

# Executive Summary

The purpose of WHO's *Global Tuberculosis Report* is to provide a comprehensive and up-to-date assessment of the TB epidemic and of progress in care and prevention at global, regional and country levels.<sup>1</sup> This is done in the context of recommended global TB strategies and associated targets, and broader development goals. For the period 2016–2035, these are WHO's End TB Strategy and the United Nations' (UN) Sustainable Development Goals (SDGs), which share a common aim: to end the global TB epidemic.

Specific targets set in the End TB Strategy include a 90% reduction in TB deaths and an 80% reduction in TB incidence (new cases per year) by 2030, compared with 2015. Achieving these targets requires provision of TB care and prevention within the broader context of universal health coverage, multisectoral action to address the social and economic determinants and consequences of TB, and technological breakthroughs by 2025 so that incidence can fall faster than rates achieved historically.

Overall, the latest picture is one of a still high burden of disease, and progress that is not fast enough to reach targets or to make major headway in closing persistent gaps.

TB is the ninth leading cause of death worldwide and the leading cause from a single infectious agent, ranking above HIV/AIDS. In 2016, there were an estimated 1.3 million TB deaths among HIV-negative people (down from 1.7 million in 2000) and an additional 374 000 deaths among HIV-positive people.<sup>2</sup> An estimated 10.4 million people fell ill with TB in 2016: 90% were adults, 65% were male, 10% were people living with HIV (74% in Africa) and 56% were in five countries: India, Indonesia, China, the Philippines and Pakistan.<sup>3</sup>

Drug-resistant TB is a continuing threat. In 2016, there were 600 000 new cases with resistance to rifampicin (RR-TB), the most effective first-line drug, of which 490 000 had multidrug-resistant TB (MDR-TB).<sup>4</sup> Almost half (47%) of these cases were in India, China and the Russian Federation.<sup>3</sup>

Globally, the TB mortality rate is falling at about 3% per year. TB incidence is falling at about 2% per year and 16% of TB cases die from the disease; by 2020, these figures need to improve to 4–5% per year and 10%, respectively, to reach the first (2020) milestones of the End TB Strategy.

Most deaths from TB could be prevented with early diagnosis and appropriate treatment. Millions of people are diagnosed and successfully treated for TB each year, averting millions of deaths (53 million 2000–2016), but there are still large gaps in detection and treatment.

In 2016, 6.3 million new cases of TB were reported (up from 6.1 million in 2015), equivalent to 61% of the estimated incidence of 10.4 million; the latest treatment outcome data show a global treatment success rate of 83%, similar to recent years. There were 476 774 reported cases of HIV-positive TB (46% of the estimated incidence), of whom 85% were on antiretroviral therapy (ART). A total of 129 689 people were started on treatment for drug-resistant TB, a small increase from 125 629 in 2015 but only 22% of the estimated incidence; treatment success remains low, at 54% globally.

Making large inroads into these gaps requires progress in a particular subset of high TB burden countries. Ten countries accounted for 76% of the total gap between TB incidence and reported cases; the top three were India (25%), Indonesia (16%) and Nigeria (8%).<sup>5</sup> Ten countries accounted for 75% of the incidence-treatment enrolment gap for drug-resistant TB; India and China accounted for 39% of the global gap.<sup>6</sup> Most of the gaps related to HIV-associated TB were in the WHO African Region.

TB preventive treatment is expanding, especially in the two priority risk groups of people living with HIV and children under 5. However, most people eligible for TB preventive treatment are not accessing it.

Financing for TB care and prevention has been increasing for more than 10 years, but funding gaps still exist (US\$ 2.3 billion in 2017). Total health spending also falls short of the resources needed to achieve universal health coverage. Closing these gaps requires more resources from both domestic sources (especially in middle-income countries) and international donors (especially in low-income countries).

Broader influences on the TB epidemic include levels of poverty, HIV infection, undernutrition and smoking. Most high TB burden countries have major challenges ahead to reach SDG targets related to these and other determinants.

The pipelines for new diagnostics, drugs, treatment regimens and vaccines are progressing, but slowly. Increased investment in research and development is needed for there to be any chance of achieving the technological breakthroughs needed by 2025.

The WHO Global Ministerial Conference on ending TB in the SDG era in November 2017 and the first UN General Assembly high-level meeting on TB in 2018 provide a historic opportunity to galvanize the political commitment needed to step up the battle against TB and put the world and individual countries on the path to ending the TB epidemic.

## Additional highlights from the report

### Introduction

The main data sources for the report are annual rounds of global TB data collection implemented by WHO's Global TB Programme since 1995 and databases maintained by other WHO departments, UNAIDS and the World Bank. In WHO's 2017 round of global TB data collection, 201 countries and territories that account for over 99% of the world's population and TB cases reported data.

### The SDGs and the End TB Strategy

The first milestones of the End TB Strategy are set for 2020. They are a 35% reduction in TB deaths and a 20% reduction in TB incidence, compared with levels in 2015; and that no TB patients and their households should face catastrophic costs as a result of TB disease.

Monitoring of TB-specific indicators is well established at global and national levels. For example, standardized monitoring of notifications of TB cases and their treatment outcomes at global and national levels has been in place since 1995, and estimates of TB incidence and mortality have been published annually by WHO for more than a decade.

In 2017, WHO has developed a TB-SDG monitoring framework of 14 indicators that are associated with TB incidence, under seven SDGs. There are seven indicators under SDG 3 (health and well-being): coverage of essential health services; percentage of total health expenditures that are out-of-pocket; health expenditure per capita; HIV prevalence; prevalence of smoking; prevalence of diabetes; and prevalence of alcohol use disorder. The other seven indicators, linked to SDGs 1, 2, 7, 8, 10 and 11, are: proportion of the population living below the international poverty line; proportion of the population covered by social protection floors/systems; prevalence of undernourishment; proportion of the population with primary reliance on clean fuels and technology; gross domestic product (GDP) per capita; Gini index for income inequality; and proportion of the urban population living in slums.

### TB disease burden

Most of the estimated number of incident cases in 2016 occurred in the WHO South-East Asia Region (45%), the WHO African Region (25%) and the WHO Western Pacific Region (17%); smaller proportions of cases occurred in the WHO Eastern Mediterranean Region (7%), the WHO European Region (3%) and the WHO Region of the Americas (3%).

The annual number of incident TB cases relative to population size varied widely among countries in 2016, from under 10 per 100 000 population in most high-income countries to 150–300 in most of the 30 high TB burden countries, and above 500 in a few countries including the Democratic People's Republic of Korea, Lesotho, Mozambique, the Philippines and South Africa.

Regionally, the fastest decline in TB incidence is in the WHO

European Region (4.6% from 2015 to 2016). The decline since 2010 has exceeded 4% per year in several high TB burden countries, including Ethiopia, Kenya, Lesotho, Namibia, the Russian Federation, the United Republic of Tanzania, Zambia and Zimbabwe.

About 82% of TB deaths among HIV-negative people occurred in the WHO African Region and the WHO South-East Asia Region in 2016; these regions accounted for 85% of the combined total of TB deaths in HIV-negative and HIV-positive people. India accounted for 33% of global TB deaths among HIV-negative people, and for 26% of the combined total of TB deaths in HIV-negative and HIV-positive people.

Globally, the TB mortality rate (per 100 000 population) fell by 37% between 2000 and 2016. Regionally, the fastest declines in the TB mortality rate are in the WHO European Region and the WHO Western Pacific Region (6.0% and 4.6% per year, respectively, since 2010).

Globally in 2016, an estimated 4.1% (95% confidence interval [CI]: 2.8–5.3%) of new cases and 19% (95% CI: 9.8–27%) of previously treated cases had MDR/RR-TB.

National notification and vital registrations systems need to be strengthened towards the goal of direct measurement of TB incidence and mortality in all countries. National TB prevalence surveys provide an interim approach to directly measuring the burden of TB disease in an important subset of high TB burden countries.

### Diagnosis and treatment: TB, HIV-associated TB and drug-resistant TB

Most of the global increase in notifications of new TB cases since 2013 is explained by a 37% increase in India 2013–2016.

The global male:female (M:F) ratio for notifications was 1.7. Results from national TB prevalence surveys of adults show higher M:F ratios, indicating that notification data understate the share of the TB burden accounted for by men in some countries.

Globally, children (aged <15 years) accounted for 6.9% of the new TB cases that were notified in 2016.

In 2016, coverage of testing for rifampicin resistance was 33% for new TB patients and 60% for previously treated TB patients, and 39% overall (up from 31% in 2015).

Globally in 2016, 57% of notified TB patients had a documented HIV test result, up from 55% in 2015. In the WHO African Region, where the burden of HIV-associated TB is highest, 82% of TB patients had a documented HIV test result (up from 81% in 2015).

The treatment success rate for HIV-associated TB (2015 cohort) was 78% and for extensively drug-resistant TB (XDR-TB) (2014 cohort) it was 30%.

At least 35 countries have introduced shorter regimens for treatment of MDR/RR-TB. As part of efforts to improve outcomes for MDR/XDR-TB, 89 countries and territories had started using bedaquiline and 54 had used delamanid by June 2017.

## TB prevention services

The number of children aged under 5 years who were reported to have been started on TB preventive treatment increased by 85% between 2015 and 2016 (from 87 242 to 161 740), but was still only 13% of the 1.3 million estimated to be eligible.

A total of 940 269 people newly enrolled in HIV care were started on TB preventive treatment in 2016, based on data from 60 countries. As in previous years, South Africa accounted for the largest share of the total (41%), followed by Mozambique, Zimbabwe and Malawi. However, of the 30 high TB/HIV burden countries, 18 did not report any provision of preventive treatment in 2016. In the 12 high TB/HIV burden countries that did report data, coverage ranged from 2.4% in Indonesia to 73% in Zimbabwe.

In Kenya, data on the number of people newly enrolled in HIV care who were started on TB preventive treatment in 2016 were not available. However, TB preventive treatment was provided to a total of 390 298 people living with HIV in 2016. Combined with data reported by other countries, this means that the global total of people living with HIV who were started on TB preventive treatment in 2016 was at least 1.3 million.

## Financing for TB prevention, diagnosis and treatment

Funding for TB care and prevention reached US\$ 6.9 billion in 2017 in 118 low and middle-income countries that reported data (and accounted for 97% of reported TB cases globally). This was an increase from US\$ 6.3 billion in 2016 and more than double the US\$ 3.3 billion that was available in 2006.

India stood out as a country in which the budget envelope for TB was substantially increased in 2017 (to US\$ 525 million, almost double the level of 2016), following political commitment from the Prime Minister to the goal of ending TB by 2025. The budget is fully funded, including US\$ 387 million (74%) from domestic sources (triple the amount of US\$ 124 million in 2016) and the remainder (26%) from international donor sources.

Overall, most funding during the period 2006–2016 has been provided from domestic sources, and this remains the case in 2017 (84% of the global total of US\$ 6.9 billion). However, aggregated figures conceal substantial variation among countries. For example, domestic funding dominates (95% overall, range 74–100%) in Brazil, the Russian Federation, India, China and South Africa (BRICS), which collectively account for almost half of the world's TB cases. In low-income countries, international donor funding exceeds domestic funding and in the 25 high TB burden countries outside BRICS levels of domestic and international donor funding are similar.

## Universal health coverage, social protection and social determinants

Projections of total health expenditures in low and middle-income countries 2016–2030 compared with estimates of the funding required for progress towards universal health coverage and achievement of other SDG-related health

targets have been published in a 2017 WHO report, *The SDG Health Price Tag*. Overall, they suggest that most middle-income countries could mobilize the funding needed to achieve universal health coverage and other SDG-related health targets during this period, but that low-income countries are unlikely to have the domestic resources to do so.

Surveys of costs faced by TB patients and their households have been completed in seven countries: Ghana, Kenya, Myanmar, the Philippines, Republic of Moldova, Timor Leste and Viet Nam. Final results from Myanmar and Viet Nam show a high economic and financial burden due to TB disease. This is consistent with data showing that out-of-pocket expenditures on health account for a high proportion (>30%) of total health expenditures in most high TB burden countries.

Of the 10.4 million incident cases of TB in 2016, an estimated 1.9 million were attributable to undernourishment, 1.0 million to HIV infection, 0.8 million to smoking and 0.8 million to diabetes.

Examples of high TB burden countries doing relatively well in terms of at least some of the indicators associated with TB incidence include Brazil, Indonesia, South Africa, Thailand and Viet Nam.

## TB research and development

Few diagnostic technologies emerged in 2017 and the evaluation of GeneXpert Omni<sup>®</sup>, which is intended as a close-to-care platform for rapid molecular testing, has been delayed.

There are 17 drugs in Phase I, II or III trials, including eight new compounds, two drugs that have received accelerated or conditional regulatory approval based on Phase IIb results, and seven repurposed drugs. Various new combination regimens are in Phase II or Phase III trials.

There are 12 vaccine candidates in clinical trials: three in Phase I, and nine in Phase II or Phase III.

## Country profiles

Annex 2 contains country profiles for the 30 high TB burden countries. This year, a second page has been introduced to each profile. This provides an overview of the latest status of and recent trends in the indicators included in the TB-SDG monitoring framework developed by WHO in 2017.

<sup>1</sup> WHO has published a Global Tuberculosis Report annually since 1997.

<sup>2</sup> When an HIV-positive person dies from TB disease, the underlying cause is classified as HIV in the International classification of diseases system (ICD-10).

<sup>3</sup> Countries are listed in descending order of their number of incident cases.

<sup>4</sup> MDR-TB is defined as resistance to both isoniazid and rifampicin, the two most effective first-line drugs.

<sup>5</sup> The ten countries, in descending order of the size of their gap, were: India, Indonesia, Nigeria, the Philippines, South Africa, Pakistan, Bangladesh, the Democratic Republic of the Congo, China and the United Republic of Tanzania.

<sup>6</sup> The ten countries, in descending order of the size of their gap, were: India, China, the Russian Federation, Indonesia, the Philippines, Pakistan, Nigeria, Ukraine, Myanmar and Uzbekistan.



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