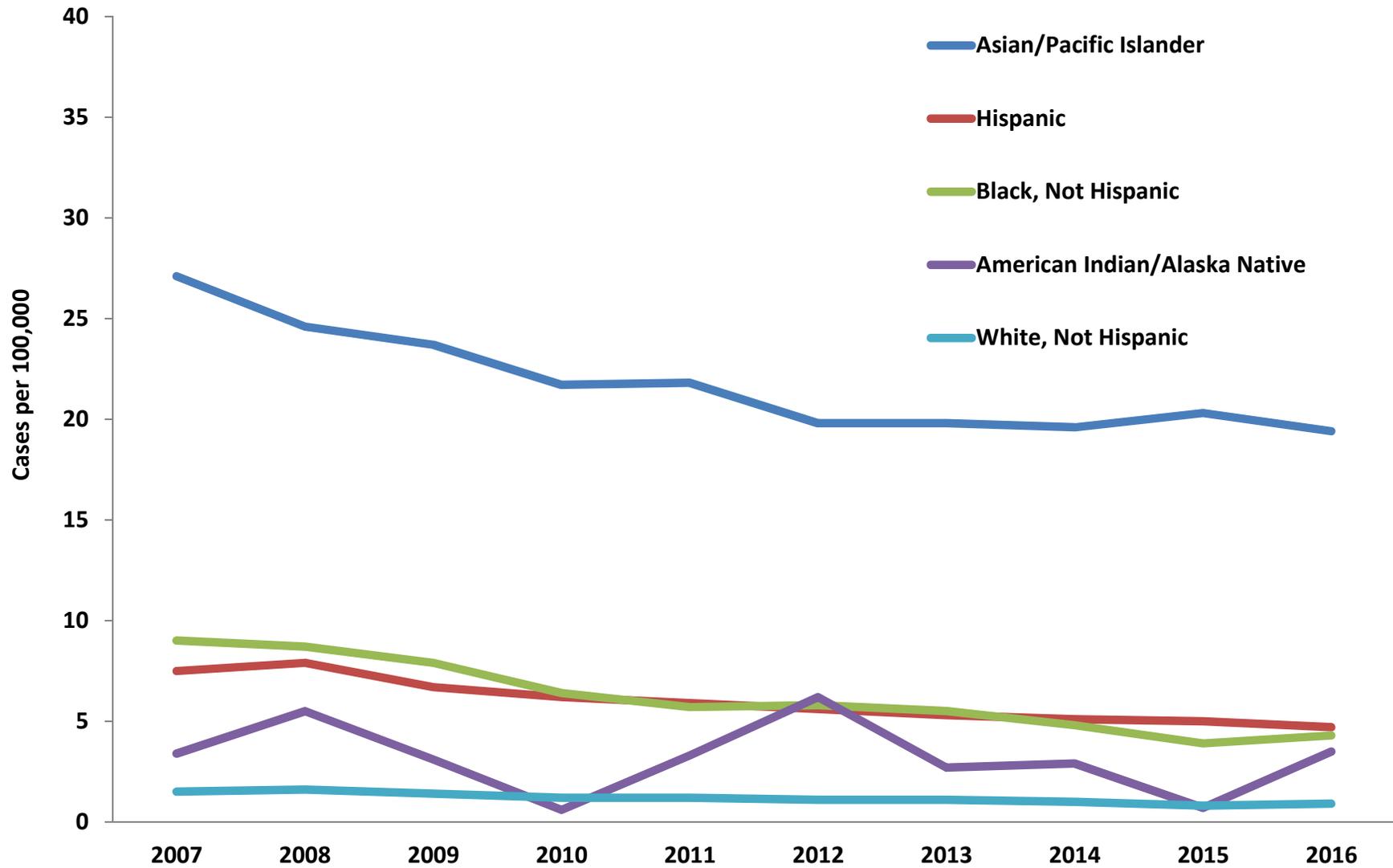
Note: The map illustrates tuberculosis case rates by reporting jurisdiction in 2016. Fourteen jurisdictions (including Long Beach, and Pasadena not represented) had tuberculosis case rates equal to or above the state average of 5.2 cases per 100,000 population. Nine jurisdictions had case rates greater than the national rate and less than the state rate (3.0 to 5.1 cases per 100,000 population). Nine jurisdictions had case rates less than or equal the national rate (2.9 cases per 100,000 population). Case rates were not calculated for 30 jurisdictions because there were fewer than five cases in these areas.

Figure 4. Tuberculosis Cases by Race/Ethnicity: California, 2016



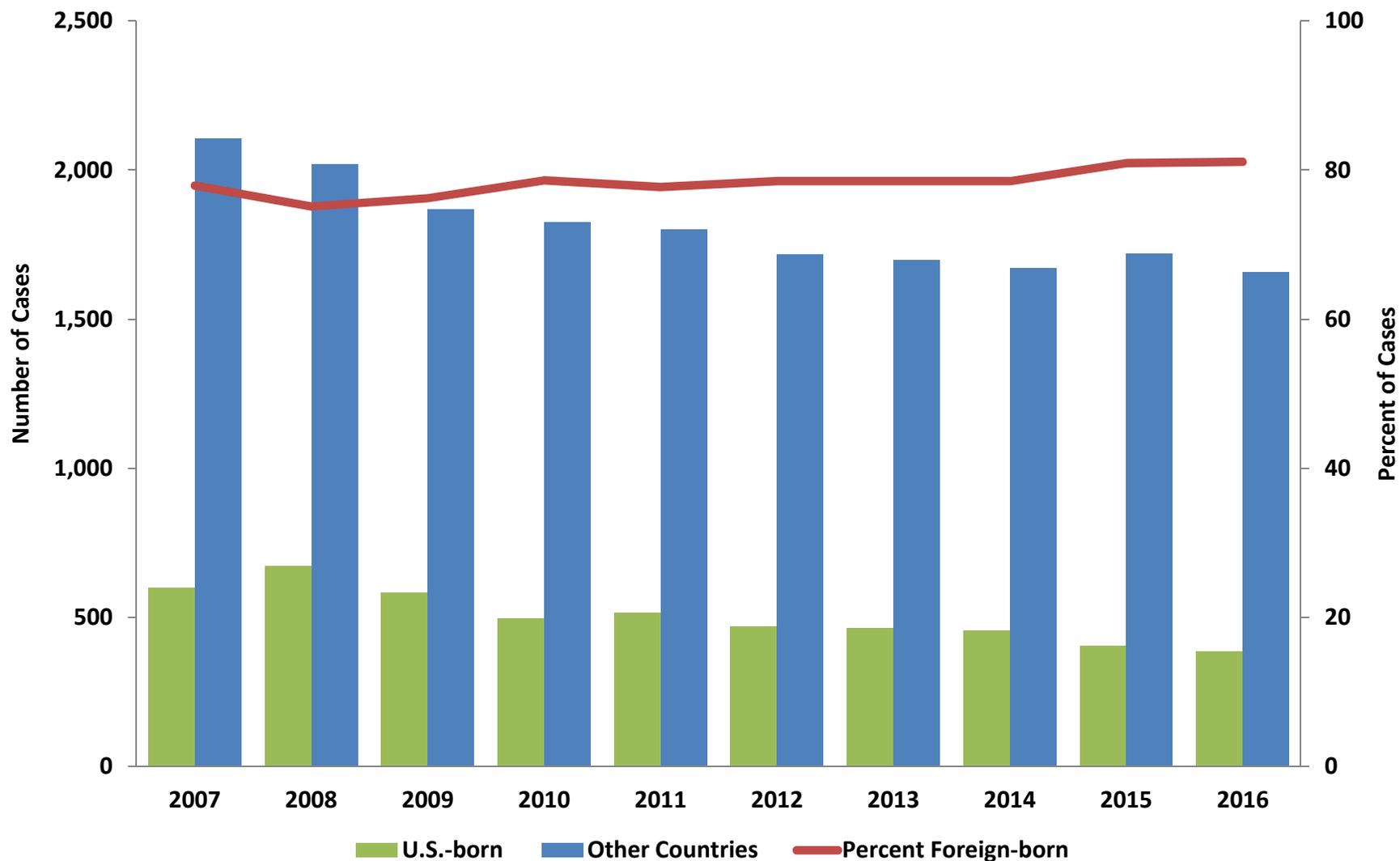
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Figure 5. Tuberculosis Case Rates by Race/Ethnicity: California, 2007-2016



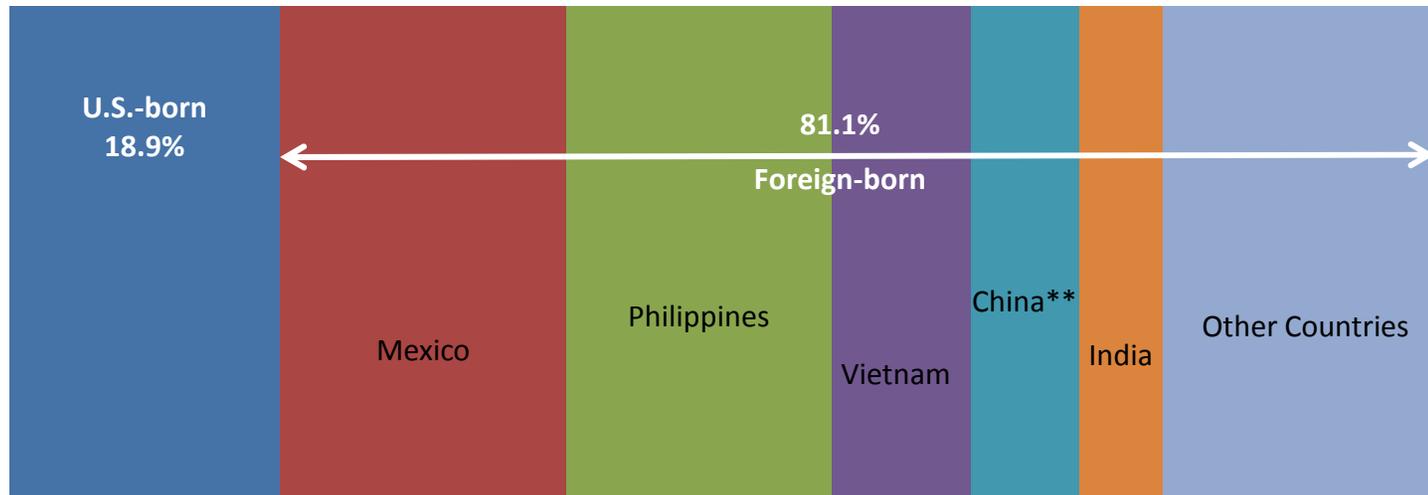
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Figure 6. Tuberculosis Cases in Foreign-born and U.S.-born Persons: California, 2007-2016



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Figure 7. Tuberculosis Cases by Country of Origin:* California, 2016

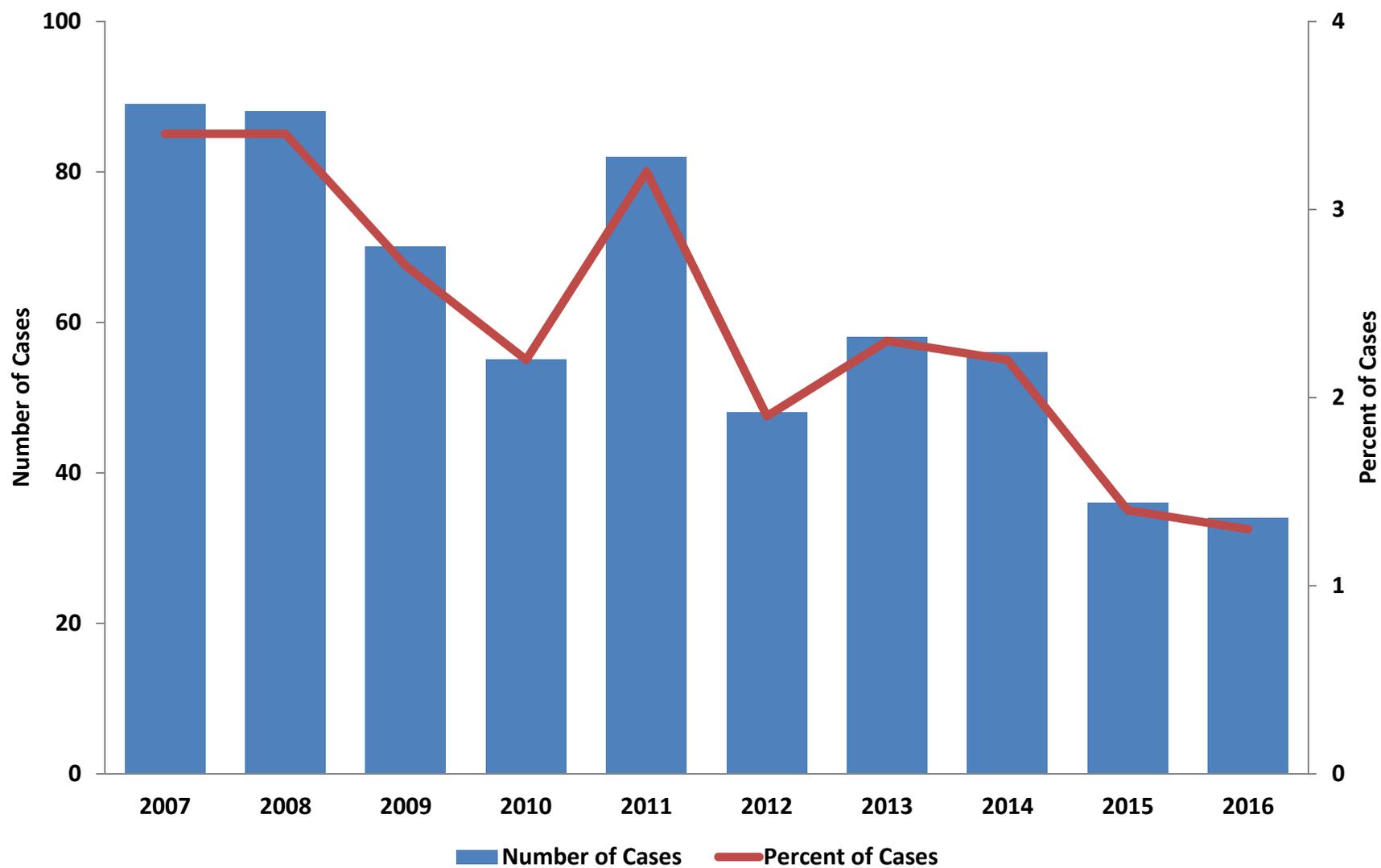


* Excludes cases for whom country of origin is unknown

** People's Republic of China includes Hong Kong

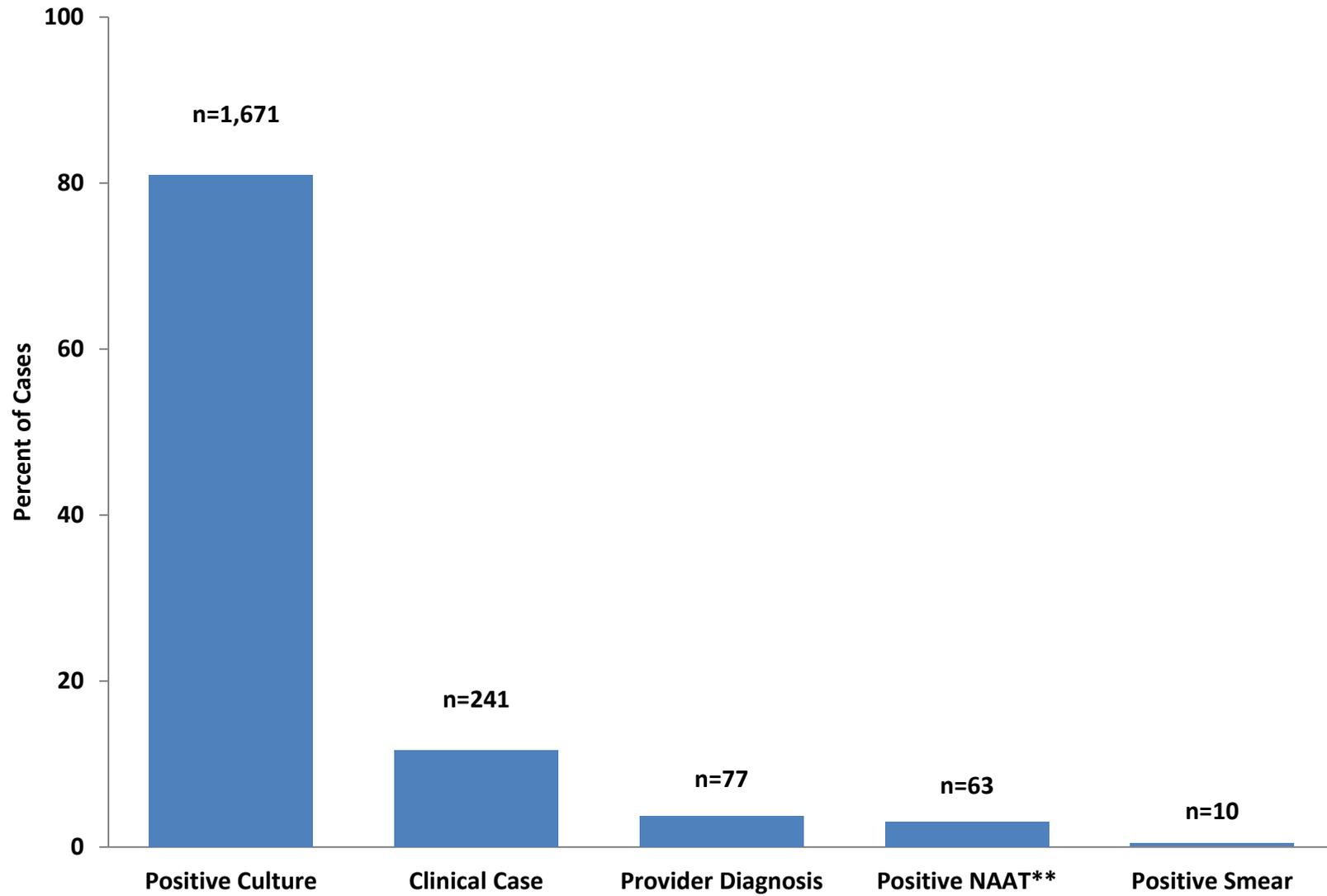
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Figure 8. Tuberculosis Cases in Persons 0-4 Years of Age: California, 2007-2016



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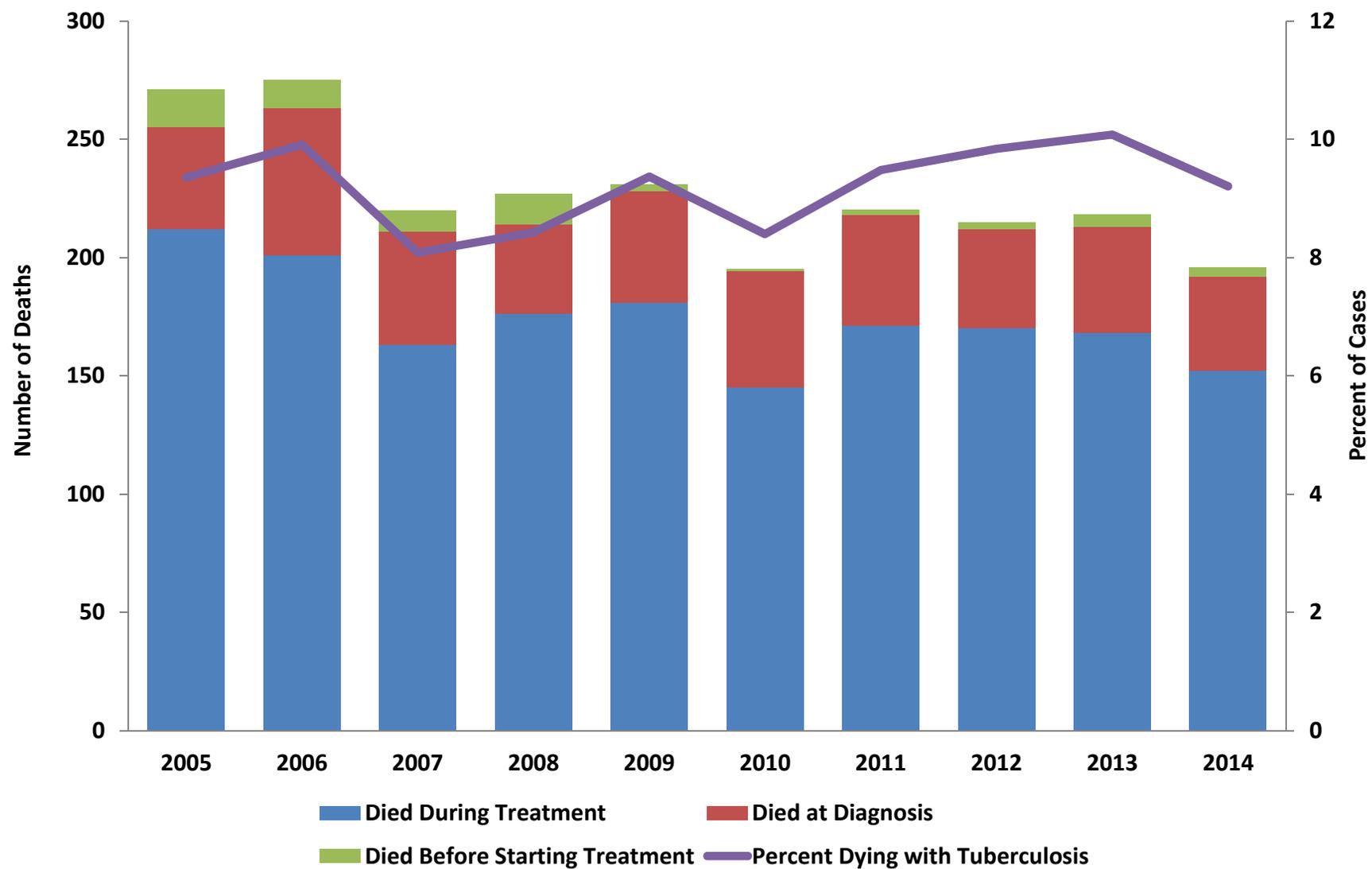
Figure 9. Tuberculosis Cases by Verification Criteria: California, 2016



*NAAT = Nucleic Acid Amplification Test

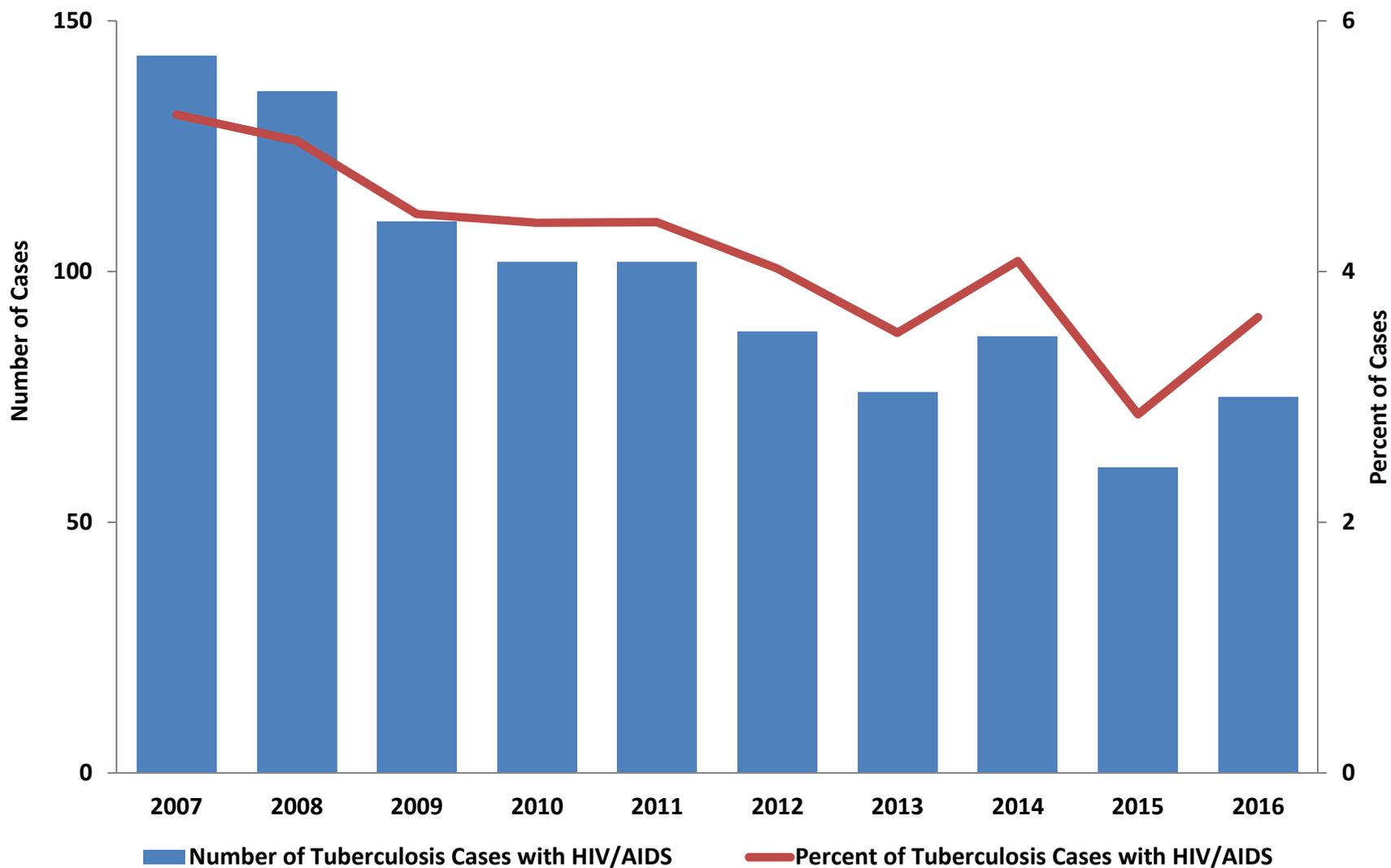
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Figure 10. Deaths in Persons with Tuberculosis: California, 2005-2014



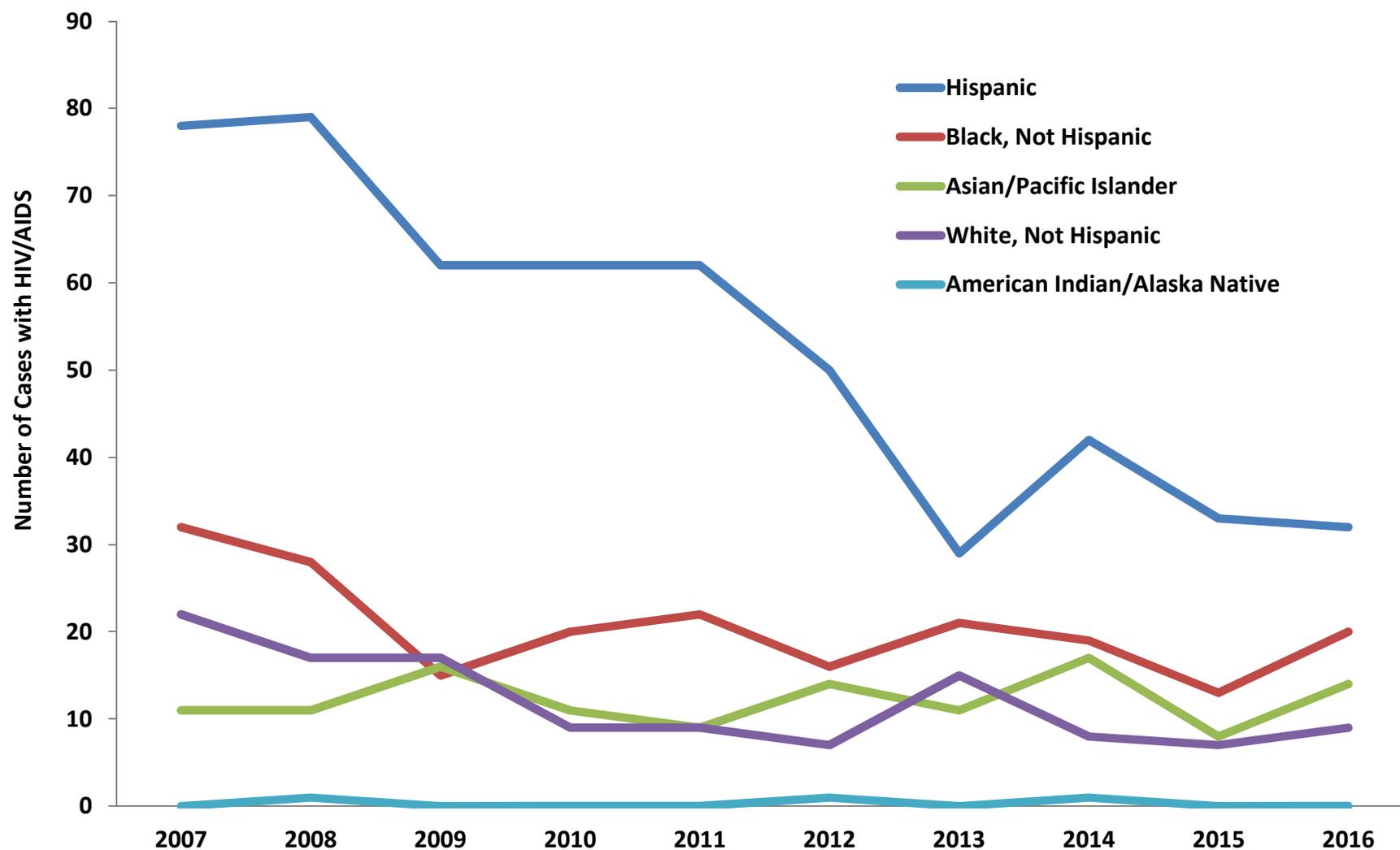
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Figure 11. Tuberculosis Cases by HIV/AIDS Diagnosis*: California, 2007-2016



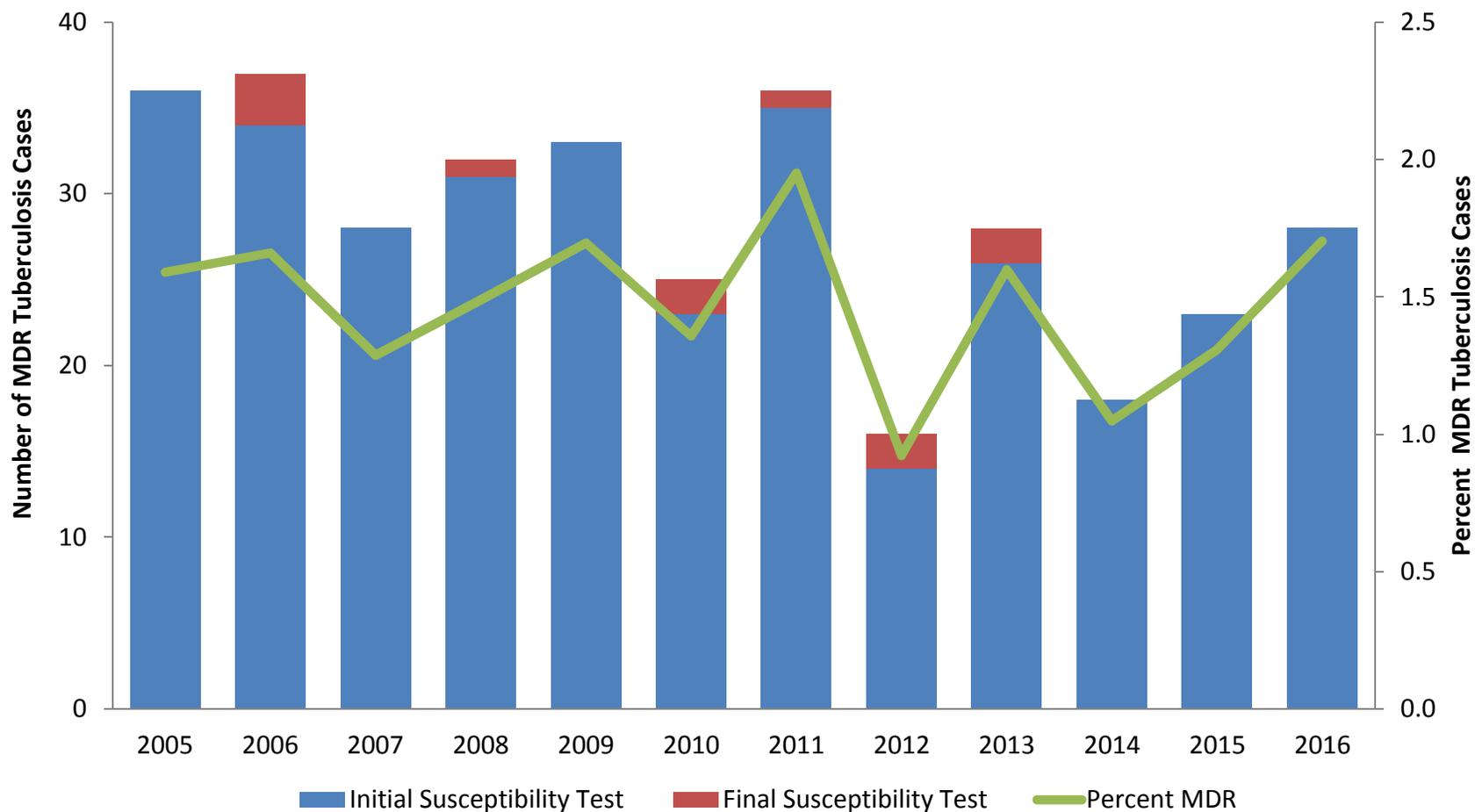
* Match found in HIV/AIDS Case Registry, California Office of AIDS or HIV-positive status reported on RVCT

Figure 12. HIV/AIDS-associated Tuberculosis* by Race/Ethnicity: California, 2007-2016



* Match found in HIV/AIDS Case Registry, California Office of AIDS or HIV-positive status reported on RVCT

Figure 13. Tuberculosis Cases with Multidrug Resistance (MDR) on Initial or Final Drug Susceptibility Testing*: California, 2005-2016**



* Cases with resistance to at least isoniazid and rifampin on the Initial Drug Susceptibility Report (Follow-up 1) or on the Case Completion Report (Follow-up 2)

** Number of MDR cases may increase as additional drug susceptibility test results are received for 2015 and 2016.

**Figure 14. Tuberculosis Cases with Initial Multidrug Resistance (MDR)*:
California, 2012-2016**

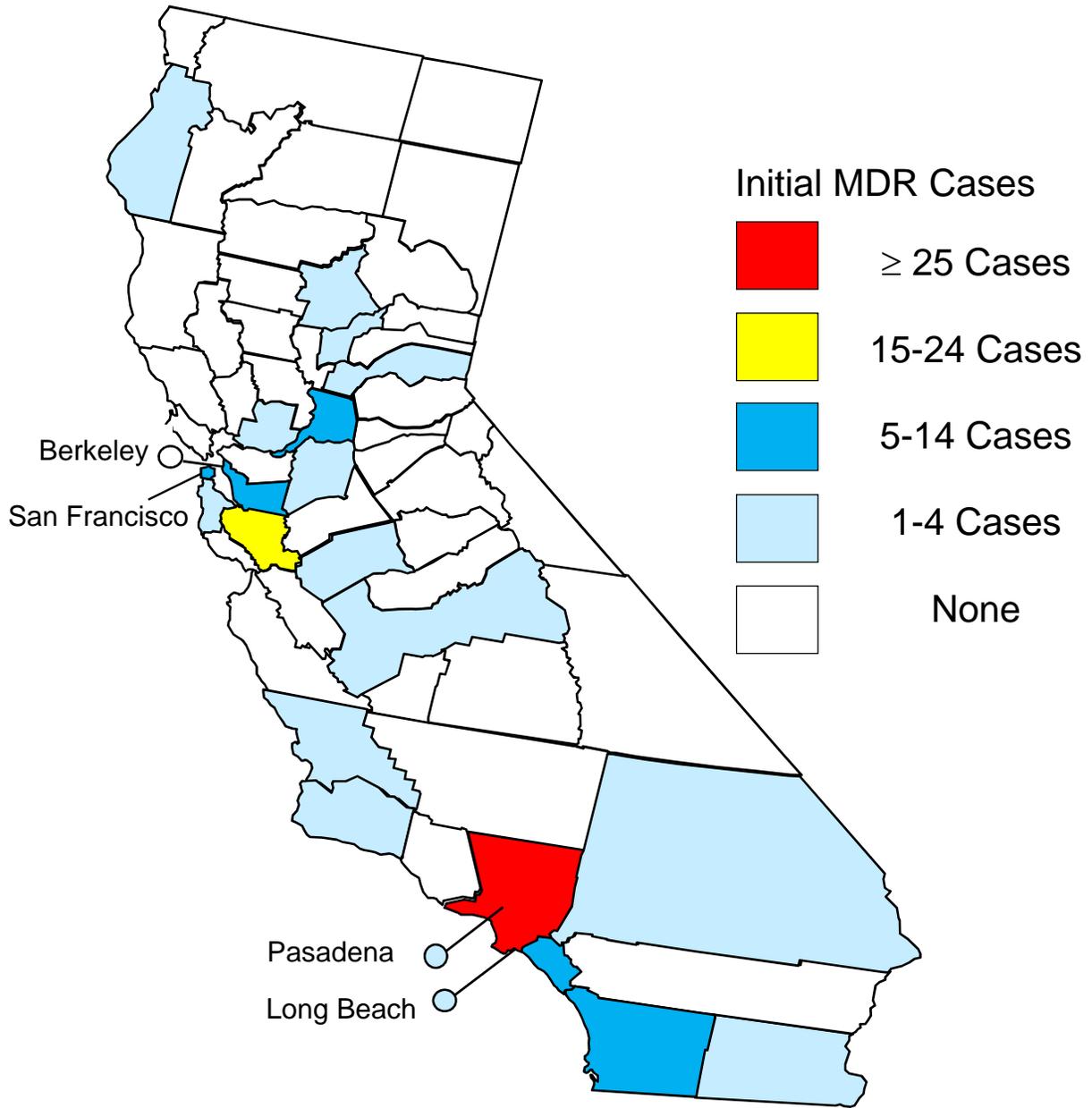
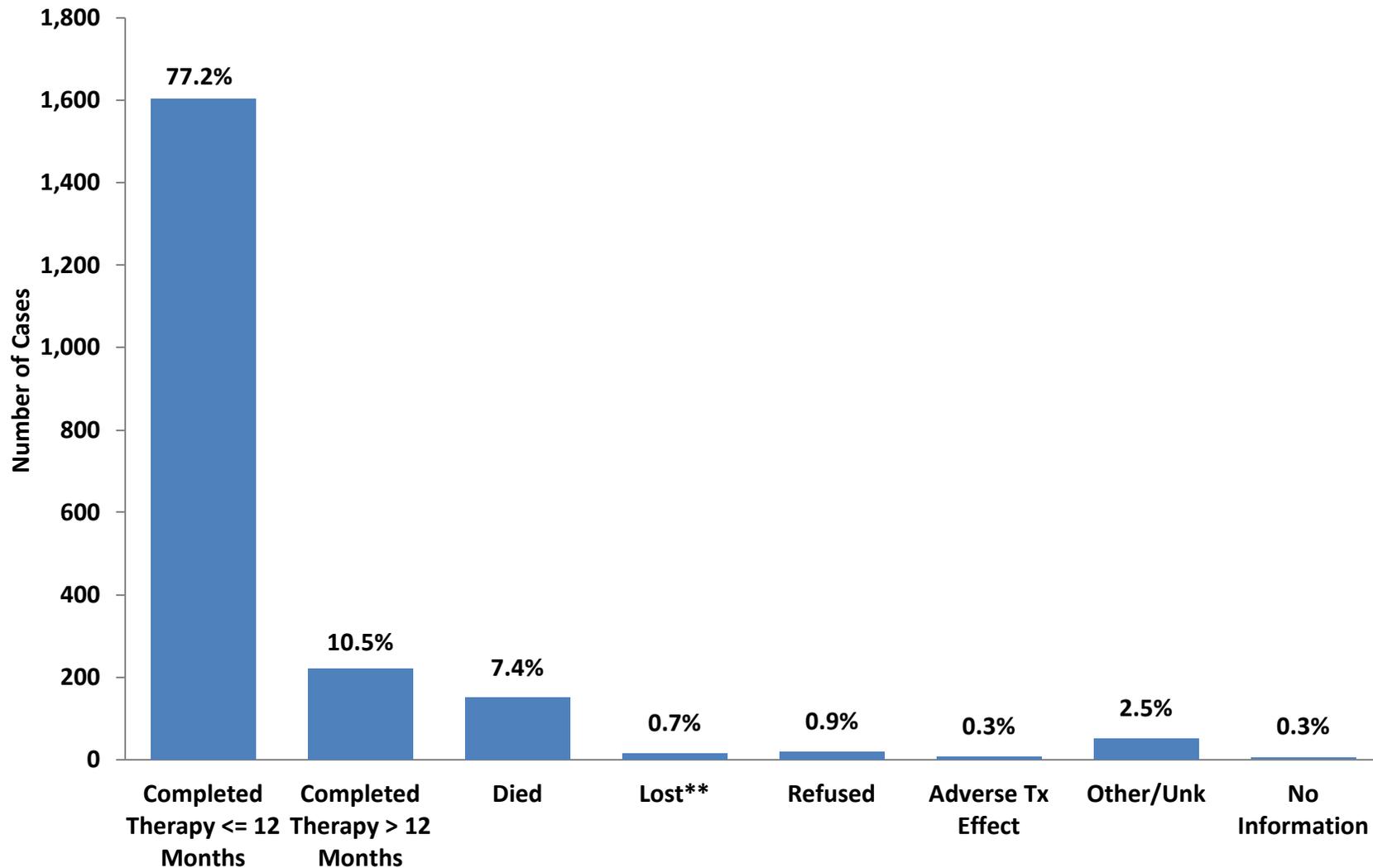


Figure 15. Tuberculosis Cases* by Outcome of Treatment (Tx): California, 2014

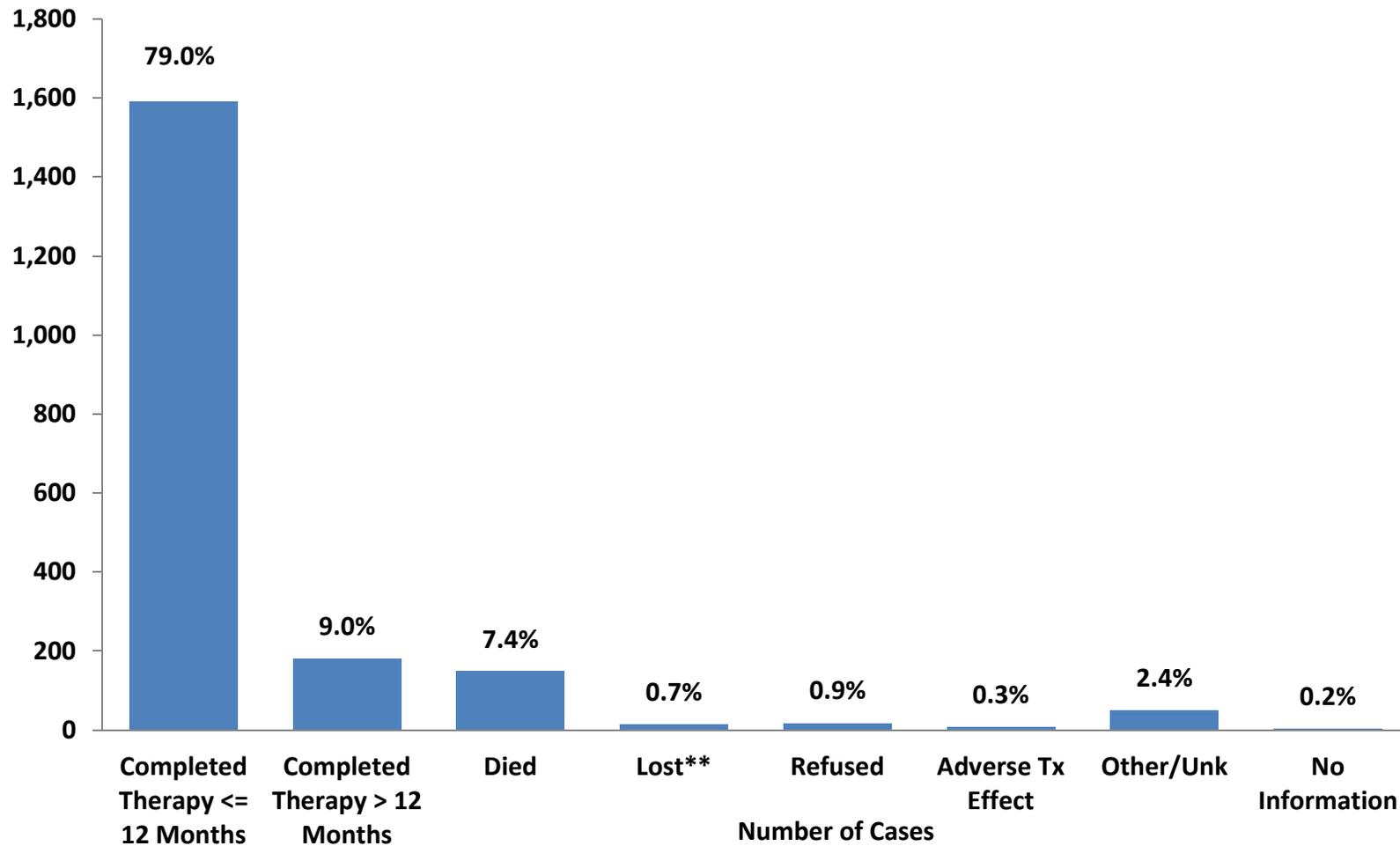


* Patient was alive at diagnosis and started on an initial drug regimen of two or more drugs.

** Patient could not be located prior to the completion of treatment.

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Figure 16. Outcome in Tuberculosis Cases for Whom One Year or Less of Treatment (Tx) was Indicated*: California, 2014

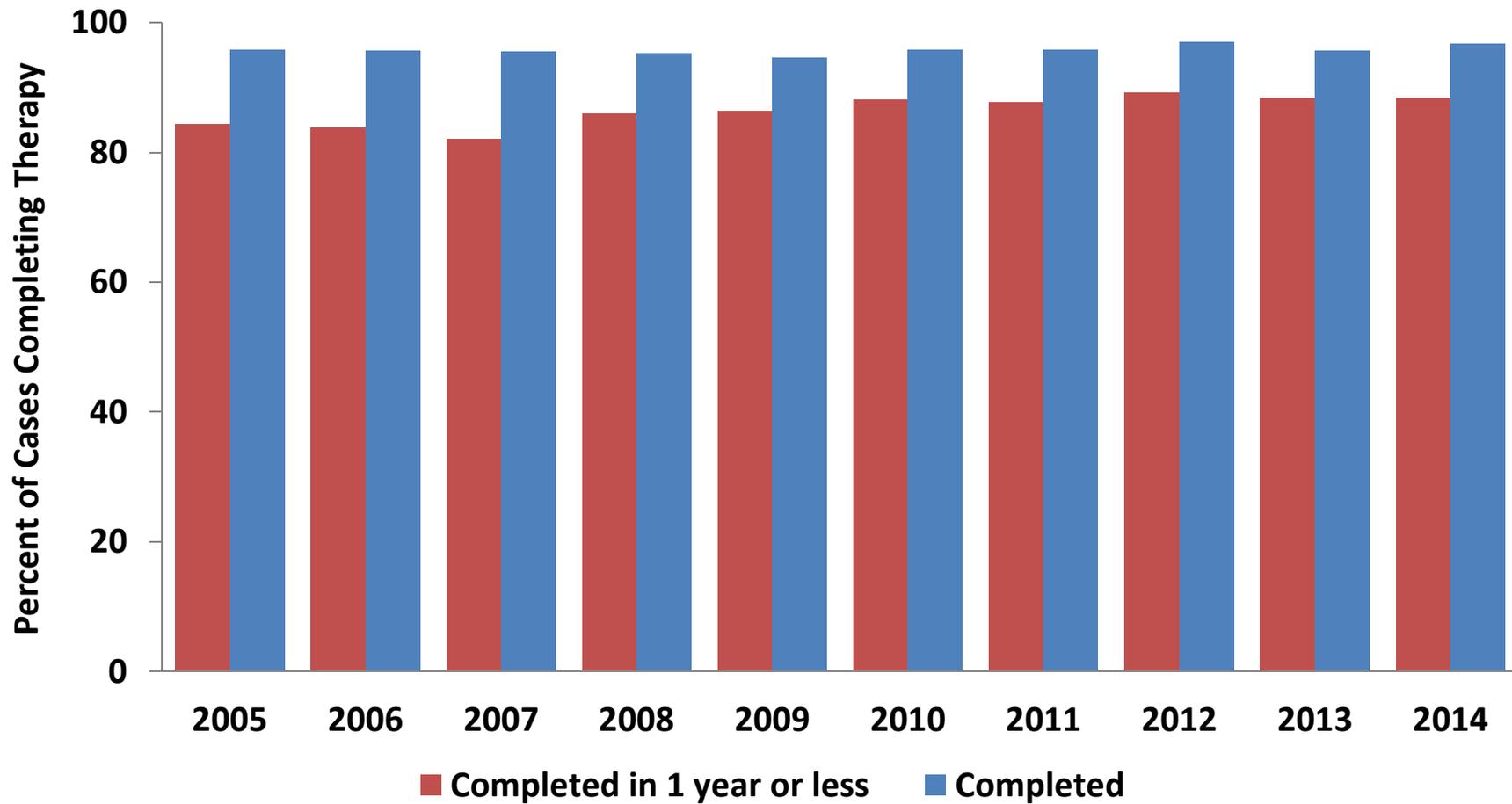


* Excludes cases with rifampin resistant disease, cases with meningeal disease, and cases less than 15 years of age with disseminated tuberculosis disease.

** Patient could not be located prior to the completion of treatment.

California Department of Public Health, Tuberculosis Control Branch

Figure 17. Completion of Tuberculosis Therapy: California, 2005-2014



Note: Consistent with CDC's National Tuberculosis Indicators Project completion of therapy measure, excludes cases with rifampin resistant disease, cases with meningeal, bone and/or joint, or central nervous system disease, cases less than 15 years of age with disseminated tuberculosis disease, and cases that died or moved out of country less than one year after treatment initiation.