



Tuberculosis in Alameda County, 2008

Alameda County Public Health Department

Tuberculosis Overview

Tuberculosis (TB) is a communicable disease caused by the bacteria, *Mycobacterium tuberculosis*. TB is spread from person to person when someone with active TB disease sings, laughs, or coughs, aerosolizing the bacteria. Transmission can occur when people breathe in the bacteria while in close and prolonged contact with a person with infectious TB. Although TB can affect any part of the body, it most often affects the lungs.

Once TB bacteria have been inhaled, that person may become infected with TB. In most cases, the body is able to keep the bacteria from growing, but will still show evidence of exposure or infection. The TB bacteria in the body remain alive but inactive, and cannot be spread to others. This is referred to as latent TB infection (LTBI). For others, TB infection can progress to TB disease when the immune system cannot fight off the bacteria. If TB disease goes untreated, it can cause serious illness or death.

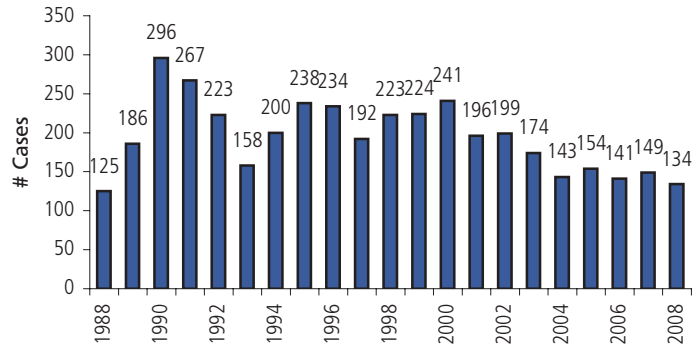
Over 2 billion people, more than one-third of the world's population, are infected with *Mycobacterium tuberculosis*, with more than 8 million becoming sick with TB disease annually. In the United States, there are an estimated 9 to 14 million Americans infected with TB, each of whom has the potential to develop active TB disease at any point in their lives. Both LTBI and TB disease are medically treatable. The treatment regimens can take at least six to nine months, possibly longer if the case is co-infected with other diseases or the strain is drug resistant.

Alameda County TB Cases and Rates

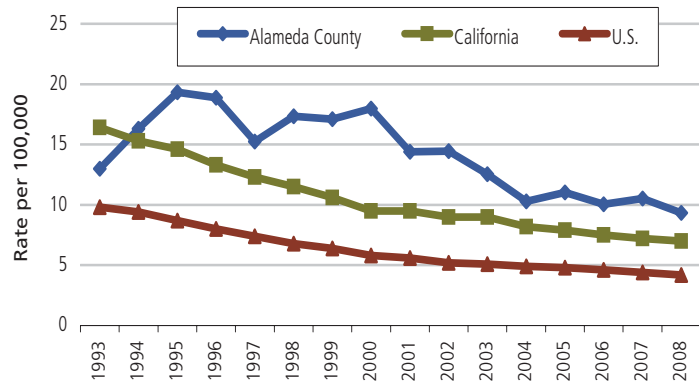
Tuberculosis in Alameda County, as in the rest of the United States, increased dramatically in the early 1990s as a result of federal funding cuts in the late 1970s and the dismantling of TB control program infrastructure in the 1980s. This, compounded with the emergence of HIV/AIDS resulted in outbreaks of TB and multi-drug resistant (MDR) TB in major cities across the nation. Tuberculosis in Alameda County peaked at nearly 300 cases in 1990, at which time Oakland was ranked as having the 3rd highest TB rate in the nation. In response to this resurgence of TB, the federal government refunded TB programs nationally, once again resulting in TB coming under control, as it currently seems to be. However, due to the current economy, reductions in funding may occur. With loss of jobs, health insurance and housing, it is likely that we will see delays in diagnosis and increased transmission. Should this happen, increases in TB, MDR-TB and possibly XDR-TB will undoubtedly emerge.

In 2008, there were 134 cases of TB in Alameda County (excluding the city of Berkeley), a 10% decrease from 2007. Alameda, San Francisco, San Mateo, Santa Clara counties, the City of Berkeley, and the state experienced declines in the number of

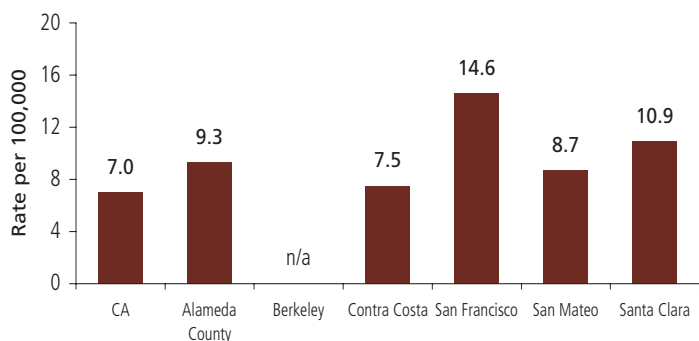
Annual Tuberculosis Cases, 1988-2008 Alameda County



Annual TB Case Rates, 1993-2008 Alameda County, California and U.S.



TB Case Rates for California and Selected Jurisdictions, 2008



new cases of TB from the previous year, while Contra Costa experienced a 55% increase. Statewide, 19 of the 61 reporting jurisdictions saw increased numbers of cases, 24 experienced decreases and the remaining had no change from the previous year.

Alameda County's case rate was 9.3 per 100,000 residents in 2008, more than double the national rate of 4.2 per 100,000 population. Alameda County also exceeds the California state rate of 7.0. Compared to other Bay area jurisdictions, the rate in Alameda County is higher than in Contra Costa and San Mateo counties, but is lower than the surrounding counties of San Francisco and Santa Clara.

TB Cases by Gender

The gender distribution of annual TB cases in Alameda County has remained relatively stable over the past decade, with a greater proportion of cases occurring among males. In 2008, there were three cases among males for every two reported cases among females. The average annual rate among males during 2006-2008 was 11.8 per 100,000, one and one half times the rate of 8.1 among females.

TB Cases by Age Group

In 2008, 90% of incident tuberculosis cases occurred among individuals over the age of 25 years, with the greatest proportion among those 25-44 years (36%). However, individuals ages 65 and over have the greatest risk of having TB compared to younger populations. In 2006-2008, adults 65 and over had an annual average case rate of 24.6 per 100,000, more than twice the rate of those in age groups 25-44 and 45-64, and 3.5 times the rate of persons 15-24 years.

In 2008, there was one pediatric (children aged 0-4 years) case of TB. Cases among young children are of particular concern because they indicate recent transmission of tuberculosis. This can occur when the child is born in a country with high rates of TB, or from exposure to a foreign-born individual coming from a country with high TB rates.

Tuberculosis Cases by Race/Ethnicity

Racial/ethnic minorities in Alameda County bear a disproportionate load of reported TB cases, with the majority of cases occurring primarily among Asian/Pacific Islanders. In 2008, 62% of TB cases were among Asians/Pacific Islanders, 20% among Latinos, and 11% among African Americans. Non-Hispanic Whites accounted for 7% of tuberculosis cases last year.

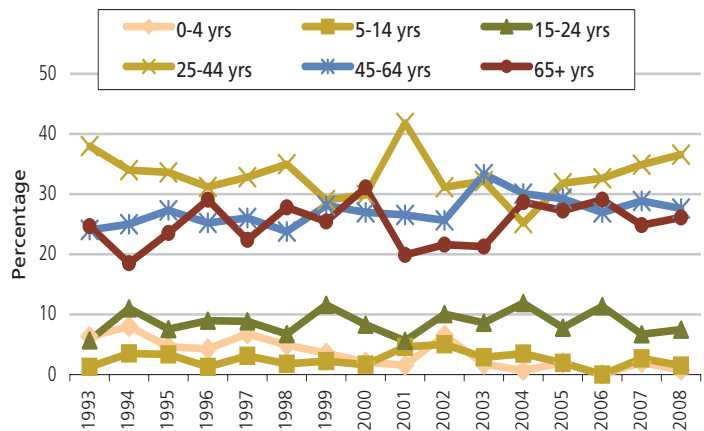
In the period 2006-2008, Asian/Pacific Islanders had the highest average annual case rates (26.7 per 100,000), more than twice the rates for Africans or African-Americans (12.0), and nearly five times that of Latinos (5.6). The Asian/Pacific Islander case rate was 17 times the rate for Non-Hispanic Whites whose average annual case rate was 1.5 per 100,000 for the same period.

In 2008, the majority of the foreign-born incident cases occurred among Asians/Pacific Islanders (68%) and Latinos (20%).

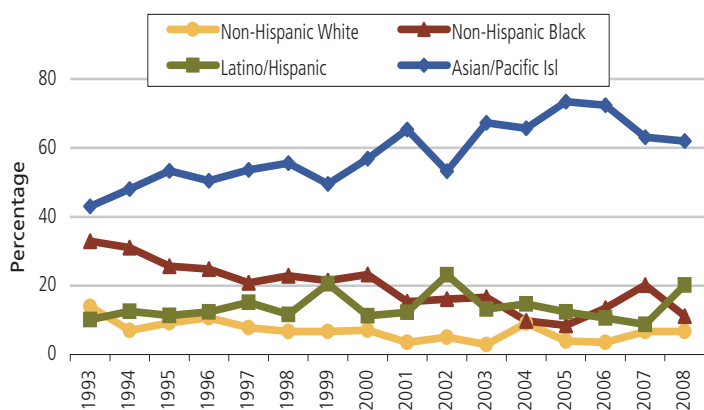
TB Cases and Average Case Rates 2006-2008

		Number of Cases	Average Case Rate
Sex	Male	247	11.8
	Female	177	8.1
Age group	0-4 yrs	4	n/a
	5-14 yrs	6	n/a
	15-24 yrs	36	6.8
	25-44 yrs	147	11.2
	45-64 yrs	118	10.7
	65+ yrs	113	24.6

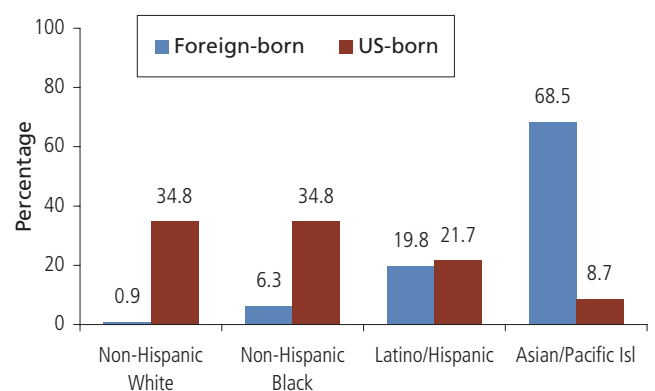
Annual Percent of TB Cases by Age Group, 1993-2008



Annual Percent of TB Cases by Race/Ethnicity, 1993-2008



TB Cases by Place of Birth and Race/Ethnicity, 2008



However, among the U.S.-born individuals, African Americans and Whites equally accounted for 35% of incident cases, Latinos 22% and U.S.-born Asian/Pacific Islander at 9%.

TB Cases by Place of Birth

TB among foreign-born residents of Alameda County has accounted for an overall and continually increasing proportion of annual cases. In the early 1990s, cases were almost evenly split between foreign- and U.S.-born persons. In 2008, 82% of the newly reported TB cases occurred among individuals who migrated from countries with high tuberculosis rates. Individuals most often came from the Philippines, China, Vietnam, Mexico, and India.

The average annual case rate in 2006-2008 for foreign-born individuals in Alameda County is 28.5 per 100,000 residents, ten times the rate for TB cases born in the U.S. (2.8).

Most recently, trends have been showing increases in TB cases among our Central American/Guatemalan and Mongolian populations. The TB Control Program will continue to monitor closely and will outreach to these communities with education and information to effect early case finding and treatment.

TB Drug Resistance

Drug resistance can occur when a person with TB infection or disease does not take their medicines as prescribed and the bacteria become resistant to the medication, or if a person is infected by someone who has drug resistant TB. Drug resistant cases undergo longer courses of treatment. Twenty (15%) of the cases in 2008, 17 of which were foreign-born, were resistant to at least one of the anti-tuberculosis medications. Two TB cases in 2008 were considered multi-drug resistant (MDR), that is, resistant to both Isoniazid and Rifampin. Between 1993-2008, there have been a total of 26 MDR tuberculosis cases, and 92% of these occurred among foreign-born individuals.

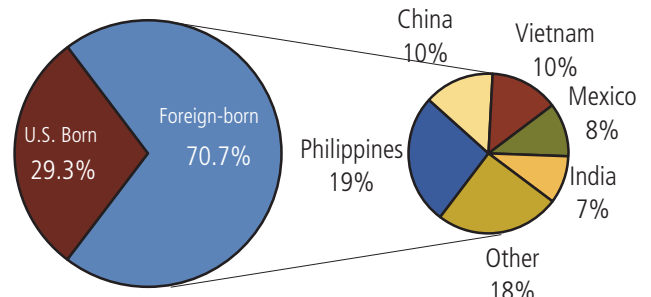
Other Characteristics of TB Cases

Most often, tuberculosis occurs in the lungs, known as pulmonary TB. Of the incident cases in 2008, 75% were pulmonary TB, and one in four cases had TB affecting areas other than the lungs (extra-pulmonary TB). The most common sites outside the lungs are lymph nodes, bones and joints, and brain or spinal cord.

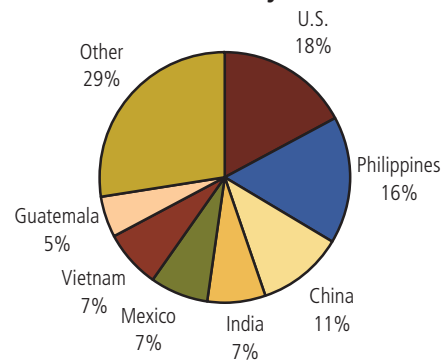
In the 12 months prior to their TB diagnosis, 6% of the 2008 cases had used alcohol excessively, 4% had used non-injection drugs, and 2% were injection drug users. One percent of the cases had been homeless, 1% had been in a long-term care facility and 1% in correctional facilities within one year of diagnosis.

Eight of the 134 incident TB cases (6%) in 2008 were known to be co-infected with HIV/AIDS. Of the cumulative 51 co-infected cases from the past 15 years, 23 (45%) were diagnosed with TB in the most recent three years. HIV is the most important risk factor for progression from latent TB infection to TB disease.

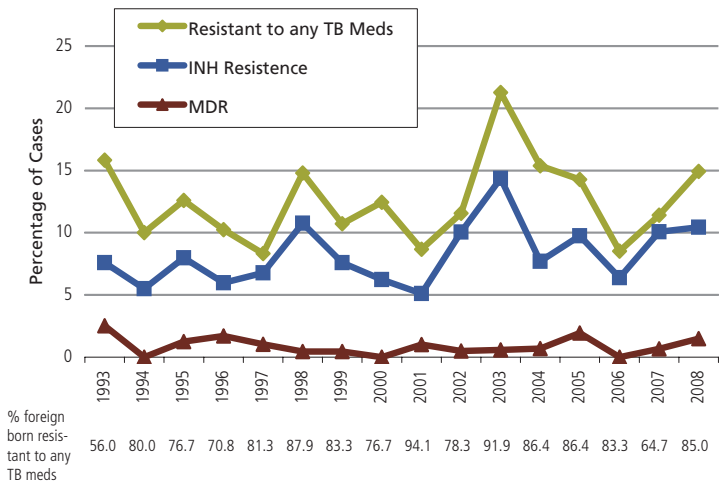
**Cumulative TB Cases by Place of Birth
Alameda County, 1993-2008**



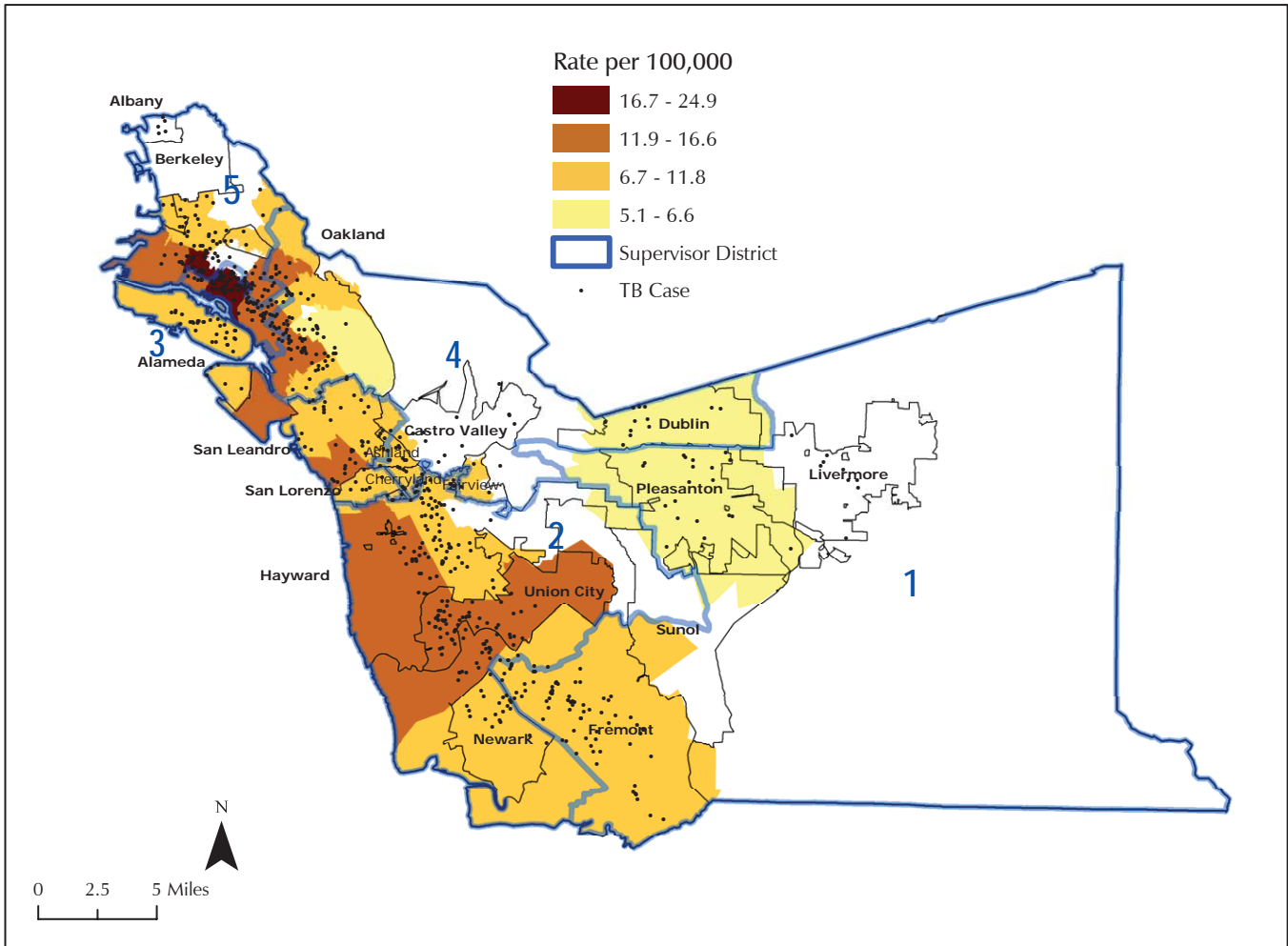
**Incident TB Cases by Place of Birth
Alameda County, 2008**



Percent TB Cases Resistant to any TB Meds, INH and MDR Resistance, Alameda County, 1993-2008



Alameda County TB Cases and Rates by ZIP, 2004-2008



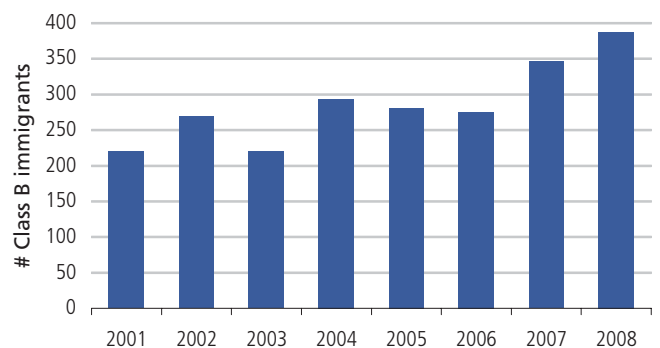
Source: CAPE, with data from TIMS, 2004-2008
 Note: ZIPs with less than 10 cases excluded.

Thirty-seven percent of TB cases reported in 2008 were among residents of Oakland. The cities of Fremont and Hayward reported the greatest number of cases in the south county, accounting for 16%, and 13% respectively. The east county (Dublin, Pleasanton and Livermore) comprised 3% collectively. The map of TB rates for the most recent five years indicate that elevated rates occurred in neighborhoods of West and East Oakland, San Leandro, Hayward, Fremont and Union City. The highest rates occurred in the downtown, Chinatown and San Antonio neighborhoods of Oakland.

B1/B2 Immigrants to Alameda County

As the proportion of TB among foreign-born residents continues to grow, TB elimination efforts in the United States are hinged upon efforts to control TB among foreign born individuals. Immigrants and refugees from countries with high rates of TB undergo a tuberculosis screening before obtaining a visa to enter the United States. Depending on results of the screen, foreign-born applicants are classified as class A, if they have infectious TB; class B1 if they have clinically active TB; Class B2 if the TB is not clinically active; or class B3 if the TB is healed or old TB. The state or local health jurisdiction is notified of the arrival of each person with an A, B1 or B2 status, and the immigrant or refugee is advised to report to their local health department. Class A immigrants must begin TB treatment in their country of origin before admission into the U.S. Class B immigrants to Al-

Class B1 and B2 Immigrants to Alameda County, 2001-2008



Alameda County most often arrived from the Philippines, China, Vietnam, India, followed by Mexico. Refugees are followed up by the refugee program.

Alameda County experienced an increase in the number of B1/B2 immigrants coming into the county. Once identified, active cases are referred to TB case management for follow-up. The TB program has a dedicated Class B Clearance Coordinator who follows up on all B1 immigrants to obtain a medical history, ensure a tuberculosis skin test is placed and read, obtain lab specimens, make referrals for chest x-rays and schedule medical screenings or evaluations in the ambulatory or private provider setting for appropriate care. From 2001-2008, a total of 2293 class B immigrants entered the county, were processed and followed-up by the TB program. In 2008, 388 class B immigrants were reported to Alameda County by the federal Division of Global Migration and Quarantine, a 76% increase from 220 immigrants in 2001. Nine of these B1/B2 immigrants in 2008 were diagnosed with active TB prior to arrival or following medical evaluation.

Alameda County Public Health Department's TB Control Program strives to continue to meet the demands of following the increasing numbers of Class B immigrants coming into the county. Elimination of TB in the county requires strengthened domestic TB control efforts coupled with intensified screening and follow-up of foreign-born Class B individuals.

Tuberculosis Outbreak Investigations

In 2007, the Alameda County Public Health TB Control Program identified a cluster of several INH resistant, HIV-positive, drug using tuberculosis cases. With the assistance of the State TB Control Branch, using genetic molecular fingerprinting, it was determined that several cases diagnosed 2006-2007 were linked with cases fitting similar profiles. DNA sequencing using restriction fragment length polymorphism (RFLP) technique determined that 13 cases diagnosed over

the past five years were genetically linked to one another. This cluster, designated CA-242, has been jointly followed by Alameda County and the state TB Control Branch. As of the end of 2008, no new cases have been identified in this cluster.

In 2008, five new cases were found, by traditional case contact investigation, to be epidemiologically linked to one another through shared acquaintances who frequented several bars. RFLP/genetic fingerprinting yielded a new cluster, CA-489, with an additional 11 cases having the same genetic fingerprint. Alameda County has been working with the California State TB Branch's Outbreak Team to attempt to identify commonalities between and among these newly identified cases and the original five in order to identify possible common sites of transmission. To date, no epidemiologic linkages have been identified, with the last new case in this cluster having been identified in late August, 2008, and no new related cases reported since.

TB Control Program Moving Forward

The TB program is working to strengthen partnerships with medical care providers and facilities in order to increase awareness of TB and assist with the early identification, diagnosis and treatment of active cases. The TB program collaborates with providers to determine appropriate initiation of therapy, ensure best practices, best possible care, and successful patient completion of therapy.

Although cuts in federal funding to the CDC and the states for Tuberculosis control coupled with California's own budgetary crisis threaten our successes, the Alameda County TB Control Program will continue to strive to reduce active TB cases within the county.

Acknowledgments

This report was produced by the Alameda County
Public Health Department

Tony Iton, M.D., J.D., MPH
Health Officer and Director

Robert Benjamin, M.D., MPH
TB Controller, Deputy Health Officer

David Kears
Director, Health Care Services Agency

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Comments, questions, and requests for
additional copies can be directed to:

TB Control Program
Alameda County Public Health Department
Eastmont Town Center
7200 Bancroft Way, #202
Oakland, California 94605
(510) 577-7000
www.acphd.org