

# How Can We End the Tuberculosis Epidemic?

## Lessons from Around the World

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# Acknowledgements

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Founded in 1995, AVAC is an international non-profit organization that uses education, policy analysis, advocacy, community mobilization and a network of global collaborations to accelerate the ethical development and global delivery of HIV prevention options as part of a comprehensive and integrated response to the epidemic.

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Since 2004, Friends of the Global Fight Against AIDS, Tuberculosis and Malaria has been a leading advocate and source of information on the Global Fund, a public-private partnership that is the largest funder of global health services in the world. Friends also works with partners to advance the Global Fund's mission of ending the three epidemics.

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Partners In Health (PIH) is a non-profit, global health organization which fights social injustice by bringing the benefits of modern medical science first and foremost to the most vulnerable communities around the world.

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RESULTS is a movement of passionate, committed everyday people. Together they use their voices to influence political decisions that will bring an end to poverty.

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Treatment Action Group (TAG) is an independent, activist and community-based research and policy think tank fighting for better treatment, prevention, a vaccine and a cure for HIV, tuberculosis and hepatitis C virus.

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The Zero TB Initiative is working across the world to create islands of elimination with strong local partners in high-burden areas. We are committed to ending TB by utilizing a proven, comprehensive, community-based care platform.

## TB is curable. We need renewed and sustained political will to combat this epidemic.

***It can be easy to forget that until COVID-19 began its onslaught, tuberculosis (TB) was the leading infectious disease killer of adults worldwide.*** Like COVID-19, TB bacteria spread when a person with TB coughs, sneezes, speaks or sings. These bacteria can be passed anywhere: in communities where people live, in hospitals and clinics and on buses and trains. Anyone can get TB. In 2019, an estimated 10 million people contracted TB and more than 1.4 million died.

Despite the numbers, we know we can end the TB epidemic. It is a matter of scaling up effective programs, dedicating sufficient resources and mobilizing the political will.

This report highlights six locations where communities made impressive progress to significantly reduce TB cases and deaths – from California in the United States to Tomsk, Russia and Karachi, Pakistan. Some harnessed the power of technology and innovation, while others depended on meticulous contact tracing and a highly skilled network of medical professionals and community health workers. Each case study provides a TB surveillance timeline as well as crucial policy changes, local leadership and public health interventions – inflection points – that contributed to successes.

The locations represent diverse contexts, geographies and economies. Taken together, they demonstrate how a comprehensive public health approach to eliminate TB can be realized on a global scale and how lessons from TB can be applied to new and emerging pandemics like COVID-19.

For more about how COVID-19 is impacting the fight against TB, please see page 16.

### The critical components of successful and comprehensive responses include:

- Patient-centered care and active search for cases of TB disease and infection
- Utilization of rapid diagnostic tests for TB and sensitivity tests for drug resistance
- Treatment of all forms of TB, including TB infection, drug-sensitive TB (DS-TB), multidrug-resistant (MDR-TB) and extremely drug-resistant TB (XDR-TB)
- Infection control in key settings, including hospitals and prisons
- Social and financial supports for patients so they are able to complete treatment
- Public investments in innovation for new public health tools – including improved diagnostics, shorter and tolerable treatments and an effective vaccine
- Public policies that provide appropriate funding and uphold the rights and protection of communities vulnerable to TB

To drive effective solutions to end TB everywhere, we need renewed and sustained political will – as well as increased funding – to stop a disease that claims 4,000 lives a day. This report outlines a new narrative for success and opportunity. Together, U.S. and local policymakers, researchers and communities can end the TB epidemic in our cities, our countries and in our world by increasing funding for global and domestic programs; scaling what works and reaching those most at-risk; prioritizing public health systems strengthening; and ensuring scientific research is well-funded to continue innovations against TB and COVID-19. Many places are doing it already, and we can learn from these lessons to scale and implement them everywhere.

Together, we can end TB.



# Cambodia

## Active Case Finding and Treatment Results in Global Success Story

Cambodia has one of the highest prevalence rates of TB in the world, yet it has become a remarkable success story in the fight against the disease. Thanks to strong national leadership, political will and international support for innovative policies – including long-standing support from Japan along with the U.S., the Stop TB Partnership and The Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), among others – Cambodia has significantly reduced the mortality and incidence rates of people developing TB. Twenty-three thousand fewer people developed the disease in 2019 compared to 2000, and 6,600 fewer people died of TB in 2019 compared to 2000.

How was this possible?

The TB response in Cambodia has benefitted enormously from strong leadership in its national TB program, which has not only welcomed support from external partners but has also been willing to try out new approaches, even before they were officially endorsed by the WHO.

In 1998 the country shifted to providing decentralized health services at the community level. The number of community-based health centers providing free TB services increased from 60 in 2000 to around 1,000 across the country by 2005. Then, long before most other countries, Cambodia began using an active approach to finding people who have TB, in collaboration with civil society organizations. This approach reaches people with TB who are in the community with TB, ensuring they are treated and cured and leading to decreased TB transmission.

This involved systematically searching for TB in people who would not otherwise go on their own to a health facility for evaluation. Health officials started by working with community leaders and health volunteers in vulnerable communities to locate people who had likely been exposed to TB. Using mobile X-ray and TB testing services, health workers screened people for the disease, including neighborhood contacts of a person with TB, and then initiated treatment as needed. The goal was to broaden access to care at the local level and remove the need for patients to travel long distances. This community TB screening approach increased TB case notifications by 65 percent.

In 2012, Cambodia successfully expanded to intensive screening for TB in urban settlements, including the use of rapid molecular diagnostics. In 2018, active case finding campaigns expanded further to rural areas that had little access to new diagnostic and screening methods, particularly among the elderly, who make up 50 percent of people with TB in the country, and other key affected populations. These innovative campaigns have used lay counselors and TB survivors to identify people for TB screening. As the chart shows, active case finding helped bend the curve in incidence rates.

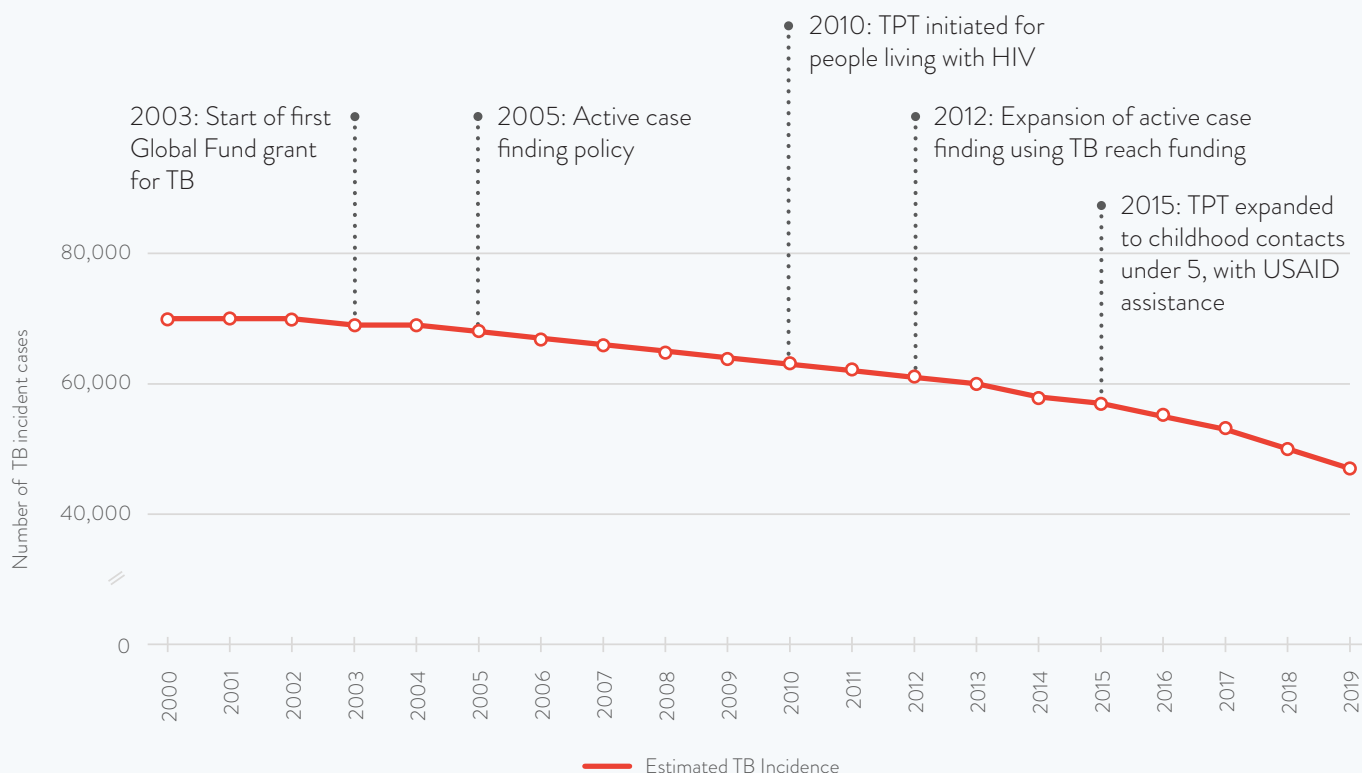
Cambodia was also far ahead of most countries in providing TB preventive therapy (TPT), which has been shown to be very effective in reducing the risk of TB. In 2010, Cambodia began a TPT pilot program for people living with HIV, with subsequent national scaleup. In 2015, with U.S. Agency for International Development (USAID) support, TPT was rolled out for children under five years of age, who make up an estimated 19 percent of people with TB in the country, with further expansion under the Global Fund grant to reach more than two-thirds of the country.

In 2020, the Cambodian civil society organization Khana received funds from USAID's TB Local Organizations Network to launch Community Mobilization Initiatives to End Tuberculosis (COMMIT), for early TB case finding, linkage to diagnosis and treatment support, TB prevention and community engagement. Khana has been a leader in adapting TB programs to maintain TB services in the context of COVID-19, as well as in regional advocacy on TB.

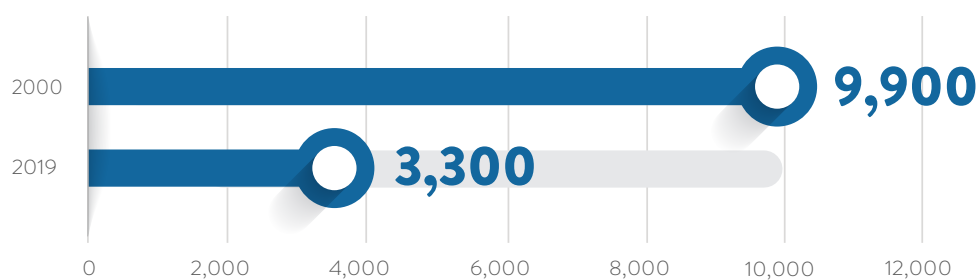


**Cambodia's active approach to finding and treating people with TB involves mobile X-ray and TB testing services.**

**With strong national leadership, political will and international support for innovative policies, Cambodia has dramatically reduced the mortality and incidence rates of people developing TB.**



### Change in Estimated TB Mortality 2000-2019



### Keeping Up the Fight

- Despite many achievements, Cambodia's progress is fragile. With the restrictions on movement following the spread of COVID-19, most active TB case finding activities were put on hold, resulting in a delay in identifying new people with TB.
- 42 percent of people with TB are not receiving treatment, and preventive therapy must reach many more people.
- According to research by USAID, the country needs to triple the number of molecular testing devices (Xpert MTB/RIF) to meet the need for rapid TB screening.
- While the rate of multidrug-resistant (MDR) TB in Cambodia is relatively low, an estimated 1,000 Cambodians developed this form of TB in 2018, yet only 128 were started on treatment.



# South Africa

## Making TB a Political Priority

In 2009, the number of active TB infections in South Africa reached a ten-year peak, with 636,000 people developing the disease. But during the last decade, the country made fighting TB – the leading cause of death in South Africa – a political priority, scaling up innovative diagnostic tools and drugs while also investing in community-based treatment programs across the country.

This approach increased TB case notifications and contributed to the downward trend in incidence rates. In 2011, South Africa launched a multifaceted TB screening program. This included household contact tracing, HIV counselling and testing campaigns, community mobilization, door-to-door enquiry in areas with a high burden of smear-positive TB and the screening of high-risk populations. As part of this comprehensive screening program, the country worked to provide every person who needed a TB test with state-of-the-art molecular GeneXpert technology, which made TB test results available in two hours rather than three weeks. This turning point was due to bold leadership and a strong lab network. South Africa was one of the first countries to scale the use of GeneXpert technology.

The government was also ahead of the curve in transforming how people were tested and treated for multi-drug resistant (MDR) TB. In 2011, with support from the Global Fund to Fight AIDS, Tuberculosis and Malaria, South Africa created community-based treatment centers in all nine provinces to replace centralized hospital-based care, leading to a significant increase in the number of people receiving treatment. Additionally, the introduction of GenXpert made it possible to test for resistance to rifampicin – a drug routinely used to treat TB – in just a few minutes.

In 2014, South Africa was the first country to rigorously introduce the oral drug bedaquiline to treat MDR-TB, setting the stage for country- and world-wide replacement of injectables with bedaquiline. Up until that point, people with MDR-TB endured months of painful injections that could cause deafness and other severe side effects. South Africa helped build the evidence for the World Health Organization to change their recommended treatments for MDR-TB. In 2018, the government negotiated a lower price for bedaquiline and made it available to all MDR-TB patients.

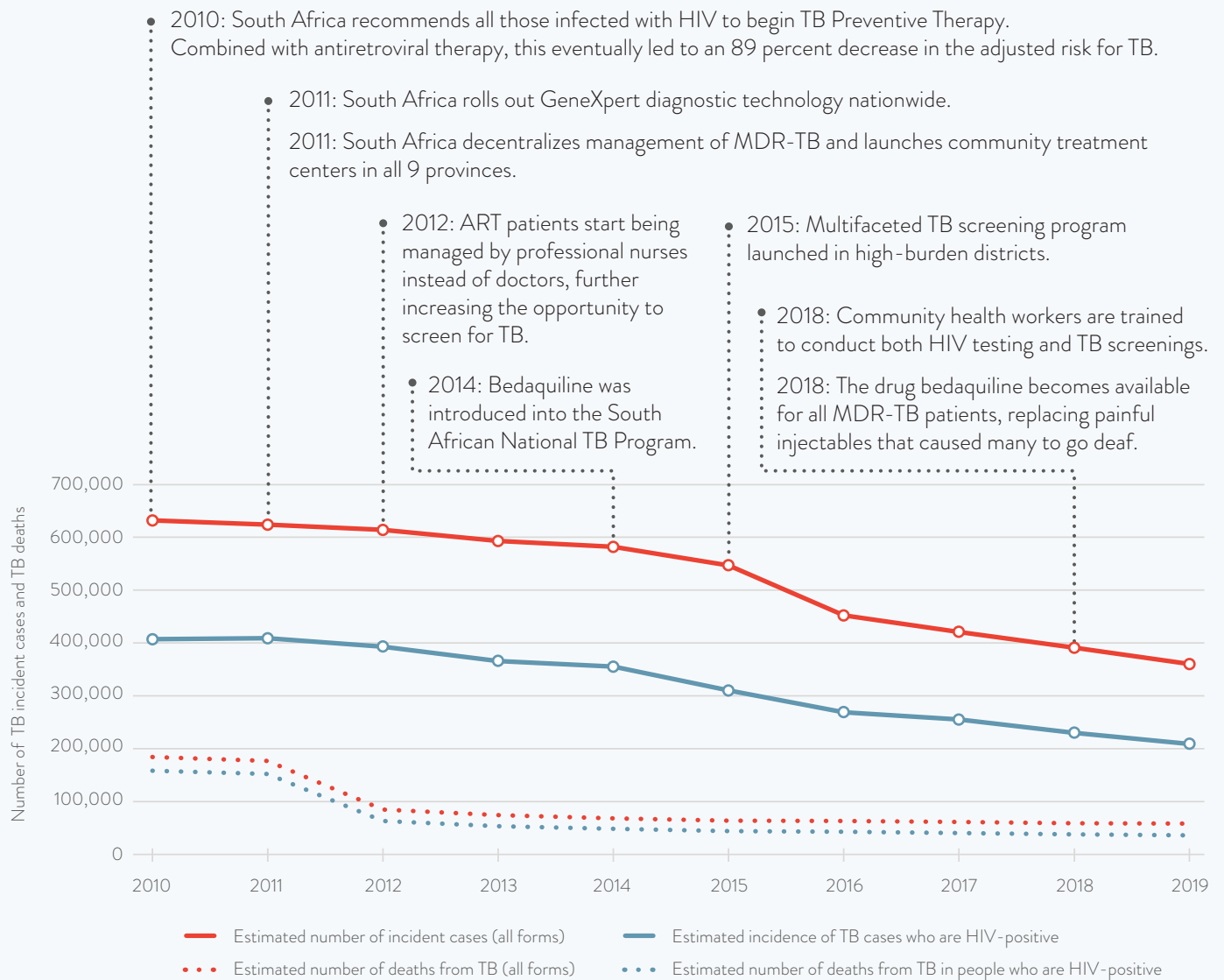
South Africa also worked aggressively to combat TB among people living with HIV – a high risk group – achieving high coverage of antiretroviral therapy (ART). Co-infections of both HIV and TB were nearly halved between 2010 and 2018. The government made numerous changes and interventions, including scaling up access to HIV testing and treatment, recommending that all people living with HIV begin TB preventative therapy (TPT) – medications that can prevent TB – and training community health workers to conduct both HIV testing and TB screening. Contact tracing and household screenings of those living with TB patients were also put in place to find more cases in the community and to link them to GeneXpert diagnosis and treatment.

South Africa was at the forefront of scaling up yet another innovation with the TB LAM test. This test – the tuberculosis lipoarabinomannan antigen test – is the first point-of-care, urine-based test for TB, and has been proven to reduce mortality by rapidly detecting TB in people with AIDS and enabling TB treatment to start earlier. The Ministry of Health piloted this test in 2017 in hospital settings, and in 2018 began a national scale up, thus improving early diagnosis of TB in people with advanced HIV and saving lives.

### Glossary

**GeneXpert:** A small machine (about the size of a coffeemaker) that works on a molecular level to rapidly identify TB and MDR-TB bacteria. It uses technology that is faster and more sensitive than traditional TB tests and can detect resistance to the most powerful first-line drugs.

**During the last decade, South Africa made fighting TB a political priority, scaling up innovative diagnostic tools and drugs while also investing in community-based treatment programs across the country. This approach dramatically increased detection and treatment rates and reduced the number of new infections.**



## Keeping Up the Fight

- Find all of the missing people with TB. These are people who have TB but aren't being found or properly identified by the health system. The South African Department of Health expected to notify 301,000 people with positive TB test results in 2018, but only notified 235,000.
- Ensure national plans also translate into local and provincial procedures and resources.
- Improve TB symptom screening and testing practices at the facility level.
- Implement contact screening and tracing to scale. When a person is diagnosed with TB, all of their contacts should also be traced, notified and tested to stop the spread of the disease.
- Implement the scale-up of new tools, such as a digital chest x-ray with computer-assisted detection, to improve detection of asymptomatic TB cases.



# Ethiopia

## Community Health Workers Deliver on Quality Services

Ethiopia ranks among the world's highest TB burden countries, with the disease killing approximately 24,000 Ethiopians each year, about 66 people each day. However, considerable progress has been made in reducing the impact of TB in the country, thanks to determined leadership at all levels and targeted international assistance.

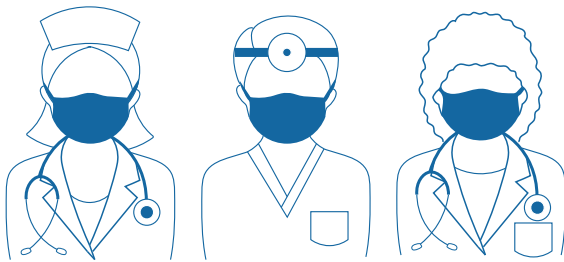
There has been significant progress in reducing the rate of new cases, which have fallen 44 percent since 2000. This means 122,000 fewer people were developing the disease in 2019 than in 2000. Ethiopia has also reduced TB mortality, among both HIV negative and HIV positive people, with the country seeing 83,000 fewer deaths from TB in 2019 compared to 2000, a 78 percent drop. Since 2014, TB incidence has fallen four to five percent a year.

In 2016, a team of U.S. experts on TB from the Center for Strategic and International Studies carried out a study of the TB challenges facing Ethiopia. Following field visits and extensive discussions with senior leaders, including the country's president, the team concluded that the country's successes could be traced to the high level acknowledgement of the magnitude and complexity of TB, effective use of donor funds and a strong commitment to provide health care for the entire population.

Health services in Ethiopia are integrated into the primary health delivery system and are decentralized to rural areas, where 80 percent of the population lives. All public hospitals and health centers provide TB services, and, according to a 2020 study of the TB programs by MEASURE Evaluation, community TB care has been rolled out to most of the country's 16,660 health posts, which are staffed with health extension workers. They are a cadre of community health workers initiated in 2003 and empowered to deliver 16 basic health services at the local level, including awareness raising about TB, referral of symptomatic cases and advice to patients on treatment adherence.

Ethiopia's leaders have made strategic use of international assistance to improve the quality and reach of TB services, starting with case finding. In 2010 the country began receiving grants from the Stop TB Partnership's TB REACH program to improve case-detection and treatment completion among rural residents, the incarcerated and refugees. The health extension workers conducted door-to-door screenings and collected sputum samples to find people in need of TB services.

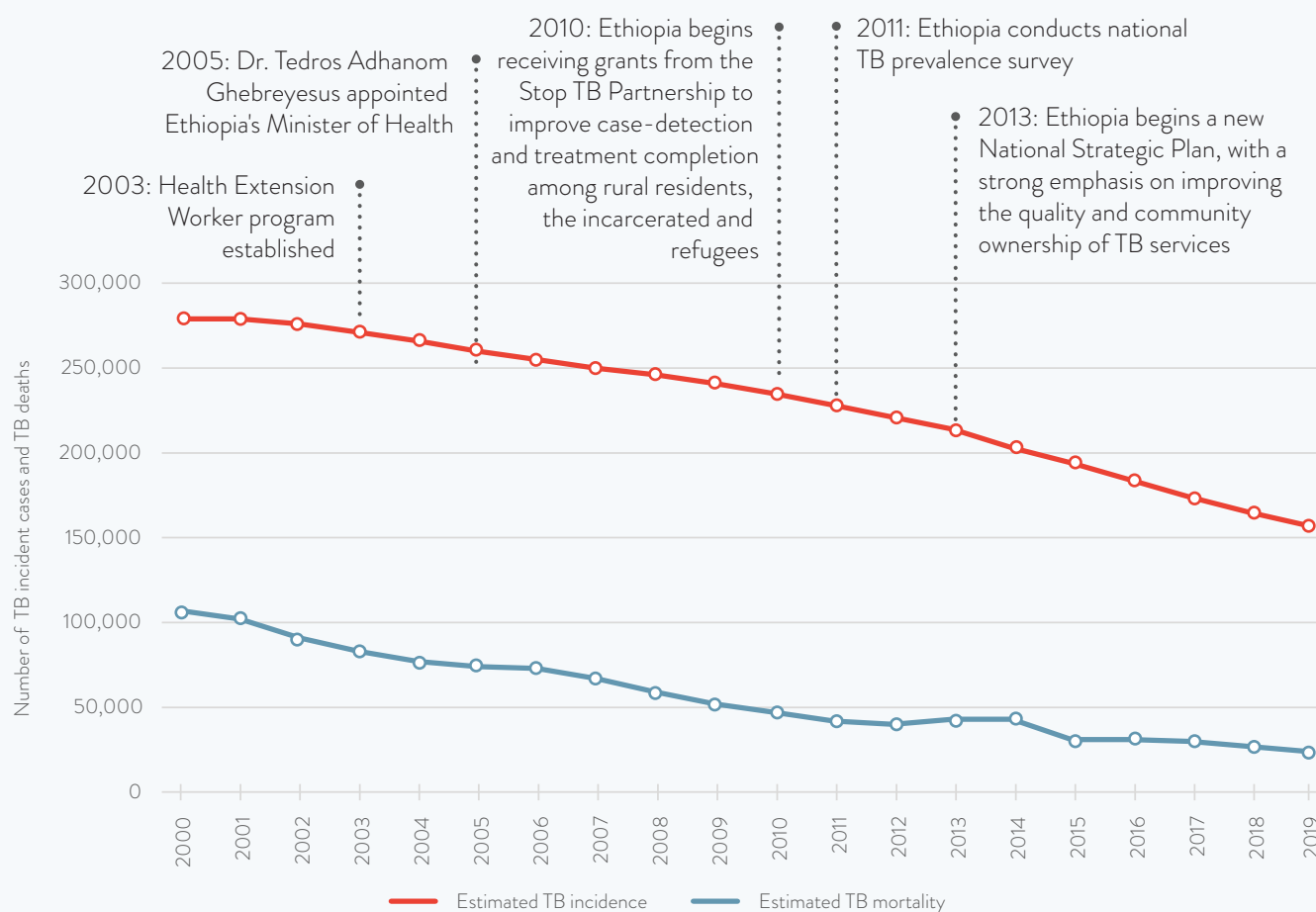
On the basis of an extensive 2011 TB survey, Ethiopia developed a National Strategic Plan (NSP) for 2013-2020 that placed a strong emphasis on improving the quality and community ownership of TB services. This focus on quality was carried through to the overarching Health Sector Transformation Plan (2015) that identified TB as a major priority, including MDR-TB. In 2020 a new plan has been developed, with technical support from the KNCV Tuberculosis Foundation, and it includes bold plans for scaleup.



**Health extension workers are a cadre of community health workers empowered to deliver 16 basic health services at the local level, including awareness raising about TB.**



## A national strategic plan and a cadre of highly trained community health workers have led to significant progress in reducing the rate of new TB cases, which have fallen by 75 percent since 2000.



## Keeping Up the Fight

- Ethiopia still faces major challenges as it seeks to meet the targets it committed to as a part of the UN High Level Meeting on TB in 2018. 157,000 people developed the disease in 2019, and while treatment access has expanded, about 30 percent were not able to access it. The MEASURE Evaluation study found high patient satisfaction, but also significant TB stigma and unmet needs for counseling, nutrition, transportation support and home-based treatment. Sustained progress is uncertain, with the National TB Program warning in April 2020 that the COVID-19 response was leading to the disruption of basic health services, including TB.
- With the assistance of Management Sciences for Health and USAID, the country has made major strides in combatting drug-resistant TB, increasing treatment success by five-fold since 2011 and providing patients with nutritional support and transport reimbursement. However, only about half of the country's estimated 1,600 people with MDR-TB were able to access treatment in 2018.
- Rapid molecular diagnosis, which can detect MDR-TB, is still underutilized, with only 313 GeneXpert modules in the country. According to an estimate from USAID, the country needs to increase its number of GeneXpert modules by nearly three-fold, and the number of cartridges by seven-fold, to make this the standard method for all TB diagnoses. TB detection with digital X-ray would also enable faster progress, but it is not in use in the country.
- Ethiopia is providing TB preventive therapy to children and people living with HIV, reaching 22 percent and 49 percent, respectively. However, to fully succeed with TB prevention, Ethiopia will need to expand the use of preventive therapy to all at risk, as well as make faster progress on ending poverty and undernourishment, which are the two biggest TB risk factors.



# Karachi, Pakistan

## Improved Case Finding Spearheaded by Donor Support and Local Innovation

Sustained donor funding in the last decade has facilitated health systems strengthening and improved TB case notifications in Karachi, the South Asian megacity of over 20 million people. From 2011 to 2017, support from the TB REACH Initiative for active case finding increased detections, particularly for pediatric and drug susceptible (DS) TB. This was done through a variety of innovative approaches led by the private and not-for-profit sector, including household contact tracing by community health workers, multi-media communication campaigns and service delivery centers with free-of-charge TB diagnostics and treatment for the working poor.

Innovation in the Karachi TB program has centered around cross-sectoral linkages and encouraging local ownership and community participation. A prominent example of this approach is when the Indus Health Network, a charity-based health network and leading TB treatment center in Pakistan, partnered with local not-for-profit Interactive Research and Development (IRD) in 2011 to employ an incentive-based active case finding approach to screen 1.2 million people for TB. This “mobile-money” scheme relied on pre-programmed electronic scorecards on screeners’ mobile phones to facilitate active case finding and detected twice as many TB cases in its catchment area as compared to the previous year. It encouraged Karachi’s untapped private sector to offer progressive financial incentives to providers, health workers and community screeners when they detected and referred suspected TB cases. It also ensured adherence and successful completion of treatment.

Two service delivery grants (2016 to 2017 and 2018 to 2020) awarded to Indus Health Network from the Global Fund to Fight AIDS, TB and Malaria with IRD as the technical partner expedited the scale-up of interventions under the Zero TB Karachi initiative and aimed to utilize comprehensive TB control measures (like “search-treat-prevent”) to bring about rapid declines in incidence rates. These initiatives built on previous public sector efforts and helped contribute to a 60 percent increase in TB detection rates between 2010 and 2018, and a 39 percent increase between 2015 and 2017-2018.

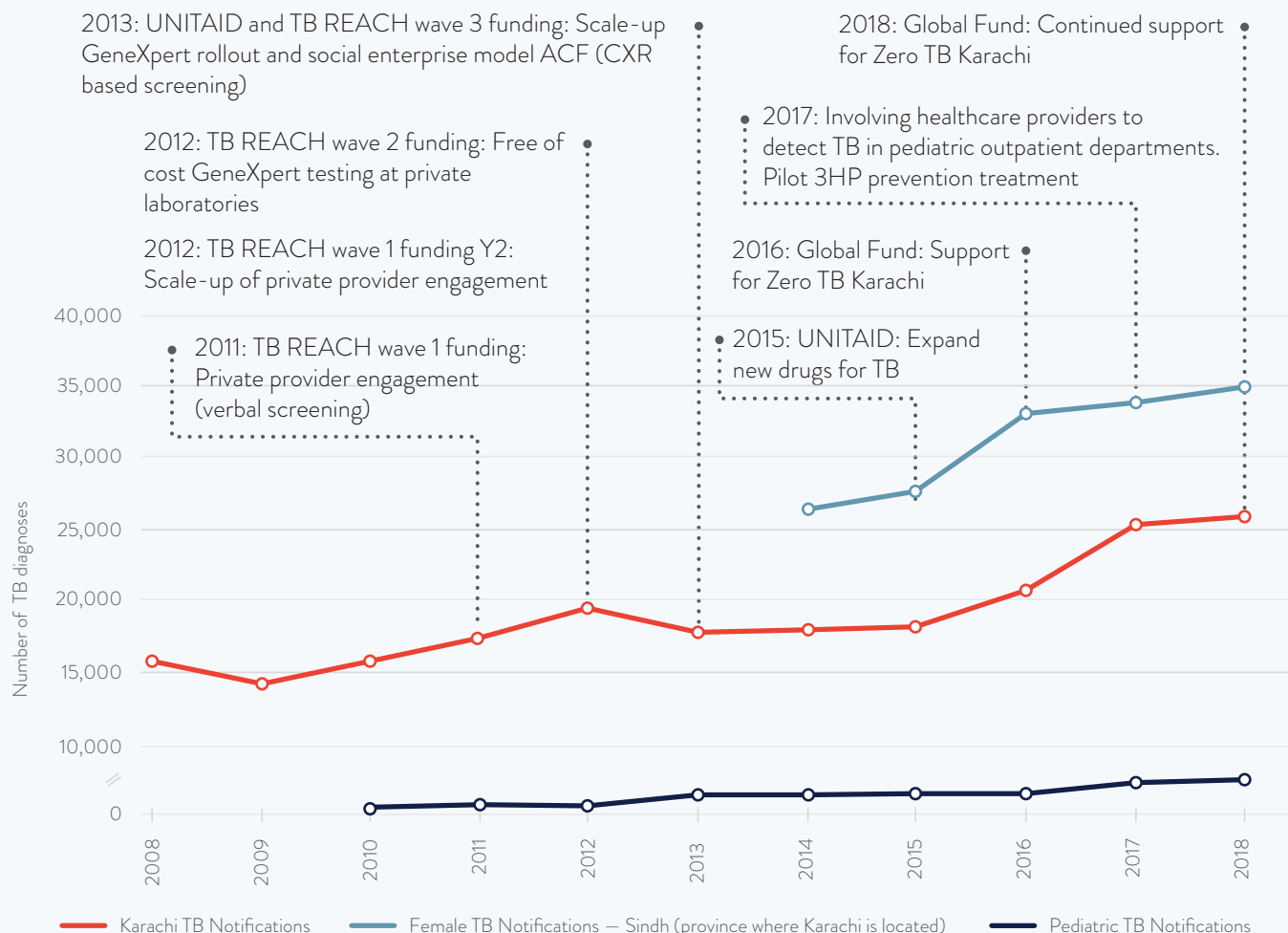
In a populous city known for its fragmented and uncoordinated health infrastructure, Zero TB Karachi introduced mechanisms for patient monitoring and cross-sectoral collaboration. A centralized database housed electronic medical records to identify patients regardless of whether they sought care in the public, private or not-for-profit sector. A linked call-center followed up with cases of treatment delay, disruption or other concerns. Mobile X-ray digital vans were deployed to proactively screen asymptomatic individuals in high-risk areas – such as hospital outpatient departments, prisons and factories – and were a source of heightened visibility and publicity for efforts to end TB. Integrated into these efforts were the pilot roll out of 3HP, a TB prevention treatment, as well as access to new drugs for drug-resistant TB patients.

Zero TB Karachi’s youth engagement scheme, dubbed “Kiran Sitara,” trained and mobilized 40,000 school girls to create referral networks and run mobile radiology camps as part of a concerted effort to increase the uptake of TB diagnostics and treatment in women in Karachi’s low-income and socially-conservative settings. Adolescent girls and young women constitute the highest TB prevalence population in Pakistan and the Kiran Sitaras were successful in engaging an overwhelming majority of women (over 80 percent) in the mobile radiology camps they organized and studies are underway to evaluate their impact.

Building on the government-led scale-up of pediatric TB interventions in 2013, Zero TB Karachi boosted pediatric TB notifications by more than 600 percent from 2010. This was accomplished by strengthening public sector hospitals and training healthcare providers to accurately detect and diagnose pediatric TB.

Consistent with the envisioned impact of the comprehensive “search-treat-prevent” strategy, latest estimates from Karachi show a seven percent decline in all forms of TB and a 28 percent decrease in DR-TB notifications from 2017/18 to 2019. The evidence suggests that large-scale active case finding combined with X-ray screening sustained for an extended period of time has resulted in reduced TB transmission and decreased incidence in the city.

## Sustained donor funding in the last decade has facilitated health systems strengthening and improved TB case notifications in Karachi, Pakistan.



TB detection rates increased by 60 percent between 2010 and 2018



From 2014 to 2018, case detection in women improved by 29 percent

### Keeping Up the Fight

- Lack of accountability and coordination at the local, provincial and federal level in Pakistan's decentralized health system makes sustainable and continued progress challenging.
- TB programming is underfunded nationally and heavily dependent on external donors. Fluctuation in funding from donors has the potential to derail current and future progress.
- Lack of flexibility in implementing innovative interventions or adapting existing interventions based on local needs will limit the continued progress of eliminating TB.

**“The quality and intensity of interventions in TB programs are directly correlated with the investments made in searching for, treating and preventing TB. In Karachi, between 2010 and 2019, investments by Stop TB's TB REACH Initiative, UNITAID, Global Fund and, to a lesser extent, the government and private donors can be demonstratively linked to increasing notifications and improved treatment outcomes in the initial years, followed by declines in TB and DR-TB notifications.”**

*Aamir Khan, MBBS, PhD, Executive Director IRD*



# Tomsk Oblast, Russian Federation

## Patient-Centered TB Control Approach Leads to Significant Declines

Following the dissolution of the Soviet Union in 1991 and the termination of many Soviet-era social services, there was a dramatic increase in rates of TB across the newly established Russian Federation. As the new millennium approached, both TB and multidrug-resistant TB (MDR-TB) rates had doubled compared to rates at the end of Soviet governance, and the rates in Tomsk Oblast were even higher than the average across the rest of the Russian Federation. Partners in Health (PIH) began working with Tomsk Oblast TB Services in 1998, initiating declines in incidence and mortality rates that continued throughout the 2000s.

In 1998, the TB case notification rate in Tomsk was 90.3 per 100,000 people in the civilian sector, with a mortality rate of 21.2 per 100,000 people. The percentage of MDR-TB among new cases and retreatment cases was 8.5 percent and 32.2 percent, respectively. In the prison sector, the TB case notification rate was 3,357 people per 100,000, with a mortality rate of 129.9 per 100,000. The percentage of MDR-TB among new cases and retreatment cases was 13.1 percent and 34.9 percent, respectively.

Tomsk Oblast TB services initiated one of the world's first MDR-TB programs. In 2000, the World Health Organization Green Light Committee approved the project to treat 630 MDR-TB patients with high-quality second-line TB drugs. Starting with the most disadvantaged cohort — prisoners with MDR-TB — the project expanded to the civilian sector of Tomsk Oblast.

Between 2004 and 2009, with support from the Global Fund to Fight AIDS, Tuberculosis, and Malaria, the Tomsk project focused on expanding treatment through the introduction of a comprehensive and integrated program to treat 950 MDR-TB patients. The project addressed many issues, including the strengthening of drug resistant TB laboratory diagnoses, improving infection controls and developing sub-programs focused on social and psychological issues related to TB treatment, such as reduction of alcohol use, treatment adherence and early case detection.

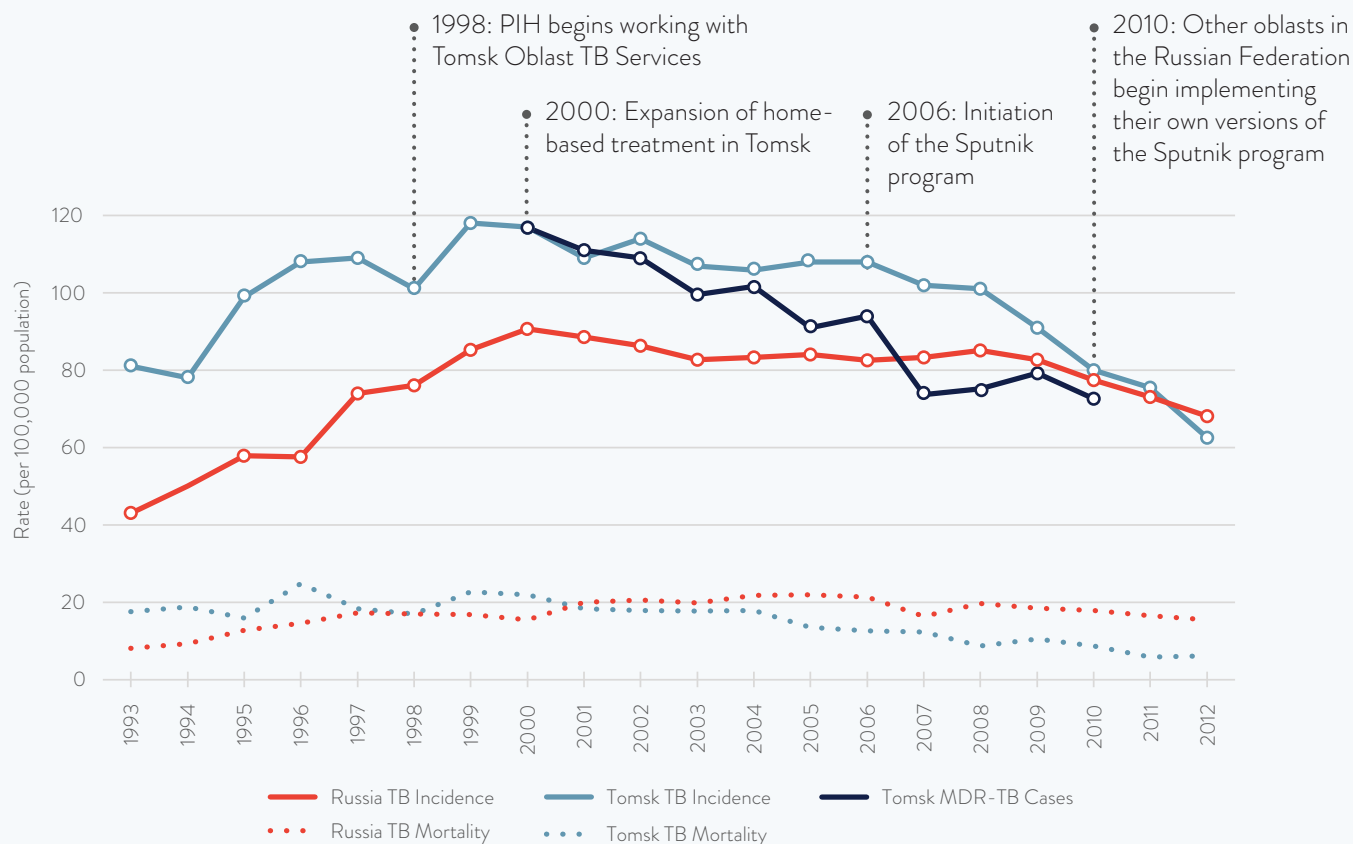
In 2006, PIH implemented the Sputnik project. The Sputnik program mobilized around a patient-centered approach to TB care, especially to individuals most at-risk of not completing TB therapy. Teams of nurses and mobile clinic drivers set out every day to find the patients enrolled in the program, many of whom were indigent or suffering from substance abuse disorders. These healthcare workers not only ensured that people with TB fully complied with treatment regimens — especially those with MDR-TB — but they also delivered food and provided other forms of social support to mitigate the socioeconomic constraints that patients faced in their daily lives. As part of the Sputnik project, PIH successfully collaborated with the Tomsk Regional AIDS Center, which resulted in the implementation of a TB prevention program among people living with HIV. Later, in 2009, the Global Fund extended its funding to the Tomsk project, enabling Tomsk TB Services to expand MDR-TB treatment activities and improve its efficiency.

The programs in Tomsk make clear that a comprehensive, patient-centered approach to managing TB is vital to an inclusive and successful TB program. The MDR-TB project implemented in Tomsk addressed both programmatic and socioeconomic factors associated with unfavorable outcomes. The result has been a strengthening of the overall TB control program in the region and improved case management for the most vulnerable patients. The model of MDR-TB care in Tomsk can be applied to other resource-poor settings facing challenges to TB and MDR-TB control.



**Teams of nurses and mobile clinic drivers set out every day to ensure people suffering from TB — especially MDR-TB — fully complied with treatment regimens.**

## Comprehensive epidemic control — with a focus on MDR-TB and improved social supports — led to declines in incidence and mortality rates in Tomsk Oblast.



## Keeping Up the Fight

- Russia continues to have a high burden of MDR-TB, constituting nine percent of new MDR-TB cases globally in 2018. As funding was removed from these programs in Tomsk, the incidence and mortality from TB and MDR-TB immediately started to rise, suggesting that sustained investment in comprehensive TB programs is vital for driving down TB rates in a substantial way.
- The procurement of new TB drugs and repurposed drugs required for an adequate treatment regimen for XDR-TB remains a challenge in Russia.
- Russia has also seen an increase in HIV/AIDS incidence rates, which have been growing at a rate of around 10 percent per year. Co-infections with HIV makes TB more difficult to treat successfully.
- Chronic hepatitis C infections have been on the rise in the Russian Federation as well, nearly tripling since the turn of the century.



# California

## Public Health and Policy Innovation to Drive Progress

While the United States sees thousands fewer TB cases each year than heavily impacted countries, the overall prevalence has plateaued for the past several years, making TB elimination a formidable challenge without new resources and policies. With the U.S. government as the leading funder of global TB research and programs, ending TB in the U.S. can be a catalytic example of the policies and resources other countries can emulate to help eliminate TB at home. California – at the forefront of TB elimination in the U.S. – stands as an illuminative case study.

California's TB epidemic peaked with a surge of 5,150 cases in 1993, which served as the impetus for the state's public health practitioners to pursue innovative policy solutions and programming to address the rising epidemic. As a result of these efforts, California has seen a significant decline in new cases over the years, with the latest low of 2,113 new TB cases in 2019. Despite making remarkable progress with limited resources, TB still persists in the state, and new challenges have arisen. Even with the declining number of cases, the annual incidence rate of 5.4 per 100,000 persons is nearly double the national rate (2.7 per 100,000). Available figures show that 837 people in the state succumbed to active TB disease between 2013 and 2017. With this relatively high burden of TB, public health practitioners estimate an annual societal and economic impact of \$200 million. However, California TB controllers continue to rise to the challenge, and if given new resources, are in a pivotal position to drive down new infections further and address a slowing decline in the state's incidence rate.

What did public health officials and policymakers do to drive TB rates down? The 1993 surge prompted the state to invest \$17.4 million to strengthen the response. With this new investment, local TB controllers began making improvements in data and reporting – known as base surveillance measures – with detailed case reporting on TB drug susceptibility and treatment outcomes. This provided the public health department with a clearer roadmap to identify and reach vulnerable populations.

Building upon that initial investment, an innovative and strategic mix of additional funding, research, policies and public health interventions have followed. This has contributed to the dramatic decline in cases, demonstrating the potential of local, state and federal governments to work together in overcoming this disease. California's achievements were also made possible through a host of other initiatives, including expanding health coverage and protection (TB Med-Cal program); legal reinforcement (Gotch legislation); creating a program to share best practices among providers and linkages for patients (MDR-TB Service); directly funding training centers and providing housing support (Governor's TB Initiative for Housing and Detention); constant evaluation and quality improvement (Tuberculosis Indicator Project – TIP); and deploying new technologies like rapid molecular testing and a short-course regimen for latent TB infections. California codified these strategies into a layered, comprehensive TB elimination plan in 2016 that outlined the necessary steps to achieve TB elimination in the state, including coordination among the state's communities, clinics and health departments.

The state's work on TB has also led to profound transnational innovations in TB research and care. In 1996, California instituted a bi-national TB referral program with Mexico called Cure TB, which connects people with TB to healthcare as they move between the U.S. and other countries. In addition, the University of California San Francisco has developed strong research links with Vietnam that have been crucial in developing game-changing interventions like 3HP, which shortens the length of TB treatment from nine months of daily medicine to 12 once-weekly doses. This groundbreaking transnational research relationship is funded through support from TB Trials Consortium (TBTC), through the CDC's Division of TB Elimination.

### Glossary

**TB Trials Consortium (TBTC):** Housed within the U.S. Centers for Disease Control and Prevention (CDC), the TBTC conducts clinical research and is key to strengthening domestic and global campaigns to eliminate TB.

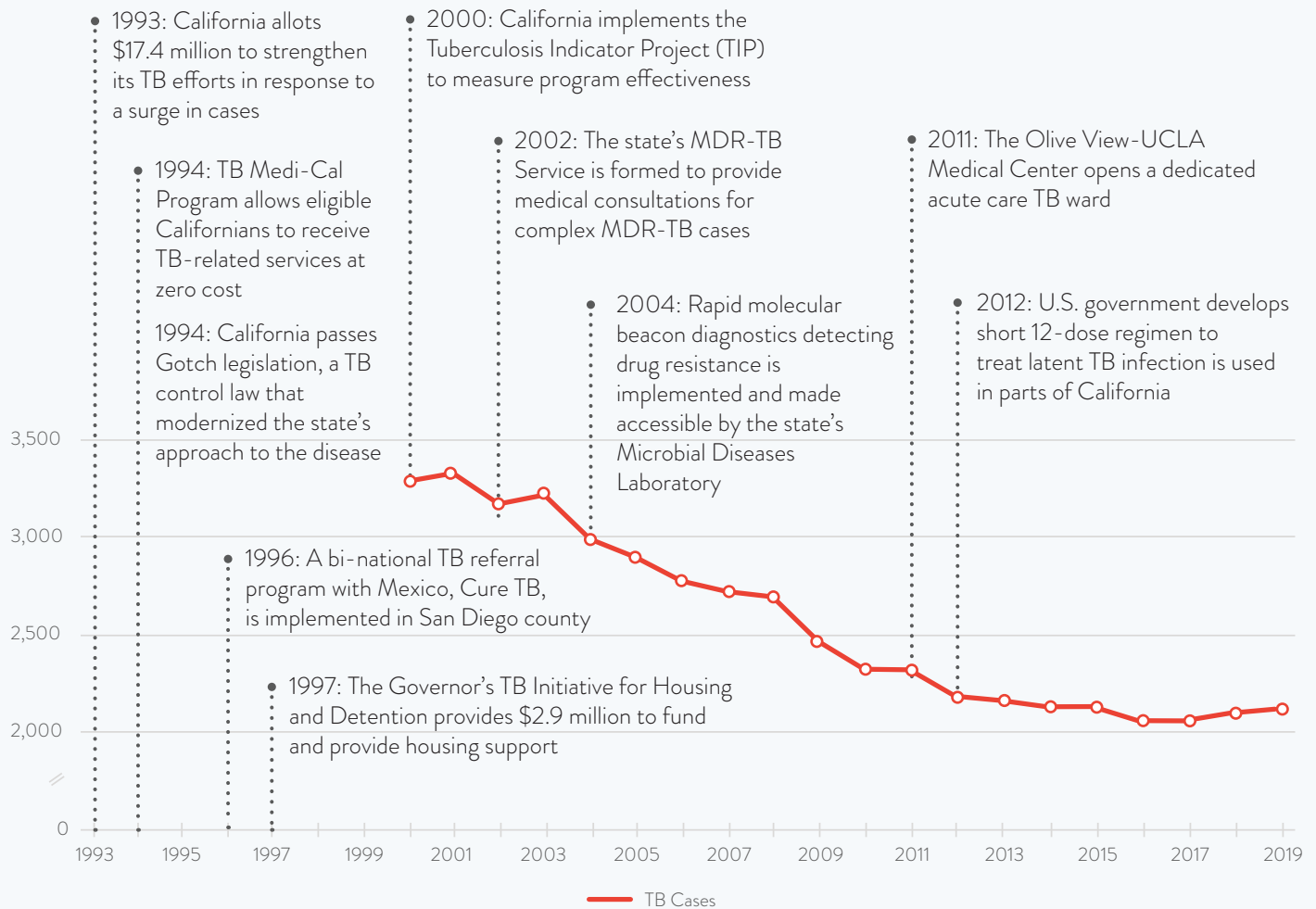
**3HP:** A breakthrough short-course (three month) preventative therapy for latent TB infections developed at the TBTC.

**Gotch Legislation:** California's TB control law that requires health facilities to obtain approval before discharging TB patients, based on a written plan for the patient's post-discharge care and support.

**Tuberculosis Indicator Project (TIP):** A quality assurance initiative and collaboration between local and state TB partners in California. Under this initiative, local and state staff review program data, identify gaps and implement plans to improve the performance and outcomes of local TB programs.

**TB Medi-Cal Program:** California's state Medicaid healthcare program, aimed at covering the healthcare needs of children and adults with limited incomes. California has a TB specific Medi-Cal program for those who might not otherwise qualify for healthcare benefits.

**An innovative mix of investments, research and public health interventions have contributed to a dramatic decline in TB cases, demonstrating the potential of local, state and federal governments to work together in overcoming this disease.**



## Keeping Up the Fight

- The state has been at the forefront of annual declines, seeing its infections drop by 61 percent since the height of its epidemic in 1993. For the last five years, California has had an annual decline of 1.8 percent, pointing to a slowing and plateauing of the epidemic, which may indicate that expanded resources are needed to continue the momentum generated by TB controllers. Modelling suggests that TB elimination will be well out of reach for 100 years without new resources to identify and treat latent TB.
- The nation's federal TB program at the CDC, the Division of Tuberculosis Elimination, provides critical funding to state and local TB programs, including California. However, funding at DTBE has been stagnant at \$142.2 million for over a decade, making TB elimination in the hardest-hit states like California more difficult to achieve. New investments in latent TB infection testing and treatment could help California cut cases in half and reach elimination with current tools.
- Access to TB therapeutics and tools is a challenge to TB controllers given the drug shortages, stock-outs, high prices and procurement issues for multi-drug regimens to treat drug-resistant cases. Investments are also needed to advance research for an effective vaccine, rapid point-of-care testing and shorter and more tolerable treatment regimens for all forms of TB.



# COVID-19 and TB

TB took 1.4 million lives in 2019, but COVID-19 – another airborne contagion that is spreading at a scale and speed unparalleled in recent history – could exacerbate TB incidence and mortality rates, derailing hard-earned gains.

While TB is important to end in its own right, as TB advocates and affected communities have stressed, the global TB response can provide important insights for the response to COVID-19. Strategies, innovations and lessons learned can be leveraged from decades of TB elimination efforts. Additionally, understanding how COVID-19 interacts with TB is essential to designing a complementary response that curtails the spread of both.

The rapid spread of COVID-19 should be a wake-up call for policy makers around the world to invest in strengthened health systems that can better address epidemics of today and be ready for the inevitable epidemics of tomorrow.

## Similarities between TB and COVID-19

The TB community sees a familiar foe as the world faces COVID-19. Both diseases are airborne respiratory infections that impede host immunity, attack the lungs and cause a wide spectrum of symptoms. Both TB and COVID-19 are spread primarily through contact with respiratory droplets (in the air or on surfaces) produced during breathing, talking, coughing and sneezing. The period between exposure to the pathogen and onset of symptoms or infectivity, known as the incubation period, is much faster for COVID-19 than for TB. Individuals infected with COVID-19 typically develop symptoms of disease or become infectious within one to two weeks after exposure. In contrast, around half of people that develop TB do so within two years of infection.

Both diseases tend to disproportionately impact vulnerable populations, such as the elderly, people living with HIV who are not on treatment, the immunocompromised and people with existing respiratory illnesses. The risk for developing adverse health outcomes from both is exacerbated by underlying social, economic, racial and geographic disparities, in addition to other health conditions. TB survivors have contended with stigma and discrimination for many years in ways that are similar to what those who test positive for COVID-19 face today.

## Risks to Current Progress in Global and Domestic TB Response

COVID-19 has ground economies to a halt, disrupted entire health systems and had far-reaching impacts on vertical and primary healthcare programs all over the world. A modeling analysis commissioned by the Stop TB Partnership concluded that a three-month lockdown for COVID-19 could cause an excess of 1.4 million TB deaths and 6.3 million cases in the next five years. According to the results of a recent Global Fund survey, programs across 106 countries show widespread disruptions to HIV, TB and malaria service delivery as a result of the COVID-19 pandemic, impacting approximately three-quarters of HIV, TB and malaria programs.

Supply chain disruptions have resulted in shortages and misallocation of personal protective equipment (PPE) as well as an inadequate supply and unsuitable allocation of diagnostic cartridges for both diseases. National lockdowns and stay-at-home orders are preventing the continued identification of people in need of TB prevention or treatment interventions, and disrupting treatment and support services for people with TB. In most countries, TB program staff have been detailed to the COVID-19 response. The delivery of vaccines has been put on hold in some countries, further exacerbating inadequate levels of protection against TB.



Domestic TB programs in the U.S. face similar impacts, with preliminary data from a National TB Controllers Association survey illustrating a significant shift in resources for state/local TB programs to COVID-19. Respondents reported that more than 90 percent of state and local health programs have deployed TB program personnel to their jurisdiction's COVID-19 response. Jurisdictions are also having to devote physical resources such as supplies and space to the COVID-19 response. For example, an entire TB in-patient setting in Los Angeles, Olive View, was re-purposed for COVID-19, resulting in the premature discharge of TB patients.

The consequences of disrupting TB services are dire, especially as TB patients with lung damage may have a higher likelihood of developing life-threatening complications from COVID-19.

Countries have worked to adapt TB services to regain momentum in the fight against TB, with the backing of the Global Fund and USAID. For instance, South Africa has done community-based screenings for both TB and COVID-19. Indonesia, the Philippines and others are providing patients with several weeks' worth of medication so they do not have to travel to a clinic, and then maintaining contact with patients via mobile phone.

## **Lessons Drawn from TB**

TB controllers, public health practitioners and community health workers bring a wealth of expertise in airborne infection response. They know how to manage outbreaks while ensuring treatment access and socioeconomic support for patients. The TB field pioneered the comprehensive community-based strategy of "search, treat and prevent" which led to dramatic reductions of TB in the developed world. The active contact tracing strategy for testing is particularly crucial to disrupt transmission from asymptomatic carriers, and has been piloted across the world to curb the spread of COVID-19. The TB field also helped pioneer protocols for quarantine and isolation measures that have become commonplace during this pandemic.

Networks of TB diagnostic platforms across countries are well-positioned to support the response to COVID-19. For example, the GeneXpert diagnostic machine – developed through U.S. taxpayer funding to the Department of Defense, NIH and PEPFAR – was originally utilized and brought to scale for TB diagnostics. It has now been approved for rapid COVID-19 testing. There are over 23,000 GeneXpert devices worldwide that can facilitate testing, especially in low and middle-income countries. The Global Fund seeks to train more personnel to use the machines for both TB and COVID-19.

In addition, as governments around the globe partner with researchers and private companies in the race for a COVID-19 vaccine, current vaccine platforms developed for TB are being looked at in new light for possible efficacy against COVID-19. This includes the Bacillus Calmette-Guérin (BCG) vaccine, currently used to prevent childhood TB, which preliminary observational research indicates may confer some protection against COVID-19.

The experiences of the TB community can be a valuable part of the global response to COVID-19, but must not divert funds and other resources away from tuberculosis to COVID-19. The only way to defeat both of these deadly infectious diseases is to grow the total resources for both.

# Statement on Racial Justice, Human Rights and Tuberculosis

Racial injustice, human rights violations, stigma and approaches that ignore community needs have long been unaddressed undercurrents of the TB epidemic, which takes 1.4 million lives a year, mostly in low- and middle-income countries. Protests against racial justice in the United States and abroad – as well as the disproportionate impact of COVID-19 on Black, Brown and Indigenous people – have laid bare the inequities, structural violence and racism that underpin our societies and health systems. In order to achieve meaningful progress against TB and other epidemics, we must fight against the notion that diseases mainly impacting communities of color and those living in poverty are less deserving of the world's time, attention and funds. We must stand for upholding the health, dignity and livelihoods of people affected by TB everywhere.

While racial injustice as a driver of TB inequities has been well documented throughout the history of the epidemic, in particular national contexts, actions to address the impact have been inadequate. For example, data presented at the 2017 Conference on Retroviruses and Opportunistic Infections (CROI) showed that Black communities and communities of color in South Africa suffer from higher rates of TB compared to even the poorest of white communities. That same year, a cover story by Harper's magazine investigated an ongoing TB outbreak in the "Black Belt" of rural Alabama, revealing that rates of TB in Perry county, which is predominantly Black, are 100 times higher than rates in India and Haiti.

Yet years later, these stories have still not catalyzed the necessary resources – both domestically and globally – to address TB thoroughly, including in communities of color. Funding increases to USAID's TB program have been piecemeal, while the CDC's domestic TB program remains flat-funded. The lingering effects of racism, such as segregation and medical mistrust, allowed the TB outbreak to continue unabated in Alabama since the first cases were reported in 2014.

Throughout history, affected communities have often taken it upon themselves to address racial inequities and gaps in the TB response. Black public health researchers in the U.S. have advocated for policies that would improve working and housing conditions in order to reduce TB rates among African American communities in urban centers. The Young Lords, a civil and human rights organization, created community health projects for poor Latinx neighborhoods, conducting door-to-door testing for TB in New York City's Bronx borough. Nearly a century ago, the Black women-led Women's Improvement Club of Indianapolis pioneered efforts in deeply segregated conditions to open a sanatorium for TB patients. These are just a few examples of how TB has persisted in a vacuum of political attention, resources, and urgency, and how in many cases communities have risen to the challenge themselves.

We must do better, and we can start by shifting the burden off of impacted communities. Our TB response efforts must be centered around rectifying the social and structural injustices in the context of TB and bolstering the human rights and voices of vulnerable groups. We should start by implementing the specific policy recommendations that have been made by TB-affected communities. This includes prohibiting, in law and policy, all forms of discrimination against people affected by TB, including but not limited to, health care, employment, education, housing, family and detention settings. Programs should implement the Declaration of the Rights of People Affected by TB, a tool that Justice Edwin Cameron, formally of the Constitutional Court of South Africa, described as "assertive, expressive, dignified...(and) unparalleled in a world grappling with TB."

The profiles in this report demonstrate the remarkable progress made by public health programs against TB, while also showcasing the importance of empowerment, leadership and social protection as a key strategy to ending the epidemic. Reversing decades of systematic oppression takes bold and ambitious policymaking, as well as adequate resources to address human rights, systemic racism and legal barriers to care.

Addressing human rights abuse, especially racial and other forms of injustice, is critical to breaking the persistent stranglehold TB has had on vulnerable communities for years, and to delivering on the promise of the historical investments and scientific advances made to date. Marginalized communities have shown what it takes to undo interlocking oppressions related to TB, in varying global and national contexts. It is now time for policymakers to take the next step.

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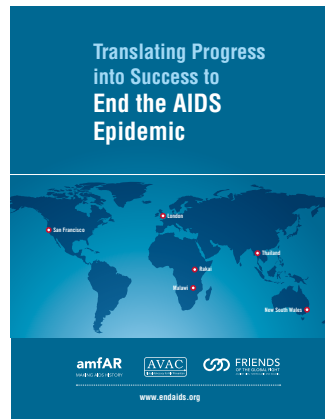
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## Additional Reports

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### **The AIDS epidemic can be ended.**

That is not a fantasy — it is a matter of choice. Policy makers, researchers and communities can end the AIDS epidemic in our cities, our countries and in our world. Some places are doing it already.

We must learn from these successes and demand the investment and policies needed to end the AIDS epidemic.

**[www.endaids.org](http://www.endaids.org)**



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