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Tuberculosis control in the South-East Asia Region: annual report 2014.

1. Tuberculosis – prevention and control  2. HIV


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## Acronyms and abbreviations

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<th>Description</th>
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<td>ART</td>
<td>antiretroviral therapy</td>
</tr>
<tr>
<td>ARTI</td>
<td>annual risk of tuberculosis infection</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention (United States)</td>
</tr>
<tr>
<td>CPT</td>
<td>co-trimoxazole preventive therapy</td>
</tr>
<tr>
<td>DFID</td>
<td>United Kingdom Department for International Development</td>
</tr>
<tr>
<td>DOT</td>
<td>directly-observed treatment</td>
</tr>
<tr>
<td>DOTS</td>
<td>directly-observed treatment, short-course</td>
</tr>
<tr>
<td>DR-TB</td>
<td>drug-resistant tuberculosis</td>
</tr>
<tr>
<td>DRS</td>
<td>drug resistance surveillance</td>
</tr>
<tr>
<td>DST</td>
<td>drug susceptibility testing</td>
</tr>
<tr>
<td>EQA</td>
<td>external quality assessment/assurance</td>
</tr>
<tr>
<td>EXPAND-TB</td>
<td>Expanding Access to New Diagnostics for Tuberculosis</td>
</tr>
<tr>
<td>FIND</td>
<td>Foundation for Innovative New Diagnostics</td>
</tr>
<tr>
<td>GDF</td>
<td>Global (TB) Drug Facility</td>
</tr>
<tr>
<td>GENETUP</td>
<td>German–Nepal Tuberculosis Project</td>
</tr>
<tr>
<td>Global Fund</td>
<td>Global Fund to Fight AIDS, Tuberculosis and Malaria</td>
</tr>
<tr>
<td>GLC</td>
<td>Green Light Committee</td>
</tr>
<tr>
<td>GLI</td>
<td>Global Laboratory Initiative</td>
</tr>
<tr>
<td>HRD</td>
<td>human resources development</td>
</tr>
<tr>
<td>FIND</td>
<td>Foundation for Innovative New Diagnostics</td>
</tr>
<tr>
<td>IPT</td>
<td>isoniazid preventive therapy</td>
</tr>
<tr>
<td>IPAQT</td>
<td>Initiative for Promoting Affordable, Quality TB Tests</td>
</tr>
<tr>
<td>ISTC</td>
<td>International Standards for Tuberculosis Care</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goal</td>
</tr>
<tr>
<td>MDR-TB</td>
<td>multidrug-resistant tuberculosis</td>
</tr>
<tr>
<td>MoU</td>
<td>memorandum of understanding</td>
</tr>
<tr>
<td>NGO</td>
<td>nongovernmental organization</td>
</tr>
</tbody>
</table>
NIDCH National Institute of Disease and Chest Hospital
NTP national tuberculosis programme
PAL Practical Approach to Lung Health
PMDT programmatic management of drug-resistant tuberculosis
PPM public–private mix
PSI Population Services International
rGLC Regional Green Light Committee (on MDR-TB)
RNTCP Revised National Tuberculosis Control Programme (India)
RR-TB rifampicin-resistant tuberculosis
SAARC South Asian Association for Regional Cooperation
SRL supranational reference laboratory
SOP standard operating procedure
STAG-TB Strategic and Technical Advisory Group for Tuberculosis
TB tuberculosis
TB/HIV tuberculosis and human immunodeficiency virus
TBTEAM Tuberculosis Technical Assistance Mechanism
ToT training of trainers
The Union International Union Against Tuberculosis and Lung Disease
USAID United States Agency for International Development
VR vital registration
WHO World Health Organization
XDR-TB extensively drug-resistant tuberculosis
Preface

The WHO South-East Asia Region continues to make significant contribution to the global efforts towards the elimination of tuberculosis (TB). The notified TB cases have been steadily increasing, and in 2012 the figure reached to 2.3 million. However, the Region still bears 39% of “global burden” of TB in terms of incidence. It has a pool of 4.8 million cases to which 3.4 million are added each year. The decline in prevalence is observed in all Member States, and in some countries it is over 50% since 1990.

The mortality rate among TB patients has decreased by more than 40% during the same period. However, the absolute number of TB deaths is less than half a million. This is mainly because of the “population momentum”. With good performance in the implementation of DOTS the level of multidrug-resistant (MDR) TB among newly detected cases is low. Nonetheless, due to the large number of the total TB cases, the Region accounts for an estimated 90,000 MDR-TB cases. This is nearly one third of the world’s estimate.

National TB control and national AIDS control programmes in most countries in the Region are jointly implementing a comprehensive package of interventions against this problem. This is helping them cover an estimated over 1500 million people.

While much has indeed been achieved, the national TB control programmes continue to face a number of challenges. These are related to many uncertainties in terms of sustainable financial and operational resources and limited technical and management capacity. In addition, countries need to further strengthen procurement and supply management mechanisms for TB drugs and commodities as well as national laboratory networks. These uncertainties, in turn, are slowing down the planned expansion of early and enhanced case detection and interventions for TB–HIV and drug-resistant TB.

Though collaboration with other sectors is steadily increasing, the provision of care by all health-care providers is not sufficiently linked to national programmes to make an impact at the national level. Low community awareness and utilization of services hamper the uptake of services. It is increasingly becoming clear that
attention needs to be paid to addressing the social, economic and behavioural determinants that impact TB, if national efforts to combat TB are to succeed in the longer term.

We must ensure that we reach the ‘hard-to reach’ or ‘unreached’ through community actions based on the primary health care approach, which are multidisciplinary and multisectoral. An estimated one third of TB cases remain “unreported”. Such cases are of particular concern because they perpetuate continued disease transmission in the community and pose a serious risk of drug-resistant TB that leads to difficulty in its treatment, and to high TB mortality.

The long-term goal is to eliminate tuberculosis as a public health problem. Given the nature of the TB epidemic, increased and sustained commitment is needed from all stakeholders, including national governments as well as national and international partners. Our continued collaboration is critical to deliver much-needed services more effectively and efficiently, to reach all population groups and to overcome the physical, social and financial barriers that prevent people from accessing care. A comprehensive and holistic package of interventions for TB control must involve multispectral and multidisciplinary efforts.

This annual report is a compilation of regional and country-specific achievements, challenges and plans. WHO will continue to provide technical support to catalyse and accelerate the implementation of TB care and control in Member States through a range of activities as detailed in this report. I am sure that with the commitment of ministries of health and support from all partners and stakeholders the Region will achieve the desired targets and lead the global fight against TB.

Dr Poonam Khetrapal Singh
Regional Director
Tuberculosis (TB) remains one of the major public health concerns in the WHO South-East Asia Region. The Region accounts for 39% of the global burden of TB in terms of incidence, and India alone accounts for 26% of the world’s TB cases. It is estimated that about 3.4 million new cases of TB continue to occur each year and that about 450 000 people died of TB in 2012, most of these in five countries, namely Bangladesh, India, Indonesia, Myanmar and Thailand. In 2012, the percentage of TB patients with known HIV status was 39% and 6.2% of those were HIV-positive. Eighty-nine percent of HIV-positive TB patients were on co-trimoxazole preventive therapy (CPT) and 61% were on antiretroviral therapy (ART). Fortunately, levels of multidrug-resistance are still low in the Region at less than 2.2%; however, this translates into nearly 90 000 estimated multidrug-resistant TB (MDR-TB) cases among all TB cases notified in 2012.

In terms of progress in TB control, all 11 Member States in the Region have sustained country-wide access to DOTS services. Each year, more than 2 million TB cases are registered for treatment, and the treatment success rate among new smear-positive pulmonary TB cases has remained above 85% since 2005, and was 89% in the 2011 cohort. The TB mortality rate has decreased more than 40% since 1990 and the South-East Asia Region is on track to achieve the global target of a 50% reduction by 2015. A decline in prevalence rate is observed in all Member States and in some countries it has reached over 50% reduction from 1990 levels.

National TB control programmes have also made progress in implementing the components of the Stop TB Strategy. As a result of this concerted action by the programmes and all partners, almost 20 million TB patients have been treated during the past 10 years – thereby averting several thousand deaths. A growing number of MDR-TB diagnosis and treatment sites are being established in the Region and, in 2012, almost 16 000 MDR-TB patients were put on treatment. However, this represents only a fraction of the estimated 90 000 MDR-TB cases in the Region.

A Regional Advisory Committee on MDR-TB (the Regional Green Light Committee, rGLC) was established in 2012 to provide technical guidance to the
countries in the scale up of drug-resistant TB (DR-TB) care and management. The rGLC mechanism has since been functioning to provide technical assistance to the countries. All countries in the Region (except Maldives) have received technical support through rGLC missions.

Collaboration between TB and HIV control programmes is improving in the Region. Both national TB and HIV programme managers or representatives from all Member States (except the Democratic People’s Republic of Korea) met at a regional workshop in 2012 to strengthen TB/HIV collaborative activities, share common concerns and experiences, and reaffirm commitments to strengthening collaboration. Consequently, a Regional Response Plan for TB/HIV Collaboration, 2012–2015 was developed that highlights the current challenges and constraints, and points the way forward.

Private–public collaborative activities have been further expanded in medical colleges, large private and public hospitals, the corporate sector, prisons and nongovernmental organizations (NGOs). Infection control policies and plans are being pursued in 10 Member States. Newer diagnostics are being deployed with assistance from partners in all high-burden countries and, additionally, in Nepal.

A Regional Workshop on Promoting Roles of NGOs and Civil Society in Community-based TB Care and Control was held in Jakarta, Indonesia in November 2013. This workshop facilitated the development of a comprehensive community-based TB plan to cover a wide range of activities contributing to prevention, diagnosis, improved treatment adherence and care that positively influence the outcomes of drug-sensitive, drug-resistant and HIV-associated TB. The activities also included community mobilization to promote effective communication and participation among community members to generate demand for TB prevention, diagnosis, treatment and care services. In addition, recognizing that the success of TB control depends on strong health systems, health systems strengthening components were included in the national strategic plans.

In terms of resources, national governments meet half of the budgets available to run national TB control programmes, while the Global Fund covers more than a third of funding. Additional support is received through several bilateral agreements with donor governments and agencies including USAID TBCARE I and II in Indonesia and Bangladesh, respectively, the Three MDGs Fund and USAID in Myanmar, and USAID in India. Other global initiatives such as UNITAID, the Global Drug Facility (GDF), the Global Laboratory Initiative (GLI),
the Expanding Access to New Diagnostics for TB (EXPAND-TB) Project, TB REACH and the Stop TB Partnership are helping to mobilize resources for the diagnosis and treatment of all forms of TB towards achieving universal case detection and treatment.

While considerable progress continues to be made, national TB control programmes still face a number of challenges. These relate to uncertainties in terms of sustainable financial and operational resources, and limited technical and management capacity. Procurement and supply management mechanisms, as well as national laboratory networks, need to be strengthened. These challenges are, in turn, slowing down the planned expansion of early and enhanced case detection and interventions for TB/HIV and DR-TB.

Although collaboration with other sectors is steadily increasing, the provision of care by all health-care providers is not sufficiently linked to national programmes to make an impact at the national level. Low community awareness and utilization of services hamper the uptake of services and it is becoming increasingly recognized that attention needs to be paid to addressing the social, economic and behavioural determinants that impact TB, if national efforts to combat TB are to succeed in the longer term.
Epidemiology of TB in the South-East Asia Region

The WHO South-East Asia Region with an estimated 4.8 million prevalent cases and about 3.4 million incident cases and 450 000 deaths in 2012 carries about 39.5% morbidity and 48% mortality of the global burden of tuberculosis (Figure 1a and b). Five of the 11 Member States are among the 22 high-burden countries, with India alone accounting for 26% of the world’s incident cases. Among all new smear-positive TB cases detected in the Region in 2012, most cases continued to occur among young adults, particularly in the most productive age group of 25–34 years. Males are disproportionately affected: the male to female ratio was 2.0 among all new smear-positive TB cases and 2.8 among cases older than 45 years. Although death rates due to TB continued to steadily decline after the introduction of DOTS in the Region, the disease is estimated to still claim about 450 000 lives each year.

Figure 1a: Estimated incidence of all forms of TB, classified by WHO region, 2012

Estimated global TB incidence = 8 600 000 (8 300 000–9 000 000) cases (all forms of TB)
2.1 Estimated TB incidence, prevalence and mortality

2.1.1 Enhancement of TB burden estimates methodology in the South-East Asia Region

In 2009, the methodology for the calculation of estimates of TB burden (prevalence, incidence and mortality) was revised by WHO and further enhanced in the following years.\(^1\) Since all TB burden estimates are imprecise, they are published as best estimates with confidence intervals; the uncertainty intervals provide a range of plausible values and their width is inversely proportional to the accuracy of the estimate, depending on the quality and coverage of country data. Some of the estimates are not officially endorsed by Member States.

All countries are strongly encouraged to improve their estimates of TB burden through available methods, such as in-depth analysis of available data, systematic assessment of the quality and coverage of surveillance data, strengthening TB

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surveillance within countries, operational research, strengthening vital registration (VR) systems, and conducting prevalence and mortality surveys. In 2013, WHO issued guidelines for inventory studies\(^2\) that can support improvement of TB burden estimates by providing quantification of under-notification. In addition, these studies provide valuable information on where collaborative efforts with public- and private-sector providers are needed.

In order to support countries in strengthening surveillance systems and allow direct measurement of TB incidence and mortality using notification and VR data, WHO developed the *Checklist of standards and benchmarks for TB surveillance and vital registration systems*. The checklist supports identification of gaps, corrective actions, and funds needed. In the South-East Asia Region, Indonesia and Thailand successfully used the checklist during 2013.

For all the countries in the Region, TB incidence was estimated through indirect methods: based on estimated case detection rate combined with notification data. During a regional workshop on TB burden estimates held in 2009, case detection rate of all forms of TB was estimated through in-depth analysis of available surveillance data, information on access to health care, and programmatic management of TB. Expert opinion on the proportion of cases not detected or not captured by TB surveillance was also considered. Trends over time were calculated considering changes in case detection rate in different years, except for Bhutan and India where results from repeat annual risk of TB infection (ARTI) surveys were also used. When information was not enough for time-series analysis, the incidence was considered flat or “frozen” at the value of the most recent point estimate.

For India, in addition to the regional workshop, two national consultations were held in July 2011 and July 2012 to revise TB burden estimates. Case detection rate was also estimated with the support of two subnational inventory studies. However, national inventory studies are needed: in particular, to better assess the number of TB cases that are diagnosed in the private sector but not reported. In the analysis of trend over time, the trend was estimated to be flat between 1990 and 2001, due to absence of data and considering that the Revised National Tuberculosis Control Programme (RNTCP) started in 1999 only in part of

the country. Between 2001 and 2012, based on data from two national tuberculin surveys (conducted in 2000 and 2010) and annual notification data, the rate of decline in TB incidence was assessed to be 1.5% per year.

Across the South-East Asia Region, prevalence was estimated based on the results of prevalence surveys (direct method) in Myanmar and Bangladesh only, which conducted studies in 2010 and 2009, respectively. Bangladesh, however, used a methodology other to the one recommended by WHO and is therefore planning to conduct another prevalence survey in 2014. For all other countries, prevalence was estimated by indirect method: multiplying incidence by estimated duration of TB disease. This type of estimate makes prevalence the most uncertain of the three TB burden indicators, because it is the product of two uncertain quantities: incidence and disease duration, which cannot be measured directly.

TB-related mortality was estimated indirectly, by multiplying incidence by estimated case fatality ratio, for six of the countries because of lack of good quality vital registration (VR) systems or data from mortality surveys. VR data were used for direct estimation of TB related-mortality in the Democratic People’s Republic of Korea, Maldives, Sri Lanka and Thailand. Reports of TB mortality were adjusted upwards to account for incomplete coverage of VR and ill-defined causes of death; the width of uncertainty bound is therefore related to completeness and quality of national VR data. For India, data from six large community-based subnational mortality surveys conducted between 2003 and 2008, using verbal autopsy and methodology endorsed by the Registrar General of India, were used. Additional information on TB mortality has emerged from a community-based prospective mortality survey covering 2002–2007. All data were pooled to obtain a national estimate and to derive a complete time-series for 1990–2012; current estimate is higher than the previous indirect estimate. A large nationally-representative community-based prospective all-causes mortality survey (the Million Death Study), accounting for deaths from 2001–2003, is underway in collaboration with the Registrar General of India and with the support of other partners.

In the Region, progress towards the enhancement of TB burden estimates is being made. Sri Lanka conducted an in-depth analysis of data in 2010. In 2013, Timor-Leste conducted a comprehensive TB epidemiological assessment with the primary objective of evaluating the efficiency and reliability of case-finding under the NTP and the accuracy of notification data, to revise current burden estimates.
Nepal is planning to upgrade the Open Medical Record System (OpenMRS) platform used for reporting DR-TB cases to include drug-susceptible TB in 2014. India successfully transitioned its electronic recording and reporting system (EPI Centre software) to a Windows-based platform and developed a case-based web-based notification system (NIKSHAY); TB was made a mandatory notifiable disease impacting completeness of TB case notification. Thailand piloted a national electronic database to be rolled out in all regions of the country to improve real-time reporting. Indonesia is transitioning to a web- and case-based electronic recording and reporting system, and is scaling up the sample VR system. In 2013, Thailand and Indonesia conducted a national assessment of the TB surveillance system using the newly developed WHO Checklist of standards and benchmarks for TB surveillance and vital registration systems. A thorough analysis of all available surveillance data and relevant information was conducted and, on the basis of identified gaps, a list of costed priority activities was outlined and an investment plan was developed.

Population-based surveys of the prevalence of TB disease can provide direct measurement of prevalence as well as useful information about why and to what extent people with TB are missed in surveillance data. In the Region, Thailand concluded field operations of its second national TB prevalence survey in 2013 (the first was conducted in 2006) and data are being analysed; updated TB burden estimates are expected in 2014. In April 2013, Indonesia started a nationwide TB prevalence survey and the final results will be available by the end of 2014. Nepal is planning to conduct a prevalence survey during 2014–2015: the protocol and implementation plan are ready and field operations should start by mid-2014, for an expected overall duration of 18 months. Bangladesh is planning to conduct a new national prevalence survey in 2014. Myanmar is planning a repeat TB prevalence survey for 2017; the survey will provide direct measurement of point prevalence and trend over time.

2.1.2 Estimated TB incidence, prevalence and mortality in the South-East Asia Region

The control of TB in the Region is affected by variations in the quality and coverage of TB control interventions, population demographics, urbanization, changes in socioeconomic standards, and magnitude of the subepidemics of TB/ HIV and MDR-TB. The TB incidence, prevalence and mortality rates in Member
States of the South-East Asia Region (estimated as discussed in paragraph 2.1.1.) are presented in Table 1.

Table 1: Estimates of TB disease incidence, prevalence and mortality in Member States of the South-East Asia Region (rates per 100 000 population), 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Population* (in thousands)</th>
<th>Incidence rate of all forms of TB (95% confidence intervals (CI))</th>
<th>Prevalence rate of all forms of TB (95% CI)</th>
<th>Mortality rate for all forms of TB, excluding HIV (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>154 695</td>
<td>225 (185–268)</td>
<td>434 (218–721)</td>
<td>45 (19–84)</td>
</tr>
<tr>
<td>Bhutan</td>
<td>742</td>
<td>180 (154–207)</td>
<td>225 (79–446)</td>
<td>14 (8.4–21)</td>
</tr>
<tr>
<td>Democratic People’s Republic of Korea</td>
<td>24 763</td>
<td>409 (373–447)</td>
<td>511 (139–1200)</td>
<td>9 (8.6–9.5)</td>
</tr>
<tr>
<td>India*</td>
<td>1 236 687</td>
<td>176 (159–193)</td>
<td>230 (155–319)</td>
<td>22 (14–32)</td>
</tr>
<tr>
<td>Indonesia</td>
<td>246 864</td>
<td>185 (153–220)</td>
<td>297 (144–506)</td>
<td>27 (12–48)</td>
</tr>
<tr>
<td>Maldives</td>
<td>338</td>
<td>41 (33–49)</td>
<td>65 (30–113)</td>
<td>2 (1.8–2.2)</td>
</tr>
<tr>
<td>Myanmar*</td>
<td>52 797</td>
<td>377 (322–435)</td>
<td>489 (377–616)</td>
<td>48 (23–84)</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>21 098</td>
<td>66 (55–79)</td>
<td>109 (52–185)</td>
<td>1.1 (0.8–1.4)</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>1 114</td>
<td>498 (409–596)</td>
<td>758 (342–1340)</td>
<td>74 (33–132)</td>
</tr>
<tr>
<td>South-East Asia Region</td>
<td>1 833 357</td>
<td>187 (174–200)</td>
<td>264 (203–333)</td>
<td>25 (18–32)</td>
</tr>
</tbody>
</table>


*The estimated incidence, prevalence and mortality rates should be considered provisional as they have not yet been officially approved by Ministry of Health and Family Welfare, Government of India, and National TB Programme of Bangladesh.

bThe rates reported in this table slightly differ from rates reported in the Myanmar country profile because different population figures have been used.

Figure 2 compares the estimated TB prevalence rate (per 100 000 population) in 1990 with 2012, in the 11 Member States of the Region. Note that for Timor-Leste, the baseline is set at 2002 due to non-availability of national
data for 1990. The comparison takes into consideration only the best estimate of prevalence rate, and not the uncertainty bounds. Taking into account this limitation, a decline in the prevalence rate is observed in all Member States (except Democratic People’s Republic of Korea). In some countries, the decrease in prevalence is very significant and is already beyond the 50% reduction from 1990 baseline that is a Stop TB Partnership target for 2015.

Figure 3 compares the estimated TB mortality rate (per 100 000 population) in 1990 with 2012, in the 11 Member States of the Region. Note that for Timor-Leste, the baseline is set at 2002 due to non-availability of national data for 1990. As described earlier, the comparison takes into consideration only the best estimate of mortality rate, and not the uncertainty bounds. A significant decline in the mortality rate is observed in all Member States. For some countries, the decrease in mortality is already beyond the 50% reduction from the 1990 baseline that is the Stop TB Partnership target for 2015.

The trends in estimated prevalence, incidence and mortality rates in the South-East Asia Region as a whole are presented in Figure 4. TB prevalence and
Figure 3: Estimated TB mortality rate (excluding HIV) in 1990* and 2012, by Member State of the South-East Asia Region

*For Timor-Leste, the baseline is 2002.


Figure 4: Trends in estimated TB prevalence, incidence, and mortality rates from 1990 to 2012 in the South-East Asia Region

mortality rates have decreased by more than 40% since 1990. The decline in incidence is less perceptible, but the tendency began to revert.

Interpretation of the trends should, however, take into account the uncertainty bounds around each value. Figures 5, 6 and 7 show the trends in TB incidence, prevalence and mortality as best estimates and upper and lower confidence intervals.

2.2 Community-based surveys to estimate pulmonary TB prevalence, ARTI and TB mortality

A number of community-based surveys have been carried out in the Region at different times to estimate the prevalence of pulmonary TB. Most of the surveys conducted were at subnational level and the screening methodology varied between surveys, reducing the comparability of outcomes. The current recommended methodology (symptom screening and chest x-ray) has been applied only in Myanmar (2006 and 2010), Thailand (2012) and Indonesia (2013); however, the results of the recently concluded nationwide survey in Thailand

Figure 5: Trend of TB incidence rate (best estimate, upper and lower bounds) from 1990 to 2012 in the South-East Asia Region

Figure 6: Trend of TB prevalence rate (best estimate, upper and lower bounds) from 1990 to 2012 in the South-East Asia Region


Figure 7: Trend of TB mortality rate (best estimate, upper and lower bounds) from 1990 to 2012 in the South-East Asia Region

are not yet available, and in Indonesia the survey is still ongoing. The results of surveys undertaken between 1990 and 2010 show large in-country and between-country variability.3

Four rounds of prevalence surveys in Tiruvallur district in Tamil Nadu, India (between 1999 and 2006) showed a decline of about 12% per year in the prevalence of smear-positive as well as culture-positive pulmonary TB; however, a more recent survey showed a slight increase compared to 2006 (of about 7%). In this district, no decline in prevalence had been observed during the pre-DOTS period through several rounds of surveys carried out between 1968 and 1986. The most recent survey results in India (six district-/subdistrict-level surveys) show variable levels of TB prevalence in different geographical areas and provided important information for the revision of national TB burden estimates. Another state-level prevalence survey (in Gujarat) was completed in 2012; however, the report is not yet published.

In Indonesia, a national-level prevalence survey conducted in 2004 demonstrated a three-fold decline in prevalence rates when compared to rates obtained during a number of district-level surveys carried out during the 1980s.

The subnational surveys carried out in Bangladesh in the early 2000s are not comparable with the national-level prevalence survey conducted in 2009, since they used different methodology. Bangladesh plans to conduct another nationwide TB prevalence survey by 2015, using the methodology currently recommended by WHO.

Myanmar conducted a TB prevalence survey in Yangon district in 2006 and completed a nationwide TB prevalence survey in 2010; results showed higher prevalence compared to previous estimates.

Tuberculin surveys to estimate the ARTI among children continue to be conducted in the Region. The most recent were conducted in Bhutan, Sri Lanka and India; the latter recently conducted a national-level ARTI survey, although the results are not yet published. Tuberculin surveys carried out in Member States of the Region from 1990 onwards were reported in *Tuberculosis Control in the South-East Asia Region: Annual TB Report 2013* (WHO 2013). Available at http://www.searo.who.int/entity/tb/documents/sea_tb_338/en/index.html. Results from surveys conducted between 2011 and 2013 are yet to be published, and therefore are not provided in this report.

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3 Details were reported in *Tuberculosis Control in the South-East Asia Region: Annual TB Report 2013* (WHO 2013). Available at http://www.searo.who.int/entity/tb/documents/sea_tb_338/en/index.html. Results from surveys conducted between 2011 and 2013 are yet to be published, and therefore are not provided in this report.
It is currently not recommended to use estimates of ARTI to estimate disease incidence and derive prevalence, since the assumptions needed to link ARTI and incidence were shown to be no longer valid. However, the results from ARTI surveys, along with other information, have been used to revise burden estimates particularly in Bhutan, Democratic People’s Republic of Korea and India.

Results from repeated ARTI surveys have mainly been used to estimate trends over time. Trends in ARTI are available for India, from repeated surveys in Bangalore, Karnataka, and three sequential surveys in Tiruvallur, Tamil Nadu. Unpublished data are also available from repeated nationwide surveys (in 2000–2001 and 2009–2010). All available trends in ARTI mirrored the decline in prevalence of TB over the same time period.

In Indonesia, surveys in five provinces (between 2006 and 2008) demonstrated a significant decline in the ARTI when compared to estimates obtained from several district-level surveys carried out in the 1980s.

A limited number of TB mortality studies, based on VR data and verification of cause of death through verbal autopsies, have been carried out in the Region. In India, a series of large community-based mortality surveys have been conducted using verbal autopsy and methodology endorsed by the Registrar General of India. Surveys conducted in Andhra Pradesh, Orissa, Tiruvallur and a Kolkata slum (between 2003 and 2008) showed an average TB mortality rate of 36 per 100 000 population (range 28–76). Additional information on TB mortality has emerged from the All India Institute of Medical Science (AIIMS), Ballabgarh, Haryana, where a community-based prospective mortality survey (from 2002–2007) reported a TB mortality rate of 40 per 100 000 person-years. The nationally-representative Million Death Study, accounting for deaths from 2001 to 2003, has informally reported TB deaths of 77 and 40 per 100 000 person-years for men and women, respectively.

In Indonesia, verbal autopsy-based mortality studies carried out at seven sites at the provincial- and subprovincial-level (during 2006–2008), revealed that TB was ranked first to third among the leading causes of death in the different provinces.

Myanmar is planning to conduct a nationwide TB mortality survey in 2015.
2.3 Impact of HIV on TB in the Region

In 2012, it was estimated that there were 3.4 million people living with HIV in the South-East Asia Region, constituting nearly 10% of people living with HIV globally. There were an estimated 230,000 new HIV infections and 200,000 AIDS-related deaths in the Region in 2012; this level has remained stable since 2001 (3.4 million). Women (aged 15 years and above) account for nearly 37% of the total number of people living with HIV in the Region.

Magnitude of the infection varies and five countries, namely, India, Indonesia, Myanmar, Nepal and Thailand together account for almost all (99.9%) of the HIV burden in the Region (Figure 8).

The per cent prevalence of HIV in the general population is estimated to be highest in Thailand, followed by Myanmar, Indonesia, Nepal and India (Table 2).

While Myanmar and Thailand have more homogeneous HIV prevalence among populations living in different geographical areas, the epidemic is more concentrated in some states and districts in India and among high-risk population groups in Bangladesh and Nepal. Indonesia has concentrated epidemic with prevalence less than 1%; however, the Papua province has a low-level generalized epidemic with adult HIV prevalence over 2%. HIV prevalence is estimated to be

Figure 8: Number of people living with HIV by country and cumulative percentage of cases in the South-East Asia Region, 2012

The number of new infections every year is showing a downward trend in four of the five HIV high-burden countries (namely India, Myanmar, Nepal and Thailand). Nepal has reduced new infections by 91% while India, Myanmar and Thailand have reduced incidence by more than 50%. In Indonesia, the HIV epidemic has registered 25% increase since 2001. Bangladesh and Sri Lanka have significant rising epidemics.

Table 2: Estimated HIV prevalence among adult populations and number of people living with HIV in Member States of the South-East Asia Region, 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Estimated number of people newly infected with HIV</th>
<th>Proportion (%) of adult population infected with HIV (prevalence)</th>
<th>Estimated number of people living with HIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>&lt;1 000</td>
<td>&lt;0.1</td>
<td>8 000</td>
</tr>
<tr>
<td>Bhutan</td>
<td>&lt;200</td>
<td>0.2</td>
<td>1 100</td>
</tr>
<tr>
<td>Democratic People’s Republic of Korea</td>
<td>No reported HIV-positive individual to date</td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>130 000</td>
<td>0.3</td>
<td>2 100 000</td>
</tr>
<tr>
<td>Indonesia</td>
<td>76 000</td>
<td>0.4</td>
<td>610 000</td>
</tr>
<tr>
<td>Maldives</td>
<td>&lt;100</td>
<td>&lt;0.1</td>
<td>&lt;100</td>
</tr>
<tr>
<td>Myanmar</td>
<td>7 100</td>
<td>0.6</td>
<td>200 000</td>
</tr>
<tr>
<td>Nepal</td>
<td>1 200</td>
<td>0.3</td>
<td>49 000</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>&lt;500</td>
<td>&lt;0.1</td>
<td>3 000</td>
</tr>
<tr>
<td>Thailand</td>
<td>8 800</td>
<td>1.1</td>
<td>440 000</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>–</td>
<td>&lt;0.1</td>
<td>&lt;1 000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>224 000</strong></td>
<td><strong>0.3</strong></td>
<td><strong>3.4 million</strong></td>
</tr>
</tbody>
</table>


Note: Figures are rounded off. Data shown are the best available estimates.
A significant proportion of people living with HIV are also infected with tubercle bacilli and are thus at a high risk of developing TB. However, most of the incident TB cases continue to emerge among HIV-negative people.

In 2012, the estimated incidence of HIV-positive TB cases was 170 000 (9.2 per 100 000 population) in the South-East Asia Region, although incidence varied widely among countries (Table 3). In the Region, most countries use direct measures of HIV prevalence among incident cases of TB through national surveys, HIV sentinel surveillance, provider-initiated testing and counselling with at least 50% coverage of testing (the latest only for Thailand). High TB case fatality rates have been reported from certain areas with high HIV prevalence in India, Myanmar and Thailand.

Table 3: HIV/TB burden in Member States of the South-East Asia Region, 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Prevalence of all forms of TB</th>
<th>Number of HIV-positive TB patients notified</th>
<th>Incidence of HIV-positive TB cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>670 000</td>
<td>434</td>
<td>63</td>
</tr>
<tr>
<td>Bhutan</td>
<td>1 700</td>
<td>225</td>
<td>24</td>
</tr>
<tr>
<td>Democratic People’s Republic of Korea</td>
<td>130 000</td>
<td>511</td>
<td>0</td>
</tr>
<tr>
<td>India</td>
<td>2 800 000</td>
<td>211</td>
<td>44 063</td>
</tr>
<tr>
<td>Indonesia</td>
<td>730 000</td>
<td>297</td>
<td>754</td>
</tr>
<tr>
<td>Maldives</td>
<td>220</td>
<td>65</td>
<td>1</td>
</tr>
<tr>
<td>Myanmar</td>
<td>260 000</td>
<td>489</td>
<td>5 161</td>
</tr>
<tr>
<td>Nepal</td>
<td>66 000</td>
<td>241</td>
<td>217</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>23 000</td>
<td>109</td>
<td>23</td>
</tr>
<tr>
<td>Thailand</td>
<td>110 000</td>
<td>159</td>
<td>5 807</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>8 400</td>
<td>758</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>4.8 million</td>
<td>264</td>
<td>56 093</td>
</tr>
</tbody>
</table>


Note: Figures are rounded off. Data shown are the best available estimates.
NA = not available
2.4 Drug resistant TB

Well-functioning national TB control programmes achieving high treatment success rates have resulted in maintaining a slow but steady decline in TB incidence rate in the Region during the past decade. This has also led to low levels (2.2%, range: 1.6–2.8%) of multidrug-resistance among newly detected cases. Among previously treated cases in the Region, the MDR-TB rate is estimated to be higher at around 16% (range: 11–21%). However, given the large numbers of TB cases in the South-East Asia Region, this translates to a total of 90 000 (range: 63 000–116 000) estimated MDR-TB cases – accounting for almost 30% of the world’s MDR-TB cases estimated to exist among notified TB cases in 2012. Four of the 27 high MRD-TB burden countries are in the South-East Asia Region.

Country-wise estimated burden of MDR-TB is based on nationwide drug resistance surveillance (DRS), models based on subnational DRS or generic models applied to the whole Region; estimates and sources of estimate are presented in Table 4. Final results from the most recent DRS conducted in Myanmar and Thailand are expected at the start of 2014.

Extensively drug-resistant TB (XDR-TB) has been reported from five countries in the Region, namely Bangladesh, India, Indonesia, Nepal and Thailand.

In December 2011, Mumbai, India, also reported cases of so-called “totally drug-resistant TB” that posed an extremely difficult challenge to clinicians and public health authorities. The Government of India took important measures at both the local and national level. In Mumbai, laboratory and hospital facilities were improved, medical staff and funding were substantially increased, access to second-line drugs was provided to eligible patients, contact-tracing was enhanced, and efforts were made to train staff on DR-TB and infection control. National regulations governing the private sale of anti-TB medication were strengthened. By the end of 2012, all 35 states in the country were expected to provide programmatic management of DR-TB. In May 2012, India made TB a notifiable disease.

Considerable efforts are required to expand capacity for quality-assured drug susceptibility testing (DST) in the Region in order to more accurately estimate the extent of DR-TB. Given the widespread availability and use of second-line drugs, and as laboratory capacity to conduct second-line DST increases, additional numbers of patients with XDR-TB are likely to be identified.
### Table 4: Estimated MDR-TB cases and rates in Member States of the South-East Asia Region, 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Source of estimates</th>
<th>% MDR among new TB cases (95% CI)</th>
<th>% MDR among previously treated TB cases (95% CI)</th>
<th>Estimated number of MDR-TB cases among all TB cases notified in 2012 (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>DRS, 2012</td>
<td>1.4 (0.7–2.5)</td>
<td>29 (24–34)</td>
<td>4 200 (3 100–5 200)</td>
</tr>
<tr>
<td>Bhutan</td>
<td>Model</td>
<td>2.2 (1.6–2.8)</td>
<td>16 (11–21)</td>
<td>25 (20–30)</td>
</tr>
<tr>
<td>Democratic People’s Republic of Korea</td>
<td>Model</td>
<td>2.2 (1.6–2.8)</td>
<td>16 (11–21)</td>
<td>3 800 (3 000–4 600)</td>
</tr>
<tr>
<td>India</td>
<td>Model (^a)</td>
<td>2.2 (1.9–2.6)</td>
<td>15 (11–19)</td>
<td>64 000 (49 000–79 000)</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Model (^b)</td>
<td>1.9 (1.4–2.5)</td>
<td>12 (8.1–17)</td>
<td>6 900 (5 200–8 500)</td>
</tr>
<tr>
<td>Maldives</td>
<td>Model</td>
<td>2.2 (1.6–2.8)</td>
<td>16 (11–21)</td>
<td>2 (1–2)</td>
</tr>
<tr>
<td>Myanmar</td>
<td>DRS, 2008</td>
<td>4.2 (3.1–5.6)</td>
<td>10 (6.9–14)</td>
<td>6 000 (4 600–7 500)</td>
</tr>
<tr>
<td>Nepal</td>
<td>DRS, 2011</td>
<td>2.2 (1.3–3.8)</td>
<td>15 (10–23)</td>
<td>990 (660–1 300)</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>DRS, 2006</td>
<td>0.18 (0–0.99)</td>
<td>2.2 (1–4.1)</td>
<td>21 (0–43)</td>
</tr>
<tr>
<td>Thailand</td>
<td>DRS, 2006</td>
<td>1.7 (1.0–2.6)</td>
<td>35 (28–42)</td>
<td>1 800 (1 400–2 200)</td>
</tr>
<tr>
<td></td>
<td>DRS, 2012 (^c)</td>
<td>2.0</td>
<td>18.9</td>
<td>1 700</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>Model</td>
<td>2.2 (1.6–2.8)</td>
<td>16 (11–21)</td>
<td>82 (62–100)</td>
</tr>
<tr>
<td>South-East Asia Region</td>
<td>Model</td>
<td>2.2 (1.6–2.8)</td>
<td>16 (11–21)</td>
<td>90 000 (63 000–116 000)</td>
</tr>
</tbody>
</table>

\(^a\) Estimates based on subnational drug resistance surveys conducted in three states between 2006 and 2009.

\(^b\) Model based on two subnational surveys: DRS in Mimika District in 2004, and Central Java Province in 2006.

\(^c\) At the time of finalization of this report, 2012 DRS results were newly released, but confidence intervals for best estimates were not available.

DRS = drug resistance surveillance/survey data; CI = confidence interval.
3.1 DOTS coverage

DOTS coverage, defined as the proportion of population living in administrative areas with access to DOTS services, increased steadily from 1995 onwards in the South-East Asia Region. Almost the entire population had access to DOTS by the end of 2007 (Figure 9).

3.2 Case notifications

3.2.1 Trends in case notification

Figure 10 shows trends in the numbers of cases notified in the Region since 1993 for all forms of TB (including new and relapse cases) and new smear-positive cases. Notifications have continued to rise over the past decade, reflecting

Figure 9: Population covered by DOTS services in the South-East Asia Region, 1995–2012

Source: Tuberculosis Control in the South-East Asia Region, Annual Reports 1996–2013, WHO Regional Office for South-East Asia.
Achievements in TB Control

Achievements in TB Control

case-finding efforts in Member States over time, with a sharper increase in notifications of all forms of TB (particularly from 2000 to 2009) possibly due to increased registration of smear-negative and extrapulmonary cases following the involvement of the private sector and medical teaching institutions. From 2009, the upward trend has stagnating despite ongoing efforts to strengthen TB control in most countries, which could be the result of estimated declining trends of incidence and prevalence of TB, particularly in India.

The trends in notification rates of all TB cases (new and relapse cases) for the five high-burden countries and for the intermediate and low-burden countries in the Region are presented in Figure 11a and b, respectively.

In Bangladesh, an important increasing trend was observed up to 2006, following which the case notification rate has remained fairly stable, although some oscillations are visible from 2009 onwards. In India, the notification rate decreased from 1995 until 2002, before seeing a slight increase until 2009; in recent years, the trend has reverted. The decreasing trend up to 2002 was mainly driven by smear-negative and extrapulmonary cases; in fact, smear-positive cases...
Figure 11a: Trends in annual TB case notification rates (all forms) for high-burden countries in the South-East Asia Region, 1995–2012

Sources: Tuberculosis Control in the South-East Asia Region, Annual Reports 1996–2013, WHO Regional Office for South-East Asia; and Annual Reports, National TB programmes, Member States of the South-East Asia Region, 2013.

Figure 11b: Trends in annual TB case notification rates (all forms) for intermediate- and low-burden countries in the South-East Asia Region, 1995–2012

Sources: Tuberculosis Control in the South-East Asia Region, Annual Reports 1996–2013, WHO Regional Office for South-East Asia; and Annual Reports, National TB programmes, Member States of the South-East Asia Region, 2013.
followed a steadily increasing trend, which flattered only in 2008. The increasing trend in the past decade is primarily due to improved case-finding efforts and the greater involvement of health-care providers from other sectors in programme case-finding and treatment activities. Important efforts to strengthen TB control activities are ongoing, but in recent years the trend has been reverting; estimates suggest a decrease in TB burden in the country. In Indonesia, after a period of steady increase, there was a drop in the new smear-positive cases notification rate in 2007, attributed to the temporary cessation of Global Fund support for a period of 9 months; afterwards, the notification rate started to slightly increase again. In Myanmar, the highest-burden country in the Region with the highest notification rate, a steady increase in notification rate was observed between 2000 and 2007; the drop in 2008 may be related to funding problems. From 2009 onwards, the trend continued to increase at slower pace, mainly due to smear-negative and extrapulmonary cases. In Thailand the trend was rather flat from 2001 to 2008, followed by oscillations in the following years.

In Democratic People’s Republic of Korea, a sharp increase in the case notification rate has been observed since 2006. This is primarily due to the introduction of active case-finding and involvement of other sectors. Active case-finding was adopted as a supplementary strategy, since a big gap had been observed between case notification rates and the revised estimates of TB incidence in the country, following a national tuberculin survey among children in 2007 that revealed a high ARTI. In Sri Lanka, which together with Maldives has the lowest notification rate in the Region, a small increase in notifications was recorded up to 2000, followed by a fairly stable trend until 2012. In Nepal, some increase in notification rate was observed in the 1990s; however, the trend has flattened and there have been no significant deviations up to 2012, despite case-finding efforts and increased coverage of TB services. In Bhutan, the notification rate followed a declining slope until 2008; after which, an increase can be observed up to 2012 with a peak in 2010. A consistently declining trend in case notification rate has been observed in Maldives over the past 15 years. The fluctuating trend in Timor-Leste reflects episodes of civil strife, when services were seriously disrupted for considerable periods of time. The fluctuations reflect, on one hand, efforts toward case detection and, on the other, improvement of TB diagnosis with a reduction in the misdiagnosis of cases.
3.2.2 Case notifications in 2012

Table 5 shows the absolute number of TB cases, notified by case type, for each Member State of the South-East Asia Region in 2012. The 11 Member States together notified 2,124,859 cases of TB (new and relapse cases, all forms) which represents a case notification rate of 116 per 100,000 population. Of the cases notified, 1,065,852 were new smear-positive pulmonary cases (60% of all new pulmonary cases and relapse cases). Five countries (Bangladesh, India, Indonesia, Myanmar and Thailand), which are among the 22 high-burden countries globally, notified a total of 2,181,985 cases, or 94% of all cases notified in the Region.

There was a decrease of 1% in the number of cases (all forms) notified in 2012 as compared to 2011 (Table 5). This small decrease is mainly driven by new smear-negative cases, relapses and treatment after default. Cases of unknown type increased by 60%; although a very small number of cases fall into this category, the figure indicates that reporting systems need to be strengthened to prevent misclassification of cases, particularly in view of the implementation of revised case definitions issued by WHO in 2013.

About half of all notified new cases in the Region (54%) were new smear-positive cases (Figure 12). This proportion was considerably lower in Myanmar (31%), Democratic People’s Republic of Korea (37%) and Bhutan (39%); however, the proportion was substantially higher in Bangladesh (66%) and Indonesia (63%). Among all new cases of pulmonary TB, 65% were smear-positive in the Region as a whole, ranging from 37% in Myanmar to 81% in Bangladesh. Of all new TB cases in the Region, 17% were extrapulmonary cases. This proportion varied greatly among the countries, from a minimum of 5% in Indonesia to a maximum of 49% in Bhutan (Figure 12).

In 2012, the proportion of smear-positive retreatment cases among all smear-positive cases was 17% in the Region as a whole, ranging from 0% in Maldives to 25% in Democratic People’s Republic of Korea (Figure 13). Low proportions of retreatment smear-positive cases were also reported by Timor-Leste (3%), Bangladesh (4%) and Indonesia (4%). The proportion of treatment after default was below 5% in all countries except India, where it was 8% of all smear-positive cases. The highest proportion of treatment after failure among all smear-positive cases was 6% in Democratic People’s Republic of Korea, with a range from 0% to 3% across the Region as a whole.
Table 5: Estimated incidence and cases notified (by type of TB patient) in Member States of the South-East Asia Region, 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Estimated incidence of all forms, in thousands (confidence intervals)</th>
<th>TB cases notified</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New smear-positive</td>
<td>New smear-negative</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>350 (290–410)</td>
<td>106 790</td>
</tr>
<tr>
<td>Bhutan</td>
<td>1.3 (1.1–1.5)</td>
<td>420</td>
</tr>
<tr>
<td>Democratic People’s Republic of Korea</td>
<td>100 (92–110)</td>
<td>31 904</td>
</tr>
<tr>
<td>India</td>
<td>2 200 (2 000–2 400)</td>
<td>629 589</td>
</tr>
<tr>
<td>Indonesia</td>
<td>460 (380–540)</td>
<td>202 319</td>
</tr>
<tr>
<td>Maldives</td>
<td>0.14 (0.11–0.17)</td>
<td>52</td>
</tr>
<tr>
<td>Myanmar</td>
<td>200 (170–230)</td>
<td>42 909</td>
</tr>
<tr>
<td>Nepal</td>
<td>45 (37–53)</td>
<td>15 057</td>
</tr>
<tr>
<td>Country</td>
<td>Estimated incidence of all forms, in thousands (confidence intervals)</td>
<td>TB cases notified</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td>New smear-positive</td>
<td>New smear-negative</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>14 (12–17)</td>
<td>4 269</td>
</tr>
<tr>
<td>Thailand</td>
<td>80 (66–95)</td>
<td>30 998</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>5.6 (4.6–6.6)</td>
<td>1 545</td>
</tr>
<tr>
<td>South-East Asia Region</td>
<td>3 400 (3 200–3 700)</td>
<td>1 065 852</td>
</tr>
<tr>
<td>South-East Asia Region (2011)</td>
<td>3 500 (3 200–3 700)</td>
<td>1 067 367</td>
</tr>
<tr>
<td>Percentage change 2012 versus. 2011</td>
<td>-0.1%</td>
<td>-2.1%</td>
</tr>
</tbody>
</table>

*This category includes “cases with unknown history of previous treatment”, except for India and Nepal which include “other new cases”.

Figure 12: Proportion of smear-positive pulmonary TB, smear-negative pulmonary TB and extrapulmonary TB cases among all new notified cases in Member States of the South-East Asia Region, 2012

Source: Annual Reports, National TB programmes, Member States of the South-East Asia Region, 2013.

Figure 13: Proportion of different types of smear-positive cases among all smear-positive cases reported in Member States of the South-East Asia Region, 2012

Source: Annual Reports, National TB programmes, Member States of the South-East Asia Region, 2013.
The proportion of relapse cases among all newly notified (new and relapse) smear-positive cases ranged from 17% in Democratic People’s Republic of Korea to 0% in Maldives, with a regional average of 11%. This proportion has remained stable during the past decade for most of the countries in the Region. However, an increasing trend in the proportion of relapse cases has been observed in Bhutan, Democratic People’s Republic of Korea and India, while Myanmar has shown a consistent decrease in the proportion of relapse cases since 1995.

3.2.3 Age and sex distribution of notified new smear-positive cases in 2012

Age and sex distribution for all types of new cases notified is available for 6 of the 11 Member States of the South-East Asia Region (Bangladesh, Bhutan, Democratic People’s Republic of Korea, Indonesia, Maldives and Sri Lanka). All the countries report age and sex distribution for new smear-positive cases. For new cases other than smear-positive, India and Timor-Leste report breakdown by two age groups only (0–14 years, and 15 years and above); Timor-Leste also disaggregate by sex. Figure 14 shows the distribution of notified new smear-positive cases by age and sex in the Region as a whole for 2012: approximately 76% of cases belonged to the most economically productive age groups (aged 15–54 years), with 74% among males and 80% among females.

In 2012, the percentage of cases aged 0–14 years among new smear-positive cases was 1.6% for the Region as a whole (0.9% among males and 3% among females). There was variability between the countries, with Nepal reporting the highest proportion of paediatric cases among new smear-positive cases (3.1%) and Maldives and Thailand reporting the lowest (0% and 0.4%, respectively). The proportion of paediatric cases among other types of TB cases can be analysed for all countries in the Region except Myanmar, Nepal and Thailand. Therefore, for 8 of the 11 Member States, the average proportion of paediatric cases among new smear-negative and new extrapulmonary cases was 13% and 15%, respectively. Timor-Leste and Indonesia have the highest proportion of paediatric cases among new smear-negative cases (18% and 22%, respectively) and new extrapulmonary cases (28% and 17%, respectively). For the eight countries, the overall proportion of paediatric cases among reported new TB cases was 7%, ranging from 3% in Bangladesh to 12% in Timor-Leste. In 2012, breakdown by age 0–4 years and age 5–14 years was reported by Bangladesh, Democratic People’s Republic of Korea, Indonesia, Maldives, Nepal, Sri Lanka and Timor-Leste.
The male to female ratio of new smear-positive cases notified in 2012 varied from 1.0 in Bhutan to 2.7 in Sri Lanka, and was 2.0 for the Region as a whole. The male to female ratio in the Region progressively increased from 0.6 to 3.3 in the age groups from 0–14 years to 65 years and above. The paediatric age group (0–14 years) is the only one in which notified female cases are more than male cases. The pattern in age and sex distribution shown in Figure 14 is observed when data are expressed in terms of rates. Several studies showed that this finding could be explained by higher susceptibility to TB disease in males after adolescence due to biological factors, as well as by socioeconomic determinants that create higher exposure to risk factors (such as smoking and alcohol) in men and undernotification in women due to gender-based unequal access to care and greater stigma.

Figure 14: Age and sex distribution of notified new smear-positive cases in the South-East Asia Region, 2012

Sources: Annual Reports, National TB programmes, Member States of the South-East Asia Region, 2013.

### 3.3 Treatment outcomes

The treatment success rate among new smear-positive cases enrolled for treatment during 2011 was 89% in the Region as a whole. Ten of the 11 Member States have reached 85% treatment success rate, while six Member States have already reached or surpassed the newly-set target of 90% treatment success rate by 2015 (Table 6). The overall cure rate in the Region for new smear-positive cases was 85% and the completion rate was 4%, for the 1 064 879 cases registered in 2011.
The overall case fatality rate, default rate and failure rate were 4%, 5% and 2% respectively among new smear-positive cases registered for treatment in 2011.

In Maldives, as in previous years, the treatment success rate among new smear-positive cases was lower than the target. The relatively high proportion of patients not evaluated and/or defaulting is the main reason for the target not being achieved. Small numbers in Maldives create high fluctuation of figures for other unsuccessful treatment outcomes over time.

In the Region, the highest default rates among new smear-positive cases were observed in India and Indonesia (5% for both).

The highest case fatality rates were registered in Myanmar (5%), Sri Lanka (5%) and Thailand (7%). In Myanmar and Thailand, relatively high case fatality rates may be partially explained by high mortality among HIV-positive new smear-positive cases, being 16% for both countries; however, the case fatality rate for HIV-positive new smear-positive cases is progressively decreasing.

As expected, the treatment success rate among retreatment cases was lower than that in new cases, being 75% for the Region as a whole and ranging from 69% to 85% within the countries. Similarly, the case fatality rates and failure rates among retreatment cases were higher being 7% and 4%, respectively, for the Region as a whole. The case fatality rate ranged from 4% in Timor-Leste to 12% in Myanmar, while the failure rate ranged from 2% in Bangladesh to 12% in Bhutan. The default rate among retreatment cases in the Region was high at 11%, and was particularly high in India (12%), Indonesia (11%) and Sri Lanka (9%); although in all countries, the default rate is slightly decreasing. These high default rates among retreatment cases are a cause for concern, in addition to failure rates, since many of these cases could be expected to have multidrug resistance.

### 3.4 Reporting progress towards global targets

With its fifteenth annual report, *Global Tuberculosis Control 2010*, WHO ceased publishing data on case detection rates of new smear-positive TB cases. A case detection rate of new smear-positive TB cases greater than 70% is, therefore, no longer a global target. One of the reasons behind this decision was the difficulty in obtaining reliable estimates of the denominator of this indicator, which is not directly measurable. Moreover, the current focus on universal case detection, supported by expansion of newer diagnostics that allow increasingly rapid definite
<table>
<thead>
<tr>
<th>Countries</th>
<th>New smear-positive cases</th>
<th>Notification (number)</th>
<th>Success rate (%)</th>
<th>Failure rate (%)</th>
<th>Default rate (%)</th>
<th>Not evaluated/transfer out (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>98,932</td>
<td>381</td>
<td>91</td>
<td>92</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Bhutan</td>
<td>31,279</td>
<td>127</td>
<td>90</td>
<td>90</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Democratic People’s Republic of Korea</td>
<td>642,321</td>
<td>1,432</td>
<td>88</td>
<td>88</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Indonesia</td>
<td>197,797</td>
<td>770</td>
<td>90</td>
<td>90</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Maldives</td>
<td>48</td>
<td>81</td>
<td>90</td>
<td>90</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Myanmar</td>
<td>42,310</td>
<td>86</td>
<td>90</td>
<td>90</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Nepal</td>
<td>15,000</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 6: Treatment outcomes among cases notified in 2011, by type of case, in Member States of the South-East Asia Region.
<table>
<thead>
<tr>
<th>Countries</th>
<th>New smear-positive cases</th>
<th>Retreatment cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Notified (number)</td>
<td>Success rate (%)</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>4 490</td>
<td>87</td>
</tr>
<tr>
<td>Thailand</td>
<td>30 711</td>
<td>85</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>1 610</td>
<td>91</td>
</tr>
<tr>
<td>South-East Asia Region</td>
<td>1 064 879</td>
<td>89</td>
</tr>
</tbody>
</table>

Source: Annual Reports, National TB programmes, Member States of the South-East Asia Region, 2013; N.B. Sum of treatment outcomes may be >100% due to rounding of decimals. For some countries there are discrepancies between cases notified in 2011, published in previous reports and cases notified reported as denominator in this table. Figures may change due to delayed reporting of some units, data quality checks during the past year, revision of completeness of surveillance data, etc.
diagnosis of smear-negative TB, make the emphasis on the detection of only smear-positive cases increasingly outdated.

To monitor the performance of TB control efforts in countries, the focus is now on case notification (in absolute numbers and rates) and treatment success rate, which are both directly measurable and are important indicators of the quality of TB management and care. No target has been set for case notification rate, while the global target for treatment success rate has been increased to 90% by 2015.

In 2012, the South-East Asia Region reached 89% treatment success rate among new smear-positive cases, with 6 of the 11 Member States reaching or surpassing the 90% target. The Region as a whole is well on track to reach the 90% target by 2015.

The case notification rate of all forms of TB had been steadily increasing since 2000, but over the last 3 years a minor decrease has been observed (Figure 15). However, the notification rate in 2012 was still far from estimated TB incidence that represents the ideal in terms of universal access. In 2012, the estimated case detection rate of all TB cases in the Region was 62% (range 58–67%).

Figure 15: Estimated TB prevalence, incidence and notification rates in the South-East Asia Region, 1990–2012
Regarding the Stop TB Partnership’s targets of halving TB prevalence and mortality rates compared to the 1990 baseline, the Region is on track to reach both targets. In fact, according to Figures 16 and 17, considering only the best estimates and not taking into account uncertainty bands, the prevalence and mortality rates decreased by 43% and 41%, respectively, in 2012. According to the projections, and based on the assumption that current trends will not change, the Region will achieve the targets of 50% reduction from the baseline data.

According to WHO estimates, the incidence rate has already decreased compared with the 1990 baseline (Figure 15), mainly driven by high-burden countries such as India, and therefore the South-East Asia Region has already reached the MDG goal of incidence reduction.

Figure 16: Trends in estimated TB prevalence rate 1990–2012 and forecast TB prevalence rate 2013–2015, in the South-East Asia Region
Figure 17: Trends in estimated TB mortality rate 1990–2012 and forecast TB prevalence rate 2013–2015, in the South-East Asia Region

Note: Shaded areas represent uncertainty bands. The horizontal dashed lines represent the Stop TB Partnership target of a 50% reduction in the prevalence rate by 2015 compared with 1990.
4.1 DOTS

Full DOTS coverage was achieved in the South-East Asia Region in 2007, enabling the whole population to have access to TB prevention and control services. Taking into consideration DOTS coverage and the continuous increase in cases notified over time, with almost 22 million TB patients treated during the past 10 years, the Region is moving towards universal access.

4.2 Strengthening national laboratory networks

Quality-assured smear microscopy services are available through increasingly larger laboratory networks in all 11 Member States. National reference laboratories in all countries (with the exception of Maldives and Timor-Leste) have capacity for mycobacterial culture and DST. Although this capacity is limited in some Member States, efforts have been made to strengthen laboratory capacity according to national plans and with the support of supranational reference laboratories (SRLs).

For most countries with at least one national reference laboratory already accredited for culture and DST, the expansion of culture and DST capacities is ongoing – both in terms of implementation of newer technologies and the establishment of new laboratories. In Bangladesh, two additional laboratories were accredited in 2012 and a third is planned for 2014. In Bhutan, the Public Health Laboratory has been accredited for culture and DST on solid media; liquid culture has been recently introduced and line probe assay is expected to be available by 2014. It is also planned to upgrade two regional culture facilities in two reference hospitals. In Indonesia, there are currently 46 culture facilities; of these, 5 underwent external quality assurance (EQA) for DST in 2012 (with acceptable performance for both first- and second-line) and 2 have been recently equipped with line probe assay. In Myanmar, the two national reference laboratories have been equipped with liquid culture, first-line DST, rapid immunoassay for species identification, and line probe assay for rapid diagnosis.
of MDR-TB. By the end of 2013, India was relying on a network of 66 accredited laboratories to undertake quality-assured culture and DST for the programme (30% increase from 2011); of these, 41 are also implementing rapid tests through line probe assay for diagnosis of MDR-TB cases and 5 perform second-line DST. In Thailand, culture and first-line DST capacity was expanded up to 65 culture facilities, 18 of which perform DST including rapid DST (specifically Hain Lifescience, GenoType MTBDRplus test). While quality assurance is a challenge, the access to tests was improved thanks to the National Health Security Office reimbursing tests for smear-positive patients with a history of previous treatment or household contacts of MDR-TB.

All 11 Member States have formally established linkages with SRLs, within and outside the Region. The National Institute for Research in Tuberculosis (formerly the Tuberculosis Research Centre), in Chennai, India, and the Bureau of Tuberculosis in Bangkok, Thailand, are the designated SRLs for TB in the Region. These two laboratories are part of a global network of 32 SRLs. However, national reference laboratories in some countries are linked up to SRLs outside the Region: Bangladesh to the SRL in Antwerp, Belgium; Democratic People’s Republic of Korea to the SRL in China, Hong Kong Special Administrative Region (SAR); Indonesia and Timor-Leste to the SRL in Adelaide, Australia; and Nepal to the SRL in Gauting, Germany.

The national reference laboratories in India, Indonesia, Nepal and Thailand are currently undertaking DST for second-line anti-TB drugs to determine the extent of XDR-TB. Reference laboratories in Bangladesh, Indonesia, Myanmar and Nepal are also engaged in rapid surveys for XDR-TB among mycobacterial isolates from patients who have failed retreatment regimens, through in-country facilities or linking with the SRLs in the global network.

Efforts are ongoing to introduce the newer molecular and liquid culture technology for the management of MDR TB in high-burden countries in the Region, with assistance through the EXPAND-TB Project, the GLI, the Foundation for Innovative New Diagnostics (FIND) and WHO Regional Office for South-East Asia. In 2013, the multinational TBXpert Project was launched, aiming to enable further roll-out and scale-up of Xpert MTB/RIF in targeted low- and middle-income countries. Following WHO endorsement of Xpert MTB/RIF as a rapid test for diagnosis of TB and resistance to rifampicin, and the issuance of guidelines, 8 of the 11 Member States in the Region are adopting, testing or scaling up Xpert MTB/RIF and 6 are target countries for the TBXpert Project (Bangladesh,
Democratic People’s Republic of Korea, India, Indonesia, Myanmar and Nepal). Bangladesh installed Xpert machines in 12 sites and will scale up to 39 sites in 2014; 25 Xpert MTB/RIF machines will be provided by the TBXpert initiative to target the urban area of Dhaka. The Democratic People’s Republic of Korea has installed one machine in the national reference laboratory and is conducting a small-scale TB drug-resistance study. India installed Xpert machines in 32 sites in 2012, some for field demonstration and some for decentralization of DST in MDR-TB suspects. In 2013, an additional 40 Xpert sites were initiated in the government sector, and a guidance policy to use Xpert MTB/RIF under the programme has been developed. In 2013, Indonesia had 9 Xpert implementation sites, and in 2014 will receive 25 Xpert instruments to address DR-TB in the urban area of Jakarta. Indonesia is also planning to expand Xpert to 25 ART hospitals. In Myanmar, Xpert was implemented in 16 sites during 2013 and it is planned to provide all states and regions with diagnostic capacity through Xpert MTB/RIF and MDR-TB treatment centres. In 2014, Nepal is going to deploy an additional 13 machines to the 9 already in place to conduct intensified case detection among vulnerable groups (slum dwellers, migrants, prisoners, diabetic patients, etc.). In Sri Lanka, one Xpert machine was deployed in the country in 2012 and it is mainly used for detection of MDR-TB among suspect cases. In 2013, Thailand implemented Xpert in a total of 14 sites that have also access to other rapid drug susceptibility tests; the National Health Security Office reimburses the cost of the test for some categories of cases.

4.3 Addressing TB/HIV, MDR-TB and other challenges

4.3.1 TB/HIV

An estimated 3.4 million persons are estimated to be living with HIV/AIDS in the South-East Asia Region. The Region is distinguished by a complex, heterogeneous HIV epidemic which is at different stages across different countries and in geographical areas within individual countries. For example, approximately two thirds of the estimated HIV burden in India is in six states in the south and northeast, which make up only a third of the country’s population. In Indonesia, where the overall prevalence of HIV is low, three provinces have been reported to have much higher rates of HIV. In Nepal, increasing HIV prevalence among high-risk groups such as intravenous drug users has raised concerns about the potential risk of a generalized HIV epidemic. Bangladesh and Sri Lanka have significant rising epidemics compared to previous years.
The South-East Asia Region accounts for about 15% of the global burden of new HIV-positive TB cases. HIV prevalence among new TB patients is 6.2%. The need to urgently address TB/HIV is well understood in the Region. A Regional Response Plan for TB/HIV collaboration, 2012–2015, has been developed, adapting global strategies and guidelines to the unique needs of the Region.

National TB/HIV policies and guidelines, and a comprehensive package of interventions (such as joint advocacy, coordination, training of staff, integrated service delivery and referral of patients) are being implemented in 10 countries in the Region. TB/HIV activities are widely implemented in Thailand, where high and continuously increasing coverage of HIV testing for TB patients, TB screening among HIV-positive patients, and CPT and ART among TB/HIV coinfected patients are reported. Services are being further expanded in India (full coverage of all 35 states was reached in 2012), in Myanmar (28 sites are providing TB/HIV collaborative activities) and in Indonesia (33 provinces are currently covered).

Intensified case-finding is steadily increasing at integrated/HIV counselling, testing and care centres and cross-referrals between the TB and HIV programmes have been strengthened; integrated management is becoming more widely available as HIV services expand. In 2012, a total of 39% of TB patients in the South-East Asia Region knew their HIV status, and 89% and 61% of TB/HIV coinfected patients were put on CPT and ART, respectively. Although there is still progress to be made, the Region is rapidly achieving increasingly higher targets for TB/HIV collaborative activities. Infection control measures have been included in national plans in Bangladesh, Bhutan, Democratic People’s Republic of Korea, India, Indonesia, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste.

The TB recording and reporting systems in countries have been revised to include information on TB/HIV coinfection. However, the availability of data on HIV among TB cases remains suboptimal in some countries and there is an urgent need to scale up and report screening of TB cases for HIV infection, and vice versa.

Isoniazid preventive therapy (IPT) has proven to be difficult to implement for several reasons, and it is not policy in most countries. However, Myanmar and Thailand are implementing IPT in pilot townships/projects. India has conducted operational research on IPT, adopted IPT policy and the programme is planning to roll out IPT in selected districts. Bhutan and Maldives have included IPT in the national guidelines.
4.3.2 MDR-TB

In 2011, the Regional Office published the South-East-Asia Regional Response Plan for Drug-resistant TB Care and Control 2011–2015 in collaboration with WHO country offices. In 2012, the Regional Green Light Committee (rGLC) was established in the WHO Regional Office for South-East Asia, known as the Regional Advisory Committee on MDR-TB. The advisory committee was established to provide clear guidance on new policies and strategies for PMDT in the countries of the Region.

In recent years, steady progress has been made in the Region in initiating MDR-TB cases on treatment. The rGLC approved the case management of patients with MDR-TB under national programmes in 10 Member States. Several countries, among them the four high MDR-TB burden countries in the Region, are in the process of expanding these services. Bangladesh, Democratic People’s Republic of Korea, India, Indonesia, Myanmar, Nepal, and Thailand have developed clear programmatic management of drug-resistant tuberculosis (PMDT) expansion plans. In India, since September 2012, all 35 states are providing MDR-TB diagnostic and treatment services. In Indonesia, by the end of November 2013, there were 13 PMDT referral centres and 411 treatment centres across the country. In Myanmar, a MDR-TB scale-up plan was developed for 2011–2015 including building capacity for diagnosis, treatment and care for 10 000 MDR-TB patients over 5 years, and providing diagnostic capacity through Xpert MTB/RIF and MDR-TB treatment centres in all states and regions. Nepal has already established ambulatory case management services for MDR-TB throughout the country; currently there are 13 treatment and 67 subtreatment centres offering MDR-TB treatment services through primary health care services and health facilities managed by other sectors. Maldives continues to treat the few cases that occur on a case-by-case basis. Bhutan and Sri Lanka began enrolling cases in 2010, and Timor-Leste began in 2011. In Democratic People’s Republic of Korea, the number of MDR-TB cases notified went up from 25 in 2012 to 126 in 2013, showing a rapid increase of MDR-TB diagnostic capacity; up to June 2013, a total of 170 MDR-TB cases were enrolled on second-line treatment under programmatic conditions. In Thailand, MDR-TB treatment is presently provided at about 100 treatment units throughout the country (mostly university, regional/provincial and some private hospitals, which procure drugs using local resources such as the Government Pharmaceutical Organization). In addition, the recording and reporting system for DR-TB was revised in 2012 to be consistent with international recommendations and to capture data about detection and enrolment on treatment.
In 2012, of around 20,000 MDR-TB and 4,000 rifampicin-resistant TB (RR-TB) cases reported, almost 16,000 patients with MDR-TB had been registered for treatment in the Region (according to country reports). Compared to the previous year, there was an almost two-fold increase in reported MDR-TB cases put on treatment, thanks to the progress made in most of the countries. Available data from the first semester of 2013 (from five countries, including India) confirmed the increasing trend, as almost 12,000 cases were reported on treatment. However, the numbers reported are often incomplete or inconsistent with the expansion of PMDT, showing a clear need for strengthening the recording and reporting systems for DR-TB cases. Moreover, although most of the countries provided data on MDR-TB cases detected and on treatment, data for drug resistance testing and treatment outcomes are often not available, suggesting that recording and reporting is a challenging issue in most of the countries in the Region. For example, it is estimated that less than 1% of notified cases (both among new and previously treated cases) have undergone DST; in fact, most of the countries report that testing, although still considerably far from global targets, is often done but not reported. In addition, information about previous treatment was available for only 7% of all confirmed MDR-TB cases in 2012.

The regional average for treatment success rate of MDR-TB patients enrolled on second-line treatment was 46% for the 2010 cohort, although much higher rates have been reported by some countries.

### 4.3.3 Paediatric TB

The WHO *Guidance for national TB control programmes on the management of tuberculosis in children* published in 2006 and *Rapid Advice: Treatment of tuberculosis in children* published in 2010 serve as reference tools for countries to adapt to optimize outcomes, including quality of life and survival of children with TB.

Guidelines for diagnosis and treatment of paediatric TB have been widely disseminated in Indonesia, although diagnostic algorithms are reported to not be properly followed. In India, the guidelines have been disseminated and patient-wise drug boxes for children are available under the programme. National guidelines for the management of childhood TB have also been finalized in Bangladesh and Myanmar. Bangladesh conducted four batches of training of trainers (ToT) on childhood TB in 2012 and training for doctors and paediatricians is planned for 2014. Myanmar has also included paediatricians in their National Expert MDR-TB Committee. In Democratic People’s Republic of Korea, training
materials on paediatric TB treatment have been developed and trainings conducted; an orientation meeting on childhood TB with children-related facilities was held at central and provincial levels to improve TB service in 2012. In Nepal, a childhood TB management section was introduced into the national tuberculosis programme (NTP) General Manual. Bangladesh, Democratic People’s Republic of Korea, India, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste have received grants for anti-TB paediatric formulations through the Global Drug Facility (GDF).

Despite these achievements, paediatric TB remains neglected area, as it is shown by the very low notification rate in the age group below 15 years old. National guidelines should be widely disseminated and staff trained on paediatric TB management in all Member States in order to increase TB case detection in the paediatric population. All Member States need to revise national guidelines according to Rapid Advice: Treatment of tuberculosis in children issued in October 2010 by WHO, which provides evidence-based recommendations on treatment of childhood TB.

In 2012, notification data with breakdown by paediatric age groups were available for 7 of the 11 Member States in the South-East Asia Region.

### 4.3.4 Other challenges

National plans for TB control in the 11 Member States address the needs of populations at higher risk and those living in cross-border areas according to each country specificity, pursuing higher and earlier case detection and quality case management. Infection control measures have been included in national plans in Bangladesh, Bhutan, Democratic People’s Republic of Korea, India, Indonesia, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste.

### 4.4 Public and private partnerships

A major strategy to increase TB case detection and treatment success rates has been the inclusion of public health-care providers operating outside the ministries of health, such as the railways, military, corporate sectors and prison health services, as well as private providers in TB management. In some countries in particular, the percentage of patients seeking services through the private health sector is very high. Currently, all Member States have clear policies and strategies to involve other sectors. In 2012, these sectors contributed about 15% of new TB case notifications across the Region; however, this proportion is underestimated, because in some countries the recording and reporting system does not allow for
a proper breakdown by reporting source. In India, from 2012 onwards, reporting from the private and non-NTP public sector is expected to increase due to the introduction of TB on the list of notifiable diseases. Indonesia is exploring new public–private mix (PPM) approaches, matching with country needs, including mandatory notification and social business models.

Universities and medical schools are contributing to evidence-based policies and strategies through technical advisory groups at the national level. The International Standards for Tuberculosis Care (ISTC) have been endorsed by professional bodies, including medical associations in Bangladesh, Democratic People’s Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka and Thailand. Intersectoral collaboration and public–private partnerships for delivery of services have been further scaled up in eight Member States (Bangladesh, India, Indonesia, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste). More than 1200 medical colleges, 30 000 private practitioners, 2000 large public and private hospitals, 250 corporate institutions, 2500 nongovernmental organizations, nearly 100 faith-based organizations and over 900 prisons are now working with NTPs.

Other recent initiatives include the formal inclusion of the principles and practices of TB control in pre-service training, and the establishment of referral mechanisms through the provision of lists of DOTS centres to teaching institutes. Indonesia has also introduced coordination meetings between community health facilities and hospitals to improve transfer mechanisms between lung clinics and puskesmas. In Myanmar, services have been resumed throughout the network of Sun Quality Health clinics and the Myanmar Medical Association.

More than 1000 private laboratories are now included in national diagnostic networks and undergo quality-assurance mechanisms. Indonesia has intensified training of private and public hospital and laboratory staff. India launched the Initiative for Promoting Affordable, Quality TB Tests (IPAQT), an innovative approach aiming to increase access to rapid, accurate and affordable diagnostics for patients treated in the private sector. IPAQT involves a consortium of 50 private laboratories (approximately 3000 franchisee laboratories and over 10 000 specimen collection centres) supported by not-for-profit stakeholders, and aims to allow concessional prices for Xpert MTB/RIF, line probe assay and liquid culture in the private sector through agreements with producer companies.
Partnerships with international and national NGOs enable TB service delivery in remote areas and among marginalized populations in several countries of the Region. The work of the Bangladesh Rural Advancement Committee and the Damien Foundation, through memoranda of understanding (MoUs) with the Government of Bangladesh, are outstanding examples of large-scale service delivery by NGOs that contribute to achieving national targets for TB control.

Several thousand community-based initiatives are being incorporated into routine service delivery by NTPs in the Region. In addition, business alliances, such as the Thai Business Coalition and the Business Alliance in India, are emerging as players from the non-health private sector and introducing TB services into their workplaces. Successful approaches should be systematically documented in order to replicate winning models in similar settings in countries of the Region.

4.5 Surveillance, monitoring and evaluation
Efforts are being made to strengthen national TB surveillance systems, focusing on quality of data, with the main emphasis on completeness of case reporting, accurate compilation and reporting of data.

In 2013, Thailand and Indonesia conducted in-depth assessment of their TB surveillance system using the newly developed WHO Checklist of standards and benchmarks for TB surveillance and vital registration systems in order to detail and cost a list of actions to strengthen the national systems.

With the exception of Maldives and Bhutan, trends in case notification rates cannot be used as proxy of trends in the incidence of TB because of insufficient reliability of data. Population-based surveys therefore continue to serve as independent tools for evaluating the burden of TB, estimating the trends of the TB epidemic, and assessing the impact of control strategies.

Efforts have been made to improve notification data and monitoring of treatment outcomes of MDR-TB cases, both in paper-based and electronic-based recording and reporting systems.

In 2013, joint monitoring missions on TB control were conducted in Indonesia, Nepal, Thailand and Timor-Leste.
4.6 Resources for TB control

In the Region as a whole, domestic funding continues to account for about 50% of the funding for NTPs, while the Global Fund accounts for almost 45% of funding for TB activities. Ten Member States currently benefit from funds mobilized through the Global Fund over the previous rounds of grants and through the single stream of funding, transitional funding mechanism and new funding model. Maldives is planning to apply for the new funding model of the Global Fund grant for 2015. Nepal is successfully implementing the national strategy application grant. In addition, nine Member States benefit from funds from other development partners and donor governments, with the exception of Bhutan and Maldives where the only external funds are provided through WHO country budgets. Despite the funding available through governments and various donors, the funding gap in the Region is about one fourth of the estimated overall budget of NTPs for 2014.

Considering the threshold of 2.28 health professionals per 1000 population, 5 of the 11 Member States have sufficient human resources for health. Turnover of staff, adequate training, and management of human resources are common challenges for most of the countries in the Region. Human resource development (HRD) plans are available for six countries in the Region.

All 11 Member States continue to access quality-assured affordable anti-TB drugs on a regular basis through grants or direct procurement services of the GDF. All countries of the South-East Asia Region successfully transitioned from grants to direct procurement services using domestic sources, Global Fund, World Bank, or other sources of bilateral funding for adult anti-TB drugs. An exceptional extended GDF grant of drugs was secured for Democratic People’s Republic of Korea (covering 100% of paediatric formulations, and adult formulation for one province).

Second-line anti-TB drugs are secured through GDF procurement, funded by UNITAID, for India (partially), Myanmar, Nepal and Timor-Leste; they are secured through GDF procurement, funded by the Global Fund, for Bangladesh, Bhutan, India (partially), Indonesia and Sri Lanka.

4.7 Operational research

NTPs and partners are engaged in carrying forward several operational research projects. Several other research projects are supported by WHO country offices through funds available at the country level from the Global Fund. Examples
are knowledge, attitude and practice studies in Timor-Leste; PPM models in Bangladesh, India, and Myanmar; hospital DOTS in Indonesia; seasonality in TB notifications; use of IPT in India, Indonesia and Myanmar; outcomes from cross-border TB control in Thailand; mortality studies in India, Indonesia and Myanmar; and approaches to community-based TB care in several countries. National workshops on operations research priority-setting and dissemination are held regularly in India; in collaboration with The Union and other stakeholders, India is conducting several operational researches.

Bangladesh, India, Indonesia, Myanmar, Nepal, Sri Lanka and Thailand have benefitted by several TB REACH-approved projects.
5.1 Technical assistance on implementation of Stop TB Strategy

All 11 Member States in the Region continue to receive technical assistance through the WHO Regional Office for South-East Asia and WHO country offices, in coordination and collaboration with international technical partners, namely the Centres for Disease Control and Prevention (CDC), Atlanta, United States of America; the Institute of Medical and Veterinary Science, Adelaide, Australia; the KNCV Tuberculosis Foundation in the Netherlands; the United States Agency for International Development (USAID); USAID-supported TBCARE I and II; the Foundation for Innovative New Diagnostics (FIND); PATH; the Institute of Tropical Medicine in Antwerp, Belgium; and, The Union. The three WHO collaborating centres, namely, the National Tuberculosis Institute, Bangalore, India, the National Institute for Research in Tuberculosis, Chennai, India, and the South Asian Association for Regional Cooperation (SAARC) Tuberculosis and HIV/AIDS Centre, Kathmandu, Nepal, and technical partners based in countries in the Region have also actively provided technical support to NTPs during 2013.

To provide overall guidance to countries, the Regional Office for South-East Asia has disseminated the *Updated Regional Strategic Plan for TB Care and Control 2012–2015* in the Region.

Technical missions were undertaken to all 11 Member States during 2013 to provide support to NTPs in various areas, such as laboratory assessment and capacity-building; development and implementation of guidelines and/or national strategies for TB, MDR-TB, TB/HIV, childhood TB, infection control, PPM, and advocacy, communication and social mobilization; improvement of drug procurement and supply management; HRD; data management and use; and, impact assessments.

Support was provided to review and update 5-year national plans in Maldives and Timor-Leste; to update the NTP manual and guidelines on PMDT.
in Bangladesh, Indonesia, Myanmar, Thailand and Timor-Leste; to implement infection control plans in Bangladesh, India, Indonesia, Myanmar and Nepal; to elaborate the HRD plan for PMDT in Indonesia; to follow up on the implementation of Practical Approach to Lung Health (PAL) in Bangladesh, India, Nepal, Maldives and Sri Lanka; to scale up TB/HIV activities in India, Indonesia and Myanmar; to develop NTP training modules in Timor-Leste; and, to develop a plan for intensive case-finding in Myanmar.

With the assistance of the rGLC, monitoring missions to assess the current situation were conducted in Bangladesh, Bhutan, Democratic People’s Republic of Korea, Myanmar, Nepal, Sri Lanka and Timor-Leste, and support was provided to conduct national trainings on PMDT in Bangladesh, Thailand and Timor-Leste. Technical assistance is ongoing to India and Indonesia to scale up implementation of the PPM approach. A national workshop on PPM was supported in Nepal.

The TB Technical Assistance Mechanism (TBTEAM) has been utilized to provide technical assistance to countries. The South-East Asia Region’s TBTEAM identified national TBTEAM focal point(s), in collaboration with all national and external partners, in respective countries. The regional TBTEAM regularly monitors the functioning of national TBTEAMs, to ensure information is up to date and that tasks in the standard terms of reference for a national TBTEAM focal point are performed. Specific training on TBTEAM was conducted in Timor-Leste. The regional roster of experts was further expanded and all proposed technical assistance missions to countries were mapped, with the aim of deploying suitable consultants to meet the technical assistance requirements of countries. This also serves to facilitate the seeking of additional funding from the Global Fund, TB REACH, UNITAID and other partners to support the necessary technical assistance to countries.

5.2 Regional Green Light Committee (rGLC)

To provide better coordinated and quality support to the implementation and expansion of PMDT, the rGLC was established in 2012. The rGLC Secretariat provides clear guidance on new policies and strategies for PMDT interventions in countries of the Region. The rGLC “package of services” was defined and the modus operandi was endorsed. The rGLC is supporting the implementation of the South-East Asia Regional Response Plan for Drug-resistant TB Care and Control 2011–2015, ensuring that country PMDT plans reflect programmatic recommendations on the response to DR-TB, including recording and reporting of the standard indicators selected for the South-East Asia Region, and that
monitoring mission reports are reviewed and structured according to a standard template. The rGLC also supports the coordination of high-quality technical assistance and resource mobilization for countries that have a PMDT expansion plan.

Some of the programmatic recommendations of the rGLC address the need to prioritize at-risk groups and develop algorithms for use of WHO-approved rapid diagnostics in order to improve case-finding and diagnosis; move toward self-sufficient in-country diagnostic capacity, and create linkages with SRLs for technical support; move forward ambulatory case management; strengthen infection control; monitor advocacy, communication and social mobilization efforts at the country level; and, encourage research on WHO-approved rapid diagnostics and DRS.

Some of the strategies to ensure effective support to countries are to identify centres of excellence in MDR-TB clinical management at the regional level; establishment of a regional PMDT training centre to enhance managerial and technical capacities for the management of DR-TB within the Region; and the possibility of a regional proposal to address cross-border issues and the treatment of migrants.

The third and fourth meetings of the MDR-TB Advisory Committee were held in April and November 2013, respectively.

### 5.3 Strengthening national laboratory networks

Technical assistance, coordinated through WHO, is being provided by the SRLs based at the Institute of Medical and Veterinary Science in Adelaide, Australia; the Institute of Tropical Medicine in Antwerp, Belgium; the Central Reference Laboratory in Gauting, Germany; the National Institute for Research in Tuberculosis in Chennai, India; the National Tuberculosis Institute in Bangalore, India; the Bureau of Tuberculosis in Bangkok, Thailand; and Department of Health, China, Hong Kong SAR, to help establish culture and DST facilities in countries in a phased manner, in line with national plans. All 11 Member States in the Region have formally established linkages with the SRLs.

Continuous support to strengthen capacity for quality assurance, culture and DST, was provided to Bangladesh, Bhutan, Democratic People’s Republic of Korea, India, Indonesia, Myanmar, Nepal and Thailand. As a result, all 11 Member States have quality-assured smear microscopy, culture and first-line DST (through in-
country facilities or through linkage with SRLs) and two countries have developed capacity for quality-assured second-line DST.

In 2013, GLI missions to assist implementation of the EXPAND-TB Project were conducted in Bangladesh, India, Indonesia and Myanmar. EXPAND-TB is a collaboration between WHO, GLI, FIND and GDF to ensure access to quality-assured new diagnostic technologies endorsed by WHO, including liquid culture, rapid speciation, rapid DST and molecular line probe assay. Diagnostic technologies are properly integrated into TB control programmes and implemented in appropriate laboratories in countries, and local know-how and sustainability are promoted through technology transfer efforts. As of 2013, newer diagnostics were available in Bangladesh, India, Indonesia, Myanmar, Nepal and Thailand.

5.4 Capacity-building and information exchange

Training and exchange of information at the global and regional levels, as well as in-country capacity-building, have been the key areas of work for the WHO Regional Office for South-East Asia and country office staff during the past few years.

In 2013, the Regional Office and WHO country offices supported the facilitation of several national-level trainings and workshops, in all countries, and capacity was built in various technical areas.

In 2013, all 11 Member States participated in three meetings organized by the Regional Office. A Regional Meeting on Combating Drug-resistant TB was held in Bangkok and the report is available. A Regional Meeting of National TB Control Programme Managers and Partners was held in Bangkok and the report is available. A Regional Meeting on Promoting Roles of NGOs and Civil Society in Community-based TB Care and Control was held in Jakarta and the report is available. In addition, Thailand and Indonesia participated in the WHO Global Taskforce on TB Impact Measurement: Multi-country workshop on TB prevalence surveys and TB surveillance, organized in Accra, Ghana to build capacity on survey protocol development.

WHO staff at the regional level participated in the Annual GLI Partners’ Meeting, the meeting of the Strategic and Technical Advisory Group for Tuberculosis (STAG-TB) and the Annual TBTEAM Meeting in WHO headquarters, mainly addressing the post-2015 strategy, the inclusion of newer drugs
into treatment protocols and the MDR-TB Booster Initiative. Outcomes and recommendations of the meetings were disseminated to countries for reference, follow-up and further action.

## 5.5 Resource mobilization

Several Member States were assisted in mobilizing resources from development partners and donor governments during 2013. Bhutan, Sri Lanka and Timor-Leste were supported to develop proposals for submission during the Global Fund’s transitional funding mechanism call for applications. Myanmar was supported in the preparation of a proposal for USAID funding, as well as for the Global Fund’s new funding mechanism. The Regional Office for South-East Asia developed and got approval for a proposal for USAID funding for the fiscal year 2013. USAID reports were elaborated and are available for Bangladesh, India, Indonesia, Myanmar and the Regional Office.

The activities undertaken and coordinated by the TB unit at the Regional Office are supported almost entirely through USAID regional funding. Additional funds for technical assistance to countries are being sourced through the TBTEAM and rGLC Secretariat.

## 5.6 Ensuring regular supplies of drugs and improving procurement and supply management

Assistance continued to be provided for timely procurement of anti-TB drugs through grants and direct procurement mechanisms. All 11 Member States in the Region embarked on use of GDF services and products, and accessed low-cost and quality-assured fixed-dosage combination drugs. No stock-outs were reported from any country at the point of treatment delivery.

All countries in the Region, at different stages, successfully transitioned from grants to direct procurements in for first-line anti-TB drugs, adult and paediatric formulations. An exceptional extended GDF grant was secured for Democratic People’s Republic of Korea (100% of paediatric formulation, and adult formulation for one province). Second-line anti-TB drugs were procured through the GDF and funded by UNITAID or the Global Fund (see details in Chapter 4) in all countries, except Maldives where the Ministry of Health is procuring second-line drugs on a case-by-case basis. In Thailand, drugs are procured using local resources such as the Government Pharmaceutical Organization.
In 2013, in-country technical support to strengthen procurement and supply management was ongoing: Bangladesh, India, Indonesia, Myanmar, Sri Lanka and Thailand have procurement and supply management plans available. A drug manufacturers’ meeting was held in Indonesia, supported by the Regional Office for South-East Asia, to promote and advocate to drug manufacturers for production of first- and second-line anti-TB drugs.

5.7 Operational research
Countries have received technical support in the submission of research proposals through the TB REACH initiative. Bangladesh, India, Indonesia, Myanmar, Nepal, Sri Lanka and Thailand submitted proposals concerning access to diagnosis and treatment of TB and/or MDR-TB. Bangladesh, India, Indonesia and Myanmar were supported in the elaboration of operational research protocols in order to address country needs and use innovative approaches.

India, Myanmar and Thailand were assisted in developing protocols for initiating IPT at selected sites and were required to have evidence for the implementation of IPT to prevent TB among people living with HIV.

5.8 Coordination, collaboration and partnerships
To mobilize greater commitment for TB control in the Region, WHO at country, Regional Office and headquarters levels continued to interact with several donor and development partners. The Region is represented on the Stop TB Coordinating Board and the Board of the Global Fund.

Staff from the Regional Office and country offices participated and contributed to workshops and meetings held by WHO headquarters and partner agencies, namely: STAG Meeting, Regional Adviser’s meeting, TBTEAM meeting, Union Conference; and GLI.

5.9 Advocacy, communication and social mobilization
The Regional strategy for advocacy, communication and social mobilization was developed and the framework for advocacy, communication and social mobilization activities at the country level has been finalized. In 2013, Bangladesh was supported to develop an advocacy, communication and social mobilization strategy, which is available.
Many community-based initiatives have been established through the active involvement of NGOs in Bangladesh, India, Indonesia, Myanmar, and Thailand. Ongoing advocacy, communication and social mobilization activities are being properly documented and analysed for cost-effectiveness; best practices emanating from these will be utilized for wider replication. In 2013, in addition to success stories on best practices in advocacy, communication and social mobilization activities, a document on best practices by community-based organizations in TB control in the Region was made available.

All countries and the Regional Office observed World TB Day, for which advocacy materials were developed.

5.10 Monitoring and evaluation, and TB burden estimates

In the past few years, interventions to support impact assessments were conducted in several Members States in the form of prevalence surveys, ARTI surveys, mortality surveys, in-depth analysis of programme data to determine trends, and the revision of TB burden estimates.

In 2013, support of prevalence surveys at different stages of implementation was provided to four countries. Thailand was supported in the finalization of field operations and analysis of data; Indonesia was supported in elaboration of the implementation plan and beginning of field operations; Bangladesh received support for a methodology workshop and budget estimation in preparation for the survey to be conducted in 2014–2015; Nepal was supported in the development of survey protocol and implementation plan in preparation for a survey to be started in mid-2014.

Assistance was also provided to Bangladesh to analyse data and finalize the report of a national drug resistance survey, conducted in 2012.

Timor-Leste received support to assess notification data and the surveillance system, and to revise TB burden estimates.

In-country technical assistance for improving data management software (e-TB Manager) and trainings on data management were completed in Bangladesh, India and Nepal with support of Management Sciences for Health; recording and reporting is in place.
Thailand received support to finalize the revised monitoring and evaluation plan. Countries were also assisted in further improving supervision and monitoring of programme performance.

Joint external monitoring missions on TB control were completed in Indonesia, Nepal, Thailand and Timor-Leste. In Indonesia and Thailand, during the monitoring mission, the surveillance system was thoroughly assessed using the newly developed WHO *Checklist of standards and benchmarks for TB surveillance and vital registration systems* and a list of costed actions to strengthen the national system was developed.
Country Profiles
With a population of about 155 million, Bangladesh ranks sixth among the high TB burden countries globally. The estimated prevalence and incidence rates of all forms of TB were 434 and 225 per 100 000 population, respectively, in 2012. However, the estimates have not been officially approved by the NTP, which plans to reassess them jointly with WHO following the completion of the national TB prevalence survey in 2014–2015.

In 2012, the notification rate of all forms of TB and new smear-positive cases was 109 and 69, respectively, showing almost a 10% increase compared to 2011. The treatment success rate among new smear-positive cases has been steady at 92% for all the cohorts of patients registered since 2006, including the 2011 cohort. Treatment success rate among smear-negative and retreatment cases was 89% and 82%, respectively, in the 2011 cohort.

The number of peripheral laboratories performing smear microscopy increased from 1050 in 2010 to 1070 in 2012, corresponding to 0.7 per 100 000 population, to extend greater access to TB diagnostic services. EQA has been carried out for all microscopy laboratories, showing an acceptable performance in 94% of them. Upgrading and renovation of the National Reference Laboratory at the National Institute of Diseases of the Chest and Hospital (NIDCH) in Dhaka was conducted in 2010. The National Reference Laboratory was accredited for culture and DST by the SRL in Antwerp, Belgium, in 2010, although the two have been linked since 2007. In 2012, the number of laboratories performing culture increased from one to three, all of which also perform DST for first-line drugs. Despite this increase, culture and DST capacity is still low considering the size of the population (at 0.1 laboratory per 5 million population). Establishment of additional regional reference laboratories in Khulna and Sylhet divisions for culture and DST is in process and will be completed in 2014, although it was planned for 2013.

In 2012, Xpert MTB/RIF was implemented in 12 sites with the support of TB CARE II, and it is planned to expand up to 39 sites in 2014. Bangladesh is also a recipient of the UNITAID TBXpert Project, with support from the Stop TB
Partnership and TB REACH initiative. Twenty-five Xpert MTB/RIF instruments will be implemented in order provide access to free diagnosis to high-risk patients in Dhaka through innovative social business models, including private screening centres and other partnering locations.

In 2012, the national TB guidelines were updated in line with more recent international recommendations. After piloting e-TB Manger in six sites, it was expanded to 20 more sites in 2012. The NTP plans to establish e-TB Manager in an additional 80 sites in 2014, with support from Management Sciences for Health. At present, data are being collected from the field as both hard and soft copy; this will be continued until e-TB Manager is fully operational throughout the country.

The National Guidelines for the Management of Tuberculosis in Children were published in 2012, and four batches of ToT conducted. Training for doctors and pediatricians for childhood TB is planned after ToT. In 2013, thanks to TB CARE II support provided in 2012, TB cases aged 0–14 years represented 2.9% of all new TB cases detected. Since 2010, Bangladesh has been reporting TB notification disaggregated by age groups 0–4 years and 5–14 years, showing commitment towards addressing childhood TB.

The National Guidelines for Tuberculosis Infection Control were published in 2011. The operational guidelines for drug-resistant TB have been revised and standard operating procedures (SOPs) for community-based PMDT were developed in 2012.

The PAL guidelines have been finalized and two batches of ToT have been completed. After the ToT, 26 medical doctors were trained on PAL.

Due to the size of the population and reported TB cases, Bangladesh is among the 27 high MDR-TB burden countries, despite data from previous drug resistance surveys indicating low levels of MDR-TB. The results of the first national drug resistance survey, completed in 2012, confirmed a low proportion of new cases with MDR-TB (1.4%, confidence intervals 0.7–2.5), but the proportion among retreated cases was revised upwards (28.5%, confidence intervals 24–34). Coverage of routine DRS is still low, being 0.02% and 7% among new and retreatment cases of TB, respectively.

A GLC-approved project for the management of MDR-TB cases at NIDCH, Dhaka started in August 2008 and at the Chest Disease Hospital in Chittagong in 2011. The Damien Foundation (NTP NGO partner) provides MDR-TB services
as an operational research project in designated geographical areas following a 9-month regimen. The Damien Foundation has its own reference laboratory capable of performing culture and DST for first-line drugs. In 2012, a total of 513 MDR-TB cases were confirmed and notified (almost 30% increase compared to 2010 notifications) and all of these cases were started on second-line treatment; another 388 RR-TB cases were notified. In the first semester of 2013, 213 MDR-TB cases were reported, and 332 cases (MDR-TB or RR-TB) were started on treatment. For the cohort of MDR-TB patients enrolled on treatment in 2010, the success rate was 75%.

HIV prevalence in the adult general population is low (less than 1%) in Bangladesh except for injecting drug users, among which a recent survey revealed an HIV prevalence of 7%. This has raised concerns regarding the potential for transmission of HIV to other population groups. National TB/HIV operational guidelines were developed in 2009. While a national TB/HIV committee is now functional, collaboration between the national AIDS and sexually-transmitted infections programme and the NTP for TB/HIV activities needs to be strengthened. A limited number of NGOs provide HIV counselling, prevention and care for TB/HIV coinfectected individuals. Capacity-building for wider implementation of TB/HIV interventions started in 2009 and is ongoing. The number of TB patients tested in 2012 for HIV was 2086 (almost 10% more than in 2011), corresponding to 1% of all TB patients notified in the same year. HIV-positive TB cases detected numbered 63 (3% of all tested) and all of them started ART and CPT. TB screening was reported for 429 HIV-positive patients.

TB services are part of an essential services package under the Health, Nutrition and Population Sector Program (presently known as the Health, Population and Nutrition Sector Development Program) which is implemented through the country’s primary health care system. Bangladesh is an outstanding example of implementing TB control in partnership with NGOs. Community-based DOTS through village doctors and the network of shasthya shebikas (community health volunteers) is the most common mechanism for supervising drug intake. Collaboration with garments’ manufacturers, which account for 3 million employees and one of the largest industrial sectors, was formalized and plans developed for providing TB services in these companies. Several private and corporate sectors are involved in TB control and in rendering services in line with international standards for TB care. In total, 110 non-NTP public providers (including public hospitals, medical college hospitals and military hospitals) and 85 private providers have been involved so far, contributing to about 17 500 TB cases notified in 2012. Services have also been established in the prison system.
The data management software has been upgraded and financial management software has been installed. The ISTC have been formally endorsed by professional associations. An HRD plan has been developed and a focal point for human resources designated at the central level. NTP guidelines have been included in the curricula for basic training of different categories of health staff, and curricula for undergraduate/postgraduate medical, paramedical and nursing students on DOTS, TB/HIV, MDR-TB is under process.

The NTP benefits from Global Fund support through Rounds 3, 5, 8 and 10. This support is channelled through two principal recipients: the External Resource Division of the Ministry of Finance for the NTP (Government) and the Bangladesh Rural Advancement Committee for the NGO consortium. WHO provides strong technical and operational support to the programme. In addition, USAID provides financial assistance to the NTP directly while several other donors are funding TB activities through NGOs. Some support for TB control is also made available through the Health, Population and Nutrition Sector Development Program.

Major achievements

- First national drug resistance survey completed and final report available soon.
- First national TB prevalence survey completed in 2009 and disseminated in 2010. Second national TB prevalence survey planned for 2014–2015. Preliminary works, such as a workshop for methodology and budget estimation, have been conducted with technical support from WHO and the Research Institute of Tuberculosis.
- PMDT guidelines have been revised and updated.
- MDR-TB management successfully piloted in NIDCH at Dhaka and scaled up in Chittagong.
- The SOPs for community-based DR-TB finalized and piloted in four districts. Implementation is being supported by the partner (TB CARE II).
- Upgrading and renovation of the National Reference Laboratory at NIDCH, Dhaka was completed.
- Further expansion of PPM and involvement of workplaces (e.g. Bangladesh Garment Manufacturers and Exporters Association) was achieved.
- Drug storage capacity strengthened by the establishment of a separate store in the newly constructed hospital at Shyamoli, Dhaka.
• Piloting of e-TB Manager in six sites and expansion to 20 more sites in 2012. Management Sciences for Health plans to establish e-TB Manager in another 80 sites in 2014.

• PAL guidelines finalized and two batches of ToT conducted in September 2012. Training conducted for two batches of medical doctors.

• National Guidelines for the Management of Tuberculosis in Children published and ToT conducted in 2012.

• National Guidelines for Tuberculosis Infection Control published.

• Training manuals for Gene Xpert developed and 12 Gene Xpert machines installed in different sites in 2012.

• Line probe assay and liquid culture installed and functionalized in 2012.

• Operational research on validation of data and TB/diabetes relationship conducted.

Major challenges

• Ensuring uninterrupted supply of drug and logistics.

• Ensuring sustainability of skilled and trained staff at different levels.

• Scaling up the management of DR-TB and community-based PMDT.

• Further scaling up and strengthening of private–public collaborative interventions.

• Strengthening linkages with the national AIDS and sexually-transmitted infections programme for TB/HIV.

• Quality control, and sustaining quality, of DOTS.

• Strengthening system for diagnosis of smear-negative, extra-pulmonary and child TB cases.

• Reaching the hard-to-reach populations on islands and marshlands.

Planned activities for 2014

• Conducting a joint monitoring mission.

• Conducting TB prevalence survey in 2014–2015.

• Application to Global Fund using the new funding model.
• Piloting shorter regimen for MDR-TB management.
• Establishment of the regional reference laboratories at Khulna and Sylhet for culture and DST in a phase-wise manner.
• Scaling up of PAL activity.
• Phase-wise expansion of TB/HIV collaborative activities.
• Developing capacity for wider implementation of TB/HIV, MDR-TB and PPM DOTS interventions.
• Further expanding private-public collaborative activities.
• Strengthening the procurement and supply management system.
• Strengthening supervision and monitoring.
• Scaling up of e-TB Manager.
• Implementation of TB infection control.
• Scaling up of comprehensive advocacy, communication and social mobilization activities.
• Conducting assessment of the impact of the information, education and communication (IEC) campaigns on the population and service recipients.
• Capacity-building for diagnosis and management of smear-negative, extrapulmonary and childhood TB. Training for doctors and pediatricians is planned for childhood TB, after ToT.
• Establishing a pharmacovigilance system.
• Conducting drug quality assessment.
• Conducting operational research on validation of data, TB-diabetes relationship, etc.
• Establishment of logistics management information system.
• Scaling up of GeneXpert sites.
Case notifications by type of patients, 2012

- New smear-positive: 61.5%
- New smear-negative: 14.1%
- New extrapulmonary: 17.6%
- Relapse: 1.8%
- Case type unknown: 2.2%
- Treatment after failure: 0.5%
- Treatment after default: 0.1%
- Other: 2.8%
- Other retreatment: 2.2%

Trends in TB case notifications, 2001–2012

- All cases
- New smear-positive

Cases per 100,000 population

Years


0 20 40 60 80 100 120

Tuberculosis Control in the South-East Asia Region 2014
Trends in notified new smear-positive TB cases by age group among males, 2001–2012

Trends in notified new smear-positive TB cases by age group among females, 2001–2012
Treatment outcomes of new smear-positive cases, 2011 cohort

- Cured: 91%
- Completed: 1%
- Died: 3.8%
- Defaulted: 1.7%
- Not evaluated: 1.8%
- Other: 8%

Trends in treatment outcomes of new smear-positive cases, 2000–2011
<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td><strong>154,695,368</strong></td>
</tr>
<tr>
<td><strong>Incidence of all forms of TB</strong></td>
<td><strong>350,000</strong></td>
</tr>
<tr>
<td><strong>Incidence rate of all forms of TB (per 100,000 population per year)</strong></td>
<td><strong>225 (185–268)</strong></td>
</tr>
<tr>
<td><strong>Prevalence of all forms of TB</strong></td>
<td><strong>670,000</strong></td>
</tr>
<tr>
<td><strong>Prevalence rate of all forms of TB (per 100,000 population)</strong></td>
<td><strong>434 (218–721)</strong></td>
</tr>
<tr>
<td><strong>TB death rate (of all forms of TB, excluding HIV per 100,000 population per year)</strong></td>
<td><strong>45 (19–84)</strong></td>
</tr>
<tr>
<td><strong>Notification rate of all forms of TB (per 100,000 population for the year 2012)</strong></td>
<td><strong>109</strong></td>
</tr>
<tr>
<td><strong>Notification rate of new smear-positive cases (per 100,000 population for the year 2012)</strong></td>
<td><strong>69</strong></td>
</tr>
<tr>
<td><strong>Case detection rate (all forms of TB)</strong></td>
<td><strong>49 (41–59)</strong></td>
</tr>
<tr>
<td><strong>Treatment success rate (%) of new smear-positive cases for 2011 cohort</strong></td>
<td><strong>92</strong></td>
</tr>
</tbody>
</table>

*Estimated incidence, prevalence and mortality rates and numbers have not been officially approved by the NTP and should be considered provisional; reassessment will be done following the prevalence survey planned for 2014.

Bhutan

With a population of approximately 740 000, Bhutan had estimated prevalence and incidence rates of all forms of TB of 225 and 180 per 100 000 population, respectively, in 2012. All TB burden indicators are estimated to be decreasing over time. The notification rate of all forms of TB (new and relapse cases) and new smear-positive cases was 152 and 57, respectively, showing a steady decrease since 2010, particularly for all TB cases. The treatment success rate for the cohort of new smear-positive cases registered during 2011 was 91%; the treatment success rate has been equal to or above 90% since 2007. In the 2011 cohort, treatment success rate for smear-negative and extrapulmonary cases was 92% and for retreatment cases it was 76%. The NTP is fully integrated into the general health services, with the majority of activities decentralized to the districts.

Efforts to improve access to TB services for vulnerable populations were conducted according to the workplan of the Global Fund transitional funding mechanism grant. Activities aiming to increase access for migrant workers were conducted in eight districts where major projects and construction works are undertaken. Symptomatic screening and educational programmes for TB are being carried out in all districts for monastic institutions. In 2014, it is planned to establish partnership with the indigenous unit for referral of presumptive TB cases along with revision of recording forms to capture information on the partnership.

There are no representative data on levels of DR-TB in the country. Based on modelling, WHO estimated that 2.2% of newly diagnosed TB cases and 16% of retreatment cases have MDR-TB. DRS started in 2010 and is ongoing to better assess levels of DR-TB in the country; preliminary results suggest a higher drug resistance rate than WHO estimates. In 2012, 15% of all new cases notified and 6% of retreatment cases were tested for drug resistance; five MDR-TB cases were diagnosed among new cases tested for DST (proportion of 3%), none among retreatment cases, and six among cases with unknown history.

The Public Health Laboratory is linked to the regional SRL in Bangkok, Thailand, and has been accredited for culture and first-line DST; EQA showed
acceptable performance in 2012. There are plans to expand culture capacity to the two regional referral hospitals. Additional laboratory staff were trained for undertaking quality-assured culture and DST. DST is currently done for all retreatment cases; it is being extended to all smear-positive cases initiated on treatment, at a slow pace due to limited laboratory capacity and considerable backlog. Liquid culture has been recently introduced at the Public Health Laboratory and the process of validating liquid DST results is ongoing; furthermore it is expected that the Public Health Laboratory will be able to produce timely results after line probe assay is installed by early 2014.

GLC-approval for the management of MDR-TB cases was obtained in 2009, guidelines for MDR-TB management have been finalized, medical doctors have been trained on MDR-TB management and second-line drugs are being procured through GDF/GLC. Of the 16 MDR-TB cases detected in 2012, 11 were started on second-line standard treatment. Treatment success rate for MDR-TB patients in the 2010 cohort was 76%.

As result of laboratory capacity and PMDT strengthening efforts, in 2013 the programme was seeing an increased notification of MDR-TB cases. A drug resistance survey was completed in 2013 and the preliminary report, elaborated by the Public Health Laboratory, suggests high rates of MDR-TB, with around 5% among new cases and 35% among previously treated cases.

The NTP has introduced fixed-dose combination drugs, replacing single drug formulations for first-line treatment for both adult and paediatric cases. The adult fixed-dose combination drugs are procured through the GDF while paediatric formulations are supported through a GDF grant. Guidelines on management of TB have been revised and trainings conducted for medical doctors involved in TB control activities.

The prevalence of HIV infection in the general population is low, at 0.02%. HIV sentinel surveillance carried out annually has also revealed low levels of HIV infection among TB patients. Policies exist for referral of TB patients to HIV counselling and testing, CPT and ART are in place, as well as policy for IPT. Development of new TB/HIV guidelines, including a recording and reporting system to capture implementation of collaborative activities, was completed and training conducted for all involved health workers. A national body responsible for coordinating TB/HIV activities has been formed. TB/HIV collaborative activities are planned under the National Strategic Plan for TB Control 2012–2016. No HIV-
positive TB case was reported in 2012, however; following activities conducted in 2013, data are expected to be available for 2013 onwards.

A comprehensive HRD master plan is in place in the Human Resources Division of the Ministry of Health. The programme coordinates with the Human Resource Division at the central level on human resource issues.

There is strong collaboration between the NTP and partners, including the military hospitals. All military hospitals are involved in delivering TB services. The NTP is financially supported through the Government and the Global Fund (Round 6 and transitional funding mechanism grant).

**Major achievements**

- Treatment success rate of new smear-positive cases maintained at 90% or higher.
- Global Fund transitional funding mechanism grant was secured to ensure continuity of key essential services.
- National TB/HIV guidelines developed and implementation initiated.
- In-country training on MDR-TB management.
- GLC and GDF mission conducted.
- Laboratory assessment visit by SRL
- Laboratory capacity strengthened for culture and DST.
- Strengthened patient follow-up using mobile technology.
- World TB Day observed.
- Procurement of first-line and second-line drugs through GDF/GLC.
- Monitoring and supervision was strengthened.
- Drug resistance survey completed.
- Training of new laboratory technicians on sputum microscopy.

**Major challenges**

- Ensuring practice of DOT throughout the course of treatment.
- Emergence and gradual rise of MDR-TB.
- Limited human resources, especially in terms of technical capacity.
• Ensuring adequate funding for TB control.
• Delay in laboratory diagnosis of MDR-TB.
• Inadequate community participation.

Planned activities for 2014

• Refresher training for laboratory technicians found poor on proficiency.
• Training of basic health unit grade II staff in sputum smear preparation and transport in remote, hard-to-reach basic health units.
• Procuring first-line and second-line drugs through GDF/GLC.
• Establishing line probe assay for rapid diagnosis of MDR-TB.
• Strengthening monitoring and supervision.
• Strengthening partnership with the indigenous unit for referral of presumptive TB cases.
• Strengthening the follow-up of cases using communication technology.
• Engaging multisectoral task force for advocacy, communication and social mobilization.
• Strengthening laboratory and clinical capacity for diagnosis of MDR-TB.
• Improving access to TB services for vulnerable populations such as migrant workers and monastic institutions.
• Commemoration of World TB Day.
• Holding annual TB laboratory and TB review meetings.
• Quality assessment visit to the Public Health Laboratory by the SRL.
• Conducting annual GDF/GLC mission.
Case notifications by type of patients, 2012

- New extrapulmonary: 45.3%
- Relapse: 5.6%
- Treatment after failure: 0.9%
- Treatment after default: 0.4%
- Other: 1.3%
- New smear-positive: 36.7%
- New smear-negative: 11.1%

Trends in TB case notifications, 2001–2012

- Cases per 100,000 population
- Years: 2001 to 2012

- All cases
- New smear-positive
Notified TB cases by type, age group and sex, 2012

Notified TB cases by type, age group and sex, 2012

Notification rate of TB cases by type, age group and sex, 2012
Treatment outcomes of new smear-positive cases, 2011 cohort

- Cured: 87.7%
- Completed: 3.4%
- Died: 3.1%
- Failed: 4.7%
- Defaulted: 0.5%
- Not evaluated: 0.5%
- Other: 8.9%

Trends in treatment outcomes of new smear-positive cases, 2000–2011
### Estimates and notification rates for 2012, Bhutan

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Population*</td>
<td>741 822</td>
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<tr>
<td>Incidence of all forms of TB</td>
<td>1300 (1100–1500)</td>
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<td>Incidence rate of all forms of TB (per 100 000 population per year)</td>
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<td>Prevalence of all forms of TB</td>
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<td>Prevalence rate of all forms of TB (per 100 000 population per year)</td>
<td>225 (79–446)</td>
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<tr>
<td>TB death rate (of all forms of TB, excluding HIV per 100 000 population per year)</td>
<td>14 (8.4–21)</td>
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<td>Notification rate of all forms of TB (per 100 000 population for the year 2012)</td>
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<tr>
<td>Notification rate of new smear-positive cases (per 100 000 population for the year 2012)</td>
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<tr>
<td>Case detection rate (all forms of TB)</td>
<td>85 (73–99)</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2011 cohort</td>
<td>91</td>
</tr>
</tbody>
</table>

Democratic People’s Republic of Korea

With a population of about 25 million, the Democratic People’s Republic of Korea has an annual incidence and prevalence of TB (all forms) of 409 and 511 per 100 000 population, respectively. In 2012, the notification rate of all forms of TB and new smear-positive cases were 371 and 129, respectively, showing a slight increase compared to 2011. However, since 2007, there has been a significant steadily increasing trend over time, especially for all TB cases: in 2012 the notification rate was double that in 2006. The increase was due to active case-finding efforts, following the upward revision of incidence estimates done in 2007, based on a national ARTI survey. At that time, given the significant gap between the estimated incidence and actual case notifications, intensified active case-finding in the community was adopted as a supplementary method for case-finding. Moreover, integration of previously non-DOTS sectors has led to an increase in case notifications. The burden estimates for 2012 were further revised upwards because case detection rate exceeded 100%: for 2012, case detection rate for all forms of TB was estimated to be 91%. The treatment success rate of smear-positive TB cases has been above 85% since 2001, and sustained at 90% or above since the 2009 cohort (at 90% in the 2011 cohort). High treatment success rates were also reported for smear-negative/extrapulmonary and retreatment TB cases at 92% and 84%, respectively.

Laboratory capacity has been strengthened in the country. The National Reference Laboratory was established at the Central TB Institute in Pyongyang and is currently supported by international NGOs, namely Christian Friends of Korea and Stanford University, as well as WHO, the Global Fund and UNICEF. In 2012, EQA was carried out at the National Reference Laboratory with acceptable results for culture and DST. The number of smear microscopy laboratories was expanded from 285 in 2011 to 320 in 2012. EQA was carried out in 96% of the smear microscopy laboratories, and 91% showed acceptable results. The GeneXpert system was established in the National Reference Laboratory in 2013, for the first time in the country.
Currently, MDR-TB is estimated to be 2.2% among new cases and 16% among retreatment cases, based on WHO modelling. A small-scale TB drug-resistance study with GeneXpert is underway in one province. Guidelines for MDR-TB management were developed in October 2011, the NTP adopted the standard regimen recommended by WHO and second-line drugs are being procured through GDF with Global Fund support. In 2012, 25 MDR-TB cases were notified; in 2013 another 126 cases were detected showing a rapid increase of MDR-TB diagnostic capacity. Between January 2012 and June 2013, a total of 170 MDR-TB cases were enrolled on second-line treatment under programmatic conditions.

No HIV has been reported among the country’s population to date. However, surveillance is being maintained and HIV testing in select TB cases with history of travel is being undertaken.

Training materials on paediatric TB treatment have been developed and trainings conducted. An orientation meeting on childhood TB with children-related facilities at the central and provincial level was held to improve paediatric TB services in 2012.

A multi-year strategic plan for 2008–2015 was developed in line with the *Global Plan to Stop TB* and the *Regional Strategic Plan for TB control, 2006–2015*. The strategic plan has been revised in consultation with WHO Regional Office for South-East Asia. The Government provides for around one fourth of the programme’s funding requirements in terms of staffing, infrastructure, drugs and surveillance. WHO continues to provide support to the programme, in terms of technical assistance, training health staff, strengthening laboratory services, upgrading infrastructure, and monitoring and evaluation. Regular supplies of anti-TB drugs were ensured through the GDF grant mechanism from 2003, and the last grant was extended until 2009. WHO Regional Office for South-East Asia exceptionally secured funds to provide up to 90% of funding for a further 1 year’s supply of drugs to cover the needs in 2010. Currently, anti-TB drugs are being procured through the Global Fund Round 8 TB grant for which UNICEF Democratic People’s Republic of Korea is the principal recipient. The GDF provides paediatric anti-TB drugs for the whole country and adult drugs for the one province not covered by the Global Fund grant. Support for single-line drugs is also received through Global Fund and the Eugene Bell Foundation.
Major achievements

- GeneXpert machine established in National Reference Laboratory and fully operational.
- High case detection and treatment success rates sustained.
- Monitoring and evaluation and supervision of DOTS implementation strengthened.
- Health facilities in other sectors actively involved in TB control activity.
- Involvement of household doctors in TB programme institutionalized.
- The Global Fund-supported project being implemented satisfactorily.
- Regular supplies of anti-TB drugs ensured through the Global Fund and GDF.
- Logistic management system for drug supply and management strengthened.
- National TB Strategy updated in line with WHO recommendations.
- PMDT being rolled out in phased manner.
- Establishment of a regional TB laboratory for culture and DST initiated.
- Human resource capacity strengthened through regular trainings (programme management, laboratory work and EQA, advocacy, communication and social mobilization, supply management, data management).

Major challenges

- Sustaining and enhancing uninterrupted supply of vital anti-TB drugs for Jagang province not covered under Global Fund grant.
- International standard method of EQA in pilot phase, not yet fully institutionalized.
- Suboptimal capacity for diagnosis of childhood TB.
- Inadequate funding for establishment of regional TB laboratory for culture and DST.
- Lack of capacity for expanding PMDT to all the provinces including capacity for programme management, clinical management of MDR-TB patients, and others.
Activities planned for 2014

- Preparing and starting TB prevalence survey in 2014.
- Conducting joint monitoring and evaluation of the NTP.
- Strengthening of coordination with other sectors, particularly the mining industry,
- Undertaking systematic supportive supervision at all levels.
- Establishing GeneXpert system at regional level.
- Expand programmatic management of DR-TB for better geographical coverage.
- Refurbishment of seven MDR-TB wards in the sanatorium.
- Technical support to National Reference Laboratory for early accreditation.
- Mobilizing additional resources through the Global Fund new funding model.
Case notifications by type of patients, 2012

- New smear-positive: 32.1%
- New smear-negative: 36.2%
- New extrapulmonary: 17.4%
- Relapse: 6.7%
- Treatment after failure: 2.4%
- Treatment after default: 1.7%
- Other: 7.6%
- Other retreatment: 3.5%

Trends in TB case notifications, 2001–2012
Trends in notified new smear-positive TB cases by age group among males, 2001–2012

Trends in notified new smear-positive TB cases by age group among females, 2001–2012
Treatment outcomes of new smear-positive cases, 2011 cohort

- **Cured**: 87.2%
- **Completed**: 3.1%
- **Died**: 2.7%
- **Failed**: 3.7%
- **Defaulted**: 2.1%
- **Not evaluated**: 1.2%
- **Other**: 9.7%

Trends in treatment outcomes of new smear-positive cases, 2000—2011

![Graph showing treatment success rate trends](image-url)
### Estimates and notification rates for 2012, Democratic People’s Republic of Korea

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Population*</td>
<td>24 763 188</td>
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<tr>
<td>Incidence of all forms of TB</td>
<td>100 000 (92 000–110 000)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100 000 population per year)</td>
<td>409 (373–447)</td>
</tr>
<tr>
<td>Prevalence of all forms of TB</td>
<td>130 000 (34 000–280 000)</td>
</tr>
<tr>
<td>Prevalence rate of all forms of TB (per 100 000 population per year)</td>
<td>511 (139–1200)</td>
</tr>
<tr>
<td>TB death rate (of all forms of TB, excluding HIV per 100 000 population per year)</td>
<td>9 (8.6–9.5)</td>
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<tr>
<td>Notification rate of all forms of TB (per 100 000 population for the year 2012)</td>
<td>371</td>
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<tr>
<td>Notification rate of new smear-positive cases (per 100 000 population for the year 2012)</td>
<td>129</td>
</tr>
<tr>
<td>Case detection rate (all forms of TB)</td>
<td>91 (83–100)</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2011 cohort</td>
<td>90</td>
</tr>
</tbody>
</table>

With a population of around 1.24 billion, India is the largest country in the South-East Asia Region. It ranks first among the high TB burden countries and contributed 26% of estimated global incident TB cases in 2012.

As per WHO estimates for 2012, prevalence and incidence rates of all forms of TB were 230 and 176 per 100,000 population, respectively, showing a decline compared to previous years. However, current WHO estimates for TB incidence, prevalence and mortality have not yet been officially approved by the Ministry of Health and Family Welfare, Government of India and should be considered provisional. India has initiated the process to generate its own national estimates for disease burden, and two rounds of consultations were held with national and international experts in 2011 and 2012. The notification rate for all forms of TB and new smear-positive cases was 119 and 53, respectively, in 2012.

Since its inception in 1997, the Revised National Tuberculosis Control Programme (RNTCP) has initiated almost 16.5 million patients on treatment. Since 2005, the programme has consistently achieved and exceeded the global target of 85% treatment success rate among new smear-positive cases, with 87% for the cohort of patients registered in 2012 – slightly below the newly-set target of 90% success rate for the period 2012–2017. In the 2012 cohort, the treatment success rate for new pulmonary smear-negative and extrapulmonary cases was 90% and for retreatment cases it was 75%.

By the end of 2013, a total of 66 laboratories were accredited by the Government of India’s RNTCP to undertake quality-assured culture and DST for the programme, of which 51 laboratories (including eight from the private sector) undertake DST for first-line drugs and five laboratories (including one from the private sector) undertake second-line DST; all laboratories demonstrated acceptable performance during EQA. In addition, 41 laboratories (including four from the private sector) implemented line probe assay for diagnosis of MDR-TB cases. In 2012, rapid DST through Xpert MTB/RIF was introduced in 32 sites, some for field demonstration and some for decentralization of DST in MDR-TB suspects. In 2013, an additional 40 Xpert sites were initiated in the government sector. EQA
was carried out in all of the 13 089 smear microscopy laboratories in the country; 74% of laboratories demonstrated acceptable performance. The target of at least one smear microscopy laboratory per 100 000 population has been reached (in 2012, there was 1.06 per 100 000 population); despite the rapid increase in number of accredited culture and DST laboratories, the target of one laboratory per 5 million population has not yet been reached: in 2012 there was 0.3 and 0.15 laboratory per 5 million population for culture and DST, respectively.

Following the banning of commercial serology for TB diagnosis in 2012, in March 2013 the Initiative for Promoting Affordable, Quality TB Tests (IPAQT) was launched. IPAQT is a consortium of 50 private laboratories (approximately 3000 franchisee laboratories and over 10 000 specimen collection centres) supported by not-for-profit stakeholders, aiming to allow concessional prices for Xpert MTB/RIF, first-line probe assays and liquid culture in the private sector through agreements with producer companies. Participating laboratories must be quality-assured, notify TB cases to the RNTCP, adhere to a ceiling price when charging patients and cannot use any tests that are not recommended by WHO and RNTCP. IPAQT is an innovative approach to increase access to rapid, accurate and affordable diagnostics for patients treated in the private sector.

SOPs for second-line DST, guidelines for certification of laboratories for second-line DST, and policy guidance documents on how to use Xpert MTB/RIF under the programme have been developed in 2013.

MDR-TB prevalence is estimated to be low (2.2% among new cases and 15% among retreatment cases) based on subnational drug resistance surveys conducted in three states between 2006 and 2009; the first national drug resistance survey is expected to start in 2014. Despite the low MDR-TB prevalence, due to size of population and number of TB cases reported annually, India ranks first among the 27 MDR-TB high-burden countries worldwide, contributing to 21% of all MDR-TB cases estimated among notified cases. The RNTCP has developed a plan to considerably scale-up MDR-TB services in order to treat at least 40 000 MDR-TB patients annually by 2017, supported by the Global Fund single stream of funding, UNITAID and domestic funds to enable a rapid expansion of MDR-TB services in the next few years. India is also a target country for the EXPAND-TB and TBXpert global projects. Since September 2012, all 35 states have been providing MDR-TB diagnostic and treatment services. In 2012, India detected 16 588 MDR-TB cases, 26% of the estimated number among notified TB pulmonary cases; this represents a remarkable four-fold increase in MDR-TB notification in 2012 compared to 2011. Additionally, 3299 RR-TB cases
were detected using Xpert MTB/RIF. In the first semester of 2013, 11,789 MDR-TB cases were detected, confirming rapid scale-up of MDR-TB diagnosis capacity. In 2012, 14,143 laboratory-confirmed MDR-TB and 131 XDR-TB cases were started on second-line standard treatment. In addition, treatment enrolment is showing a significant increase: in the first semester of 2013, another 10,273 MDR-TB and 152 XDR-TB cases were started on second-line standard treatment. Treatment outcomes of the 2010 cohort showed a 34% success rate.

It is estimated that around 2.4 million Indians are currently living with HIV. Recent country-level data show that about 6% of TB patients are HIV-positive. The incident HIV-positive TB cases in 2012 were estimated to be 130,000. National surveillance has shown that the distribution of HIV among TB patients is highly heterogeneous, and is closely correlated with the distribution of HIV infection. Implementation of the revised National framework for Joint TB/HIV Collaborative Activities began in early 2008 and interventions now cover the entire country. An “intensified TB/HIV package” has been rolled out and expanded to all 35 states of India. Intensified TB case-finding has been implemented nationwide at all 5223 HIV testing centres (known as integrated counselling and testing centres). In 2012, 577,442 TB suspects were referred from integrated counselling and testing centres to the RNTCP and 49,319 of those were diagnosed as having TB. In 2012, 821,807 TB patients were tested for HIV and about 44,063 (5.4%) of them were diagnosed as HIV-positive and offered access to HIV care. From 2011 to 2012, the percentage of TB patients tested for HIV increased nationally from 45% to 56%. Ninety-two percent of diagnosed HIV-positive TB cases were offered access to CPT, which is included in national policies; access to ART is more challenging, with 59% of coinfected patients started on treatment (only 1% more than in 2011, but 11% more than in 2010). In 2013, the Government of India adopted the policy of IPT in HIV-infected cases and the programme is planning to roll out IPT in selected districts.

In April 2010, the RNTCP finalized the guidelines for airborne infection control in health-care facilities (provisional version). Since then, the guidelines are being pilot-tested in 35 health-care facilities in three states (ranging from high-end tertiary care facilities to primary health centres) and will be finalized after the pilot conclusion by end-2013.

In 2008, the revised guidelines and schemes to operationalize RNTCP activities with NGOs and the private sector were implemented. The RNTCP training materials specifically designed for private practitioners have been revised and updated. Utilizing support received under the Global Fund’s rolling continuation
channel, the RNTCP has further expanded its collaborative PPM TB activities. The PPM project with the Indian Medical Association has been expanded from 6 to 16 states, and that with the Catholic Bishops’ Conference of India has been expanded from 11 to 19 states across the country. The RNTCP is successfully involving an ever greater number of care providers. In 2012, the RNTCP involved over 2325 NGOs and 13 997 private practitioners; 150 corporate hospitals and 312 medical colleges are implementing RNTCP. The programme has successful partnerships with the Indian Medical Association, the Catholic Bishops’ Conference of India, PATH, The Union and World Vision India. In 2012, information was available from 14 PPM surveillance sites (in each site, about 50% of TB cases are contributed by PPM providers). The number of TB patients notified by non-NTP public providers was 13 572 and private, corporate and voluntary providers notified 3533. At the national level, the contribution of medical colleges was 218 139 cases. In total, PPM contributed to 16% of reported cases in 2012.

Health services are administered in a decentralized manner at the state and union territory level through diverse public- and private-sector facilities. Policies for TB control activities are formulated at the central level in consultation with other stakeholders, with the Central TB Division in the Ministry of Health and Family Welfare having overall responsibility for the RNTCP. The RNTCP plan and budgets are aligned with the national health plan. The National Rural Health Mission provides an opportunity for strengthening TB service delivery at the grass-root level. A focal point for HRD has been designated at the central level. The EPI centre software has been successfully transitioned to a Windows-based system. The RNTCP has developed a case-based web-based patient tracking and data management system for all forms of TB (NIKSHAY) that is being scaled up nationwide. The 3-yearly joint Government of India/WHO monitoring mission for the RNTCP was successfully conducted in August 2012.

The Mumbai programme has developed an innovative urban TB control model. MDR-TB in Mumbai was brought into sharp focus in January 2012 with the reports of allegedly incurable, totally drug-resistant TB (TDR-TB). The Municipal Corporation of Greater Mumbai took up the challenge, and since then detection of MDR-TB has gone up from 53 cases in 2010 to 2429 cases in 2012, through improved diagnostics and strategies. The year 2012 has witnessed strengthening of the TB control programme in Mumbai in terms of infrastructure, diagnostics and treatment capacities. In February 2013, a workshop was held in Mumbai facilitated by WHO to develop a comprehensive plan for further scaling up TB care in the city. The “Mumbai Mission for TB Control” plan, released on 22 March
2013, formulated a blueprint to ensure universal access to TB care. It details seven key strategies to achieve these objectives in a mission mode. There is a comprehensive programme for reaching up to the last TB patient in vulnerable areas, especially the slums of Mumbai. This document also details further scaling up of diagnostic and treatment facilities in Mumbai, ensuring sensitization of every first-point health-care contact with RNTCP protocols.

The programme was supported by World Bank, the United Kingdom Department for International Development (DFID), the Global Fund, USAID, UNITAID and other partners during 2007–2012 and has since transitioned to an increased budgetary support from domestic resources, with domestic contribution of about 80% during 2012–2015. The Global Fund, UNITAID, WHO, USAID and other technical partners continue to support the programme.

**Major achievements**

- Since its inception, the programme has initiated more than 16 million patients on treatment, thus saving more than 2.8 million additional lives.
- Since 2007, the RNTCP has achieved the new smear-positive case detection rate of more than 70%, in line with the global targets for TB control, while maintaining the treatment success rate of more than 85%.
- Decentralized diagnosis through a network of more than 13,000 quality-assured sputum microscopy laboratories. To ensure quality of sputum microscopy, EQA is being routinely conducted throughout the country as per a standardized protocol based on international guidelines (on site evaluation, panel testing and blinded cross-checking).
- Treatment services decentralized through a network of more than 640,000 DOT centres/providers using patient-wise boxes both for adults and pediatric patients.
- Increasing engagement of the new cadre of community-based accredited social and health activists.
- Successful involvement of 312 medical colleges, 2325 NGOs, 13,997 private practitioners and over 150 corporate sector health units.
- Revised RNTCP guidelines and schemes for involvement of NGOs and private providers in RNTCP activities implemented.
- Basic national framework for TB/HIV collaborative activities implemented nationwide, with “intensified TB/HIV package” implemented in all 35 states.
• 51 laboratories accredited for TB culture and DST.
• By March 2013, all districts in the country were covered by PMDT services. As of September 2013, a cumulative total of 276,149 suspects had been tested for MDR-TB, and 36,725 MDR-TB patients and 351 XDR-TB patients were initiated on treatment.
• India has developed its National Strategic Plan for the 12th Five Year Plan 2012–2017 with universal access to TB care as its goal. Budgetary outlay has been increased to more than three times compared to the previous 5-year plan and the domestic contribution now stands at 84%, showing excellent political commitment for TB control.
• Major policy decisions by the Government of India in 2012, which could galvanize universal coverage, including a ban on commercial serology for TB diagnosis and making TB a mandatory notifiable disease in India.
• Programme has developed a case-based web-based notification system (NIKSHAY).
• The programme has developed the Standards of TB Care in India, which could trigger important advancement in early case detection and effective treatment for all TB patients.
• Under the Global Fund Round 9, civil society organizations are undertaking activities in 374 districts across 23 states to enhance the visibility and reach of the programme and engage with communities and community-based care providers to improve TB care and control.
• During 2013, central internal evaluation of the programme performance and implementation status of the RNTCP was conducted every month in two districts in a state, on a one-to-one basis, along with review of activity plans to improve programme performance.

**Major challenges**

• Ineffective and delayed diagnosis of TB in both the private and public sector.
• Patients accessing private providers not linked or engaged with the RNTCP.
• Failure to notify and register patients diagnosed with TB in the private sector.
• Achieving universal access, including marginalized and high-risk groups, while maintaining and continuing to improve the quality of services across the country.
• Introducing newer diagnostics for TB control and their positioning at various levels of health care.

• Ensuring adequate staffing at all levels, through improved HRD, to reduce reliance on a limited pool of TB-dedicated staff.

• Alleviating weaknesses in supervision capacity and quality, as well as in planning, monitoring and evaluation.

• Enforcement of regulations for prescribing and sale of anti-TB drugs; promoting rational use of first-line and second-line anti-TB drugs outside the programme to prevent MDR-TB and XDR-TB.

• Developing and implementing airborne infection control measures in health facilities.

• Effectively promoting operational research to address local challenges.

Planned activities for 2014

• Maintaining and further improving both quality and reach of services to move towards achieving universal access.

• Major initiatives for urban TB control models.

• Innovative private sector engagement initiatives, including social franchising.

• Revisiting the laboratory scale-up plan to further expand the network of quality-assured laboratories.

• Deployment of 40 additional Xpert MTB/RIF machines to address laboratory capacity deficits in hard-to-reach areas for decentralized DST.

• Piloting of intensified TB case-finding in ART centres and piloting IPT.

• Disseminating the Standards for TB Care in India.

• Deploying revised schemes for involvement of NGOs and private practitioners across the country.

• Finalizing RNTCP guidelines for airborne infection control in health-care facilities and handing it over for integration with the general health system (the Indian public health standards, Medical Council of India, National Centre for Disease Control, National Rural Health Mission and Integrated Disease Surveillance Programme).
• Developing revised technical and operational guidelines for early case detection, including revision of the diagnostic algorithm, contact tracing, active case-finding, etc.

• Evaluating the effect of the revised diagnostic algorithm, suspect and case definitions on case notifications.

• Developing and testing information and communication technology for notification and drug management.

• Scaling up of NIKSHAY, the case-based web-based patient tracking and data management system for all forms of TB including use of mobile apps and call centre notification systems.

• Introduction of strategies for universal access to free treatment for all TB patients diagnosed and managed in the public or private sector across the country, using private provider interface agencies.
Case notifications by type of patients, 2012

- New smear-positive: 42.9%
- New smear-negative: 21.6%
- Other new cases: 12.1%
- Treatment after failure: 1.1%
- Treatment after default: 4.4%
- Other retreatment: 6.6%
- Relapse: 7.3%
- Other: 0.1%

Trends in TB case notifications, 2001–2012

- New and relapse cases per 100,000 population
Trends in notified new smear-positive TB cases by age group among males, 2001–2012

Trends in notified new smear-positive TB cases by age group among females, 2001–2012
Treatment outcomes of new smear-positive cases, 2011 cohort

- Cured: 84.8%
- Completed: 2.9%
- Died: 4.1%
- Failed: 1.9%
- Defaulted: 5.5%
- Not evaluated: 0.8%
- Other: 12.3%

Trends in treatment outcomes of new smear-positive cases, 2000–2011
### Estimates and notification rates for 2012, India*

<table>
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<tr>
<th>Measure</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Population**</td>
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<td>Incidence of all forms of TB</td>
<td>2 200 000</td>
</tr>
<tr>
<td></td>
<td>(2 000 000–2 400 000)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100 000 population per year)</td>
<td>176 (159–193)</td>
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<tr>
<td>Prevalence of all forms of TB</td>
<td>2 800 000</td>
</tr>
<tr>
<td></td>
<td>(1 900 000–3 900 000)</td>
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<tr>
<td>Prevalence rate of all forms of TB (per 100 000 population per year)</td>
<td>230 (155–319)</td>
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<tr>
<td>TB death rate (of all forms of TB, excluding HIV per 100 000 population per year)</td>
<td>22 (14–32)</td>
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<td>Notification rate of all forms of TB (per 100 000 population for the year 2012)</td>
<td>104</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100 000 population for the year 2012)</td>
<td>51</td>
</tr>
<tr>
<td>Case detection rate (all forms of TB)</td>
<td>59 (54–66)</td>
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<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2011 cohort</td>
<td>88</td>
</tr>
</tbody>
</table>

*Estimated incidence, prevalence and mortality rates and numbers should be considered provisional as they have not yet been officially approved by Ministry of Health and Family Welfare, Government of India.

Indonesia

With a population of about 247 million, Indonesia carries the fourth highest TB burden globally. The estimated prevalence and incidence rates of all forms of TB were 297 and 185 per 100 000 population, respectively, in 2012. Data from repeated tuberculin surveys and mortality studies during 2006–2008 indicate that TB prevalence in Indonesia continues to decrease. To better assess TB burden estimates and trends, in April 2013 Indonesia started a nationwide TB prevalence survey; 82 150 persons from 156 clusters are expected to participate. The final results of the survey will be available by the end of 2014. The notification rates of all forms of TB and new smear-positive cases were 133 and 82, respectively, confirming a slight but steady increase since 2006. Treatment success rate among new smear-positive cases has been consistently above the 85% target in the last decade and had already reached the newly set target of 90% in 2004; for the cohort of patients registered in 2011, treatment success rate was 90%. For the same cohort, the treatment success rate for smear-negative/extrapulmonary TB was lower (85%), mainly due to the relatively high rate of loss to follow-up and not evaluated (7% and 6%, respectively); treatment success rate among retreatment cases was 71%.

Rapid expansion of DOTS over the last decade has led to significant improvement in case detection and treatment success. The NTP implemented the second strategic plan for 2006–2010, built on a solid DOTS foundation, in the public sector and aimed to strengthen the quality of service delivery and increase the participation of hospitals in both the public and private sectors. The leading theme for the national TB control strategy 2010–2014 (being extended to 2016) is “Breakthrough toward Universal Access”. Strategies such as hospital DOTS linkages, MDR-TB management, improvement of the laboratory network and strengthening of a quality assurance system, and HIV collaborative activities are currently being scaled up.

Notification of sputum smear-positive cases has increased by more than 20% in the past 5 years, and extrapulmonary cases have increased by about 50%; on the other hand, the number of sputum smear-negative cases has remained stable. This is likely the result of increased notification by hospitals and clinics linked
to the NTP. The TB programme is scaling up public–public and public–private partnerships. In 2013, 8911 NTP providers, 868 non-NTP public providers and 629 private providers were engaged in the programme and actively collaborated with the NTP. The non-NTP public providers include 168 prisons and 180 military/police hospitals. In total, an additional 176 non-NTP providers were engaged in 2013 as compared to 2012. The total contribution from non-NTP providers to case notification is 25% (82,808 cases), of which 90% came from non-NTP public providers. The number of cases contributed by non-NTP private, corporate and voluntary providers is small, at only 5,432 cases notified to NTP in 2012. The support of quality DOTS expansion in public and private hospitals and private practitioners relied on the standardization and accreditation system.

Collaborating with the Ministry of Education, teaching of the principles and practices of DOTS has been integrated into the national medical school curriculum and implemented at all 74 schools of medicines in Indonesia.

New PPM approaches, matching with country needs, are being considered including mandatory notification and social business models. Indonesia is a target of the recently launched UNITAID TB Xpert Project; with support from the Stop TB Partnership and TB REACH initiative, 25 Xpert MTB/RIF instruments will be implemented to provide access to free diagnosis to high-risk patients in Jakarta through innovative social business models, including private screening centres and other partnering locations.

The ISTC have been endorsed by the professional associations and are currently being widely disseminated among members of professional organizations.

Advocacy, communication and social mobilization activities are being scaled up in different provinces of the country. The National Stop TB Partnerships Forum Indonesia, established on 30 May 2013, is a movement to accelerate social and political action to stop the spread of TB in the country. Members of the Forum consist of 65 organizations/institutions, which fall into one of eight groups: government, community-based organizations, academia, professional associations, private sector, health-care institutions, international partners and individuals.

The number of retreatment cases is steadily around 2%, and reported failure to first-line treatment is low (steadily around 0.5%) suggesting that the overall rate of TB drug resistance is still relatively low. However, these data are mainly from
DOTS centres; data from the private sector and non-NTP public sector are not yet extensively captured by the NTP. There are no nationwide representative data on prevalence of MDR-TB. Subnational drug resistance surveys have been conducted in Mimika District (2004), showing 2% MDR-TB cases among newly diagnosed TB cases, and in Central Java province (2006) showing MDR-TB rate of 1.8% among the new cases and 16.7% among retreatment cases. Another drug resistance survey is ongoing for East Java province (entering the final analysis phase, results not available yet). Drug resistance sentinel surveillance was implemented in four provinces in 2012 and will be expanding gradually, following the country PMDT expansion plan; in 2013, the sentinel DRS was expanded to two other provinces. The sentinel DRS is aiming to provide geographically representative data for the whole country, the official reports will be available by the end of 2013. In 2012, only 10% of retreatment cases notified was tested for DST; among cases tested, 52% were confirmed MDR-TB cases.

Although MDR-TB prevalence is considered to be low, due to the large population size and number of TB cases reported annually, Indonesia is one of the 27 high MDR-TB burden countries worldwide. GLC approval for the management of MDR-TB cases was obtained in 2008. In 2009, national PMDT started, treatment guidelines were developed and MDR-TB diagnostic and treatment services commenced at two urban sites. By the end of November 2013, there were in total 13 PMDT referral centres and 411 treatment centres across the country. In 2012, 610 MDR-TB cases were detected, 435 being initiated on treatment. Between January and November 2013, 775 DR-TB cases were detected using Xpert MTB/ RIF, including 471 confirmed MDR-TB cases and 304 RR-TB cases, showing a significant increase compared to previous years. In the same period, 708 of the detected cases were initiated on second-line standard treatment. Among the 2010 cohort of MDR-TB patients enrolled on treatment, the success rate was 72%.

It is estimated that the prevalence of HIV among the adult population is 0.4% nationally, and there are an estimated 591 000 people living with HIV in the country. While HIV is characterized as a concentrated epidemic in Indonesia, in Papua province it is in the generalized epidemic stage, with an HIV prevalence of 2.4% in the general population. The estimated number of people coinfected with TB/HIV is 7500 (range, 5600–9700) and Indonesia is listed among the 41 TB/ HIV high-burden countries. The estimated prevalence of HIV among incident TB cases is 3% nationally. In some provinces the reported TB/HIV coinfection rate is reported to be much higher, for example in Papua (14%) and Bali (3.9%). The national policy for TB/HIV collaboration activities is in place, and guidelines and
Country profile: Indonesia

Training materials have been developed. The NTP has revised the recording and reporting system to include information on TB/HIV. By the end of 2013, in total there were 592 health facilities providing voluntary counselling and testing, and 378 health facilities providing ART in all 33 provinces. The NTP’s top priority is to provide quality DOTS services at all ART facilities; 95 hospitals were identified as providing ART but not DOTS. Facilities for CD4 counts are available in 181 health facilities across the country. In 2012, less than 1% of TB cases were reported being tested for HIV; however, this low proportion was mainly due to delay in completeness of report due to the transition to a web-based system for reporting and the difficulties related to a different format of TB register to that previously in use. Of the TB patients tested, 28% were HIV-positive; 18% and 29% of TB/HIV coinfected patients were put on CPT and ART, respectively. In 2013, TB/HIV activities have showed significant improvement: in 63 TB/HIV sites, among 12 904 TB patients, 2074 were tested for HIV (16%): 856 (41%) were HIV-positive, 410 (48%) started/continued on ART and 720 (84%) are put on CPT. An IPT pilot was successfully completed in four hospitals: 205 out of 281 (73%) of people living with HIV received IPT and 167 (81%) of the patients completed 6-or 12-month regimens.

Efforts to expand and strengthen the national laboratory network are ongoing, with assistance from the SRL in Adelaide, Australia. In 2012, there were 46 culture laboratories of which 5 carried out EQA for DST with acceptable performance both for first-line and second-line. Line probe assay is in use in two laboratories and Gene Xpert was implemented in nine sites.

A comprehensive HRD plan is in place and a focal point for human resources has been designated at the central and provincial levels. Drug management is showing good improvement; there is generally a good supply of first-line and second-line drugs at all levels. Since 2010, all first-line drugs have been procured using Government of Indonesia budget. There have been no drug stock-outs reported in the last 2 years.

Indonesia is transitioning to a web- and case-based electronic recording and reporting system. In February 2013, during the national programme review, a national assessment of the TB surveillance system was undertaken using the newly developed WHO Checklist of standards and benchmarks for TB surveillance and vital registration systems. A thorough analysis of all available surveillance data and relevant information was conducted, showing that 97% of all districts reported data but (since TB reporting is not a legal requirement) not all TB cases were reported to the NTP. On the basis of identified gaps, a list of costed priority
activities was outlined, including the implementation of mandatory notification policy, scaling up a sample VR system, implementation of drug resistance surveys or sentinel surveillance, implementation of a nationally representative survey of HIV prevalence among TB patients, and an inventory study to assess levels of underreporting. An investment plan was developed and financing was secured for implementation in collaboration with the NTP, WHO and the Global Fund.

The NTP’s plan and budget are aligned with the national health sector development plan. However, in the past, there were challenges due to the decentralization of health services down to the district level in the country. In 2011, the NTP formulated a policy known as “exit strategy”, anticipating less reliance on external funding and by mobilizing funds at subnational level for programme operational costs and funds from universal health coverage insurance scheme for patients’ costs.

The Indonesian programme received support from several sources including the Global Fund (Round 8, 10 and single streams of funding) and USAID through TB CARE I. Technical assistance is being provided by WHO, KNCV Tuberculosis Foundation, Management Sciences for Health, Family Health International 360, the Japan Anti-Tuberculosis Association, the American Thoracic Society, The Union and the Institute of Medical and Veterinary Science.

Major achievements

PMDT:

- Almost 100% increase in number of notified MDR-TB cases compared with previous year (from 435 in 2012, to 708 in 2013)
- Two largest provinces (East Java and West Java, with 25% of total population) finalized long-term PMDT plans.
- 13 PMDT sites, 3 PMDT sub-referral centres and almost 411 PMDT satellite health centres established (compared to 9 referral centres and about 200 treatment centres previously).
- Further decentralization of PMDT services: 64% of MDR-TB patients are continuing treatment at satellite health centre (452 out of 708 MDR-TB patients, as per September 2013).
- Global Fund support for PMDT expansion plan.
Laboratory:
- Six laboratories are now certified for culture and DST, and quality assured by SRL in Australia.
- Certification of five other laboratories is in pipeline.
- 17 Xpert MTB/RIF machines installed and functional.

TB/HIV:
- Increased testing of TB and HIV patients and preparation for scaling up (test and treat areas).
- In 2013, data from 63 TB/HIV sites showed significant improvement compared to previous year: 16% of TB patients tested for HIV, with 41% of them resulting HIV-positive; among them 48% and 84% were on ART and CPT, respectively.
- IPT pilot successfully completed in four hospitals: 73% of eligible people living with HIV/AIDS received IPT and 81% of them completed 6- or 12-month regimens.
- All 33 provinces now have provincial TB/HIV plans.
- Xpert MTB/RIF used for diagnosis of TB in HIV patients in 25 ART hospitals.

PPM:
- Hospital accreditation for TB services has begun implementation.
- 97 pulmonologists engaged with NTP: 4118 patients enrolled so far; treatment success rate slightly improving.
- 25 large prisons and detention centres implementing DOTS and TB/HIV services. Referral success rate: 80%; all prisons now conduct mass- and at-entry screening and are being linked to PMDT services.

Other:
- National prevalence survey: 38 out of 156 (24%) clusters have been completed.
- e-TB Manager being implemented in all PMDT sites.
- All PMDT sites have been trained in management of single-line drugs to ensure availability of stocks.
• Stop TB Partnership Forum Indonesia established in 2013, as a part of national strategy to engage civil society to participate in TB control.


• National TB curriculum for medical faculties/schools of medicine finalized.

• National guidelines for TB infection control implementation in health facilities finalized and distributed.

• Electronic web-based TB information system developed and implemented in all 33 provinces to strengthen national TB surveillance system.

• Further development to synchronize TB data with other health information system is underway.

Major challenges

PMDT:

• High loss to follow-up due to socioeconomic constraints and weak patient support. No mechanism in place to identify poor treatment compliance and develop corrective actions to solve problems.

• Laboratory constraints due to delay on Xpert MTB/RIF expansion, and slow expansion/decentralization of the culture and DST laboratory network. Suspect and specimen referral and transport mechanisms not yet well functioning.

• Lack of local government commitment: negligible local-level funding and PMDT still seen as an ”NTP project”. Most provinces do not yet have provincial PMDT plans.

Laboratories:

• Underutilization of Xpert MTB/RIF due to weak patient referral and/or sputum sample transfer systems, repeated stock-out of cartridges and lack of confidence of clinicians to use the Xpert result for decision to start MDR-TB treatment in RR-TB cases.

• Limited national human capacity to support Xpert MTB/RIF trainings and supervision visits.
• EQA coverage for smear microscopy relatively low, and review of existing EQA system needed.
• Reference laboratories do not yet meet biosafety standards due to lack of regulation/monitoring.
• Limitations in capacity of national reference laboratories.

TB/HIV:
• Coverage of HIV testing among TB patients is still low.
• Many clinicians still using “old” ART guidelines.
• Underutilization of Xpert MTB/RIF to diagnose TB in HIV patients.
• Limited scale-up of IPT.

PPM:
• Cure rates of patients treated in hospitals are low (only 50% in private hospitals and 66% in public hospitals) due to high loss to follow-up rates (around 12.4%).
• Large majority of private providers not yet engaged and not implementing ISTC; limited number of private providers engaged in PMDT.
• Resource limitations for TB in prisons to implement TB control, including MDR-TB and TB/HIV activities.
• Diagnosis of TB in children is still low. Tuberculin tests are not available in all health facilities and many paediatricians do not follow the diagnostic algorithm.
• Reducing gaps in case notification due to under reporting cases from hospitals and other private sectors.
• Reaching the unreached and underserved populations (remote, border, island and migrant areas).

Activities planned for 2014
• Advocate to increase commitment and contribution from local governments to support TB control through civil society involvement.
• Engagement of national health protection system to cover TB service expenditures.
• Support comprehensive approach to increase performance of DOTS in low performance areas (unreached and underserved populations).

• Support quality DOTS expansion in government hospitals, private hospitals and private practices through standardization, regulation and accreditation system.

• Support PMDT expansion, with aim to establish PMDT services in all 33 provinces and enrol 1800 new cases in 2014.

• Finalization of national TB prevalence survey which aims to measure impact of TB control in Indonesia.

• Support laboratory network expansion and EQA for DST and microscopy.

• Facilitate the implementation of the new PPM approach, which matches country need and situation (branding, mandatory notification, social business model, etc.).

• Support expansion of TB/HIV collaborative activities to follow up the new test and treat policy (Ministerial Decree No. 21/2013).

• Conduct sentinel survey to assess prevalence of HIV among incident TB cases.

• Support initiation of TB and diabetes collaborative activities.

• Support capacity strengthening of TB staff on DOTS, PMDT, TB/HIV and other key areas.

• Collaborate with all partners to prevent problem of drug and commodity stock-out.
Case notifications by type of patients, 2012

New smear-positive 61%
New smear-negative 31.6%
New extrapulmonary 4.7%
Relapse 1.8%
Other 0.8%
Treatment after failure 0.1%
Treatment after default 0.3%
Other retreatment 0.4%

Trends in TB case notifications, 2001–2012

Days per 100,000 population

Years

New and relapse
New smear-positive
Trends in notified new smear-positive TB cases by age group among males, 2001–2012

![Graph showing trends in notified new smear-positive TB cases by age group among males, 2001–2012.](image)

Trends in notified new smear-positive TB cases by age group among females, 2001–2012

![Graph showing trends in notified new smear-positive TB cases by age group among females, 2001–2012.](image)
Trends in notified TB cases (all forms) by age group among males, 2007–2012

Trends in notified TB cases (all forms) by age group among females, 2007–2012
Treatment outcomes of new smear-positive cases, 2011 cohort

Cured 83.7%
Completed 6.5%
Died 2.3%
Failed 0.5%
Defaulted 3.8%
Not evaluated 3.2%
Other 9.8%

Trends in treatment outcomes of new smear-positive cases, 2000—2011

Years:
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011

Tuberculosis Control in the South-East Asia Region 2014
<table>
<thead>
<tr>
<th>Estimate</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>246 864 191</td>
</tr>
<tr>
<td>Incidence of all forms of TB</td>
<td>460 000 (380 000–540 000)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100 000 population per year)</td>
<td>185 (153–220)</td>
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<tr>
<td>Prevalence of all forms of TB</td>
<td>730 000 (350 000–1 200 000)</td>
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<tr>
<td>Prevalence rate of all forms of TB (per 100 000 population per year)</td>
<td>297 (144–506)</td>
</tr>
<tr>
<td>TB death rate (of all forms of TB, excluding HIV per 100 000 population per year)</td>
<td>27 (12–48)</td>
</tr>
<tr>
<td>Notification rate of all forms of TB (per 100 000 population for the year 2012)</td>
<td>133</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100 000 population for the year 2012)</td>
<td>82</td>
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<tr>
<td>Case detection rate (all forms of TB)</td>
<td>72 (61–87)</td>
</tr>
<tr>
<td>Treatment success rate (% of new smear-positive cases for 2011 cohort)</td>
<td>90</td>
</tr>
</tbody>
</table>

Maldives

With a population of about 340,000, Maldives had estimated prevalence and incidence rates of all forms of TB of 65 and 41 per 100,000 population, respectively, in 2012. The notification rates of all forms of TB and new smear-positive cases were 33 and 15, respectively, showing an increase (mainly related to smear-negative and extrapulmonary cases) compared to the steady decrease over the previous 5 years. Treatment success rate among new smear-positive cases was 81% for the cohort of patients registered in 2011. The treatment success rate has been below the 85% target since 2007, mainly because of defaulters and non-evaluated cases (the latter being 17% in the 2011 cohort).

The NTP at the Health Protection Agency continues to act as a central body for registration, planning, monitoring and evaluation of TB control activities since its establishment in 1976. Continuous support has been received from WHO and from curative services in both the public and private sector for TB case-finding, treatment, record keeping, follow-up of TB patients and contact-tracing activities. All anti-TB drugs are available only through the Government-run NTP.

The main thrusts of the NTP are on strengthening infrastructure and HRD for intensified case-finding and early case detection, strengthening NTP management, strengthening the microscopy network so as to improve access to diagnostic services, and social mobilization for increased community involvement and utilization of available services.

The NTP’s main objectives are to effectively improve and strengthen TB preventive activities, in addition to diagnosis and treatment of TB cases. In this regard, establishment of critical infrastructure and HRD for intensified case-finding, early case detection and strengthening the microscopy network are critical. In 2012, there were 70 smear microscopy laboratories, representing a 30% increase compared to 2011; EQA has not been conducted for any laboratory. There is one culture facility in the country.

At present, priority has been given to improve and strengthen TB preventive activities, raise awareness, cure as many patients as possible and provide better
services to the community. In this regard, efforts have been made to improve the quality of services in terms of case holding and case management. Work has been initiated to establish diagnostic facilities at regional and atoll levels. As a result of the intensified activities, the programme has maintained the same trend in TB prevalence for the past few years. In addition, the programme has made efforts to develop close coordination and collaboration with other health establishments, especially private health-care institutions, in identifying and accurately reporting identified cases.

DST, if deemed clinically necessary for particular patients, is undertaken by shipment of samples to the National Tuberculosis Institute in Bangalore, India, which is the designated SRL for the country. MDR-TB patients are clinically managed at the Indira Gandhi Memorial Hospital in Malé, and treatment is based on individualized regimens. Second-line drugs for the management of these cases are procured by the Ministry of Health on a case-by-case basis through the GDF.

Available data suggest that TB is relatively uncommon in Maldives; HIV prevalence is estimated to be less than 0.01% in the adult population and TB/HIV is not a major problem as yet. Screening of all HIV-positive cases for active TB has been in place since 2003, in collaboration with the HIV programme. HIV testing for all TB patients above 15 years of age was initiated in December 2011. In 2012, only one TB patient was tested positive for HIV; no CPT or ART was initiated.

The NTP is technically supported by WHO and benefits from an ongoing grant from the GDF for first-line drugs.

**Major achievements**

- The Government of Maldives is committed to support the programme.
- Most activities for the programme, including drug purchase, are undertaken through state funding with limited external support through WHO.
- Availability of quality-assured anti-TB drugs from the Facility is being maintained.
- Continuous allocation of funds by the Government for the procurement of anti-TB drugs.
- Direct observation for full course of treatment is in place due to the well functioning DOT centres at all health facilities.
• For the past decade, the number of notified cases has been steadily decreasing.

• Screening of all HIV-positive cases for active TB since 2003, in collaboration with the HIV programme.

**Major challenges**

• Lack of human and financial capacity to implement, fully control and coordinate all TB-related activities in the country.

• EQA has not been carried out for smear microscopy.

• No capacity available for DST: no adequate system of sputum transport has been established with external TB laboratory for DST (for diagnoses as well as for follow-up for MDR-TB and XDR-TB patients).

• Inadequate levels of collaboration between all care providers and the NTP.

**Activities planned for 2014**

• Finalization and endorsement of the national strategic plan for TB control 2014–2018.

• Apply for the Global Fund new funding mechanism grant for 2015.

• Review and revise the national guidelines for PMDT and national guidelines for TB control.

• Development of treatment guidelines, SOPs and protocols for TB screening in special institutions.

• Strengthen TB surveillance and monitoring.

• Promotional activities to mark World TB Day 2014.
Case notifications by type of patients, 2012

- New smear-positive: 46.8%
- New smear-negative: 15.4%
- New extrapulmonary: 36.9%
- Other retreatment: 0.9%

Trends in TB case notifications, 2001–2012

- All cases
- New smear-positive
Trends in notified new smear-positive TB cases by age group among males, 2001–2012

Trends in notified new smear-positive TB cases by age group among females, 2001–2012
Treatment outcomes of new smear-positive cases, 2011 cohort

- Cured: 81.2%
- Died: 2.1%
- Not evaluated: 16.7%

Trends in treatment outcomes of new smear-positive cases, 2000–2011

- Yearly success rate
- Died
- Failed
- Defaulted
- Not evaluated

Country profile: Maldives
**Estimates and notification rates for 2012, Maldives**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>338,442</td>
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<tr>
<td>Incidence of all forms of TB</td>
<td>140 (110–170)</td>
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<tr>
<td>Incidence rate of all forms of TB (per 100,000 population per year)</td>
<td>41 (33–49)</td>
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<tr>
<td>Prevalence of all forms of TB</td>
<td>220 (100–380)</td>
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<tr>
<td>Prevalence rate of all forms of TB (per 100,000 population per year)</td>
<td>65 (30–113)</td>
</tr>
<tr>
<td>TB death rate (of all forms of TB, excluding HIV per 100,000 population per year)</td>
<td>2 (1.8–2.2)</td>
</tr>
<tr>
<td>Notification rate of all forms of TB (per 100,000 population for the year 2012)</td>
<td>33</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100,000 population for the year 2012)</td>
<td>15</td>
</tr>
<tr>
<td>Case detection rate (all forms of TB)</td>
<td>80 (66–98)</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2011 cohort</td>
<td>81</td>
</tr>
</tbody>
</table>

Myanmar is among the 22 high TB burden countries worldwide. TB control is a priority in the National Health Plan. DOTS was introduced in 1997 and expanded to the entire country by 2003. In 2006, the country endorsed the Stop TB Strategy and started implementation of a broader spectrum of activities.

According to WHO, based on the results of a prevalence survey successfully conducted in 2009–2010, the estimated prevalence and incidence rates of all forms of TB were revised upward and were 489 and 377 per 100 000 population, respectively, in 2012. Data showed that TB affects mainly young adults, which is characteristic for significant ongoing transmission. It also indicated a downward trend of smear-positive symptomatic TB. In addition, the 2010 survey provided important information and reasons for missing cases that are being used to improve case-finding strategies. Myanmar is planning to repeat the prevalence survey in 2017.

In 2012, the notification rates of all forms of TB and new smear-positive cases were 291 and 88 per 100 000 population, respectively. Since 2008, a slightly increasing trend for all TB cases and a fairly stable trend for smear-positive cases has been observed. The treatment success rate among new smear-positive cases was 86% for the cohort of patients registered in 2011; among new smear-negative TB cases the success rate was 85% while among retreatment cases it was 71.6%.

The reference laboratories in Yangon and Mandalay perform culture and first-line DST (both conventional method and rapid test). Second-line DST is undertaken at the SRL in Bangkok. With support from EXPAND-TB, the two national reference laboratories have been equipped with liquid culture, first-line DST, rapid immunoaassay for species identification and line probe assay for rapid diagnosis of MDR-TB. With the upgraded laboratory capacity, MDR-TB can be detected within 3–7 days. In 2013, Xpert MTB/RIF was implemented in 16 sites. Myanmar is one of the countries participating in the TBXpert Project, which aims to expand the availability and use of Xpert MTB/RIF. The number of smear microscopy laboratories increased from 458 in 2011 to 464 in 2012, almost
reaching the target of 1 per 100,000; according to EQA carried out in 96% of the laboratories, 98.3% reported slide concordance rate.

The second nationwide drug resistance survey carried out in 2008 showed an MDR-TB prevalence of 4.2% among new cases and 10% among previously-treated cases. Myanmar is on the list of the 27 high MDR-TB burden countries worldwide. A third nationwide drug resistance survey was conducted in 2012–2013, with results being analysed at the time of writing. The Ministry of Health has established an expert committee on DR-TB including chest physicians, general physicians, ART physicians, paediatricians, microbiologists and staff from the NTP, WHO and NGOs to oversee the national response. A GLC-approved pilot project for treatment of MDR-TB has already concluded enrolment; the 2009–2010 cohort (301 patients) showed a cure rate of 71%, which is remarkable considering that only category 2 failures were included in the project. The NTP is now mainstreaming MDR-TB management as a routine programme component. In April 2011, the GLC approved the expansion of MDR-TB management to treat an additional 1800 patients financially supported by the Global Fund and Three Diseases Fund. A MDR-TB scale-up plan was developed for 2011–2015. This plan aims to build capacity for diagnosis, treatment and care for 10,000 MDR-TB patients over 5 years. All states and regions will have diagnostic capacity through Xpert MTB/RIF and MDR-TB treatment centres. In 2013, new MDR-TB guidelines were launched and MDR-TB diagnosis, treatment and care were scaled up to additional geographical areas. In 2012, 778 MDR-TB and 259 RR-TB cases were detected; in total, 949 MDR-TB cases were initiated on treatment between January 2012 and September 2013.

While the national prevalence of HIV infection is estimated at 0.53% of the adult population, the prevalence of HIV among TB patients was reported to be 9.7% (confidence intervals: 8.7–10.7%), based on data from the 2012 HIV sentinel survey. At the end of 2013, TB/HIV collaborative activities were being implemented jointly by the NTP and the national AIDS programme in 28 sites (including two sites supported by The Union). HIV screening for TB patients is presently available through 28 voluntary confidential counselling and testing sites. CPT was included in national guidelines. In 2012, 13% of all TB patients were tested for HIV (an increase from 3% in 2011) and 27% of them were found HIV-positive. TB/HIV coinfected patients are all receiving CPT and 83% of them are receiving ART, mainly from the national AIDS programme with support from The Union and Médecins Sans Frontières.
A pilot project to provide IPT to people living with HIV was conducted in nine townships and 3134 people living with HIV were reported provided with IPT between August 2009 and June 2012.

An update of the strategic plan 2011–2015 was released in 2012. It was developed in light of the prevalence survey results and the recommendations of the joint monitoring mission conducted in November 2011. This plan and budget are aligned with the national health sector development plan.

To address the component of increasing case finding, the NTP has engaged private providers through partnerships with the Myanmar Medical Association and the Sun Quality Health network of Population Services International (PSI), which together accounted for 18% of TB notifications (all forms) in 2012 nationally. The collaboration with the private providers as well as other non-NTP providers such as NGOs and public hospitals are currently contributing about one fourth of all TB notifications (24% in 2012). With support of The Union, PSI and the International Organization for Migration, three projects on innovative approaches to increase case-finding and early detection (TB-REACH initiative) were implemented in 2012. The Union as well as PSI adopted an active approach at the community level, with PSI also engaging private pharmacies and drug sellers. The International Organization for Migration project aimed to deliver TB services by boat in the delta region. Guidelines on community involvement in TB prevention, care and control were developed with national and international partner organizations.

The ISTC has been endorsed by specialists and the professional associations in the country.

The NTP is being supported by increased funding from the Government, supplemented significantly by funding from external sources such as USAID, UNITAID, WHO, Japan International Cooperation Agency, TB-REACH and the GDF. The Three Millennium Development Goals Fund (funded by the governments of Australia, Denmark, the Netherlands, Norway, Sweden, the United Kingdom and the USA; and the European Commission) maintains a component of TB in its portfolio. This funding source has an expanded scope compared to the Three Diseases Fund (which was funded by the same donors, except the United States).

The Global Fund Round 9 grant for TB control was signed in November 2010. A total of US$ 28.6 million was approved for Phase 1 (2011–2012). Myanmar was one of the early applicants under the new funding model, covering the period
2013–2016. Grant agreements have been signed with two principal recipients for a combined amount of up to US$ 90.8 million for the 4-year period.

**Major achievements**

- National MDR-TB guidelines have been updated. A laboratory expansion plan was developed including expansion of Xpert MTB/RIF as well as culture and DST facilities in the country. Guidelines on community involvement in TB prevention, care and control were also finalized.

- The Myanmar Health Sector Coordinating Committee (equivalent of country coordination mechanism) has secured Global Fund grants for TB, HIV and malaria under the Global Fund’s new funding model, covering the period 2013–2016. For TB, US$ 90.8 million has been committed (including carry-over from Round 9, Phase 1).

- The Three Diseases Fund has successfully transitioned to the Three Millennium Development Goals Fund with significant support earmarked for TB control, particularly to support active case-finding and PMDT.

- MDR-TB management is being mainstreamed. In 2013, 653 patients were enrolled for treatment with second-line drugs in 38 townships.

- Engagement of private general practitioners and public hospitals is being consolidated.

**Major challenges**

- The gap between estimated TB burden and notified cases remains significant and will require new strategies to narrow. The huge number of definite, chronic TB cases with less prominent symptoms needs to be addressed. Hard-to-reach areas, border areas and conflict areas also pose challenges for service delivery.

- In spite of significant additional resources committed for TB control by the Government and external donors, the funding gap is still considerable. Consolidation of current activities and expansion of new approaches will require significant additional funding.

- With the introduction of Xpert MTB/RIF, capacity for diagnosing MDR-TB is increasing faster than treatment can be made available, leading to long waiting lists. Delays in single-line drugs delivery also adds more patients on the waiting list.
- TB/HIV collaborative activities are only implemented in 28 out of the 330 townships. It is estimated that 10% of TB patients are living with HIV.

**Activities planned for 2014**

- Finalize protocols and SOPs for active case-finding in hospitals, poor urban communities, remote and hard-to-reach areas, mines and prisons.

- Complete analysis of results of third nationwide drug resistance survey.

- Accelerate expansion of PMDT project in 30 new townships and TB/HIV collaborative activities in 108 new townships.

- Under the Global Fund’s new funding model grant for TB, the NTP will progressively expand TB/HIV collaboration to cover 300 townships by 2016. Scale up of MDR-TB is also planned for up to 100 townships.

- Biosafety level 3 laboratories will be established in three more sites.
Case notifications by type of patients, 2012

<table>
<thead>
<tr>
<th>Type of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>New smear-positive</td>
<td>29%</td>
</tr>
<tr>
<td>New smear-negative</td>
<td>49.3%</td>
</tr>
<tr>
<td>New extrapulmonary</td>
<td>13.9%</td>
</tr>
<tr>
<td>Relapse</td>
<td>3.1%</td>
</tr>
<tr>
<td>Treatment after failure</td>
<td>1.1%</td>
</tr>
<tr>
<td>Treatment after default</td>
<td>0.4%</td>
</tr>
<tr>
<td>Other retreatment</td>
<td>3.2%</td>
</tr>
<tr>
<td>Other</td>
<td>4.7%</td>
</tr>
</tbody>
</table>

Trends in TB case notifications, 2001–2012

![Graph showing trends in TB case notifications, 2001–2012](image_url)
Trends in notified new smear-positive TB cases by age group among males, 2001–2012

Trends in notified new smear-positive TB cases by age group among females, 2001–2012
Treatment outcomes of new smear-positive cases, 2011 cohort

- Cured: 76.5%
- Completed: 9.1%
- Died: 5.1%
- Failed: 3.3%
- Defaulted: 4.4%
- Not evaluated: 1.6%
- Other: 14.4%

Trends in treatment outcomes of new smear-positive cases, 2000–2011
### Estimates and notification rates for 2012, Myanmar

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>48 531 478</td>
</tr>
<tr>
<td>Incidence of all forms of TB</td>
<td>200 000 (170 000–230 000)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100 000 population per year)</td>
<td>412 (350–474)</td>
</tr>
<tr>
<td>Prevalence of all forms of TB</td>
<td>260 000 (200 000–320 000)</td>
</tr>
<tr>
<td>Prevalence rate of all forms of TB (per 100 000 population per year)</td>
<td>536 (412–659)</td>
</tr>
<tr>
<td>TB death rate (of all forms of TB, excluding HIV per 100 000 population per year)</td>
<td>52 (25–91)</td>
</tr>
<tr>
<td>Notification rate of all forms of TB (per 100 000 population for the year 2012)</td>
<td>291</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100 000 population for the year 2012)</td>
<td>88</td>
</tr>
<tr>
<td>Case detection rate (%) (all forms of TB)</td>
<td>71 (62–83)</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2011 cohort</td>
<td>86</td>
</tr>
</tbody>
</table>

Nepal

With a population of about 27 million, Nepal had an estimated incidence and prevalence rate of all forms of TB of 163 and 241 per 100,000 population, respectively, in 2012. The notification rates of all forms of TB and new smear-positive cases were 128 and 55, respectively, showing no significant change in the past decade despite sustained high case detection and treatment success rates, increased access to DOTS through decentralization of services, outreach projects and strong community involvement. In the last 5 years, there has been very slight shift to the older age groups that could indicate a possible recent decline in TB burden in Nepal. The national ARTI survey completed in 2007 was also indicative of a declining trend. However, the evidence currently available does not allow a reliable estimation of trend for TB incidence and it is considered “frozen” at 163 per 100,000 population since 1990. To better understand the real burden of disease, age distribution and possible reasons for missed TB cases, Nepal is planning to conduct a prevalence survey in 2014. The protocol and implementation plan were prepared in collaboration with the Research Institute of Tuberculosis/Japan Anti-Tuberculosis Association and national staff will undergo WHO training in Indonesia. Field operations should start by mid-2014 for an expected overall duration of 18 months.

Treatment success rate among new smear-positive cases was 90% for the cohort of patients registered in 2011, and has been consistently above the target of 85% since 2001. The success rate among new smear-negative/extrapulmonary and retreatment cases is high: 91% and 85%, respectively, in the 2011 cohort.

TB control is identified as a top priority programme within the Ministry of Health and Population; the NTP has several fully dedicated staff at central, regional and district levels. In addition, a Programme Management Unit was set up in 2009 at the National Tuberculosis Center to help with planning, implementation and monitoring of activities supported by the Global Fund. Full DOTS institutional coverage was reached in the primary health system, including 100% coverage of primary health care centres and health posts, and 99% of the sub-health posts in the country.
The number of smear microscopy laboratory increased by 5% between 2011 and 2012, reaching 1.9 smear microscopy laboratories per 100,000 population; quality assurance activities are regularly carried out in all regions: in 2012, results were available for 61% of all laboratories, showing no major error for 98% of them.

To increase case detection, intensified case finding strategies are being initiated. In 2012, nine Xpert MTB/RIF machines granted by the Stop TB Partnership through TB REACH have been deployed to increase case detection of sputum smear-negative, HIV-infected and MDR-TB cases. In 2013, the NTP received from WHO-TB Xpert an additional 7 Xpert MTB/RIF machines and a substantial supply of cartridges, with another 6 machines supplied to a national nongovernmental organization (HERD) to be used for intensified case detection among vulnerable groups (slum dwellers, migrants, prisoners, diabetic patients, etc.).

According to results from DRS conducted in 2007, MDR-TB prevalence is quite low among new and retreatment cases at 2.9% and 11.7%, respectively. In 2011, the German–Nepal Tuberculosis Project (GENETUP) laboratory (a NGO-run laboratory in public–private partnership with the NTP) conducted nationwide DRS on a sample of 806 patients (664 new cases and 142 previously treated cases). Results showed a very slight decline of MDR-TB prevalence among new cases (2.2%, confidence interval: 1.3–3.8%) but a rather sharp increase among retreatment cases (15.4%, confidence interval: 10.1–22.7%). Overall MDR-TB prevalence among TB cases in Nepal is 4.7% (confidence interval: 3.3–6.5%); therefore, in 2012, estimated MDR-TB cases among incident cases were 2115. The findings, however, may not reflect real changes due to the wide confidence intervals, overlapping those of the previous DRS. Culture and DST facilities (for first-line and second-line drugs) are provided by two quality-assured laboratories: the national reference laboratory at the National Tuberculosis Center and the GENETUP laboratory, both supported by the SRL in Gauting, Germany. Results of patients’ DST are collected, but not regularly reported and analysed. In 2012, 1% of new cases and 24% of retreatment cases were tested for drug resistance.

Nepal was one of the first countries globally to introduce ambulatory MDR-TB case management in 2005, diagnosing and treating Category II failures and other laboratory-confirmed MDR-TB cases under a GLC-approved project. The management of MDR-TB on an ambulatory basis has been expanded to all five regions in the country. Currently, there are 13 treatment and 67 subtreatment centres offering MDR-TB treatment services through primary health care services and health facilities managed by other sectors. Further improvement of MDR-
TB management was achieved in 2011 through the establishment of hostels for DR-TB cases, introduction of 20-months treatment regimen for MDR-TB patients, revision of the national DR-TB management manual with elaboration of the 2013–2016 PMDT expansion plan, and introduction of an electronic database for programme and cohort analysis for MDR-TB cases on treatment which should be fully implemented in 2014.

From 16 July 2012 to 15 July 2013 (Nepali fiscal year 2069–2070) a total of 271 MDR-TB cases diagnosed (7.4% increase compared to previous fiscal year) were started on second-line treatment regimen; in the same period, 21 confirmed XDR-TB cases were reported, all of which were started on treatment. Average cure rate among MDR-TB patients registered during 2005–2008 was 66.7%; for the cohort of patients registered in 2009 and 2010 the cure rate was 73% and 74%, respectively.

Estimated HIV prevalence among adult populations in Nepal is 0.28%. Sentinel surveys of HIV among TB patients conducted in 2006–2007 showed an HIV prevalence of 2.4%; a more recent sentinel survey was conducted in 2011–2012 and results showed HIV prevalence of 1.55% among TB patients. The country has established a national working group on TB/HIV and a national TB/ HIV coordination committee. The national strategy for TB/HIV has been officially endorsed by the Ministry of Health and Population. Joint planning, evaluation and logistics management, information sharing, advocacy and operational research have been planned by the two programmes. In the Nepali fiscal year 2012–2013, 3773 TB patients were tested and 65 were found HIV-positive (1.7%); all TB/HIV cases detected were enrolled on CPT and ART.

A national infection control plan and guidelines have been developed and are being implemented.

The NTP’s plan and budget are aligned with the national health sector development plan. The programme, working in close collaboration with national and international implementing partners, has successfully involved private practitioners in major cities. The expansion of PPM has led to the engagement of several NGOs, public hospitals, all 20 medical college hospitals (both in the public and private sectors) and two major prisons in the country. The military hospital is also collaborating with the NTP in providing TB services. In 2012, reporting from non-NTP public providers was missing; cases were reported only by private providers and NGOs, and contributed to 15% of all annual cases notified.
Data management is presently paper-based; however the programme is using an Excel-based system but it is planning to upgrade the OpenMRS platform for drug-susceptible TB in 2014. PAL was introduced in two districts in 2007, and the NTP expanded PAL to cover 19 districts in 2013. By 2015, it is planned to complete the expansion of PAL to all health facilities in the 19 districts currently covered.

An in-depth programme review was successfully conducted in 2013.

The NTP is heavily dependent on donor funding. The programme also received support through the Global Fund Rounds 4 and 7 and successfully applied for a national strategy application grant. For the national prevalence survey, funding is coming from the Global Fund, LHL International Tuberculosis Foundation (LHL International) in Norway, and the Government of Nepal.

**Major achievements**

- Full implementation of all six components of the Stop TB Strategy.
- Successful implementation and nationwide coverage of MDR/XDR-TB management programme. At present, 41 of the 75 districts are covered by DR-TB centres and subcentres.
- Full DOTS health institutional coverage in the primary health system including 100% coverage in primary health care centres and health posts, and 99% of subhealth posts in the country.
- Successful resource mobilization through the Global Fund (Rounds 4 and 7 and national strategy application grant), LHL International and WHO/Stop TB Partnership.
- Revision of national DR-TB management manual.
- Revision of NTP general manual (with introduction of childhood TB management section).
- Establishment of PAL in 19 districts in the country.
- Development of infection control policy, strategy, plan and guidelines and resource mobilization for implementation.
- Establishment of hostels for DR-TB cases.
- Uninterrupted supply of first- and second-line and pediatric quality-assured TB medicines through the GDF.
• Introduction of Xpert MTB/RIF technology in several districts and development of national algorithms for their use.
• Piloting of IPT in five HIV centres.

Major challenges
• Programme sustainability at risk due to heavy dependence on external funding and one major donor (the Global Fund).
• Addressing operational issues of accommodation and insufficient socioeconomic support for MDR-TB cases.
• Expansion of DOTS in urban areas.
• Introducing infection control in TB programme setting.
• Addressing stagnant case notification by implementing intensified case detection among at-risk and unreached populations.
• Implementation of proper and effective TB/HIV collaborative activities, including provider-initiated HIV testing and counselling and the “Three I’s” for TB/HIV (intensified case-finding, IPT, and infection control).
• Harnessing the potential offered by a rampant, yet barely regulated, private health sector through the adoption and expansion of PPM’s most suitable model(s).

Activities planned for 2014
• Planning and initiation of prevalence survey.
• Expansion of DOTS in urban areas.
• Starting other forms of intensified case-finding.
• Introduction of infection control in TB programme settings.
• Increasing case detection of MDR-TB, TB/HIV and sputum smear-negative cases by strategically deploying the Xpert MTB/RIF machines and cartridges granted by WHO plus others to be procured under the national strategy application grant.
- Expansion of PAL initiative to all health facilities in the 19 districts.
- Expansion and consolidation of TB/HIV collaborative activities.
- Submitting the concept note for the Global Fund new funding mechanism.
- Conducting a national TB conference.
- Countrywide adoption of the revised recording and reporting formats.
- Establishment of five additional DR-TB hostels inside governmental health institutions.
- Upgrading of three regional laboratories (two for sputum culture, one for culture and DST).
- Procurement and deployment of six more Xpert MTB/RIF machines under the national strategy application grant Phase 2.
- Engaging in more aggressive PPM activities.
**Case notifications by type of patients, 2012**

- **New smear-negative**: 25.6%
- **New extrapulmonary**: 22.1%
- **New smear-positive**: 42.3%
- **Other new**: 2.4%
- **Relapse**: 6.4%
- **Other**: 1.3%
- **Treatment after failure**: 0.7%
- **Treatment after default**: 0.6%

**Trends in TB case notifications, 2001–2012**

- **Case notifications per 100,000 population**
- **Years**: 2001–2012
- **All cases**
- **New smear-positive**
Trends in notified new smear-positive TB cases by age group among males, 2001–2012

Trends in notified new smear-positive TB cases by age group among females, 2001–2012
Treatment outcomes of new smear-positive cases, 2011 cohort

- **Cured**: 87.6%
- **Completed**: 2.5%
- **Died**: 3.5%
- **Failed**: 1.4%
- **Defaulted**: 2.7%
- **Not evaluated**: 2.3%
- **Other**: 9.9%

Trends in treatment outcomes of new smear-positive cases, 2000–2011

- Success rate
- Died
- Failed
- Defaulted
- Not evaluated

<table>
<thead>
<tr>
<th><strong>Estimates and notification rates for 2012, Nepal</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
</tr>
<tr>
<td><strong>Incidence of all forms of TB</strong></td>
</tr>
<tr>
<td><strong>Incidence rate of all forms of TB (per 100 000 population per year)</strong></td>
</tr>
<tr>
<td><strong>Prevalence of all forms of TB</strong></td>
</tr>
<tr>
<td><strong>Prevalence rate of all forms of TB (per 100 000 population per year)</strong></td>
</tr>
<tr>
<td><strong>TB death rate (of all forms of TB, excluding HIV per 100 000 population per year)</strong></td>
</tr>
<tr>
<td><strong>Notification rate of all forms of TB (per 100 000 population for the year 2012)</strong></td>
</tr>
<tr>
<td><strong>Notification rate of new smear-positive cases (per 100 000 population for the year 2012)</strong></td>
</tr>
<tr>
<td><strong>Case detection rate (all forms of TB)</strong></td>
</tr>
<tr>
<td><strong>Treatment success rate (%) of new smear-positive cases for 2011 cohort</strong></td>
</tr>
</tbody>
</table>

With an estimated population of 21 million, Sri Lanka is among the low TB prevalence countries in the Region. The estimated prevalence and incidence rates of all forms of TB were 109 and 66 per 100 000 population, respectively, in 2012. The notification rate of all forms of TB and new smear-positive cases was 43 and 20, respectively, reverting the slight but steady increase observed during 2006–2011 for all forms of TB. This, despite there being no downscaling of NTP activities and there being an increase in the number of patients screened for TB compared to 2011. Since 2004, Sri Lanka has reached and sustained the target of 85% treatment success rate among new smear-positive cases; success rate was 86% for the cohort of patients registered in 2011. In the same cohort, treatment success rate for new smear-negative/extrapulmonary and retreatment TB cases was 89% and 75%, respectively. The overall default rate has dropped from 15% to 4% in the past decade, due to intensified default tracing efforts involving the district and field public health inspectors and other categories of health staff. In Colombo district, which accounts for around 20% of total case-finding, treatment after default has increased by almost threefold from 2011 to 2012. Activities such as mass screening in prisons (the largest prison is in Colombo district) and improved defaulter tracing (possible due to appointment of more public health inspectors) will have contributed to this increase. An innovative case-finding strategy is being implemented through TB/diabetes collaborative activities; the pilot phase has been completed, but data are yet to be analysed. It is planned to conduct sensitization programmes for health staff working in diabetes clinics throughout the country.

The first national level ARTI survey, undertaken in 2009 (to capture the transmission level of the year 2004), showed continuing transmission of TB and estimated ARTI was between 0.07% and 0.72%.

A national drug resistance survey was completed in 2006, and this confirmed the very low levels of drug resistance. Resistance to any drug was 1.4% among new patients and 8.8% among previously treated cases in the country; the prevalence of MDR-TB was 0.17% (1 out of 595 isolates). Protocol for a repeat
A drug resistance survey has been developed with the technical assistance of WHO. DRS is planned to be conducted in 2014, funded through the Global Fund’s interim new funding model.

Culture and DST are to be performed for all patients who fail initial anti-TB treatment regimens, at the time of initiation of treatment for all sputum smear-negative TB patients, patients commencing retreatment regimens, contacts of MDR-TB cases, health care workers, HIV-infected TB cases, migrants and prisoners. In 2012, 13% of new and 55% of retreatment TB cases were tested for drug resistance. Only five MDR-TB cases were detected in 2012, one among new cases (0.1% of all tested) and four among retreatment cases (1.7% of all tested); all of them were started on treatment. The programme initiated MDR-TB case management under GLC approval with support through the Global Fund in 2010. MDR-TB is diagnosed at the national reference laboratory which is supported by the SRL at the National Institute for Research in Tuberculosis in Chennai, India. Patients are treated initially at the Central Chest Hospital, Colombo; afterwards they are referred for continuation of treatment at the chest clinics in their respective districts. National guidelines for the management of MDR-TB have been developed. The cohort of MDR-TB patients started on treatment in 2010 includes only four patients: two were cured and two completed the treatment.

HIV coinfection rate among TB patients was estimated at 0.07% in 2011. Since 1993, TB patients have been included under the HIV sentinel sero-surveillance survey and the data show consistently low TB/HIV coinfection rate. In 2012, 3379 TB patients were tested for HIV, almost double the number tested in 2011, as result of expansion of HIV screening in all district chest clinics and improved reporting; 23 TB patients were found to be HIV-positive (0.1% of all tested). Of TB patients counselled and tested for HIV in 2010 and 2011, 1.3% and 1.1% resulted HIV-positive, respectively. A national policy for provision of CPT and ART to HIV-positive TB patients is in place. In 2012, 22% of the TB/HIV patients detected were started on CPT and 48% were started on ART.

Laboratory network strengthening is ongoing. In 2012, the number of smear microscopy laboratories increased to 213 (1 laboratory per 100 000 population); EQA was carried out for 97% of these laboratories, and results showed acceptable performance for 91%. Quality-assured culture facilities currently number three, of which one is newly established. One Xpert MTB/RIF was deployed in the country in 2012 and it is mainly used for detection of MDR-TB among suspect cases.
The NTP’s plan and budget are aligned with the national health sector development plan. Public–private collaborative projects have been initiated on a limited scale. Thirty-eight public hospitals, including teaching hospitals and five military hospitals, have been involved by the NTP. Non-NTP public providers contributed 5004 TB patients to case notification in 2012, 55% of the total compared to a proportion of 35% in 2011. This result was due to the improvement of reporting and recording (correct coding by health provider referring the patients) as well as sensitization of health-care providers. The private sector contributed 445 TB patients (5% of the total). The ISTC will be used as a tool for establishing effective TB services within other sectors. There is a plan for initiation of PAL and piloting is expected to start soon.

The Government provides the major part of funding for the TB programme, with additional resources from the Global Fund Round 6, and WHO. A GDF grant has been approved for the total requirement of adult and paediatric first-line drugs.

**Major achievements**

- Reaching and sustaining the global targets.
- Integration of TB surveillance and control activities into primary health care settings.
- Improvement of the quality of DOTS provision.
- Strengthening of TB control activities in the Northern Province by infrastructure development and human resource mobilization.
- Further expansion of the service coverage by consultant respiratory physicians.
- Implementation of TB infection control activities in chest clinics.
- Sustaining the control of MDR-TB and TB/HIV coinfection.
- Operational research on TB-related deaths.

**Major challenges**

- Maintaining adequate number of human resources in the face of high turnover of trained staff.
- Reaching the unreached population groups, for example population groups with limited access to services, urban slums, prison population, and population in tea and rubber estates.
• Addressing TB control among migratory working population from high-burden countries.
• Overcoming TB-related stigma.
• Financial sustainability.

Activities planned for 2014
• Introduction of new technologies in laboratory diagnostics of TB and MDR-TB
• Establishment of two regional TB culture laboratories (in Galle and Jaffna).
• Capacity-building of central and district staff by training on procurement and supply management, MDR-TB, TB/HIV coinfection, information technology literacy, data management, operational research and productivity.
• Completion of infrastructure development at the national reference laboratory, upgrading to biosafety level 3.
• Further expansion of community DOTS provision.
• Decentralization of TB control activities in the Colombo District.
• Strengthening PPM in TB control by establishing DOT centres in private hospitals, linking private institutions to the programme data management system, and improving proficiency of private laboratories.
• Further integrating of TB control with existing primary health care network. Improved defaulter tracing and contact screening through field public health inspectors.
• Printing and distribution of manuals and guidelines.
• Conduct drug resistance survey and pharmacovigilance survey of TB.
• Development and implementation of a comprehensive advocacy, communication and social mobilization plan.
• Strengthening of central- and peripheral-level monitoring mechanisms.
Case notifications by type of patients, 2012

New smear-negative 20.2%
New smear-positive 45.7%
New extrapulmonary 25.1%
Relapse 2.6%
Other 6.3%
Treatment after failure 0.8%
Treatment after default 1.2%
Other (unknown history of treatment) 4.3%

Trends in TB case notifications, 2001–2012

<table>
<thead>
<tr>
<th>Years</th>
<th>All cases</th>
<th>New smear-positive</th>
</tr>
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<tbody>
<tr>
<td>2001</td>
<td>40</td>
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<tr>
<td>2002</td>
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<tr>
<td>2012</td>
<td>45</td>
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</tbody>
</table>
Trends in notified new smear-positive TB cases by age group among males, 2001–2012

Trends in notified new smear-positive TB cases by age group among females, 2001–2012
Treatment outcomes of new smear-positive cases, 2011 cohort

- **Cured**: 83.5%
- **Completed**: 3.5%
- **Died**: 5.4%
- **Failed**: 1.2%
- **Defaulted**: 4.7%
- **Not evaluated**: 1.7%
- **Other**: 13%

Trends in treatment outcomes of new smear-positive cases, 2000–2011
### Estimates and notification rates for 2012, Sri Lanka

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>21,098,099</td>
</tr>
<tr>
<td>Incidence of all forms of TB</td>
<td>14,000 (12,000–17,000)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100,000 population per year)</td>
<td>66 (55–79)</td>
</tr>
<tr>
<td>Prevalence of all forms of TB</td>
<td>23,000 (11,000–39,000)</td>
</tr>
<tr>
<td>Prevalence rate of all forms of TB (per 100,000 population per year)</td>
<td>109 (52–185)</td>
</tr>
<tr>
<td>TB death rate (of all forms of TB, excluding HIV per 100,000 population per year)</td>
<td>1.1 (0.8–1.4)</td>
</tr>
<tr>
<td>Notification rate of new and relapsed TB (per 100,000 population for the year 2012)</td>
<td>43</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100,000 population for the year 2012)</td>
<td>20</td>
</tr>
<tr>
<td>Case detection rate (all forms of TB)</td>
<td>66 (55–80)</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2011 cohort</td>
<td>87</td>
</tr>
</tbody>
</table>

Thailand

With a population of approximately 67 million, Thailand is one of the 22 high TB burden countries. In 2012, the estimated prevalence and incidence rates of all forms of TB were 159 and 119 per 100,000 population, respectively. In 2013, Thailand concluded field operations of its fourth national TB prevalence survey (the previous one was conducted in 2006) and data are being analysed; results will allow improvement of current burden estimates, as well as better definition of trends, and guide future TB programming.

The country has achieved full DOTS coverage and TB services are available in all hospitals in Thailand. Widespread effective coverage of health insurance enables people to afford the cost of diagnosis, treatment and much of the care for all forms of TB. It is estimated that since 2000, 525,000 patients have been diagnosed and treated and 220,000 lives saved (compared to no treatment). However, access to TB services is to some extent limited for uninsured patients and efforts towards universal coverage of services are needed. Despite this limitation, Thailand has made considerable progress in expanding and enhancing TB diagnosis and care, particularly among vulnerable populations such as migrants (a new policy to make health insurance packages available to all categories of migrants was announced by the Ministry of Public Health in November 2013), people living with HIV/AIDS, and populations in closed settings. In 2012, the notification rates of all forms of TB and new smear-positive cases were 90 and 46, respectively, showing a slight decrease after the steady increase observed from 2006 to 2011. Considering that mandatory notification for TB is not enforced and that the surveillance system is under-performing (due to reports missing from a large proportion of teaching hospitals and private providers, and several platforms being in use for reporting), the notification rate is likely to be affected more by underreporting to the NTP than by under-diagnosis.

The treatment success rate among new smear-positive cases was 85% for the cohort of patients registered in 2011, reaching the former target of 85% treatment success rate (reset to 90% by WHO in 2010) for the third consecutive year. This positive result seems to be primarily driven by the decrease in defaulters and failures; another contributing factor has been the increased
completeness of reporting. By targeting large urban settings such as Bangkok, not evaluated cases have decreased by 70% in the last 5 years. However, treatment success rate among smear-negative/extrapulmonary and retreatment cases is still rather low being 78% and 69%, respectively, in the 2011 cohort. The further increase in treatment success rate is also challenged by a high notification rate in the age group over 64 years (highest age-specific rate among both female and male), where patients are prone to die from any cause including comorbidities such as diabetes. Another challenge to improving the treatment success rate is represented by high death rates among HIV-positive TB cases (15% in the 2011 cohort).

In the South-East Asia Region, Thailand has the highest HIV burden (estimated 1.3% of adult population infected with HIV). Since the peak of 26% in 2000, the estimated HIV-prevalence among TB cases has declined yearly to approximately 13% in 2012. Substantial progress has been made in implementing TB/HIV collaborative activities throughout the country. Provider-initiated HIV testing and counselling of TB patients has been integrated into national guidelines and implemented throughout the country. TB/HIV collaborative activities are monitored and supervised, mainly by TB programme staff. Routine HIV screening is recommended for all registered TB patients, nationally. In 2012, the HIV counselling and testing rate among TB patients was 72%, and 13% among all those tested were found to be HIV-positive. Care and treatment for HIV-infected persons is free of charge and is covered by all three insurance agencies, and widely available through National Health Security Office and Global Fund-supported programmes. CPT and ART were provided to 77% and 62% of HIV-positive TB patients, respectively. This increase reflects progress made in previous years, particularly for provision of CPT which has almost reached the national target of 80% coverage. Early initiation on ART could be enhanced by increasing the awareness of doctors on management of TB/HIV patients, and reducing holding-back factors such as concerns about immune reconstitution inflammatory syndrome. In 2012, the treatment success rate for HIV/TB coinfected patients who were smear-positive was 73% and smear-negative was 72%. Improved identification of HIV-infected TB patients, together with effective linkages to care and treatment, will be required to significantly reduce TB mortality rates.

IPT for HIV-infected persons had been introduced in some health facilities as pilot and demonstration projects, but has been largely discontinued. Intensified case-finding among newly detected HIV-positive patients has been initiated. Routine and periodic symptomatic screening for TB among HIV-infected patients
is undertaken at some hospitals during the initial diagnosis, on follow-up visits and when the decision to initiate ART is made. In 2012, the proportion of newly diagnosed HIV patients screened for TB was above 95% according to programme-based data. In 2011, it was reported that 30% of all estimated HIV-positive incident TB cases received treatment for both TB and HIV; however, this figure seems to be affected by underreporting, as coverage based on routine data indicate it was over 60%.

Based on a national drug resistance survey in 2006, MDR-TB rates were reported to be 1.7% among newly diagnosed cases and 35% among previously treated cases. The fourth national drug resistance survey was completed in 2012, and results are showing that there has been no significant increase of MDR-TB prevalence among new cases (2.03%) and considerable decrease of MDR-TB prevalence among previously treated cases (18.88%) since the 2006 survey. Thailand has an extensive and well-developed laboratory network and in the past year there has been a considerable scale-up of laboratory capacity: the 65 culture laboratories represent 2.6 laboratories per 100 000 population, above the global target for culture availability. In addition, access to DST was expanded to 18 sites at selected regional laboratories, all demonstrating acceptable performance in EQA, and representing 1.3 DST facility per 100 000 population. Newer molecular technologies for rapid DST, specifically GenoType MTBDRplus test and Xpert MTB/RIF (implemented in 14 sites), have been introduced and the cost of the tests is reimbursed by the National Health Security Office for smear-positive patients with a history of previous treatment or household contacts of MDR-TB. However, due to the decentralized nature of laboratory services and the number of private sector laboratories also undertaking TB diagnosis, maintaining quality assurance is one of the key challenges faced by the NTP. For smear microscopy laboratories, quality control reached 90% of facilities and 90% of those showed acceptable performance. Laboratory strengthening is being supported through domestic funding, with additional funding from the Global Fund, and the Thailand Ministry of Public Health–U.S. Centers for Disease Control and Prevention (CDC) Collaboration (TUC). The national reference laboratory has capacity for second-line DST, and has recently been formally designated as the second SRL in the South-East Asia Region. Culture, DST and second-line drugs for eligible patients (failure of any treatment regimen, contacts of MDR-TB cases, patient commencing retreatment regimen) are available free of cost for Thai citizens through the National Health Security Office. The Global Fund is providing support to approximately one fourth of the MDR-TB patients currently diagnosed and managed.
At present, most patients with DR-TB are diagnosed and managed by university hospitals, regional/provincial hospitals and some private hospitals, which procure second-line anti-TB drugs using local resources such as the Government Pharmaceutical Organization. The recording and reporting system for MDR-TB/XDR-TB was revised in 2012 to be consistent with international recommendations and to capture data about MDR-TB/XDR-TB detection and enrolment on treatment. The NTP reported 510 and 492 MDR-TB cases detected in 2011 and 2012, respectively; in 2011, only 123 were reported as having started on treatment. Since the revised recording and reporting system was implemented in 2012, at the time of writing, notification data for four quarters were available, but treatment outcomes for the 2010 cohort were not available.

The national electronic database (TB Clinical Management), developed to improve real-time reporting and case management, has been piloted and it currently covers about 50% of the country; nationwide expansion is planned by the end of 2015. Thailand is among the countries that conducted a national assessment of the TB surveillance system using the newly developed WHO Checklist of standards and benchmarks for TB surveillance and vital registration systems. A thorough analysis of all available surveillance data and relevant information was conducted; on the basis of identified gaps, a list of costed priority activities was outlined and an investment plan was developed.

TB services are fully integrated within primary health care. Thailand has made remarkable progress in involving NGOs and the private sector. The programme has involved private hospital associations, NGOs (World Vision International, American Refugee Committee, Thailand Business Coalition on AIDS, Raks Thai Foundation and National Catholic Commission on Migration) to provide TB care according to the ISTC. In 2012, the only public providers reporting to the NTP were prisons: 1532 cases were reported, contributing 2.5% of the total of cases notified. Under-notification is known to be important in the urban area of Bangkok, where only 21 of the 97 hospitals notify TB cases to the NTP. Of around 450 private hospitals, only 38 reported TB cases to the NTP in 2012 (1267 cases, contributing to 2% of all cases).

The fifth joint international monitoring mission and review of the NTP was successfully conducted in August 2013.

The TB programme is supported mainly by the Government budget through the National Health Security Office. The NTP and National Health Security Office have ensured an uninterrupted supply of anti-TB drugs at all levels, and the delivery of services throughout the country. Additional support has been provided by Global Fund single stream of funding, and other health partners.
Major achievements

- Funding from the National Health Security Office to support TB activities at the provincial and local levels.
- Sustained high utilization rate for HIV/TB patients (72% of TB patients counselled and tested for HIV in 2011).
- Progress made towards sustained TB services among marginalized populations, such as migrants and cross-border populations, through domestic government funding.
- Sustained TB services in about 140 prisons.
- Global Fund support secured: all rounds consolidated into the single stream of funding.
- Introduction and progressive scale-up of molecular diagnostics, including domestic funding from National Health Security Office to reimburse the cost.
- Updated TB guidelines have been finalized.
- Scaling up of an electronic database which will greatly improve reporting and case management in each of the 12 regions.
- A 5-year PMDT plan has been drafted and is currently being budgeted.
- An action plan for advocacy, communication and social mobilization activities for the country has been outlined.
- Prevalence survey and DRS completed.
- Epidemiological assessment and review completed.
- Revision of national strategic plan being undertaken for the period 2014–2018.

Major challenges

- Improving quality of DOTS under the decentralized health system and in large urban centres (i.e. Bangkok or capital districts of each province).
- Improving case notifications.
- Harmonizing monitoring and reporting systems.
- Rolling out new treatment guidelines.
- Further strengthening of TB/HIV integrated activities, particularly revitalization of the TB/HIV committee, intensified case-finding among known HIV-positive people, and IPT.
- Revising records and reports of MDR-TB/XDR-TB to monitor all indicators of detection, enrolment, interim results and final outcomes in line with new 2013 WHO-revised definitions.

- Strengthening referral system between MDR-TB hospitals in the capital districts and community hospitals where MDR-TB/XDR-TB patients live.

- Better systematic management and regular supervision of programme activities in the context of decentralization.

- Effectively involving private hospitals in TB control.

- Sustaining gains in implementing TB control activities in the Bangkok metropolitan area.

- Addressing human resource management constraints at the central and regional levels.

**Planned activities for 2014**

- Capacity-building of health staff at primary care units whose location is closer to patients’ homes in decentralized settings and in large urban centres (i.e. Bangkok) to enhance treatment adherence.

- Ongoing decentralization of laboratory services to support early case-finding is being implemented. All regional laboratories must be able to provide quality-assured DST and molecular diagnostics by end-2014 and meet quality assurance requirements.

- Strengthening of regular supervision, monitoring and evaluation of the programme.

- Roll out the electronic reporting and recording system nationally.

- Revising the recording and reporting system of MDR-TB/XDR-TB to be consistent with the international recommendations.

- Increasing the involvement of private hospitals and ensuring that practices are in line with national and international guidelines.

- Supporting key stakeholders in the government and private sector for greater commitment to address fragmented service delivery, and improving regulation of the private sector.
Case notifications by type of patients, 2012

- New smear-negative: 28.7%
- New smear-positive: 50.6%
- New extrapulmonary: 14.5%
- Relapse: 3.1%
- Treatment after failure: 0.5%
- Treatment after default: 0.9%
- Other (unknown history of treatment): 1.7%
- Other: 3.2%

Trends in TB case notifications, 2001–2012
Country profile: Thailand

Trends in notified new smear-positive TB cases by age group among males, 2001–2012

Trends in notified new smear-positive TB cases by age group among females, 2001–2012
Treatment outcomes of new smear-positive cases, 2011 cohort

- **Cured**: 78.9%
- **Completed**: 6.2%
- **Died**: 7.1%
- **Failed**: 1.5%
- **Defaulted**: 3.3%
- **Not evaluated**: 3%
- **Other**: 14.8%

Trends in treatment outcomes of new smear-positive cases, 2000–2011

- Year 2001 to 2011
- **Success rate** (%)
- **Died**
- **Failed**
- **Defaulted**
- **Not evaluated**
### Estimates and notification rates for 2012, Thailand

<table>
<thead>
<tr>
<th>Metric</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>66 785 001</td>
</tr>
<tr>
<td>Incidence of all forms of TB</td>
<td>80 000 (66 000–95 000)</td>
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<tr>
<td>Incidence rate of all forms of TB (per 100 000 population per year)</td>
<td>119 (98–142)</td>
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<tr>
<td>Prevalence of all forms of TB</td>
<td>110 000 (47 000–190 000)</td>
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<tr>
<td>Prevalence rate of all forms of TB (per 100 000 population per year)</td>
<td>159 (71–282)</td>
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<tr>
<td>TB death rate (of all forms of TB, excluding HIV) (per 100 000 population per year)</td>
<td>14 (6–25)</td>
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<tr>
<td>Notification rate of all forms of TB (per 100 000 population for the year 2011)</td>
<td>90</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100 000 population for the year 2011)</td>
<td>46</td>
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<tr>
<td>Case detection rate (all forms of TB)</td>
<td>76 (64–92)</td>
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<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2010 cohort</td>
<td>85</td>
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</table>

With a population of about 1.2 million, Timor-Leste is a low TB burden country. However, the notification rate in 2012 was very high, being 344 and 139 per 100 000 population for all forms of TB and new smear-positive cases, respectively. In 2007, the estimated incidence and prevalence rates of all forms of TB were 322 and 378 per 100 000 population, respectively. The burden estimates clearly need to be revised upwards, because they have been consistently lower than the notification rate since 2008 and the case detection rate has been far over 100%. New estimates for the years 2005–2011 were calculated by WHO using updated methodology; however, they are based on poor assumptions and historical data and have very large uncertainty intervals. They do not reflect properly the considerable efforts conducted in the country to provide access to TB diagnosis and care.

In October 2013, a comprehensive TB epidemiological assessment was conducted with the primary objective of evaluating the efficiency and reliability of case-finding under the NTP and the accuracy of notification data. The level of under-diagnosis/underreporting, as well as the degree of over-diagnosis/overreporting, was estimated from analysis of available notification data, results of the recent knowledge, attitudes and practice survey, and observation of practices and resources available for TB diagnosis. Based on this information, estimates of TB burden were calculated during an in-country workshop: incidence and prevalence of all TB cases were estimated at 400 and 800 per 100 000 population, respectively. Annual mortality was estimated at 65 per 100 000 population.

The notification rates of new smear-positive cases has been increasing since 2007 and this reflects efforts made in TB control in recent years; however, the increasing trend for all forms of TB has been reverting in the past two years. Treatment success rate among new smear-positive cases was 91% for the cohort of patients registered in 2011.

The NTP has established services in all 13 districts and 65 subdistricts of the country; district TB coordinators are working with the district health management
teams in all districts and in the 65 community health centres at the subdistrict level. Community health centres have been strengthened and better funded, in order to include support for conducting outreach activities at the village level through the *servisu integradu da saúde communitária* (SISCa) initiative.

Presently, 18 microscopy centres are based in public and NGO facilities. All of these have been covered by EQA activities, and all have showed acceptable performance in 2012. Retraining of laboratory technicians in smear microscopy and EQA took place in 2011.

The Ministry of Health supports all staff costs, infrastructure and basic resources. In 2010, additional resources were mobilized through the Global Fund Round 7, which is in Phase II.

Six NGO facilities are providing ambulatory care and one is providing in-patient MDR-TB management. There are five NGOs which support the NTP in identifying TB suspects and referring them to DOTS facilities for diagnosis and treatment. Civil society participation is expected to improve and expand with additional funding from the Global Fund through Round 7.

MDR-TB rates are estimated to be low, being 2.2% among newly diagnosed and 16% among previously treated TB cases. In 2011, there were no culture and DST facilities in the country. A GLC-approved MDR-TB case management project is in place. A small number of patients with MDR-TB have been identified through culture and DST conducted at the SRL at the Institute of Medical and Veterinary Sciences in Adelaide, Australia. Confirmed MDR-TB cases numbered three in 2012; an additional RR-TB case was detected through Xpert MTB/RIF deployed in the country. All detected patients were enrolled on second-line treatment. The treatment of such cases is initiated through an NGO, Klibur Domin, in the district of Liquiça. The GDF has provided necessary second-line anti-TB drugs, with funding supported through UNITAID until 2012 and then the Global Fund.

HIV remains relatively uncommon in Timor-Leste. In 2010, a nationwide survey based on representative samples of TB patients showed TB/HIV coinfection rate of 1.13%; data from sentinel sites for surveillance of HIV in TB patients showed similar results (1.0%). A TB/HIV coordinating body at the national level is being established. Initial training for staff at voluntary counselling and testing centres has been completed and a formal mechanism for referral from voluntary counselling and testing centres to DOTS centres has been initiated. In 2012, 20% of all TB patients were tested for HIV (greatly increased from 6% in 2011) and 0.5% of them were found HIV-positive; all were started on ART.
A national Stop TB Strategy for 2011–2015 has been developed. The NTP manual is being revised to reflect changes in international guidelines. Different types of training are being conducted (for medical doctors, laboratory technicians, and peripheral staff involved in TB control activities) and training manuals updated. Continued funding under the Global Fund Round 7, Phase II was secured for TB control activities.

**Major achievements**

- NTP manual revised to include the most recent WHO recommendations.
- All recording and reporting tools revised according to new WHO definitions.
- Joint monitoring mission 2013 completed successfully.
- Continuing funding from the Global Fund’s transitional funding mechanism secured until end-2015.
- Laboratory EQA protocol developed and ready for implementation in 2014.
- Two rounds of trainings of laboratory technicians successfully conducted by international trainers.
- Two laboratory quality controllers trained at the National Tuberculosis Institute in Bangalore, India, to enhance their skills.
- TB/HIV collaboration further strengthened at national as well as district levels.
- Training manual for doctors and health workers (at all levels) developed and ready for implementation.
- Ensured availability of TB and MDR-TB drugs at all times in the country.
- TB infection control guidelines finalized and translated in Tetun.
- Trained all district TB coordinators and regional supervisors on improving drug logistics and drug management.

**Major challenges**

- Improving the quality of DOTS implementation.
- Ensuring adequate access to health care services in remote and hilly areas through a reliable transport system.
- Promoting adherence to standard diagnostic and treatment practices by all levels of health staff.
• Building adequate capacity and improving commitment of health staff towards TB control at district and subdistrict level.

Activities planned for 2014

• Strengthening EQA system for all microscopy centres.
• Implement the revised NTP manual.
• Plan for roll out of better regimen for TB in 2015.
• Training of newly-trained Timorese doctors from Cuba on the revised NTP manual.
• Continue meetings of TB Technical Working Group and PMDT Committee.
• Continue PMDT activities.
• Improving involvement of community volunteers in TB suspect referral and DOTS provision.
• Improving routine programme data recording and reporting, and feedback to districts.
• Strengthening regular supervision from national to district level and from district level to subdistrict level.
• Improving programme management capacity at national and district level.
• Continue regular quarterly review meetings with staff from all levels.
Case notifications by type of patients, 2012

- New smear-negative: 47.5%
- New smear-positive: 40.3%
- New extrapulmonary: 10.9%
- Relapse: 1%
- Treatment after failure: 0.1%
- Treatment after default: 0.1%
- Other: 0.2%

Trends in TB case notifications, 2002–2012

- All cases
- New smear-positive
Notified new smear-positive TB cases by age group and sex, 2012

![Chart showing the number of cases of smear-positive TB by age group and sex in 2012](image)

### Notification rate of new smear-positive TB cases by age group and sex, 2012

![Chart showing the notification rate of smear-positive TB cases per 100,000 population by age group and sex in 2012](image)
Treatment outcomes of new smear-positive cases, 2011 cohort

- **Cured**: 86.2%
- **Completed**: 4.6%
- **Died**: 3.4%
- **Failed**: 0.5%
- **Defaulted**: 3.4%
- **Not evaluated**: 2%
- **Other**: 9.2%

Trends in treatment outcomes of new smear-positive cases, 2000—2011
### Estimates and notification rates for 2012, Timor-Leste

<table>
<thead>
<tr>
<th>Metric</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>1,114,106</td>
</tr>
<tr>
<td>Incidence of all forms of TB</td>
<td>5,600 (4,600–6,600)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100,000 population per year)</td>
<td>498 (409–596)</td>
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<tr>
<td>Prevalence of all forms of TB</td>
<td>8,400 (3,800–15,000)</td>
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<tr>
<td>Prevalence rate of all forms of TB (per 100,000 population per year)</td>
<td>758 (342–1340)</td>
</tr>
<tr>
<td>TB death rate (of all forms of TB, excluding HIV per 100,000 population per year)</td>
<td>74 (33–132)</td>
</tr>
<tr>
<td>Notification rate of all forms of TB (per 100,000 population for the year 2012)</td>
<td>344</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100,000 population for the year 2012)</td>
<td>139</td>
</tr>
<tr>
<td>Case detection rate (all forms of TB)</td>
<td>69 (58–84)</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2011 cohort</td>
<td>91</td>
</tr>
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</table>

Millennium Development Goal Country Profiles
For each country in the South-East Asia Region, progress towards the achievement of MDG 6 – to combat HIV/AIDS, malaria and other diseases – was analysed for the extent of TB control.

The MDG target for TB control is:

- to halt and begin to reverse the incidence of TB by 2015.

In addition, progress towards the achievement of targets linked to the MDGs and endorsed by the Stop TB Partnership was analysed, the targets being:

- to halve TB prevalence rate by 2015, compared with 1990 levels;
- to halve TB mortality rate by 2015, compared with 1990 levels.

For prevalence and mortality rates, trends over time from 1990 to 2012 were analysed and projections for the years 2013–2015 were made using log-linear regression models fitted to data from 2007–2012, with the assumption that recent trends would continue. Trends and projections have uncertainty bands whose width reflects the quality and completeness of data on which estimates are based.

For countries with poor estimates of TB burden, selected main indicators in the implementation component of the Global Plan to Stop TB 2011–2015 were considered for analysis, such as:

- treatment success rate (in annual cohort): target 90%;
- number of cases diagnosed, notified and treated according to the DOTS approach: no country-specific targets set;

• number of laboratories with sputum smear microscopy services per 100 000 population: target more than 1;
• percentage of previously treated TB patients tested for MDR-TB: target 100%;
• percentage of new TB patients tested for MDR-TB: target 20%;
• percentage of TB patients tested for HIV: target 100%;
• percentage of HIV-positive TB patients treated with ART: target 100%.
TB prevalence rate (best estimate) shows a declining trend from 1990 to 2012, with acceleration in the early 2000s and slower pace in the last 5 years. According to projections up to 2015, it seems unlikely that Bangladesh will reach the target of halving TB prevalence by 2015 compared to the 1990 baseline (Graph 1). However, estimates and projections have very large uncertainty bounds underlining the need for more accurate burden estimates. Revision of estimates is expected following the national prevalence survey planned for 2014–2015.

TB mortality rate shows a declining trend from 1990 to 2012, following a similar pattern to prevalence trend. Despite progress in reducing mortality (a decrease of about 26% by 2012 compared to 1990 level), according to projections, it seems unlikely that Bangladesh will reach the target of halving TB mortality by 2015 compared to the 1990 baseline (Graph 2).

The analysis of trend in TB incidence from the notifications data proves to be difficult, because of the considerable change in case notification due to important case-finding efforts. Current data were considered insufficient to determine reliable trend, therefore incidence was assumed to follow a horizontal trend going through the most recent estimate of incidence (Graph 3). Additional information is needed to better assess whether Bangladesh will achieve the target of reverting TB incidence trend. However, it seems unlikely that Bangladesh will reach the MDG target by 2015; in fact, despite the good performance of the NTP on treatment success rate (target of 90% was steadily reached in 2004), the estimated case detection rate of all forms of TB is still low (about 49% in 2012).
Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.
TB prevalence rate has shown a constant declining trend from 1990 to 2012, and Bhutan has already reached the target of halving TB prevalence by 2015 compared to 1990 baseline (Graph 1). The projection for 2013–2015 confirms the trend, and although the upper uncertainty bound is quite large, it is still far below the target. Bhutan is very likely to reach prevalence target by 2015.

TB mortality rate follows the same declining trend as prevalence from 1990 to 2010, and the target of halving TB mortality by 2015 compared to 1990 baseline was reached in early 2000. Projections up to 2015 confirm that Bhutan reached the mortality reduction target (Graph 2).

The analysis of trend in TB incidence from the notification data shows steady decline in the past decade. In 2009–2010, however, annual notification data showed increasing figures. Since this increase was followed by a decline in the next biennium, the bump was most likely a result of greater case-finding efforts (Graph 3), and estimates suggest consistent reduction of incidence over time. Despite low HIV prevalence in the population, estimates of incidence of HIV-positive TB cases show a slightly increasing trend that might jeopardize TB control efforts in the future. Although Bhutan is well on track for the achievement of the MDG target of reversing TB incidence by 2015, efforts should be made to maintain current achievements and to address new challenges in TB control.


Graph 3: Trend in case notification rates (new and relapse cases, all forms) and estimated TB incidence rates, 1990–2012, Bhutan

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.

Note: Black line represents notification rate, green line represents estimated incidence, red line represents incidence of HIV-positive TB cases only. Shaded areas represent uncertainty bands.
Taking into consideration the steadily increasing trend in notification rate and the fact that the case detection rate had surpassed 100%, incidence and prevalence estimates and their trends were revised by WHO in 2013.

TB prevalence rate in the Democratic People’s Republic of Korea was estimated to be flat until 2007, and then to increase slightly (Graph 1). Projections for 2013–2015 confirm this increasing trend and it seems very unlikely that the country will reach the target of 50% reduction of 1990 level. However, uncertainty bounds are very wide, particularly the upper band, and estimates and projections cannot be considered reliable.

TB mortality rate and its trend rely on better quality data and uncertainty bounds are narrower. TB mortality appears to sharply decrease from the early 1990s, already going beyond the target of 50% reduction from 1990 level 5 years ago (Graph 2). Projections up to 2015 confirm this achievement.

The analysis of trend in TB incidence from the notification data proves to be difficult due to the substantial change in case notification; increased notification rate is likely to be related to important case detection efforts. However, active case-finding, enhanced reporting of cases and other efforts to address TB do not appear sufficient to justify the trend in the notification rate. It is therefore likely that TB incidence in Democratic People’s Republic of Korea is indeed increasing (Graph 3). Although it seems unlikely that the country will achieve the target of reverting TB incidence trend by 2015, additional information would be useful in order to better assess current estimates.

Despite current burden estimates that suggest achievement of the MDG target is out of reach, progress toward TB control in Democratic People’s Republic of Korea is highlighted by some indicators related to implementation of the Global Plan to Stop TB 2011–2015. Treatment success rate has been steadily above 85% since 2000 and reached 90% in the 2009 cohort; there are 1.2 microscopy laboratories per 100 000 population; one culture and DST facility has been established within the country, and testing for drug resistance and MDR-TB case detection is being initiated.

No indicators are available to assess implementation of TB/HIV control activities.


Graph 3: Trend in case notification rates (new and relapse cases, all forms) and estimated TB incidence rates, 1990–2012, Democratic People’s Republic of Korea

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015. The “x” symbol represents the mortality data from vital statistics reported by Democratic People’s Republic of Korea that were adjusted to account for incomplete coverage – deaths with no reported cause – and ill-defined causes, but not for miscoding of causes of death.

Note: Black line represents notification rate, green line represents estimated incidence, red line represents incidence of HIV-positive TB cases only. Shaded areas represent uncertainty bands.
TB prevalence rate shows a steady and important declining trend since 2000. In 2012, the best estimate of prevalence fell under the target of 50% reduction of 1990 level by 2015 (Graph 1). Projections for 2013–2015 show continuation of the current trend, reaching more than 50% reduction of 1990 level by 2015. Despite large uncertainty interval (even larger for projections), India is likely to reach the prevalence target by 2015.

TB mortality rate follows a flat trend from 1990 to 2003, with declining slope afterwards. Projections up to 2015 suggest that India could reach the target of halving 1990 mortality rate by 2015, even though projected estimates have a large upper uncertainty band which lies almost entirely above the target (Graph 2).

The analysis of trend in TB incidence from the notifications data shows that incidence started to revert in the mid-2000s (Graph 3). In fact, taking into consideration efforts and achievements in TB control and the recent revision of TB burden estimates, the declining trend in notification rate is considered to reflect a real decrease in TB incidence. The achievement of India towards halting and reverting TB incidence by 2015 (MDG target for TB control) positively reflects on the overall situation of South-East Asia Region towards the achievement of MDG targets.

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1 All graphs are based on provisional estimates (not yet endorsed by the Government of India).
Graph 1: Trend in estimated TB prevalence rates 1990–2012 and forecast TB prevalence rates 2013–2015, India

![Graph 1]

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.


![Graph 2]

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.

Graph 3: Trend in case notification rates (new and relapse cases, all forms) and estimated TB incidence rates, 1990–2012, India

![Graph 3]

Note: Black line represents notification rate, green line represents estimated incidence, red line represents incidence of HIV-positive TB cases only. Shaded areas represent uncertainty bands.
TB prevalence rate shows a declining trend from 1997 to 2012, with a smoother slope in the last 5 years. Projections for 2013–2015 show a further slight decline, although not sufficient to reach a 50% decline compared to the 1990 level (Graph 1). According to current data, Indonesia is unlikely to achieve the prevalence reduction target by 2015; however, uncertainty intervals around estimates and projections are very large. There is a need for estimate revision, which will occur based on the results of the ongoing prevalence survey.

TB mortality rates declined considerably from 1997 to 2012, with a slower decrease in the last 5 years. In contrast to prevalence, in 2012 the mortality rate almost reached 50% of the 1990 baseline and projections suggest that the mortality reduction target could be reached by 2015 (Graph 2). However, uncertainty bands are rather large and the upper band lies entirely above the target; estimates should be revised in order to provide more accurate information.

The increase in notification rates over time, with a slower pace in the last 5 years, is likely to be related to important case detection efforts instead of reflecting a parallel increase of real incidence. Therefore, it is estimated that incidence started to revert very slightly over the last decade (Graph 3). Even considering uncertainty bounds, Indonesia seems well on-track to achieve the MDG target of incidence reduction by 2015.


Graph 3: Trend in case notification rates (new and relapse cases, all forms) and estimated TB incidence rates, 1990–2012, Indonesia

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.

Note: Black line represents notification rate, green line represents estimated incidence, red line represents incidence of HIV-positive TB cases only. Shaded areas represent uncertainty bands.
Maldives

The TB prevalence rate shows a steep decline from 1990 to 2000, with a reduction of more than 50% from the 1990 level. Further decline in prevalence although not so steep, reached down to 65 per 100 000 population in 2012, which is the lowest in the South-East Asia Region. Despite some fluctuations in annual rate and relatively large confidence intervals, estimates are consistently below the target; projections for 2013–2015 are that Maldives is very likely to maintain prevalence rate at a low level (Graph 1).

TB mortality rate follows a similar overall trend to prevalence rate, with a sharp decline until 2000 and consistently low rates up to 2012 (the spike in 2002 can be considered an outlier). Projections up to 2015 show stabilization of the mortality rate to very low level, far below the MDG target (Graph 2).

The TB incidence target has also been achieved, with a steady and important decrease of incidence throughout the last 20 years (Graph 3). In fact, taking into consideration efforts and achievements in TB control, the declining trend of notification rate is considered to reflect a real decrease in TB incidence.

TB epidemiology in Maldives seems to be shifting from an epidemic phase to a low-endemic phase; however, efforts towards TB control should continue to be strengthened as estimated incidence is still above 20 per 100 000 population (the threshold for a low incidence country) and the shift of infection to older age groups expected in a country transitioning to a low endemic phase is still not clearly observed. In fact, the notification rate decreased in all age groups but more sharply in the 15–34 age group; however, due to small numbers, notification rates have large annual fluctuations hampering proper interpretation.


Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.

Graph 3: Trend in case notification rates (new and relapse cases, all forms) and estimated TB incidence rates, 1990–2012, Maldives

Note: Black line represents notification rate, green line represents estimated incidence, red line represents incidence of HIV-positive TB cases only. Shaded areas represent uncertainty bands.
TB prevalence rate shows a rather flat trend until 2000 and then decreases, almost reaching 50% reduction of the 1990 level. Projections for 2013–2015 suggest that Myanmar could achieve 50% prevalence reduction by 2015, although the upper uncertainty band would lie entirely above the target line (Graph 1). Myanmar is planning to conduct another prevalence survey in 2017 to provide direct measurement of prevalence trend.

The TB mortality rate follows a steep declining slope from 1998 until 2010, going beyond the target of 50% reduction of 1990 mortality baseline. Projections up to 2015 describe a continuing declining trend and indicate that Myanmar could reach the target of halving 1990 mortality rate by 2015, although uncertainty around the best estimate is rather large (Graph 2).

The analysis of trend in TB incidence (all cases and HIV-positive cases) from the notifications data shows that incidence slightly increased from 1990 to 2002; afterwards, due to case detection efforts and strengthening of TB control activities, the trend started to revert and in 2012 incidence is slightly lower than the 1990 level (Graph 3). Considering uncertainty bands around best incidence estimates, the reversion of trend is less clear. Incidence of HIV-positive TB cases is also slightly reverting, suggesting that the HIV epidemic is not likely to jeopardize achievement in TB control in the near future. Overall, Myanmar seems to be on track for achieving the MDG target for incidence reduction.

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.


Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.

Graph 3: Trend in case notification rates (new and relapse cases, all forms) and estimated TB incidence rates, 1990–2012, Myanmar

Note: Black line represents notification rate, green line represents estimated incidence, red line represents incidence of HIV-positive TB cases only. Shaded areas represent uncertainty bands.
TB prevalence rate, after showing a declining trend from 1990 to 2000, stabilized at around 240 per 100,000 population; projections for 2013–2015 suggest no significant change in TB prevalence (Graph 1). Estimates and projections are affected by wide uncertainty bands, suggesting the need for improving current estimates. Nepal is in fact planning to conduct a prevalence survey in 2014–2015 to better understand real burden in the country and reasons for missed cases despite continuous efforts in expanding coverage of TB services and outreach activities. According to current estimates, unless extra efforts are made to accelerate the progress rate, it seems unlikely that Nepal will achieve the target of prevalence reduction to 50% of the 1990 baseline.

TB mortality rate also showed a rather flat trend from 2001 to 2012, after a sharply declining trend from 1990 to 2000; projections up to 2015 do not suggest any further decrease. In contrast to prevalence rate, since 2003 the best estimate of mortality rate has matched 50% of the 1990 baseline; projections up to 2015 follow the same pattern (Graph 2). Although the entire large upper uncertainty band is above the target, Nepal seems to have already achieved the mortality reduction target of halving mortality rate compared to the 1990 level by 2015. Improved estimates would help to better understand the country situation in this regard.

The analysis of trend in TB incidence from the notifications data proves difficult due to fairly constant trend in notifications of pulmonary cases in the last decade, despite important case-finding efforts and expansion of population coverage for TB service delivery. The flat trend may be the result of increased case detection combined with decreasing incidence. However, in the absence of evidence of variation in TB determinants which could have led to a significant change in TB incidence, current data were considered insufficient to determine reliable trend. Therefore, incidence was assumed to follow a horizontal trend going through the most recent estimate of incidence (Graph 3). Additional information is needed in order to better assess whether Nepal will achieve the target of reverting the trend in TB incidence by 2015.


Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.

Graph 3: Trend in case notification rates (new and relapse cases, all forms) and estimated TB incidence rates, 1990–2012, Nepal

Note: Black line represents notification rate, green line represents estimated incidence, red line represents incidence of HIV-positive TB cases only, shaded areas represent uncertainty bands.
The TB prevalence rate presents a slightly declining trend overall from 1990 to 2012, although in the last decade the trend has been fairly constant at around 110 per 100,000 population. Although it is now one of the low TB prevalence countries in the South-East Asia Region, in terms of rate of decline according to projections up to 2015, it seems unlikely that Sri Lanka will reach the target of halving TB prevalence by 2015 compared to the 1990 baseline (Graph 1). However, estimates and projections have very large uncertainty bounds underlining the need for more accurate burden estimates to better assess achievement of the prevalence target.

The TB mortality rate shows an increasing trend from 1990 to 1996, followed by a decline between 1997 and 2006 and a flat trend from 2006 onwards mainly related to non-availability of vital statistics in the past six years. Most recent and reliable vital statistics are needed to better assess achievements of Sri Lanka in mortality reduction, because current data could have underestimated the impact of TB control activities on TB mortality in most recent years. Considering current trend estimates, despite progress in reducing mortality (decreased by more than 20% in 2012 compared with 1990 level), according to projections until 2015, it seems unlikely that Sri Lanka could reach the target of halving TB mortality compared with the 1990 baseline by 2015 (Graph 2). However, it would be more correct to assess country performance in reducing mortality considering the 2000 baseline, when inception of TB control under DOTS conditions started; Sri Lanka already halved mortality as compared with the 2000 baseline in 2006.

The notification rate has been increasing from 1995 to 2000 and remains fairly stable up to 2012, despite minor fluctuations. Implementation of DOTS in a phased manner between 1997 and 2005 (phased expansion of microscopy laboratory network and recruitment/training of staff) might partly explain the slow pace of increase in case notifications. There is no evidence of modification in TB determinants which could have led to a significant change in TB incidence. Current data were considered insufficient to determine a reliable trend; therefore, incidence was assumed to follow a horizontal trend going through the most recent estimate of incidence (Graph 3). Additional information is needed in order to better assess whether Sri Lanka will achieve the target of reverting TB incidence trend by 2015.


Graph 3: Trend in case notification rates (new and relapse cases, all forms) and estimated TB incidence rates, 1990–2012, Sri Lanka

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015. The “x” symbol represents the mortality data from vital statistics reported by Sri Lanka that were adjusted to account for incomplete coverage – deaths with no reported cause – and ill-defined causes, but not for miscoding of causes of deaths.

Note: Black line represents notification rate, green line represents estimated incidence, red line represents incidence of HIV-positive TB cases only. Shaded areas represent uncertainty bands.
Thailand

After a minor decrease in the early 1990s, TB prevalence sharply increased and peaked in 2000. It started consistently declining thereafter, but due to this bell-shaped trend, the 2012 prevalence rate was only 40% lower than the 1990 baseline. Projections for 2013–2015 indicate further decline, but it seems unlikely at the current rate of progress that Thailand will achieve the target of halving 1990 prevalence by 2015 (Graph 1). However, estimates and projections are affected by wide uncertainty bands. Estimates will be revised according to the results of the recently concluded prevalence survey.

TB mortality trend mirrors the prevalence trend, reaching a 20% reduction in 2012 compared to the 1990 baseline. Projections for 2013–2015 show a continuation of the recent declining trend, although it seems that Thailand could achieve the target of mortality reduction to 50% of the 1990 level by 2015 with minor increase in TB mortality control efforts (Graph 2). However, it would be more correct to assess country performance in reducing mortality considering the 2000 baseline, when inception of TB control under DOTS conditions started; Thailand already halved mortality as compared with the 2000 baseline in 2008.

The analysis of notifications data indicates substantial change in case notification rate over time, especially between 1995 and 2000; this is most probably due to disruption of the reporting and recording system and possibly to discontinuation of services. After 2000, the notification rate shows a constant slight increase, except in the past 2 years. This trend is likely to be related to changes in the TB programme (case-finding efforts, improvement of the quality of smear laboratories, and implementation of TB/HIV and PPM activities) rather than changes in TB epidemiology. The impact of the HIV epidemic in terms of incident HIV-positive TB cases seems to decrease from the early 2000s onwards. Similarly, other factors might impact TB incidence due to the rapidly changing environment in Thailand (gross domestic product, access to care, etc.). It is, therefore, estimated that TB incidence temporarily increased in the early 2000s and started decreasing up to 2012, reaching 40% reduction compared to the peak in 2002 and 15% reduction compared to 1990 (Graph 3). Hence, Thailand is well on track to revert TB incidence by 2015.

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.


Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015. The “x” symbol represents the mortality data from vital statistics reported by Thailand that were adjusted to account for incomplete coverage – deaths with no reported cause – and ill-defined causes, but not for miscoding of causes of deaths.

Graph 3: Trend in case notification rates (new and relapse cases, all forms) and estimated TB incidence rates, 1990–2012, Thailand

Note: Black line represents notification rate, green line represents estimated incidence, red line represents incidence of HIV-positive TB cases only. Shaded areas represent uncertainty bands.
Burden estimates for Timor-Leste have been recently revised by WHO based on in-depth analysis of available in-country data. According to the estimated trend, Timor-Leste is unlikely to halve 1990 level of prevalence and mortality by 2015 (Graphs 1 and 2). The analysis of trend in TB incidence from the notifications data proves to be difficult due to high fluctuation of notification rates. Current data were considered insufficient to determine reliable trend; therefore, incidence was assumed to follow a horizontal trend going through the most recent estimate of incidence (Graph 3). Additional information is needed to better assess whether Timor-Leste will achieve the target of reverting the trend of TB incidence by 2015. However, all burden estimates are still affected by very large uncertainty bands (even larger for projections) and country performance towards MDG targets is difficult to assess on the basis of available information.

Nevertheless, it can be observed that the country is progressing in the fight against TB. The notification rate of TB cases increased between 2002 and 2012, although the trend was not linear and the increase was more evident during 2004–2005 and 2009–2010. All forms of TB follow this pattern, but the increase is mainly driven by smear-negative cases. Changes in case notification may have been influenced by political instability, leading to flux of refugees and migration of population to the peripheral areas; however, they are likely to be mainly related to case-finding efforts by the NTP, such as the increased number of hospitals, health facilities providing TB services, microscopy centres, and TB doctors and staff.

Treatment success rate was around 80% until 2006 and increased thereafter, reaching and surpassing the new target of 90%, particularly as a result of the reduction of defaulters. As per 2012 data, there are 1.6 laboratories with sputum smear microscopy services per 100 000 population; no culture and DST facility is available in the country, although links with the SRL have been established and transportation system for samples strengthened. To date, the percentage of previously treated TB patients tested for MDR-TB is still negligible (6% among retreatment cases) but is increasing. Similarly, 20% of notified TB patients had HIV test results recorded; although the target of 100% is still far off, HIV testing among TB patients had increased compared to 6% the previous year.


Graph 3: Trend in case notification rates (new and relapse cases, all forms) and estimated TB incidence rates, 1990–2012, Timor-Leste

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.

Note: Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed line shows projections up to 2015.

Note: Black line represents notification rate, green line represents estimated incidence, red line represents incidence of HIV-positive TB cases only. Shaded areas represent uncertainty bands.
All 11 Member States of the WHO South-East Asia Region have sustained country-wide access to DOTS. Each year, more than 2 million TB cases are registered for treatment, and the treatment success rate among new smear-positive pulmonary TB cases has remained above 85% since 2005, and was 89% in the 2011 cohort. The TB mortality rate has decreased by more than 40% since 1990 and the South-East Asia Region is on track to achieve the global target of a 50% reduction by 2015. The decline in prevalence is observed in all Member States, and in some it is over 50% since 1990. Approximately 39% of the estimated global number of cases occurs in the Region (based on current estimates) as well as almost 30% of the multidrug resistant TB burden. The collaboration between TB and HIV control programmes is improving. Many of the constraints to effective implementation of TB control services in Member States relate to the need to strengthen and better finance national health systems in general, many of which are already over-stretched in terms of both infrastructure and staffing. To enable universal access and continue scaling-up of critical interventions, there is an urgent need to sustain current financial commitments and to advocate for additional financial resources.