

RECOMMENDATIONS

from the

San Diego County Tuberculosis Elimination Initiative

to the

San Diego County Board of Supervisors

December 2020



Cover photo: TB Survivors Network Event, November 2018

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This document was developed through a public-private partnership with the County of San Diego and community stakeholders. The report was drafted by Catherine Bender, MPH – Senior Consultant, San Diego County Tuberculosis Elimination Initiative.

“To reach tuberculosis (TB) elimination, the 10-15 million people in the U.S. living with latent TB infection (LTBI) must be identified and treated.”

- *“Ending Neglect: The Elimination of Tuberculosis in the United States”
published in 2000 by the Institute of Medicine*

“My message to other people that are going through this is that it is ok to be stressed out about your disease and treatment, but there’s hope. Life is very short and one day it will be over. I was on treatment for 3 years and I had drug resistant TB, and here I am...with a new beautiful and very healthy 3-month old baby. Believe in miracles!”

- Crystal, TB Survivor

“I came to San Diego and I went to the clinic because I was still very sick. I had lost 50 lbs. Finally, here in San Diego, I was diagnosed with active TB... What I want people to know about TB is that we need to be conscious and follow the treatment the way the doctors recommend it, because TB can kill you.”

- Maria, TB Survivor

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EXECUTIVE SUMMARY

INTRODUCTION

In 2014, the World Health Organization (WHO) launched the *End TB Strategy* with the goal of ending the global tuberculosis (TB) epidemic. The Centers for Disease Control and Prevention's (CDC) Division of TB Elimination *Strategic Plan for 2016-2020* provides a national strategy for TB elimination (defined as less than one case per million annually). In California, the TB Control Branch of the California Department of Public Health outlined a 5-year action plan (2016-2020) for TB Elimination, created by a collaboration of stakeholders. **San Diego County is poised to join global, federal, and statewide initiatives to work toward TB elimination through a public-private partnership: The San Diego County TB Elimination Initiative (TBEI).**

TB is a communicable bacterial disease transmitted from person-to-person. TB usually affects the lungs, but it can also affect other parts of the body such as the brain, kidneys, or the spine. Treatment of active TB is usually treated by taking several drugs for six to nine months. However, the majority of people infected with TB do not become ill right away, but instead harbor the bacteria in their bodies; this is referred to as latent tuberculosis infection (LTBI). LTBI cannot be transmitted to others, but without treatment, these individuals have a 5-10% risk of reactivation and progression to infectious TB disease in their lifetimes. Identifying individuals with LTBI via testing and treating persons with LTBI is an important strategy to prevent TB.

San Diego County's annual TB incidence was 7.9 cases per 100,000 persons in 2019, which is higher than both the California and national rates. Important contributing factors to this high rate include our diverse population and our location along the US-Mexico border. Approximately 175,000 San Diego County residents are infected with LTBI, which can progress to active TB disease if left untreated. An estimated 25% of individuals with LTBI are aware of their infection and only 15% have been treated. Finding and treating LTBI will prevent active TB cases in San Diego County and is an important strategy to accelerate progress towards achieving the goal of TB elimination. Efforts at the State and national levels can be leveraged to define the burden of LTBI and identify the stages where patients are lost to care in the process from LTBI diagnosis to treatment completion, known as the LTBI care cascade.

San Diego County has a pivotal opportunity to leverage the global, national and California strategies for TB elimination, and to be on the forefront of statewide efforts. Our multi-sector partnerships and binational collaboration uniquely position us for this effort. Moreover, the increased adoption of blood tests (interferon gamma release assays) to diagnose LTBI reduces false positives and new short-course LTBI treatment regimens now recommended by CDC increase the likelihood of treatment being completed by patients.

On July 23, 2019, the San Diego County Board of Supervisors (Board) authorized staff to develop and launch the San Diego County Tuberculosis Elimination Initiative (TBEI). The initiative is a coordinated effort to build a TB elimination framework that serves the County's diverse population and engages key stakeholders and communities impacted by TB.

The primary objective of this initiative is:

- To decrease the incidence of active TB cases in San Diego County from 7.9 cases per 100,000 population (2019) to less than 1 case per million population by 2040*

* Note this target was adopted from the *California Tuberculosis Elimination Plan, a Five-Year Action Plan, 2016 – 2020* and requires additional modeling and feasibility assessment for San Diego County. Short-term targets will be determined during the TBEI Implementation Planning phase of work.

To launch this work, the County of San Diego, Health and Human Services Agency, Public Health Services (PHS) convened the TBEI Advisory Committee, Steering Committee and five Action Committees in January 2020 with key community stakeholders. The purpose of establishing these committees was to assess and identify barriers to elimination of TB, analyze elimination strategies by the State and other counties, and develop recommendations focused on San Diego County priorities to eliminate TB, which are presented in this report.

METHODOLOGY

The San Diego County TB Elimination Initiative (TBEI) was modeled after the San Diego County Hepatitis C Elimination Initiative structure. The San Diego County TBEI is a public-private partnership and uses a collective impact model for both its structure and approach to community engagement. Stakeholders from over 25 unique agencies including 35 non-county participants were involved in the development of the initiative's recommendations.

Seven committees were established:

Advisory Committee – This committee guides the work of the TBEI and makes critical decisions regarding the governance, vision, and cross-cutting activities of the initiative.

Steering Committee – This committee is comprised of co-chairs of the Action Committees and serves to coordinate the activities of the initiative.

Action Committees – The following 5 committees were assembled to provide an overview of current status and develop the key recommendations for the Initiative in the areas of access, testing and treatment; surveillance and monitoring; consumer advocacy; communication and marketing; and schools.

1. **Access, Testing and Treatment Committee** – This committee is largely comprised of clinicians and direct service staff who work in settings providing TB diagnostic and treatment services. They identified strategies for testing and treatment for latent tuberculosis infection (LTBI) for high risk community populations, as well as provider outreach and peer-to-peer education.

2. **Surveillance and Monitoring Committee** – This group consists of clinicians, researchers, and epidemiologists. They identified strategies to understand the LTBI burden and monitor the LTBI care cascade to measure progress towards the elimination goal.
3. **Consumer and Advocacy Committee** – This group is comprised of members who are TB survivors who have undergone the diagnosis and treatment process related to TB and can provide feedback based on first-hand experiences.
4. **Communication and Marketing Committee** – This group is comprised of health educators, community outreach workers and other representatives that serve high-risk TB populations. They identified strategies to create accurate messaging for providers serving high-risk patients and for all individuals associated with the LTBI cascade of care.
5. **Schools Committee** – This group includes nurses, medical directors, physicians, and administrators from colleges, universities, and K-12 schools in San Diego County. They focused on strategies to standardize TB screening protocols and procedures, starting with higher education institutions, to prevent risk of TB transmission on school campuses, which are high risk environments.

The committees reviewed strategies outlined in the statewide TB elimination plan, best practices, and participated in conversation to develop recommendations for San Diego County.

FINDINGS

Several key themes were discussed by the committees and were incorporated into the recommendations:

Surveillance System Capabilities

The County of San Diego (County), Health and Human Services Agency, Public Health Services (PHS) conducts public health surveillance for active TB. However, there is no comprehensive latent tuberculosis infection (LTBI) surveillance system currently implemented at the national level, in California or in San Diego County. To monitor progress in TB elimination, San Diego County needs systems in place to define the burden of LTBI and identify the stages where patients are lost to care in the process from LTBI diagnosis to treatment completion. The County has recently gained preliminary experience for reporting of LTBI via a pilot project for civil surgeons due to a federal requirement for reporting. PHS is also working to utilize positive interferon gamma release assay (IGRA) results for surveillance, which laboratories are now required to report electronically for California residents.

Barriers to Diagnosis and Care

Committee members agreed that there currently is a lack of effective educational messaging regarding testing and treatment for providers and the communities at high risk for LTBI to

prevent development of active TB. Additionally, disparities and gaps exist across the procedures and practices for TB screening, testing and treatment at schools in San Diego County. Another critical barrier identified was the costs of treatment and insufficient resources to support an optimal TB elimination infrastructure across high risk populations.

Enhanced Partnerships Need to be Leveraged:

There are significant opportunities to collaborate with and leverage the surveillance, systems and resources of partner programs targeting populations at risk for LTBI (e.g., HIV, HCV, COVID-19, diabetes, addictions, corrections).

Faces of Tuberculosis

TB survivors were eager to participate in this initiative because they believe this will have a significant impact on people’s lives. Representative profiles in this report help raise awareness of the severity of illness and suffering of people affected by the disease.

RECOMMENDATIONS

Based on evaluation of the national and statewide TB elimination strategies, as well as committee working sessions, the stakeholders identified the following six consensus-driven recommendations to progress toward TB elimination in San Diego County:

- 1. Improve LTBI care cascade outcomes.**
- 2. Promote awareness of LTBI as a major public health concern which is preventable and curable.**
- 3. Develop an LTBI surveillance system to describe the burden of LTBI and monitor improvement of the LTBI cascade of care.**
- 4. Implement TB screening in educational systems.**
- 5. Improve access to treatment for LTBI and active TB.**
- 6. Secure sufficient resources for implementing TBEI strategies.**

INTRODUCTION

According to the World Health Organization (WHO), globally, tuberculosis is one of the top ten causes of death and the leading cause from a single disease infectious agent (above HIV/AIDS). Tuberculosis (TB) is caused by bacteria (*Mycobacterium tuberculosis*) and spreads through the air from person to person, when someone coughs, sneezes, spits, or speaks. TB can affect multiple organ systems including the lungs, brain, spinal cord, bones, eyes, genitourinary tract, and gut. TB disease can usually be treated by taking several drugs for six to nine months. Multidrug-resistant TB, although uncommon in the United States, is a challenge globally and requires extended treatment, including the use of second-line drugs.

The majority of people infected with TB do not become ill right away, but instead harbor the bacteria in their bodies; this is referred to as latent tuberculosis infection (LTBI). LTBI cannot be transmitted to others, but without treatment, these individuals have a 5-10% risk of reactivation and progression to infectious TB disease in their lifetimes. In the US, approximately 80% of persons who get sick with TB had longstanding latent TB infection (LTBI) before they developed active TB. Identifying individuals with LTBI via testing and treating persons with LTBI is an important strategy to prevent TB.

San Diego County's annual TB incidence was 7.9 cases per 100,000 persons in 2019, which is higher than both the California and national rates. Important contributing factors to this high rate include our diverse population and our location along the US-Mexico border. As of 2019, approximately 175,000 San Diego County residents are infected with LTBI, which can progress to active TB disease if left untreated. An estimated 25% of individuals with LTBI are aware of their infection and only 15% have been treated. Finding and treating LTBI will prevent active TB cases in San Diego County and is an important strategy to accelerate progress towards achieving the goal of TB elimination.

Strategic global, national, and State initiatives have led the charge for TB elimination, focusing not only on treating active cases, but on prevention strategies to identify and treat individuals with LTBI. In 2014, the World Health Organization (WHO) launched the End TB Strategy with the goal of ending the global TB epidemic. The CDC's Division of TB Elimination's Strategic Plan for 2016-2020 outlines a national strategy for TB elimination (defined as less than one case per million), and the California Department of Public Health (CDPH) and California TB Controller's Association (CTCA) have outlined an innovative statewide plan.

San Diego County has a pivotal opportunity to leverage the global, national and California strategies for TB elimination, and to be on the forefront of statewide efforts. Multi-sector partnerships and binational collaboration uniquely position San Diego County for this effort. Moreover, the increased adoption of blood tests (interferon gamma release assays) to diagnose LTBI reduces false positives and new short-course LTBI treatment regimens now recommended by CDC increase the likelihood of treatment being completed by patients. Efforts at the State and national levels can be leveraged to define the burden of LTBI and identify the stages where

patients are lost to care in the process from LTBI diagnosis to treatment completion, known as the LTBI care cascade.

On July 23, 2019, the San Diego County Board of Supervisors (Board) authorized PHS to develop and launch the San Diego County Tuberculosis Elimination Initiative (TBEI). The initiative is a coordinated effort to build a TB elimination framework that serves the County's diverse population and engages key stakeholders and communities impacted by TB.

Target for TBEI Elimination in San Diego

The primary objective of this initiative is to decrease the incidence of active TB cases in San Diego County from 7.9 cases per 100,000 population (2019) to less than 1 case per million population by 2040. (Note: This target was adopted from the *California Tuberculosis Elimination Plan, a Five-Year Action Plan, 2016 – 2020* and requires additional modeling and feasibility assessment for San Diego County. Short-term targets will be determined during the TBEI Implementation Planning phase of work.)

Reaching the San Diego County Elimination Target

The TBEI Advisory and Steering committees, through public-private partnerships, have identified barriers to eliminate TB, including those which affect San Diego County residents at the highest risk for LTBI. Subcommittees analyzed elimination strategies by the CDC and the State, and developed recommendations focused on San Diego County priorities for healthcare providers, clinics, patients, and students. Cost of treatment and first-hand accounts of individuals who survived TB were included in the thought behind these recommendations.

Burden Overview

Overview of Tuberculosis Burden: International

WHO Global Tuberculosis Report 2020 stated that TB is one of the top 10 causes of death worldwide and the leading cause of death from a single infectious agent (ranking above HIV/AIDS). Globally, an estimated 10.0 million (range, 8.9–11.0 million) people fell ill with TB in 2019, a number that has been relatively stable in recent years. The burden of disease varies enormously among countries, from fewer than five to more than 500 new cases per 100,000 population per year, with the global average being around 130. One fourth of the global population (approximately 2 billion persons) is estimated to have LTBI.

Overview of Tuberculosis Burden: National

According to the CDC 2019 annual TB report, the overall U.S. TB rate was 2.7 cases per 100,000 persons, the lowest level on record. Among 8,916 TB cases reported during 2019, a total of 6,364 (71.4%) occurred among non-U.S.-born persons. The annual pace of decline (–1.7% from 2018) remained below the average of the past two decades. The slow decline is observed

particularly among TB cases that are attributed to reactivation of LTBI. Given that approximately 80% of U.S. TB cases are attributed to reactivation of LTBI acquired years in the past, often outside the United States, this finding supports an expanded TB elimination strategy to identify and treat persons with LTBI. The CDC estimates that approximately 13 million people in the United States have LTBI.

Overview of Tuberculosis Burden: California

In 2019, California reported 2,115 new TB cases, a 1% increase compared with 2,097 cases in 2018. California's annual TB incidence in 2019 was 5.3 cases per 100,000 population; nearly double the national incidence rate of 2.7. Eighty-two percent of California's TB cases occurred in persons who were born outside the U.S. Medical and societal costs of TB reached more than \$210 million in California in 2019.

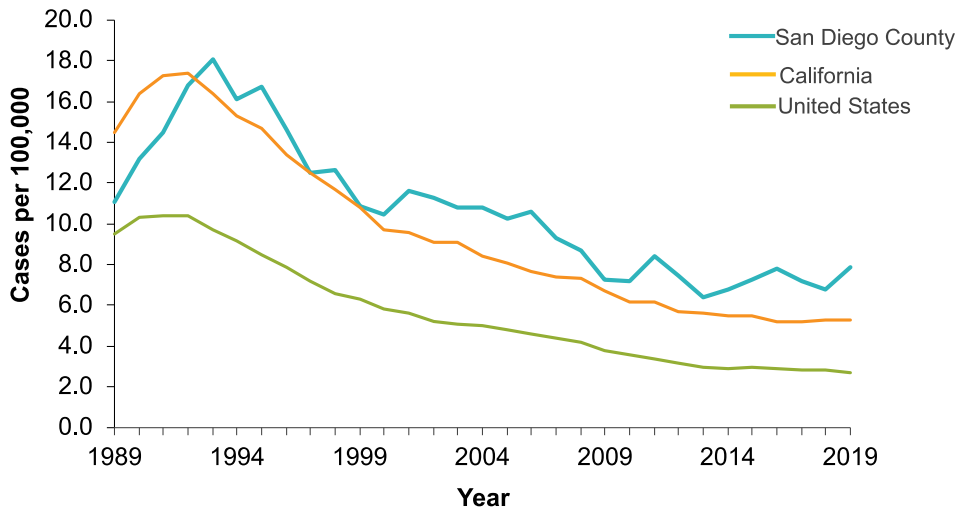
Most new TB cases in California result from longstanding LTBI. Over two million Californians have LTBI, which can progress to active TB without treatment. Approximately 1.8 million persons with LTBI were born outside of the U.S., of whom only 21% are aware of their infection and only 12% have been treated. This reservoir of TB infection, resulting from LTBI, must be addressed to achieve a reduction in active TB disease.

Overview of Tuberculosis Burden: San Diego County

In 2019, San Diego County reported 265 new active TB cases. San Diego County's TB incidence for 2019 was 7.9 cases per 100,000 population, which is higher than the California State rate of 5.3, and nearly three times the national rate of 2.7.

In 2019, the median age of TB cases in San Diego County was 51 and ranged from 1 to 95 years old. Five cases occurred among children under five years old. The highest rate occurred in the oldest age group, persons 65 years and older, accounting for 26% of all cases.

San Diego County TB Incidence Rates Compared to California and National Rates – 1989-2019:

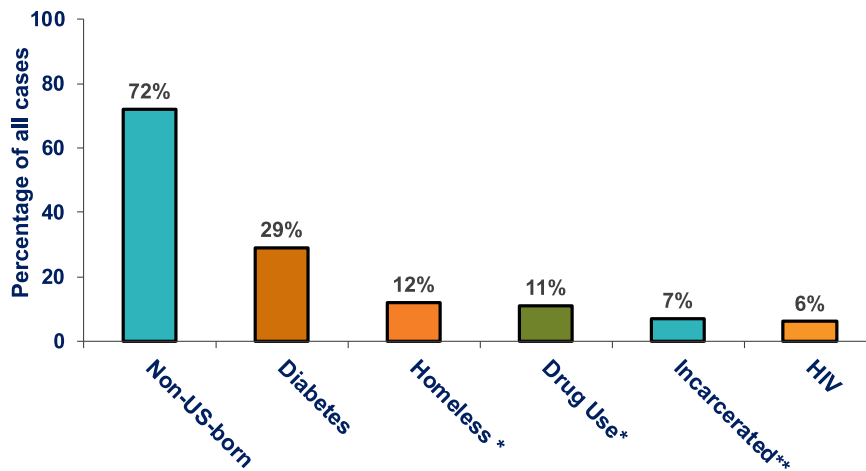


Source: County of San Diego

Top Risk Factors in San Diego County

In 2019, the majority of persons diagnosed with TB in San Diego County were born outside the U.S. Other risk factors included homelessness, drug use, and incarceration. The most common medical risk factor was diabetes, and 6% of active TB cases occurred in persons living with HIV.

Risk Factors Among TB Cases – San Diego County, 2019:

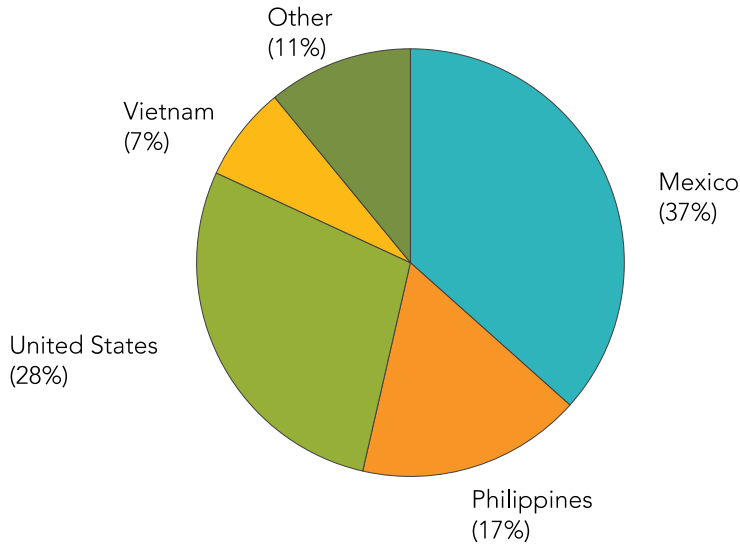


* In year prior to TB diagnosis
 ** At TB diagnosis

10

Source: County of San Diego

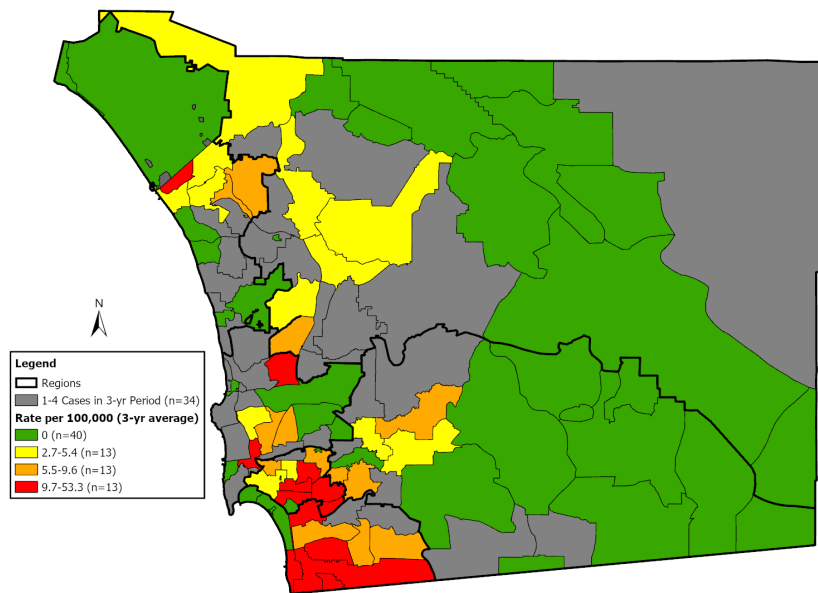
TB Cases by Birth Country, San Diego County, 2019:



Source: *San Diego County*

In 2019, 72% of San Diego TB cases occurred in persons who were born outside the U.S., and the majority of non-U.S. born cases were from Mexico (37%), Philippines (17%) and Vietnam (7%). The TB rate among persons born outside the U.S. is approximately nine times higher than the rate among U.S.-born persons in San Diego County.

TB Rates by Zip Code in San Diego County, 2017-2019:



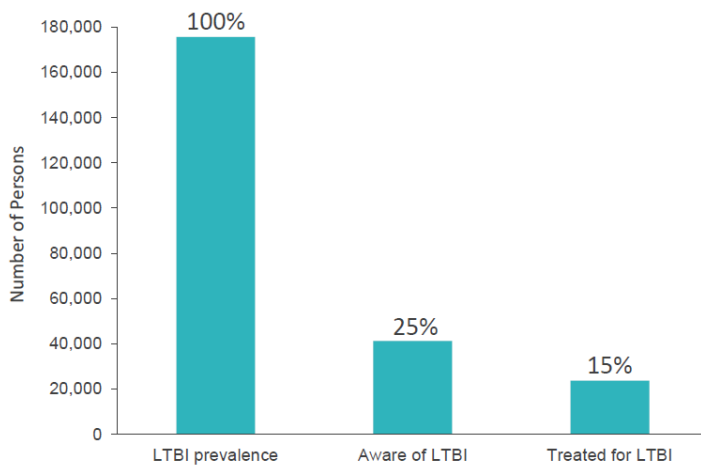
Source: *County of San Diego*

Geographically, the highest rates and numbers of tuberculosis cases in San Diego County are in the South and Central Regions.

Reservoir of LTBI Cases in San Diego County

As of 2019, approximately 175,000 San Diegans have LTBI, which can progress to active TB without treatment. Of those San Diego County residents with LTBI, only 25% are aware of their infection and only 15% have been treated. Because an estimated 80% of cases arise from reactivation of LTBI, treating LTBI will prevent many TB cases in San Diego County. The chart below shows the untreated LTBI population that represent the greatest opportunity for TB elimination in San Diego.

Approximate Estimates of LTBI Prevalence, Awareness and Treatment, San Diego County 2019:



Estimated using methodology from the California TB Control Branch Report on Tuberculosis in California, 2019 and associated Data Tables, applying national level data from the National Health and Nutrition Examination Survey, 2011-2012, to the San Diego County population.

Source: County of San Diego

Tuberculosis Elimination Strategic Approaches

Global Strategy

TB remains a significant global health threat. The World Health Assembly passed a resolution in May 2014 approving a post-2015 *End TB Strategy* with ambitious global targets for 2035:

- 95% reduction in TB deaths (compared with 2015)
- 90% reduction in TB incidence rate (< 10 TB cases per 100,000 population)
- No affected families facing catastrophic costs due to TB

National Strategy

The CDC Division of Tuberculosis Elimination (DTBE) *Strategic Plan 2016-2020* supports the National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention Strategic Plan through 2020. DTBE's goal is to reduce TB morbidity in the U.S. with a focus on reducing disparities in TB morbidity among disproportionately affected groups, including foreign-born persons and racial and ethnic minorities. DTBE's strategies, while similar to those laid out in the CDC's plan, focus on efforts unique to TB control and are aimed at eliminating TB.

The goals of the National TB Elimination Strategic Plan are:

1. Maintain control of TB
2. Accelerate the decline
3. Develop new tools
4. Increase U.S. involvement in international TB control activities
5. Mobilize and sustain support
6. Track progress

California Strategy

CDPH, in collaboration with the California TB Elimination Advisory Committee (CTEAC) and the California TB Controllers Association, developed a comprehensive, innovative TB Elimination Plan in 2015 which outlined actions over five years (2016-2020) to make progress toward eliminating TB in California. The plan calls for making TB prevention a routine part of medical care by finding and testing Californians who are at risk for TB, optimizing treatment for LTBI, monitoring and evaluating LTBI testing and treatment, and ensuring that patients, clinicians, and public health programs have the tools and resources they need to prevent TB.

The *California Tuberculosis Elimination Plan, a Five-Year Action Plan, 2016 – 2020* outlines the following recommendations and interventions:

1. Find and engage persons and populations at high risk for TB and their providers in California.
2. Apply focused and effective strategies for TB testing in California.
3. Optimize treatment for LTBI.
4. Develop strong and effective partnerships to eliminate TB in California.
5. Create an effective communication plan to promote testing for and treatment of LTBI to health providers and the community in California.
6. Develop and implement a surveillance system for reporting, tracking, and evaluating LTBI in California.
7. Secure sufficient resources for implementing the California TB Elimination Plan.

The potential for modeling to help guide and prioritize strategies for TB elimination was explored by The Consortium to Assess Prevention Economics (CAPE), a multi-year collaboration between the CDPH and the University of California, San Francisco, funded, in part, by the CDC Epidemiologic and Economic Modeling Agreement (Goodell A, et al, PLOS ONE, 2019). A key

finding was that the case decline is much steeper in the early intervention years. The models also identified a strategy that would decrease the California case burden by half in ten years (from approximately 2,000 to 1,000 cases): a four-fold increase in testing and treatment of the non-U.S.-born population and persons with medical risk factors. This research supports a short-term vision to change the pace of decline, with the hope that novel interventions will emerge in the longer term to achieve TB elimination.

San Diego Tuberculosis Elimination Strategy

The County of San Diego, Health and Human Services Agency, Public Health Services (PHS) TB Control Branch has contributed to national and State TB elimination efforts. In July 2019, the San Diego County Board of Supervisors approved the development and launch of the *San Diego County Tuberculosis Elimination Initiative*.

METHODOLOGY

Facilitation and Infrastructure

The Tuberculosis Control and Refugee Health Branch of the County of San Diego Health and Human Services Agency, Public Health Services leadership and staff are facilitating the TB Elimination Initiative (TBEI). Representative Advisory and Steering Committees were formed to map out the way forward for the TBEI. Five additional Action Committees were formed to generate the recommendations for this initiative.

Modelled after the *Eliminate Hepatitis C San Diego County Initiative*, the following committee structure was adopted:

Advisory Committee: The San Diego County TB Elimination Initiative is guided by an Advisory Committee comprised of leaders who have expertise in various areas of health care delivery, public health, and community wellness and share the vision of TB elimination. Using a collective impact model, members include San Diego County organizations and clinical practices that are on the forefront of TB testing, treatment, and advocacy.

Steering Committee: The Steering Committee acts as the coordinating committee of the initiative and is comprised of people who have expertise in various areas of health care delivery, public health, education systems and share the vision of TB elimination. This committee is comprised of co-chairs of the action committees and led by one public and one private co-chair.

Action Committees:

1. **Access, Testing and Treatment Action Committee:** The Access, Testing, and Treatment Committee is largely comprised of public and private sector clinicians, pharmacists and health plan quality leaders. This group identified strategies for screening, testing and treatment for community populations at high risk for LTBI.
2. **Communication and Marketing Action Committee:** The Communications and Marketing Committee is comprised of health educators, community outreach workers and other interested parties that serve high-risk TB populations. Members interact closely with the other committees to create accurate messaging for providers serving high-risk patients and all individuals associated with the LTBI cascade of care.
3. **Consumer and Advocacy Action Committee:** The Consumer and Advocacy Committee serves in an advisory role to all committees and is comprised of members who have had TB or have been diagnosed with LTBI and have received treatment.
4. **Schools Action Committee:** The Schools Committee members include nurses, medical directors and other administrators representing K-12 schools, colleges, and universities. This group focused on standardizing TB screening protocol and procedures, starting with higher education institutions, to prevent the risk of TB transmission on school campuses.
5. **Surveillance and Monitoring Action Committee:** The Surveillance and Monitoring Committee is comprised of clinicians, researchers, and epidemiologists with diverse areas of expertise including public health surveillance, high-risk population identification and engagement, health care delivery and public health program evaluation. They identified strategies to understand the latent TB burden and monitor the LTBI care cascade to measure progress towards the elimination goal.

Voices of all stakeholders were a critical part of the process – from health care providers, San Diego County schools and the San Diego County Health Department to TB survivors.

FINDINGS

The Action Committees and Steering Committee members discussed the following barriers and gaps that need to be addressed by the San Diego County Tuberculosis Elimination Initiative.

Surveillance System Capabilities

To monitor progress in TB elimination, we need systems in place to define the burden of LTBI and identify the stages where patients are lost to care in the process from LTBI screening to treatment completion. A county-wide LTBI surveillance system does not currently exist to assist in establishing a baseline LTBI care cascade for the County and its high-risk populations. The County has recently gained preliminary experience for reporting of LTBI via a pilot project for civil surgeons due to a federal requirement for reporting. The County is also working to utilize positive interferon gamma release assay (IGRA) results for surveillance, which laboratories are now required to report electronically for California residents. A recent national pilot project for LTBI surveillance, experiences shared by other state health departments, and an expected report from a workgroup of the National TB Controllers Association, will assist in informing local development and planning.

The CDC Tuberculosis Epidemiologic Studies Consortium is currently conducting a research protocol at community clinic sites throughout the U.S., including in San Diego County, to establish a baseline LTBI care cascade at each clinic site and pool data to describe the baseline cascade (<https://www.cdc.gov/tb/topic/research/tbesc/default.htm>). The protocol also includes a provider survey and in-depth interviews with clinic staff to help identify potential interventions to close those gaps. Over the past several years, TB Free California conducted evaluation projects in community clinics and provided technical assistance for provider training, administrative infrastructure to support best practices, and collection of baseline and post-intervention LTBI care cascade data (<https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/About-Us.aspx>).

Barriers to Diagnosis and Care

A systematic review of published reports of community-based testing programs in predominantly non-U.S.-born populations in the U.S. found more than one-third were diagnosed with LTBI and high attrition occurred throughout the care cascade (Malekinejad M. et al). Limited data are available for LTBI care cascades for individual community medical clinics or organizations. In addition, there is limited data regarding the resources and approaches within community medical practices to support TB prevention, including testing and LTBI treatment. A clinic assessment tool developed by the State in collaboration with several counties, including San Diego, may be one option to gather baseline data among large medical practices and community clinics in the early implementation phase of this initiative.

Additionally, many stakeholders across TBEI committees agreed that there is a lack of effective educational messaging regarding testing and treatment for LTBI to prevent development of

active TB. The committees identified the need for culturally competent, targeted messaging to ensure success in TB elimination.

The Schools Action Committee identified disparities and gaps across current student messaging and procedures in place to test and treat TB students at schools in San Diego County. The committee identified that some best practices from school systems that have robust procedures in place could be replicated at other institutions. Members determined all schools could benefit from targeted communications to students regarding risk factors, testing and treatment.

Another critical barrier that was identified by the committee members was the costs of treatment and insufficient resources to support TB elimination strategies and infrastructure across high risk populations.

Faces of TB

The Consumer and Advocacy Action Committee created the following profiles of TB survivors in San Diego County. Their stories help raise awareness about the experience of individuals and families profoundly affected by TB in San Diego. These individuals are eager to participate in the work of this initiative because they recognize the impact this Initiative will have on the community. All the stakeholders whose stories are shared have provided input into the development of the recommendations.

Cristal



“My name is Cristal. I was tested positive in early January 2016 in my hometown in Mexico. I was pregnant back then, and I think I contracted TB from my stepfather. He passed away and was really sick before he died, and I took care of him. I started with cough and losing weight. After a while, I noticed fresh blood in my cough. Then I went to the doctor and they tested me. They gave me more tests and told me I had Active TB. I cried a lot because they told me that I was going to die, because I was pregnant. I had a miscarriage right before I started with the treatment. I started taking the treatment in February 2016. I took normal treatment for one and a half year, and then moved to USA and started going to the doctor here. The Doctor tested me and when the results came

back, they told me that I had Drug Resistant TB. In June 2017 I continued with my medications. I was in the hospital for 2 weeks until they finished all the testing and started me with new treatment. I was still infectious until October 2017. But was able to finish my treatment in March 2019. So, it took me three years to finish my treatment and get healthy again. My message to other people that are going through this is that it is ok to be stressed out about

your disease and treatment, but there's hope. Life is very short and one day it will be over. I was on treatment for 3 years and I had drug resistant TB, and here I am...with a new beautiful and very healthy child. Believe in miracles!"

Jackie



"My name is Jackie and I tested positive early 2019. I don't know how I got active TB. I cross the border a lot to go to Mexico and I travel a lot. I started feeling sick with cough, dizziness, nausea and general malaise. I went to the doctor and they couldn't find anything. I was so sick that I ended up in the hospital for 4-5 days until they diagnosed me with active TB. It took the doctors long time to give me the right diagnosis. When the doctor told me that I had TB, I felt very angry and frustrated and scared. I couldn't believe that I had active TB. I was pretty upset because the doctor didn't tell I had active TB until 2 weeks after I got out of the hospital. The treatment lasted about a year and a month and took me a while to get used to taking all the different pills every day.

The treatment was very long, and sometimes I would forget to take my pills. But I am very grateful that I had the support of the health care workers who came every day to remind me to take my treatment. My message to other people going through this is to hang in there and be compliant with your treatment. Sometimes you don't think there's an end to all this but be hopeful."

Marbella

"My name is Marbella and I tested TB positive in 2015. I don't know who and when gave it to me. I started feeling sick with a cold, fever, cough, diarrhea, and I was sweating a lot during the nights. I was feeling very weak and tired. I was sick for over a month. The Doctor sent me to do all the different testing's, and when he told me, I felt very scared. They immediately sent me to isolation, and I felt more scared. They explained what I had and then referred me to your clinic in Rosecrans. At the beginning of the treatment, I had a lot of side effects like nausea, vomiting, and I was tired all the time. The doctor replaced the treatment and my body accepted the new treatment. I remember that I was on treatment for a whole year, and the social worker from your clinic came every day to talk to me and she gave me a lot of support. My message to other people that are going through this is to keep it up. This will be over, and you have to be strong. It will eventually end, and you will go back to normal."

Maria

“My name is Maria and I was tested positive for TB in January 2019. My 19 yr. old daughter had active TB 5 yrs. ago back in Mexico. The whole family got tested and at that time my test came back negative. In September 2018 I started getting sick and I was having a lot of cough and fever. I went to the doctor back home and they treated me for pneumonia. After I completed the treatment, I was still very sick and started losing a lot of weight. I came to San Diego and I went to the clinic because I was still very sick. I had lost 50 lbs. Finally, here in San Diego I was diagnosed with active TB. They transferred me to the clinic in Rosecrans and Dr. Campbell took care of me. She was very nice and knowledgeable. I have a lot of respect for her. When I learned here in San Diego that I had TB, I felt very angry at the doctors in Mexico because they misdiagnosed me. I started treatment in late January 2019 and followed through with my treatment. Dr. Campbell explained very careful the way I should be taking all the pills. I started feeling much better right away. The treatment lasted about 10 months. I was on DOT every day and I had a health care worker coming to see me from time to time for support. What I want people to know about TB is that we need to be conscious and follow the treatment the way the doctors recommend it, because TB can kill you.”

DISCUSSION

The diverse stakeholders that collaborated to develop the key recommendations are committed to realizing TB elimination for San Diego County. The barriers they identified – associated with gaps in tuberculosis awareness, provider and patient education, engaging and testing populations most at risk for LTBI, LTBI surveillance, as well as lack of resources - must be addressed and incorporated into the next phase of the detailed implementation planning by the San Diego County Tuberculosis Elimination Initiative committee members.

Though the County PHS conducts robust surveillance for active TB as a collaborative partner in both the national and California surveillance systems, there is no comprehensive LTBI surveillance system currently implemented at the national level, in California or in San Diego County. The County has recently gained preliminary experience for reporting of LTBI, via a pilot project for civil surgeons due to a federal requirement for reporting, and is also working to utilize positive interferon gamma release assay results now required to be reported electronically by laboratories for California residents.

Several key conditions unique to San Diego position the county for success in TB elimination:

- A strong network of committed clinical champions;
- A rich network of community health centers and advocates dedicated to serving the populations at risk for TB throughout the County;
- A strong network of education institutions committed to addressing the gaps in TB prevention; and
- Exceptional leaders from the CDPH dedicated to developing and implementing an innovative, data-driven, and collaborative statewide TB elimination plan.

COVID-19 and Tuberculosis

Since the TB Elimination Initiative began planning and developing recommendations, the COVID-19 pandemic began. Its potential impact on control and prevention of TB in San Diego County must be acknowledged.

The WHO outlined the following impact on TB elimination efforts:

- Potential for Poor Outcomes for TB Patients: While experience on COVID-19 infection in tuberculosis (TB) patients remains limited, it is anticipated that people ill with both TB and COVID-19 may have poorer treatment outcomes, especially if TB treatment is interrupted.
- Similar Risk Factors for TB and COVID-19: Older age, diabetes and chronic obstructive pulmonary disease (COPD) are linked with more severe COVID-19 and are also risk factors for poor outcomes in TB. All measures should be taken to ensure continuity of services for people who need preventive and curative treatment for tuberculosis (TB).
- Opportunities for Collaboration: The response to COVID-19 can benefit from the capacity building efforts developed for tuberculosis (TB). These include infection prevention and control, contact tracing, household and community-based care, and surveillance and monitoring systems.

RECOMMENDATIONS

Each of the committees of the San Diego County Tuberculosis Elimination Initiative met multiple times from November 2019 until July 2020. As a result of these meetings, the stakeholders developed the following six key recommendations:

1. Improve LTBI care cascade outcomes:

- The LTBI care cascade shows the proportions of high-risk populations that have been tested and diagnosed with LTBI as well as the proportions starting and completing LTBI treatment. It assists in identification of gaps in the care cascade to guide further study and development of interventions to successfully close the gaps.
- Given 80% of active TB cases arise from untreated LTBI, LTBI care cascade outcomes can be improved by finding and engaging persons and populations at risk for LTBI, applying focused and effective strategies for TB testing, and optimizing LTBI treatment.
- Providing support and technical assistance for community providers to develop LTBI care cascades within their organizations and use the cascades for self-evaluation of care performance can enhance patient outcomes leading to fewer cases of active TB.

2. Promote awareness of LTBI as a major public health concern which is preventable and curable:

- By creating an effective communication campaign to encourage and promote testing and treatment of LTBI, individuals can become aware that LTBI can be diagnosed and treated easily, and treatment of LTBI prevents future development of active TB.
- Effective communication strategies which target high risk populations and healthcare providers who care for these populations can help to address health disparities in TB.
- Promotion of testing and treatment of LTBI with the use of patient education materials in a broad array of languages allows for improved communication between at risk patients and their healthcare providers.

3. Develop a LTBI surveillance system to describe the burden of LTBI and monitor improvement of the LTBI cascade of care:

- Developing a surveillance system for LTBI diagnosis and treatment would help to capture metrics along the LTBI care cascade.
- Using the LTBI surveillance system, standard reports would assist in identifying actionable gaps in the LTBI care cascade and measuring the effectiveness of interventions designed to address gaps.

4. Implement TB screening in educational systems:

- Implementing TB screening in educational systems like high schools and colleges can lead to early detection and prevention of active TB and detection of LTBI in younger populations.
- By improving TB screening, more thorough contact tracing for students with active TB can be conducted. Screening all college students for TB risk factors with TB screening questionnaires, providing education regarding need for testing, and enhancing communication of local resources for treatment can decrease LTBI and active TB cases.
- Developing web-based tools and resources for student populations can allow easier and more timely access to screening, testing and LTBI treatment.

5. Improve access to treatment for LTBI and active TB:

- Working with pharmacies, clinics, and community healthcare providers to lower cost of treatment options for LTBI including shorter duration options.
- Increasing communications for uninsured patients and those who do not have alternative access to care for treatment at county facilities where medication for TB is provided at no cost to the patient.
- Creating a system of low to no cost for clinics who serve vulnerable patient populations would assist in treatment of active and latent TB and decrease overall cases.

6. Secure sufficient resources for implementing TBEI strategies:

- Elimination of TB via public-private partnership, with participation from community clinics and healthcare providers and outreach to high risk communities requires increased funding streams. Sufficient funding will broaden and support TB elimination efforts countywide, especially for those patients who are from vulnerable populations, including the homeless and recent immigrants.

These recommendations support the *Live Well San Diego* vision by building better health through increased life expectancy and improved quality of life through prevention and treatment of a curable infectious disease.

CONCLUSION

The San Diego County Tuberculosis Elimination Initiative has been successful, to date, in achieving the critical first steps of diverse stakeholder engagement, commitment, and partnership that has led to achieving progress in evaluating the needs of San Diego County's unique population and geographic characteristics, incorporating feedback about current practices and barriers, and identifying a collective set of initial recommendations.

The TB Elimination Initiative stakeholders believe that it is crucial to continue planning for elimination of TB in San Diego. Through strong collaboration and multi-sector support, as well as national and statewide guidance, San Diego County is ready to begin developing a comprehensive plan for implementation of the locally developed recommendations for TB elimination.

NEXT STEPS

The next phase in the project is to develop a detailed implementation plan, which will incorporate the recommendations outlined by the TB Elimination committees. The effort will include setting shorter term, realistic and feasible goals and establishing a timeline to initiate and fully implement key strategies and tactics. The plan will also identify public and private organizational commitments, and resources required for successful implementation. As noted throughout this report, achieving TB elimination in San Diego County will take a collaborative effort, requiring strategic partnerships, leveraging best practices, and combining resources from partners, organizations, and advocates throughout the county. Through organized collaboration, San Diego County can progress toward our goal of tuberculosis elimination.

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Family Health Centers of San Diego

Health Center Partners of Southern California

Healthy Campus Consultants

Healthy San Diego

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Mesa College Student Health Services

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