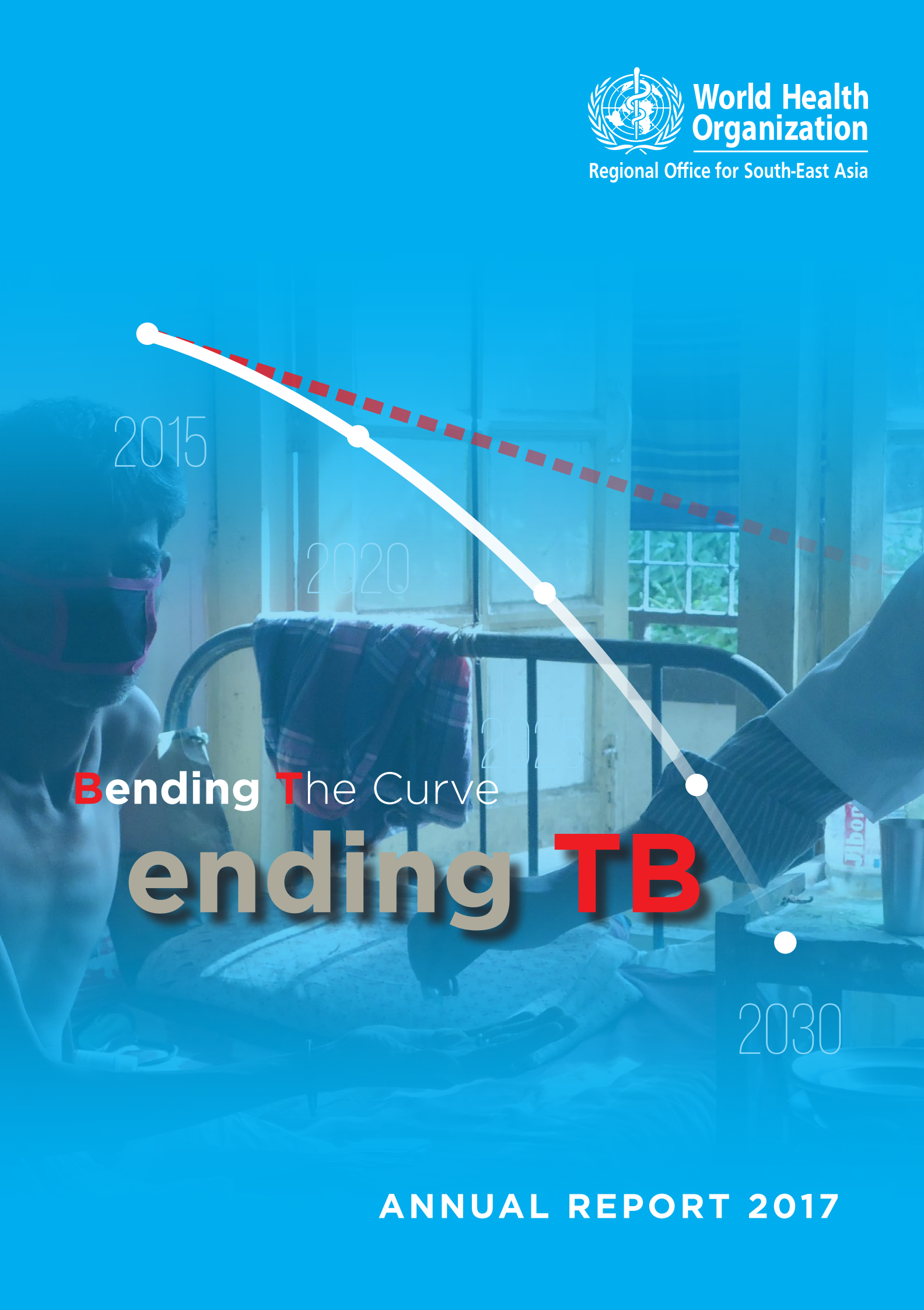
World Health Organization

Regional Office for South-East Asia



Bending The Curve
ending TB

ANNUAL REPORT 2017

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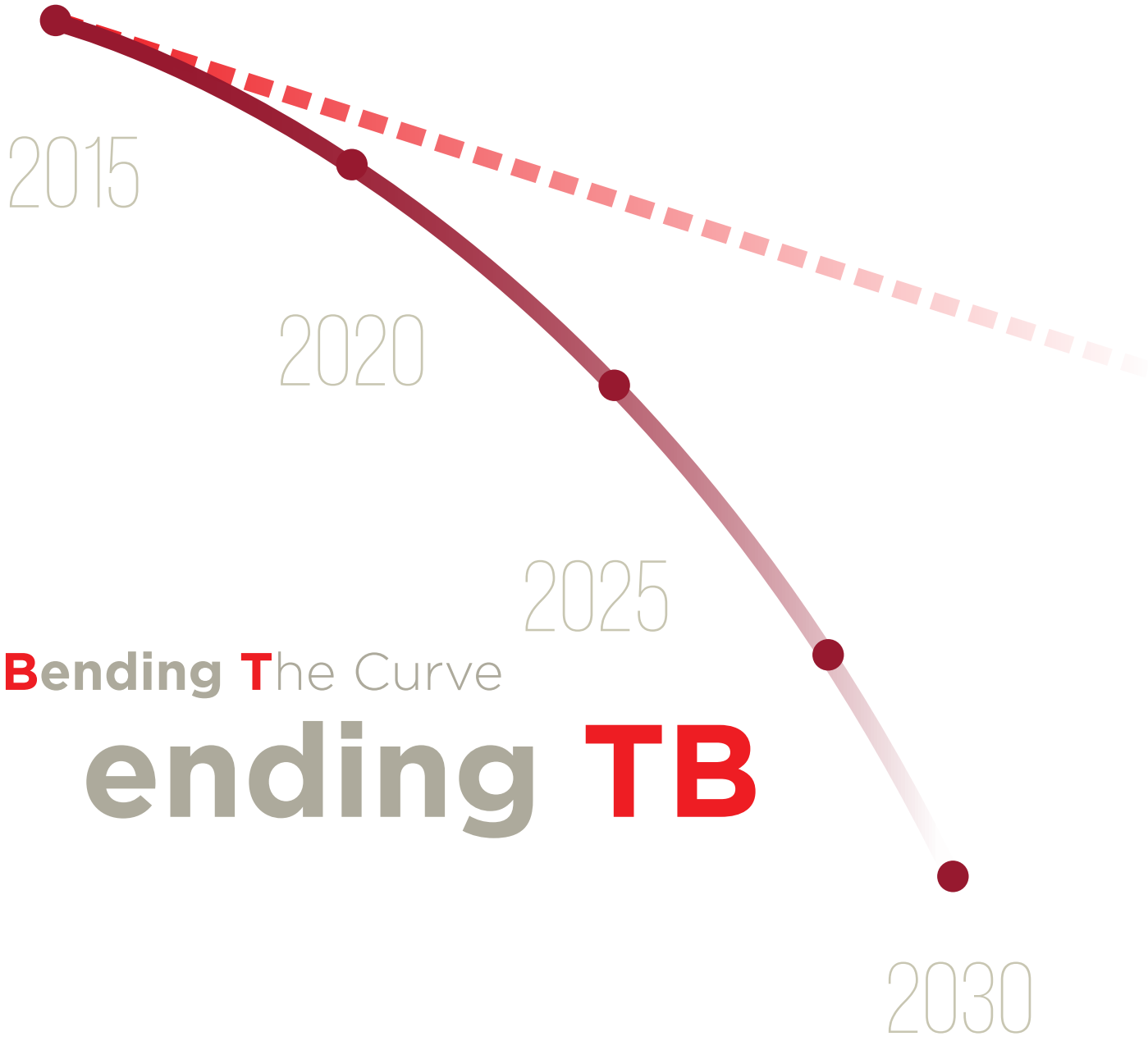

Bending The Curve

ending TB

ANNUAL REPORT 2017

Bending the curve - ending TB: Annual report 2017

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TB is **preventable** and completely **curable**– yet about 710 000 people **died of TB** in 2015.

Incomplete treatment can lead to drug-resistant TB over 200 000 people got **DR-TB** in 2015.

Malnutrition, **smoking** and diabetes **aggravate TB**.

TB thrives in **poverty**. It also creates poverty; the poor have a **five-time higher** chance of getting TB.

FACTFILE

TB is the **largest killer** among communicable diseases in the 15 to 49 age group, when humans are most productive.

TB accounts for the highest DALYs or **workdays lost** each year among the communicable diseases.

TB is the **leading cause** of death among people with HIV.

A well **ventilated** room that allows sunlight **reduces risk** of TB transmission.

Treating a **drug-resistant** TB case can **cost** as much as US$ 5000.

A dollar **invested in TB** gives a return of US$ 43.

Contents

Map: Kindly refer to disclaimer page

F O R E W O R D

TB needs a surge in our efforts

Let me reiterate, for us in the South-East Asia Region ending TB is the topmost priority as we shift gear from "Stop TB" to "End TB" by 2030. Why is ending TB so crucial to this Region? Because South-East Asia accounts for nearly half of the world's TB burden, 45.6 per cent to be precise. While TB is commonly caused by poverty it also creates poverty in our Region, being the single largest killer in the 15 to 49 year age group. It strikes people in their most productive years. Since 1990, TB has remained the topmost reason for workdays or DALYs lost. Fighting TB is like fighting poverty. Evidence suggests that for every dollar invested in TB the return is 43 dollars! It makes great economic sense to end this malady.

Ending TB will need a quantum leap in our efforts. The silence surrounding TB has to end first. According to the 2016 WHO Global TB Report, it was estimated that in 2015 there were 10.4 million TB cases globally. In the WHO South-East Asia Region an estimated 4.74 million cases of TB were reported and about 784 000 people died of it. Globally the gap between notifications of new TB cases and the estimated number of incident cases was 4.3 million. The "missing cases" were a combined result of non-detection and under-reporting of detected cases. No longer can the world afford to sweep TB under the carpet. It is crying for the political attention it deserves.

Evidence suggests that for every dollar invested in TB the return is 43 dollars! It makes great economic sense to end this malady

And yet we're hopeful of a new beginning. I am optimistic because we have in the past met the MDG goal of halving TB by 2015 (compared with 1990). The world has saved 43 million lives from TB in the past two decades through concerted efforts. We owe it to the untiring efforts of programme managers and frontline workers. But those efforts have to be redoubled now. Taking 2015 as a baseline, the new WHO "End TB" Strategy targets a 95 per cent reduction in TB deaths and incidence by 2035. Currently, the Region, and the whole world, is achieving only a 1.5% to 2% annual decline in TB incidence. With present efforts none of the countries in the Region will reach the "End TB" targets. For reaching targets the declining TB curve has to bend much more sharply.

Can we "bend the curve"? Yes, we can. We have to do much more, and do it fast. All this will be possible only if there is a strong commitment from the political leadership of each country to address multiple challenges, including high levels of multidrug-resistant TB, low financial allocations, and weak health systems.

TB has been curable for several decades now. Great strides have been made in innovations for newer diagnostics and drugs. Vaccines too are in the pipeline. All we need now is a surge in our actions to reduce the TB burden dramatically. In this report we have some of the best minds working on TB telling us how to do things the right way.

Above all, we need an effective communication strategy that creates awareness of TB among ordinary people. Understanding will generate the demand for seeking treatment. Radio and TV have a deep penetration in every country of our Region. These and other outreach mediums can be exploited strategically so that even the last person in the remotest village when faced with persistent cough asks the question, "Is it TB"? The health system in their vicinity should be robust enough to respond to that person. Only when the last man is brought into the realm of treatment, can our aim of ending TB by 2035 be realized. I appeal to the political leadership of every country in our Region: make this your mission.

Dr Poonam Khetrapal Singh
Regional Director

To bend the curve and meet the 2030 goal of ending TB we have to do much more, and do it fast. All this will be possible only if there is a strong commitment from the political leadership of each country. Below are commitments made by some leaders of our Region

TALKING

"I firmly believe that tuberculosis is preventable and treatable. It needs commitment, determination and solidarity... let's make a pledge to work together towards that end."

Sheikh Hasina
Prime Minister
BANGLADESH*

"The Government of India stands committed to accelerating its efforts to combat tuberculosis..... Compared with the world we have a large number of TB patients in India. We have to defeat TB in India."

Narendra Modi
Prime Minister
INDIA*

"TB has devastating socio-economic effects on individuals, families and communities in Timor-Leste. TB is also severely impacting the health and development of our country and jeopardising our future prosperity. We are committed to end TB by 2030."

Dr Rui Maria De Araújo
Prime Minister
TIMOR- LESTE

"Our commitment to and obligation for achieving the elimination of tuberculosis is ensured by the Government of Indonesia's self-reliance and sustainability in TB control which includes implementation of the Exit Strategy, and national health insurance and social protection schemes. Our family health and community approaches, district-based public-private mix, active case-finding and partnership engagement policies in TB control are keys to improve access and outreach for the previously unreached TB cases. A legal framework, which includes declaring TB as a notifiable disease, has been established to support TB control and to achieve its elimination. Indonesia aims to achieve the elimination of tuberculosis by 2035 as part of its National Development Agenda."

Professor Nila F. Moeloek
Minister of Health
INDONESIA

"Maldives will continue the commitment to protect its community from TB. We will leave a TB-Free Maldives to the next generation."

Abdulla Nazim Ibrahim
Minister of Health
MALDIVES

*Source: Public domain

HEADS

"I fully support the National Tuberculosis Programme. As the NTP prgramme manager and Deputy Director-General (Disease Control) have suggested, I will take immediate action to address this important issue."

Dr Myint Htwe
Minister of Health and Sports
MYANMAR

"The Government of Nepal highly prioritizes the response to tuberculosis and is committed to reduce the people's suffering from this preventable and treatable illness. We have adopted the End TB Strategy to eliminate tuberculosis from Nepal by 2035."

Gagan Kumar Thapa
Minister of Health
NEPAL

"The Government of India stands committed to accelerating its efforts to combat tuberculosis in the country."

J.P. Nadda
Minister of Health and Family Welfare
INDIA*

"The tuberculosis trend in Bhutan has been progressively declining but it is still a priority public health problem, mostly affecting the productive age group of 15–44 years. I call upon all citizens of the country to unite with the health sector in combating TB. I would like to call upon each individual, family, and community to take ownership and participate in the fight against TB... I believe that through shared responsibility we can end TB."

Lyonpo Tandin Wangchuk
Minister of Health
BHUTAN

"Top political commitment is needed to turn the serious TB epidemic. Thailand is proud to be one of the first supporters of the UN High-Level meeting on TB. The Meeting will ensure a historic tipping point in the fight against the world's leading infectious killer. Together, we can tip the situation."

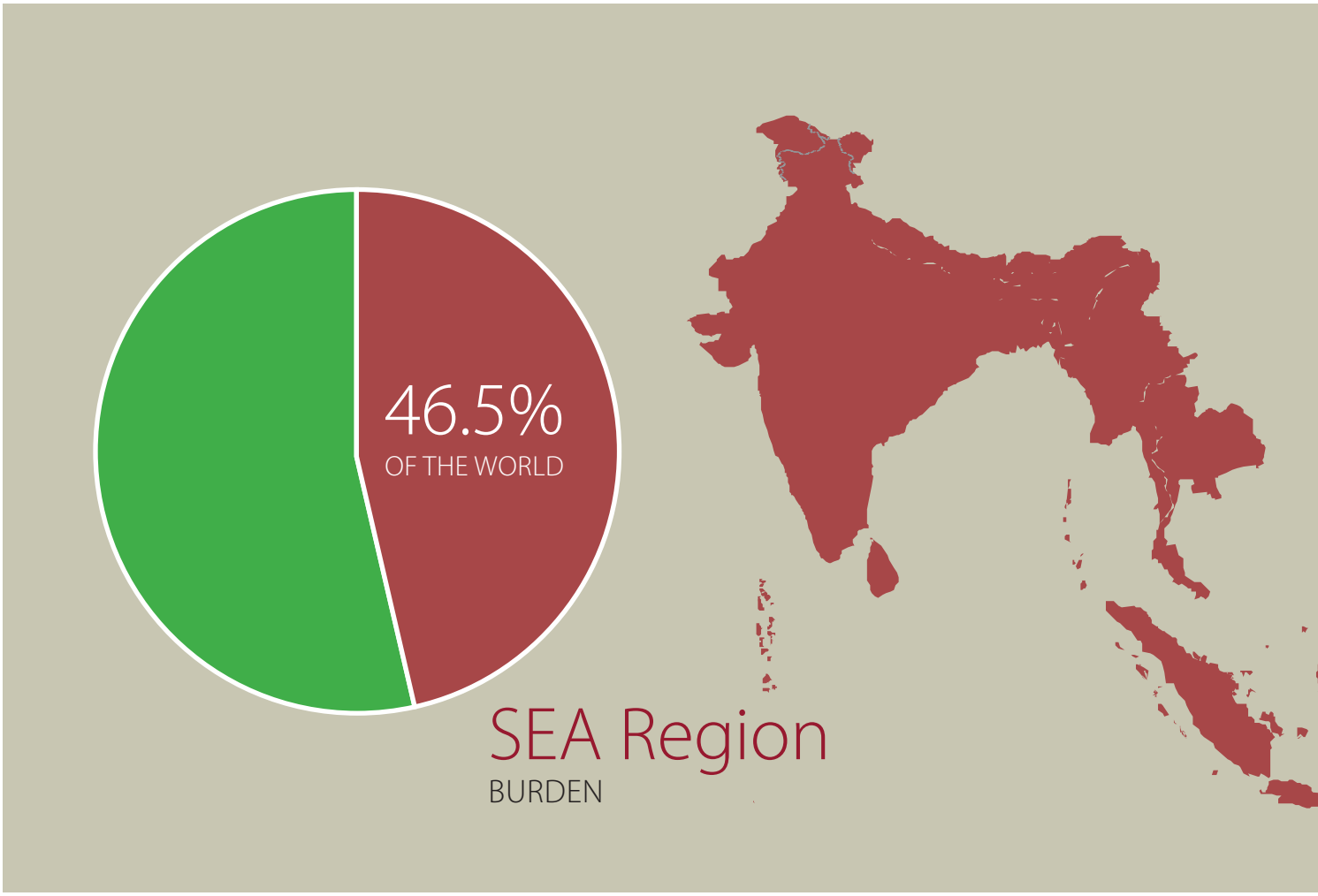
Dr Piyasakol Sakolsatayadorn
Minister of Public Health
THAILAND

"Sri Lanka has enjoyed free universal health care for almost seven decades. In spite of this, and the significant progress we have made in health care delivery to our people, we are yet to fully control TB in our country. Our aim is virtual elimination of TB, the way we have achieved success with malaria and polio. Since it has been proven that the disease is treatable and preventable, we hope to use modern medical know-how and expertise to achieve this goal and accelerate our efforts towards ending TB."

Dr Rajitha Senaratne
Minister of Health, Nutrition and Indigenous Medicine
SRI LANKA

A heavy burden

The SEA Region bears an inordinately high share of the global TB burden. To end TB across the world by 2030 much will depend on how this Region fares in the coming years



In 2015, the world had an estimated 10.4 million new TB cases. Over half of these were among men (5.9 million), and women constituted over a third (3.5 million). Ten per cent of cases were among children. The global TB estimate has seen a considerable upward revision in recent years, mainly a result of new surveillance, and estimates being revised in India. The TB epidemic is much larger than earlier thought, particularly in the WHO South-East Asia Region (SEAR). This is because in 2015 there were 4.3 million "missing cases". This was largely because the private sector in India was outside the ambit of the National TB Programme (NTP). When the correction was made it led to a 34% rise in notifications in India between 2013 and 2015. Ten countries accounted for 77% of this estimated gap globally. In SEAR, besides India, Bangladesh,Indonesia and Myanmar also contributed substantially to the "missing cases".

Though the Region's epidemic is now larger than previously estimated, the incidence rate and number of deaths continue to fall globally, including in India which alone accounts for nearly a quarter of the world's burden. This decline is a result of advances made in TB prevention and treatment. Between 2000 and 2015, some 49 million lives were saved globally due to better diagnostics and care. Yet glaring gaps persist that need

Map: Kindly refer to disclaimer page

to be closed if we are to meet the "End TB" goals. Under-reporting of TB cases remains a critical deficiency in accurately measuring the Region's TB burden. The End TB target is to reduce TB deaths by 90% and incidence rates by 80% by 2030, compared with 2015. This is a major challenge in the face of sheer numbers facing countries of the Region (Fig. 1).

This is the second SEAR TB Report as we take first steps into the post 2015 era of the SDGs. In 2015, there was an estimated 4.74 million incidence of TB in the SEA Region, including HIV+TB co-infection. The total number of new cases notified to National TB programmes in the Region were around 2.65 million in 2015. The Region accounts for nearly half (45.6%) the global burden in terms of TB incidence even though it comprises only a quarter of the world's population. Six SEAR Member States find a place in the global list of 30 high-TB-burden countries. They include, in order of incidence rate, the Democratic People's Republic Korea, Indonesia, Myanmar, Bangladesh, India and Thailand (Fig. 2).

Of these India (23%) and Indonesia (10%) alone account for a third of the world's burden. These grim figures need to change rapidly.

Though India appears to be the major source for the Region's TB numbers it actually ranks number six in terms of incidence rate. Even its mortality rate, at six, is not too bad. (Figs. 3 & 4) The countries that fare poorly in terms of incidence, in descending order, are DPR Korea, Timor-Leste, Indonesia and Myanmar. In terms of mortality rate the picture is not very different. Timor-Leste (100 per 100 000 population) is followed by DPR Korea (61), Myanmar (49), Bangladesh (45) and Indonesia (36). It is because of its population size that India's numbers

India, Bangladesh,Indonesia and Myanmar contributed substantially to the 'missing' cases

Fig. 1 Ranking of SEAR countries by TB incidence, 2015

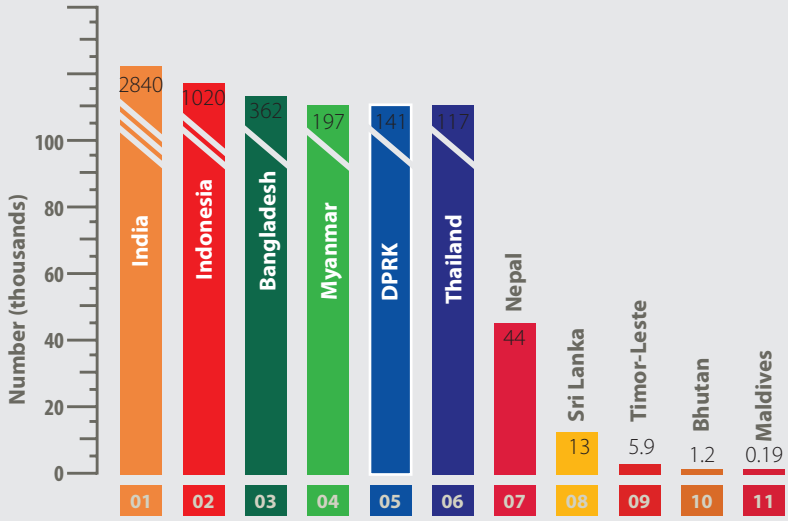
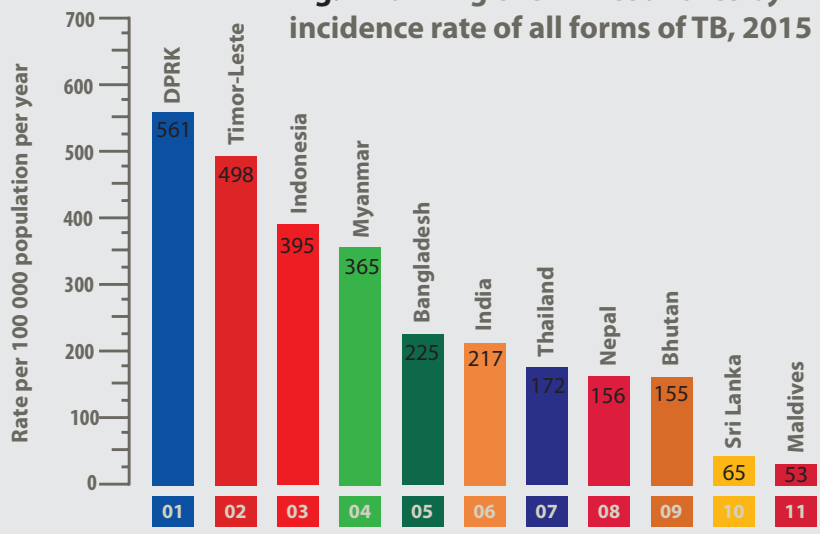
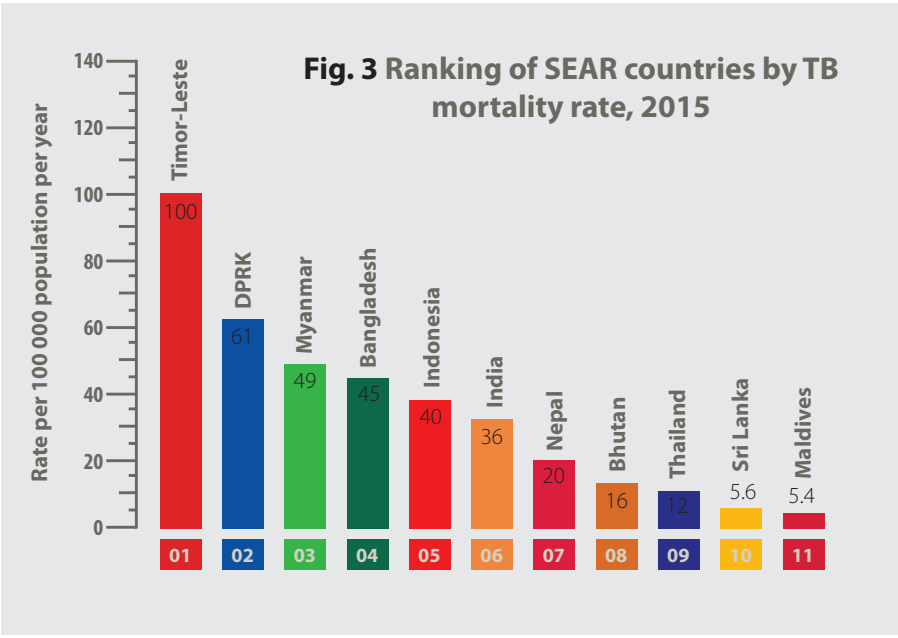
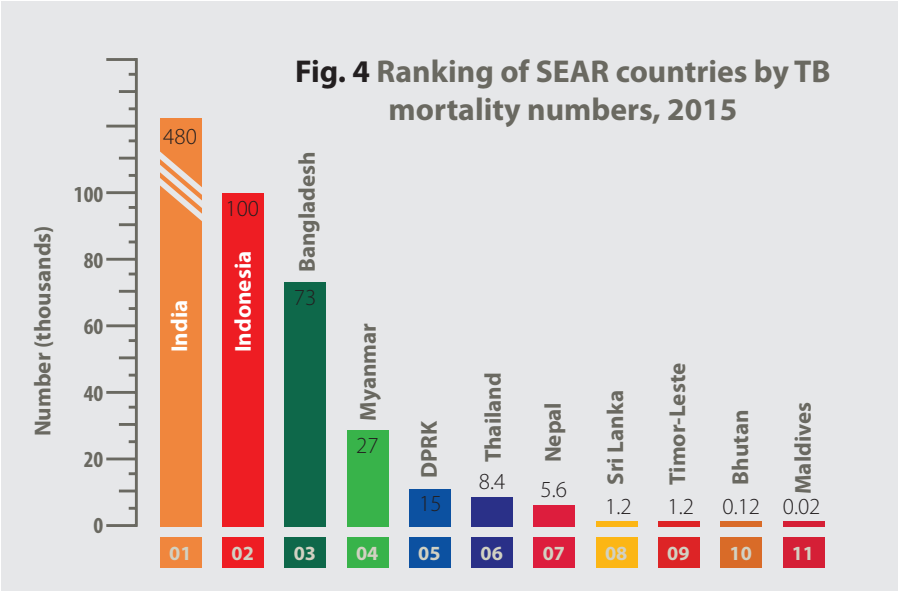


Fig. 2 Ranking of SEAR countries by incidence rate of all forms of TB, 2015





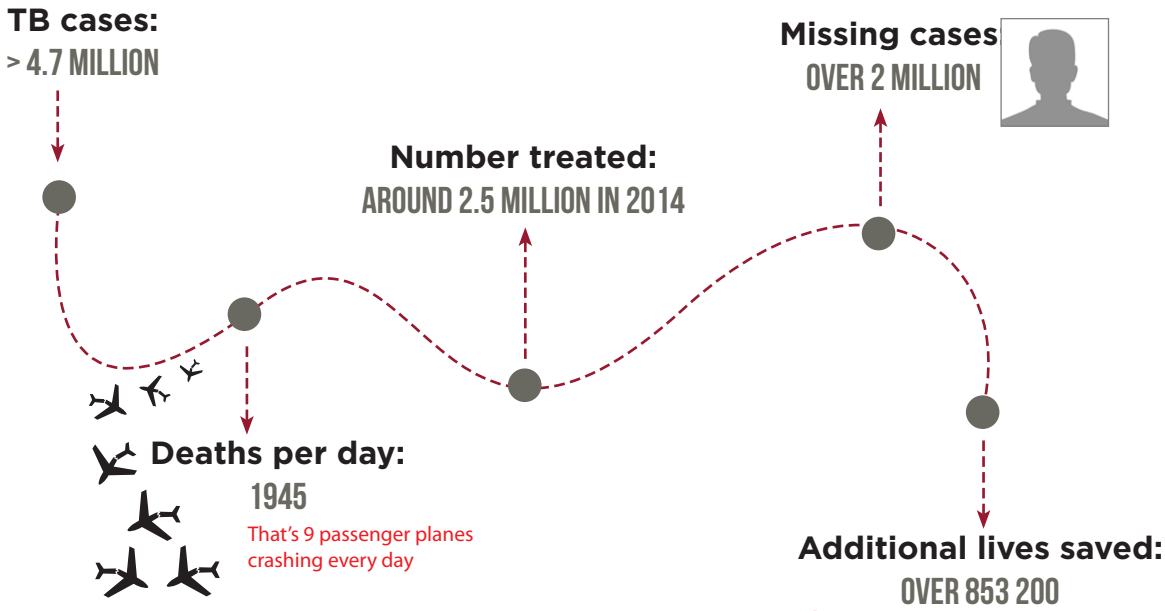


appear staggering despite a reasonably good performance. Three countries that are poised well to eliminating TB by 2030 are Maldives, Bhutan and Sri Lanka. Nepal too is doing well despite the twin challenges of its mountainous terrain and coping with a major natural disaster. Timor-Leste, though small in terms of absolute TB numbers, faces a major challenge in bringing down its incidence rate.

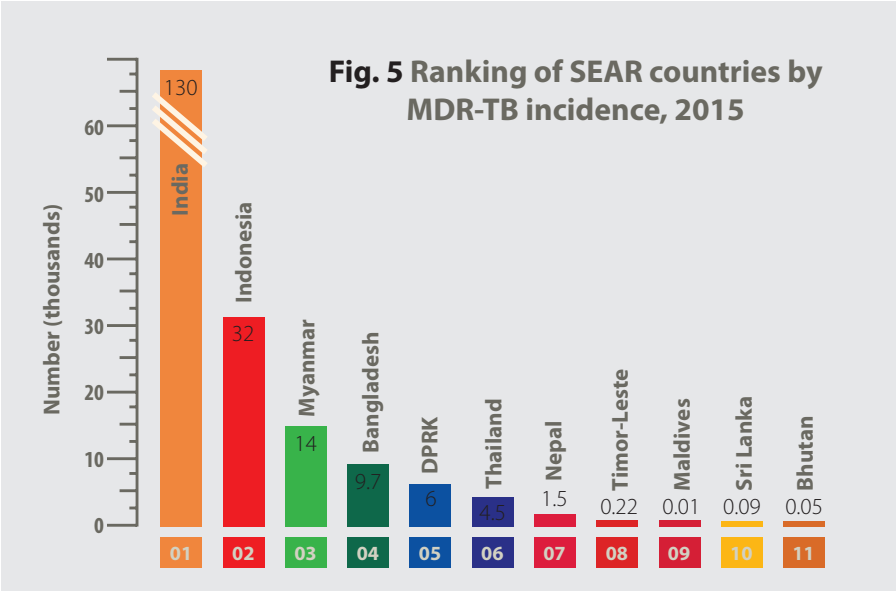
The overall success rate of tuberculosis treatment in the WHO South-East Asia Region stood at 79% in 2015, the lowest in the last five years, largely because,as mentioned before, India's private sector healthcare system–accounting for a large proportion of TB patients–did not report to the National TB Programme. Of the recorded 2.7 million TB cases in the SEA Region, pulmonary tuberculosis and relapse cases accounted for 2.14 million.

Besides the high rate of relapse, the emergence of drug-resistant tuberculosis poses a major challenge to ending TB (Fig. 5) with traditional therapeutics. Only 52% of multi drug-resistant tuberculosis (MDR-TB) patients worldwide were successfully treated. In SEAR less than half the MDR-TB cases (49%) were cured.

Globally, an estimated 250 000 people died of DR-TB in 2015. The number of MDR-TB cases detected worldwide represented only 37% of the estimated 340 000 MDR/RR-TB cases among pulmonary TB patients reported in 2015 and only 21.5% of the MDR-TB incidence cases. In SEA Region, the



SEA Region, 2015



estimated incidence of MDR/RR-TB was 200 000, with India alone accounting for 130 000.

People with HIV accounted for 11% of all new TB cases estimated globally in 2015, while in the SEAR that number stood at 4.7% or an estimated 227 000 cases. An estimated 74 000 patients with HIV-associated TB died in 2015 in the Region.

The SEA Region has made considerable progress in its campaign to control tuberculosis, reaching the Millennium Development Goal for 2015 of halting and reversing TB incidence. The Region also realized its "Stop TB" target of halving the TB mortality and prevalence rate (against 1990 levels).

While the region's achievements in TB control over the past two decades have been laudable, the goal of TB elimination worldwide by 2030 remains a formidable challenge. Some persistent barriers to TB control in the SEA Region include:

- Absence of universal health coverage, as well as limited access to quality health services and fully subsidized treatment for chronic diseases;
- Widespread shortage and uneven distribution of well-trained, well-equipped and motivated health workers;
- Insufficient data collection capacity, leading to gross neglect of TB monitoring and under-reporting of incidence;
- Failure to address poverty, undernutrition and risk factors that adversely influence exposure to tuberculosis;
- Insufficient strategies to address populations at risk, including targeted screening and investigation;
- Lack of regulatory systems and weak accountability mechanisms, as well as poor governance in public health management;
- Insufficient long-term strategies to address the socioeconomic factors that germinate tuberculosis – poverty reduction, better nutrition, better living and work conditions, as well as strategies to mitigate the impact of migration.
- Above all, there is an over-reliance on donors and insufficient resource mobilization even in countries with small funding gaps. National governments average just 41% of current budgets for NTPs.

In view of the new realities the response has to be matching. To overcome these challenges the Region as a whole will have to work to a plan, accelerate its current efforts and adopt newer treatment and diagnostics emerging from the pipeline. Above all it has to reach out to patients in far-flung remote locations. The current rate of decline in TB incidence will not take us too far. The chapter *Bending the Curve* gives you an outline on how the current TB curve can bend to reach the 2030 End TB goals. ■

Besides, the high rate of relapse, the emergence of drug resistant Tuberculosis poses a major challenge to endingTB

Jog Bahadur Gurung (left), 90, serving a TB patient.

TB HERO
Soldiering on at ninety

At 89 Jog Bahadur Gurung of Nepal is still serving TB patients. In doing so the retired soldier is also saving himself from boredom or slipping into the abyss of alcoholism. He's our Regional TB Hero

Jog Bahadur Gurung, a Gorkha, served in the Indian Army till 1983. After retirement he began living in Kaldhara, Kathmandu. In 2007, he and his family migrated to Nawalparasi district in the wake of the revolution for democracy, where they continue to live. At 89, Gurung now spends his twilight years in the service of TB patients. Father of a son and three daughters, he also has a mentally challenged wife to care for. How did the retired soldier take to the TB cause?

It all started when Gurung nearly became an alcoholic. After retiring from the army, the pensioner had nothing to do for 10 to 12 years. Idling away at home, he began to drink. Soon the drinking became so heavy that it started taking a toll on his health and family life. Then realization dawned one day when he told himself, "If this situation continues, I will soon die an alcoholic". That bit of introspection led him to Prakash Shrestha, Parasi's Pradhanpancha of that time. He requested Shrestha to help him find some work. "I wanted to pass my leisure time in a meaningful way," Gurung recalls. As the saying goes, where there is a will, there is a way. Soon, work came Gurung's way when he got a volunteering job as an assistant in the DOTS clinic at the Prithvi Chandra Hospital in Parasi.

Since then Gurung has been working tirelessly as a volunteer at the Parasi hospital, seeing off many a cured patient. It has been 10 years now and he shows no signs of giving up anytime soon. "I will continue serving till my body supports me," he says with a grin. The Nepal Anti-Tuberculosis Association (NATA) has provided him training to assist in tuberculosis management. Though not a health worker, he has been serving TB patients since 1996 in the DOTS centre.

Gurung's day begins early. He wakes up at 4.30 a.m. and walks for over an hour, after which he performs his morning prayers. At 10 every morning he is at the clinic, a 20-minute walk from his home, without fail. He is happy helping the DOTS focal person in providing medicines to TB patients. "Most of the TB patients are poor and from disadvantaged communities. I am grateful for the opportunity to help them," he says.

While his relatives were unhappy that he was working at the clinic without any remuneration, his family never stopped him from doing so. However, in recent years, the hospital management committee has begun paying Gurung a small amount in recognition of his hard work. The man views his work as social service for the community he lives in. "I never feel tired of this work." With his advanced years no barrier, Gurung hopes to continue serving TB patients as long as he lives. "Helping patients gives me the energy to carry on," he says. ■

FEATURE STORY

Treatment at ART centres reduces HIV-positive TB morbidity

Rani and Sundar are both daily wage labourers. With their 10 year old son, the couple lives in a village near Vellore, in the south Indian state of Tamil Nadu. There are no paved roads leading to their remote village situated off the highway. Both husband and wife are HIV-positive, both have TB too. Rani, diagnosed with tuberculosis of the lungs a few months earlier, is undergoing treatment. The first thing she eagerly tells is that her weight has improved after treatment. "You wouldn't have recognized me if you had seen me three months ago". Her husband nods with relief. Any disease can have deadly consequences for this HIV-positive couple.

Sundar was first diagnosed with TB two years ago when he began to lose weight and was unable to continue working. When the treatment at the local clinic failed he was referred to the government hospital 30 km away. Three days of tests and waiting for results revealed he was HIV-positive and had TB as well. He was referred to the antiretroviral therapy (ART) centre where he was counselled and started on ART. He was also started on treatment at the TB centre that subsequently referred him to the local government hospital near his house.

Sundar began visiting his local hospital everyday for TB treatment. Once a month he travelled to the ART centre for the antiretroviral drugs. "It was hard those days," he recalls. "As a daily wager it was difficult to feed my family because I couldn't work".

Yet, he went everyday for two months and finished the first phase of his TB treatment. Did he wish there was an easier way to take the treatment? He nods. "But they had to make sure I took the medicines. Otherwise, I won't get cured and I may have to take treatment for much longer." Both Sundar and Rani are aware that defaulting on treatment could lead to developing resistance to medicine.

Sundar is now cured of TB. In between he was hospitalized when he suffered from jaundice, probably because of the TB drugs. He continues to take his ART everyday and visits the ART centre once a month for routine follow up. Rani was also found to be HIV-positive two years ago, soon after Sundar. Fearing social stigma, the two have kept their HIV status concealed, reducing their social contacts with neighbours and relatives, attending only unavoidable social functions.

"I know I won't spread HIV to my neighbors or relatives through social interactions. But I can't help worrying, they'll treat us differently if they know of

On average, there was over a month's delay in starting confirmed TB patients on treatment

Rani and Sundar at their home in Vellore

Photo: Delphina Pathinathan

our HIV status," Sundar says, eyes welling up with pain. "I have to think about my son, too. I want him to have friends, and be able to be like other children his age". The wife whispers, "Our community will shun us if they get to know".

Four months ago the family was dealt another blow when Rani began losing weight steadily. The doctor at the ART centre diagnosed her with TB. This time round, unlike her husband, Rani did not have to wait three days. Her ART centre was part of a pilot of 30 ART centres in the country that provided TB diagnosis and treatment at the ART centre itself.

Earlier, persons with HIV had to undertake TB tests at centres that were sometimes located far away. Many patients simply did not undertake the journey. Those that did had to wait for at least two days for the results. Very often the visit to the ART centre was postponed to coincide with the monthly schedule. On average, there was over a month's delay in starting confirmed TB patients on treatment. For persons with HIV, this was precious time lost.

Recognising that this delay was leading to higher mortality among people living with HIV (PLHIV), a joint project was developed between the National TB Programme, the National AIDS Control Organization and WHO in 2014. The project now uses a cartridge-based Nucleic Acid Amplification Test (CBNAAT) which diagnoses TB and also detects rifampicin resistance within two hours. By testing those at risk at the ART centre itself, HIV patients can now be diagnosed for TB and started on treatment the very same day.

It was also known for some time that the daily TB treatment for people living with HIV gave better results than the thrice-a-week regimen followed earlier. To address this, fixed-dose combination with four TB drugs in a single pill are now being used for treating PLHIV. This has the added benefit of weight based dosage, so appropriate doses can be given without risk of under or overdosing of individual drugs. This ambitious project was named the innovative intensified TB case finding among PLHIV in 30 ART centres in India.

Another major innovation was the use of mobile telephones to monitor and supervise treatment adherence, called 99DOTS. The earlier programme insisted on direct supervision of patients. Under 99DOTS patients can now inform the treatment supporter just by calling a toll-free number. The free real-time information, enables monitoring of patients' medicine intake without having to travel.

Rani and Sundar were screened for TB on the day of their visit to the ART centre. But unlike Sundar, Rani's sample was taken and sent for testing the same day. The results were available by email the same day and treatment began the very next day at the ART centre itself. She was given a month's supply of TB drugs and counselled on how to take her medication and call the toll-free number. That she regularly takes her medicines is shown by the flaps with the different toll free numbers. "This is very convenient", she smiles "I call immediately after taking the tablet every morning."

Sure enough, Rani has called in everyday of her treatment, except one – her father's funeral. What happens when she doesn't call? Her treatment supporter calls her if she hasn't heard from Rani by 5 p.m. Now, unlike earlier, Rani has her own mobile phone, and she calls in the mornings. Does she have to spend more on the mobile phone? "No. Even with zero cash balance I can call the toll free number," Rani assures. Asked what they liked best about this new system, Sundar says, "It's a blessing, she no longer has to travel to two different places for treatment."

It gives her privacy, while the concerned staff is kept informed. Rani says the hospital staff visit her only once a month to check. This new system puts Rani in control of her treatment, and protects her from the dual stigma of TB and HIV.

The project has led to reduced TB deaths among PLHIV, and is now being expanded to all ART centres across India. Sundar and Rani are just two of the many people whose lives have improved thanks to the project. It was inspiring, the way this family has endured suffering, embraced change and technology to deal with their disease. And, as if to stamp their approval, the cloudy skies, gathered earlier in the day, gave way to radiant sunshine as I took my leave.

(Rani and Sundar are fictitious names of real people) ■

Rani did not have to wait three days. Her ART centre was part of a pilot of 30 ART centres in the country that provided TB diagnosis and treatment at the ART centre itself

ITRC shows the way

The Consortium's trailblazing research on TB can be a model for other high-burden countries of the Region

Tuberculosis is one of India's severest health crises. The country's large population size and vast geographical expanse further compounds the problem. In response, the Indian Council of Medical Research (ICMR) has created an India TB Research Consortium (ITRC), a unique mechanism to address TB in mission mode. ITRC brings together diverse stakeholders including national and international agencies to address the overarching scientific questions facing TB.

Dr Soumya Swaminathan, Director General of ICMR, who leads ITRC says, "The Prime Minister has spoken about the need to address TB as an emergency and a national priority. Through strong partnerships forged as part of a Consortium, concerted efforts are on to merge diverse initiatives to accelerate India's efforts towards eliminating TB. Our aim is to bring together national and international stakeholders to develop new tools – drugs, diagnostics, vaccines – that serve patients in India, as well as provide these solutions to the world."

The Consortium aims to advance technology and product development by harnessing interdisciplinary expertise, and consolidating scientific capabilities. It hopes to accelerate the development of new diagnostics, new and improved vaccines, immune therapies, and drugs for TB. Building intracountry collaborations and global partnerships, the Consortium partners with a cross-section of national and international organizations. These include ICMR, India's Central TB Division of the Ministry of Health and Family Welfare, Department of Biotechnology, Biotechnology Industry Research Assistance Council, Council of Scientific & Industrial Research, Clinical Development Services Agency, Andhra Pradesh Medtech Zone (AMTZ – Government of Andhra Pradesh Enterprises), the Tata Trusts, WHO, the International Union Against Tuberculosis and Lung Disease (The Union), TB Alliance, Malaria Vaccine Development Programme, International Centre for Genetic Engineering and Biotechnology, the Bill & Melinda Gates Foundation and others.

The Consortium received support from various government, nongovernment and international research organizations at a high level meeting held in Delhi in February 2016. The concept also has an in-principle approval of the Prime Minister's Office. In just a few months a detailed landscape analysis of national and global leads in four thematic areas – diagnostics, vaccines, therapeutics and implementation research – has been done and most advanced leads have been identified to take forward.

The Consortium's first International Scientific Advisory Group (ISAG) meeting on 9–10 November 2016, brought together eminent TB experts from across the world. It included Dr Barry Bloom of Harvard University; Dr Madhukar Pai, Director, McGill Global Health Programs, Canada; Dr Samir K. Brahmachari, Founder Director, CSIR-IGIB, and Chief Mentor OSDD, Delhi; Dr Christian Lienhardt, Senior Research Adviser, Global TB Program–WHO; Dr K Srinath Reddy, President, Public Health Foundation of India; Dr Stefen H. E. Kaufmann, Professor, Max Planck Institute, Germany; Dr Peter Small, Founding Director, Global Health Institute, USA; Dr P R Narayanan, Former Director, NIRT, Chennai; Dr Lalitha Ramakrishnan, Professor of Infectious Diseases, Cambridge University; and Dr Abdool Karim, Caprissa Professor, Epidemiology & Public Health, Columbia University.

A detailed landscape analysis of national and global leads in four thematic areas – diagnostics, vaccines, therapeutics and implementation research – has been done

ISAG has lauded the Consortium's progress made over a relatively short span of time. The Group has critically analysed the leads and plans of action identified after a consolidated landscape analysis of all national and international leads in each thematic area. Their suggestions will give a fillip to India's efforts to eliminate TB. ■

Manel, cured at last

FEATURE STORY

Missing treatment, Manel ends up with drug-resistant TB

Thanks to the consistent support of his wife, Manel was able to survive what looked like certain death

Manel was a young man happily living with his wife and family in Manatutu, a municipality in Timor-Leste. He ran a small business and was also engaged in a project at the time. Then, in 2002, he began to cough consistently. He ignored it. When it became persistent he got worried and visited a doctor. The doctor, suspecting TB, put him through a TB test. The laboratory technician confirmed the doctor's fears. Manel had TB. Soon he was started on anti-tubercular treatment (ATT). The treatment worked so well that Manel thought he was cured. Within two weeks he stopped taking medicines. Like many TB patients he missed his treatment. It did not take him long to return to his old lifestyle of smoking and drinking. Soon TB was a distant memory.

However, within a year, the coughing returned. "I fell seriously ill and came to Bairo Pite, a well-known NGO clinic in Dili municipality, in 2003," Manel recalled. The doctors at the clinic confirmed his worst fears that he had TB again. He was admitted to the clinic for two weeks. After being discharged, he continued on ATT for the next three months by when he started feeling better. All this while his wife had to assist him constantly and his work was neglected. Soon it became difficult to afford the children's school fees. But Manel, forgetting all the hardships his wife and children had to undergo, missed treatment once again.

Things looked good until 2006. But later that year he became very ill again. "This time I went to Baucau Municipality Hospital, and was put on treatment for eight months," he remembers. His health began to improve. "But in 2008, I became seriously sick once more." Baucau hospital then referred him to Manatutu. Timor-Leste had just then launched its MDR-TB programme and Klibur Domin, an NGO, provided in-patient services for MDR-TB patients in the intensive phase.

The Manatutu community health centre (CHC) immediately sent him to Klibur Domin where he was diagnosed as one of the first three patients with MDR-TB. Klibur Domin kept him admitted for six months, after which he continued his treatment under Motael Clinic for the next six months. During this period he started getting emotional and violent. "I would abuse staff at the clinic. I could not understand why I was getting so upset with everyone," Manel recalls. Finally, he felt better. And, guess what, he dropped treatment yet again.

With four children to feed, she was stressed out worrying about how to pay for their food and education

By now his wife had become the primary bread earner of the family. With four children to feed, she was stressed out, worrying about how to pay for their food and education. She also had his bills to pay to the traditional healers. As a primary caregiver to Manel during his prolonged sickness and hospitalization, she often had to leave the children under the care of relatives. Between 2008 and 2012, Manel started visiting traditional healers as well. He also took injections by local health care workers. Nothing worked and he got weaker and weaker. This was the time when he met his friend. "My friend told me that he too had TB and how he had been cured. That gave me some hope and I was inspired to go back to Klibur Domin for treatment."

By this time he was so weak that his wife had to tie a belt around him and attached it to herself, while she drove the motorbike to hospital. It was a five-hour drive from their home to Manatutu CHC. From there, on a small public mini-van, they travelled to the National Hospital in Dili Municipality. At the hospital he became comatose and the doctors almost declared him dead. Four hours later he had been revived. For three weeks he remained in a confused state and his skin started to peel off leaving red blotches all over his body.

"One thing is certain, if you deal with it, TB is completely curable"

He was re-admitted in Klibur Domin for MDR-TB treatment. While his wife was attending to Manel in Klibur Domin relatives called up one day to inform that their youngest child was very ill and had to be hospitalized. Helpless, she took out her frustration on her sick husband. "Why don't you die, that way at least I will be able to take care of the children," she said storming out of the hospital room, crying.

In the course of Manel's prolonged sickness the family had to sell off their shop, land, laptop, a motorbike and even the wife's ornaments. "I cannot calculate the amount spent, but I know it is big money," the wife says. Now, looking back, she says, "Caring for a TB patient can be very taxing and stressful. You have to be very patient."

At Klibur Domin, Manel finally completed his treatment in 2014. It took him almost one year to be able to walk around on his own without assistance. Having learnt the hard way Manel's advise to people is, "If you have any sign and symptom of TB, consult your doctor." He further adds, "Please make sure you take the complete treatment course. Discontinuing treatment will mean the disease will become severe and you will die."

Manel, now completely cured, is slowly regaining his strength. He says he owes his life to his wife. The small woman, who continues with the running around for a living, says, "One thing is certain, if you deal with it, TB is completely curable." ■

TB & TOBACCO

Urgent need for integration

In recent decades the prevalence of noncommunicable diseases has increased globally, much of it attributable to urbanization and changing lifestyles. As a result, low and middle-income countries now have a particularly large burden of noncommunicable diseases. It is well documented that certain risk factors such as tobacco use are common to both communicable as well as noncommunicable diseases.

In 2015, there were an estimated 10.4 million new tuberculosis cases worldwide. Globally, the rate of decline in TB incidence remained at just 1.5 per cent from 2014 to 2015. Worldwide, approximately 1.3 billion people smoke cigarettes or use other tobacco products. Over 900 million of them live in developing countries. Tobacco is the second most common cause of preventable deaths in the world. If current trends persist, tobacco would kill 150 million persons in the first quarter of the 21st century and 300 million persons in the second quarter.

The WHO South-East Asia Region, home to a quarter of the world's population, accounts for nearly half the global burden of TB incidence. In 2015 an estimated 4.74 million people developed the disease and over 780,000 people succumbed to it. Tobacco use is an equally serious public health concern in the Region. Nearly a quarter of the world's smokers, and over 80% smokeless tobacco users, reside here. The rising trend of tobacco use among youth and women is also a concern for Member States.

Passive or active exposure to smoking is closely associated with TB. Active smoking is significantly associated with recurrent tuberculosis and TB deaths. These effects appear independent of the effects of alcohol use, socioeconomic status and other potential confounders.

Studies establishing actual biological mechanisms linking exposure to tobacco smoke with tuberculosis do exist. Conservative estimates show that some 13–20 per cent of all TB cases worldwide can be attributed to tobacco smoking. There may be wide variations between regions, and even higher percentages likely in countries with a high burden of tuberculosis and a high proportion of smokers in the population, as is the case in many SEAR countries. Also, widespread smokeless tobacco use, associated with practices such as frequent spitting lead to unaesthetic and unhygienic environments, which assist in the spread of communicable diseases, including TB.

Significantly, smokers have a prolonged period of contagiousness and continue to transmit *M. tuberculosis* for a longer period than non-smokers. Smokers among TB patients were also found to have a higher frequency of "loss to follow-up" thus prolonging transmission in the community. Smokers with tuberculosis, therefore, can affect the entire community.

The well-established association between TB and tobacco epidemics makes it imperative to prioritize tobacco cessation to reduce not only the overall mortality from TB but also the health cost of national governments. This is all the more important for the SEA Region which is faces the double burden of tuberculosis and tobacco. Inadequate management of co-morbidities from tobacco use is hampering TB control in the SEA Region. Interventions to decrease prevalence of smoking among TB patients, or in the general population, would certainly have a favourable impact on the incidence of TB in the Region.

Adopting smoke-free environments will also help countries to achieve their TB targets. Pilot studies in Bangladesh, India, Indonesia and Nepal corroborate the success of such approaches. Yet, effective integration of tobacco and tuberculosis at the policy and programmatic level is currently missing. It is high time that tobacco cessation interventions are integrated into routine and ongoing national TB control programmes across the Region. Teaching DOT providers to give "brief advice" for tobacco cessation can easily be incorporated into their training.

In conclusion, it is clear that the association of tobacco and TB showcases a useful preventive adjunct to curative chemotherapy for TB and in reducing TB transmission. Incorporating tobacco use within the framework of tuberculosis management and care should be the way forward. ■

Conservative estimates show that some 13–20 per cent of all TB cases worldwide can be attributed to tobacco smoking

Effective integration of tobacco and tuberculosis at the policy and programmatic level is currently missing

OPINION

Flexible supply chains and lifting regulatory barriers can save lives

Professors Paul S. Lalvani and Andy Barraclough (Empower School of Health)

One of the oldest diseases, TB is still one of the biggest killers, with a high morbidity rate, especially in this Region. While the South-East Asia Region comprises about a quarter of the world's population it accounts for nearly half the world's TB burden. Two countries, India (23%) and Indonesia (10%), alone account for a third of the global burden.[1]

The Region also faces high drug resistance, and changing resistance patterns to anti-TB treatments. This, coupled with the highly diverse country population sizes and prevalence rates, produces huge variations in commodity quantity requirements.

Addressing MDR-TB requires that TB programmes continuously adapt their treatment regimens and adopt newer products and diagnostics emerging from the pipeline. For this, the supply chain must be highly flexible, making way for newer products. A typical national TB program requires a total of over 50 medicines, diagnostics and health products which must be funded, registered, procured, and delivered to the point of care. Currently, there are 30-40 new medicines and diagnostics in the pipeline (see page 25). These products are slowly being introduced into markets after completing the inordinately long journey starting with adoption before they finally reach patients. Stakeholders will have to work across sectors to improve access, as illustrated below.

It typically takes 3-5 years longer introducing new medicines in SE Asian countries, diagnostic products can take even longer

Supply chain challenges

Despite this Region's high TB burden, the role of health commodity procurement and supply chain functions has long been neglected. A report by The Union states, *"The supply chain for second-line drugs (SLDs) for drug-resistant tuberculosis (DRTB) is fraught with other problems that make it even more difficult to ensure patients are able to receive treatment, let alone to scale up access to diagnosis and treatment for all those who need it".*[2]

A similar message was echoed at the recent 36th Global Fund Board Meeting. *"In-country supply chains for many drugs and health products currently face end-to-end challenges, including issues related to forecasting and quantification, storage and inventory management, distribution, quality assurance, and information management and reporting".*[3]

Part of the reason for this dire situation is the failure to address commodity access issues, and poor funding. The Global Fund Secretariat says, *"The current level of funding devoted to supporting procurement and supply management (PSM) processes are less than 1% of total funding channelled to countries, and are not adequate to address the risks of stock-outs".*[4]

Moreover, resources allocated for PSM in SE Asia, have rarely targeted regulatory barriers and human resource capacity.

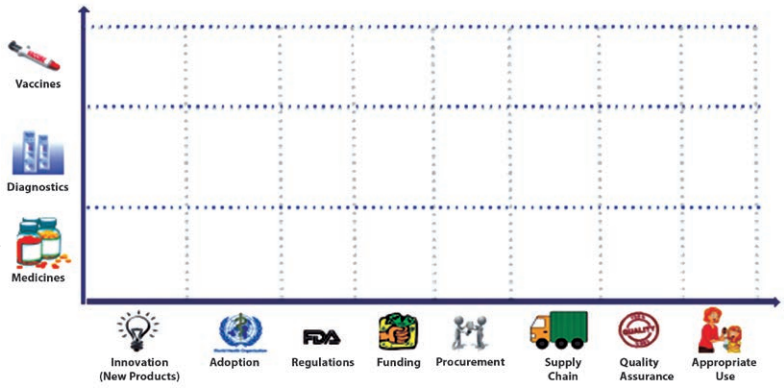
Regulatory barriers

With 30–40 new TB products waiting to enter the market, delays in obtaining national regulatory approvals can once again play spoilsport in accessing these products, especially diagnostics. It typically takes 3–5 years longer introducing new medicines in SE Asian countries; diagnostic products can take even longer. While the public sector can use "Government use only" waivers, this mechanism is generally not available to the private sector where many patients seek treatment.

Access to bedaquiline and delamanid is an example. *"The approval of two new drugs, bedaquiline and delamanid, and growing evidence for the use of linezolid, offer renewed hope for addressing MDR-TB. However, access to these medicines remains a significant challenge. These drugs have not been registered for TB in most settings; barriers to pre-approval access persist; and high pricing and intellectual property restrictions limit access."*

http://www.sciencedirect.com/science/article/pii/S1201971214017299

Components for comprehensive access to health products



"India, the country with the largest national burden of MDR-TB, has overly cumbersome requirements to get new drugs and research approved through its Drug Controller-General of India (DCGI). The Indian regulatory authority did manage to approve

bedaquiline in mid-2015, two years after Janssen filed for its approval in May 2013. In the meantime, just a handful of patients have been able to get the drug under compassionate use"

http://www.treatmentactiongroup.org/tagline/2015/fall/improving-regulatory-systems-address-global-tb-drug-access-failures

These examples clearly illustrate that regulatory barriers for TB and other medicines raise significant risk of morbidity and mortality. These barriers also have a secondary negative impact, discouraging pharmaceutical manufacturers from investing in research and development of new medicines, and focusing on countries where registration is easy. It is therefore essential to dismantle such regulatory barriers, but without compromising on quality assurance.

Some common regulatory challenges in SE Asia:

- While most countries have regulatory frameworks, technical capacity for their implementation is often severely limited, risking entry of sub-standard and counterfeit medicines in the market.
- Time taken for registration of new medicines and diagnostics can be excessively long, denying their timely access to needy patients.
- Some countries in SE Asia lack capacity to regulate diagnostic tests effectively, compromising quality assurance.

Shortage of supply chain professionals affects both the public and private sector. According to the Supply Chain Digital, *"The supply chain challenges in South-East Asia have reached a turning point owing to the scarcity of supply chain professionals, increased consumer diversity and fragmented supply chains".*[5]

Time taken for registration of new medicines and diagnostics can be excessively long, denying their timely access to needy patients

These barriers also have a secondary negative impact, discouraging pharmaceutical manufacturers from investing in research and development

A leading human resource organization-reports, *"Countries such as Thailand, Viet Nam, Indonesia and the Philippines have huge supply chain needs that are only going to get larger as the ASEAN Economic Community (AEC) comes online and consumerism grows".*[6]

Potential solutions

Addressing these issues must start with acknowledging access issues, and subsequent resource allocation. The Global Fund says, *"Over the next strategy period, approximately 40% of Global Fund support going to countries for their HIV, tuberculosis, malaria, and resilient and sustainable systems for health (RSSH) programme will be used for procurement and supply-chain management of health products."*[7]

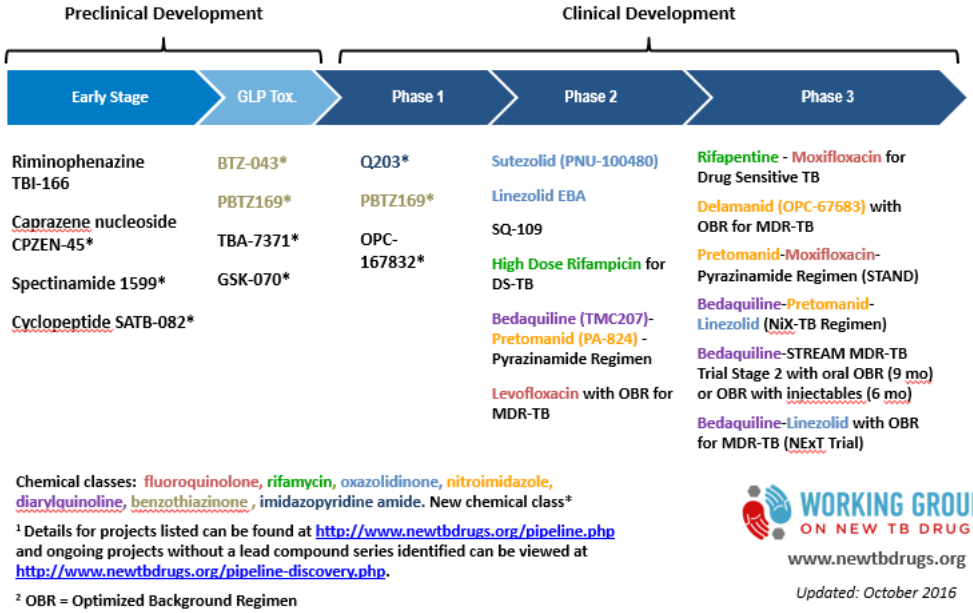
To accelerate regulatory evaluation, various agencies are working on disease-specific initiatives. WHO-SEARO, for example, is supporting the South East Asia Regulatory Network (SEARN)–a network of 11 national regulatory authorities, to develop and strengthen regulatory collaboration in the Region. Other initiatives include *Supporting the Implementation of ASEAN Harmonized Requirements for Drug Registration* (SIAHR). ADB is also supporting the assessment of gaps and building capacity of regulatory authorities in the Mekong area.

Meanwhile, numerous training courses , including online, for PSM staff are now available, many free of cost, such as UNDP's PSM course in English, French and Russian (Ref.: http://www.undp-psmtraining.com/login/index.php).

Long neglected, precurement supply chain management will now require the same level of commitment as new product development. ■

[1]Global TB Report 2016 http://www.who.int/tb/publications/global_report/gtbr2016_executive_summary.pdf?ua=1
[2]http://www.union-imdp.org/archiveshm/item/81-the-broken-supply-chain-challenges-to-procurement-of-medicines-for-drtb
[3]http://www.aidspan.org/node/4023
[4]http://www.aidspan.org/gfo_article/global-fund-says-not-enough-money-being-spent-ways-prevent-stock-outs
[5]http://www.supplychaindigital.com/supplychainmanagement/4329/The-supply-chain-challenges-in-South-East-Asia-have-reached-a-turning-point
[6]http://www.heidrick.com/Knowledge-Centre/Article/Supply-Chain-Talents-in-the-Emerging-markets
[7]http://www.aidspan.org/node/4023

Global TB Drug Pipeline[1]



2016 Tuberculosis Diagnostics Pipeline[2]

Products in later stage of development or on track for evaluation by the WHO with new published data or policy updates since the 2015 pipeline report

Test	Type	Sponsor	Status	Comments
Molecular/NAAT				
BD MAX MTB assay	qPCR for MTB in automated BD MAX	BD	In 16 M. tuberculosis samples, 100% sensitivity, 97.1% specificity [6]	
Genedrive MTB/RIF	Portable RT-PCR for MTB + RIF resistance	Epistem	Worse sensitivity than smear [!] in 2016 study [7]	Marketed in India
GenoTypeMTBDRplus	Line probe assay for RIF + INH resistance	Hain Lifescience	WHO now recommends based on FIND evaluation [8]	WHO guidance pending
GenoTypeMTBDRsl	Line probe assay for FQ + SLID resistance	Hain Lifescience	WHO now recommends [9]	FIND's multicountry evaluation of MTBDRsl version 2.0 from 2015 still unpublished
MeltPro	Closed-tube RT-PCR	Zeesan Biotech	New study from China of 2057 smear-positive TB patients shows sensitivity of detecting resistance to rifampin 94.2%, isoniazid 84.9%, ofloxacin 83.3%, amikacin 75.0%, kanamycin 63.5% [10]	
NTM+MDRTB Detection Kit 2	Line probe assay for RIF + INH resistance	Nipro	WHO now recommends based on FIND evaluation [11]	WHO guidance pending
RealTime MTB/ TB MDx m2000	Automated RT-PCR for MTB; can be added to HIV RNA platform	Abbott	Sensitivity 100%, 95% CI: 98.6–99.9 in smear-positive samples, similar to GeneXpert MTB/RIF [12]	
Truenat MTB	Chip-based NAAT with RT-PCR on handheld device for MTB	Molbio Diagnostics, Bigtec Labs	FIND and ICMR studies underway	
Xpert MTB/RIF Ultra	Next-generation cartridge-based detection of MTB + RIF resistance	Cepheid	FIND study results anticipated end 2016	
Xpert Omni	Single-cartridge mobile platform that can use single MTB/RIF or ultra cartridge	Cepheid	FIND study pending but delayed	
Xpert XDR	NAAT	Cepheid	FIND study anticipated 2018	
Antibody/Antigen detection				
Determine TB LAM Ag	Urine dipstick for TB LAM protein	Alere	WHO recommended use in people with HIV with CD4 count <100 [13]	

[1] http://www.newtbdrugs.org/pipeline/clinical

[2] http://pipelinereport.org/2016/tb-diagnostics

TB HERO
Costa Lopes, and Timor-Leste's war against TB

A TB Hero, Costa's life is a brief history of the TB programme in the country. Timor Leste has the highest TB mortality in the Region and the second highest incidence rate.

Constantino Lopes, Costa to friends and colleagues, literally built Timor-Leste's National TB Programme with his own hands, brick by brick. Now a national programme manager, Costa was just eight when he lost his parents during the war in 1975-1978. Soon after, he was shifted to a relative's home. The little boy had to literally earn his way through school and later, nursing school.

To pay for his schooling, young Costa began working all night selling knick-knacks on the streets of Dili. He would start work at about six in the evening, staying on the streets all night. When there were no customers he would often fall asleep on the pavement. He used to carry along his books and study under the streetlights whenever business was slow, returning home to his relatives at four in the morning. Work did not end there. He had to clean the house and prepare breakfast for the family. In return he got only two meals a day.

By 1994, Costa graduated from nursing school and soon joined St Motael Clinic as an OPD nurse, giving consultation, medication and injections to patients. He had to quickly learn to deal with patients and colleagues in the clinic. Dr Rui Maria de Araújo, the current Prime Minister of Timor-Leste, who was working in St. Motael Clinic at that time, took Costa under his wings, guiding him through his hospital days.

In 1995, Costa got married. A year later, in 1996, two Timorese won the Nobel Peace Prize – Jose Ramos Horta and Bishop Carlos Filipe Ximenes Belo. When, the Norwegian representative to the Nobel Committee asked how Timor-Leste could be helped, the Bishop promptly replied, "My people suffer from tuberculosis. Can you help in eliminating TB?" Norway responded with alacrity, conducting a situational analysis. In February 1997 the TB programme was started in Dili through the Catholic Clinic Network of Caritas. This programme was first headed by Dr Rui Maria de Araújo, Costa's mentor. As providence would have, Costa found a place in the TB programme as a "TB Responsible."

Meanwhile, in the uprising against foreign occupation there was mass fighting and killing. "Motael Clinic was full of our resurrection soldiers injured in the war. Thus all of us – doctors, nurses and other health staff were

Costa Lopes (right) with a cured TB patient.

The resurrection between 1999 and 2002 saw Timor-Leste's health system completely destroyed

placed under surveillance. There was so much fighting and killing at that time, that people were afraid to go out," Costa recalls. "We couldn't reach the communities, and patients couldn't come to us – we had high dropout rates and couldn't follow up on patients".

The resurrection between 1999 and 2002 saw Timor-Leste's health system completely destroyed. There were less than 50 doctors in the country. Nurses were trained to double up as doctors as well as step in as laboratory technicians. "We did everything from patient consultation, diagnosis and management," recalls Costa. By now he had become a Regional Superviser with the National Tuberculosis Programme in Caritas Dili. "We still had a big problem. Our programme was being implemented only up to the district level. There was nothing at the village level," Costa reminisces. After the war, in 1999 the TB programme was re-established in Bairo Pite Clinic and the Catholic Clinic funded by Caritas Norway.

By 2001 peace returned to the country with oversight from the UN. This period saw a gradual expansion of the TB programme. "We had to reach people in the sub district and suco or village level. Since it was risky to move out, with roads broken and no transportation, we decided to advertise and recruit local people as district TB coordinators. That was the only way we could expand the programme", Costa said. Nurses who had had experience with the earlier TB Programme were hired. This was also the period when many international NGOs came into the country and set up an emergency healthcare system.

In 2003, after securing funds from the Global Fund, Round 3, Costa moved from Caritas Dili to the Ministry of Health. As the National Programme Manager his job was to set up the National TB Control Programme Unit in 2004. "There was no office, no equipment, no capacity... only Costa! I didn't even speak English!" Costa remembers with a laugh. "One administrative officer acted as my translator if any international visitor arrived". By then he had also enrolled for a degree course in public health. Life became a constant struggle, between setting up the programme, studying for his degree, and catering to the needs of his growing family. Working through the day, in the evening Costa went for his classes and studied at night!

By 2005 the National TB Programme, under Costa's stewardship, had expanded rapidly. But then the political crisis in 2006 erupted, with the eastern part of the country fighting the western side. This led to disruptions in the TB programme and drying up of the Global Fund support. Two months later, Costa and his family moved to their ancestral village in the mountains of Viqueque to live with his older brother. Soon he returned alone to Dili, knowing that his family was safe. "I continued to work for the programme, knowing well that Western Timor was dangerous for me and I could have been killed... all that we had put in place came to naught and we had to start from scratch all over again," Costa laments. Eventually the situation normalized and Costa brought back his family down from the mountains.

By 2008, with the situation somewhat stable, the WHO technical team was able to help in developing national capacity. They even helped set up the first MDR-TB treatment centre in Klibur Domin. In 2009 the Global Fund Round 7 grant injected much-needed vigour into the sluggish TB programme. "Staff were recruited, we got back Caritas Dili as a sub recipient and the Catholic Clinics were revived. Soon we bought microscopes and motorcycles and the programme was expanded to all community health centres," Costa remembers.

Since then Costa and the National TB Programme have not looked back. Now, at 47 with a Master's degree in Public Health, Costa says, "It has been a long journey, I have been through so many difficult situations... setting and shaping up this programme has been an adventure."

He recalls his high point: a patient diagnosed with MDR-TB, kept on missing treatment until he was very sick. This patient was so angry with Costa that, when being counselled, he wanted to kill him. The man was literally on his deathbed when his wife called Costa for help, who immediately had him brought to the hospital. "When I gave him the first dose of medicine he was in a semi-conscious state. Cured, he is doing very well now. There are many such patients... it makes me very happy to see them healthy".

From 2000 to 2015, Timor-Leste's NTP has treated more than 60 000 cases. It continues to march forward supported by national and international partners. ■

In 2009 the Global Fund Round 7 grant injected much-needed vigour into the sluggish TB programme

In **Bending** The curve lies… **ending TB**

With the current rate of 1.5% to 2% decline in TB incidence, the Region will not be able to meet the 2030 End TB targets. The declining curve has to bend much more

About a year back the term 'Bending the curve' gained currency in WHO-TB circles. Lately it has become a byword of sorts in the discourse on reducing the TB burden.

What is 'bending the curve'?

A quick look at the graph (Fig. 1) will give you an idea of what bending the curve means. Essentially, it means that the current rate of decline in TB (represented by the dotted line), at 1.5% to 2% per year, is just not enough to meet the End TB target of 2030 (represented by the dark line). Look at the Fig. 1 graph again: The curve has to bend much more.

Before we go into the question whether we can bend the curve sufficiently to meet our 2030 targets, a backward glance may not be out of place.

First, the good news: Between 2000 and 2014, dramatic improvements in diagnosis and treatment of TB contributed to saving 43 million lives worldwide. The treatment success rate in our Region has been 88 per cent since 2009. Much of the decline in the last two decades was a result of the robust DOTS strategy (1994–2005) and the Stop TB Strategy (2006–2015). Our Region has done well to meet the MDG goal of halving the TB burden by 2015, compared with 1990.

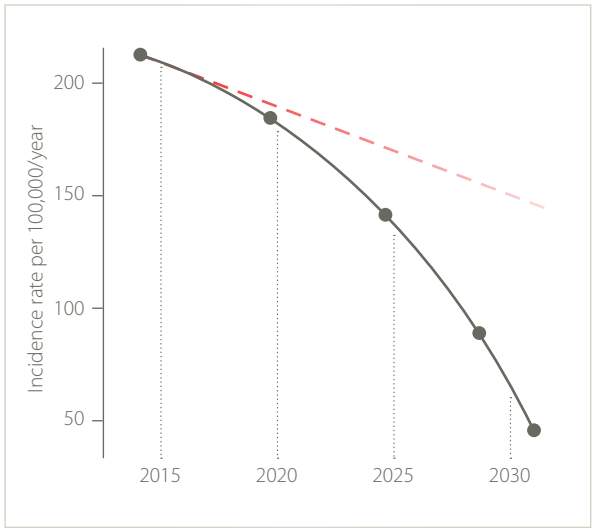


Fig. 1: Bending the curve – the dotted line represents the current incidence trend. The dark line represents the curve needed to meet the End TB targets

The bad news is that though remarkable, this performance has not done enough in terms of declining the incidence rates and driving down the TB epidemic. A clarification: our End TB goal is defined as reducing the regional burden of TB to ≤10 cases per 100 000 as TB cannot be eliminated completely. As we all know, TB is not just a biomedical and public health problem but also a disease associated with poverty. It will continue to survive as long as there is poverty. Tackling the social determinants of TB such as poverty, smoking or diabetes can have a lasting effect in reducing TB.

To achieve the End TB target milestones for 2020, the decline rate has to be accelerated to at least 10% per year. By 2025, this decline has to become steeper at 17% (Fig. 2).

Fig. 2 SDG milestones

So, can we bend the curve?

Each of our Member States has made a commitment. The pertinent question is: How quickly can the curve bend? If we work to a fast-tracked plan, achieving the 2030 targets may not be impossible. There is no one-size-fits-all strategy. At the same time it is also not about re-inventing the wheel but more about oiling the wheel and accelerating it. This acceleration has to be in the specific country context. The thrust in high-burden countries should be to improve coverage and access to quality treatment. In-low burden countries the aim should be to reach the pre-elimination stage through focused planning. Achieving targets are by no means an easy task.

A little recap here: the WHO South-

East Asia Region accounts for nearly half the global TB burden though it constitutes just a quarter of the world's population. The Region's TB burden is inordinately high. Six SEA Region Member States are among the world's 30 high TB burden countries. They include, according to the burden, India, Indonesia, Bangladesh, Myanmar, DPR Korea, and Thailand. India alone accounts for nearly a quarter of the world's burden; Indonesia has 10%. So, if the world has to end TB it has to start with our Region. Look at the illustration below (Fig. 3) carefully.

Can all these countries achieve the 2030 goals of reducing incidence rate by 80% and TB deaths by 90% ? For some the goal appears achievable. For others it appears very unlikely; unless, of course, we take some bold, catalytic actions that accelerate our efforts. A few strategic interventions can work wonders. A close look at the graph below (Fig. 4) will explain how certain interventions can become game-changers.

The above graph is self explanatory.

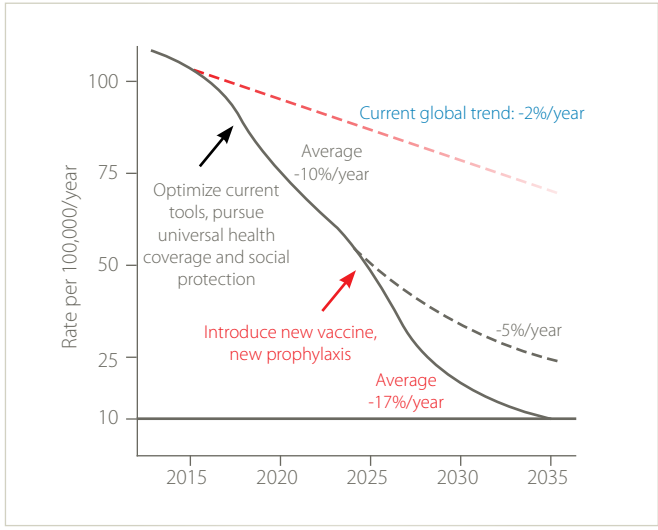


Fig. 4: Desired decline in global TB incidence rates to reach 2035 targets

Even by accelerating current tools and practices, universalizing health coverage and social protection, we can gain 10% decline per year. By introducing vaccines and new treatment regimes this decline can go down further to 17% a year. Of course, implementing these on the ground may not be as simple as it looks on paper.

If we work to a fast-tracked plan, achieving the 2030 targets may not be impossible

What can work

Accelerating existing tools can make a difference. WHO SEARO in collaboration with the Public Health Foundation of India (PHFI) is conducting a scientific modelling exercise on the impact of selected interventions in reducing the TB burden. The graphs (Fig.

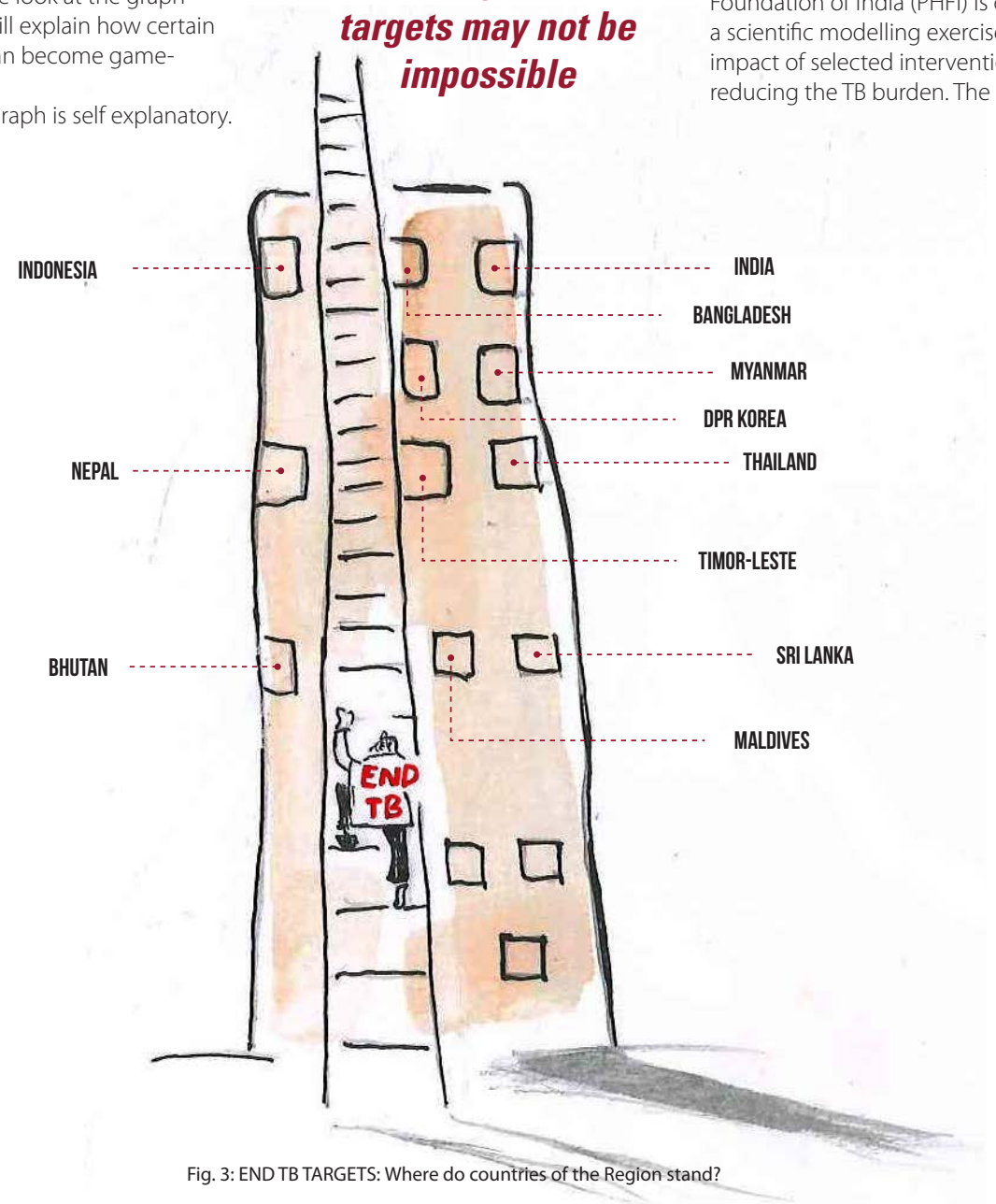


Fig. 3: END TB TARGETS: Where do countries of the Region stand?

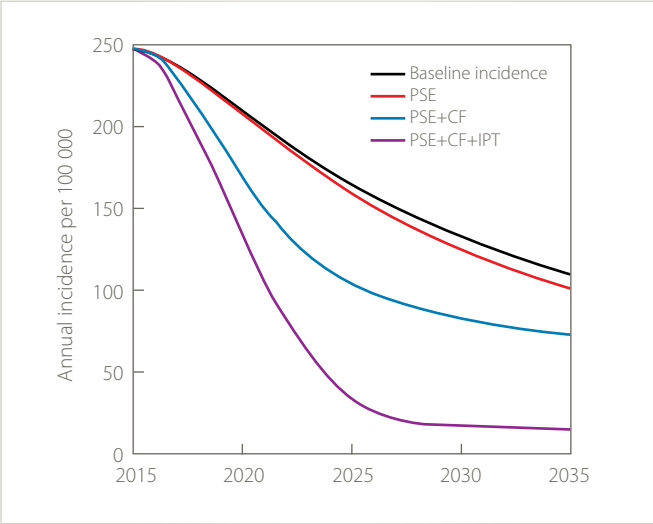


Fig. 5: Impact on TB incidence in the Region

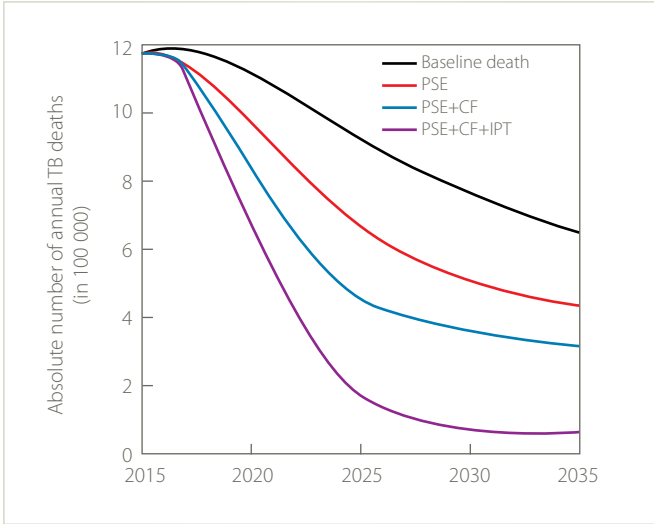


Fig. 6: Impact on TB mortality

The question to ask is: will governments take the political decision to make this investment?

5 & 6), a product of this modelling exercise, shows the impact of non-Programme sector engagement (PSE), intensified case-finding (CF) and preventive therapy (IPT) in the Region.

A similar effect is observed even for low-burden, less populated countries.

The black line on top represents the current TB trend which will not take us far in terms of reducing incidence or death to reach our 2035 "End TB" targets. The red line representing PSE means there will be some improvement by engaging the private sector and others outside the programme through standardizing treatment and reporting systems.

The blue line PSE+CF means that by adding active case finding to PSE the curve can bend substantially. What is active case finding? It means taking a proactive approach to search out people suffering from TB instead of waiting for them to approach the health system. It means searching for the difficult-to-reach people and bringing them under the ambit of the NTPs.

The pink line represents introduction of preventive therapy (IPT) in addition to PSE+CF. By doing so, the curve comes down steeply. IPT essentially means giving medication to people at risk of TB, such as people with HIV or those exposed to other factors that predispose them to TB. It also means treating people at early stages of the TB infection.

Fast-tracking the existing response along with improving access to newer diagnostics, intensive case-finding, infection control, treating latent TB infections, standardizing algorithm per country context, rolling out shorter-regimen for MDR-TB, expanding quality assured laboratory services including rapid molecular diagnostics, involvement of non-programmatic sector for community-based care and a robust PSM systems can give us dramatic results.

India, for instance, has also been successful in reducing morbidity among HIV-positive people with TB. The trick was simple, just providing TB services at ART centres (read story on page 17). Similarly, in Bangladesh, BRAC, an NGO, has made deep inroads reaching out to remote communities and following up on patients (read story on page 64).These interventions don't come cheap. It is estimated that India will need to invest at least US$ 3.4 billion in TB control over the next five years to have substantial impact on TB. This translates to about spending US$ 0.50 per capita per year.

The question to ask is: will governments take the political decision to make this investment?

The heartening news is that for the same period, the return on investments is expected to be US$ 52.9 billion. How? Nearly 20 million TB cases would be averted, nearly 4 million lives saved, and more than 8 million DALYs or work years saved. It has been calculated that for every dollar invested in TB the return is US$ 43. Which is why we keep repeating: invest in TB, it makes great economic sense.

That is why we call upon the political leadership of our Region to make strong commitments to end TB; commitments that strengthen national disease control programmes. Promises that are backed by resources, actions, and initiatives geared to banishing TB from our lives. Here we would like to recall what H.E. Abdulla Nazim Ibrahim, the Minister of Health for Maldives, one of the smallest countries in our Region, has said, "We will leave a TB-free Maldives to the next generation." His words are an inspiration. We sincerely hope that this credo will be adopted by every country in our Region. Then we can all say with certainty, "The curve, we shall indeed bend." ■

How the India TB estimates rose

A series of events led to India's TB estimates being revised upward

The WHO Global TB Report 2016 has revised substantially upwards the estimates for India compared with earlier estimates published in 2011–2015. This is a result of accumulating evidence that the TB burden in India is higher than was thought earlier. The updated figures for India are interim estimates, pending results from a national TB prevalence survey scheduled in 2017–2018.

The revised estimates of TB incidence (new TB cases per year) of 2.8 million are derived by extrapolating results from a prevalence survey in Gujarat state, the results of which were shared in 2015. This survey used WHO recommended methods and is the largest, as well as the only statewide, prevalence survey implemented in India to date. It was assumed that the national prevalence of TB disease is the same as the prevalence in Gujarat, with incidence then estimated using a standard methodology. The TB incidence rate accordingly is 217 per 100 000 population (range 112–355).

The updated estimate, higher than earlier reported, of the number of TB deaths (excluding those in HIV-positive people) is 478 000 in 2015 (36 per 100 000 population). In 2014 it was 483 000 (37 per 100 000 population). These updated estimates are derived from results published by the Institute for Health Metrics and Evaluation (IHME) after adjustment for differences between WHO and IHME estimates of the total number of deaths each year. IHME has used a large body of cause-of-death data from the vital registration and verbal autopsy surveys.

Besides the Gujarat survey, other evidence supporting revision of TB estimates include results of a household survey in 30 districts conducted in 2011

A study of sale of anti-TB drugs published in 2016 indicated there were 17.8 million patient-months of TB treatment in the private sector, twice the number in the public sector

Besides the Gujarat survey, other evidence supporting revision of TB estimates include results of a household survey in 30 districts conducted in 2011. This TB project – aimed at increasing civil society support to the NTP in India and engage community-based care providers – was implemented in 374 out of 650 districts. In a sample of 30 of the 374 districts, a number of people on TB treatment, based on self-reporting, were assessed. It used a dataset compiled as part of a survey of knowledge, attitudes and practices conducted from January to March 2011. Of the self-reported cases, 54% had not been officially reported to national authorities. In comparison, the 2015 Global TB Report had estimated that 59% of incident cases were officially reported in 2010 – a gap of 41% including both unreported and undetected cases.

A study of sale of anti-TB drugs published in 2016 indicated there were 17.8 million patient-months of TB treatment in the private sector, twice the number in the public sector. The authors noted that even if 40%–60% of private-sector TB diagnoses are correct, and if private-sector TB treatment lasts on average 2–6 months, then about 2.2 million TB cases were treated in the private sector in 2014.

Furthermore, a large increase in national case notifications in 2013–2015 was observed when India implemented a policy of mandatory TB notification and rolled out a national web-based reporting system in 2012. As a result, in 2014, the number of notified cases increased by 29% compared with 2013. And the number of notified cases in 2015 was 34% higher than in 2013. ■

8 Edicts to End TB

WAY FORWARD

1. Leave no one behind: Focus first on the most marginalized
2. Know your epidemic and know your response at local level
3. Adapt health delivery to people's needs: Invest in decentralized community health systems, strengthen community-based organizations
4. Complement the UHC Framework with a strategic coordinated body: Ensure targeted services to reach affected populations
5. Translate new technologies into concrete health gains
6. Learn from evidence: Adjust programmes early based on ongoing findings of internal and external partners
7. Translate commitments into results: Invest now or pay much more down the road
8. Create public awareness: Information is protection against disease

Illustration(s): Ashim Choudhury

COUNTRY PROFILES

TB trends and progress

BANGLADESH

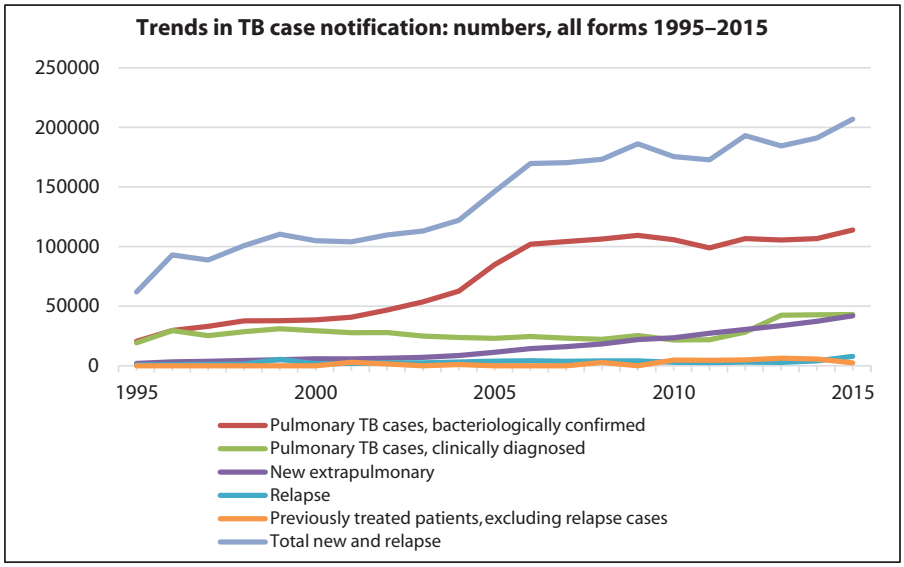
The National TB Programme (NTP) of Bangladesh and its partners have maintained good "basic TB control services", with reasonable case detection and excellent treatment outcomes. The Government of Bangladesh, the Global Fund, USAID and other partners have kept their financial commitment to TB control during recent years, enabling NTP to consolidate its activities and address challenges of TB/HIV, multidrug resistant (MDR) TB, intensified case-finding in high-risk groups and vulnerable populations, and use of new technologies. There has been consistent increase in case notification especially among new and relapse cases since 2013. Bangladesh is the first country in the Region to introduce a shorter treatment regimen for MDR-TB and is achieving high cure rate for MDR-TB patients (75%). National Strategic Plan for TB Control 2018–2022 is being updated.

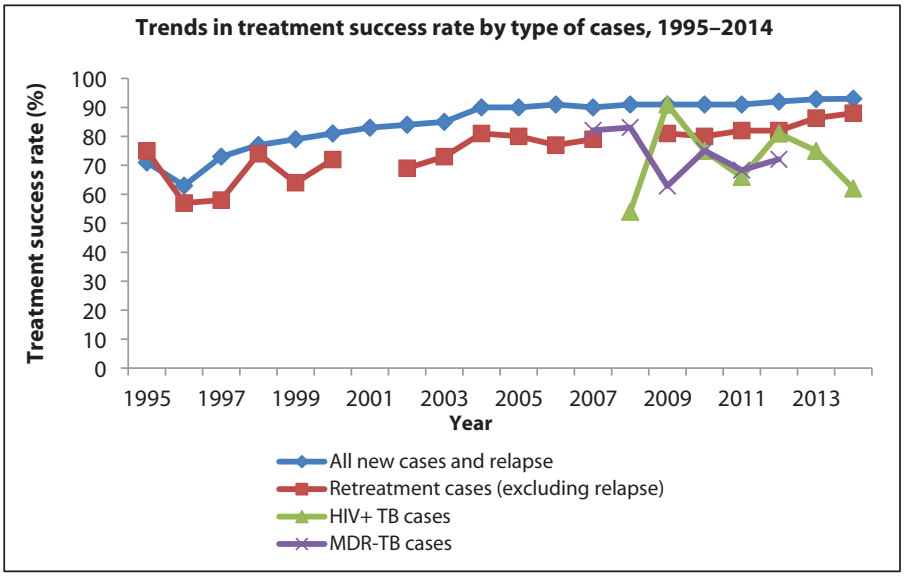
Estimated TB burden, 2015	
Incidence (includes HIV+TB)	362 000 (234 000–517 000)
Incidence rate (includes HIV+TB) per 100 000 population per year	225 (146 –321)
Incidence rate (HIV+TB only), per 100 000 population per year	0.39 (0.24–0.59)
Mortality rate (excludes HIV+TB), per 100 000 population per year	45 (27–68)
Mortality rate (HIV+TB only), per 100 000 population per year	0.14 (0.12–0.18)
Drug-resistant TB, 2015	
Incidence of MDR/RR-TB	9 700 (5 400–14 000)
Estimated MDR/RR-TB cases among notified pulmonary TB cases	5 100 (3 500–6 800)
Estimated % of TB cases with MDR/RR-TB among new cases	1.6% (0.59–2.6)
Estimated % of TB cases with MDR/RR-TB among previously treated cases	29% (24–34)

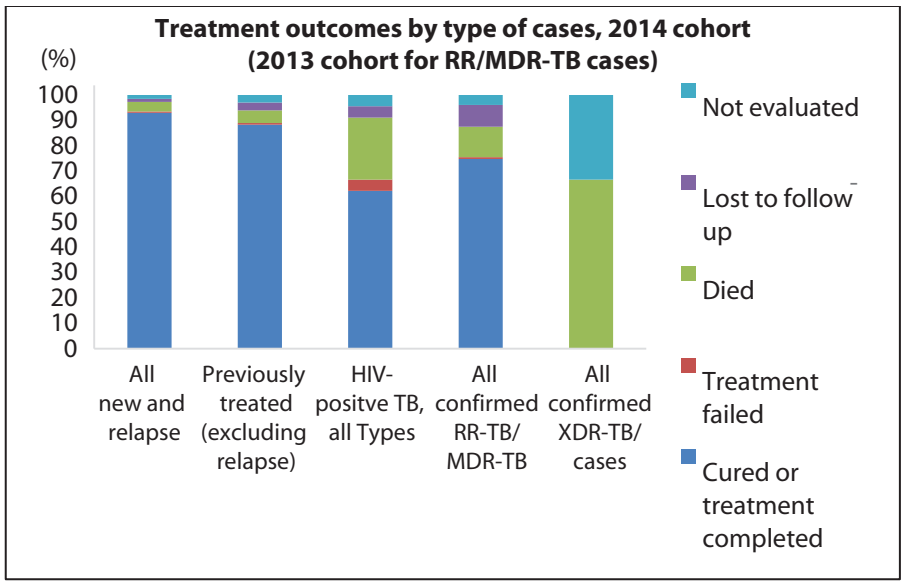
TB case notification, 2015	
Total cases notified	209 438
Total new and relapse	206 915
- % tested with rapid diagnostics at time of diagnosis	
- % with known HIV status	<1%
- % pulmonary	79%
- % bacteriologically confirmed among pulmonary	72%

	Number	(%)
Patients with known HIV-status who are HIV-positive	92	16%
-on antiretroviral therapy	82	89%

Treatment success rate and cohort size	Success	Cohort
New and relapse cases registered in 2014	93%	191 141
Previously treated cases, excluding relapse, registered in 2014	88%	5 497
HIV-positive TB cases, all types, registered in 2014	62%	45
MDR/RR-TB cases started on second-line treatment in 2013	75%	686
XDR-TB cases started on second-line treatment in 2013 **1cured, 1 died, 1 still on treatment*	33%	3*







Key challenges

- Low appreciation of TB as a major social and development issue.
- TB response remains highly dependent on external funding.
- Notification data indicates that 40% of all TB cases are still not diagnosed.
- Active case finding at community level not yet expanded to entire country.
- Limited engagement of private practitioners and public/private hospitals, mandatory TB case notification not operationalized.
- Weak coordination of TB response in urban areas.
- Detection of MDR-TB cases low (16% in 2015) due to improper history-taking and slow expansion of Gene Xpert. Inadequate skilled human resources at MDR-TB treatment sites.
- Childhood TB detection and management largely insufficient.
- Slow scale up of electronic recording and reporting system to cover whole country.
- Social support schemes mainly limited to MDR-TB cases.

* All data in the country profiles are from WHO Global TB Report 2016

BHUTAN

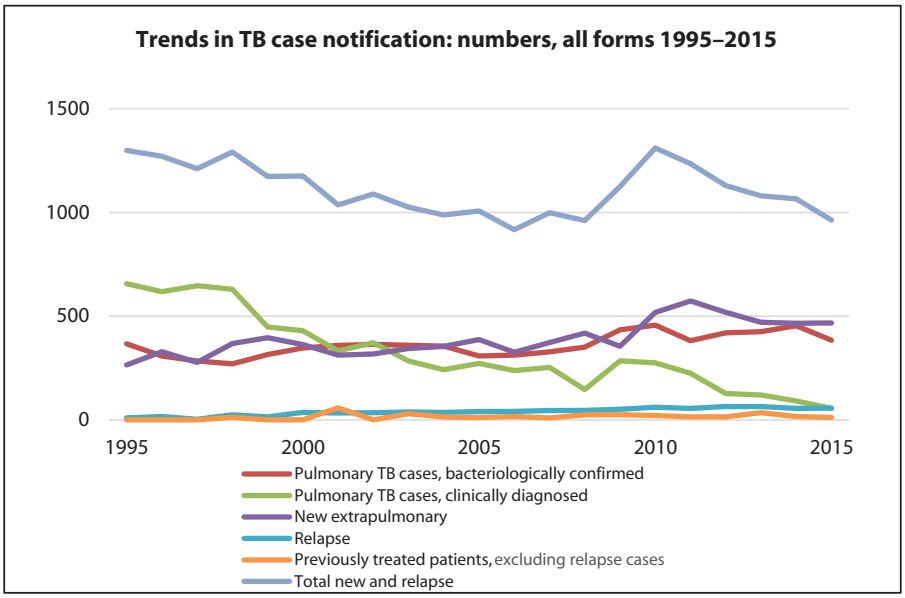
High treatment success rate, 86% in 2015 among new and relapse cases and 92% among MDR/RR-TB cases. Coverage of TB services is high. About 80% out of the estimated incidence in 2015 were notified. However, prevalence of MDR/RR-TB among previously treated cases is high at 38%. NTP performance has been noteworthy over the years. TB incidence and mortality reduced by half, achieved MDG targets. Increase in MDR-TB case detection and treatment. Rapid diagnostic tool, GeneXpert, introduced at four sites.

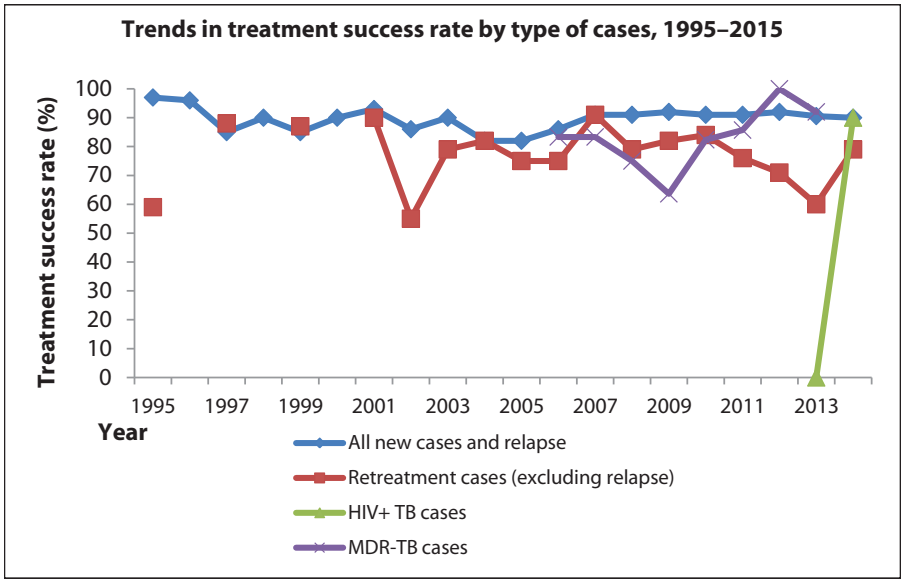
Estimates of TB burden, 2015	
Incidence (includes HIV+TB)	1 200 (930–1 500)
Incidence rate (includes HIV+TB), per 100 000 population per year	155 (120–196)
Incidence rate (HIV+TB only), per 100 000 population per year	14 (9.8–18)
Mortality rate (excludes HIV+TB), per 100 000 population per year	16 (10–22)
Mortality rate (HIV+TB only), per 100 000 population per year	3.1 (2.4–3.9)
Drug-resistant TB, 2015	
Incidence of MDR/RR-TB	52 (43–62)
Estimated MDR/RR-TB cases among notified pulmonary TB case	37 (24–51)
Estimated % of TB cases with MDR/RR-TB among new cases	2.6% (2.3–3)
Estimated % of TB cases with MDR/RR-TB among previously treated cases	38% (19–59)

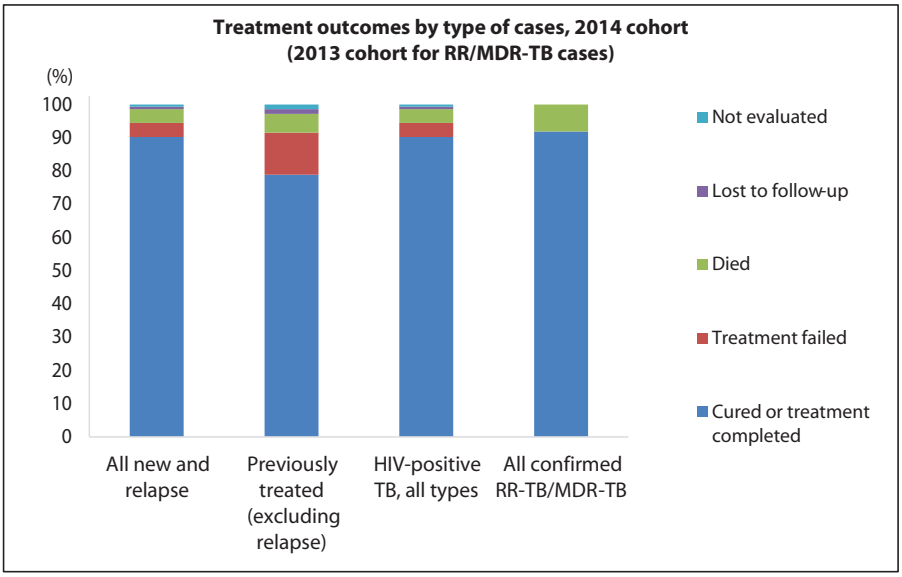
TB case notification, 2015	
Total cases notified	975
Total new and relapse	963
• % tested with rapid diagnostics at time of diagnosis	
• % with known HIV status	73%
• % pulmonary	52%
• % bacteriologically confirmed among pulmonary	89%

TB/HIV 2015	Number	(%)
Patients with known HIV-status who are HIV-positive	6	<1%
• on antiretroviral therapy	6	100%

Treatment success rate and cohort size	Success	Cohort
New and relapse cases registered in 2014	86%	1067
Previously treated cases, excluding relapse, registered in 2014	75%	16
HIV-positive TB cases, all types, registered in 2014	90%	1083
MDR/RR-TB cases started on second-line treatment in 2013	93%	49
XDR-TB cases started on second-line treatment in 2013	0	0







Key challenges

- Implementation of DOT weak due to hilly and difficult terrain.
- Low detection of TB in children.
- Delay in sample shipment from districts to National TB Reference Laboratory (TRL).
- Infection control practices inadequate, threatening transmission to community and healthcare workforce.
- Frequent staff turnover.
- Inadequate follow-up and monitoring.
- Limited implementation of TB/HIV collaborative activities.
- Limited or no operational research on key priority areas.
- Sustaining financial resources for disease control programme.

DPR KOREA

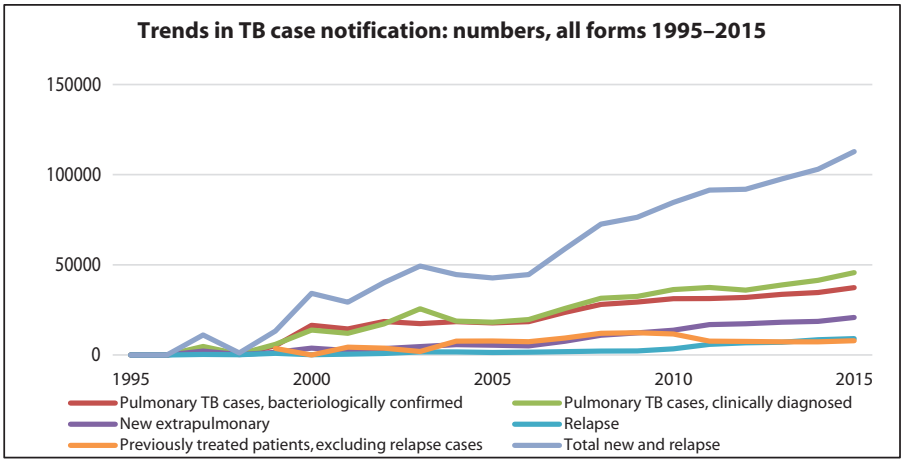
Steady increase in case notification rate since 2000. Treatment coverage in 2015 was over 80%, high treatment success rate among new and relapse cases (91%) due to very low default rates. Laboratory network has been strengthened with addition of one regional laboratory conducting culture and DST. Field operation of National TB Prevalence Survey, started in October 2015 was completed in May 2016. Currently, only a limited number of estimated DR-TB cases are being diagnosed and enrolled for treatment. To achieve universal access for DR-TB diagnosis and treatment, Ministry of Public Health plans expanding diagnostic facility to all provinces and also introducing WHO recommended shorter regimen.

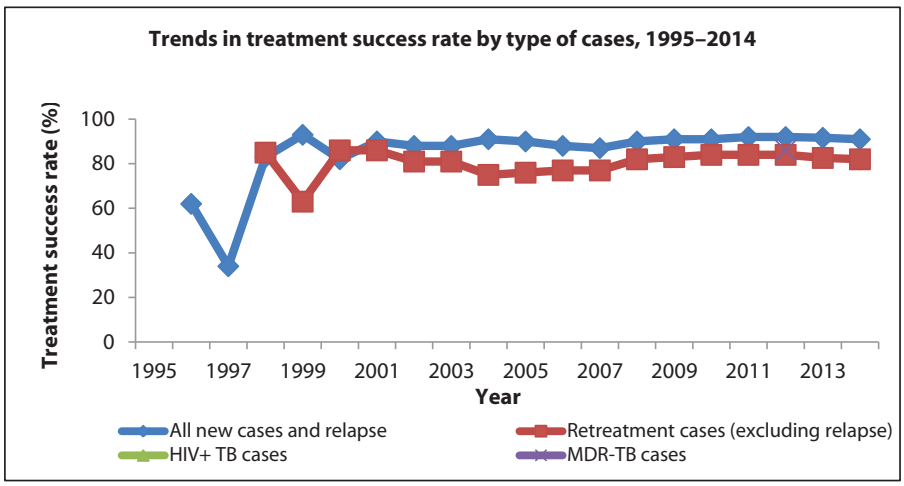
Estimates of TB burden, 2015	
Incidence (includes HIV+TB)	141 000 (109 000–178 000)
Incidence rate (includes HIV+TB), per 100 000 population per year	561 (432–706)
Incidence rate (HIV+TB only), per 100 000 population per year	1.8 (1.3–2.4)
Mortality rate (excludes HIV+TB), per 100 000 population per year	61 (40–87)
Mortality rate (HIV+TB only), per 100 000 population per year	0.15 (0.07–0.26)
Drug-resistant TB, 2015	
Incidence of MDR/RR-TB	6 000 (3 400–8 600)
Estimated MDR/RR-TB cases among notified pulmonary TB cases	4 600 (2 600–6 500)
Estimated % of TB cases with MDR/RR-TB among new cases	2.2% (0.51–3.9)
Estimated % of TB cases with MDR/RR-TB among previously treated cases	16% (8.4–24)

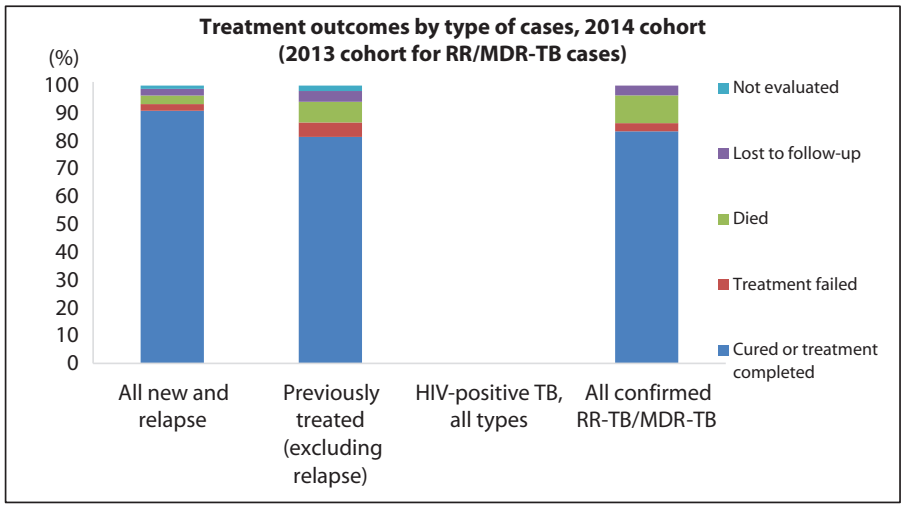
TB case notification, 2015	
Total cases notified	120 722
Total new and relapse	112 840
• % tested with rapid diagnostics at time of diagnosis	
• % with known HIV status	0%
• % pulmonary	82%
• % bacteriologically confirmed among pulmonary	50%

TB/HIV care in new and relapse TB patients, 2015	Number	(%)
Patients with known HIV-status who are HIV-positive	0	-
• on antiretroviral therapy	0	-

Treatment success rate and cohort size	Success	Cohort
New and relapse cases registered in 2014	91%	103 045
Previously treated cases, excluding relapse, registered in 2014	82%	7 245
HIV-positive TB cases, all types, registered in 2014		0
MDR/RR-TB cases started on second-line treatment in 2013	84%	170
XDR-TB cases started on second-line treatment in 2013		0







Key challenges

- Considering the current burden of DR-TB, available resources and existing capacity to expand PMDT across country inadequate.
- Diagnostic capacity for childhood TB and extrapulmonary TB still insufficient.
- Resources for Jagang province, excluded from Global Fund support, still a challenge.
- Long lead time to procure key commodities into country.
- EQA for TB culture and DST problematic due to restrictions on transporting samples which are labelled Infectious/Dangerous Goods.
- DR-TB detection is limited to first-line anti-TB drugs only at National TB Reference Laboratory and Regional TB Reference Laboratory. Increasing diagnostic capacity of DST on FLD and SLD a challenge for rapid scale up of DR-TB management.
- Financial resource for procurement of second-line anti-TB drugs is very limited.
- Technical capacity for MDR-TB management insufficient at field, needs rapid improvement.

INDIA

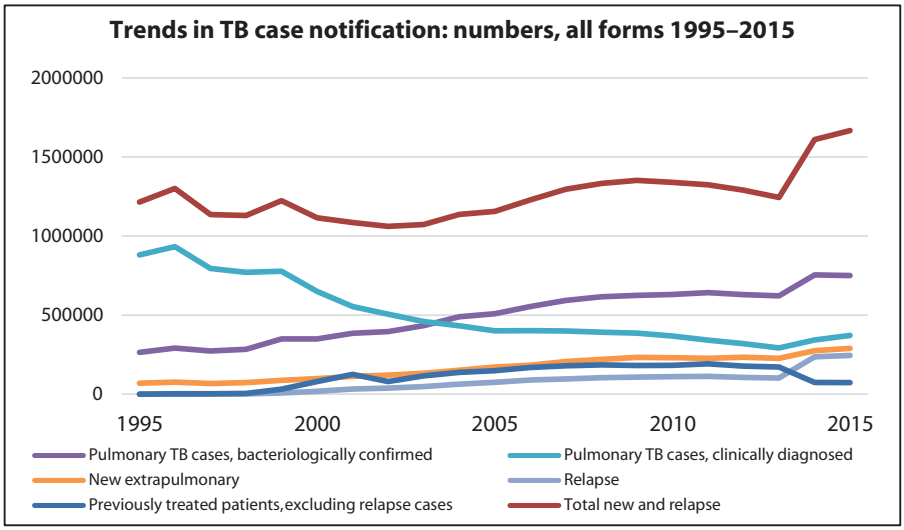
Increased case notification since 2014 especially among new and relapse cases. High, (92%) TB patients with HIV put on antiretroviral therapy. Some 628 Xpert-MTB-Rif machines offering rapid-quality diagnostics has led to 35% rise in DR-TB case notification in 2016. New anti-TB drug bedaquiline has been introduced under Conditional Access Programme (CAP) to improve outcomes of drug-resistant TB treatment. Single-window care for HIV and TB has been initiated across all ART centres. RNTCP technical and operational guidelines revised with major changes in diagnostic algorithm, treatment strategies and surveillance.

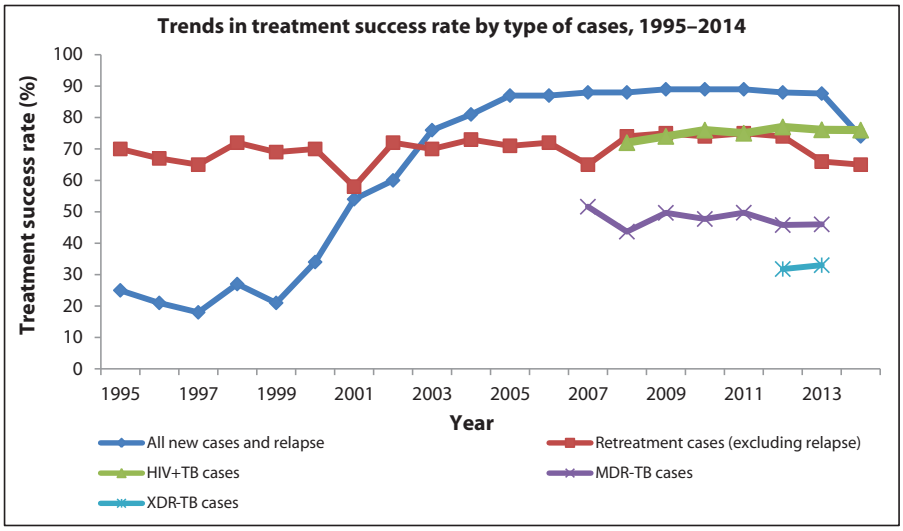
Estimates of TB burden, 2015	
Incidence (includes HIV+TB)	2 840 000 (1 470 000–4 650 000)
Incidence rate (includes HIV+TB), per 100 000 population per year	217 (112–355)
Incidence rate (HIV+TB only), per 100 000 population per year	8.6 (4.4–14)
Mortality rate (excludes HIV+TB), per 100 000 population per year	36 (29–45)
Mortality rate (HIV+TB only), per 100 000 population per year	2.8 (1.6–4.3)
Drug-resistant TB, 2015	
Incidence of MDR/RR-TB	130 000 (88 000–180 000)
Estimated MDR/RR-TB cases among notified pulmonary TB cases	79 000 (72 000–87 000)
Estimated % of TB cases with MDR/RR-TB among new cases	2.5% (2.1–3.1)
Estimated % of TB cases with MDR/RR-TB among previously treated cases	16% (14–18)
% notified tested for rifampicin resistance	among new cases: 6% among previously treated cases: 60% Total number: 275 321
Laboratory-confirmed cases	MDR/RR-TB: 28 876 , XDR-TB: 3 048
Patients started on treatment	MDR/RR-TB: 26 966, XDR-TB: 2 130

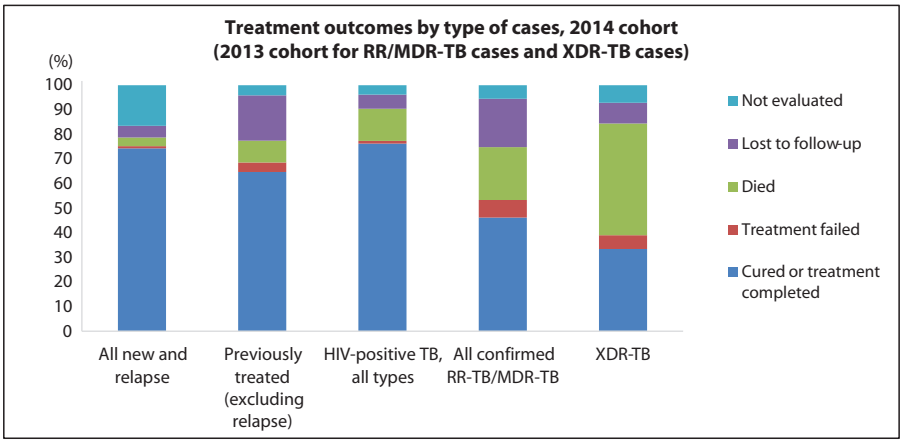
TB case notification, 2015	
Total cases notified	1 740 435
Total new and relapse	1 667 136
• % tested with rapid diagnostics at time of diagnosis	
• % with known HIV status	67%
• % pulmonary	82%
• % bacteriologically confirmed among pulmonary	64%

TB/HIV care in new and relapse TB patients, 2015	Number	(%)
Patients with known HIV-status who are HIV-positive	44 652	4%
• on antiretroviral therapy	40 925	92%

Treatment success rate and cohort size	Success	Cohort
New and relapse cases registered in 2014	74%	1 609 547
Previously treated cases, excluding relapse, registered in 2014	65%	74 368
HIV-positive TB cases, all types, registered in 2014	76%	44 257
MDR/RR-TB cases started on second-line treatment in 2013	46%	21 093
XDR-TB cases started on second-line treatment in 2013	33%	392







Key challenges

- Missing TB patients, with 59% notification in 2015 as against estimated 2.8 million TB patients.
- Reaching TB patients under private sector, ensuring their quality care.
- Identification of all drug resistant TB patients and treatment coverage.
- Improving treatment outcomes among drug resistant TB patients.
- Advancing to universal DST, balancing availability of requisite quantities of second line drugs to cover whole country.
- Laboratory capacity to diagnose DR-TB patients among notified TB cases, especially patients in the private sector.
- Long DR-TB treatment duration and poor treatment outcomes.
- Implementing infection prevention in healthcare and community settings.

INDONESIA

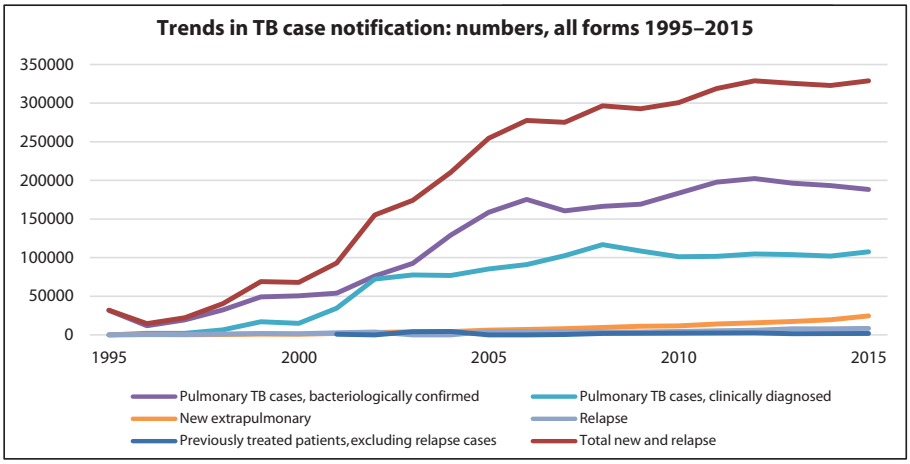
TB declared a "Presidential priority" for the country. National TB Prevalence Survey 2013–14 reveals two-fold higher TB prevalence than previously estimated. High treatment success rate, 84% in 2015, especially among new and relapse cases. However, proportion of TB patients notified was low (32%). PMDT services expanded to 35 referral hospitals. Over 55 000 TB patients tested for drug resistance and 6 000 DR-TB patients (MDR, pre XDR and XDR patients) treated since 2009. "TOSS TB" (Detect and Treat TB until Cure) movement, as a popular/easy-to-understand terminology for Public Private Mix (PPM), launched in 2016. All 34 provinces developed joint TB HIV plans, TB screening among PLHIV 72%.

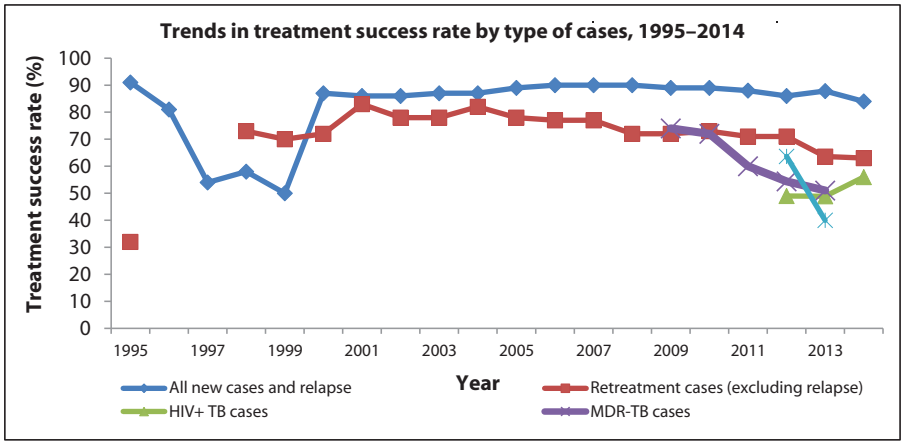
Estimates of TB burden, 2015	
Incidence (includes HIV+TB)	1 020 000 (658 000–1 450 000)
Incidence rate (includes HIV+TB), per 100 000 population per year	395 (255–564)
Incidence rate (HIV+TB only), per 100 000 population per year	30 (18–45)
Mortality rate (excludes HIV+TB), per 100 000 population per year	40 (26–57)
Mortality rate (HIV+TB only), per 100 000 population per year	10 (7.6–13)
Drug-resistant TB, 2015	
Incidence of MDR/RR-TB	32 000 (19 000–45 000)
Estimated MDR/RR-TB cases among notified pulmonary TB cases	10 000 (8 000–12 000)
Estimated % of TB cases with MDR/RR-TB among new cases	2.8% (2.2–3.5)
Estimated % of TB cases with MDR/RR-TB among previously treated cases	16% (10–20)
% notified tested for rifampicin resistance	among new cases: <1% among previously treated cases: 80% Total number: 9 764
Laboratory-confirmed cases	MDR/RR-TB: 2 135, XDR-TB: 28
Patients started on treatment	MDR/RR-TB: 1 519, XDR-TB: 22

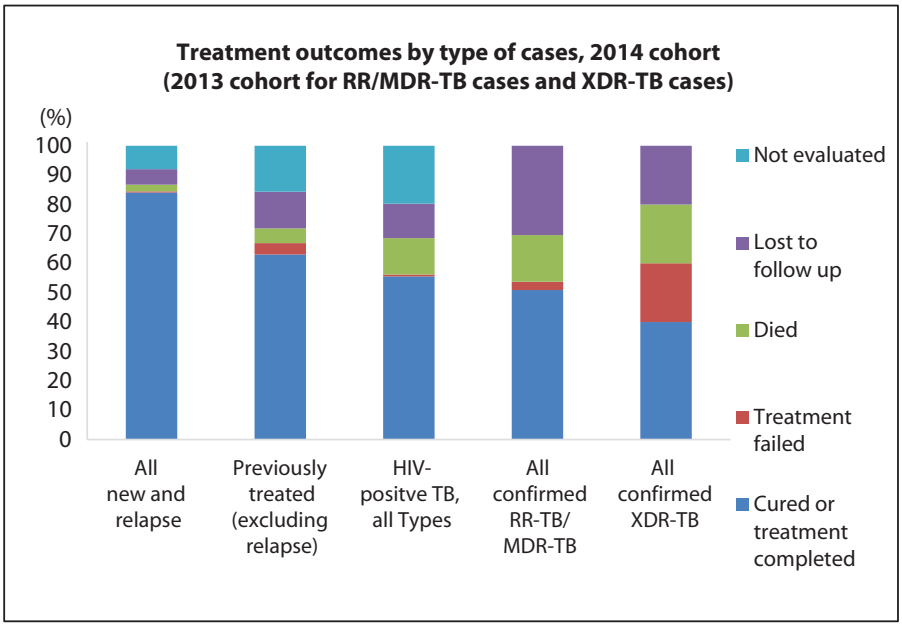
TB case notification, 2015	
Total cases notified	330 729
Total new and relapse	328 895
• % tested with rapid diagnostics at time of diagnosis	
• % with known HIV status	11%
• % pulmonary	93%
• % bacteriologically confirmed among pulmonary	64%

TB/HIV care in new and relapse TB patients, 2015	Number	(%)
Patients with known HIV-status who are HIV-positive	3 523	10%
• on antiretroviral therapy	757	21%

Treatment success rate and cohort size	Success	Cohort
New and relapse cases registered in 2014	84%	322 806
Previously treated cases, excluding relapse, registered in 2014	63%	1 733
HIV-positive TB cases, all types, registered in 2014	56%	2 548
MDR/RR-TB cases started on second-line treatment in 2013	51%	809
XDR-TB cases started on second-line treatment in 2013	40%	10







Key challenges

Programme management:

- Centralized approach results in low programme ownerships at sub-national levels.
- High donor dependence raises concern of sustainability.
- Lack of synergy among too many stakeholders and partners.
- Slow progress in moving away from donor funding and realization of exit strategy.

Technical challenges:

- Low detection; only 32% TB cases notified by NTP, only 15% of DR-TB.
- PPM networks slowly implemented mainly by public providers, varying quality.
- High turnover of trained staff, weak mechanism of competent staff distribution.
- Weak TB supply chain management.
- Under reporting due delays in implementation of TB mandatory notification.
- Sub-optimal capacity to utilize TB strategic information collected through Management Information System (MIS) and research.
- Slow transition to adopt new diagnostic tools and treatments (new diagnostic algorithm, rapid molecular test expansion, second line-line probe assay (LPA), shorter regimen, new drugs).
- Slow progress in expanding HIV tests for TB patients to know their HIV status.

Expansion of DR-TB services:

- 71% of MDR confirmed cases enrolled, others refused or died before treatment.
- 51% success rate for MDR-TB treatment, 40% for XDR TB.
- Poor knowledge of standardized PMDT services, including infection control at facility level.
- Private sector health providers in PMDT few, limited presumptive referral.

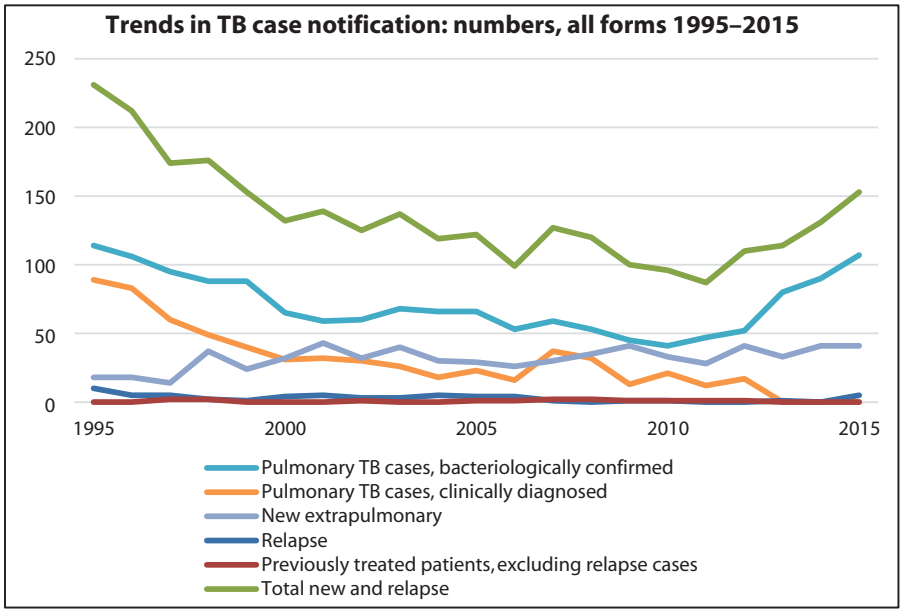
MALDIVES

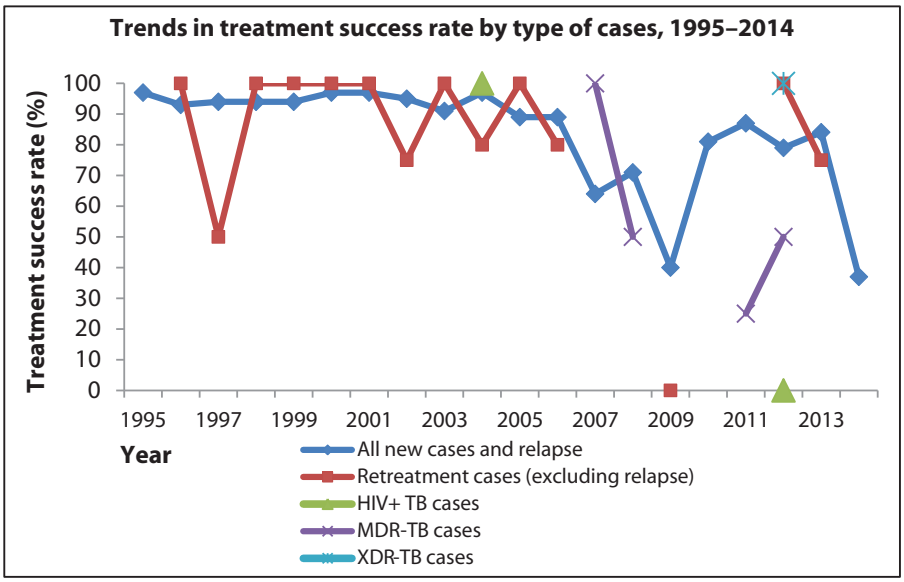
With increased case notification and treatment coverage, there is high political commitment towards ending TB in the country. Diagnosis and treatment guidelines adopted by the NTP are in line with WHO recommended standards. New and more convenient paediatric formulation for childhood TB cases introduced. Gene Xpert testing services initiated. Quality assured anti-TB drugs are procured using domestic funding. All TB services are provided free of charge. Case detection among risk groups (prisons, home for people with special needs, migrants) strengthened through collaboration between related agencies.

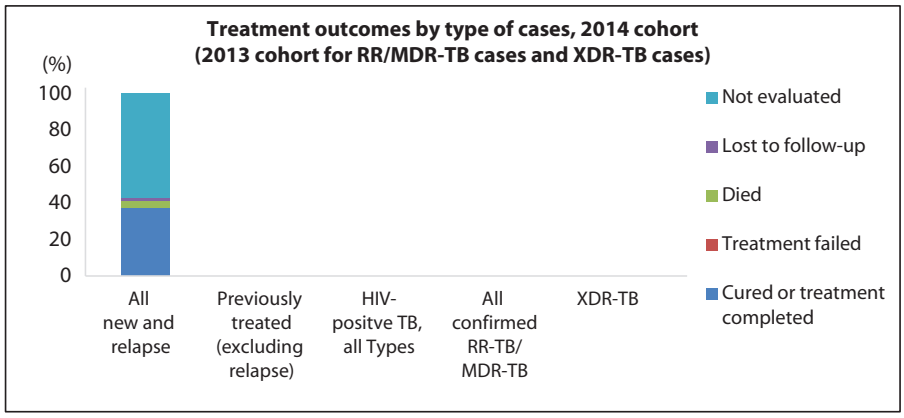
Estimates of TB burden, 2015	
Incidence (includes HIV+TB)	190 (150–240)
Incidence rate (includes HIV+TB), per 100 000 population per year	53 (41–66)
Incidence rate (HIV+TB only), per 100 000 population per year	0.05 (0.04–0.07)
Mortality rate (excludes HIV+TB), per 100 000 population per year	5.4 (4.4–6.4)
Mortality rate (HIV+TB only), per 100 000 population per year	0.01 (0.01–0.02)
Drug-resistant TB, 2015	
Incidence of MDR/RR-TB	<0.01 (<0.01–<0.01)
Estimated MDR/RR-TB cases among notified pulmonary TB cases	3 (2–3)
Estimated % of TB cases with MDR/RR-TB among new cases	2.6% (2.3–3)
Estimated % of TB cases with MDR/RR-TB among previously treated cases	0% (0–52)

Treatment success rate and cohort size	Success	Cohort
New and relapse cases registered in 2014	80%	130
Previously treated cases, excluding relapse, registered in 2014	100%	1
HIV-positive TB cases, all types, registered in 2014	0	0
MDR/RR-TB cases started on second-line treatment in 2013	0	0
XDR-TB cases started on second-line treatment in 2013	0	0

TB case notification, 2015	
Total cases notified	153
Total new and relapse	153
• % tested with rapid diagnostics at time of diagnosis	14%
• % with known HIV status	100%
• % pulmonary	73%
• % bacteriologically confirmed among pulmonary	100%







Key challenges

- Shortage of financial and human resources to implement TB related activities in the country.
- Culture and DST services not available, proper sputum transportation system not established.
- Regular supervision and monitoring of TB centres at the regional, atoll and island level is arduous.
- Social stigma of TB still lingers at the community level.
- Patients seek medical care from abroad, may lead to emergence of drug resistance.
- Diagnosis and treatment of drug-resistant TB has long turnaround time. Current capacity to manage such patients is limited.

MYANMAR

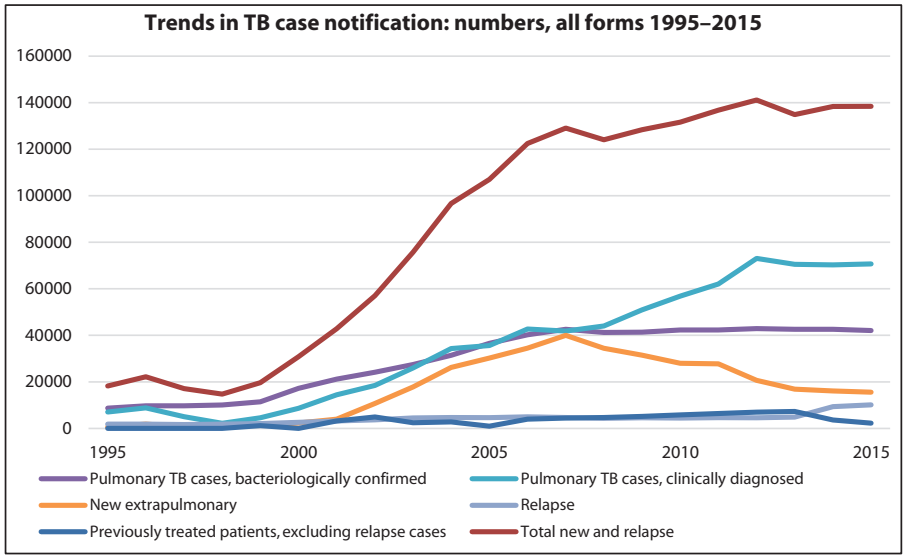
Myanmar has a high triple burden of - TB, HIV associated TB and MDR-TB. Response was limited in the last two decades except for DOTS expansion and increasing TB notification seven times, from less than 20 000 in 1999 to 140 000 currently. National TB prevalence survey, national drug resistance survey, operational researches and strengthened surveillance system have led to a paradigm shift in TB control and care, backed by massive domestic and international support in the last five years. NTP has adopted an updated National Strategic Plan 2016–2020. High treatment success rate, 87% among new and relapse cases registered in 2014, and 83% among MDR/RR-TB cases started on second-line treatment in 2013 was reported in 2015. PMDT and TB-HIV services now available across the country; quality TB diagnostic services improving after roll-out of Xpert MTB/Rif and active case detection with portable digital X-ray equipment targeting hard-to-reach populations is expanding.

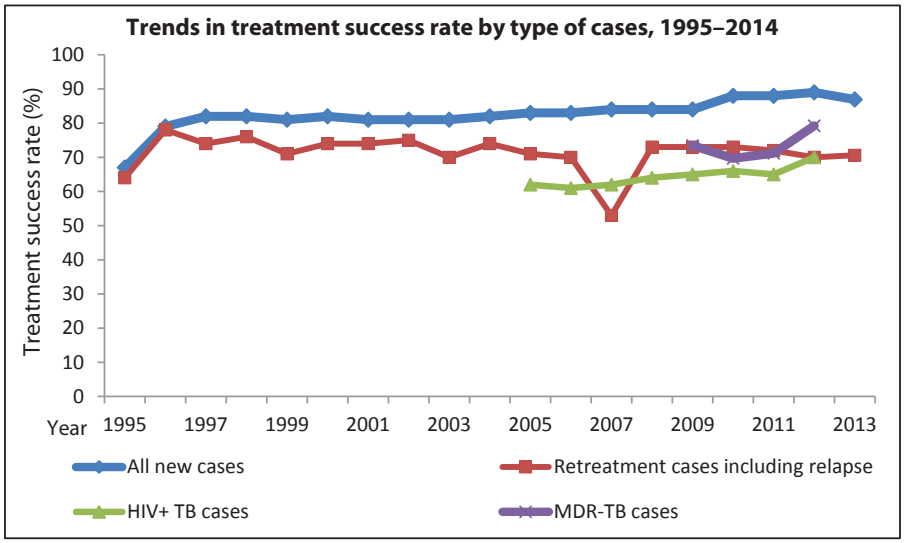
Estimates of TB burden, 2015	
Incidence (includes HIV+TB)	197 000 (144 000–258 000)
Incidence rate (includes HIV+TB), per 100 000 population per year	365 (267–479)
Incidence rate (HIV+TB only), per 100 000 population per year	32 (21–47)
Mortality rate (excludes HIV+TB), per 100 000 population per year	49 (30–74)
Mortality rate (HIV+TB only), per 100 000 population per year	9 (6.4–12)
Drug-resistant TB, 2015	
Incidence of MDR/RR-TB	14 000 (8 900–18 000)
Estimated MDR/RR-TB cases among notified pulmonary TB cases	9 000 (6 400–12 000)
Estimated % of TB cases with MDR/RR-TB among new cases	5.1% (3.2–7)
Estimated % of TB cases with MDR/RR-TB among previously treated cases	27% (15–39)
% notified tested for rifampicin resistance	among new cases: 7% among previously treated cases: 46% Total number: 14 599
Laboratory-confirmed cases	MDR/RR-TB: 2 793 , XDR-TB: 11
Patients started on treatment	MDR/RR-TB: 2 207, XDR-TB: 7

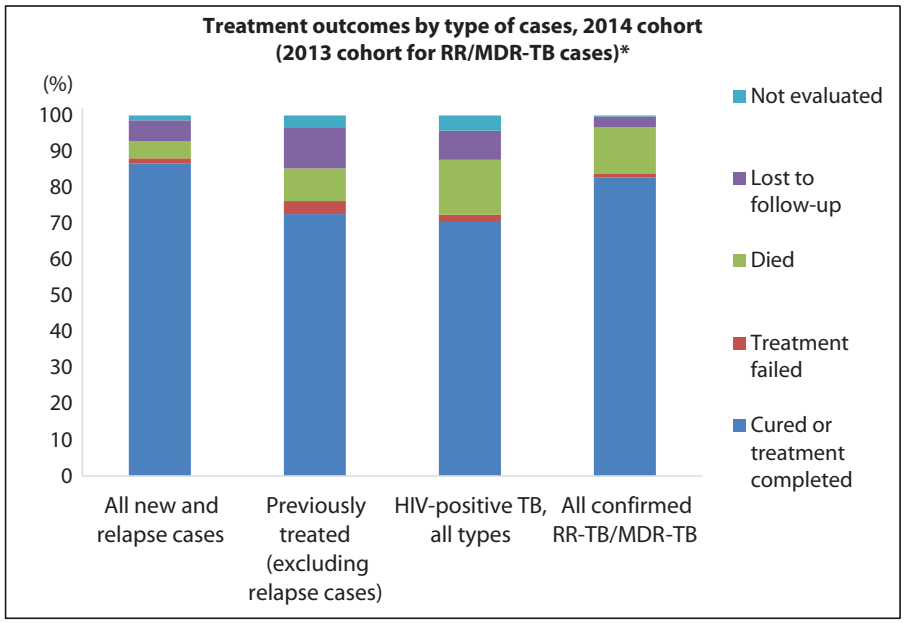
TB case notification, 2015	
Total cases notified	140 700
Total new and relapse	138 447
• % tested with rapid diagnostics at time of diagnosis	22%
• % with known HIV status	65%
• % pulmonary	88%
• % bacteriologically confirmed among pulmonary	39%

TB/HIV care in new and relapse TB patients, 2015	Number	(%)
Patients with known HIV-status who are HIV-positive	7 918	9%
• on antiretroviral therapy	3 034	38%

Treatment success rate and cohort size	Success	Cohort
New and relapse cases registered in 2014	87%	135 984
Previously treated cases, excluding relapse, registered in 2014	73%	3 677
HIV-positive TB cases, all types, registered in 2014	70%	10 782
MDR/RR-TB cases started on second-line treatment in 2013	83%	667
XDR-TB cases started on second-line treatment in 2013		







Key challenges

- Human resource replenishment stalled till completion of HR allocation by ongoing reform/re-structuring of health sector.
- Establishing greater linkages with private sector after introduction of mandatory case notification.
- Providing timely ART to all HIV-TB patients.
- Delayed or missing cases for second line treatment after the detection of R-resistance.
- Capacity of National TB Reference Laboratory to cope with increasing demands on culture and second-line Line Probe Assay (new building planned in 2017).
- Limited health service capacity to monitor, detect and manage adverse drug reactions.

NEPAL

NTP maintaining high treatment success rate among drug-susceptible TB. For 2014 cohort treatment success rate was 92%. Community-based DOT has been further extended. However, there has been a slight decrease in case notification in 2015. More new MDR and RR-TB cases are being registered for treatment. High treatment success rate (71%) reported among MDR/RR-TB cases started on second-line treatment in 2013.

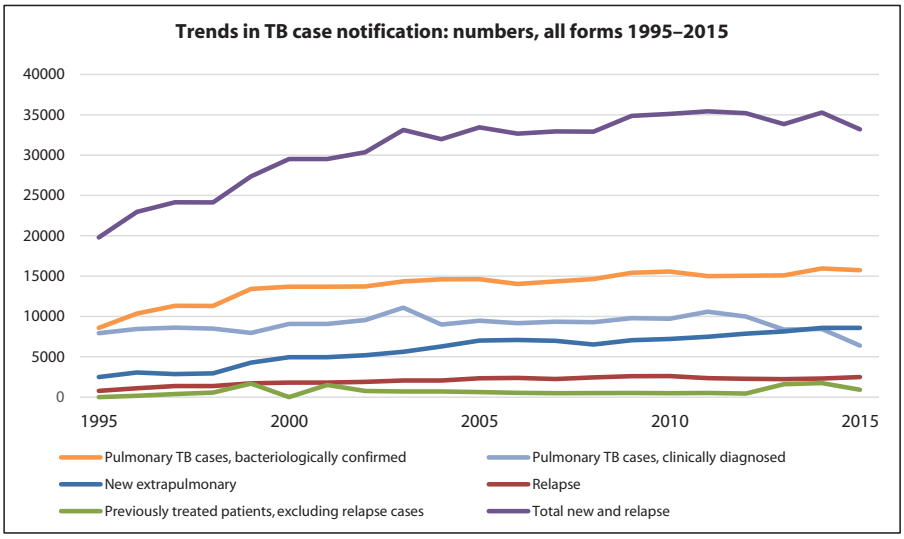
The network of WHO recommended rapid drug susceptibility testing facilities has been expanded, as has been the capacity to conduct culture and DST laboratories. NTP has built capacity for rapid response during disasters, ensuring continuity of TB services.

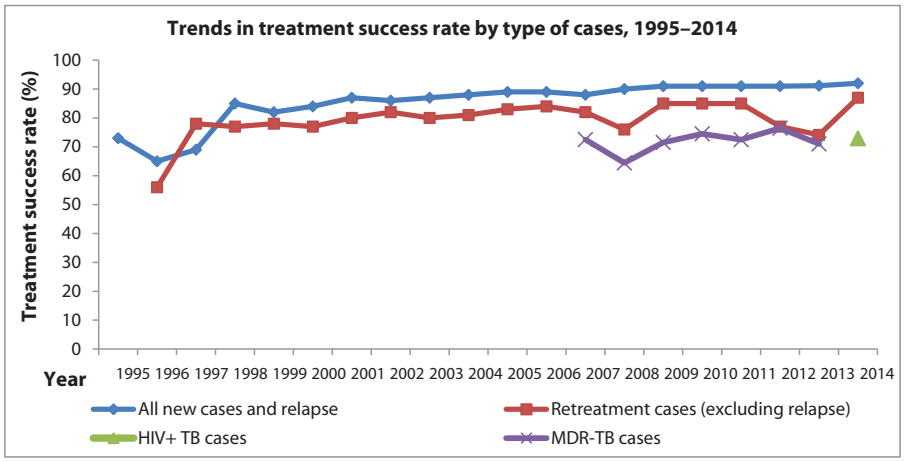
Estimates of TB burden, 2015	
Incidence (includes HIV+TB)	44 000 (39 000–50 000)
Incidence rate (includes HIV+TB), per 100 000 population per year	156 (137–176)
Incidence rate (HIV+TB only), per 100 000 population per year	6.7 (21–47)
Mortality rate (excludes HIV+TB), per 100 000 population per year	20 (14–26)
Mortality rate (HIV+TB only), per 100 000 population per year	1.7 (1.4–2.2)
Drug-resistant TB, 2015	
Incidence of MDR/RR-TB	1 500 (950–2 100)
Estimated MDR/RR-TB cases among notified pulmonary TB cases	990 (650–1 300)
Estimated % of TB cases with MDR/RR-TB among new cases	2.2% (0.98–3.4)
Estimated % of TB cases with MDR/RR-TB among previously treated cases	15% (9.2–22)
% notified tested for rifampicin resistance	among new cases: 12% among previously treated cases: 29% Total number: 4 752
Laboratory-confirmed cases	MDR/RR-TB: 451, XDR-TB: 7
Patients started on treatment	MDR/RR-TB: 379, XDR-TB: 7

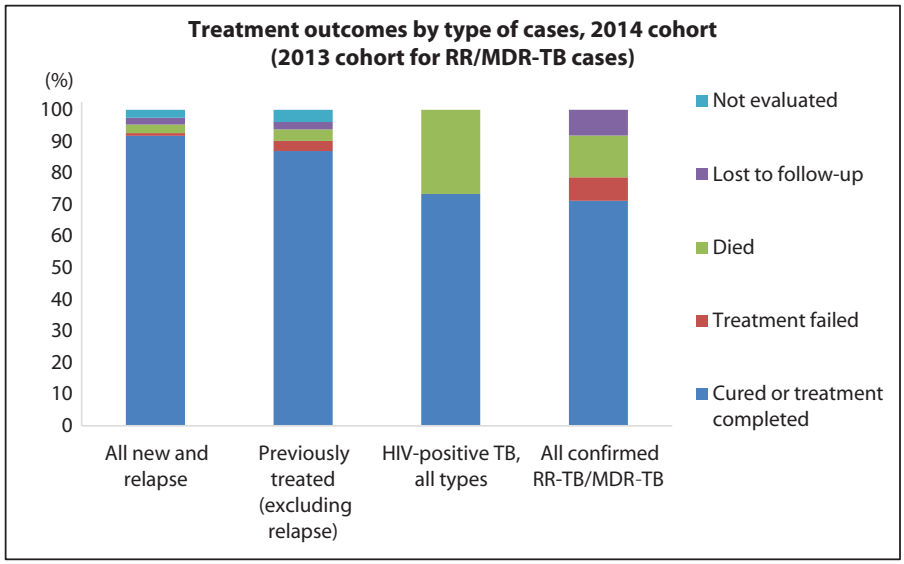
TB case notification, 2015	
Total cases notified	34 122
Total new and relapse	33 199
• % tested with rapid diagnostics at time of diagnosis	14%
• % with known HIV status	7%
• % pulmonary	74%
• % bacteriologically confirmed among pulmonary	73%

Treatment success rate and cohort size	Success	Cohort
New and relapse cases registered in 2014	92%	34 764
Previously treated cases, excluding relapse, registered in 2014	87%	1 286
HIV-positive TB cases, all types, registered in 2014	73%	15
MDR/RR-TB cases started on second-line treatment in 2013	71%	257
XDR-TB cases started on second-line treatment in 2013		

TB/HIV care in new and relapse TB patients, 2015	Number	(%)
Patients with known HIV-status who are HIV-positive	179	8%
• on antiretroviral therapy	133	74%







Key challenges

- TB case notification has shown a decline in 2015.
- GeneXpert machines/sites and microscopic centres not being utilized optimally.
- Coverage of DR-TB programme across country limited.
- Models of public-private partnerships not functioning optimally.
- Low childhood TB notification and use of other management tools. Uptake of isoniazid preventive therapy also low.
- Expansion and operationalization of electronic TB data recording/ reporting.
- Technical capacity at peripheral level not optimal.
- High primary loss to follow up is a major challenge facing the programme.
- Expansion of shorter DR-TB regimen and management of adverse drug reactions is limited.
- Retentions of technically qualified experts for DR-TB a major issue.
- Infection control in health facilities and communities not adequate.

SRI LANKA

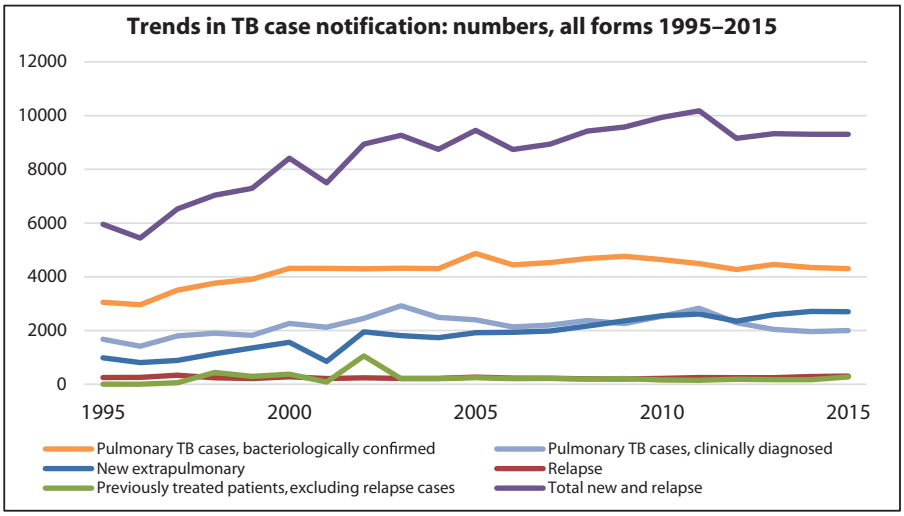
A middle-burden country, around 25% of total TB cases are from Colombo District, predominantly affecting males in the productive age group (15–54 years). Multidrug resistant TB is not a major problem and TB/HIV co-infection remains low. Treatment success rate above 85% since 2005. Incidence remains stable but case notification among new and relapse cases decreased since 2013. Loss to follow-up is low (<5%). The National Strategic Plan 2015–2020 finalized following Joint Monitoring Mission in 2014. National TB Reference Laboratory (NTRL) upgraded to Biosafety level III in 2015. TB culture facility expanded, available at NTRLsin, Ratnapura and Peradeniya. Construction completed in Jaffna and Karapitiya. Gene Xpert services being expanded, a 16-module machine to be placed at NTRL and 4-module machines at four more sites.

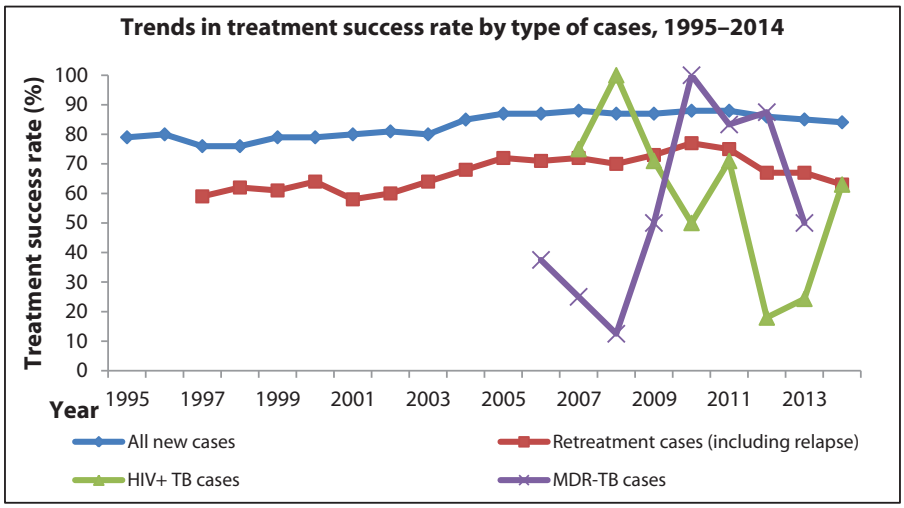
Estimates of TB burden, 2015	
Incidence (includes HIV+TB)	13 000 (9 700–18 000)
Incidence rate (includes HIV+TB), per 100 000 population per year	65 (47–86)
Incidence rate (HIV+TB only), per 100 000 population per year	0.21 (0.13–0.3)
Mortality rate (excludes HIV+TB), per 100 000 population per year	5.6 (4.5–6.9)
Mortality rate (HIV+TB only), per 100 000 population per year	0.06 (0.03–0.09)
Drug-resistant TB, 2015	
Incidence of MDR/RR-TB	89 (0–190)
Estimated MDR/RR-TB cases among notified pulmonary TB cases	43 (0–93)
Estimated % of TB cases with MDR/RR-TB among new cases	0.54% (0-1.3)
Estimated % of TB cases with MDR/RR-TB among previously treated cases	1.7% (0.64–3.7)
% notified tested for rifampicin resistance	among new cases: 13% among previously treated cases: 75% Total number: 1 635
Laboratory-confirmed cases	MDR/RR-TB: 15, XDR-TB: 0
Patients started on treatment	MDR/RR-TB: 13, XDR-TB: 0

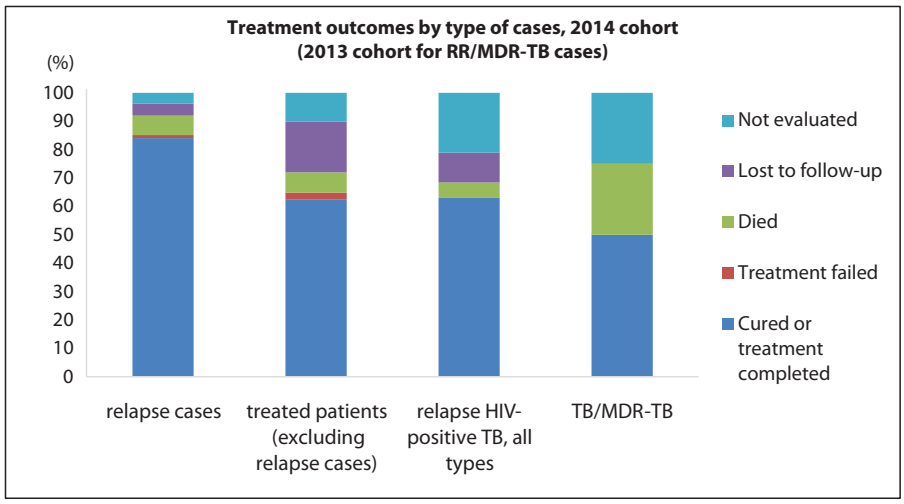
TB case notification, 2015	
Total cases notified	9 575
Total new and relapse	9 305
• % tested with rapid diagnostics at time of diagnosis	3%
• % with known HIV status	84%
• % pulmonary	71%
• % bacteriologically confirmed among pulmonary	69%

TB/HIV care in new and relapse TB patients, 2015	Number	(%)
Patients with known HIV-status who are HIV-positive	25	<1%
• on antiretroviral therapy	17	68%

Treatment success rate and cohort size	Success	Cohort
New and relapse cases registered in 2014	84%	8 980
Previously treated cases, excluding relapse, registered in 2014	63%	168
HIV-positive TB cases, all types, registered in 2014	63%	19
MDR/RR-TB cases started on second-line treatment in 2013	50%	4
XDR-TB cases started on second-line treatment in 2013		0







Key challenges

- TB control among hard-to-reach populations prisoners, drug addicts, urban poor, migrants (coming from high-TB burden countries) and estate population – is a challenge.
- Inadequate and poor distribution of trained staff especially for laboratory services.
- Need for multisectorial approach in TB care-involvement of the private sector, social services, plantation sector etc. (improving socioeconomic standards will reduce TB incidence).
- Social stigma associated with TB.
- Relatively high death rate associated with TB.

THAILAND

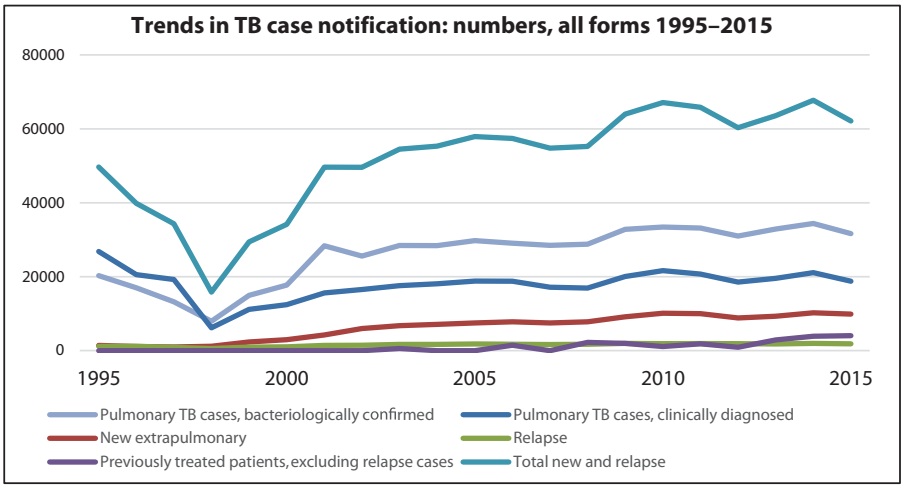
Universal health coverage almost achieved with significant improvement in coverage of unregistered migrants. Since 2010, 320,000 cases have been treated successfully. National Strategic Plan for TB control, 2017-2021 in line with End TB Strategy is in place, fully costed. NTP, Thailand has developed a case-based, electronic recording and reporting system being piloted online. A High proportion of TB patients (98%) know their HIV status. TB burden still high (117 000 new cases and 12 000 deaths in 2015). Large notification gap, at least 50 000 cases, due to under-diagnosis and under-reporting. Treatment success rate lower than target of 85% in some provinces and districts. With 57 GeneXpert machines and 17 LPAs, urgent need to utilize both technologies optimally and invest in additional rapid technology to decentralize rapid diagnosis of drug resistant TB at district level.

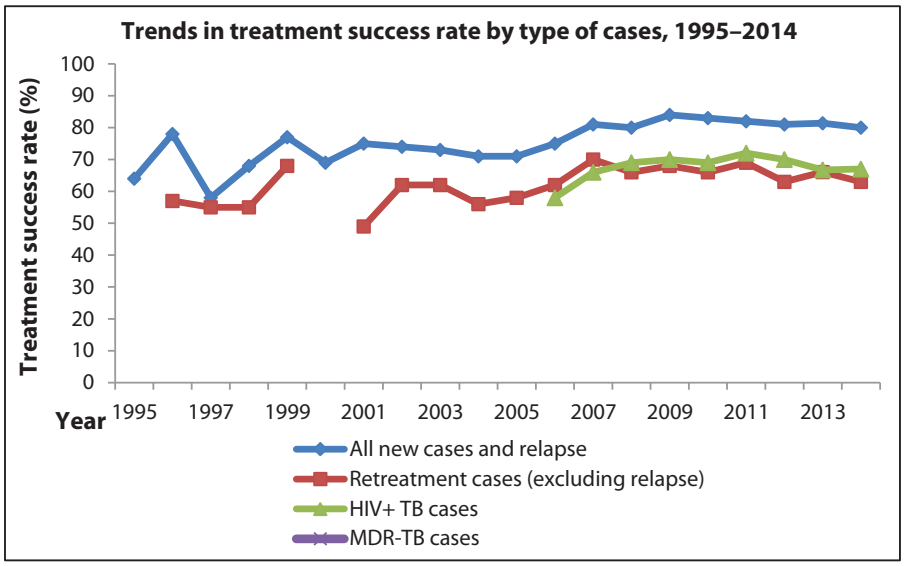
Estimates of TB burden, 2015	
Incidence (includes HIV+TB)	117 000 (69 000–176 000)
Incidence rate (includes HIV+TB), per 100 000 population per year	172 (102–259)
Incidence rate (HIV+TB only), per 100 000 population per year	22 (12–37)
Mortality rate (excludes HIV+TB), per 100 000 population per year	12 (10–15)
Mortality rate (HIV+TB only), per 100 000 population per year	8 (4.9–12)
Drug-resistant TB, 2015	
Incidence of MDR/RR-TB	4 500 (2 900–6 200)
Estimated MDR/RR-TB cases among notified pulmonary TB cases	2 500 (2 000–3 000)
Estimated % of TB cases with MDR/RR-TB among new cases	2.2% (1.5–2.9)
Estimated % of TB cases with MDR/RR-TB among previously treated cases	24% (18–30)

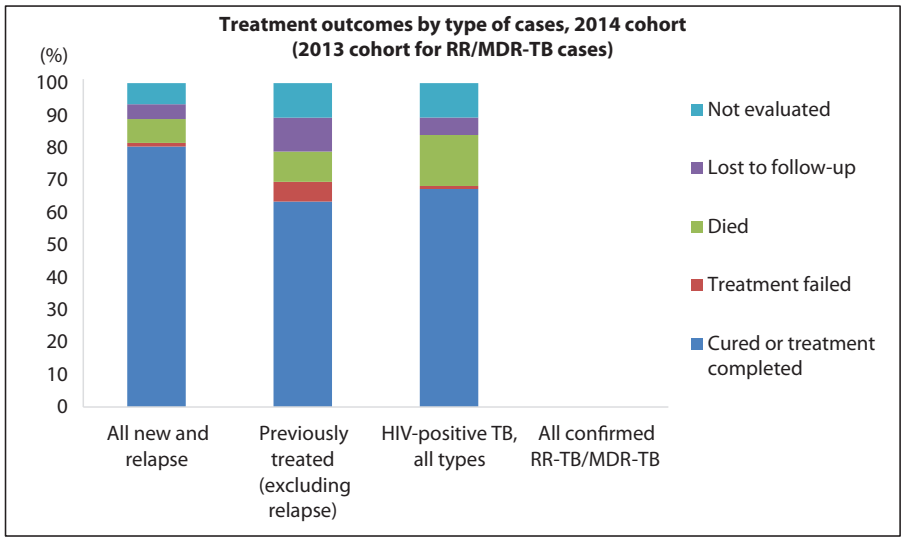
TB case notification, 2015	
Total cases notified	66 179
Total new and relapse	62 135
• % tested with rapid diagnostics at time of diagnosis	
• % with known HIV status	98%
• % pulmonary	84%
• % bacteriologically confirmed among pulmonary	64%

TB/HIV 2015	Number	(%)
Patients with known HIV-status who are HIV-positive	7 819	13%
on antiretroviral therapy	5 389	69%

Treatment success rate and cohort size	Success	Cohort
New and relapse cases registered in 2014	80%	58 774
Previously treated cases, excluding relapse, registered in 2014	63%	1 433
HIV-positive TB cases, all types, registered in 2014	67%	6 451







Key challenges

- TB burden still high. Large notification gap (at least 50 000) due to underdiagnosis and under-reporting.
- A rapidly ageing population, relatively high level of HIV-TB co-infection, and high prevalence of diabetes mellitus further compounds the TB situation.
- Nationwide system of MDR-TB diagnosis and care established, but only 20% MDR-TB cases notified for starting treatment.
- Treatment success in 2015 was well below the 85% target in many districts owing to weak follow up.
- Clear understanding of the national TB burden is limited by multiple data collection systems each requiring its own data entry.
- Planning for end of GF support due to its upper middle income country status and decreasing GF allocations.
- Bureau of TB needs additional human and financial resources to fully implement NSP 2017–2021.

TIMOR-LESTE

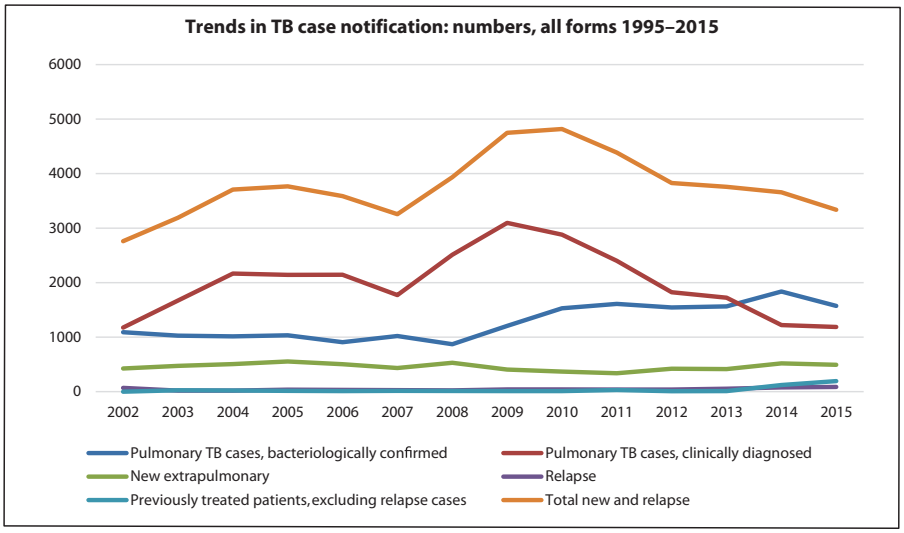
High treatment success rate (84%) among new and relapse cases registered in 2014. However, there has been a decrease in the number of cases being notified since 2012. Revised National Strategy Plan 2015–2020 developed in line with End TB Strategy. External Quality Assessment system established across the country. ABSL-III laboratory has been funded and built by KOICA, South Korea. This is the first laboratory in the country which does TB culture and DST. Paediatric and extrapulmonary guidelines revised and updated, including newer developments in diagnosis and treatment. Regional and district-level programme managers were trained on Programme Management; laboratory technicians and nurses trained. Series of community-level meetings held in 2016 in partnership with local NGOs supported by WHO. School and university students, medical students and prisoners have been sensitized on TB disease and management. National Strategic Plan 2017–2021has the overall goal of reducing TB incidenceby 12.5% per year, from 171 per 100 000 to 88 per 100 000, between 2017 and 2021.

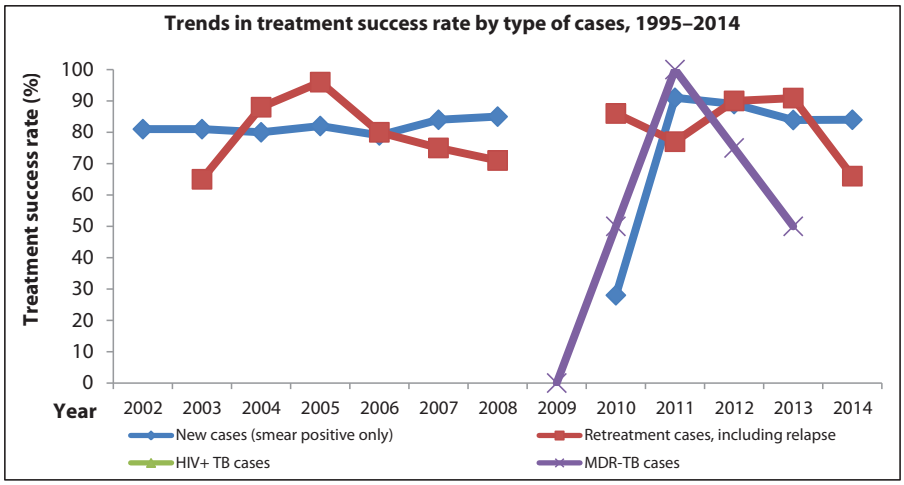
Estimates of TB burden, 2015	
Incidence (includes HIV+TB)	5 900 (3 800–8 400)
Incidence rate (includes HIV+TB), per 100 000 population per year	498 (322–712)
Incidence rate (HIV+TB only), per 100 000 population per year	7.3 (4.5–11)
Mortality rate (excludes HIV+TB), per 100 000 population per year	100 (60–151)
Mortality rate (HIV+TB only), per 100 000 population per year	0.32 (0–1.6)
Drug-resistant TB, 2015	
Incidence of MDR/RR-TB	220 (150–290)
Estimated MDR/RR-TB cases among notified pulmonary TB cases	120 (110–130)
Estimated % of TB cases with MDR/RR-TB among new cases	2.6% (2.3–3)
Estimated % of TB cases with MDR/RR-TB among previously treated cases	17% (15–19)
% notified tested for rifampicin resistance	among new cases: 5% among previously treated cases: 12% Total number: 184
Laboratory-confirmed cases	MDR/RR-TB: 4, XDR-TB: 0
Patients started on treatment	MDR/RR-TB: 4, XDR-TB: 0

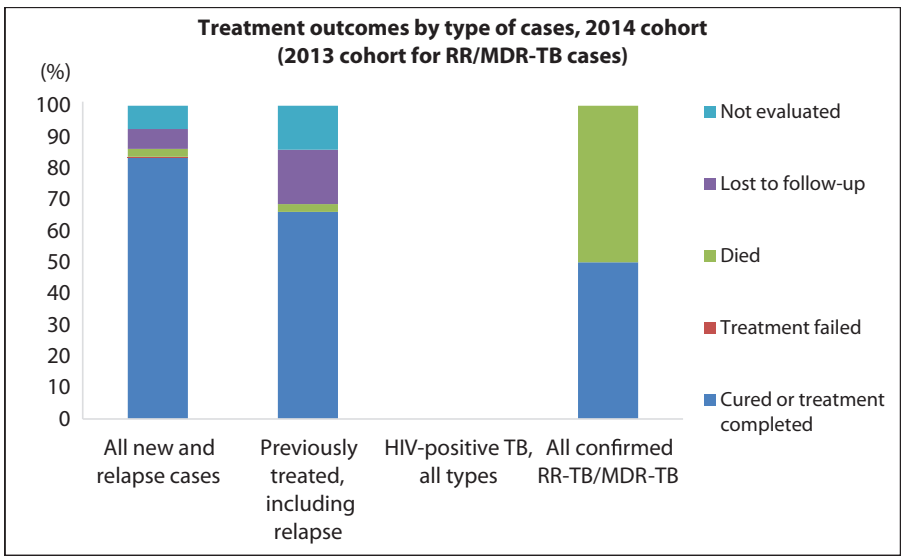
TB case notification, 2015	
Total cases notified	3 532
Total new and relapse	3 337
• % tested with rapid diagnostics at time of diagnosis	25%
• % with known HIV status	79%
• % pulmonary	85%
• % bacteriologically confirmed among pulmonary	44.5%

TB/HIV care in new and relapse TB patients, 2015	Number	(%)
Patients with known HIV-status who are HIV-positive	24	<1%
• on antiretroviral therapy	24	100%

Treatment success rate and cohort size	Success	Cohort
New and relapse cases registered in 2014	84%	3 657
Previously treated cases, excluding relapse, registered in 2014	66%	121
HIV-positive TB cases, all types, registered in 2014		
MDR/RR-TB cases started on second-line treatment in 2013	50%	2
XDR-TB cases started on second-line treatment in 2013		0







Key challenges

- Case detection remains low. Challenges include poor referral of cases by doctors posted at health posts in villages and poor quality laboratory work including sputum collection and sputum microscopy.
- Poor TB awareness among communities, who continue to rely on traditional healers for treatment. Stigma a key issue in patients not seeking care.
- Drop in detection of paediatric cases since 2011, from 20% to ~11%. Shortage of paediatricians at sub–district level and lack of good paediatric diagnostics further compounds the issue.
- Timor-Leste has three GeneXpert machines, one with government system and two with partner NGOs. All machines are located in and around Dili, making access difficult for people outside the capital.

Partners

WHO PARTNER

The Global Fund in South-East Asia

As a unique public-private partnership organization, the Global Fund (GF) has been a major international financing institution supporting HIV, TB and malaria programmes in over 140 countries. With a cumulative portfolio of more than US$ 38 billion since it was established in 2002, it has an annual disbursement of about US$ 4 billion. The Global Fund has contributed to saving over 20 million lives by reducing the burden of these three diseases and strengthening health and community systems.

The Global Fund accounts for over 75% of international funding for TB. About 26% (US$ 1.6 billion) of the cumulative signed grant amounts for TB of the Global Fund has been allocated for countries in the WHO SEA Region. The investments match with the Region's disease burden, nearly half (45.6%) of the global TB incidence and a third of MDR-TB incidence. Global Fund grants have been used for almost all components of TB programmes depending on specific needs and gaps in countries. It includes scale-up of TB diagnosis and treatment, response to MDR-TB, TB-HIV collaborative activities, building resilient and sustainable health systems. It also engages communities, civil society and private sectors in the fight against TB, including capacity building and technical assistance.

Some success stories include:

- Scale up of new diagnostics and access to TB and MDR-TB treatment services in all countries.
- Civil society and private sector engagement in TB - in India, Bangladesh, Myanmar and Indonesia.
- Community-based TB services in Bangladesh – BRAC.
- Scale-up of MDR-TB responses in India

Challenges

- "Missing" TB and MDR-TB cases leading to continued transmission of TB and slow reduction in TB incidence. The Region accounts for almost half (2.2 million) of the global missing TB cases and one third of missing MDR-TB cases (162 000).
- Slow implementation of activities and absorption of funding in some countries.
- Poor treatment outcome of MDR-TB patients in most countries with a high proportion of "lost-to-follow up" including initial and during treatment.
- Inadequate engagement of private care providers

These challenges have to be addressed by prioritization of interventions, and focusing on detecting and treating "missing" TB and MDR-TB patients. They will require a paradigm shift and change in mindset to implement and scale up screening of patients using X-rays (including digital X-rays), intensified and active cases-finding, scale-up of innovative and successful experiences (at the local, regional and international level), intensifying engagement of private care providers and communities, and scale-up of new diagnostic tools, paediatrics formulations and shorter regimens.

There should be a mechanism to incentivize implementation of new approaches that improve access to services, increase detection of TB/MDR-TB cases and improve treatment outcomes.

Reprogramming of "savings" and reprioritization to focus on key populations and interventions, accelerate absorption and maximize impact of the investments.

Preparation for new applications for the next allocation-based cycle. Applications should be aligned with End TB Strategy, Global Plan to End TB and the new Global Fund Strategy (2017–2022) and be based on evidence and prioritization including using catalytic funding to reach "missing" TB and MDR-TB patients. ■

Cumulative investment on TB in SEAR (2002–16)

Country	Total signed amount	Total committed amount	Total disbursement amount
Bangladesh	250 817 862	247 115 159	216 380 925
Bhutan	4 867 980	4 436 026	4 092 668
India	690 326 200	660 146 517	571 660 069
Indonesia	294 924 701	264 454 309	245 738 247
DPR Korea	73 894 640	65 117 398	62 064 628
Myanmar	144 754 465	118 662 520	118 662 520
Nepal	55 594 878	49 465 262	46 538 630
Sri Lanka	21 835 451	18 717 118	15 506 352
Thailand	58 962 475	58 962 475	58 962 475
Timor-Leste	13 133 563	11 713 010	10 068 273
Total	1 609 112 213	1 498 789 793	1 349 674 785
Investments on TB (compared with the total TB portfolio)	26	26	26

all amount in US$

Stop TB Partnership

GDF, a one-stop facility for TB drugs

Established in 2001, the Stop TB Partnership's Global Drug Facility (GDF) is a one-stop, bundled procurement mechanism for quality assured TB commodities. It provides grants and direct procurement services to countries in need. As the largest supplier of quality assured TB medicines and diagnostics worldwide in the public sector, it plays a key role in the procurement of first-line drugs (FLDs) and paediatric TB drugs. GDF is the sole procurement mechanism for second-line TB drugs (SLDs) for the Global Fund.

GDF support to the SEA Region for 2016:

- Total value of orders placed in South-East Asia Region was US$ 74.8 million, 61% was for second line drugs (SLDs), 29% for first-line drugs (FLDs) and 10% for new diagnostics.
- To facilitate rapid and efficient uptake of new medicines and regimens by countries, GDF is improving the ability of national procurement and supply management specialists in forecasting, quantification, supply planning and early warning systems. GDF organized its South-East Asia Regional Workshop in November in Bangkok with 22 participants from eight countries, and the QuanTB tool was used there.
- The GDF participated in the Ninth South-East Asia Regional Advisory Committee/Regional Green Light Committee Meeting on MDR-TB held in Kathmandu, Nepal in October. It presented the availability of second-line drugs, including new and repurposed medicines from GDF, and guided countries on the uptake of shorter MDR-TB regimens and new drugs.
- The GDF also conducted review missions in Sri Lanka, India, Indonesia, Bangladesh, and Nepal. During these missions GDF experts conducted trainings on quantification and early warning systems, and reviewed the PSM systems including storage and distribution practices in the countries. It recommended the revision of National TB Strategic Plans and upgrading of systems.
- The GDF has continued to implement the bedaquiline donation programme that was made available through an agreement between USAID and Johnson & Johnson affiliate, Janssen Therapeutics. As of December 2016, 208 bedaquiline patient treatments were delivered in the South-East Asia Region.
- GDF was the first organization to make an agreement with Otsuka on access to delamanid, another new, life-saving medicine for MDR-TB. As of December 2016, no country from the Region had placed any order for delamanid.
- Since the launch of new paediatric formulations in December 2015, GDF is rolling them out globally in 27 countries. Orders for new pediatric formulations are being placed for seven SEA countries: Bangladesh, Bhutan, DPR Korea, India, Maldives, Myanmar and Sri Lanka. ■

TB REACH to invest nearly US$ 5 million in Region

Multilateral funding mechanism of the Stop TB Partnership, TB REACH provides a platform for testing innovative strategies to increase the number of people detected with TB and link them to appropriate treatment. It combines fast-track results based financing and rigorous, external monitoring and evaluation to produce strong evidence around specific innovative approaches, so they can be scaled up by other donor agencies and/or national governments.

From 1 April 2009, to 31 March 2016, TB REACH provided US$ 95 million to 144 projects in 46 lower-income and/or high TB burden countries. Over 33 million people were screened for TB, and more than 1.9 million people were diagnosed with TB and reported to national TB programmes in areas where TB REACH projects are active. Most of TB REACH grants in the South-East Asia Region ended on 31 March 2016, their activities and achievements included in the previous annual report.

In May, 2016, the Government of Canada announced renewed investment of 85 million Canadian dollars to TB REACH over the next five years. In addition, the Bill & Melinda Gates Foundation pledged US$ 7 million to fund TB REACH. The Indonesia Health Fund, comprising of eight Indonesian business leaders convened by Dato Sri Dr. Tahir, also pledged US$ 1.5 million to support TB REACH's efforts in Indonesia. The new TB REACH grantees were selected in December 2016, and will begin implementation in the first half of 2017. In the South-East Asia Region, there will be 10 TB REACH projects implemented in Bangladesh, India, Indonesia and Nepal to improve case detection, treatment adherence and outcomes. Approximately US$ 4.8 million will be invested in this Region to encourage partners to move beyond the "business-as-usual" approach to ending TB. ■

WHO PARTNER

USAID in SEA Region countries

The United States Agency for International Development (USAID) funding supports national TB programmes of ministries of health implement their strategic plans and the Global Fund TB grants through technical assistance in four SEARO countries: Bangladesh, India, Indonesia and Myanmar. Targeted Global Fund-related technical assistance is provided to Nepal as well.

USAID focuses on improving access to high-quality patient-centred TB, DR-TB & TB/HIV services; preventing transmission and disease progression; and strengthening TB service delivery. One of its flagship projects is a consortium of partners called Challenge TB. (see highlights below)..

MYANMAR

- Developed a comprehensive National TB Laboratory Strategic Plan.
- Helped revision and update of TB Infection Control Guidelines.
- Improved building infrastructure, equipment maintenance and procurement and installation of infection control equipment to prevent the spread of TB.
- Supported the country's Global Fund grant concept note and grant implementation.
- Introduced LQMS and biosafety officer training as well as GeneXpert trainings based on the GLI package.
- Supported review and revision of the procurement and supply chain system.

GeneXpert Training – FHI 360

BANGLADESH

- Established TB awareness and case finding through the cross-cutting urban TB project of the NGO Health Service Delivery Project (NHSDP) and the social franchising of Marketing Innovations for Health (MIH).
- Finalized an NTP-endorsed contact investigation (CI) mechanism including SOPs and updated recording and reporting formats to be piloted in 2017. Through local NGOs, scaled-up CI for paediatric contacts resulted in 672 (2%) being diagnosed with TB.
- Improved the GeneXpert network through a country-wide inventory assessment performed jointly with NTP and Cepheid. A GeneXpert repair and maintenance centre was also established.
- Last year, the number of reference laboratories implementing Laboratory Quality Management Systems (LQMS) grew significantly as Bangladesh implemented its first LQMS system.
- Established electronic systems for recording and reporting (eTB manager) and for drug quantification (QuanTB) via Systems for Improved Access to Pharmaceuticals and Services (SIAPS).
- Supported local partners to collaborate with Government of Bangladesh and others in TB care.

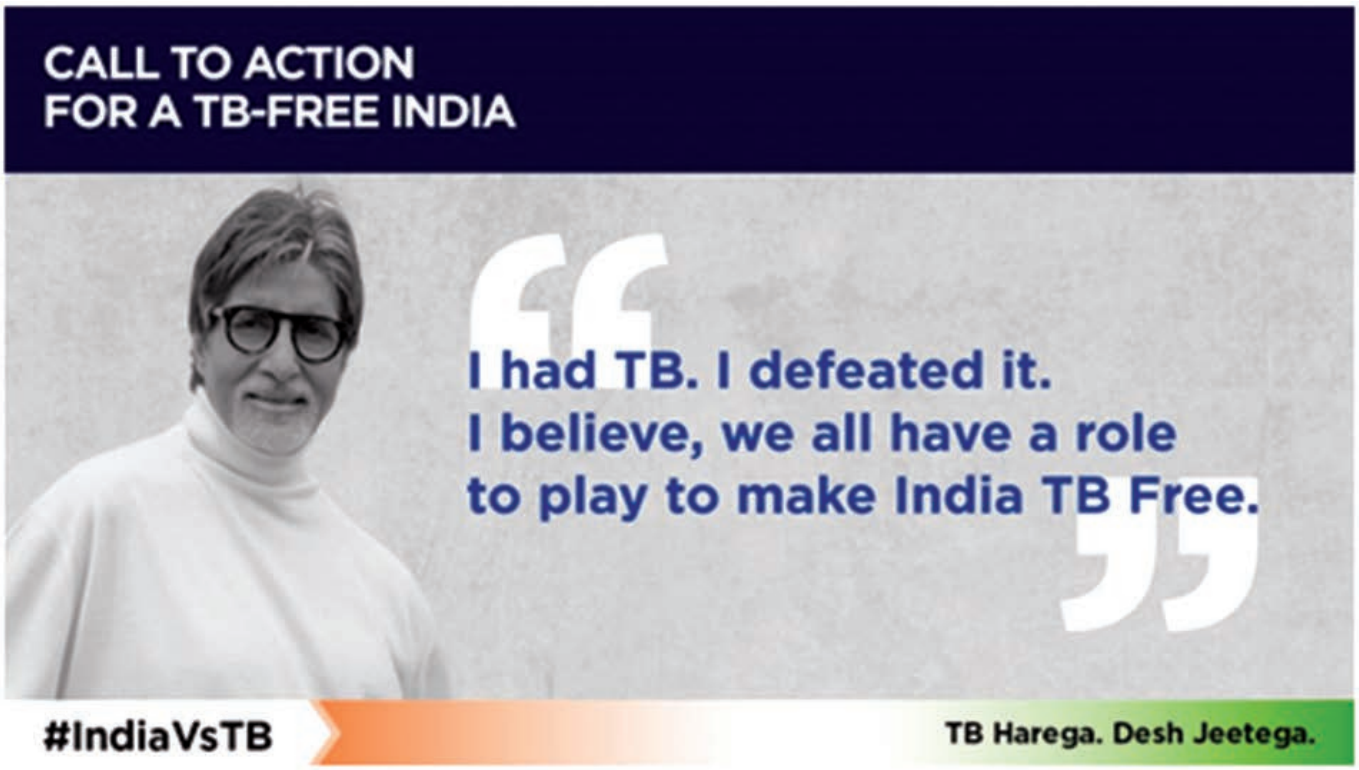
INDONESIA

- Supported intensified case finding (ICF) in select areas and community-based approaches to ICF, strengthened surveillance systems, TB distance learning for general practitioners, and PPM committee establishment.
- Assisted TB drug manufacturers in receiving WHO prequalification standards.
- Supported the Ministry of Health in health financing reforms.
- Established the national TB patient organization (POP TB), providing a platform for TB patients, and others affected for national policy implementation.
- Assisted NTP for GeneXpert placement, installation, and training for laboratory technicians, doubling network from 41 to 82 machines in 33 provinces. Plan to procure many more in 2017.
- Towards decentralization, proposed district action plans (DAP) to be developed. The NTP has adopted TB district planning as a priority in the National Action Plan for TB Elimination. Provincial level DAP meetings were conducted in 13 provinces.

On-the-job training at Adam Malik Hospital Laboratory, Indonesia - Roni Chandra

INDIA

- USAID is working in five mega-million cities through the TB Health Action Learning Initiative (THALI) project to ensure that urban patients — particularly slum dwellers and the poor — are diagnosed on their first visit to a health care facility. Through THALI, healthcare professionals, including private providers, are trained to follow standard TB care and try innovative approaches to diagnose and treat TB and MDR-TB. It aims to develop, test and scale-up new and existing innovations to detect and treat TB.
- In an effort to avoid high rates of failed treatment and reduced the number of patients who abandon treatment, private care providers were trained on NTP guidelines and standards.
- MDR-TB:
  - Carried out the first anti-TB drug resistance survey in India.
  - Promoted adoption and use of bedaquline to treat MDR-TB.
  - Developed new reporting systems for monitoring early diagnosis and treatment of MDR-TB across the country.
- Supported the national campaign, "Call to Action for a TB-free India", engaging health care providers, various stakeholders and patients. USAID also supports a campaign to advocate and provide outreach in select states.
  - Over US$1 million of estimated private sector cost share was leveraged for the TB Free India campaign including celebrity Amitabh Bachchan's time.
  - Corporate and public sector commitment worth US$ 3 million.
  - Five leading companies committed to implement workplace interventions and support TB prevention and care initiatives.
  - More than 10 corporations signed letters of intent to incorporate TB in their programmes.
  - CTB launched social media channels, Facebook, Twitter and YouTube, engaging a wide range of stakeholders for increased visibility of TB.
  - Media roundtable and group discussions were held.
  - Sensitized parliamentarians and legislators from the state of Himachal Pradesh, leading to "TB Free Himachal" initiative. ■



Challenge TB in SEA Region

Challenge TB (CTB) is USAID's flagship global project, implementing the US Government's TB strategy

KNCV Tuberculosis Foundation (KNCV) leads a unique and experienced coalition of nine partners implementing the Challenge TB project (CTB). Other coalition partners are the American Thoracic Society (ATS), FHI 360, Interactive Research and Development (IRD), International Union Against Tuberculosis and Lung Disease(The Union), Japan Anti-Tuberculosis Association (JATA), Management Sciences for Health (MSH), PATH and the World Health Organization (WHO). Working closely with ministries of health, USAID, Global Fund, the Stop TB Partnership and other key stakeholders, CTB contributes to the global End TB Strategy targets. In the SEA region CTB runs major projects in Bangladesh, India, Indonesia and Myanmar. Below, are some highlights on Indonesia:

KNCV leads the Challenge TB project with WHO and other partners, all working through Indonesia's Ministry of Health. A wide range of activities include policy and guidelines development, and technical assistance (TA). In 2016, CTB Indonesia focused on: (i) improved access to quality patient centred care for TB, TB-HIV and MDR-TB services and (ii) strengthening TB platforms to ensure the necessary enabling environment (i.e comprehensive Health Information and Management Systems (HMIS), political commitment & leadership with resources to achieve programme goals.

CTB and its partners achieved the following key results in Year 2 (2016):

Indonesian NTP district action plans

CTB supports development of district action plans (DAP). The NTP has included TB district planning as a priority in the National Action Plan for TB Elimination and is considered an indicator of local government leadership and commitment. The NTP agreed and adopted the draft guideline developed by CTB in the second quarter of 2016. Further more, training of trainers (ToT) was conducted with CTB being a part of the national facilitators' team. By September 2016, provincial level DAP meetings were conducted in four CTB provinces and nine non-CTB provinces. In 2017, CTB will support and facilitate capacity building at the national and provincial level, using the planning in six CTB provinces (16 districts) as demonstration sites.

GeneXpert scale-up in 33 provinces

CTB provided technical assistance for GeneXpert placement, installation and training of laboratory technicians. Expanding the Programmatic Management of Drug-resistant TB (PMDT), NTP installed 82 GeneXpert machines in 33 provinces (40 four-module and 42 two-module) as of September 2016. The 200 machines procured with the Global Fund grant were installed in October-December 2016. About 100 more machines are expected in 2017. NTP also procured 31 machines to be installed in early 2017.

CTB will continue supporting decentralization, and roll out and utilization of GeneXpert. Linked to this acceleration, KNCV will support PMDT in providing treatment closer to the homes of patients.

Culture and DST laboratories

Till two years ago, there were five C/DST laboratories in Indonesia providing DST for second line anti TB drugs. With support from CTB, two additional regional laboratories were provided in DKI Jakarta and North Sumatra and certified for drug susceptibility testing (DST) for second line anti-TB drugs, bringing the total number of certified laboratories for second line DST in Indonesia to seven.

National TB Patient Organization (*Persatuan Organisasi Pasien*) established

The national TB patient organization (POP TB/ *Perhimpunan Organisasi Pasien Tuberkulosis Resistan Obat*) was established in August 2016, combining the resources of eight unique patient organizations. POP TB aims to provide a platform giving voice to TB patients in national-level discussions and in decision-making in national policies. POP TB also aims to promote and facilitate the establishment of "homegrown" TB patient organizations across Indonesia.

In 2017, CTB will invest in the development of CSOs for "TOSS TB" (*Temukan, Obatisampai Sembuh* TB = Find, Treat and Cure TB) networks at national and provincial levels. In districts CSOs will be engaged to monitor functioning and utilization of treatment sites, sputum transportation systems and other TB services. ■

Mr Budi Hermawan signing the official letter of his assignment as POP TB chairman (Photo by: Thorofy, PETA)

BRAC: Combing Bangla villages and towns to identify TB patients

"Tuberculosis remains a major cause of death in Bangladesh, especially among the poor. We have been working to control this deadly disease since 1984 through our frontline community health workers, who visit households, identify and refer people with TB symptoms for tests, and ensure the daily intake of required medicines by every TB patient. We will continue our efforts to reduce the TB burden further and to promote economic growth and social change to ensure healthy lives for the people of Bangladesh. I look forward to the day when our country, and the rest of the world, will be free of the TB scourge."

Sir Fazle Hasan Abed KCMG, Founder and Chairperson, BRAC

In Bangladesh TB has emerged as a leading public health threat that mostly affects people in their productive years, adversely affecting the country's economy. Although there are no precise estimates on prevalence of childhood TB, it is assumed that childhood TB is under-diagnosed, and DR-TB is growing (*see Country Profile for details*).

BRAC, a nongovernment organization, has played a pivotal role in recognizing and tackling different aspects of poverty since 1972. It started the TB Control Programme in 1984 as a pilot project in Manikganj Sadar Upazila (sub-district), further extended to 10 other upazilas in 1992. Following its success, BRAC signed an MoU with the Government of Bangladesh in April 1994 to expand DOTS (directly observed treatment short course). Currently, BRAC covers 297 sub-districts in 42 districts and eight city corporations with a population of 93 million. It includes 45 academic institutions, 41 prisons, 416 peripheral laboratories and 26 external quality assessment centres. As principal recipient (PR) BRAC leads 27 NGOs who are sub-recipients (SRs) of the GFATM grant under NTP.

Cost-effective model

BRAC provides intensified services to communities through frontline community health workers called "*shasthya shebika*" who connect individuals to TB services. This community based care is a cost-effective model that enhances TB case detection and improves treatment success. Each *shebikas* receives a basic training initially after selection, and a one-day refresher training every month. During household visits *shebikas* identify presumptive TB cases and refer them to the Governmental Upazila Health Complex or BRAC laboratory facility for sputum examination. To diagnose DR-TB presumed patients they are referred to Gene Xpert (rapid diagnostic tool) sites based on NTP guidelines.

Delay in diagnosis is a concern and, to save on time, outreach sputum collection centres have been established at the "union" level, comprising a cluster of villages. Sputum collection or smearing centres are also organized at remote, hard-to-reach areas and urban slums. Sputum samples are collected and smearing is done at the outreach centres. For those diagnosed with TB, the *shasthya shebikas* ensure DOTS usually at their house. BRAC gives high priority to active case finding among key populations through contact screening for increasing early diagnosis and treatment. It includes people living in slums and low cost housing, those living in crowded places, prisoners, workers in factories/industries including brick fields, mines and construction sites, and people in close contact with pulmonary TB and DR-TB patients.

Innovative approaches

As investigation costs for diagnosis of smear negative (SN), extrapulmonary (EP) and child TB is expensive and inaccessible in many areas, several cases still remain undiagnosed in the community. To bring such populations under the programme, BRAC began the diagnostic support system since 2013. Now, all poor TB presumptive, including all DR-TB and TB-HIV co-infected patients, receive investigation and transportation support from BRAC under The Global Fund grant.

BRAC has also developed partnerships with various service providers at different levels including private medical practitioners, village doctors, pharmacy holders, industry partners, private clinics/hospitals and government hospitals, institutes and authorities to create a portfolio of innovative

strategies that offer referral networks and expand access to vulnerable people in diverse settings.

BRAC also engages different stakeholders including cured TB patients, and local opinion and religious leaders, to identify presumptive TB cases, ensure treatment adherence, and reduce stigma and discrimination. Its roundtable discussions and talk shows on TV with a range of public personalities helps raise awareness on TB.

In 2012, the case-notification of all forms of TB was 102 716 which increased significantly to 135,432 in 2015. Case-notification rate was 111 per 100 000 population in 2012 and this rose to 146 in 2015. High treatment success rate (94%) has been maintained since 2012.

BRAC has been running its flagship TB control programme in partnership with the Government of Bangladesh for over 30 years now. With a network of over 55 000 frontline community health workers who identify potential TB patients and refer them to government facilities, BRAC follows upon patients ensuring daily medicine intake until full recovery. Together, this partnership has resulted in saving nearly 200 000 lives from TB in 2015. ■

Fishing out Amer

Amer Hossain grew up in Patuakhali, a sub-district in southern Bangladesh. A fisherman, the most common livelihood option in his village near the Bay of Bengal, Amer spent days on end at sea to earn a living. When he started to suffer from cough, chest pain, fever and night sweat for a month, Amer thought it would not last long. A trip to the doctor was out of question due to both costs and time involved. But the illness persisted, making it difficult for him to continue fishing. As the family's sole breadwinner, Amer knew a disaster was coming.

Luckily Amer was discovered by Kohinur Begum, a BRAC frontline community health worker, during one of her routine household trips. Seeing his symptoms, she referred him to the nearby Kuakata government hospital, where he was diagnosed with TB. The medical officer referred Amer to the tuberculosis and leprosy control assistant who registered Amer and gave him the first dose of medicine. He was then referred to a local BRAC office where Amer was tagged with Kohinur Begum. For the next six months Kohinur visited Amer's house every day and assisted him in taking his daily dose of medicines. Amer recovered fully after six months and is now back to fishing for a living.

BRAC covers 297 sub-districts of 42 districts and eight city corporations with a population of 93 million

FIND: Partnering for India's TB labs

FIND is RNTCP's technical and implementing partner for India's nationwide laboratory network for DR-TB service. This initiative began under EXPAND TB with funding support from UNITAID, complemented by GFATM from 2011 to September 2015. From October 2015 under the New Funding Model (NFM) of the Global Fund, FIND provides support to all laboratories with human resources, in addition to supporting training, quality assurance procedures, technical assistance, monitoring and supervision, supply of equipment and consumables, and National PMDT reviews.

EXPAND TB along with GFATM projects has had a significant impact on the laboratory component of MDR-TB landscape in the country.

Number of laboratories supported

	EXPAND TB	GFATM	GFATM NFM	EXPANDTB CBNAAT
Project duration	2010–2015	2010–2015	2015–2017	2012–2015
No. of sites planned	LPA: 46, LC: 40		LC: 15	14
No. of sites functional	LPA: 45*, LC: 40			14 + 24 additional sites

** Infrastructure is ready for remaining LPA laboratories (Gwalior). The laboratories will be functional in the first quarter of 2017*

As this network of well-equipped laboratories is vital for RNTCP, comprehensive maintenance of these establishments and equipment has been undertaken under the GFATM project. Mechanisms for sustenance of these facilities beyond the project period are also being put in place.

Additional HR support is given by providing about 300 laboratories personnel under the Global Fund project for 46 sites. These include microbiologists, technical officers, laboratory technicians, laboratory attendants and data entry operators to support day-to-day functioning of the laboratory.

During the last four quarters, up to September 2016, 154 344 MDR-TB suspects were tested with new rapid TB diagnostics and 14 492 MDR-TB cases were diagnosed by LPA and Xpert while 1997 cases were diagnosed by LC-DST. The cumulative figures till the end of third quarter of 2016 is 666 158 suspects tested and 90 458 MDR-TB cases diagnosed. Total MDR-TB cases diagnosed by LC-DST is 4641.

Accelerating TB diagnosis for paediatric cases

Accurate and timely diagnosis of paediatric TB remains a challenge to the management of TB among children. FIND is implementing a project focussed on increasing access to TB/MDR-TB in coordination with RNTCP with funding support from USAID, since April, 2014. Initiated in four major cities of India in 2016 – New Delhi, Chennai, Hyderabad and Kolkata – in 2016, the project was extended to five more cities including Surat, Nagpur, Guwahati, Visakhapatnam and Bengaluru. In the last one year, up to September 2016, 30 977 paediatric suspects were provided upfront access to Xpert testing. A total of 2148 (7%) TB cases were detected out of which 185 were rifampicin resistant. Overall Xpert MTB/RIF positivity was > 3-fold higher compared with smear microscopy. Positivity varies between different specimens, however, PUS FNAC, CSF and BAL has shown higher positivity than other specimens. More than 70% of rifampicin-resistant cases were diagnosed from non-sputum specimens.

Logistical support

Under GFATM's grant, FIND is supporting the laboratories with supply of equipment and consumables. This is monitored on a monthly basis ensuring that laboratories have sufficient consumables and reagents to support the programme.

Training

Training has been a major focus for FIND, and its key driver is the International Centre of Excellence for Laboratory Training (ICELT) at the National TB Institute in Bangalore, funded by UNITAID. This Centre has trained 386 laboratories personnel at the national level since its inception. In addition to the trainings conducted at ICELT, FIND has so far provided hands-on onsite trainings to 2399 laboratory staff (till November 2016). ■

WHO PARTNER

CFK, supporting DPR Korea's health infrastructure

Christian Friends of Korea (CFK), a US-based NGO, has been supporting the health sector in DPR Korea since 1997. It provides support and technical assistance to the Ministry of Health for tuberculosis as well as hepatitis control. CFK contributes to various capacity-building and programme efforts of the National TB Programme (NTP). Peripheral support includes ensuring systems at TB care centres that provide clean, safe water for patients and staff, and ensuring healthy locally produced vegetables including shipments of protein-rich food to improve patient nutrition and healing.

Since 2009, CFK in collaboration with Stanford University School of Medicine, various donors, and technically skilled volunteers, supported the development of the National TB Reference Laboratory (NTRL). It helped with initial renovations, equipment installation, diagnostic materials procurement, technical skills training and capacity-building for all currently-implemented TB and clinical diagnostics performed to date. Through these efforts, the NTRL became fully operational in 2010. Over the past six years, continued support from CFK and partners have enabled NTRL to expand testing capacity, including LED AFB microscopy, conventional culture and DST (first and second line drugs), new molecular technologies (LPA and Xpert).

Over the past six years, continued support from CFK and partners have enabled NTRL to expand testing capacity

It also helped establish a full clinical diagnostic section for testing, that is needed for side-effect management of MDR-TB patients. CFK continues providing high-level technical assistance to NTRL for accurate and reliable patient diagnosis and care. It is also striving to implement all necessary quality systems for international accreditation. Every year CFK provides up to 12 weeks of focused in-country technical assistance to the Ministry of Public Health and other partners (WHO, UNICEF, GF) within four scheduled visits to support NTP's capacity-building efforts. In 2017, CFK will continue providing technical support to assist with diagnostic network expansion and systems building as guided by NTP and partners.

CFK provides support to fill gaps in various medical and laboratory supplies and consumables as requested by the programme

CFK also assists individual TB hospitals and sanatoriums to upgrade building facilities. In 2016 it donated a roofing-tile making machine to make roofing for TB care centres. Additional renovation materials have been sent to various TB care centres to improve infrastructure for patient housing and establishing separate MDR-TB wards for drug resistant patients. Infrastructure efforts provided by CFK have supported the use of solar power for lighting facilities and supporting smaller clinical diagnostic laboratories at hepatitis care centres. Finally, CFK provides support to fill the gaps in various medical and laboratory supplies and consumables as requested by the programme, when traditional mechanisms for procurement cause delays, to prevent extended periods of stock outs.

Through careful coordination by CFK, multidisciplinary teams of highly skilled volunteers from multiple countries-including medical doctors, laboratory professionals, infection control engineers, biomedical equipment specialists, construction specialists, plumbers, electricians, agricultural experts, and so on-participate in a variety of projects focused on improving the quality of care for both TB and hepatitis patients. CFK operates under full collaboration and cooperation with all in-country partners in order to fill gaps and support overall developments outlined under the programme' national strategy.

NTP, DPR Korea is also supported by the Eugene Bell Foundation, particularly in the area of treatment and care of multidrug-resistant TB patients. ■

Axshya - Reaching out to the forgotten villages

How a project by The Union changed the story of one such village

Passar, with a population of around 3000, barely had any access to healthcare. This small village in Tamil Nadu's coastal district of Cuddalore is over 80 kms away from the district headquarters. The nearest primary health centre (PHC) is 7 km. away in Mangalur. With no reliable means of transport the distance becomes long. Only three buses ply in a day and the road is bumpy. But project Axshya has made some inroads into Passar, organising meetings that sensitized the village self-help group, Gaon Kalyan Samiti, and local youth committees.

Divya Bharathi, a trained community volunteer with Axshya, conducted active case finding that reaches every household in the village with messages on TB. Through Axshya Samvad, Divya identifies and refers TB symptomatic persons to the nearest diagnostic centres. Since distance is an issue, she herself collects and transports sputum samples to the nearest diagnostic centre. She routinely visits all homes in the area and holds awareness drives for TB patients.

In coordination with the District TB programme regular camps and sputum collection and transportation drives in and around the village were organised. Her concerted efforts led to four new patients being diagnosed with TB. For two of them, poor farmers, she even arranged financial help through the government. Divya has so far helped six patients to complete treatment and is providing DOTS for five others in Passar and nearby villages. "For us Divya is a family member," say patients from Passar, "We could not have got through these difficult times without her support."

The project also established the Axshya Cuddalore District TB Forum that acts as a bridge between the community and the TB programme. The Forum provides economic and nutritional support to poor and needy TB patients. It also sensitized 30 TB patients on their rights and responsibilities using the Patient Charter it developed. At a recent review meeting, Cuddalore's TB programme manager congratulated Axshya for its work in Passar. Axshya's door-to-door activities have been useful for both active case finding and creating awareness about TB in remote communities. Prassar was recently declared Axshya (TB Free), meaning the community takes initiatives to make their village free of TB.

ALL ATTENTION: A sensitization meeting

Divya Bharathi at work

A civil society initiative assisting India's Revised National Tuberculosis Control Programme (RNTCP) to expand its reach, visibility, and effectiveness, Axshya is supported by the Global Fund and implemented by The Union in 300 districts across 21 states of India through eight civil society organizations and over 1000 local NGOs and nearly 15000 community volunteers. Leveraging community participation in TB care and control, Axshya has emerged as RNTCP's key partner. Between January and December 2015, Axshya reached out to nearly 15 million people from various vulnerable and marginalized communities. It facilitated identification and testing of over 230 000 TB symptomatic (including ~200,000 sample of sputum for collection and transportation). About s20 000 patients were diagnosed and started on DOTS. ■

Union collaborations

The Union, in collaboration with the Lilly MDR-TB partnership, is strengthening engagement of private health care providers in India through mHealth both in rural and urban settings. The project is being piloted in the tribal district of Khunti in Jharkhand state to track referrals and ensure testing using a mobile app. In the urban setting a pilot with Apollo Hospital is underway.

In collaboration with the United Kingdom's Medical Research Council of the United Kingdom, Janssen and USAID The Union is coordinating the STREAM stage 2 trial which aims to reduce multidrug-resistant tuberculosis (MDR-TB) treatment from 24 months to six or nine months using bedaquiline and without injectables. India is one of the sites for this multicountry trial.

Challenge TB, the flagship global mechanism for implementing USAID's TB strategy, supports the Government of India's Call to Action for a TB Free India, building partnerships and mobilizing domestic resources.

In Myanmar, The Union supports the community based Active Case Finding (ACF) Programme and the MDR-TB Treatment and Care Programme in collaboration with NTP. It covers 35 townships in three regions (Mandalay, Magway, Sagaing) and Shan state of Upper Myanmar. In 2015 and up to July 2016 the ACF programme detected 1616 TB cases, and screened and referred 18 595 presumptive TB cases. The project also completed 9199 TB health education sessions and reaching 695 721 people. Till June 2016 there were 245 MDR-TB patients receiving treatment.

Capacity-building

The Union has been conducting courses on operational research for SEA Region countries since 2012. In 2016 the course conducted in Nepal had participants from Bhutan, India, Myanmar, Nepal and Sri Lanka.

The Union has been conducting an international course on clinical management of drug resistant TB in Bangkok for the past several years.

In collaboration with WHO SEARO, The Union conducted a workshop on newer drugs and shorter regimens in August 2016 for the high TB burden countries in the Region.

AIIMS research & training

The All India Institute of Medical Sciences (AIIMS), New Delhi, organized

i) Four workshops at the WHO Collaborating Centre (WHO CC) of AIIMS, New Delhi, in 2016 for synthesis, publication and dissemination of Evidence-based Extra Pulmonary TB Guidelines. This was in collaboration with the Liverpool School of Tropical Medicine's (UK) Centre for Evidence Synthesis, Cochrane Infectious Diseases Group, and Effective Health Care Consortium. INDEX-TB Guidelines were printed by the WHO Country Office in India

ii) Training modules for primary and secondary health care level workers have been developed in collaboration with the Central TB Division (CTD), Ministry of Health & Family Welfare, Government of India in a series of meetings at the WHO CC of AIIMS, New Delhi

WHO PARTNER

National Tuberculosis Institute

The National Tuberculosis Institute (NTI), of Bengaluru is a technical arm of India's Central TB Division (CTD) which leads the country's Revised National TB Control Programme (RNTCP). Since its inception in 1959, NTI has been supporting NTP in formulating guidelines, training of programme officers, administrative and laboratory personnel. It is also involved in monitoring and surveillance and, most importantly, operational research. NTI also houses the National Reference Laboratory which supports India's TB laboratory network and quality assurance. It is also a WHO Collaborating Centre.

Activities undertaken in 2015–2016

Training

NTI conducted induction and refresher training programmes for state and district level programme managers, medical college faculty and various levels of TB staff for effective implementation of the national programme. A 12-day modular training in RNTCP was held in four batches for 116 participants. A five-day training on management of drug-resistant TB was imparted to 75 programme managers. It also conducted financial management training and training on procurement and supply chain management.

National Master Trainers' Training on Standards for TB Care in India was held for 29 participants. Other key trainings conducted were on operations research and project mentorship for professionals working with RNTCP, in collaboration with WHO-India, The Union, and other partners.

NTI regularly conducts trainings on TB-HIV collaborative activities. Training of Trainers (ToT) on daily regimen for first line ATT for all HIV-TB Co-infected patients at ART centres was conducted for 151 participants. NTI held four sensitization workshops in 2016 on the revised Technical and Operational Guidelines of the Indian programme. NTI also organized orientation on TB disease and its control activities in RNTCP for 1784 medical (postgraduate and undergraduate), paramedical and other students and administrative trainees in 61 batches.

Laboratory trainings

NTI is a hub for TB laboratory trainings in India last year NTI organized several trainings covering key laboratory issues and for different skill levels. It included PCR-based line probe assay (LPA) to detect drug resistance; external quality assurance (EQA) system for sputum smear microscopy and comprehensive training on solid culture, LPA & LED-FM, CBNAAT and NIKSHAY. These were conducted in four batches of 25 newly recruited microbiologists. Other trainings were on preventive maintenance of microscope, bio-safety practices in TB laboratories, and ToT for expanding CBNAAT services.

The International Centre of Excellence in Laboratory Training (ICELT), in collaboration with NTI imparted comprehensive and integrated training on all TB diagnostics for 16 participants, training in LED FM microscopy for nine participants and National TB Laboratory Bio Safety Training for 60 participants from intermediate reference laboratories, C&DST laboratories and medical colleges

Research is an important aspect of NTI's work. India's first National anti-tuberculosis Drug Resistance Survey (NDRS) by RNTCP is being currently conducted in collaboration with NTI, CDC, Atlanta and WHO in both newly diagnosed and previously treated sputum smear-positive pulmonary TB cases. The survey will provide a statistically representative national estimate of the prevalence of drug resistance among new and previously treated TB patients in India. Another study is being undertaken to determine prevalence and speciation of nontuberculous mycobacterium (NTM) under programmatic settings in India using high performance liquid chromatography technique and LPA. Till date 18 different species of NTM have been isolated.

Key research initiated or completed in 2016

- Cost analysis of different diagnostic algorithms for pulmonary tuberculosis, using present algorithm under RNTCP and using Xpert MTB/RIF (Xpert) as frontline test or in conjunction with smear microscopy and/or chest radiography.
- Multicentric cohort study of recurrence of TB among newly diagnosed sputum positive PTB patients treated under RNTCP. This multicentric cohort study will estimate the recurrence of TB among newly diagnosed sputum-positive pulmonary TB patients who were successfully treated.
- Studies undertaken to improve TB case-finding efficiency and management of TB cases in private health care facilities in Bangalore city; and other measure to improve their knowledge in diagnosis and treatment of TB.
- An inventory study will estimate the proportion of under-reporting in each state; a pilot in Tumkur district of Karnataka state is underway. Protocol for the study has been approved by the National Research Committee
- Study on role of chest X-ray in early detection of smear negative pulmonary TB completed and manuscript published. ■

National prevalence surveys in WHO SEA Region countries

Most countries in the WHO South-East Asia Region have had a national TB prevalence survey (NPS) since the 1960s to measure their TB burden (Table 1). Although WHO published the first guidelines on TB prevalence surveys in 1958 with mass miniature radiography screening and mycobacterium culture for TB diagnosis, the methodology of surveys varied according to country capacity and availability of resources for the study. Chest X-ray screening and mycobacterium culture were not adopted systematically in most surveys under the DOTS programme from the mid-1990s to the end of 2010, except for a series of surveys in Thailand.

However, establishing the WHO Global Task Force on TB Impact Measurement in 2006, followed by its recommendations on the national TB prevalence survey to measure the impact of TB control efforts, became a turning point. Globally 21 focus countries were designated to prioritize national TB prevalence surveys, including Bangladesh, Indonesia, Myanmar and Thailand from the SEA Region.

Since the 2009–2010 national survey in Myanmar, study protocols of the national TB prevalence survey are being reviewed by the WHO Task Force. National prevalence surveys conducted by NTPs have generally fulfilled required conditions and standardized methodology from sampling design to analysis. Parameters reviewed include selection method of study sites; cluster size; eligibility criteria for inclusion in study; and screening using individual structured interview chest X-ray and sputum examinations for at least one culture test.

These nationwide surveys face major challenges, including high costs, procurement and maintenance of digital X-ray units and other equipment, the high burden on national and regional TB reference laboratories, and low participation. Yet, countries in the SEA Region have successfully carried out the surveys providing robust estimates of the TB burden.

Main characteristics of recent surveys in the SEA Region countries are summarized in Table 2. All four global focus countries in the Region successfully completed one survey. In addition, DPR Korea completed it in 2016 with the final results expected to be announced in 2017. NPS are expected to be initiated in Nepal, India and Myanmar, which will become the first country globally to launch a repeat survey.

Recent TB prevalence surveys have showcased the use of eHealth with digital X-ray units and onsite data entry followed by data transmission by the Internet; use of bar codes that reduce data management errors and workload; and introduction of molecular technology such as GeneXpert. The final report from the Bangladesh NPS will report on GeneXpert Positive TB for the first time in the world. ■

Table 1: Number of NPS by country

Country	Number of surveys	In the year
Bangladesh	4	1964,1987, 2007–2009, 2015
DPR Korea	1	2016
India	1	2017–2018 (planned)
Indonesia	4	1979–1982, 2004, 2010, 2013–2014
Myanmar	4	1972, 1994, 2009-10, 2017–2018
Nepal	1	2017
Sri Lanka	1	1970
Thailand	5	1960–1964, 1977, 1991–1992, 2006, 2012

Source: WHO-SEARO

Table 2: Characteristics of recent surveys in SEA Region countries

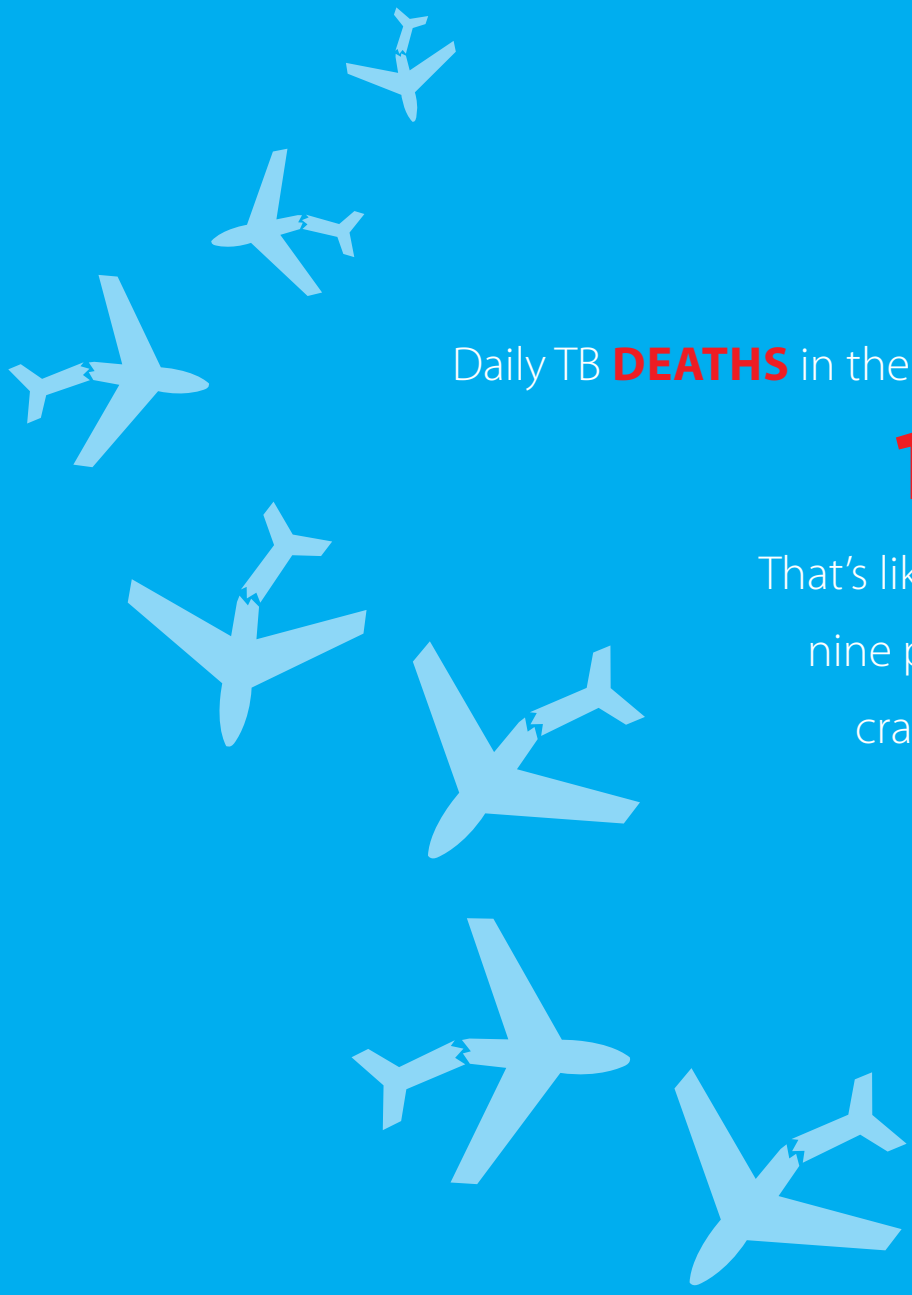
Country	Main year	Age of eligibility	Participants (clusters)	Stratification	Screening criteria: Symptom	Screening criteria 2: CXR	CXR type	Smear	Culture	Xpert
Myanmar	2009	>15years	51367 (70)	States/ regions	3 weeks of cough	Abnormal	Direct, conventional	2	2 solid	N.A.
Thailand	2012	>15 years	62536 (83)	Urban/rural	2 weeks of cough and score of other symptoms	Abnormal	Direct, digital	2	2 solid	N.A.
Indonesia	2013	>15 years	67946 (156)	3 Regions and Urban/ rural	2 weeks of cough and blood in sputum	Abnormal	Direct, digital	2	1 or 2 solid	Smear-positive and culture failure
Bangladesh	2015	>15 years	98710 (125)	Urban/rural	2 weeks of cough and other symptoms	Abnormal	Direct, digital	2	2 solid	One test for all sputum eligible
DPR Korea	2015	>15 years	60683 (100)	Urban/rural	2 weeks cough	Abnormal	Direct, conventional	2	2 solid	N.A.

Source: WHO Global TB Programme

TB burden in the WHO South-East Asia Region, 2015

Country	Incidence rate (per 100 000)	Incidence number (thousands)	Mortality rate (per 100 000)	Mortality Numbers (thousands)	MDR incidence Rate (per 100 000)	MDR incidence numbers (thousands)
Bangladesh	225 (146-321)	362 (234-517)	45 27-68)	73 (43-110)	6 (3.4-8.7)	9.7 (5.4-14)
Bhutan	155 (120-196)	1.2 (0.93-1.5)	16 (10-22)	0.12 (0.079-0.0170)	6.7 (5.5-8.0)	0.052 (0.043-0.062)
DPRK	561 (432-706)	141 (109-178)	61 (40-87)	15 (10-22)	24 (14-34)	6 (3.4-86)
India	217 (112-355)	2840 (1 470-4 650)	36 (29-45)	480 (380-590)	9.9 (6.7-14)	130 (88-180)
Indonesia	395 (255-564)	1020 (658-1450)	40 (26-57)	100 (67-150)	12 (7.4-17)	32 (19-45)
Maldives	53 (41-66)	0.19 (0.15-0.24)	5.4 (4.4–6.4)	0.02 (0.016–0.023)	1.6 (1.2-2.0)	<0.01 (<0.01 - <0.01)
Myanmar	365 (267-479)	197 (144-258)	49 (30–74)	27 (16-40)	26 (17-33)	14 (8.9-18)
Nepal	156 (137-176)	44 (39-50)	20 (14–26)	5.6 (3.9–7.5)	5.3 (3.3-7.4)	1.5 (0.95-2.1)
Sri Lanka	65 (47-86)	13 (9.7-18)	5.6 (4.5–6.9)	1.2 (0.930–1.4)	0.43 (0-0.92)	0.089 (0-0.19)
Thailand	172 (102-259)	117 (69-176)	12 (10-15)	8.4 (6.9-10)	6.6 (4.3-9.1)	4.5 (2.9-6.2)
Timor-Leste	498 (322-712)	5.9 (3.8-8.4)	100 (60–151)	1.2 (0.710–1.8)	19(13-24)	0.22 (0.15-0.29)
SEAR	246 (167-339)	4740 (3 230-6 540)	37 (31–43)	710 (600–830)	10 (7.9-13)	200 (150-250)

Source: WHO Global TB Report 2016



Daily TB **DEATHS** in the SEA Region:

1945

That's like

nine passenger planes

crashing every day

World Health Organization
Regional Office for South-East Asia

Regional Office for South-East Asia
World Health House
Indraprashta Estate
Mahatma Gandhi Marg,
New Delhi-110002, India
www.searo.who.int/topics/tuberculosis

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