COUNTY OF LOS ANGELES
Public Health

Tuberculosis in Los Angeles County

Surveillance Report

2016

Snapshot: Tuberculosis in Los Angeles County: 2016

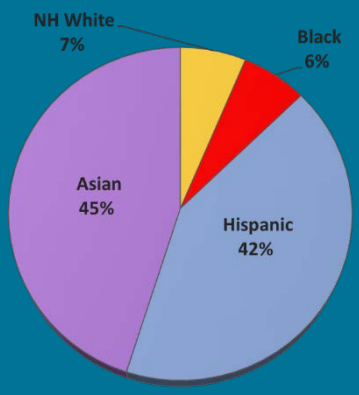
2016 Case Count and Rate

550
Number of confirmed TB cases

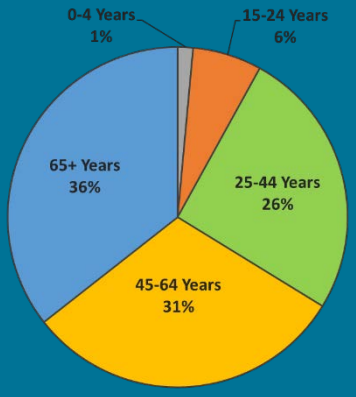
5.7
Rate per 100,000 persons

<8.6%
Percent decrease between 2015 and 2016

Demographic and Social Characteristics



45% of cases were comprised of Asian



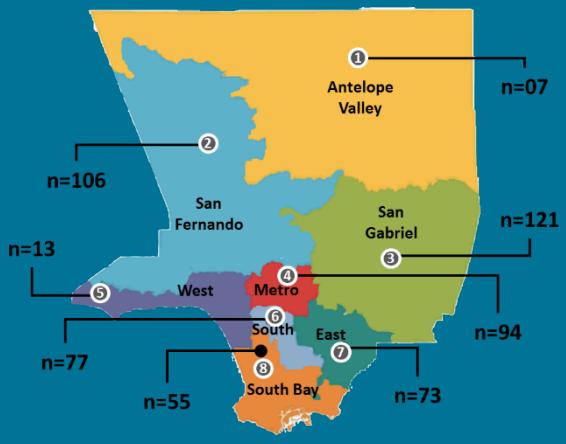
36% of cases occurred in persons 65+ years of age

Tuberculosis cases by Service Planning Area (SPA)

SPA 2, SPA 3, and SPA 4 reported the most TB cases

22% of TB cases were reported by SPA 2

From 2015 to 2016 SPA 3 had a **2.5%** increase in cases while SPA 5 had a **23.5%** decrease in cases



Clinical Characteristics

72% of cases had only pulmonary TB

2.2% (n=10) of TB cases had multi-drug resistant TB

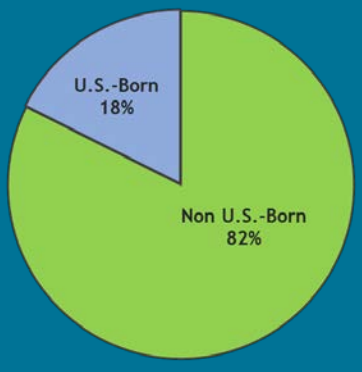
39% of adults reported at least 1 medical comorbidity

5.1% (n=25) of TB cases were reported to be HIV-infected, among who **60%** were Hispanic and **80%** were born outside the U.S.

Place of Birth

82% of TB cases were born outside the U.S.

Among foreign-born TB cases, **29%** originated from Mexico and **26%** from the Philippines



45 Countries were represented

Top 7 Countries	No. of Cases
Mexico	131 (24%)
Philippines	103 (19%)
United States	96 (18%)
China*	40 (7%)
Vietnam	31 (6%)
Korea**	25 (5%)
El Salvador	21 (4%)

*Includes Hong Kong. **Includes North and South Korea.

Table of Contents

Tuberculosis Control Program

VISION

TB is eliminated from Los Angeles County

MISSION

To Prevent the transmission of TB within Los Angeles County

COUNTY OF LOS ANGELES
Public Health

LOS ANGELES COUNTY HEALTH AGENCY

BARBARA FERRER, Ph.D., M.P.H., M.Ed.
Director

JEFFREY D. GUNZENHAUSER, M.D., M.P.H.
Interim Health Officer

CYNTHIA A. HARDING, M.P.H.
Chief Deputy Director

SEIRA KURIAN, M.D., M.P.H.
Director, Division of Medical and Dental Affairs

JULIE M. HIGASHI, M.D., Ph.D.
Director, Tuberculosis Control Program

2615 South Grand Avenue, Room 507
Los Angeles, California 90007
TEL (213) 745-0800 • FAX (213) 749-0926

www.publichealth.lacounty.gov

August 27, 2018

Dear Colleagues,

I am pleased to provide you with the 2016 "Tuberculosis in Los Angeles County: Surveillance Report." This report examines and presents a snapshot of tuberculosis (TB) in Los Angeles County (LAC), which consistently reports the highest number of cases of TB in California and a higher number than most states in the U.S. There was a decrease in confirmed cases of TB from 604 in 2015 to 550 in 2016. Similar to past years, our tuberculosis case rate (5.7 per 100,000) was higher than the overall rate for California (5.2 per 100,000) and the United States (2.9 per 100,000).

We see evidence of progress combatting the large outbreak of TB identified in 2013 in the LAC homeless population. The percent of TB cases in the homeless population in 2016 was 7.6%, as compared to 10.1% in 2013. However, challenges remain as we continue to see TB cases linked to the outbreak, and so must continue to provide outreach for preventive treatment in our homeless population.

In 2016, the United States Preventive Services Task Force issued TB recommendations for the first time since 1996, advising that adults at risk for TB infection should be tested. This recommendation will improve access for TB testing for non-US born adults, adults who have experienced homelessness, and residents of long-term care facilities and correctional facilities. Individuals at risk for TB infection with health insurance will have TB tests provided as part of preventive care services which we hope will facilitate preventive treatment for those found to have TB infection. Also in 2016, the California TB Elimination Advisory Committee, a collaboration of public health agencies, academic institutions, and community healthcare providers released the California TB Elimination Plan 2016-2020, a roadmap for California to achieve TB elimination by 2040.

It is our hope that this Surveillance Report will facilitate greater understanding, better planning, and more effective use of resources in the local and national effort to reduce and eventually eliminate TB.

Sincerely,

Julie M. Higashi, M.D., Ph.D.
Director, Tuberculosis Control Program
Los Angeles County Department of Public Health

Los Angeles County Board of Supervisors

Hilda L. Solis, First District
Mark Ridley-Thomas, Second District
Sheila Kuehl, Third District
Janice Hahn, Fourth District
Kathryn Barger, Fifth District

Los Angeles County Department of Public Health

Barbara Ferrer, Ph.D., MPH, M.Ed.
Director

Jeffrey Gunzenhauser, M.D., MPH
Interim Health Officer

Los Angeles County Department of Public Health
Division of Communicable Disease Control and Prevention

Robert Kim-Farley, M.D., MPH
Director

Tuberculosis Control Program

Julie M. Higashi, M.D., Ph.D.
TB Controller /Program Director

Alicia H. Chang, M.D., M.S.
Medical Director

Administration Unit

Nayeli Aguirre, Melineh Arakilian, Yolanda Martinez, Cherry Tam

Genotype Cluster Identification and Assessment Unit (CDC)

Erika Alex, Erin Anderson, Sara Bemisdarfer, Kim Do, Bezaleel Gebru, Jamiee Gomez, Johannah Hansen, Andrea Lomeli, Stuart McMullen, Stephen Passman, Wendy Pernal, Mallory Perper, Shameer Poonja

Data Management and Information Technology Unit

Kai-Jen Cheng, Byron Garcia

Education and Evaluation Unit

Eileen Alagot, Rosarina Albert, Marthe Bangura, Sandra Bible, Toi Brown, Natividad Bustos, Maria (Cris) Cuevas, Antoinette Edwards, Hasmik Grigorian, Javon Harvey, Doris Jones, April King-Todd, Rita Larranaga, Jose Leiva, Cassy Morris, Gabriela Nunez, Bris Ratchford Jr., Socorro Rodriguez, Erika Siever, Diana Sosa, Toni Stephens, Claire Torres

Epidemiology and Research Unit

Aimee Acosta, Terese Brookins, Ramon E. Guevara, Mariah Kalmin, Ying Ker, Edward Lan, Jelilat (Dayo) Majekodunmi, Daisy Nuno, Kay Parks, Samir Patel, Monica Rosales, Josephine Yumul

Medical Consultation Unit

Steven K. Hwang, M.D., Rashmi J. Singh, M.D.

Patient Services and Reporting Unit

Sunny Y. Chun, Nadine Flores, Ana Delia Hernandez, Karen Hurst, Gwendolyn Jones, Dora Klee, Tricia Lim, Maria Mejia, Crystal Mingo, Hattie Morris, Alejandra Novelo, Rebecca Park, Leticia Reyna-Terry, Cathy Ruiz, Jimmy Ruiz, Nichelle Simon, Yingyos Sinitvong, Jeanne Soukup, Tearah Taylor, Maria Thomas, Elizabeth Valencia, Salina Yu

Public Health Investigation Unit

Katrin Eskandary, Bruce Hudley, Carlos Reyes, Sergio Triana

Volunteers

Fatima Castaneda, Nicole Higashiyama, Jennifer Kim, Sandra Martinez, Katherine Takeshita, Taylor Verdin

Tuberculosis in Los Angeles County:

Surveillance Report 2016

Suggested Citation: Tuberculosis in Los Angeles County: Surveillance Report 2016. Los Angeles County Department of Public Health, Tuberculosis Control Program, Los Angeles, CA. 2018.

A PDF of this report is available on our website: http://publichealth.lacounty.gov/tb/

Prepared by: Monica Rosales, Ph.D., M.S.

Edited by: Ramon E. Guevara, Ph.D., MPH

Cover art by: Christopher Rogers

ACKNOWLEDGEMENTS

Special thanks to the health center staff who managed all tuberculosis cases and suspected cases and provided all patient-related data, Information Systems staff who created and managed the databases, Liaison Nurses and Assistant Program Specialists for their role in data quality assurance and providing patient services, Registry staff who entered data into the database with attention to accuracy, Epidemiology and Research Unit staff who analyzed the data, and all Tuberculosis Control Program management for their support of our work.

Background

LOS ANGELES COUNTY: DEMOGRAPHIC PROFILE

With its population of 10 million[1], Los Angeles (LA) County is one of the nation's largest counties spanning over 4,000 square miles[2]. LA County is home to a quarter of California residents and to one of the most ethnically diverse populations, composed of 48% Hispanic, 15% Asian/Pacific Islander, 9% Black, 2% Native American/American Indian, and 26% Non-Hispanic White populations[1]. LA County is a major port of immigration and a resettlement destination for large numbers of immigrants and refugees, thus driving ethnic diversity in the county's population. According to U.S. Census estimates, 35% of LA County residents are born outside the U.S. and 57% speak a language other than English at home[1].

Box 1. LA County Service Planning Areas (SPA) Map

Due to its large size, LA County is divided into 8 specific geographic regions or Service Planning Areas (SPAs) for the purposes of healthcare planning and provision of health services. The 8 SPAs include: SPA 1: Antelope Valley, SPA 2: San Fernando Valley, SPA 3: San Gabriel Valley, SPA 4: Metro, SPA 5: West, SPA 6: South, SPA 7: East, and SPA 8: South Bay (Box 1). Public health clinics located within each SPA offer tuberculosis screening and treatment services. Specifically, patients receive services at the following public health clinics: Antelope Valley Health Center (SPA 1); Glendale Health Center and Pacoima Health Center (SPA 2); Monrovia Health Center and Pomona Health Center (SPA 3); Central Health Center and Hollywood/Wilshire Health Center (SPA 4); Simms-Mann Health and Wellness Center (SPA 5); Martin Luther King Jr. Health Center (SPA 6); Whittier Health Center (SPA 7); Curtis R. Tucker Health Center (SPA 8).

ABOUT LOS ANGELES COUNTY TUBERCULOSIS CONTROL PROGRAM

The LA County Tuberculosis Control Program (TBCP) is an integral part of the Los Angeles County Department of Public Health. One of the primary roles of TBCP is collecting epidemiological data, maintaining a registry of all tuberculosis cases, and reporting the data to the California State Tuberculosis Control Branch and the Centers for Disease Control and Prevention (CDC). Our jurisdiction includes all of LA County, with the exception of the cities of Long Beach and Pasadena, who operate independent health departments. TBCP receives reports of tuberculosis cases and suspects from LA County hospitals and health centers, 116 private hospitals, one VA hospital, and many private medical providers. Throughout the county's 8 SPAs, tuberculosis patients receive services at one of LA County Public Health Clinics, three County hospitals, the County jail medical services, or from private medical providers.

TUBERCULOSIS CONTROL PROGRAM ORGANIZATIONAL STRUCTURE

Medical Consultation, Patient Services and Reporting Unit

This unit is made up of four sections: Medical Consultation, Nursing Surveillance, Incentive and Enabler, and Public Health Investigation/Legal Intervention. The goals of these four sections are to provide consultation, guidance, and oversight to ensure all TB cases are identified, reported, and able to complete a prescribed course of treatment while minimizing the risk of TB transmission to others.

Medical Consultation

This section includes Physician Specialists who provide medical consultations to physicians and other health care professionals in inpatient and outpatient settings, both public and private, related to the diagnosis and treatment of active TB disease, TB infection, and TB infection control issues. The medical consultation section works with Nursing Surveillance to review and approve the TB Discharge Care Plan that is submitted by private hospital providers for patients diagnosed with or suspected of having active TB, in accordance with CA State law. As part of the multi-drug resistant TB (MDR-TB) team, a physician specialist offers consultations on MDR-TB cases and their contacts. The team recommends and monitors MDR-TB treatment throughout the course of therapy and follows patients for at least 2 years after completion of treatment to ensure any potential relapses are detected in a timely fashion. The unit works with a public health nurse (from the Nursing Surveillance section) who oversees the identification and case management of MDR-TB cases and their contacts. The MDR-TB public health nurse monitors about 20 MDR-TB cases (both active and inactive) on a yearly basis. The public health nurse also monitors patients with TB strains exhibiting other drug resistance patterns but that do not meet the criteria for MDR-TB. Medical Consultation also provides clinical education at medical facility grand rounds.

Nursing Surveillance

This section is comprised of two teams: The Private Hospital Surveillance team and the Public Hospital/Corrections team. The Public Hospital/Corrections team consists of Liaison Public Health Nurses assigned to 3 hospital facilities operated by the LA County Department of Health Services (DHS), and to the Men's Central Jail operated by the LAC Sheriff's Department. In each facility, a nurse is assigned to the identification and case management of patients with confirmed or suspected TB disease and their contacts. In addition, nurses in the team work with community stakeholders to provide nursing consultation on a wide variety of topics and engage laboratories to facilitate specimen submission. The Private Hospital Surveillance team is responsible for strengthening and improving the quality of reporting and care of TB cases in non-DHS facilities. The team consults with community providers and measures the quality of care against program standards and ensures continuity of care as the patient transitions from inpatient to outpatient care. The team also provides consultations to assure that appropriate infection control measures are being taken to prevent the spread of disease. In 2016, the unit processed 450 hospital admissions, and participated in numerous consultations (e.g. phone, labs).

Incentive and Enablers

This section is dedicated to managing a wide variety of services to assist patients in completing their treatment (i.e., provision of housing, meals, grocery store gift cards, restaurant gift cards, bus passes/tokens). Provision of incentives leads to significant improvement in adherence to clinic appointments, clinic-based diagnostic testing, and TB treatment via directly observed therapy (DOT), especially among high priority patients. In 2016, the unit distributed 26,500 incentives to TB patients and provided housing to 67 TB patients. Housing incentives were expanded to include high priority contacts.

Public Health Investigation and Legal Intervention

This section locates non-adherent patients and returns them into care. Staff use education, counseling, and other voluntary measures before exercising their authority to serve Health Officer's Orders. Recommendations are developed for the use of civil orders, and staff works closely with Community Health Services (CHS) and County Counsel in the initiation, enforcement, and follow-up of civil orders, including legal orders for medical examination, directly observed therapy (DOT), home isolation, and civil detention. As sworn Deputy Health Officers, staff in this section have authority to arrest individuals who violate Health Officer's Orders. In 2016, the unit processed 90 referrals and 22 health officer orders of civil detention and 1 criminal detention.

Education and Evaluation Unit

This unit consists of the following sections: Contact Investigation Monitoring and Assessment; Education, Partnership and Community Outreach; Program Evaluation and Policy; and TB Registry.

Contact Investigation Monitoring and Assessment

This section has oversight responsibilities for contact investigation (CI) conducted by CHS. CIs are monitored to ensure they are conducted according to the TBCP guidelines outlined in the TB Manual Chapter 6: Contact Investigation Tool Kit. The team provides technical assistance with complex, large, or high-profile CIs and TB outbreaks. Data analysis support is provided by the Epidemiology and Research Unit, and the Genotype Cluster Investigation and Assessment Unit assists with the investigation of TB case clusters to determine if an outbreak event is emerging. Staff collaborate with homeless medical providers and targeted shelter sites to promote TB clearance and TB symptom screening at shelter entry, delivery of targeted testing, and treatment of TB infection. The unit continues to maintain the Access database to enhance the tracking of all CIs that are reviewed. The unit also continues to oversee the cohort review process. In 2016, cohort review took place at 5 public health clinics, totaling 20 sessions.

Education, Partnership, and Community Outreach

This section plans, develops, and delivers TB educational training to increase awareness and knowledge of TB infection and active TB disease. Staff ensure that training and resources are available to public and private sector medical providers, and community agencies who serve high-risk populations within LAC. A strong evidence-based evaluation component is also incorporated into educational sessions. Section staff partner with the Curry International TB Center, CDC and others on selected training activities. Section staff collaborate with Ryan White-funded early intervention clinics to promote delivery of targeted testing and

treatment of TB infection. In 2016, this section provided 6 TB CME conferences, provided CAL OSHA training to TBC staff, led the biannual new nurse orientation and biannual new student nurse orientation, organized the World TB Day event for TBC staff, and hosted the California TB Controllers Association (CTCA) 50th Annual Educational Conference.

Program Evaluation and Policy

In this section, staff participate with the CTCA and its workgroups on legislative proposals. This section communicates with DPH and CHS on performance measures and progress towards national targets. Staff also participate on a national level with the TB Program Evaluation Network and submit annual reports describing activities including challenges and barriers, and progress toward CDC performance targets. Staff also organize joint CHS and TB Control cohort reviews which includes review of performance indicators as well as individual and aggregate patient outcomes on a quarterly basis for staff in the public health clinics.

TB Registry

This section provides general clerical support and is responsible for entering data into our primary surveillance database: Tuberculosis Registry Information Management System (TRIMS). TRIMS contains information about suspected and confirmed TB cases, contacts, and persons screened for TB infection. Registry staff also create and maintain physical TB patient files, including files for patients with TB infection who receive 3HP (a once-weekly isoniazid-rifapentine 12-week regimen). Additionally, staff enter data from TB screening forms (H-304) originating from a variety of sources (e.g., HIV/TB ambulatory outpatient medical clinics, volunteer, schools and drug programs; outreach via community medical partners); data from contact investigation forms (H-289); lab results (e.g. smears, cultures, nucleic acid amplification tests or NAATS, pyrosequencing drug sensitivities); hospital admission, course, and discharge data (H-803, H-1365, H-1397, H-804); and inter-jurisdictional & bi-national TB notifications. In 2016, registry staff entered over 45,000 forms into TRIMS and archived patient medical records for deceased TB cases confirmed between 2012-2013. This section also initiated a Data Quality Assurance policy.

Epidemiology and Research Unit

This unit is responsible for providing epidemiologic and data management support for the program. The Epidemiology and Research Unit produces mandated reports and other critical reports to monitor TB surveillance data, ensure high quality reporting of TB epidemiological data, monitor data for high priority TB clusters and outbreaks, evaluate outcomes for outbreak response and other program activities, and support ongoing quality improvement and program evaluation activities. In 2016, the unit conducted data analyses for 12 main reports, 95 data requests and executive assignments, 15 lab error investigations, and staff-led presentations on TB data at conferences and meetings, including three first-authored and five co-authored posters.

Surveillance Epidemiology and Research

This team is responsible for ensuring high quality data for the mandatory reporting of TB cases, including the submittal of the Report of Verified Case of Tuberculosis (RVCT), and prepares mandated

epidemiological reports submitted to county, state, and federal agencies. In 2016, this team authored a surveillance report and a fact sheet. The Surveillance Epidemiology team provided data on TB cases for 21 quarterly Cohort Review meetings at 5 public health clinics, with the aim to continue supporting improvements in program performance. The team is involved in the "Automated Video Directly Observed Therapy (VDOT) pilot project by leading the outcomes evaluation for the project and creating and maintaining an Access database capturing data for patients enrolled in the project.

Cluster Epidemiology and Response

This team creates and maintains cluster surveillance databases, conducts analysis related to outbreak surveillance and response, prepares epidemiologic reports on high priority clusters, develops protocols and tools for contact and outbreak investigation, provides data support for the implementation of the DPH Guidelines for Shelters, and provides reports for community medical partners serving the homeless populations. In 2016, in conjunction with the Genotype Cluster Identification and Assessment Unit and the Contact Investigation Monitoring and Assessment unit, this team offered data management and support services for 8 complex CIs. Also, in support of the implementation of the DPH Guidelines for Shelters, 'Preventing Tuberculosis (TB) in Homeless Shelters', the unit continued to work on TB Clearance and Alert data by entering it into the Homeless Management Information System (HMIS).

Genotype Cluster Identification and Assessment Unit

This unit is responsible for monitoring TB genotype data to identify clusters and outbreaks of TB cases and previously unrecognized links between cases. This team provides technical assistance to CHS TB case managers surrounding the investigation of TB genotype clusters, including the provision of index patient interviewing services, data management support, and contact investigation screening services. Index patient interviewing services target populations at high-risk for TB transmission, including patients experiencing homelessness and patients with a history of alcoholism. The unit works closely with the California and CDC cluster and outbreak units for cross-jurisdictional clusters. In 2016, the unit was awarded funding to hire 2 new public health associates, worked on over 45 cluster investigations (new or ongoing), conducted 55 patient interviews, was awarded funds to temporarily house high-risk homeless individuals on LTBI treatment, and was awarded funds to purchase hygiene packets to increase TB evaluations among the homeless population.

Data Management and Information Technology Unit

The TRIMS database is a mission critical system supporting the activities of personnel within the TBCP, CHS, and the Public Health Lab (PHL). Unit personnel are responsible for maintaining and programming the TRIMS database, ensuring the security of the database in accordance with Health Insurance Portability and Accountability Act (HIPAA) regulations, and providing end user IT support for TBCP personnel. Management of data is critical to the support of TB prevention and control activities, and this team has primary responsibility for integrating TRIMS with other data sources to improve the management and performance of these activities.

Administration Unit

This unit is responsible for all administrative aspects of program operations, which include management of human resources, procurement, facilities management, workplace safety, coordination of time collection, and in addition, functions as a liaison to DPH Contracts & Grants and DPH Finance.

BRIEF OVERVIEW OF TUBERCULOSIS

Tuberculosis Disease

Tuberculosis (TB) is an airborne disease caused by a bacterium called *Mycobacterium tuberculosis (M. tuberculosis)*[3]. TB is spread through airborne particles (microscopic droplet nuclei) from person to person. This can typically happen when someone with untreated active TB disease coughs, sneezes, speaks or sings[3]. People nearby may breathe in these droplets and become infected. *Mycobacterium bovis (M. bovis)* is a closely related mycobacterial species that can also cause TB. This can happen most commonly by eating or drinking unpasteurized dairy products or coming into contact with infected animals (e.g., cattle, bison, elk) or products from these animals such as meat or milk[4]. Not everyone who is infected with TB becomes sick or experience symptoms. When a person is infected with TB but has no symptoms, this is known as having tuberculosis infection[5].

Tuberculosis (TB) Infection

A diagnosis of TB infection indicates a person is infected with TB, but does not experience any of the symptoms that accompany active TB disease and thus cannot spread the infection to other people[3]. Global estimates indicate that 1/3 of the world's population has TB infection[6, 7]. In the U.S. it is estimated that about 11 million people (4%) have TB infection[6]. If these individuals are not treated, 5-10% of them will be at risk of progressing to active TB disease[6]. Thus, identifying and treating persons with TB infection who are at high-risk of developing TB disease is critical for the elimination of TB. People who have lived in countries with high rates of TB are more likely to be infected with TB. Also, several medical conditions increase a person's risk of TB, including HIV, diabetes mellitus, immunocompromising conditions, and end stage renal disease. In LA County, diabetes mellitus is the 5th leading cause of death, with about 10% of adults having ever been diagnosed[8, 9]. Given the proportion of LA County TB cases with a diabetes mellitus co-diagnosis (~29%), this is an important population to address in our prevention efforts.

ABOUT THIS REPORT

The Tuberculosis Control Program (TBCP) Annual Surveillance Report is composed of summary tables, graphs, and narrative highlighting TB statistics for LA County. The report also presents a profile of TB by Service Planning Area (SPA), highlighting regional TB trends. Data presented in this report are provisional and reflect the most complete information to date. Case count data for previous years may differ from previously published data due to periodic data updates (see Technical Note 10). This report is designed to serve as a resource to:

1. Medical, public health, and other healthcare authorities at county, state, and national levels
2. Provide information on important TB program indicators
3. Provide answers to frequently asked questions
4. Provide highlights of TB surveillance data in Los Angeles County

Data Summary

In 2016, there were a total of 550 cases of tuberculosis (TB) confirmed in Los Angeles (LA) County. This represents an 8.6% decrease from 602 cases in 2015 (Table 1). The TB case rate decreased from 6.3 per 100,000 in 2015 to 5.7 per 100,000 in 2016 (Figure 1). LA County reported the 10th highest TB case rate among 61 California reporting health jurisdictions. The TB incidence rate in LA County in 2016 was higher than the overall state case rate (5.2 per 100,000)[10] and twice the national case rate (2.9 per 100,000)[11] (Box 2). In terms of case volume, LA County is one of the local health jurisdictions with the highest number of TB cases in the United States. LA County alone reported more TB cases than all states in the U.S. except California (to which LA County belongs), New York, Florida and Texas.

Box 2. TB Case Rates, 2016

	LA County	California[10]	United States[11]
Total Cases	550	2,062	9,287
Rate per 100,000	5.7	5.2	2.9

AGE AND SEX

Age Distribution

There has a been an increase in the proportion of TB cases in older adults, making them an important demographic group for TB risk. In 2016, 36% of TB cases were reported in persons 65 years of age and older, compared to 30% in this age category in 2012 (Table 1). Additionally, persons aged 25-44 years and persons aged 45-64 years contributed 25% and 30% of cases, respectively (Table 1). The TB case rate was highest for people 65 years and older (15.9 per 100,000), followed by individuals 45-64 years of age (7.2 per 100,000), and by those 25-44 years of age (6.6 per 100,000) (Figure 2). Among older individuals, medical comorbidities may increase their risk of developing active TB and may increase the complexity of medical treatment[10, 12, 13]. Thus, along with the estimated growth of the older population[14], an increased risk of developing co-occurring chronic health conditions is likely[15].

In 2016, there were 8 cases of pediatric TB (children aged 0 to 4 years), with a case rate of 1.5 per 100,000 (Table 1, Figure 2). From 2015 to 2016, the number of pediatric cases increased from 5 cases to 8 cases. The number of cases among children 5-14 years of age decreased from 6 cases in 2015 to 1 case in 2016 (Table 1). There was an increase in the number of Hispanic pediatric cases from 2015 to 2016 (4 vs 6), accounting for 75% of pediatric cases (Table 2). Over the past 5 years, Hispanic children have accounted for over 2/3s of pediatric cases. TB among young children indicates recent transmission[16], and the need for focused attention on preventing transmission among this population.

Sex Distribution

In 2016, TB in LA County occurred more often among males (351 cases, 64%) compared to females (199 cases, 36%), (Table 1). The TB case rate was higher among males (7.4 per 100,000) compared to females (4.1 per 100,000), (Figure 3). However, there was a 21% decrease in female TB cases from 2015 to 2016 (Table 1). TB cases are summarized by race/ethnicity and age in Table 2, by race/ethnicity and sex in Table 3, and by race/ethnicity, sex, and age in Table 4.

BIRTHPLACE AND RACE/ETHNICITY

Place of Birth

In 2016, TB among cases born outside the U.S. (n=450) was almost 4 times higher than among U.S.-born cases (n=96) (Table 1; Figure 4). For the past five years, non-U.S. born persons have accounted for approximately 80% of TB cases (Figure 4). Among non-U.S. born TB cases with a known place of birth, 51% were Asian, 41% were Hispanic, 5% were non-Hispanic White, and 3% were Black (Figure 6). Close to two-thirds (64%) of TB cases born outside the U.S. originated from the following 6 countries: Mexico, Philippines, China, Vietnam, Korea, and El Salvador (Figure 7). Among U.S.-born TB cases, 44% were Hispanic, 23% were Black, 17% were Asian and 16% were non-Hispanic White (Figure 6). Tables 5 and 6 summarize non-U.S. born and U.S. born TB cases (respectively) by race/ethnicity and age.

Race/Ethnicity

In 2016, Asian (45%) and Hispanic (42%) individuals accounted for 87% of TB cases in LA County (Figure 5; Table 1). The TB case rate was highest among Asians (17.7 per 100,000), followed by Hispanics (4.9 per 100,000), Blacks (4.5 per 100,000), and non-Hispanic Whites (1.3 per 100,000) (Figure 5). TB case rates for Asians, Hispanics, and Blacks were 13.6, 3.7, and 3.4 times higher than for non-Hispanic Whites, respectively. From 2015 to 2016, cases decreased by 18.6% among Blacks, 9.4% among Hispanics and 8.9% among Asians (Table 1).

MEDICAL AND SOCIAL CHARACTERISTICS

Medical Comorbidities

In 2016, 39% of adult TB cases had one or more medical comorbidities, including diabetes mellitus, end stage renal disease (ESRD), or another immunosuppressive condition. These comorbidities increase a person's risk of progression from TB infection to active TB disease. Among TB cases confirmed in 2016, the most common comorbidity reported was diabetes mellitus (n=156; 29%) (Table 7). From 2012 to 2015, diabetes mellitus has been the most common co-occurring medical condition among TB cases, ranging from 28% to 30% (Figure 8).

HIV Infected TB Cases

In 2016, there were 25 (5.1% of cases with known HIV status) TB cases co-infected with HIV (Table 7 Figure 9). Of the total 550 TB cases, information on HIV status was available for 494 (90%) of the cases. Table 8 presents HIV co-infected TB cases by demographic characteristics. Among HIV co-infected TB cases in 2016, 20% were Black and 60% were Hispanic. Individuals born outside the U.S. accounted for 80% of HIV infected TB cases. Also, 32% of HIV co-infected TB cases reported experiencing homelessness in the past year (Table 8).

Substance Abuse

Recent history of substance use (defined as within the past year) can be common among TB cases. In 2016, excess alcohol use was the most commonly reported type of substance use (10.4%) followed by non-injecting drug use (6.3%) (Table 7; Figure 10). Substance use provides special challenges in the treatment and control of TB. People with substance use problems are less likely to be screened for TB and less likely to begin and complete treatment for TB infection or TB disease[17].

Homelessness

In 2016, there were 42 (7.6%) TB cases who reported experiencing homeless in the past year (Figure 11). Among TB cases experiencing homelessness, 21.4% were Black, 60% were Hispanic, 7.1% were Asian, and 9.5% were non-Hispanic white (Table 9). Among homeless TB cases, 81% were male, and 57% were born outside the U.S., while 43% were U.S.-born (Table 9). Substance use was commonly reported among cases with a recent history of homelessness, with excess alcohol use (45%) being the most commonly reported form of substance use, followed by non-injecting drug use (45%), and injected drug use (9.5%). Tables 10 and 11 present homeless TB cases by demographic characteristics.

TUBERCULOSIS DISEASE CHARACTERISTICS AND MANAGEMENT

Site of Disease and Verification Criteria

In 2016, 72% of TB cases were diagnosed with Pulmonary TB only, while 17% were diagnosed with extra-pulmonary TB only, and 11% were diagnosed with both pulmonary and extra-pulmonary TB disease sites (Table 12; Figure 12). Among pulmonary TB cases who were sputum culture positive, 56% (n=237) were sputum smear positive while 28% (n=118) were sputum smear negative (Table 13; Figure 13). In terms of verification criteria, 85% of TB cases confirmed in 2016 were laboratory confirmed cases and 15% were clinically confirmed cases (Table 14). Similarly, from 2012 to 2016, approximately 85% of TB cases were laboratory confirmed cases.

Susceptibility Testing

Tables 15, 16, 17 and 18 summarize the results of drug susceptibility testing (DST). In 2016, there were 450 culture positive TB cases eligible for DST on first-line drugs used to treat TB. Specifically, DST performed is presented for the following first-line drugs: rifampin (n=445), isoniazid (n=445), pyrazinamide (n=442), and ethambutol (n=445) (Tables 15-18). Among cases with DST results, 1 (0.2%) had resistance to rifampin, 42 (9.4%) had resistance to isoniazid, 23 (5.2%) had resistance to pyrazinamide, and 1 (0.2%) had resistance to ethambutol. Resistance to these first-line drugs has remained stable over the past 5 years (2012-2016).

Multidrug resistant TB (MDR-TB), defined as having resistance to both isoniazid and rifampin, was identified in 10 (2.2%) TB cases in year 2016 (Table 19). Despite the significant growth of MDR-TB cases in some global regions[18, 19], in LA County, MDR-TB has remained a small proportion of TB cases, averaging between 1% and 2% of TB cases during 2012-2016. Treatment for TB patients with MDR-TB is often more complex, and requires lengthier (1 ½ to 2 years) and more costly treatment regimens[18-20].

Initial Drug Regimen and Type of Therapy Administration

Of the 550 TB cases confirmed in 2016, 526 were reported to be alive at diagnosis and having started an initial TB drug regimen (Table 20). The majority of these TB cases (86%) were started on at least 4 first line TB drugs (e.g., isoniazid, rifampin, pyrazinamide, ethambutol). Over the past five years, the number of TB cases started on an initial drug regimen consisting of at least 4 first line TB drugs has ranged from 85% to about 90% (Table 20). Information regarding type of therapy administration was available for 526 of TB cases started on an initial drug regimen (Table 21). Among these cases, 53% were on directly observed therapy (DOT), 39% were on a combination of DOT and self-administered therapy (SAT), and 8% were on SAT only (Table 21; Figure 14).

Treatment Outcomes

In 2014, there were 463 TB cases for whom therapy of one year or less was indicated. Among these cases, 428 (92.4%) completed therapy within 12 months (Table 22). There were also 27 (5.8%) cases who took longer than 12 months to complete treatment. From 2012 to 2014, the proportion of TB cases completing treatment within 12 months has remained stable at 92%.

Mortality in Persons with Tuberculosis

From 2012-2016, there were a total of 362 deaths among TB cases (Table 23; Figure 15). Among TB cases who died, 77% died during treatment and 23% died before starting treatment.

GEOGRAPHIC DISTRIBUTION

LA County: Service Planning Areas

Tables 24 and 25 present demographic characteristics for TB cases by Service Planning Area (SPA) for year 2016. Among the 8 SPAs, 3 SPAs reported the highest number of TB cases in 2016 (Table 24; Figure 16). Specifically, SPA 2: San Fernando Valley reported 106 cases (19%), SPA 3: San Gabriel Valley reported 121 cases (22%), and SPA 4: Metro reported 94 cases (17%).

SCREENING FOR TUBERCULOSIS INFECTION

Interferon-Gamma Release Assay (IGRA) Test Results

The LA County Public Health Laboratory (PHL) processes QuantiFERON TB Gold in-Tube Test (QFT-GIT), a type of Interferon-Gamma Release Assay (IGRA) test. PHL reports monthly QuantiFERON test (QFT) results for all specimens processed (see technical note 3). In 2016, PHL reported results for QFT tests administered at Community Health Services (CHS) Public Health Clinics, HIV Care Clinics, and Contract Clinics. Out of 27,549 QFT specimens, 4,289 (16%) tested positive (Box 3). Among positive QFT tests, about 57% were administered at CHS Clinics, 29% at HIV Care Clinics, and 14% at Contract Clinics. IGRA tests are an important tool to aid in the diagnosis of TB infection, particularly among patients who were previously vaccinated with Bacillus Calmette-Guerin, or patients who are unlikely to return for a skin test reading. High priority populations that should be targeted for TB infection screening include individuals with at least one of the following risk factors: HIV infection, immunocompromising medical conditions (other than HIV), being born in a country with high TB prevalence, contact with individuals with TB disease, experiencing homelessness. TB infection screening is important because it allows detection of infection among individuals who could be at risk of developing or progressing to TB disease, and thus may be eligible for preventive therapy.

Box 3. Positive Test Results for QFT Processed at the LA County PHL, by Clinic Type: LA County, 2016*

Clinic Type	Positive Test Result	Total Tests Performed****	%
CHS Clinics**	2,446	10,390	23.5
HIV Care Clinics***	1,233	13,039	9.5
Contract Clinics	610	4,119	14.8
Total tests	4,289	27,549	15.6

*Positive test results only; **CHS=Community Health Services; ***Ryan White Care Act funded; ****includes positive, negative, indeterminate results.

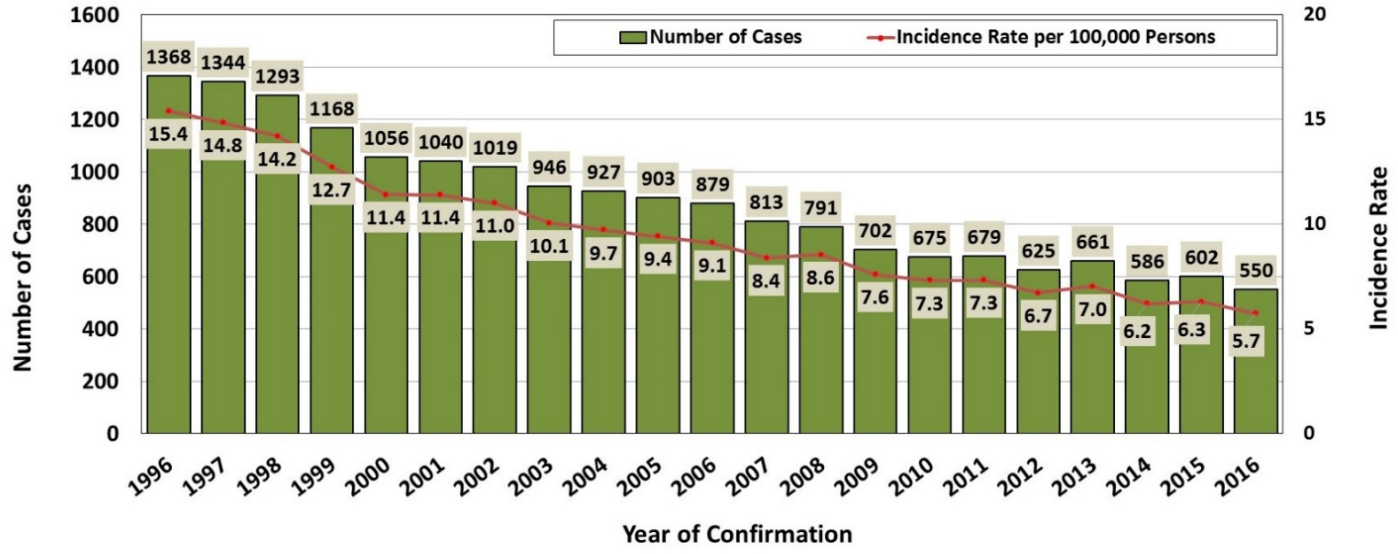
TB Notifications

LAC TBCP is also working on the early detection and treatment of TB infection among high-risk individuals born outside the U.S. To achieve this, focus is placed on newly arriving immigrants, refugees, and asylees with a TB notification. TB notifications inform jurisdictions of recent arrivals with a Class A (active TB with waiver), Class B1 (TB suspects), Class B2 (TB infection) or Class B3 (contact to known TB case). TB notification that should be promptly evaluated, as outlined in CDC guidelines[21]. The goal of evaluating individuals with TB notifications is to (1) identify and treat TB cases promptly and (2) identify and treat persons with TB infection to prevent progression to active disease. Thus, the program provides surveillance to monitor and follow-up these high-risk newly arrived immigrants and refugees in LA County.

Figures

In 2016, there were 550 confirmed TB cases in LA County, an 8.6% decrease from 2015 (602 TB cases). Among California's 61 health jurisdictions, LA County had highest number of TB cases and the 10th highest TB incidence rate (5.7 per 100,000 persons).

Figure 1: Tuberculosis Cases and Incidence Rates: Los Angeles County, 1996-2016*



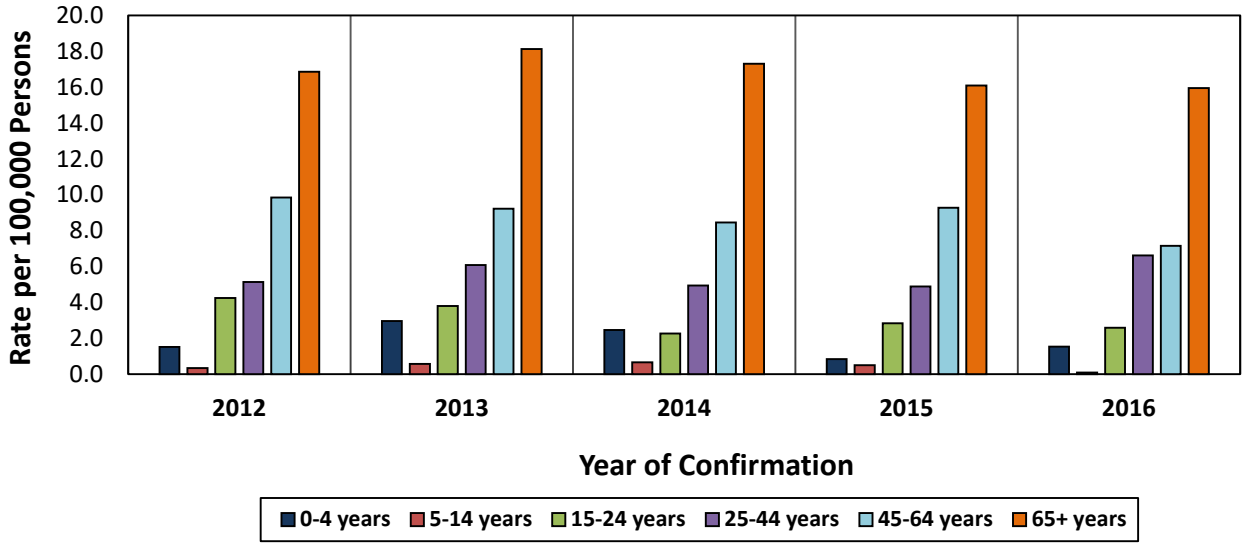
Data excludes Long Beach and Pasadena TB cases. Data are provisional and subject to change. Population estimates prepared for Los Angeles County, Internal Services Department. [24]

*Case count data for previous years may differ from previously published data and statistics due to updates in TB case information entered into the TB surveillance database, and thus the count for previous years presented in this report may not match TB counts previously released (the differences are generally very small).

AGE AND SEX

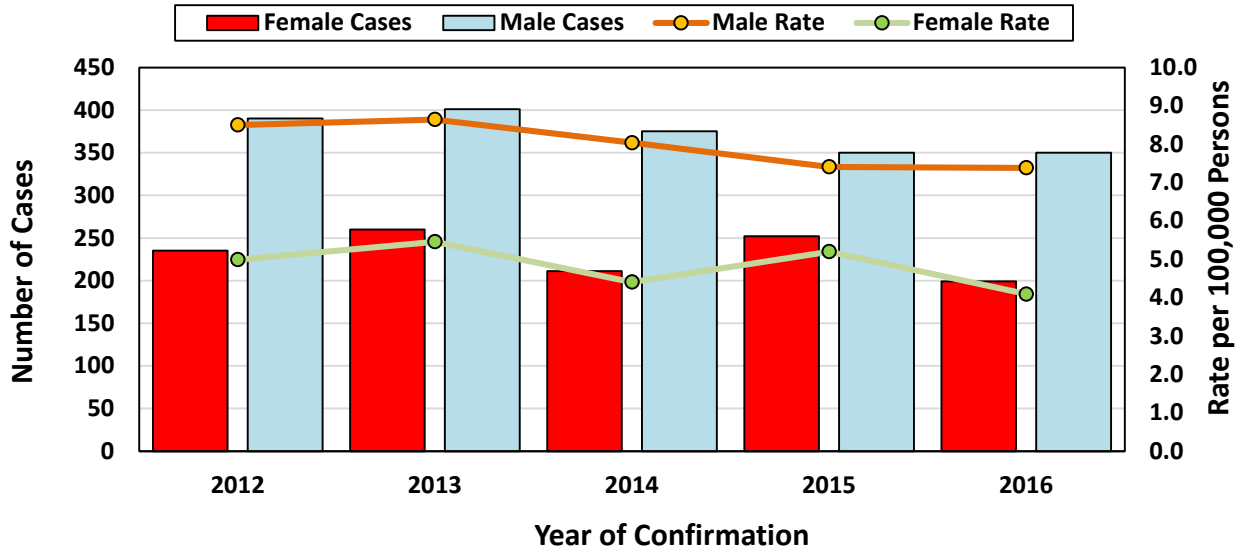
There was an increase in pediatric TB cases (children 0 to 4 years old) from 2015 to 2016 (0.8% vs. 1.5%, respectively). Older adults continue to represent a large majority of TB cases; adults 65 years of age and older represented 35.6% of TB cases and had the highest incidence rate of TB (15.9 per 100,000 persons).

Figure 2: Tuberculosis Incidence Rates by Age Group: Los Angeles County, 2012-2016



*Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change. Population estimates prepared for Los Angeles County, Internal Services Department. [24]

Figure 3: Tuberculosis Cases and Incidence Rates by Sex: Los Angeles County, 2012-2016

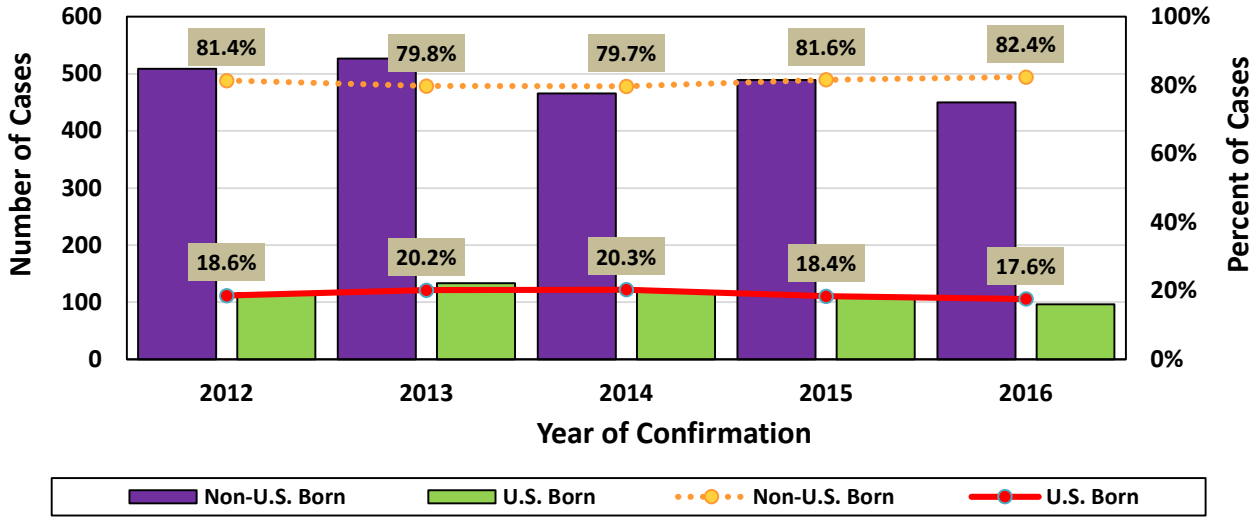


*Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change. Population estimates prepared for Los Angeles County, Internal Services Department. [24]

BIRTHPLACE AND RACE/ETHNICITY

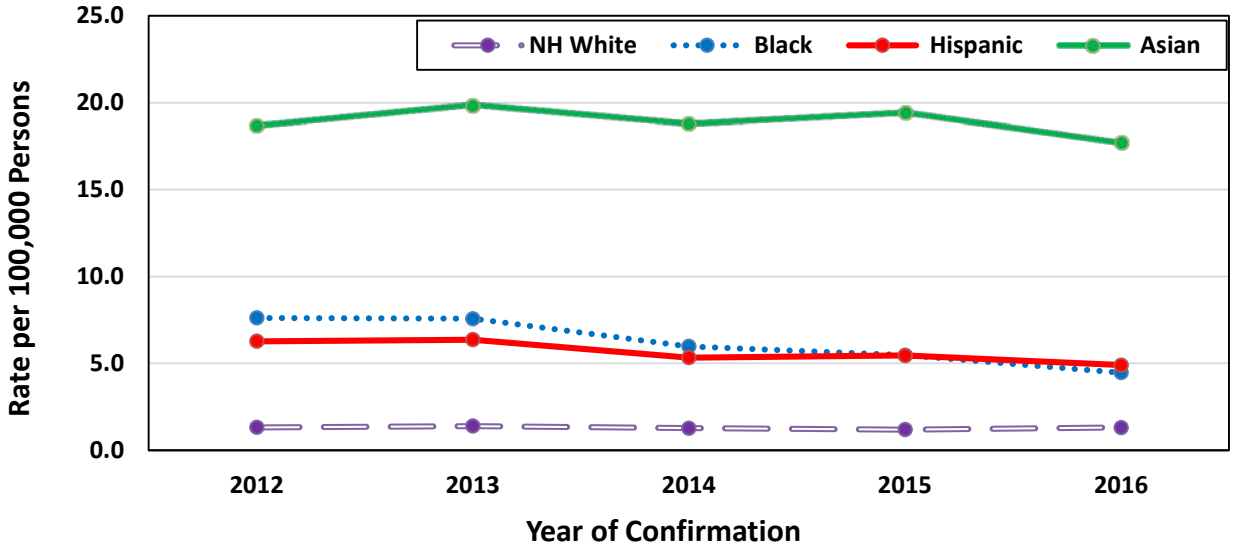
In 2016, there were 4 times the number of TB cases among non-U.S. born individuals (n=450) than among U.S.-born (n=96) individuals. Close to two-thirds of non-U.S. born TB cases (64%) originated from 6 countries (Mexico, Philippines, China, Vietnam, Korea, and El Salvador).

Figure 4: Tuberculosis Cases by Birthplace: Los Angeles County, 2012-2016



Data include TB cases with known place of birth. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

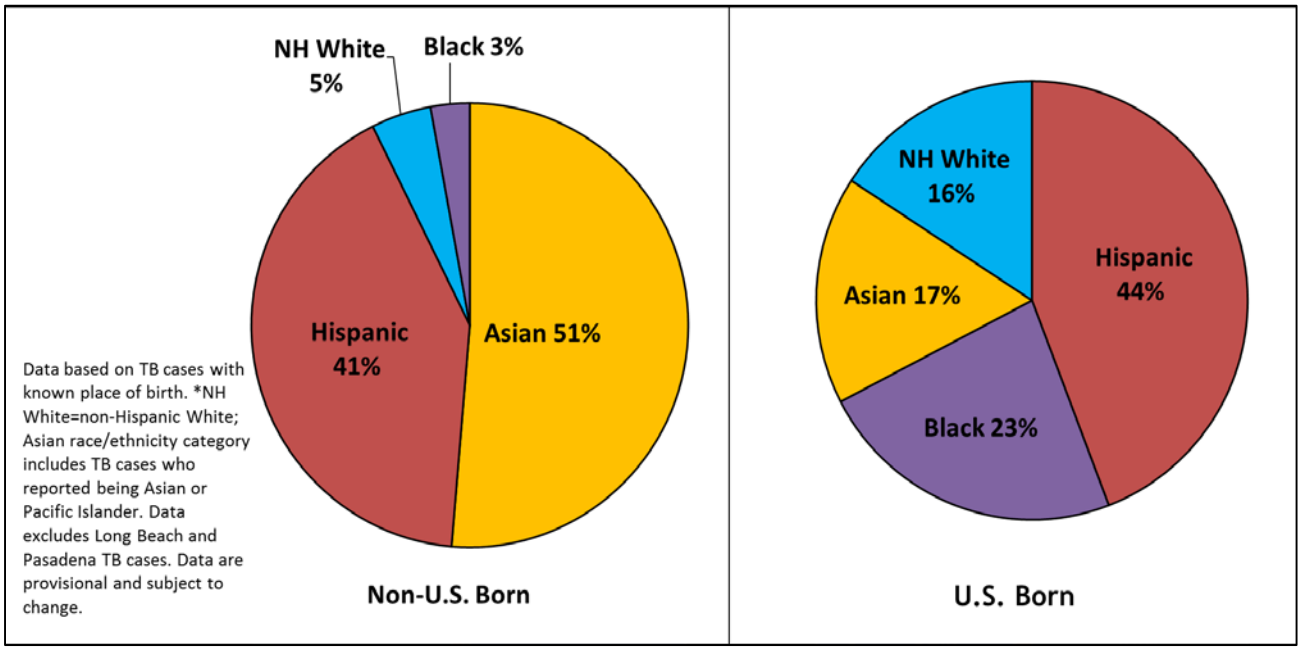
Figure 5: Tuberculosis Incidence Rates by Race/Ethnicity*: Los Angeles County, 2012-2016



*Excludes 'Other/unknown' race/ethnicity category due to small cell counts. **Asian' race/ethnicity category includes TB cases who reported being Asian or Pacific Islander. Data excludes Long Beach and Pasadena TB cases. Data are provisional and subject to change. Population estimates prepared for Los Angeles County, Internal Services Department. [24]

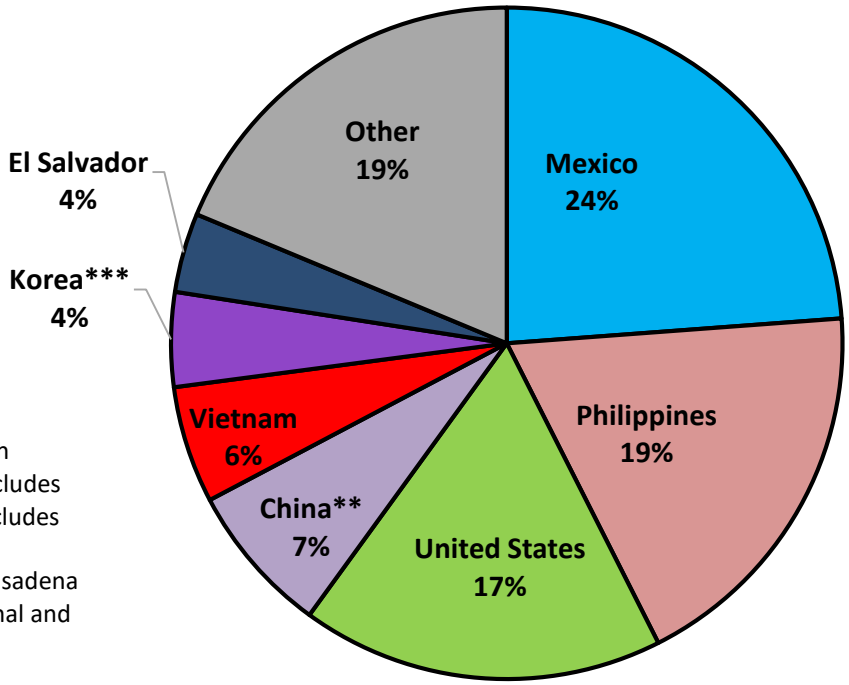
BIRTHPLACE AND RACE/ETHNICITY

Figure 6: Tuberculosis Cases by Birthplace and Race/Ethnicity*: Los Angeles County, 2016



Data based on TB cases with known place of birth. *NH White=non-Hispanic White; Asian race/ethnicity category includes TB cases who reported being Asian or Pacific Islander. Data excludes Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Figure 7. Tuberculosis Cases by Country of Birth*: Los Angeles County, 2016

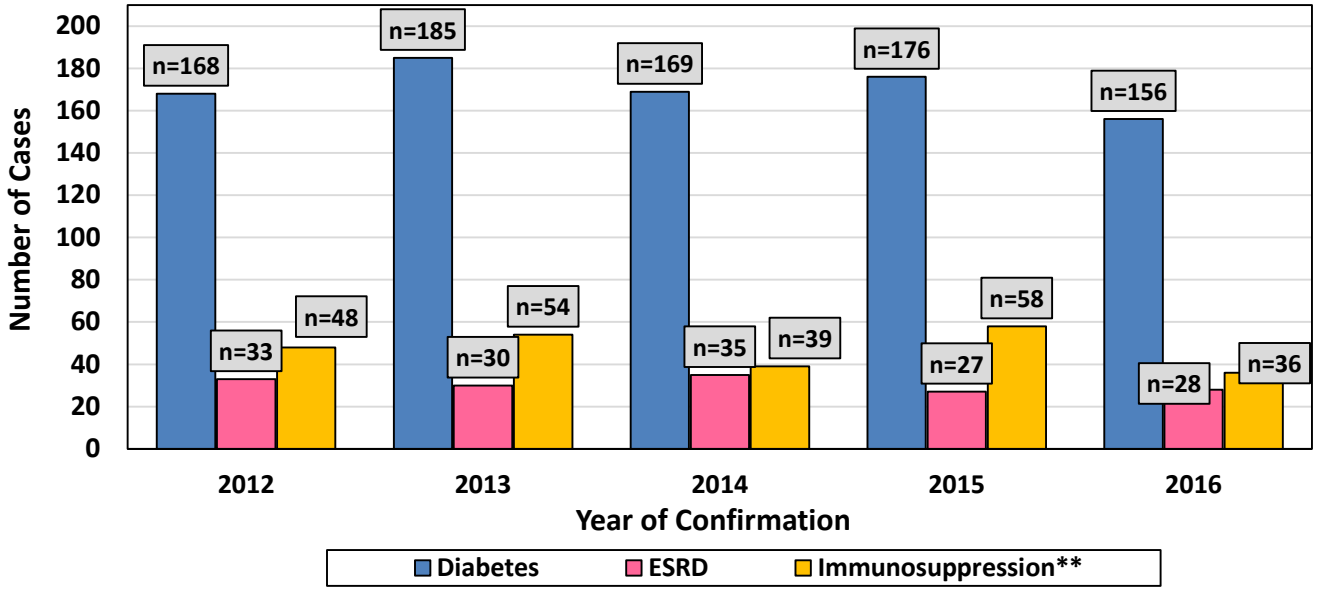


*Data include TB cases with known place of birth. **Includes China & Hong Kong. ***Includes North & South Korea. Data exclude Long Beach and Pasadena TB cases. Data are provisonal and subject to change.

MEDICAL AND SOCIAL CHARACTERISTICS

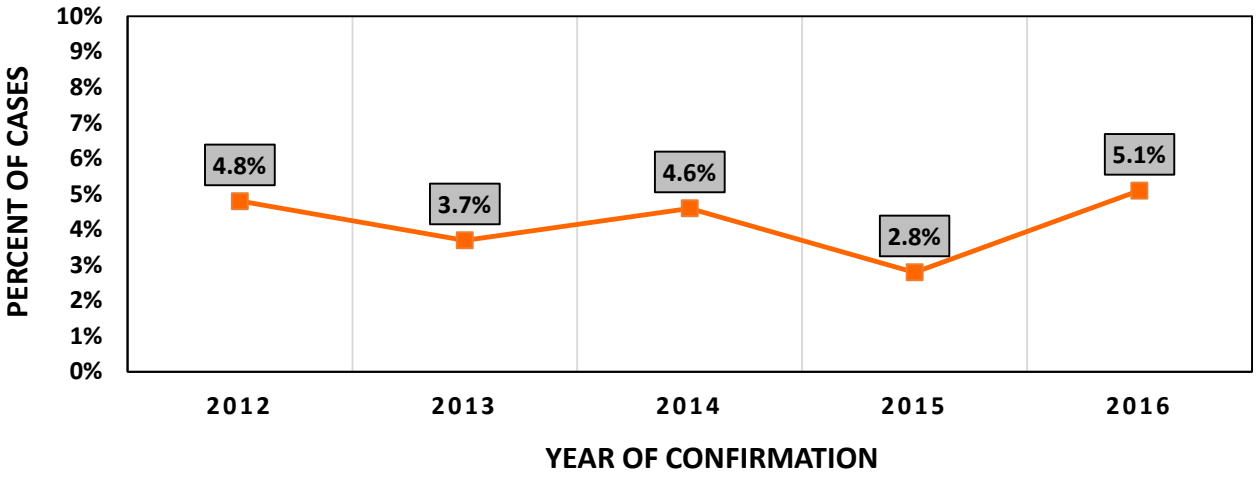
In 2016, 39% (n=210) of adult TB cases had one or more medical comorbidity, (e.g. diabetes mellitus, ESRD, HIV) with the most common comorbidity being diabetes mellitus (29% of cases). Among TB cases with known HIV status, 5.1% (n=25) were HIV infected.

Figure 8. Comorbidities among Adult Tuberculosis Cases*: Los Angeles County, 2012-2016



*Adult (18+ years of age) TB cases can have more than one comorbidity. ESDR=end stage renal disease. **Includes cases reporting one or more of the following : post-organ transplantation, TNF antogonist therapy, and non-HIV immunosupression. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Figure 9. HIV co-Infected Tuberculosis Cases: Los Angeles County, 2012-2016

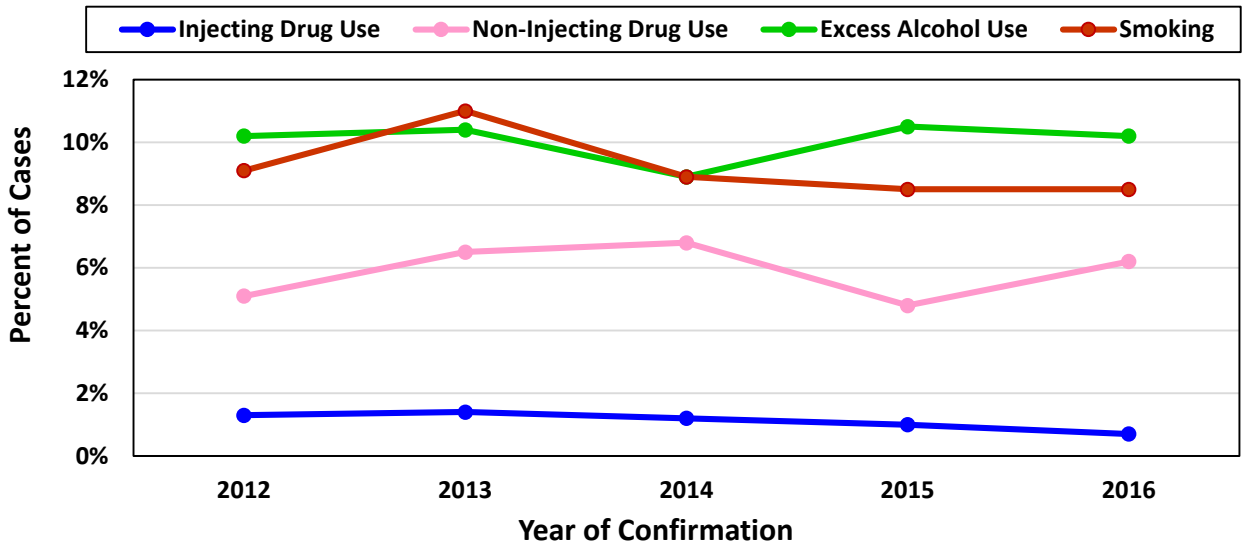


Includes cases with known HIV status. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

MEDICAL AND SOCIAL CHARACTERISTICS

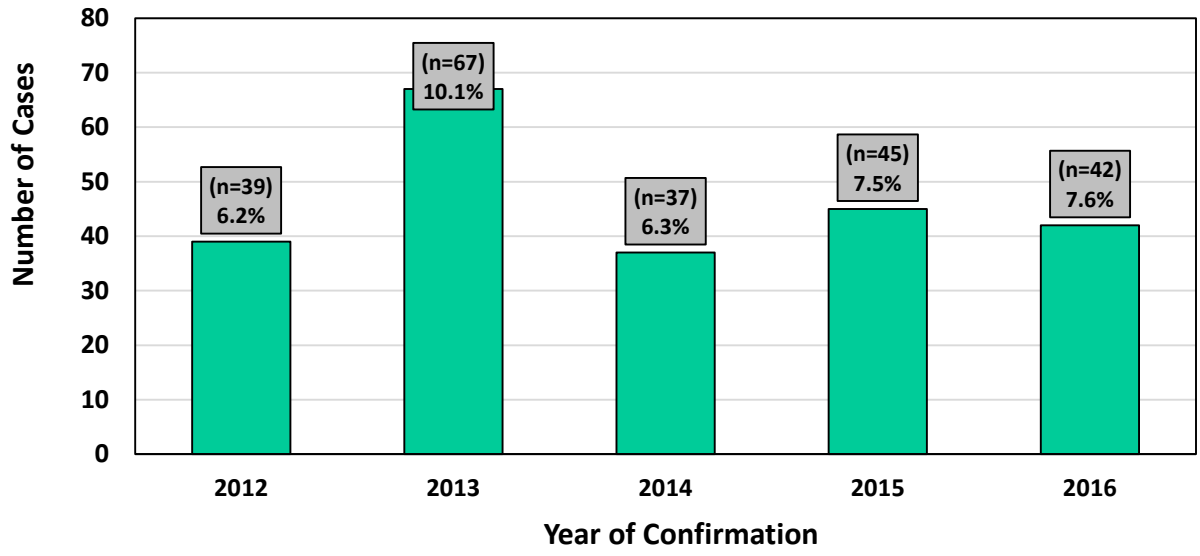
In 2016, excess alcohol use (10%) was the most commonly reported type of substance use, followed by smoking (9%). In the past 5 years, excess alcohol use and smoking have been the most commonly reported forms of substance use. In 2016, 7.6% of TB cases reported experiencing homelessness within the past year.

Figure 10. Reported Substance Use* among Tuberculosis Cases: Los Angeles County, 2012-2016



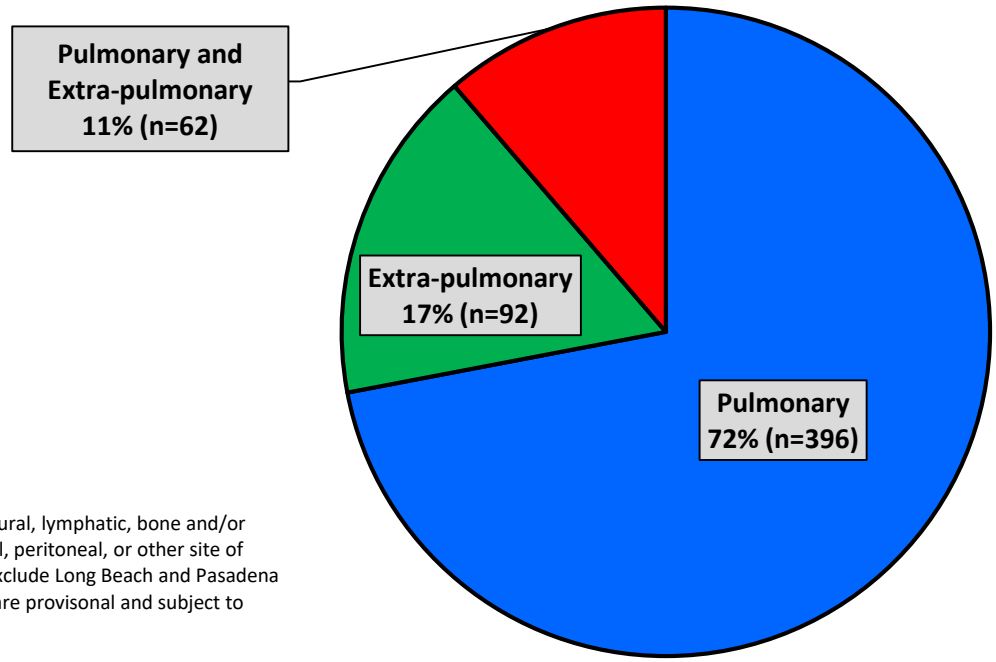
*Drug or alcohol use in the past year. Data exclude Long Beach and Pasadena TB cases. Data are provisonal and subject to change.

Figure 11. Tuberculosis Cases Experiencing Homelessness*: Los Angeles County, 2012-2016



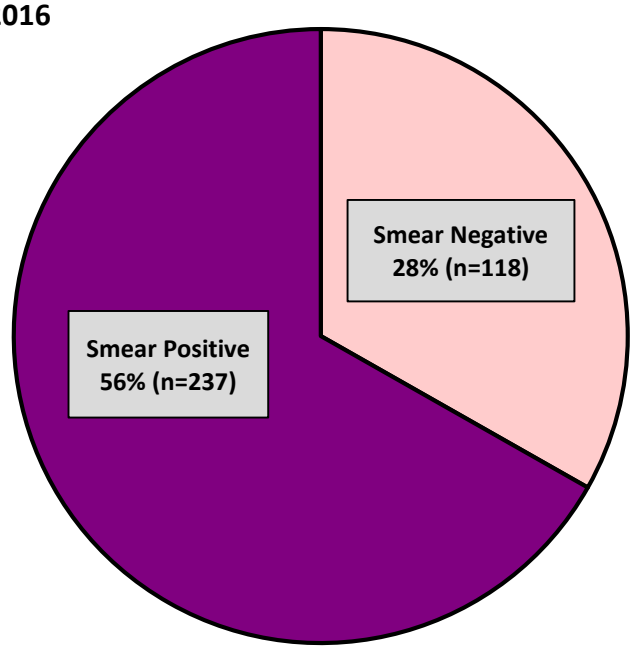
*Homelessness at any time during the 12 months prior to TB diagnosis. Data exclude Long Beach and Pasadena TB cases. Data are provisonal and subject to change.

Figure 12. Tuberculosis Cases by Site of Disease: Los Angeles County, 2016



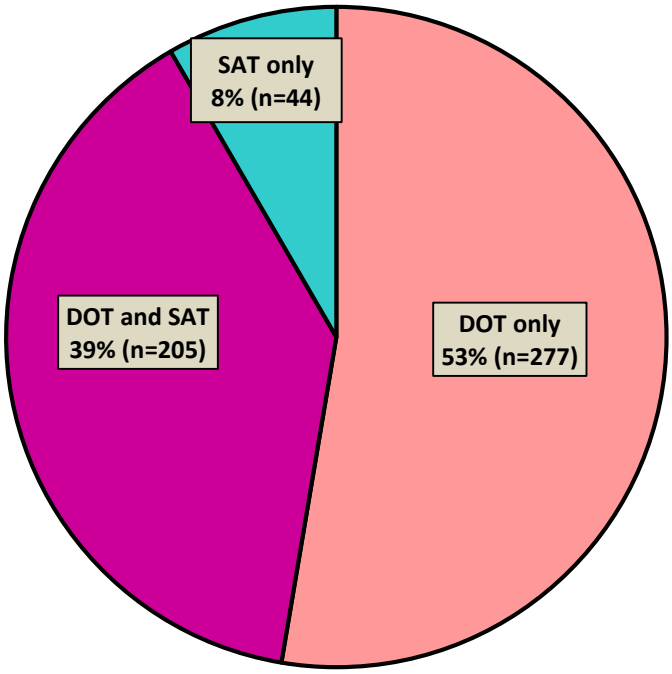
*Cases with pleural, lymphatic, bone and/or joint, meningeal, peritoneal, or other site of disease. Data exclude Long Beach and Pasadena TB cases. Data are provisonal and subject to change.

Figure 13. Pulmonary Culture Confirmed Tuberculosis Cases by Sputum Smear Result*: Los Angeles County, 2016



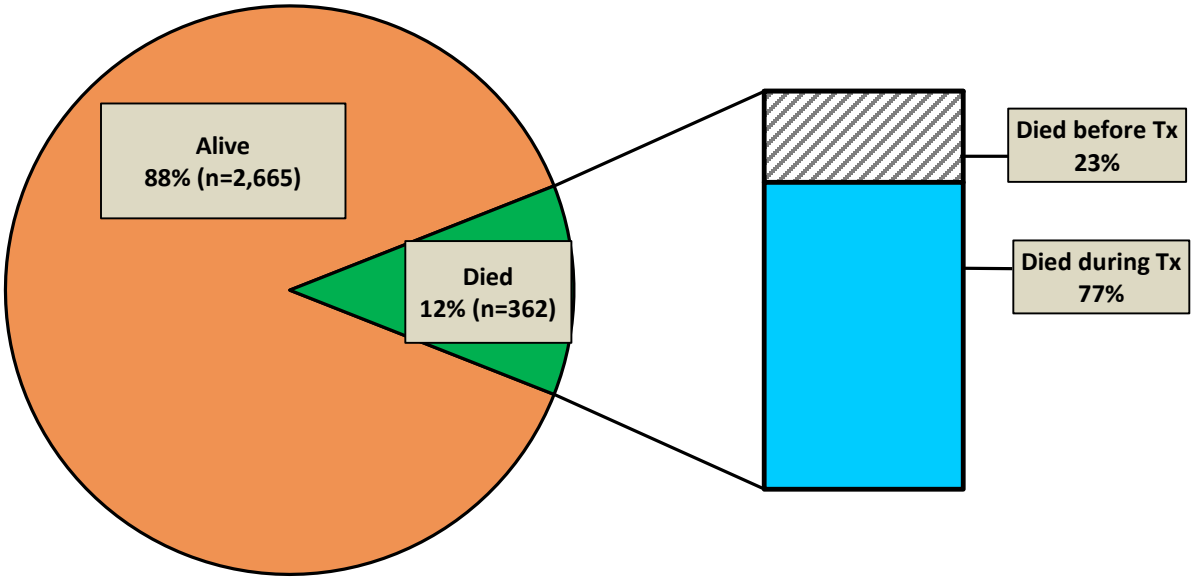
*Culture and smear positivity defined as within 14 days of treatment start date. Data based on cases with pulmonary site of TB disease. Data exclude Long Beach and Pasadena TB.

Figure 14. Tuberculosis Cases by Type of Therapy of Therapy Administration: Los Angeles County, 2016*



*DOT=Directly observed therapy; SAT=self-administered therapy. Data based on total number of cases started on therapy and with information on type of therapy admnistration. DOT only' may include TB cases on SAT on weekends. Data exclude Long Beach and Pasadena TB cases. Data are provisonal and subject to change.

Figure 15. Mortality among Tuberculosis Cases: Los Angeles County, 2012-2016



*Tx=Treatment. Cause of death not available at this time. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Tables

Table 1. Demographic Characteristics of Tuberculosis Cases: Los Angeles County, 2012-2016

	Year of Confirmation										
	2012		2013		2014		2015		2016		Percent Change*
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	2015-2016
Race/Ethnicity**											
NH White	35	5.6	37	5.6	34	5.8	32	5.3	35	6.4	9.4
Black	59	9.4	59	8.9	47	8.0	43	7.1	35	6.4	-18.6
Hispanic	284	45.4	292	44.2	246	42.0	256	42.5	232	42.2	-9.4
Asian	247	39.5	272	41.1	259	44.2	271	45.0	247	44.9	-8.9
Other	0	0.0	1	0.2	0	0.0	0	0.0	1	0.2	-
Age Group											
0-4	9	1.4	18	2.7	15	2.6	5	0.8	8	1.5	60.0
5-14	4	0.6	7	1.1	8	1.4	6	1.0	1	0.2	-83.3
15-24	59	9.4	54	8.2	32	5.5	40	6.6	36	6.5	-10.0
25-44	139	22.2	167	25.3	135	23.0	134	22.3	141	25.6	5.2
45-64	227	36.3	214	32.4	200	34.1	225	37.4	168	30.5	-25.3
65+	187	29.9	201	30.4	196	33.4	192	31.9	196	35.6	2.1
Sex											
Female	235	37.6	260	39.3	211	36.0	252	41.9	199	36.2	-21.0
Male	390	62.4	401	60.7	375	64.0	350	58.1	351	63.8	0.3
Birthplace											
Non-U.S. Born	509	81.4	527	79.7	466	79.5	489	81.2	450	81.8	-8.0
U.S. Born	116	18.6	133	20.1	119	20.3	110	18.3	96	17.5	-12.7
Unknown	0	0.0	1	0.2	1	0.2	3	0.5	4	0.7	-
Country of Birth											
Mexico	169	27.0	152	23.0	127	21.7	143	23.8	131	23.8	-8.4
United States	115	18.4	133	20.1	119	20.3	110	18.3	96	17.5	-12.7
Philippines	92	14.7	116	17.5	101	17.2	126	20.9	103	18.7	-18.3
China***	38	6.1	49	7.4	48	8.2	41	6.8	40	7.3	-2.4
Vietnam	39	6.2	38	5.7	31	5.3	35	5.8	31	5.6	-11.4
Korea****	32	5.1	26	3.9	22	3.8	25	4.2	25	4.5	0.0
El Salvador	28	4.5	25	3.7	16	2.7	28	4.6	21	3.8	-25.0
Other/unknown	112	18.0	122	18.7	122	20.8	94	15.6	103	18.8	9.6
Total Cases	625	100.0	661	100.0	586	100.0	602	100.0	550	100.0	-8.6

*Percent change not calculated due to small cell counts. **NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander. 'Other' race/ethnicity category includes 1 Native American case for year 2016. ***Includes China and Hong Kong. ****Includes North and South Korea. Data excludes Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 2. Tuberculosis Cases by Race/Ethnicity* and Age Group: Los Angeles County, 2012-2016

	Year of Confirmation									
	2012		2013		2014		2015		2016	
	Cases	%*	Cases	%*	Cases	%*	Cases	%*	Cases	%*
NH White										
0-4	0	0.0	0	0.0	1	0.2	0	0.0	0	0.0
5-14	0	0.0	0	0.0	1	0.2	1	0.2	0	0.0
15-24	1	0.2	0	0.0	0	0.0	2	0.3	2	0.4
25-44	4	0.6	7	1.1	5	0.9	3	0.5	6	1.1
45-64	15	2.4	19	2.9	12	2.0	9	1.5	7	1.3
65+	15	2.4	11	1.7	15	2.6	17	2.8	20	3.6
Subtotal	35	100.0	37	100.0	34	100.0	32	100.0	35	100.0
Black										
0-4	0	0.0	0	0.0	0	0.0	1	0.2	0	0.0
5-14	0	0.0	0	0.0	1	0.2	0	0.0	0	0.0
15-24	4	0.6	2	0.3	2	0.3	3	0.5	3	0.5
25-44	15	2.4	16	2.4	11	1.9	14	2.3	7	1.3
45-64	30	4.8	27	4.1	23	3.9	19	3.2	18	3.3
65+	10	1.6	14	2.1	10	1.7	6	1.0	7	1.3
Subtotal	59	100.0	59	100.0	47	100.0	43	100.0	35	100.0
Hispanic										
0-4	7	1.1	17	2.6	10	1.7	4	0.7	6	1.1
5-14	2	0.3	6	0.9	5	0.9	5	0.8	1	0.2
15-24	31	5.0	33	5.0	20	3.4	18	3.0	19	3.5
25-44	87	13.9	91	13.8	80	13.7	63	10.5	79	14.4
45-64	92	14.7	80	12.1	70	11.9	98	16.3	71	12.9
65+	65	10.4	65	9.8	61	10.4	68	11.3	56	10.2
Subtotal	284	100.0	292	100.0	146	100.0	256	100.0	232	100.0
Asian										
0-4	2	0.3	1	0.2	4	0.7	0	0.0	2	0.4
5-14	2	0.3	1	0.2	1	0.2	0	0.0	0	0.0
15-24	23	3.7	19	2.9	10	1.7	17	2.8	12	2.2
25-44	33	5.3	53	8.0	39	6.7	54	9.0	49	8.9
45-64	90	14.4	87	13.2	95	16.2	99	16.4	71	12.9
65+	97	15.5	111	16.8	110	18.8	101	16.8	113	20.5
Subtotal	247	100.0	272	100.0	259	100.0	271	100.0	247	100.0
Total Cases	625	100.0	661	100.0	586	100.0	602	100.0	550	100.0

*Percent equals cell count divided by column subtotal or total. **NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander. 'Other' race/ethnicity category excluded due to small cell counts. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 3. Tuberculosis Cases by Race/Ethnicity* and Sex: Los Angeles County, 2012-2016

	Year of Confirmation									
	2012		2013		2014		2015		2016	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
NH White										
Female	14	40.0	12	32.4	16	47.1	11	34.4	16	45.7
Male	21	60.0	25	67.6	18	52.9	21	65.6	19	54.3
Subtotal	35	100.0	37	100.0	34	100.0	32	100.0	35	100.0
Black										
Female	22	37.3	20	33.9	13	27.7	19	44.2	12	34.3
Male	37	62.7	39	66.1	34	72.3	24	55.8	23	65.7
Subtotal	59	100.0	59	100.0	47	100.0	43	100.0	35	100.0
Hispanic										
Female	105	37.0	112	38.4	96	39.0	106	41.4	75	32.3
Male	179	63.0	180	61.6	150	61.0	150	58.6	157	67.7
Subtotal	284	100.0	292	100.0	246	100.0	256	100.0	232	100.0
Asian										
Female	94	38.1	116	42.6	86	33.2	116	42.8	95	38.5
Male	153	61.9	156	57.4	173	66.8	155	57.2	152	61.5
Subtotal	247	100.0	272	100.0	259	100.0	271	100.0	247	100.0
Total Cases	625	100.0	661	100.0	586	100.0	602	100.0	550	100.0

*NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander. 'Other' race/ethnicity category excluded due to small cell counts. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 4. Tuberculosis Cases by Race/Ethnicity*, Sex, and Age Group: Los Angeles County, 2016

	Age Group											
	0-4		5-14		15-24		25-44		45-64		65+	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
NH White												
Female	0	0.0	0	0.0	1	50.0	2	33.3	4	57.1	9	45.0
Male	0	0.0	0	0.0	1	50.0	4	66.7	3	42.9	11	55.0
Subtotal	0	0.0	0	0.0	2	100.0	6	100.0	7	100.0	20	100.0
Black												
Female	0	0.0	0	0.0	2	66.7	4	57.1	5	27.8	1	14.3
Male	0	0.0	0	0.0	1	33.3	3	42.9	13	72.2	6	85.7
Subtotal	0	0.0	0	0.0	3	100.0	7	100.0	18	100.0	7	100.0
Hispanic												
Female	3	50.0	1	100.0	6	31.6	23	29.1	17	23.9	25	44.6
Male	3	50.0	0	0.0	13	68.4	56	70.9	54	76.1	31	55.4
Subtotal	6	100.0	1	100.0	19	100.0	79	100.0	71	100.0	56	100.0
Asian												
Female	0	0.0	0	0.0	5	41.7	27	55.1	26	36.6	37	32.7
Male	2	100.0	0	0.0	7	58.3	22	44.9	45	63.4	76	67.3
Subtotal	2	100.0	0	0.0	12	100.0	49	100.0	71	100.0	113	100.0
Total Cases	8	100.0	1	100.0	36	100.0	141	100.0	168	100.0	196	100.0

*NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander. 'Other' race/ethnicity category excluded due to small cell counts. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 5. Tuberculosis Cases Born Outside the U.S. by Race/Ethnicity* and Age Group: Los Angeles County, 2012-2016

	Year of Confirmation									
	2012		2013		2014		2015		2016	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
NH White										
0-4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
5-14	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
15-24	1	5.9	0	0.0	0	0.0	0	0.0	0	0.0
25-44	2	11.8	3	17.6	2	12.5	2	15.4	4	20.0
45-64	5	29.4	6	35.3	4	25.0	2	15.4	0	0.0
65+	9	52.9	8	47.1	10	62.5	9	69.2	16	80.0
Subtotal	17	100.0	17	100.0	16	100.0	13	100.0	20	100.0
Black										
0-4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
5-14	0	0.0	0	0.0	1	9.1	0	0.0	0	0.0
15-24	1	5.9	0	0.0	1	9.1	1	12.5	3	23.1
25-44	9	52.9	9	69.2	4	36.4	4	50.0	3	23.1
45-64	4	23.5	3	23.1	2	18.2	1	12.5	6	46.2
65+	3	17.6	1	7.7	3	27.3	2	25.0	1	7.7
Subtotal	17	100.0	13	100.0	11	100.0	8	100.0	13	100.0
Hispanic										
0-4	0	0.0	2	0.9	0	0.0	0	0.0	0	0.0
5-14	0	0.0	2	0.9	0	0.0	0	0.0	0	0.0
15-24	16	6.8	21	9.2	5	2.7	7	3.4	9	4.8
25-44	76	32.2	72	31.4	62	33.2	48	23.4	61	32.8
45-64	87	36.9	70	30.6	64	34.2	89	43.4	66	35.5
65+	57	24.2	62	27.1	56	29.9	61	29.8	50	26.9
Subtotal	236	100.0	229	100.0	187	100.0	205	100.0	186	100.0
Asian										
0-4	0	0.0	0	0.0	1	0.4	0	0.0	0	0.0
5-14	2	0.8	0	0.0	1	0.4	0	0.0	0	0.0
15-24	17	7.1	19	7.1	9	3.6	14	5.3	7	3.0
25-44	33	13.8	52	19.5	38	15.1	51	19.4	43	18.6
45-64	90	37.7	87	32.6	94	37.3	97	36.9	71	30.7
65+	97	40.6	109	40.8	109	43.3	101	38.4	110	47.6
Subtotal	239	100.0	267	100.0	252	100.0	263	100.0	231	100.0
Total Cases	509	100.0	527	100.0	466	100.0	489	100.0	450	100.0

*NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander. 'Other' race/ethnicity category excluded due to small cell counts. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 6. Tuberculosis Cases Born in the U.S. by Race/Ethnicity* and Age Group: Los Angeles County, 2012-2016

	Year of Confirmation									
	2012		2013		2014		2015		2016	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
NH White										
0-4	0	0.0	0	0.0	1	5.6	0	0.0	0	0.0
5-14	0	0.0	0	0.0	1	5.6	1	5.3	0	0.0
15-24	0	0.0	0	0.0	0	0.0	2	10.5	2	13.3
25-44	2	11.1	4	20.0	3	16.7	1	5.3	2	13.3
45-64	10	55.6	13	65.0	8	44.4	7	36.8	7	46.7
65+	6	33.3	3	15.0	5	27.8	8	42.1	4	26.7
Subtotal	18	100.0	20	100.0	18	100.0	19	100.0	15	100.0
Black										
0-4	0	0.0	0	0.0	0	0.0	1	2.9	0	0.0
5-14	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
15-24	3	7.1	2	4.4	1	2.8	2	5.7	0	0.0
25-44	6	14.3	7	15.6	7	19.4	10	28.6	4	18.2
45-64	26	61.9	24	53.3	21	58.3	18	51.4	12	54.5
65+	7	16.7	12	26.7	7	19.4	4	11.4	6	27.3
Subtotal	42	100.0	45	100.0	36	100.0	35	100.0	22	100.0
Hispanic										
0-4	7	14.6	15	23.8	10	17.2	4	8.2	6	14.3
5-14	2	4.2	4	6.3	5	8.6	5	10.2	1	2.4
15-24	15	31.3	12	19.0	15	25.9	11	22.4	10	23.8
25-44	11	22.9	19	30.2	18	31.0	14	28.6	18	42.9
45-64	5	10.4	10	15.9	5	8.6	9	18.4	4	9.5
65+	8	16.7	3	4.8	5	8.6	6	12.2	3	7.1
Subtotal	48	100.0	63	100.0	58	100.0	49	100.0	42	100.0
Asian										
0-4	2	25.0	1	20.0	3	42.9	0	0.0	2	12.5
5-14	0	0.0	1	20.0	0	0.0	0	0.0	0	0.0
15-24	6	75.0	0	0.0	1	14.3	3	42.9	5	31.3
25-44	0	0.0	1	20.0	1	14.3	3	42.9	6	37.5
45-64	0	0.0	0	0.0	1	14.3	1	14.3	0	0.0
65+	0	0.0	2	40.0	1	14.3	0	0.0	3	18.8
Subtotal	8	100.0	5	100.0	7	100.0	7	100.0	16	100.0
Total Cases	116	100.0	133	100.0	119	100.0	110	100.0	96	100.0

*NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander. 'Other' race/ethnicity category excluded due to small cell counts. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 7. Adult Tuberculosis Cases by Comorbidities* and Reported Substance Abuse: Los Angeles County, 2012-2016**

	Year of Confirmation									
	2012		2013		2014		2015		2016	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Diabetes	168	28.0	185	29.5	169	30.1	176	30.0	156	29.1
ESRD	33	5.5	30	4.8	35	6.2	27	4.6	28	5.2
Immunosuppressed* **	48	8.0	54	8.6	39	6.9	58	9.9	36	6.7
HIV Positive	28	4.8	22	3.7	24	4.6	15	2.8	25	5.1
Injecting Drug Use	8	1.3	9	1.4	7	1.2	6	1.0	4	0.7
Non-Injecting Drug Use	32	5.3	43	6.9	40	7.1	29	4.9	34	6.3
Excess Alcohol Use	64	11.0	69	11.0	52	9.3	63	11.0	56	10.4

*Adult (18+ years of age) TB cases can have more than one comorbidity. HIV includes cases of all ages with known HIV status. **Drug or alcohol use within 1 year of TB diagnosis. ***Includes any of the following: post-organ transplantation, TNF antagonist therapy, and non-HIV immunosuppression. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 8. Demographic Characteristics of HIV Positive Tuberculosis Cases: Los Angeles County, 2012-2016

	Year of Confirmation									
	2012		2013		2014		2015		2016	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Race/Ethnicity*										
NH White	0	0.0	4	18.2	1	4.2	1	6.7	3	12.0
Black	6	21.4	6	27.3	9	37.5	5	33.3	5	20.0
Hispanic	19	67.9	11	50.0	11	45.8	8	53.3	15	60.0
Asian	3	10.7	1	4.5	3	12.5	1	6.7	2	8.0
Age Group**										
15-24	0	0.0	2	9.1	1	4.2	1	6.7	1	4.0
25-44	13	46.4	9	40.9	12	50.0	5	33.3	9	36.0
45-64	13	46.4	9	40.9	10	41.7	9	60.0	13	52.0
65+	2	7.1	2	9.1	1	4.2	0	0.0	2	8.0
Sex										
Female	3	10.7	5	22.7	3	12.5	3	20.0	5	20.0
Male	25	89.3	17	77.3	21	87.5	12	80.0	20	80.0
Place of Birth										
Non-U.S. Born	20	71.4	13	59.1	10	41.7	10	66.7	20	80.0
U.S. Born	8	28.6	9	40.9	14	58.3	5	33.3	5	20.0
Injecting Drug Use***										
Yes	0	0.0	2	9.1	2	8.3	2	13.3	2	8.0
No	25	89.3	19	86.4	22	91.7	13	86.7	20	80.0
Unknown	3	10.7	1	4.5	0	0.0	0	0.0	3	12.0
Non-Injecting Drug Use***										
Yes	6	21.4	3	13.6	10	41.7	3	20.0	7	28.0
No	21	75.0	18	81.8	14	58.3	12	80.0	15	60.0
Unknown	1	3.6	1	4.5	0	0.0	0	0.0	3	12.0
Excess Alcohol Use***										
Yes	6	21.4	3	13.6	4	16.7	4	26.7	3	12.0
No	21	75.0	18	81.8	20	83.3	11	73.3	19	76.0
Unknown	1	3.6	1	4.5	0	0.0	0	0.0	3	12.0
Homelessness***										
Yes	6	21.4	8	36.4	7	29.2	3	20.0	8	32.0
No	22	78.6	14	63.6	17	70.8	12	80.0	17	68.0
Total	28	100.0	22	100.0	24	100.0	15	100.0	25	100.0

*NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander. **There were no HIV co-infected TB cases under the age of 15. ***Within 1 year of TB diagnosis. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 9. Demographic Characteristics of Tuberculosis Cases Experiencing Homelessness*: Los Angeles County, 2012-2016

	Year of Confirmation									
	2012		2013		2014		2015		2016	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Race/Ethnicity**										
NH White	2	5.1	6	9.0	5	13.5	3	6.7	4	9.5
Black	13	33.3	23	34.3	14	37.8	16	35.6	9	21.4
Hispanic	21	53.8	35	52.2	11	29.7	23	51.1	25	59.5
Asian	3	7.7	3	4.5	7	18.9	3	6.7	3	7.1
Age Group***										
15-24	2	5.1	1	1.5	1	2.7	1	2.2	2	4.8
25-44	15	38.5	25	37.3	8	21.6	15	33.3	12	28.6
45-64	21	53.8	34	50.7	21	56.8	21	46.7	25	59.5
65+	1	2.6	7	10.4	7	18.9	8	17.8	3	7.1
Sex										
Female	4	10.3	8	11.9	3	8.1	3	6.7	8	19.0
Male	35	89.7	59	88.1	34	91.9	42	93.3	34	81.0
Birthplace										
Non-U.S. Born	18	46.2	30	44.8	16	43.2	23	51.1	24	57.1
U.S. Born	21	53.8	36	53.7	20	54.1	21	46.7	18	42.9
Unknown	0	0.0	1	1.5	1	2.7	1	2.2	0	0.0
Injecting Drug Use*										
Yes	3	7.7	4	6.0	1	2.7	4	8.9	4	9.5
No	33	84.6	57	85.0	31	83.8	36	80.0	28	66.7
Unknown	3	7.7	6	9.0	5	13.5	5	11.1	10	23.8
Non-Injecting Drug Use*										
Yes	12	30.8	19	28.4	13	35.1	11	24.4	19	45.2
No	23	59.0	42	62.6	20	54.1	29	64.4	16	38.1
Unknown	4	10.2	6	9.0	4	10.8	5	11.2	7	16.7
Excess Alcohol Use*										
Yes	19	48.7	37	55.2	16	43.2	19	42.2	19	45.3
No	17	43.6	28	41.8	17	46.0	23	51.1	15	35.7
Unknown	3	7.7	2	3.0	4	10.8	3	6.7	8	19.0
Total	39	100.0	67	100.0	37	100.0	45	100.0	42	100.0

*Within 1 year of TB Diagnosis. **NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander; 'Other' race/ethnicity category excluded due to small cell counts. ***There were no TB cases under the age of 15 experiencing homelessness. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 10. Tuberculosis Cases Experiencing Homelessness* by Race/Ethnicity and Sex: Los Angeles County, 2012-2016**

	Year of Confirmation									
	2012		2013		2014		2015		2016	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
NH White										
Female	0	0.0	0	0.0	0	0.0	0	0.0	1	25.0
Male	2	100.0	6	100.0	5	100.0	3	100.0	3	75.0
Subtotal	2	100.0	6	100.0	5	100.0	3	100.0	4	100.0
Black										
Female	1	7.7	2	8.7	2	14.3	1	6.3	1	11.1
Male	12	92.3	21	91.3	12	85.7	15	93.7	8	88.9
Subtotal	13	100.0	23	100.0	14	100.0	16	100.0	9	100.0
Hispanic										
Female	3	14.3	5	14.3	0	0.0	2	8.7	3	12.0
Male	18	85.7	30	85.7	11	100.0	21	91.3	22	88.0
Subtotal	21	100.0	35	100.0	11	100.0	23	100.0	25	100.0
Asian										
Female	0	0.0	1	33.3	1	14.3	0	0.0	2	66.7
Male	3	100.0	2	66.7	6	85.7	3	100.0	1	33.3
Subtotal	3	100.0	3	100.0	7	100.0	3	100.0	3	100.0
Total Cases	39	100.0	67	100.0	37	100.0	45	100.0	42	100.0

*Within 1 year of TB Diagnosis. **NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander; 'Other' race/ethnicity category excluded due to small cell counts. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 11. Tuberculosis Cases Experiencing Homelessness* by Race/Ethnicity and Place of Birth: Los Angeles County, 2012-2016**

	Year of Confirmation									
	2012		2013		2014		2015		2016	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
NH White										
Non-U.S. Born	0	0.0	0	0.0	1	20.0	1	33.3	0	0.0
U.S. Born	2	100.0	6	100.0	4	80.0	2	66.7	4	100.0
Subtotal	2	100.0	6	100.0	5	100.0	3	100.0	4	100.0
Black										
Non-U.S. Born	0	0.0	1	4.3	0	0.0	0	0.0	2	22.2
U.S. Born	13	100.0	21	91.4	14	100.0	16	100.0	7	77.8
Unknown	0	0.0	1	4.3	0	0.0	0	0.0	0	0.0
Subtotal	13	100.0	23	100.0	14	100.0	16	100.0	9	100.0
Hispanic										
Non-U.S. Born	15	71.4	26	74.3	8	72.7	19	82.6	19	76.0
U.S. Born	6	28.6	9	25.7	2	18.2	3	13.0	6	24.0
Unknown	0	0.0	0	0.0	1	9.1	1	4.4	0	0.0
Subtotal	21	100.0	35	100.0	11	100.0	23	100.0	25	100.0
Asian										
Non-U.S. Born	3	100.0	3	100.0	7	100.0	3	100.0	3	100.0
U.S. Born	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Subtotal	3	100.0	3	100.0	7	100.0	3	100.0	3	100.0
Total Cases	39	100.0	67	100.0	37	100.0	45	100.0	42	100.0

*Within 1 year of TB diagnosis. **NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander; 'Other' race/ethnicity category excluded due to small cell counts. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 12. Tuberculosis Cases by Site of TB Disease: Los Angeles County, 2012-2016

	Year of Confirmation									
	2012		2013		2014		2015		2016	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Pulmonary	405	64.8	455	68.8	391	66.7	430	71.4	396	72.0
Extra-pulmonary*	147	23.5	128	19.4	132	22.5	106	17.6	92	16.7
Both Pulmonary and Extra-pulmonary	73	11.7	78	11.8	63	10.8	66	11.0	62	11.3
Total Cases	625	100.0	661	100.0	586	100.0	602	100.0	550	100.0

*Includes cases with pleural, lymphatic, bone and/or joint, meningeal, peritoneal, or other site of TB disease. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 13. Tuberculosis Cases with known Sputum Culture and Sputum Smear Positivity*: Los Angeles County, 2012-2016

		Year of Confirmation									
		2012		2013		2014		2015		2016	
		Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Sputum Culture Positive	**Sputum Smear Positive**										
No	No	66	94.3	67	89.3	53	77.9	51	85.0	62	89.9
	Yes	4	5.7	8	10.7	15	22.1	9	15.0	7	10.1
	Subtotal	70	100.0	75	100.0	68	100.0	60	100.0	69	100.0
Yes	**Sputum Smear Positive**										
	No	105	28.3	125	30.6	99	27.7	127	31.9	118	33.2
	Yes	266	71.7	283	69.4	259	72.3	271	68.1	237	66.8
	Subtotal	371	100.0	408	100.0	358	100.0	398	100.0	355	100.0
Total Cases		441	100.0	483	100.0	426	100.0	458	100.0	424	100.0

*Sputum culture and sputum smear positivity defined as within 14 days of treatment start date. Data include cases with pulmonary site of TB disease. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 14. Tuberculosis Cases by Verification Criteria*: Los Angeles County, 2012-2016

	Year of Confirmation									
	2012		2013		2014		2015		2016	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
Laboratory Confirmation*	532	85.1	556	84.1	510	87.0	549	91.2	468	85.1
Clinical Confirmation										
Clinical Case	81	13.0	88	13.3	66	11.3	38	6.3	62	11.3
Provider Diagnosis	12	1.9	17	2.6	10	1.7	15	2.5	20	3.6
Total Cases	625	100.0	661	100.0	586	100.0	602	100.0	550	100.0

*Laboratory Confirmation includes TB cases classified as culture positive, NAAT positive, and smear positive. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 15. Tuberculosis Cases with Resistance to Rifampin: LA County, 2012-2016

Year of Confirmation	Culture Positive Cases	No. with RIF Susceptibility Testing	Cases with Resistance to RIF*	
			Cases	%
2012	511	504	2	0.4
2013	535	530	1	0.2
2014	476	473	3	0.6
2015	520	519	0	0.0
2016	450	445	1	0.2

*RIF=Rifampin; excludes MDR TB cases. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 16. Tuberculosis Cases with Resistance to Isoniazid: LA County, 2012-2016

Year of Confirmation	Culture Positive Cases	No. with INH Susceptibility Testing	Cases with Resistance to INH*	
			Cases	%
2012	511	503	30	6.0
2013	535	530	48	9.1
2014	476	473	46	9.7
2015	520	519	53	10.2
2016	450	445	42	9.4

*INH=Isoniazid; excludes MDR TB cases. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 17. Tuberculosis Cases by Resistance with Pyrazinamide: LA County, 2012-2016

Year of Confirmation	Culture Positive Cases	No. with PZA Susceptibility Testing	Cases with Resistance to PZA*	
			Cases	%
2012	511	501	26	5.2
2013	535	528	34	6.4
2014	476	474	21	4.4
2015	520	513	23	4.5
2016	450	442	23	5.2

*PZA=Pyrazinamide; excludes MDR TB cases. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 18. Tuberculosis Cases with Resistance to Ethambutol: LA County, 2012-2016

Year of Confirmation	Culture Positive Cases	No. with EMB Susceptibility Testing	Cases with Resistance to EMB*	
			Cases	%
2012	511	504	3	0.6
2013	535	530	3	0.6
2014	476	472	0	0.0
2015	520	519	1	0.2
2016	450	445	1	0.2

*EMB=Ethambutol; excludes MDR TB cases. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 19. Multidrug Resistant Tuberculosis Cases: LA County, 2012-2016

Year of Confirmation	Culture Positive Cases	No. with MDR Susceptibility Testing*	Cases with Multidrug Resistance**					
			MDR Only	%	pre-XDR	%	XDR	%
2012	511	504	4	0.8	1	0.2	0	0.0
2013	535	530	5	0.9	0	0.0	1	0.2
2014	476	473	4	0.8	1	0.2	0	0.0
2015	520	519	6	1.2	0	0.0	0	0.0
2016	450	446	9	2.0	1	0.2	0	0.0

*Cases with drug susceptibility results for both isoniazid and rifampin. **MDR=Multidrug Resistant (Resistance to at least isoniazid and rifampin); pre-XDR = pre-Extensively Drug Resistant (Resistance to isoniazid and rifampin and either a fluoroquinolone **or** a second line injectable, but not both); XDR = Extensively Drug Resistant (resistance to isoniazid and rifampin and a fluoroquinolone **and** a second line injectable). Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 20. Tuberculosis Cases by Initial Drug Regimen: LA County, 2012-2016

Year of Confirmation	Total Cases	Alive at Diagnosis	Started on Initial Drug Regimen	Initial Drug Regimen* (%)				
		Cases	Cases	IRZE	IRZ	IRE	IR	Other
2012	625	608	599	86.6	2.0	1.7	0.3	9.3
2013	661	640	639	90.0	0.9	2.2	0.5	6.4
2014	586	576	573	89.0	1.2	2.6	0.7	6.5
2015	602	585	579	88.4	1.0	1.9	0.0	8.6
2016	550	536	526	85.7	1.7	1.0	0.6	11.0

*I=Isoniazid; R=Rifampin; Z=Pyrazinamide; E=Ethambutol; Other=all other drugs. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 21. Tuberculosis Cases by Type of Therapy Administration: LA County, 2012-2016

Year of Confirmation	Total Cases	Cases Started on Initial Drug Regimen*	Cases w/ Information on Type of Therapy Administration	Type of Therapy Administration* (%)					
				DOT		DOT and SAT		SAT Only	
				Cases	%	Cases	%	Cases	%
2012	625	599	599	341	56.9	191	31.9	67	11.2
2013	661	639	639	314	49.1	255	39.9	70	11.0
2014	586	573	573	272	47.5	251	43.8	50	8.7
2015	602	579	579	292	50.5	223	38.6	63	10.9
2016	550	526	526	277	52.7	205	39.0	44	8.4

*DOT = Directly observed therapy; SAT = Self-administered therapy. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 22. Treatment Outcomes among Tuberculosis Cases for whom One Year or Less of Therapy was indicated: Los Angeles County, 2012-2014*

	Year of Confirmation					
	2012		2013		2014	
	Cases	%	Cases	%	Cases	%
Completed Tx ≤ 1 year**	457	92.8	492	92.4	428	92.4
Completed Tx ≥ 1 year**	27	5.4	28	5.2	27	5.8

*Completion of Treatment as reported to CDC. **Tx=Treatment. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

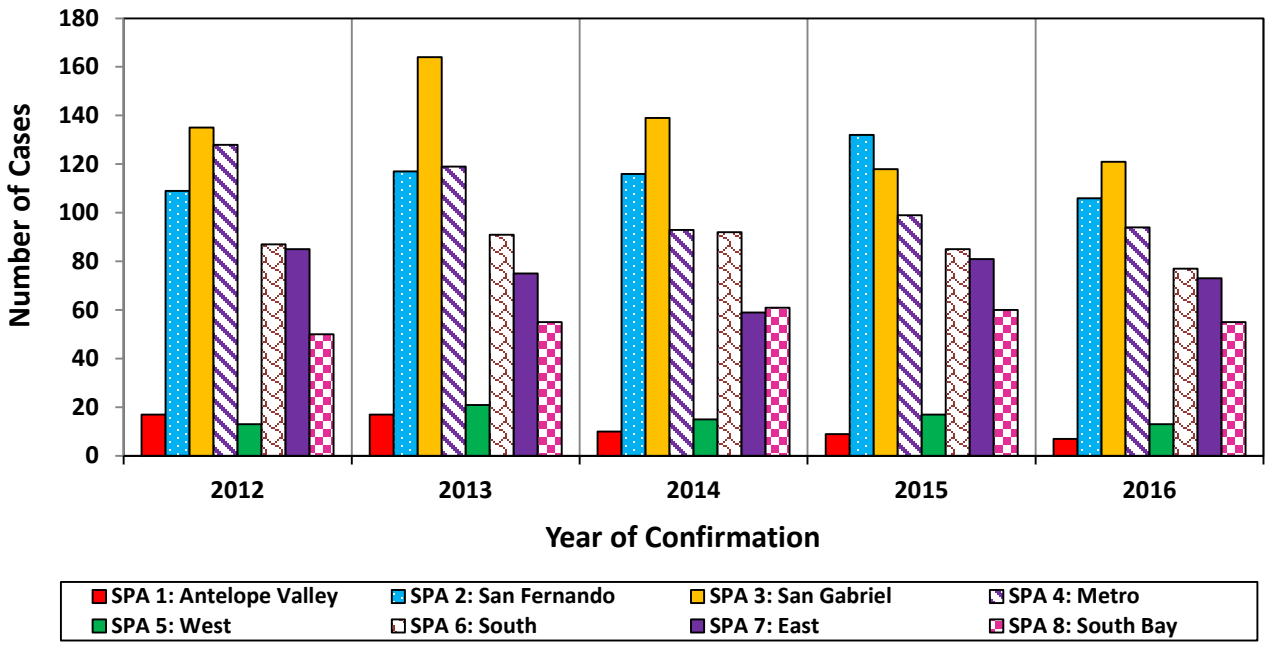
Table 23. Mortality among Tuberculosis Cases: LA County, 2012-2016

				Timing of Death			
		Total Deaths		Died Before Starting TB Therapy		Died During TB Therapy	
Year of Confirmation	Total Cases	Cases	%	Cases	%	Cases	%
2012	625	79	12.6	17	21.5	62	78.5
2013	661	85	12.9	21	24.7	64	75.3
2014	586	62	10.6	11	17.7	51	82.3
2015	602	57	9.5	17	29.8	40	70.2
2016	550	79	14.4	17	21.5	62	78.5

Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Tuberculosis Cases by Service Planning Area

Figure 16. Tuberculosis Cases by Service Planning Area (SPA)*: Los Angeles County, 2012-2016



*TB cases assigned to TB Control Headquarters (n=9) are not included in SPA counts. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 24. Tuberculosis Cases by Service Planning Area (SPA): LA County, 2016

	California*	LA County	Antelope Valley SPA 1	San Fernando SPA 2	San Gabriel SPA 3	Metro SPA 4	West SPA 5	South SPA 6	East SPA 7	South Bay SPA 8
Race/Ethnicity**										
NH White	147	35	<5	14	0	6	<5	<5	5	<5
Black	107	35	<5	5	0	6	<5	14	<5	5
Hispanic	707	232	<5	41	28	42	5	57	41	14
Asian	1,096	247	<5	46	93	40	<5	<5	25	34
Age Group										
0-4	34	8	0	<5	<5	<5	0	<5	<5	<5
5-14	17	1	0	<5	0	<5	0	<5	<5	0
15-24	175	36	<5	8	<5	6	<5	6	6	<5
25-44	505	141	0	31	27	20	5	26	15	16
45-64	647	168	5	27	36	28	<5	28	23	17
65+	684	196	<5	38	52	39	<5	15	28	17
Sex										
Female	781	199	<5	34	41	37	8	24	32	20
Male	1,281	351	<5	72	80	57	5	53	41	35
Birthplace										
Non-U.S. Born	1,656	450	<5	90	114	77	12	54	54	42
U.S. Born	386	96	<5	16	7	15	<5	23	17	13
Unknown	20	4	0	0	0	<5	<5	0	<5	0
Total Cases	2,062	550	7	106	121	94	13	77	73	55

*Report on Tuberculosis in California, 2016. CDPH, 2017. **NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander; 'Other' race/ethnicity category excluded due to small cell counts. < Suppression due to small cell counts. Four cases assigned to TB Control Headquarters not included in SPA counts. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

Table 25. Proportion of Tuberculosis Cases by Service Planning Area (SPA): LA County, 2016

	California*	LA County	Antelope Valley SPA 1	San Fernando Valley SPA 2	San Gabriel Valley SPA 3	Metro SPA 4	West SPA 5	South SPA 6	East SPA 7	South Bay SPA 8
Race/Ethnicity**										
NH White	7.1	6.4	28.6	13.2	0.0	6.4	30.8	2.6	6.8	3.6
Black	5.2	6.4	14.3	4.7	0.0	6.4	7.7	18.2	2.7	9.1
Hispanic	34.3	42.2	42.9	38.7	23.1	44.7	38.5	74.0	56.2	25.5
Asian	53.2	44.9	14.3	43.4	76.9	42.6	23.1	3.9	34.2	61.8
Age Group										
0-4	1.6	1.5	0.0	1.9	1.7	0.0	0.0	2.6	1.4	1.8
5-14	0.8	0.2	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
15-24	8.5	6.5	14.3	7.5	3.3	6.4	7.7	7.8	8.2	7.3
25-44	24.5	25.6	0.0	29.2	22.3	21.3	38.5	33.8	20.5	29.1
45-64	31.4	30.5	71.4	25.5	29.8	29.8	23.1	36.4	31.5	30.9
65+	33.2	35.6	14.3	35.8	43.0	41.5	30.8	19.5	38.4	30.9
Sex										
Female	37.9	36.2	28.6	32.1	33.9	39.4	61.5	31.2	43.8	36.4
Male	62.1	63.8	71.4	67.9	66.1	60.6	38.5	68.8	56.2	63.6
Birthplace										
Non-U.S. Born	80.3	81.8	57.1	84.9	94.2	81.9	92.3	70.1	74.0	76.4
U.S. Born	18.7	17.5	42.9	15.1	5.8	16.0	7.7	29.9	23.3	23.6
Unknown	1.0	0.7	0.0	0.0	0.0	2.1	0.0	0.0	2.7	0.0
Percent of Total‡	-	-	1.3	19.3	22.0	17.1	2.4	14.0	13.3	10.0

*Report on Tuberculosis in California, 2016. CDPH, 2017. **NH White = non-Hispanic White; Black = non-Hispanic Black; Hispanic = persons of Hispanic origin of any race; Asian = Asian/Pacific Islander; 'Other' race/ethnicity category excluded due to small cell counts. Four cases assigned to TB Control Headquarters not included in SPA proportions. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

TECHNICAL NOTES

1. Tuberculosis Case Definition: An episode of TB disease in a person meeting the laboratory or clinical criteria for TB as defined in the "Report of Verified Case of Tuberculosis (RVCT)" manual[22].

2. Reporting TB Cases: Health care providers (including administrators of healthcare facilities and clinics) in LA County are required by law (California Code of Regulations: Title 17, Chapter 4, §2500) to report all local confirmed and suspected cases of active TB, within one (1) working day of the time of identification to the Health Officer. The director of any clinical laboratory or designee must report laboratory evidence suggestive of TB to the health department on the same day that the physician who submitted the specimen is notified (California Code of Regulations: Title 17, Chapter 4, §2505).

3. Data Source: Tuberculosis cases reported in LA County are entered into the TB Registry Information Management System (TRIMS). This database contains records for TB cases and suspects and contacts of TB cases and provides the basis for the data presented in this report. To assess for the presence of TB infection, the LA County Public Health Laboratory (PHL) processes QuantiFERON TB Gold in-Tube Test (QFT-GIT), a type of Interferon-Gamma Release Assay (IGRA) test. Among recently developed screening tests, the IGRA test is recommended as an aid for detecting TB infection[3, 23]. The LA County PHL provides the TBCP with data on all QFT-GIT tests processed in their lab. For this surveillance report, positive QFT-GIT test data were summarized by the type of clinic where the test was administered. Clinics were grouped into 3 categories: (1) Community Health Services Public Health Clinics; (2) HIV Care Clinics (HIV care clinics that also offer TB screening services); (3) Contract Clinics (Community-based clinics, contracted by TBCP, that offer low-cost TB screening services).

4. Population Denominators: LA County population estimates used for calculating rates included in this report were obtained from the Population Estimates and Projections Systems (PEPS), which are made available to the LA County Department of Public Health by Urban Research[24]. The cities of Long Beach and Pasadena are separate reporting jurisdictions, as recognized by the California Department of Public Health. Thus, TB cases occurring in Long Beach and Pasadena are excluded from LA County TB data, and their population totals are not included in the LA County population denominators used to calculate rates in this report.

5. Race/Ethnicity: There is one variable for race and one for ethnicity "Hispanic." If a case is classified as "Hispanic" then the case is reported as "Hispanic" regardless of race.

6. Age: Patient age was calculated by following Wang's[25] formula for age calculation which uses a person's birthday and takes into account leap year and non-leap year birthdays. For analyses presented in this report, patient age was categorized into 6 distinct age groups. These distinct age groups reflect the same age categorization used by the California Department of Public Health Tuberculosis Control Branch[10].

7. U.S.-born refers to patients born in one of the 50 states, District of Columbia, or other U.S. territories and outlying areas. A person born abroad to a parent who is a U.S. citizen is considered U.S. born. All others with a known country of birth are considered non-U.S. born[22].

8. Drug Susceptibility Testing (DST): DST is performed to help determine whether a person's *M. tuberculosis* strain is sensitive or resistant to any TB drug(s). DST helps guide the selection of the most appropriate TB treatment regimen and duration.

9. Completion of Treatment: Since the case completion reports are not submitted until many months after a TB case is initially reported, treatment completion data reported for cases counted in 2014 are the most recent available and are presented in this report. Completion of treatment is presented for years 2012-2014 in Table 22. Outcomes for cases expected to complete therapy in 12 months or less exclude cases with rifampin-resistant disease (including MDR-TB), those with meningeal disease, and children less than 15 years of age with disseminated TB disease.

10. Data for 2016 are provisional and reflect the most complete information available as of October 2016. Case count data for previous years may differ from previously published data and statistics due to updates in TB case information entered into the TB surveillance database, and thus the counts for previous years presented in this report may not match TB counts previously released (the differences are generally very small).

REFERENCES

1. U.S. Census Bureau. *State and County QuickFacts*. 2016; Available from: https://www.census.gov/quickfacts/fact/table/losangelescountycalifornia/PST045216.
2. Los Angeles County Department of Public Health, *County of Los Angeles Public Health Working for You: Annual Report, 2012-2013*, 2013, Department of Public Health Los Angeles.
3. Centers for Disease Control and Prevention Division of Tuberculosis Elimination, *Core Curriculum on Tuberculosis: What the Clinician Should Know. 6th Edition*, 2013.
4. Centers for Disease Control and Prevention Division of Tuberculosis Elimination, *Mycobacterium bovis (Bovine Tuberculosis) in Humans*, 2011: Available from http://www.cdc.gov/tb/esp/publications/factsheets/general/mycobacterium.htm.
5. Los Angeles County Department of Public Health Tuberculosis Control Program, *TB Infection: What you need to know to stay healthy*, 2014: Available from http://publichealth.lacounty.gov/tb/public.htm.
6. Centers for Disease Control and Prevention Division of Tuberculosis Elimination, *Latent Tuberculosis Infection: A Guide for Primary Health Care Providers*, 2013.
7. World Health Organization, *Media Centre: Tuberculosis Fact Sheet No. 104*, 2016: Available from http://www.who.int/mediacentre/factsheets/fs104/en/.
8. Los Angeles County Department of Public Health Office of Health Assessment and Epidemiology, *Trends in Diabetes, Time for Action.* 2012.
9. Los Angeles County Department of Public Health Office of Health Assessment and Epidemiology, *Key Indicators of Health by Service Planning Area*, 2013.
10. California Department of Publich Health Tuberculosis Control Branch, Report on Tuberculosis in California, 2016, 2017: Richmond, CA.
11. Centers for Disease Control and Prevention (CDC). Reported Tuberculosis in the United States, 2016. Atlanta, GA.
12. Kim, SY, Lee, SM, Yim, JJ, et al. *Treatment Response and Adverse Reactions in Older Tuberculosis Patients with Immunocompromising Comorbidities.* Yonsei Med J, 2013. **54**(5): p. 1227-1233.
13. Lin, C., et al., *Tuberculosis mortality: Patient characteristics and causes.* BMC Infectious Diseases, 2014. **14**(5).
14. Ortman, J, Velkoff, V, and Hogan, H. *An aging nation: The older population in the United States. Current Population Reports, P25-1140.* , 2014, U.S. Census Bureau: Washington, DC.
15. Federal Interagency Forum on Aging-Related Statistics, *Older Americans 2012: Key Indicators of Well-Being*, 2012: Washington, DC.
16. Centers for Disease Control and Prevention. *TB in Children in the United States. Available at: http://www.cdc.gov/tb/topic/populations/tbinchildren/default.htm*. 2014.
17. Oeltmann, JE, Kammerer, JS, Pevzner, ES, Moonan, PK. *Tuberculosis and Substance Abuse in the United States, 1997-2006.* Arch Intern Med, 2009. **169**(2): p. 189-197.
18. World Health Organization, *Global Tuberculosis Report 2017*, 2017.
19. World Health Organization, *Drug-Resistant TB Surveillance & Response: Supplement Global Tuberculosis Report 2014.* 2014.
20. Marks, SM, Flood, J, Seaworth, B, et al. *Treatment Practices, Outcomes, and Costs of Multidrug Resistant and Extensively Drug Resistant Tuberculosis in the United States, 2005-2007.* Emerging Infectious Disease, 2014. **20**(5): p. 812-821.
21. California Department of Health Services and California Tuberculosis Controllers Association, *CDPH-CTCA Guidelines: Guidelines for the Follow-up and Assessment of Persons with Class A/B Tuberculosis, Revised* 2015.
22. Centers for Disease Control and Prevention Division of Tuberculosis Elimination, *Report of Verified Case of Tuberculosis (RVCT): Self-Study Modules Participant Manual.*, 2009.

23. Mazurek, GH, Jereb, J, Vernon, A, et al. *Updated guidelines for using interferon gamma release assays to detect Mycobacterium tuberculosis infection-United States, 2010* MMWR, 2010. **59**(RR-5): p. 1-25.
24. County of Los Angeles, Internal Services Department, Information Technology Service, Urban Research-GIS Section. *2016 Population Estimates for Los Angeles County Tract-City by Age, Sex, and Race/Ethnicity.*
25. Wang, W. *Calculating Age in One Line of Code*. in *Northeast SAS Users Group Meeting*. 2001. Baltimore, MD. Available from http://www.nesug.org/Proceedings/nesug01/cc/cc4022.pdf.

Tuberculosis Control Program

Los Angeles County Department of Public Health

Tuberculosis Control Program

2615 S. Grand Avenue

Los Angeles, CA 90007

213-745-0800

tbc@ph.lacounty.gov

County of Los Angeles Public Health