

A Five-Year Review of Tuberculosis Trends, Determinants, and Policy Responses in California (2020–2025)

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ABSTRACT

Tuberculosis (TB) remains a significant public health challenge for California, being the state with the highest TB case count in America. The following narrative literature review analyses TB trends in California between 2020 and 2025. It reviews peer-reviewed articles, surveillance reports and epidemiological databases to summarize current evidence for the structural determinant factors of TB disease burden in the state and policy response to TB. Deep racial and ethnicity disparities, foreign-born populations as the primary case reservoir and social determinants such as homelessness, incarceration, diabetes and Human Immunodeficiency Virus (HIV) co-infection characterized the distribution of TB in California. The COVID-19 pandemic disrupted TB surveillance and resulted in a historic 19% single-year decline, followed by consecutive increases in reported cases, with preliminary 2025 surveillance data suggesting a continued rise. An excess of approximately 200 TB cases between 2020-2023 caused by diagnostic delays, surveillance disruptions and post-pandemic rebound indicates a rebound-diagnosis phenomenon following pandemic delays. Preliminary evidence suggests that excess cases were concentrated among working-aged Hispanic adults, those foreign-born or patients with comorbid diabetes and HIV. TB control measures concentrated on expansion of screening and treatment therapy of latent tuberculosis infection (LTBI) in primary care settings, commitment to the California TB elimination Plan and implementing culturally tailored outreach schemes. Addressing gaps that remained by previous policies have centered around LTBI cascade engagement, reimbursement structure, provider education and resilience to external factors. To reverse setbacks and accelerate progress for TB control in California during the pandemic era, this review identified prioritized research areas for strengthened TB control.

1. INTRODUCTION

Tuberculosis (TB), caused by *Mycobacterium tuberculosis* complex, is an infectious disease transmitted via airborne particles.¹ While TB is both preventable and curable, it remains a major source of illness and death worldwide, even in a developed nation such as the United States.² Considering the population size, diversity and connectivity to the rest of the world, California bears a disproportionate burden of the country's cases.² In 2020, California had 1,705 cases (nearly one-fifth of total US cases) at a crude incidence rate of 4.3 per 100,000 population- nearly twice the national rate of 2.2 per 100,000 people.²

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The duration of 2020 through 2025 comprises unprecedented challenges. The COVID-19 pandemic severely distressed nearly all aspects of the fight against TB by redirecting human and community capital to fight COVID-19 in the first place, by compromising health-seeking behavior and slowing down contact tracing efforts, as well as impacting immigration patterns, which are associated California's biggest reservoir of LTBI among non-USA-born persons.³ Therefore, a record fall in cases occurred (in 2020), and national surveillance shows four consecutive years until 2024 with increasing rates nationwide reaching a zenith of around 36 cases per 100 000 by then.^{3,4} On the state level, California case numbers were forecasted to rise until 2025 to 1,549 (CDCA 2026).⁴ To comprehend both historical rise as well as a projected one across California within its past five-year interval, the epidemiological patterns have been considered along with unequal distributions of risk, structural dimensions and sociological factors.^{3,4}

Understanding this resurgence is very critical to eliminate TB and to achieve the Sustainable Development Goal of END TB by 2030. This review was conducted to understand the geographical trends in TB incidence and mortality in California, and factors contributing to the resurgence of TB in California.

2. METHODS

This study was conducted as a narrative review synthesizing information about epidemiology, clinical data, and policy data on TB in California to understand the trends, factors, and public health responses to the resurgence of TB in the state.

Study Design

The study that will be conducted will be a narrative review of the literature regarding the epidemiology of TB, its structural determinants, and the resulting public health policies within California between 2020 and 2025. The literature will be gathered from peer-reviewed journals, as well as from the public health and government agencies that published the reports regarding TB within the state.

Literature Search Strategy

The search for literature will occur through the databases PubMed and Google Scholar, as well as through the websites of the California Department of Public Health, the Centers for Disease Control and Prevention, the World Health Organization, and the California Correctional Health Care Services. Each of these databases and websites contain publications regarding TB and its control within the United States and California specifically. The search will utilize terms like “California tuberculosis,” “tuberculosis epidemiology California,” “TB incidence California,” “latent tuberculosis infection California,” “COVID-19 tuberculosis,” “tuberculosis surveillance California,” “California TB elimination,” “tuberculosis diagnostic delays,” “tuberculosis health disparities California,” “drug-resistant tuberculosis California,” and “tuberculosis policy California.”

Publications from the years 2020-2025 will be prioritized for review. Older publications will only be included in instances where they relate to topics like LTBI, health disparities, or TB policies within the state of California.

Eligibility Criteria

The following criteria will be used to determine which literature will be reviewed for this research project:

Inclusion Criteria: Studies that focus on topics related to TB such as its epidemiology, determinants, structural components, characteristics, policies, or interventions;

- Studies that relate to TB in California or topics related to health disparities in the state;
- Studies that have been published in peer-reviewed journals or governmental organizations;
- Studies that contain data related to TB epidemiology, structural components, or public health policies.

Exclusion Criteria: Studies related to basic research related to the laboratory analysis of TB;

- Studies related to individual patients with TB;
- Studies that are duplicate publications;
- Non-English publications;
- Publications unrelated to the topics of TB trends, determinants, or public health policies in California.

As there was limited evidence regarding the topic of review beyond the pandemic period, one recent preprint published on the topic of excess tuberculosis incidence between 2020 and 2023 was incorporated as a supplement to the scientific literature that had been published on the topic. The findings of this publication were reviewed with care due to its status as a preprint publication.

Information from the included studies was extracted and synthesized through a narrative summary. Data collected from the included sources encompassed information regarding TB incidence, case counts, mortality rates from the disease, the demographics of those affected by TB, the geographic locations in which the disease was found, information regarding LTBI, the determinants of TB, and even information related to the COVID-19 pandemic and its relation to TB. Each of these findings was reviewed to help determine any themes to the current scientific literature

Data Sources

The following databases were explored for evidence synthesis:

1. California Department of Public Health (CDPH) reports (2020–2025).
2. Centers for Disease Control and Prevention (CDC) Tuberculosis in the United States: 2023.
3. World Health Organization (WHO) Global Tuberculosis Report 2024.
4. Related published literature

Data Extraction and Verification

All the documents were carefully assessed to extract numbers and information that could be measured, like incidence rate, mortality rate, and drug resistance cases. Additionally, information on changes in policies and reports of outbreaks was also taken into consideration.

3. EPIDEMIOLOGICAL TRENDS IN CALIFORNIA, 2020–2025

3.1 Overall Case Burden and Incidence Rates

For nearly three decades, TB in California remained on an overall decline, until COVID-19 interrupted it. Pre-2020 TB incidence in California went gradually downwards, from about 2,320 cases in 2011 to 2,112 cases in 2019, dropping from 6.2 to 5.3 cases per 100,000 for the period.² The pattern was broken in the year 2020 by an acute decline of 19% to 1,705, the steepest single-year decline in proportion terms since 1981.² This drop was received with concern by epidemiologists, as it primarily concerned under diagnosis, compromised healthcare access and surveillance, but not the interruption in transmission itself.²

California's TB cases picked up a steady upward pace from 2021, and so did U.S. case counts. According to provisional CDC surveillance data, California reported approximately 2,150 TB cases in 2025, suggesting a slight increase from 2024. Because these figures are provisional, they remain subject to revision as additional case reports are received.⁴ Nationally, California ranked fourth with the absolute number of excess cases after Texas (410), New York (380) and Florida (260).^{4,5} This is pattern may be explained, in part, by California's epidemiological profile: it carries a huge and growing non-U. S. Born population, high-risk groups such as people with drug addiction and economically vulnerable households.⁴ It also harbours significant structural vulnerabilities in key demographic sectors that have hindered surveillance and early diagnosis, and has migrants arriving from areas with high TB prevalence.^{3,4} The unique socio-economic and demographic structure with an abundance of low-income immigrants, significant homelessness, overcrowded housing and substance abuse, are specific associated with higher TB burden and may explain these observed trends^{4,5}

3.2 Geographic Distribution Within California

TB in California is not uniformly distributed across the state's 61 local health jurisdictions (58 counties and the cities of Berkeley, Long Beach, and Pasadena). In 2020, TB cases were reported in 42 of 61 jurisdictions (69%), with 12 jurisdictions (19%) reporting just 1–4 cases.² Fourteen jurisdictions reported

rates at or above the state average of 4.3 per 100,000, while five jurisdictions had rates at or below the national average of 2.2 per 100,000.² The concentration of cases in urban, ethnically diverse counties—particularly Los Angeles, Santa Clara, and Alameda—reflects both the geographic concentration of high-risk populations and the distribution of healthcare infrastructure for TB surveillance.¹ Consisting of Oakland, Hispanics of approximately 37% and 22% respectively and one third of non-US born, Alameda County still showed TB incidence 7.4-10.0/100,000 for 2016-2019.¹ The heterogeneity of counties suggests how local based information was essential to understanding burden of TB epidemic and informing the allocation of resources in California.

4. STRUCTURAL AND SOCIAL DETERMINANTS OF TB BURDEN

4.1 Country of Birth and Immigration

Of all the factors, Country of birth is one of the strongest epidemiological factors associated with the TB burden in California.² The high proportion of TB cases among non-U.S.-born individuals largely reflect the reactivation of LTBI acquired before immigration rather than transmission occurring after arrival. Notably, 84% of California TB cases in 2020 occurred in persons born outside the United States, as the rate in non-U. S. -born people were 14 times that of U.S.-born individuals, i. e., 13.4 and 1.0 per 100,000, respectively.² The major share in countries belonged to the Philippines, which holds 19% of cases, while 20.6% were non-U. S. -born people in Mexico, Vietnam (10.6%), India (6.6%) and China (6.1%).² Most of the TB cases in non-U. S. -born individuals occurred more than two decades after they arrived in the United States due to the activation of old LTBI.² Border screening alone is unlikely to achieve TB elimination because a substantial proportion of TB cases result from reactivation of LTBI acquired before arrival in the United States.² Over 2 million Californians in 2020 have LBTI, and of this total, around 1.8 million individuals are not U.S.-born. And among the LBTI-stricken foreign population, only 20% know their LTBI status, whereas only one-tenth have received treatment from the healthcare department.²

The pandemic disrupted this already-challenged pipeline further. Nationally, the number of non-U.S.-born persons entering the United States decreased by approximately half in 2020 compared to 2019, including a 62% decline in new-arrival immigrants.³ The Electronic Disease Notification (EDN) system recorded a corresponding decline of over 60% in overseas-screened arrivals during 2020.³ These reductions likely contributed to the drop in first-year TB diagnoses, masking an underlying risk that re-emerged as immigration resumed.³

At the structural level, a regression analysis by Karami et al. (2026) examining state-level predictors of excess TB cases during 2020–2023 identified the percentage of foreign-born residents as the strongest positive predictor.⁵ The preprint suggested that states with larger immigrant populations experienced, including California, experienced greater excess TB burden during the pandemic period, consistent with the known association between immigration from high-prevalence countries and domestic TB incidence.⁵

4.2 Racial and Ethnic Disparities

Racial and ethnic disparities in TB burden are stark and persistent in California. Asians and Pacific Islanders constitute the most affected group in absolute terms: in 2020, Asians accounted for 52% of all California TB cases, a proportion that rose from 47% in 2010.² At 18.6 per 100,000 population, the TB rate among Asians and Pacific Islanders in California was 19 times that among Whites (1.0 per 100,000), while rates among Blacks (4.4 per 100,000) and Hispanics (4.6 per 100,000) were four to five times higher.⁶ These disparities reflect the combined influence of country of birth, socioeconomic conditions, healthcare access barriers, and comorbidity burden.

Nationally, the COVID-19 pandemic affected racial and ethnic groups very differently. Preliminary findings reported in a recent preprint by Karami et al. (2026) suggested that the Hispanic population experienced by far the largest pandemic-attributable excess TB burden in the U.S., estimated at 1,700 excess cases (95% PI: 1,100–2,500) during 2020–2023, accounting for a disproportionate share of the national total. The Black population also showed excess burdens in 2022–2023.⁵

Katrak and Flood (2018), highlighted that attention to racial disparities in TB has been limited compared to other conditions, arguing that without targeted interventions focused on highest-risk subgroups, declining overall case rates risk masking and even widening existing inequities.⁶ Medical comorbidities also compound racial disparities: diabetes, the most common TB comorbidity, is far more prevalent among Asians and Hispanics with TB, and together these two groups made up 93% of California patients with TB and diabetes from 2010 to 2014.⁶

4.3 Age-Related Patterns

TB in California affects people across the age spectrum but is concentrated among working-age adults and is an increasing concern among older adults.⁵ According to a recent preprint, working-age adults aged 25–44 experienced the greatest pandemic-attributable excess burden, with the 35–44 group accumulating an estimated 650 excess cases (95% PI: 300–1,200) and the 25–34 group 630 (95% PI: 330–1,100) during 2020–2023.⁵ These patterns may reflect occupational exposures, higher mobility, and greater delays in care-seeking during pandemic disruptions among prime-age adults.⁵ In contrast, children continued to show declining TB rates in California, with cases in children under five falling from 82 in 2010 to just 23 in 2020, a trend attributable in part to the low proportion of recent transmission and ongoing surveillance in pediatric settings.²

These findings suggest that California's aging non-U.S.-born population presents a growing epidemiological and clinical challenge requiring tailored diagnostic and management protocols.

4.4 Comorbidities: Diabetes, HIV, and Other Risk Factors

An important factor associated with TB risk and clinical outcome in California is the prevalence of comorbidities. In 2020, 42% cases of adult TB had at least one condition that raises the risk for progression of LTBI to active TB. These conditions include diabetes mellitus, end-stage renal disease, HIV infection, and other conditions compromising immunity.^{2,7} Diabetes was a leading comorbidity

diagnosed in 31% of cases with adult TB, specifically Asians and Hispanics, both of whom have increasing rates of obesity.² HIV co-infection remains a concern in case management, as between 2011 and 2020, the proportion of TB cases in individuals with HIV/AIDS decreased from 4.4% to 3.2%.^{2,7} A HIV infection raises the progression from TB infection to TB disease and also the probability of death.⁸ Karami et al (2026), found from their analysis on national structural determinants that increased prison population, along with poor housing conditions was a major factor contributing to excess cases of TB at the state level.⁵ Also, correctional facilities are high-risk populations for transmission of TB owing to overcrowding, poor air circulation and compromised access to control of TB facilities. These challenges may have been exacerbated following the emergence of COVID-19.⁵

4.5 Latent Tuberculosis Infection as the Primary Case Reservoir

The epidemiology of California TB is dominated by reactivation of LTBI rather than recent transmission.² With over 2 million Californians estimated to harbor LTBI—6% of the state population—the scale of the problem is daunting.⁷ Katrak and Flood (2018) estimated that approximately one in 17 Californians has LTBI, with approximately one in four non-U.S.-born Californians infected.⁶ Despite the availability of safe and effective preventive therapy, and despite U.S. Preventive Services Task Force Grade B recommendations for LTBI screening in persons born in or who have lived in high-prevalence countries, only a small fraction of those with LTBI are identified and treated.⁶ The barriers to LTBI cascade engagement are multi-layered, spanning patient, provider, and health system levels, and are explored further in the policy section of this review.

5. THE COVID-19 PANDEMIC AND ITS IMPACT ON TB IN CALIFORNIA

5.1 The 2020 Case Decline: Causes and Interpretations

The 19% decline in California TB cases in 2020—the largest single-year decrease since 1981—was unprecedented and alarming in equal measure.² Public health officials identified multiple potential mechanisms. First, reduced TB detection due to fewer patients seeking care: compliance with shelter-in-place orders and fear of COVID-19 infection appear to have suppressed healthcare-seeking.^{2,3} Nationally, 41% of adults reported having delayed or avoided medical care due to COVID-19 concerns, and overall healthcare utilization dropped by 23% in March 2020 and 52% in April 2020.³ In San Francisco, the city health department documented a substantial drop in persons seeking evaluations for TB signs and symptoms following the March 2020 shelter-in-place order.³

Second, COVID-19 mitigation measures themselves—masking, physical distancing, reduced congregate settings—may have genuinely suppressed TB transmission for a period. Third, dramatically reduced immigration likely decreased importation.³ New arrivals carrying LTBI who might have developed and been diagnosed with active disease fell sharply as immigration volumes contracted.³ The EDN system recorded a greater than 60% decline in overseas-screened arrivals from 2019 to 2020.³

Third, the diversion of funds and staff from TB programs to the COVID-19 response compromised the ability to diagnose, treat, and conduct contact investigations.³ A CDC report from April 2020 found that 52% of TB programs across the country experienced partial or high impact on their capacity to diagnose and treat TB disease, and 64% experienced partial or high impact on contact investigation capacity.³ In California specifically, clinicians had missed opportunities to diagnose TB in patients presenting with respiratory symptoms, testing only for COVID-19, given the shared symptomatology.^{3,10}

5.2 The Post-2020 Rebound and Excess TB Burden

A recent preprint by Karami et al. (2026) estimated California's cumulative excess TB cases during 2020–2023 at approximately 200, reflecting departures from predicted pre-pandemic trajectories. Although these findings have not yet undergone peer review, they provide preliminary evidence of California's post-pandemic excess TB burden.

California's position as the fourth-highest state in absolute excess case counts is notable.⁵ Nationally, patterns in California during 2020–2021 showed reported cases at or below the lower end of predicted ranges, consistent with under detection, followed by 2022–2023 observations at rise, consistent with a diagnostic and care rebound.⁵ Preliminary CDC surveillance data suggest that California's reported TB cases increased further in 2025, (2,150 cases, rate 5.5 per 100,000) while national totals slightly declined suggests the persistence of factors including, immigration patterns and a large LTBI reservoir, that may contribute to continued case accumulation.⁵

The pandemic also intersected with the TB burden through direct biological mechanisms. SARS-CoV-2 infection may increase susceptibility to TB reactivation by altering immune function, particularly in individuals with comorbid HIV or diabetes.^{2,5} In California, among the 141 TB-COVID co-infected cases in 2020, the concentration of Hispanic and Asian TB patients with COVID-19 suggested compounding infection burdens on the most vulnerable communities.⁷ Long-term consequences of SARS-CoV-2-induced immune dysregulation on TB reactivation risk in California's large LTBI reservoir remain an open research question.

5.3 Surveillance and Diagnostic Disruptions

The clinical overlap between COVID-19 and TBI likely contributed to diagnostic confusion and missed TB diagnoses.² Older adults faced particular vulnerability during this period, because TB in this age group is more likely to present with atypical features, as negative IGRA results occurred in 24.6% of older adult cases in Alameda County.¹ Pandemic-related restrictions on in-person care likely disproportionately impaired the diagnosis of TB among the elderly, adding to the documented delays in this population's already-challenging clinical course.

6. POLICY RESPONSES AND PROGRAMMATIC INTERVENTIONS

6.1 The California TB Elimination Plan

California has pursued a structured policy framework for TB elimination through the California TB Elimination Plan, developed collaboratively by the CDPH, the California TB Elimination Advisory Committee, and the California TB Controllers Association. The first five-year plan addressed 2016–2020, and a second iteration guides ongoing efforts.^{2,8-10} The plan centers on making TB prevention a routine component of primary care, with a particular focus on four pillars: finding and testing Californians at risk for TB and LTBI; optimizing treatment regimens; monitoring and evaluating LTBI testing and treatment at scale; and ensuring that patients, clinicians, and public health programs have the tools and resources required for effective prevention.

6.2 LTBI Testing and Treatment: Barriers and Progress

The LTBI care in California faces multi-level barriers, such as, at the patient level, barriers include inadequate understanding of LTBI and associated stigma, reluctance to take medication for an asymptomatic condition, mistrust of the medical system, and, particularly among non-U.S.-born individuals, concerns about disclosure of immigration status deterred care-seeking.^{6,10,11} Structural barriers include limited health insurance coverage among high-risk groups, as the U.S. Preventive Services Task Force provides LTBI screening in adults born in or who have resided in high-prevalence countries; however, coverage for treatment itself is not mandated.

Health system-level barriers suggest that the existing ICD-10-CM coding infrastructure is insufficient to capture information on LTBI therapy initiation or completion, limiting the ability to measure progress at the population level. The development of a Healthcare Effectiveness Data and Information Set (HEDIS) performance measure for LTBI care has been proposed as a vehicle for incentivizing providers and health systems to adopt systematic screening and treatment protocols.⁶

Federal law requires TB screening for all refugees and immigrants applying for visas from overseas, with those identified with active TB disease required to complete treatment before arriving or shortly after arrival in the U.S.³

Cost-effectiveness modeling has established that testing and treating non-U.S.-born U.S. residents for LTBI using 3HP is cost-effective, particularly for those without end-stage renal disease, and that interferon-gamma release assay-based testing strategies are cost-effective for the non-U.S.-born population.

6.3 Correctional Health and High-Risk Settings

The control of TB in correctional facilities is an ongoing issue especially in California, which hosts the largest state prison system in the US. Correctional facilities present conditions that are associated with increased TB transmission risk, including overcrowding, poor ventilation, high HIV prevalence, substance use, and barriers to healthcare access.^{5,13} Incarceration rate was identified by Karami et al (2026) as a

marked positive predictor for state-level excess TB burden during the pandemic, an indication that the structural vulnerability in the correctional environment was likely intensified as TB surveillance and treatment protocols were disrupted.⁵

6.4 Drug Resistance Trends

In 2020, there were 11 Multi drug-resistant (MDR) TB cases in California (0.8% of cases), compared to 25 (1.4%) in 2010.² Between 2020 and 2024, 22 cases were MDR-TB, which equals 1.0%.¹² California also had 4 cases of extensively drug-resistant TB, also known as XDR-TB.¹² The numbers themselves may not seem that high, but treating MDR-TB or XDR-TB can take up to 1.5-2 years and can cost up to tens of thousands of dollars per patient, making up for approximately \$288,000,000 (TB-related healthcare costs, in 2024, a 7% jump since 2021) of healthcare expenses yearly.^{6,14,15}

Synthesis of Key Themes in this review

The present five-year review of TB in California has unearthed multiple intriguing underlying themes. First, The structural determinants associated with California's TB burden include, i.e., foreign-born residents, racial and ethnic minority status, poverty, homelessness, incarceration and diabetes and HIV, are mere transients to California's demographics. Secondly, the demonstration of TB surveillance and control systems, both within California and elsewhere, proved themselves not to be resilient towards any major shock delivered to the system. Thirdly, the available evidence suggests that reactivation of LTBI is the predominant mechanism underlying most TB cases in California.. Fourth, demographic changes within the TB case distribution have appeared recently, including its growing numbers of old cases and its consistently high numbers towards Hispanic and Asians etc, all these call for a differential response towards these demographics.

Gaps in the Evidence Base

There is not enough California-specific peer-reviewed data on TB in 2021-2025, the majority of data is derived from national surveillance. Secondly, LTBI prevalence data have been modeled and are not based on actual measurements at the state level. The intersection of changing immigration policy and TB case detection and the LTBI cascade needs more investigation.

7. CONCLUSION & RECOMMENDATIONS

The five-year period from 2020-2025 is a critical and turbulent moment in the broader arc of California's struggle against TB. COVID-19 eroded recent progress against TB in the state, stressed already vulnerable TB surveillance systems and concentrated excess disease burden on communities that bore a disproportionate share of population risk- the rebound in cases that California has experienced since then and in the provisional 2025 CDC surveillance data, which reported approximately 2,150 cases, is one of its highest case counts in several years, is in stark contrast to the small decline in cases identified nationally. If confirmed by finalized surveillance data, this trend underscores the need for a redoubling and refocusing of

targeted efforts in public health. California's burden of TB remains strongly associated with its large reservoir of LTBI within non-U. S. -born communities. Structural factors—including poverty, homelessness, barriers to healthcare access, and incarceration—are associated with higher TB burden and may contribute to disparities in active TB disease.

Based on the synthesized evidence, this review identifies the following priority policy directions for California's TB elimination agenda: (1) Strengthen and protect TB program infrastructure against future public health emergency disruptions through dedicated funding buffers and staffing protections; (2) Accelerate the integration of LTBI testing and treatment into primary care settings, including robust provider education on risk stratification, IGRA interpretation, and short-course regimens such as 3HP; (3) Advocate for mandated coverage of LTBI treatment without cost-sharing for high-risk populations under state insurance regulations; (4) Expand culturally and linguistically tailored TB and LTBI outreach for Hispanic, Asian, and other high-risk communities, including addressing immigration-related barriers and strengthen TB control in correctional facilities.

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