Countries in the WHO South-East Asia (SEA) Region have made significant progress towards the TB-related Millennium Development Goals (MDGs). The estimated incidence and prevalence of all forms of TB and estimated TB mortality all continue to show a downward trend. The treatment success rate among new smear-positive pulmonary TB cases has remained above 85% since 2005, and was 88% in 2010. Approximately 40% of the estimated global number of cases occur in the SEA Region (based on current estimates) as well as more than one fourth of the MDR-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 underlying weaknesses and under-financing of national health systems in general, many of which are already overstretched in terms of both infrastructure and staffing. To enable continuing scale-up of critical interventions there is an urgent need to sustain current financial commitments and to advocate for additional financial resources.
Tuberculosis
in the South-East Asia Region

The Regional Report: 2012
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<td>Advocacy, Communication and Social Mobilization</td>
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<tr>
<td>AIDS</td>
<td>Acquired Immunodeficiency Syndrome</td>
</tr>
<tr>
<td>ART</td>
<td>Antiretroviral Treatment</td>
</tr>
<tr>
<td>ARTI</td>
<td>Annual Risk for Tuberculosis Infection</td>
</tr>
<tr>
<td>BRAC</td>
<td>Bangladesh Rural Advancement Committee</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>CFR</td>
<td>Case-fatality Rate</td>
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<tr>
<td>CHC</td>
<td>Community Health Centre</td>
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<tr>
<td>COD</td>
<td>Cause of Death</td>
</tr>
<tr>
<td>CPT</td>
<td>Cotrimoxazole Preventive Therapy</td>
</tr>
<tr>
<td>DFID</td>
<td>United Kingdom Department for International Development</td>
</tr>
<tr>
<td>DHS</td>
<td>Demographic Health Service</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>DPR Korea</td>
<td>Democratic People’s Republic of Korea</td>
</tr>
<tr>
<td>DRS</td>
<td>Drug Resistance Survey/Surveillance</td>
</tr>
<tr>
<td>DR-TB</td>
<td>Drug-resistant Tuberculosis</td>
</tr>
<tr>
<td>DST</td>
<td>Drug Susceptibility Testing</td>
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<tr>
<td>DTC</td>
<td>District TB Coordinators</td>
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<tr>
<td>EQA</td>
<td>External Quality Assessment/Assurance</td>
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<tr>
<td>ERD</td>
<td>External Resource Division</td>
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<tr>
<td>EXPAND-TB</td>
<td>Expanding Access to New Diagnostics for Tuberculosis</td>
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<tr>
<td>FDC</td>
<td>Fixed-dose Combination</td>
</tr>
<tr>
<td>FHI</td>
<td>Family Health International</td>
</tr>
<tr>
<td>FLD</td>
<td>First-line Anti-TB Drugs</td>
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<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>GF</td>
<td>Global Fund to Fight AIDS, Tuberculosis and Malaria</td>
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<tr>
<td>GLC</td>
<td>Green Light Committee</td>
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<td>GLI</td>
<td>Global Laboratory Initiative</td>
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<tr>
<td>HBC</td>
<td>High-burden Countries</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>HNPSDP</td>
<td>Health, Nutrition and Population Sector Development Programme</td>
</tr>
<tr>
<td>HQ</td>
<td>Headquarters</td>
</tr>
<tr>
<td>HRD</td>
<td>Human Resources Development</td>
</tr>
<tr>
<td>ICTC</td>
<td>Integrated Counselling and Testing Centre</td>
</tr>
<tr>
<td>PITC</td>
<td>Provider Initiated (HIV) Testing and Counselling</td>
</tr>
<tr>
<td>IDU</td>
<td>Intravenous Drug User</td>
</tr>
<tr>
<td>IGMH</td>
<td>Indira Gandhi Memorial Hospital</td>
</tr>
<tr>
<td>IEC</td>
<td>Information, Education and Communication</td>
</tr>
<tr>
<td>IPT</td>
<td>Isoniazid Preventive Treatment</td>
</tr>
<tr>
<td>ISTC</td>
<td>International Standards for Tuberculosis Care</td>
</tr>
<tr>
<td>IVMS</td>
<td>International Centre for Veterinary and Medical Sciences, Australia</td>
</tr>
<tr>
<td>JATA</td>
<td>Japan Anti-TB Association</td>
</tr>
<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
</tr>
<tr>
<td>KAP</td>
<td>Knowledge, Attitude and Practice</td>
</tr>
<tr>
<td>KNCV</td>
<td>Royal Dutch Tuberculosis Association</td>
</tr>
<tr>
<td>MDG(s)</td>
<td>Millennium Development Goal(s)</td>
</tr>
<tr>
<td>MIFA</td>
<td>Managing Information for Action</td>
</tr>
<tr>
<td>MIS</td>
<td>Management Information System</td>
</tr>
<tr>
<td>MoU</td>
<td>Memorandum of Understanding</td>
</tr>
<tr>
<td>NGO</td>
<td>Non Governmental Organization</td>
</tr>
<tr>
<td>NIDCH</td>
<td>National Institute of Disease and Chest Hospital</td>
</tr>
<tr>
<td>NHSO</td>
<td>National Health Security Office</td>
</tr>
<tr>
<td>NIRT</td>
<td>National Institute of Research for Tuberculosis</td>
</tr>
<tr>
<td>NRL</td>
<td>National Reference Laboratory</td>
</tr>
<tr>
<td>NSA</td>
<td>National Strategy Application</td>
</tr>
<tr>
<td>NSP</td>
<td>New Smear-positive (TB cases)</td>
</tr>
<tr>
<td>NTI</td>
<td>National Tuberculosis Institute, Bangalore, India</td>
</tr>
<tr>
<td>NTP</td>
<td>National Tuberculosis Programme</td>
</tr>
<tr>
<td>OGAC</td>
<td>Office of Global AIDS Control</td>
</tr>
<tr>
<td>PAL</td>
<td>Practical Approach to Lung Health</td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>PHC</td>
<td>Primary Health Care</td>
</tr>
<tr>
<td>PHI</td>
<td>Public Health Inspectors</td>
</tr>
<tr>
<td>PHL</td>
<td>Public Health Laboratory</td>
</tr>
<tr>
<td>PITC</td>
<td>Provider-initiated HIV Testing and Counselling</td>
</tr>
<tr>
<td>PLHIV</td>
<td>People Living with HIV</td>
</tr>
<tr>
<td>PMDT</td>
<td>Programmatic Management of Drug-resistant Tuberculosis</td>
</tr>
<tr>
<td>PPM</td>
<td>Public-private, Public-public or Private-private Mix</td>
</tr>
<tr>
<td>PSI</td>
<td>Population Services International</td>
</tr>
<tr>
<td>PSM</td>
<td>Procurement Supply Management</td>
</tr>
<tr>
<td>PTB</td>
<td>Pulmonary TB</td>
</tr>
<tr>
<td>QA</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>RNTCP</td>
<td>Revised National Tuberculosis Control Programme (India)</td>
</tr>
<tr>
<td>RO</td>
<td>Regional Office (of WHO)</td>
</tr>
<tr>
<td>R&amp;R</td>
<td>Recording and Reporting</td>
</tr>
<tr>
<td>SAARC</td>
<td>South Asian Association for Regional Cooperation</td>
</tr>
<tr>
<td>SEAR</td>
<td>(WHO) South-East Asia Region</td>
</tr>
<tr>
<td>SLD</td>
<td>Second-line Drugs (for MDR-TB)</td>
</tr>
<tr>
<td>SNRL</td>
<td>Supranational Reference Laboratory</td>
</tr>
<tr>
<td>SOP</td>
<td>Standard Operating Procedures</td>
</tr>
<tr>
<td>STD</td>
<td>Sexually Transmitted Disease</td>
</tr>
<tr>
<td>STI</td>
<td>Sexually Transmitted Infection</td>
</tr>
<tr>
<td>STAG</td>
<td>Strategic and Technical Advisory Group (for Tuberculosis)</td>
</tr>
<tr>
<td>TB</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>TB/HIV</td>
<td>Tuberculosis and Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>TBTEAM</td>
<td>TB Technical Assistance Mechanism</td>
</tr>
<tr>
<td>ToT</td>
<td>Training of Trainers</td>
</tr>
<tr>
<td>TRC</td>
<td>Tuberculosis Research Centre (Chennai, India)</td>
</tr>
<tr>
<td>The Union</td>
<td>International Union Against Tuberculosis and Lung Disease</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>USP</td>
<td>U.S. Pharmacopeial Convention</td>
</tr>
<tr>
<td>VCTC</td>
<td>Voluntary Counselling and Testing Centre</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>XDR-TB</td>
<td>Extensively Drug-resistant Tuberculosis</td>
</tr>
</tbody>
</table>
Preface

Countries in the WHO South-East Asia (SEA) Region have made significant progress towards the TB-related Millennium Development Goals (MDGs). The estimated incidence of all forms of TB, estimated prevalence of all forms of TB and the estimated TB mortality all continue to show a downward trend.

The decline in the prevalence rates is observed in all Member States, and in some countries it is very significant, being over 50%, which is the MDG target for 2015. A significant decline in mortality rates is also observed in all Member States. For some countries the rate of decrease in mortality rate is already beyond 50% of the 1990 baseline, which also is the MDG target for 2015. As a whole, in the SEA Region, the TB prevalence and mortality rates have decreased by about 40% compared with the 1990 baseline. The decline in incidence is however less perceptible.

However, we should still keep in mind the fact that the WHO SEA Region bears about 40% of the global burden of tuberculosis. The Region has a pool of nearly 5 million cases to which about 3.5 million are added each year. The decline in TB prevalence has been made possible by the expansion of quality “DOTS” (Directly Observed Treatment, Short-course) services. The absolute number of TB deaths is still close to half a million. This is mainly because of the “population momentum”. Due to good performance in the implementation of DOTS, the level of “multi-drug-resistant” (MDR) TB among newly-detected cases has come down. Nonetheless, due to the large number of total TB cases, the Region accounts for an estimated 105 000 MDR-TB cases. This is nearly one fourth of the world’s estimate.

The HIV-TB coinfection is a serious problem in the SEA Region. The two related programmes, namely 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 1000 million people.

An estimated “one third” TB cases remain “unreported”. Such cases are of particular concern because they perpetuate the continued disease transmission in the community; pose a serious risk of drug-resistant TB that leads to difficulty in its treatment, and to high TB mortality.
Success in TB control, to a large extent, has come from participation and involvement of a wide range of partners, from the early 1990s, in supporting the development and implementation of national TB control programmes. Examples of such “partners” are: private medical practitioners; international and national NGOs; public and private hospitals; medical colleges; and private corporations, etc. This “multistakeholder involvement” has contributed to about 25% increase in case notification and to more than 85% treatment success rate.

However, these achievements can be successfully maintained in the long term only through national health systems based on the primary health care (PHC) approach. This will help ensure that the hard-to-reach populations are covered. Education and empowerment of people, individually and collectively, is the primary tool of the PHC approach. In our experience, it has also been demonstrated that in terms of “primary care in the community”, the “Practical Approach to Lung Health” (PAL) is useful in the management of TB patients as the patients are managed through a “syndromic approach” that educates them appropriately. The approach mentioned above is particularly useful in low and middle-income countries.

The long-term goal of TB control is to eliminate the disease as “a public health problem”. With this perspective in view, increased and continued commitment is needed from all stakeholders and partners. In the process of implementing the control programmes with external inputs, special attention should be paid to country capacity strengthening in order to achieve long-term, sustainable self-reliance.

At the same time, “addressing social determinants of health” is one of the challenging components in TB control. Health systems that are involved in TB control must therefore be strengthened urgently. The physical, social and financial barriers that prevent affected persons from accessing the needed care and services must be overcome.

In this context, it is important to recognize that improvement in the overall social and economic development of a country will contribute importantly in its long-term, sustained success in TB “elimination” or “eradication”. Indeed, a comprehensive and holistic package of interventions for TB control must involve “multisectoral” 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 control services
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 Samlee Plianbangchang
Regional Director
The World Health Organization South-East Asia (SEA) Region, with an estimated 5 million prevalent and about 3.5 million incident cases of tuberculosis in 2010, carries about 40% of the global burden of the disease. Five of the eleven Member States of the Region are among the 22 TB high-burden countries in the world, with India alone accounting for more than 25% of the world’s incident cases.

Most cases continue to occur in the most productive age-group of 25-54 years, with males being disproportionately affected. Though the death rates due to TB have declined after the introduction of DOTS in the Region, the disease is estimated to still claim about half a million lives each year regionally.

Countries in the WHO South-East Asia Region have made significant progress towards achieving the TB-related Millennium Development Goals (MDGs). The estimated rates of incidence, prevalence and mortality of all forms of TB continue to show a downward trend in the Region. The treatment success rate among new smear-positive pulmonary TB cases has remained above 85% since 2005, and was 88% in 2010.

Most countries in the Region are observing an incrementing or stabilizing trend of smear-positive case notifications, and nationwide prevalence surveys have identified that the TB burden in most countries is much bigger than what was previously estimated. The findings of the recently completed national survey in Myanmar are challenging, but they point the way forward to improve TB care and control.
A growing number of multidrug-resistant tuberculosis (MDR-TB) diagnosis and treatment sites are being established in the Region, and in 2010, almost 4000 MDR-TB patients have been put on treatment. However, this represents only a fraction of the estimated 105 000 MDR-TB cases in the Region.

The collaboration between TB and HIV control programmes is improving. However, this collaboration needs further strengthening to ensure universal HIV counselling and testing for all TB patients, the availability of co-trimoxazole preventive therapy and ART for all eligible TB patients coinfected with HIV as well as INH prophylaxis, and implementing air born infection control in health-care facilities.

Many of the constraints to effective implementation of TB control services in Member countries relate to underlying weaknesses and under-financing of national health systems in general, many of which are already overstretched in terms of both infrastructure and staffing. The recent funding cuts by the Global Fund pose a serious threat in the way of maintaining the gains.

The fragile funding situation; health system constraints and the critical unmet capacity needs for universal access to high-quality care for all people with TB, including children; the introduction of new/rapid diagnostics for TB; taking TB control beyond the health sector; scaling up civil society involvement and addressing TB-diabetes and other comorbidities pose major challenges to TB control programmes.

To enable the scale-up of interventions, there is an urgent need to advocate for additional financial resources. In the whole Region, domestic funding for TB control continues to account for about 55% of all funding for national TB control programmes and the Global Fund accounts for about 40% of funding for TB activities. In addition, nine Member states benefit from funds from other development partners and donor governments. Bhutan and Maldives, where the only external funds are provided through WHO country budgets, are the exceptions. Despite funding available through government and various donors in the Region, there is a 20% funding gap for the budget of TB control programmes estimated for 2012.

National TB programmes and partners are engaged in carrying forward several operational research projects. Research proposals in the area of TB are being supported through the WHO SEA Regional Office and TDR funding. Several other research projects are supported by WHO country offices through funds available at the country levels. However, research has been observed to
be a weak area in the Region, and in the year ahead efforts have to be made to strengthen this through regional training and technical support.

Substantial progress has been made so far in the endeavours to implement the new Stop TB Strategy, but there is a long road ahead to travel to eliminate TB in the Region as well as globally. Sustainable efforts are required for continued commitment, enhanced advocacy, strengthening of health systems and ensuring adequate resources for national TB control programmes for several more years. As in the past, it is sincerely believed that joint and collaborative efforts will help ensure tangible progress towards achieving TB control goals in the year ahead.
The WHO South-East Asia Region registered an estimated 5 million prevalent and about 3.5 million incident cases in 2010. The Region carries about 40% of the global burden of tuberculosis (Figure 1). Five of the eleven Member countries in the Region are among the 22 countries with the highest burden of TB in the world and India alone accounts for more than 25% of the world’s incident cases.

**Epidemiology of Tuberculosis in the SEA Region**

Estimated global TB incidence = 8 800 000 (8 500 000 – 9 200 000) cases (all forms of TB).

Most cases continue to occur in the most productive age-group of 25-54 years, with males being disproportionately affected. The male-to-female ratio among new smear-positive TB cases detected during the year 2010 in the Region as a whole was 2.0. Though the death rates due to TB have declined after the introduction of DOTS in the Region, the disease is estimated to still claim about half a million lives each year.

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 TB burden estimates (prevalence, incidence and mortality) was revised and enhanced by WHO. As a consequence, figures published from 2010 onwards cannot be compared with older estimates.

It is important to highlight that all TB burden estimates are imprecise and are published as best estimates with confidence intervals. The uncertainty intervals provide a range of plausible values and their width is inversely proportional to accuracy of the estimate, depending on quality and coverage of country data.

For all the countries in the South-East Asia 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, the case-detection rate of all forms of TB was estimated through in-depth analysis of available surveillance data at the national and subnational levels, which included data on access to health care from demographic health surveys (DHS), and from programmatic management of TB and expert opinions on the proportion of cases not detected or not captured by TB surveillance. Trends over time were calculated considering the changes in the case-detection rate in different years. When information was not enough for time series analysis the incidence was considered flat, i.e. “frozen” at the value of the most recent point estimate.

For India, in addition to the Regional Workshop on TB Surveillance and Programme Monitoring and Evaluation held at the National Tuberculosis Institute, Bangalore, India, a national consultation was held in July 2011 to revise the burden estimates. Besides data also used for other countries, the results

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1 Full details about the methods used are provided in Annex 1 of the Global Tuberculosis Control: WHO Report 2011
of two subnational inventory studies were also considered for estimating case-detection rate. However, national inventory studies are needed to better assess the number of TB cases detected but not reported in the private sector. 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 Revised National TB Control Programme (RNTCP) was started in 1997 only in a part of the country and gradually expanded to cover the entire country by 2006. For the trend between 2001 and 2010, data from two national tuberculin surveys (conducted in 2000 and 2010) and notification data were used; the annual rate of decline in TB incidence was assessed to be 1.5% per year.

In the Region, prevalence was estimated based on the results of national level prevalence surveys (direct method) for Myanmar and Bangladesh only, and these were carried out in 2010 and 2009, respectively. However, Bangladesh used a methodology that was not the one recommended by WHO. For India, national-level prevalence was estimated by pooling the results of prevalence surveys carried out recently in eight districts. For all other countries prevalence was estimated with the indirect method, multiplying incidence by estimated duration of TB disease. This type of estimate is the most uncertain of the three TB burden indicators because it is the product of two uncertain quantities, i.e. incidence and disease duration, that cannot be measured directly.

For all countries but India, mortality due to TB was estimated indirectly, multiplying incidence by estimated case-fatality ratio. This was because no country had good quality vital registration systems and only India had data available from mortality surveys. In India, data from six subnational mortality surveys were pooled to obtain a national estimate for 2005, and to derive a complete time-series for 1990–2010. The current estimate is higher than the previous indirect estimate.

Some of the estimates are not officially endorsed by Member States. All countries are strongly encouraged to improve their TB burden estimates though the available methods: in-depth analysis of data available in countries, systematic assessment of the quality and coverage of surveillance data, strengthening TB surveillance within countries, operational research, strengthening vital registration (VR) systems, and prevalence and mortality surveys.

Sri Lanka conducted an in-depth analysis of data in 2010. Population-based surveys of the prevalence of TB disease can provide direct measurement of prevalence and also very useful information about why and to what extent people with TB are missed in surveillance data. A prevalence survey is being implemented in Thailand in 2011-2012, and Indonesia, Nepal, Myanmar and
Bangladesh are planning to conduct national prevalence surveys between 2012 and 2015. For Myanmar the survey will serve as 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 tuberculosis in the Region is affected by the variations in the quality and coverage of various TB control interventions, population demographics, urbanization, changes in socioeconomic standards, magnitude of the sub-epidemics of TB/HIV, and MDR-TB. The TB incidence, prevalence and mortality rates in Member States of the SEA 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 WHO South-East Asia Region (rates per 100 000 population), 2010

<table>
<thead>
<tr>
<th>Country</th>
<th>Population* (in thousands)</th>
<th>Incidence rate of all forms of TB (confidence intervals)</th>
<th>Prevalence rate of all forms of TB (confidence intervals)</th>
<th>Death rate for all forms of TB, excluding HIV (confidence intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>149 715</td>
<td>225 (184-269)</td>
<td>411 (188-671)</td>
<td>43 (32-57)</td>
</tr>
<tr>
<td>Bhutan**</td>
<td>730</td>
<td>151 (127-177)</td>
<td>181 (44-318)</td>
<td>9.2 (7.4-11)</td>
</tr>
<tr>
<td>DPR Korea</td>
<td>24 605</td>
<td>345 (295-398)</td>
<td>399 (100-698)</td>
<td>23 (17-39)</td>
</tr>
<tr>
<td>India</td>
<td>1 232 770</td>
<td>185 (167-205)</td>
<td>256 (161-373)</td>
<td>26 (17-39)</td>
</tr>
<tr>
<td>Indonesia</td>
<td>241 588</td>
<td>189 (154-228)</td>
<td>289 (123-484)</td>
<td>27 (18-38)</td>
</tr>
<tr>
<td>Maldives</td>
<td>317</td>
<td>36 (31-42)</td>
<td>13 (2.4-34)</td>
<td>3.4 (2.1-5.4)</td>
</tr>
<tr>
<td>Myanmar</td>
<td>48 324</td>
<td>384 (328-445)</td>
<td>525 (381-643)</td>
<td>41 (24-65)</td>
</tr>
<tr>
<td>Nepal</td>
<td>30 099</td>
<td>163 (134-195)</td>
<td>238 (96-405)</td>
<td>21 (13-31)</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>21 165</td>
<td>66 (54-79)</td>
<td>101 (42-170)</td>
<td>9.1 (5.9-13)</td>
</tr>
<tr>
<td>Thailand</td>
<td>70 277</td>
<td>137 (112-163)</td>
<td>182 (80-300)</td>
<td>16 (10-23)</td>
</tr>
<tr>
<td>Timor-Leste***</td>
<td>1 127</td>
<td>-</td>
<td>-</td>
<td>46 (28-79)</td>
</tr>
<tr>
<td><strong>SEA Region</strong></td>
<td><strong>1 820 722</strong></td>
<td><strong>193 (179-207)</strong></td>
<td><strong>278 (206-360)</strong></td>
<td><strong>27 (21-35)</strong></td>
</tr>
</tbody>
</table>


**The rates in this table slightly differ from the rates reported in Bhutan country profile because different population figures have been used.

*** Timor-Leste incidence and prevalence estimates calculated with methodology revised by WHO in 2010, are to be revised upon availability of better quality data. Therefore in the general part of this report no estimate is reported for the country. Refer to country profile for further details.
Figure 2 makes a comparison of the estimated TB prevalence rates per 100,000 population between 1990 and 2010 in each of the 11 Member States of the Region. However, this comparison takes into consideration only the best estimate of prevalence rate, and not the uncertainty bounds, that have variable width according to the quality of country data used for the estimate. Taking into account this limitation, a decline in the prevalence rates is observed in all Member States, and in some countries is very significant at beyond 50% that is one of the Stop TB Partnership targets for 2015.

Figure 3 compares the estimated TB mortality rates per 100,000 population in 1990 and 2010 in each of the 11 Member States of the Region. As said earlier, this comparison takes into consideration only the best estimate of mortality rate, and not the uncertainty bounds. A significant decline in the mortality rates is observed in all Member States. For Timor-Leste, the baseline is set at 2005, due to non-availability of national data in 1990. For some countries, decrease in mortality is already beyond 50% of the 1990 baseline, which is the Stop TB Partnership target for 2015.

The trends of estimated prevalence, incidence and mortality rates in the SEA Region as a whole are presented in Figure 4. TB prevalence and mortality
Figure 3: Estimated mortality rate (all forms of TB, excluding deaths in TB/HIV coinfected people) in 1990* and 2010, by Member State of the WHO SEA Region

*For Timor-Leste the baseline is 2005.


Figure 4: Trends in estimated TB prevalence, incidence, mortality rates from 1990 to 2010 in the WHO SEA Region

rates decreased by about 40%; the decline in incidence, however, is less perceptible.

However, the interpretation of the trends should take into account the uncertainty bounds around each value. Figures 5, 6 and 7 are showing the trends of, respectively, incidence, prevalence and mortality as best estimate and upper and lower confidence intervals.
2.2 Community-based surveys to estimate prevalence of pulmonary tuberculosis, annual risk of tuberculosis infection (ARTI) and mortality due to TB

A number of community-based surveys have been carried out in the Region at different times to estimate the prevalence of pulmonary TB (PTB). However, the screening methodology varied across the surveys. The results of surveys undertaken since 1990 are summarized in Table 2 and show large in-country and between country variability.

Four rounds of surveys in Thiruvallur 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 PTB; however the latest survey showed a slight increase compared with 2006 (about 7%). In this area, no decline in prevalence had been observed in the pre-DOTS period through several rounds of surveys carried out between 1968 and 1986. Most recent survey results in India (eight district/sub-district-level surveys) showed a variable level of TB prevalence in different geographical areas and provided important information for the revision of national burden estimates.

In Indonesia, the national-level survey during the year 2004 demonstrated a three-fold decline in prevalence rates when compared with the prevalence rates obtained during a number of district-level surveys carried out during the 1980s. Indonesia is planning to conduct another TB prevalence survey by 2013.
In Bangladesh, a nationwide prevalence survey was conducted in 2009. The sub-national surveys carried out previously are not comparable since these were conducted in different areas and using different methodologies.

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

The results of the most recent nationwide survey in Thailand are not yet available.

Table 2: Prevalence surveys in Member States of the WHO SEA Region, 1990-2010

<table>
<thead>
<tr>
<th>Country</th>
<th>Area</th>
<th>Study period</th>
<th>Age (yrs ≥)</th>
<th>Sample size</th>
<th>Screening method</th>
<th>Prevalence of PTB cases/100 000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>74 sub-districts</td>
<td>2001</td>
<td>12</td>
<td>223 936</td>
<td>Symptoms</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Matlab rural area</td>
<td>2001</td>
<td>15</td>
<td>59 395</td>
<td>Symptoms</td>
<td>24</td>
</tr>
<tr>
<td>India</td>
<td>National level</td>
<td>2007-2009</td>
<td>15</td>
<td>52 098</td>
<td>No screening*</td>
<td>95</td>
</tr>
<tr>
<td>Morena (Madhya Pradesh)</td>
<td>1991–1992</td>
<td>15</td>
<td>11 097</td>
<td>-</td>
<td>Symptoms</td>
<td>79</td>
</tr>
<tr>
<td>Delhi</td>
<td>1991</td>
<td>5</td>
<td>27 838</td>
<td>MMR</td>
<td>-</td>
<td>1270</td>
</tr>
<tr>
<td>Thiruvallur (Tamil Nadu)</td>
<td>1999–2001</td>
<td>15</td>
<td>83 425</td>
<td>MMR + symptoms</td>
<td>609</td>
<td>729</td>
</tr>
<tr>
<td></td>
<td>2004–2006</td>
<td>15</td>
<td>89 413</td>
<td>MMR + symptoms</td>
<td>311</td>
<td>169</td>
</tr>
<tr>
<td></td>
<td>2007–2008</td>
<td>15</td>
<td>92 255</td>
<td>MMR + symptoms</td>
<td>391</td>
<td>182</td>
</tr>
<tr>
<td>Tribal areas</td>
<td>2006–2007</td>
<td>15</td>
<td>20 000</td>
<td>Symptoms</td>
<td>-</td>
<td>387</td>
</tr>
</tbody>
</table>
Tuberculosis surveys to estimate the annual risk of tuberculosis infection (ARTI) among children carried out in the Member States of the Region from 1990 onwards are presented in Table 3. The results indicated variable rates of ARTI between and within countries.

The trends in Annual Risk for TB Infection (ARTI) in India are available from two rounds of large zonal-level surveys, besides from two geographically defined areas. The national level estimates computed by pooling the data from zonal surveys revealed a decline of 3.7% per year between 1997–2007. In Thiruvallur, a district in southern India, the trends in ARTI mirrored the decline in prevalence of TB over the same time period. A decline in ARTI rates was also seen in Bangalore city.

In Indonesia, surveys in five provinces demonstrated a significant decline in ARTI when compared to the ARTI estimates obtained during several district-level surveys carried out in the 1980s.

Tuberculin surveys have also been conducted recently in Bhutan and Sri Lanka ARTI estimates, however, should not be used for estimating disease incidence and derive prevalence.
Table 3: Tuberculin surveys in Member states of the WHO SEA Region, 1990–2011

<table>
<thead>
<tr>
<th>Country</th>
<th>Area</th>
<th>Year</th>
<th>Sample size</th>
<th>Age group (Years)</th>
<th>Estimated ARTI (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>National level</td>
<td>2007–2009</td>
<td>17 585</td>
<td>5–14</td>
<td>Results awaited</td>
</tr>
<tr>
<td>Bhutan</td>
<td>Thimphu, Mongar &amp; Bumthang districts</td>
<td>1991</td>
<td>1736</td>
<td>6–14</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>National level</td>
<td>2009</td>
<td>5890</td>
<td>8–12</td>
<td>0.4–0.5</td>
</tr>
<tr>
<td>DPR Korea</td>
<td>National level</td>
<td>2007</td>
<td>11 182</td>
<td>7–8</td>
<td>3.0</td>
</tr>
<tr>
<td>India</td>
<td>Bangalore city</td>
<td>1998</td>
<td>4936</td>
<td>5–8</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>2006</td>
<td>3354</td>
<td>5–8</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rural areas, Thiruvallur district, Tamil Nadu</td>
<td>1999–2001</td>
<td>12 854</td>
<td>0–9</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>2004–2005</td>
<td>8668</td>
<td>0–9</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2001–2003</td>
<td>8329</td>
<td>0–9</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orissa (state level)</td>
<td>2002</td>
<td>10 626</td>
<td>1–9</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>2004–2005</td>
<td>8668</td>
<td>0–9</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2001–2003</td>
<td>8329</td>
<td>0–9</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orissa (state level)</td>
<td>2002</td>
<td>10 626</td>
<td>1–9</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>2004–2005</td>
<td>8668</td>
<td>0–9</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2001–2003</td>
<td>8329</td>
<td>0–9</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Andhra Pradesh</td>
<td>2005–2006</td>
<td>3636</td>
<td>5–9</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Khammam, Andhra Pradesh</td>
<td>2001–2002</td>
<td>5–7</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zonal-level surveys (4 zones)</td>
<td>2000–2003</td>
<td>N. Zone-51 380</td>
<td>0–9</td>
<td>N. Zone-1.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>W. zone-51 733</td>
<td></td>
<td>W. Zone-1.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>E. Zone-42 836</td>
<td></td>
<td>E. Zone-1.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>S. Zone-52 300</td>
<td></td>
<td>S. Zone-1.0</td>
</tr>
<tr>
<td></td>
<td>Kerala (state level)</td>
<td>2006</td>
<td>4821</td>
<td>5–9</td>
<td>Not available**</td>
</tr>
<tr>
<td></td>
<td>Chennai city</td>
<td>2006</td>
<td>7008</td>
<td>1–9</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Tribal areas, Madhya Pradesh</td>
<td>2006</td>
<td>4802</td>
<td>1–9</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>Zonal-level surveys</td>
<td>2007–2009</td>
<td>N. Zone-15 175</td>
<td>0–9</td>
<td>N. Zone-0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>W. Zone-16 800</td>
<td></td>
<td>W. Zone-0.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>E. Zone-20 969</td>
<td></td>
<td>E. Zone-1.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>S. Zone-25 704</td>
<td></td>
<td>S. Zone-1.2</td>
</tr>
<tr>
<td>Indonesia-</td>
<td>West Sumatra</td>
<td>2006</td>
<td>5653</td>
<td>6–9</td>
<td>1–1.3$</td>
</tr>
<tr>
<td>Provincial-level</td>
<td>Nusa Tenggara</td>
<td>2007</td>
<td>5479</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>surveys</td>
<td>Central Java</td>
<td>2007</td>
<td>6943</td>
<td></td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>North Sulawesi</td>
<td>2008</td>
<td>6557</td>
<td></td>
<td>1.9–2.5$</td>
</tr>
<tr>
<td></td>
<td>South Kalimantan</td>
<td>2008</td>
<td>6359</td>
<td></td>
<td>1.8</td>
</tr>
<tr>
<td>Nepal</td>
<td>Subnational surveys in 17 selected areas</td>
<td>1985–1995</td>
<td>Not available</td>
<td>6–10</td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td>National level</td>
<td>2006–2007</td>
<td>17 260</td>
<td>5–7</td>
<td>0.9</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>National level</td>
<td>2009</td>
<td>5280</td>
<td>10</td>
<td>0.4–1.2</td>
</tr>
</tbody>
</table>

$ Estimates vary depending upon statistical method of estimation.
** ARTI could not be estimated due to low proportion of tuberculin reactors leading to absence of demarcation on the frequency distribution of tuberculin reaction sizes.
A limited number of TB mortality studies based on vital registration, and verification of the cause of death (CoD) through verbal autopsies, have been carried out in the Region. A study in Chennai revealed TB mortality rate to be at 152 per 100 000 population males and 43 per 100 000 females. A state-level study in Andhra Pradesh revealed that 5% of all deaths among males and 3% among females were caused by TB. In Indonesia, verbal autopsy-based mortality studies carried out at seven sites at the provincial and sub-provincial level during 2006-2008 revealed that TB was ranked first to third among the leading causes of death in the different provinces.

A national-level study to find out the cause of death (CoD) in a sample of one million deaths was conducted in India in 2008–2009; the results are not yet available.

Myanmar is planning to conduct a nationwide TB mortality survey in 2015.

### 2.3 Impact of HIV on TB in the Region

The expanding HIV epidemic is a growing concern. It is estimated that there are 3.5 million people living with HIV (PLHIV) in the South-East Asia Region, constituting nearly 11% of PLHIV globally, in 2009. In the same year, there

<table>
<thead>
<tr>
<th>Country</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;0.1</td>
<td>7000</td>
</tr>
<tr>
<td>Bhutan</td>
<td>&lt;0.1</td>
<td>&lt;1000</td>
</tr>
<tr>
<td>DPR Korea</td>
<td>No reported HIV-positive individual till date</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>0.3</td>
<td>2 400 000</td>
</tr>
<tr>
<td>Indonesia</td>
<td>0.2</td>
<td>340 000</td>
</tr>
<tr>
<td>Maldives</td>
<td>&lt;0.1</td>
<td>&lt;100</td>
</tr>
<tr>
<td>Myanmar</td>
<td>0.6</td>
<td>230 000</td>
</tr>
<tr>
<td>Nepal</td>
<td>0.4</td>
<td>63 000</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>&lt;0.1</td>
<td>2 800</td>
</tr>
<tr>
<td>Thailand</td>
<td>1.3</td>
<td>530 000</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>&lt;0.1</td>
<td>&lt;1000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>0.3</strong></td>
<td><strong>Approx 3.5 million</strong></td>
</tr>
</tbody>
</table>

were an estimated 210 000 new HIV infections in the Region and 230 000 AIDS-related deaths. Five countries in the Region, as shown in Figure 8, account for the majority of HIV cases in the Region, with about 2.4 million PLHIVs in India alone.

The prevalence of HIV in the general population in the Region is estimated to be the highest in Thailand, followed by Myanmar, Nepal and India (Table 4). The Region is distinguished by complex and heterogeneous HIV epidemics at different stages, both across and within individual countries. While Myanmar and Thailand have more homogenous 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, Nepal and Indonesia. HIV prevalence is estimated to be low in Bhutan, Maldives, Sri Lanka and Timor-Leste. HIV has till date not been reported from DPR Korea.
A significant proportion of PLHIVs 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.

The estimated prevalence of HIV infection among TB cases in different countries of the Region is presented in Table 5.

In the SEA Region, most countries use direct measurement of the prevalence of HIV among incident cases of TB, through national surveys, HIV sentinel surveillance, and provider-initiated testing and counselling with at least 50% coverage of testing (the latest only for Thailand).

Overall, HIV prevalence among TB cases is 5.7%, but varies widely among countries.

**Table 5: Estimated HIV prevalence among incident TB cases in Member States of the WHO SEA Region, 2010**

<table>
<thead>
<tr>
<th>Country</th>
<th>Estimated HIV prevalence among TB cases*</th>
<th>TB Global Report (incidence HIV-positive (number))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>0.2%</td>
<td>580</td>
</tr>
<tr>
<td>Bhutan</td>
<td>&lt;0.1</td>
<td>36</td>
</tr>
<tr>
<td>DPR Korea</td>
<td>Not available</td>
<td>NA</td>
</tr>
<tr>
<td>India*</td>
<td>6.4%</td>
<td>130 000</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2.8%</td>
<td>12 000</td>
</tr>
<tr>
<td>Maldives</td>
<td>&lt;0.1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Myanmar**</td>
<td>9.2%</td>
<td>22 000</td>
</tr>
<tr>
<td>Nepal</td>
<td>2.4%</td>
<td>1 100</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>0.1%</td>
<td>32</td>
</tr>
<tr>
<td>Thailand</td>
<td>17%</td>
<td>16 000</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>1.1%</td>
<td>&lt;10</td>
</tr>
<tr>
<td>SEA Region (average)</td>
<td>5.7%</td>
<td>180 000</td>
</tr>
</tbody>
</table>

Sources: Country reports, national AIDS programmes; HIV/AIDS in the South-East Asia Region: Progress Report 2010:

*Figures reported in this table and India country profile differ; WHO estimate is based on indirect modelling; estimate reported by RNTCP is based on 2008 national data.

** Figures reported in this table and Myanmar country profile differ; WHO estimate is based on indirect modelling; estimate reported by NTP is based on 2010 annual HIV sentinel surveillance.
High TB case-fatality rates have been reported from certain areas with high HIV prevalence in India, Myanmar and Thailand.

### 2.4 Drug-resistant TB

Functional national TB control programmes in the Region achieving high treatment success rates have resulted in maintaining the slow but steady decline in TB incidence rates during the past decade. This has also led to low levels (2.1, range: 1.7- 2.5%) of multidrug-resistance (MDR) among newly detected cases. Among previously treated cases in the Region, MDR-TB rate is estimated to be higher at around 17% (range: 17-18%). However, given the large numbers of TB cases in the SEA Region, this translates to 105 000 MDR-TB cases (85 000–125 000), accounting for nearly one fourth of the world’s MDR-TB cases that were estimated to exist among notified cases in 2010.

The figures for country-wise estimated burden of MDR-TB are based on nationwide drug resistance surveillance (DRS) or models based on subnational DRS or a generic model applied to the whole Region. Estimates and sources of estimates are presented in Table 6.

<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 among all TB cases notified in 2010 (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>model a</td>
<td>2.1 (1.7–2.5)</td>
<td>28 (25–32)</td>
<td>4 900 (4 100–5 700)</td>
</tr>
<tr>
<td>Bhutan</td>
<td>model</td>
<td>2.1 (1.7–2.5)</td>
<td>17 (17–18)</td>
<td>29 (16–33)</td>
</tr>
<tr>
<td>DPR Korea</td>
<td>model</td>
<td>2.1 (1.7–2.5)</td>
<td>17 (17–18)</td>
<td>4 000 (3 600–4 400)</td>
</tr>
<tr>
<td>India</td>
<td>model b</td>
<td>2.1 (1.7–2.5)</td>
<td>15 (13–17)</td>
<td>63 000 (54 000–75 000)</td>
</tr>
<tr>
<td>Indonesia</td>
<td>model c</td>
<td>1.8 (1.1–2.7)</td>
<td>17 (8.1–26)</td>
<td>6 200 (3 630–9 400)</td>
</tr>
<tr>
<td>Maldives</td>
<td>model</td>
<td>2.1 (1.7–2.5)</td>
<td>17 (17–18)</td>
<td>2 (1.5–2)</td>
</tr>
<tr>
<td>Myanmar</td>
<td>DRS, 2007</td>
<td>4.2 (3.2–5.6)</td>
<td>10.0 (6.9–14)</td>
<td>5 200 (3 810–7 000)</td>
</tr>
<tr>
<td>Nepal</td>
<td>DRS, 2007</td>
<td>2.9 (1.8–4.4)</td>
<td>11.7 (7.2–18)</td>
<td>1 090 (680–1 650)</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>DRS, 2006</td>
<td>0.2 (0.0–1.0)</td>
<td>1.6 (0.6–3.4)</td>
<td>20 (2–81)</td>
</tr>
<tr>
<td>Thailand</td>
<td>DRS, 2006</td>
<td>1.7 (1.0–2.6)</td>
<td>35 (28–42)</td>
<td>1 920 (1 380–2 600)</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>model</td>
<td>2.1 (1.7–2.5)</td>
<td>17 (17–18)</td>
<td>109 (90–128)</td>
</tr>
<tr>
<td>SEA Region</td>
<td>model</td>
<td>2.1 (1.7–2.5)</td>
<td>17 (17–18)</td>
<td>105 000 (85 000–125 000)</td>
</tr>
</tbody>
</table>

a Model based on subnational surveys conducted between 1995 and 2006.
b Estimates based on two recent subnational drug resistance data (2005).
c Model based on two sub-national surveys: DRS in Mimika district in 2004 (2.0% MDR-TB among newly diagnosis TB cases) and Central Java province in 2006 (1.9% MDR TB in newly diagnosis TB cases and 17.1% among previously treated TB cases).

DRS = drug resistance surveillance or survey data; CI = confidence interval; MDR-TB = multidrug-resistant TB.
Extensively drug-resistant TB (XDR-TB) has also been reported from five countries (Bangladesh, India, Indonesia, Nepal and Thailand) in the Region.

Considerable efforts are required to expand capacity for quality assured drug susceptibility testing in the Region in order to more accurately estimate the extent of drug-resistant TB. Given the widespread availability and use of second-line drugs, and as laboratory capacity to conduct second-line drugs susceptibility testing increases, additional numbers of patients with XDR-TB are likely to be identified.
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. Almost the entire population of the Region had access to DOTS by the end of 2007 (Figure 9).

Source: Tuberculosis control in the South-East Asia Region, Annual Reports 1996-2011, WHO/SEARO.
3.2 Case notifications

3.2.1 Trends in case notifications

Figure 10 shows the trends in numbers of cases notified in the Region since 1993 for all forms of TB and new smear-positive (NSP) cases. Notifications continue to rise, reflecting case-finding efforts in Member States over time, with a sharper increase in notifications of all forms of TB (especially from 2000 to 2008), possibly due to increasing registration of smear-negative and extrapulmonary cases following the involvement of the private sector and medical teaching institutions.

![Figure 10: Trends in TB cases notified by type of case, WHO SEA Region, 1993–2010](image)

Sources: Tuberculosis control in the South-East Asia Region, Annual Reports 1996-2011, WHO/SEARO; Annual Reports, National TB programmes, SEAR Member States, 2011.

The trends in case-notification rates of NSP cases for the five high-burden countries and other (intermediate and low-burden) countries in the Region are presented in figures 11a and 11b respectively.

In Bangladesh, a rather sharp increasing trend was observed until 2006 following which notification rates have remained fairly stable, although a slight decrease is visible in 2010. In India, notification rates have continued to rise until 2009, primarily due to increase in case-finding efforts and an increase in
**Figure 11a:** Trends in annual NSP TB case-notification rates for high-burden countries in the WHO SEA Region, 1995–2010

Sources: Tuberculosis control in the South-East Asia Region, Annual Reports 1996-2011, WHO/SEARO; Annual Reports, National TB programmes, SEAR Member States, 2011.

**Figure 11b:** Trends in annual NSP TB case-notification rates for intermediate and low-burden countries in the SEA Region, 1995–2010

Sources: Tuberculosis control in the South-East Asia Region, Annual Reports 1996-2011, WHO/SEARO; Annual Reports, National TB programmes, SEAR Member States, 2011.
the involvement of health care providers from other sectors in programme case-finding and treatment activities; the trend is rather stable in recent years.

In Indonesia, after a period of steady increase, there was a drop in NSP notification rates in 2007, attributed to the temporary cessation of Global Fund support for a period of nine months. Afterwards notification rates started to slightly increase again. In Myanmar, a steady increase in notification rates has been observed from the year 2000 to 2007; a decline in 2008, and further decline in 2009, followed by a minor increase in 2010 that may be related to funding problems. A slightly declining trend has been observed in Thailand since 2005 but is reversing in 2009 and 2010.

In DPR Korea, a sharp increase in the notification rates has been observed since 2006. This was 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 was observed between case-notification rates and the revised estimates of the incidence of TB in the country, following a national tuberculin survey among children in the year 2007, which revealed a high ARTI. In Sri Lanka, a small increase in notifications was recorded until 2000, followed by fairly stable trend until 2010. In Nepal, some increase in notification rates was observed in the 1990s but the trend reversed and declined very slightly until 2010, despite case-finding efforts and increased coverage of TB services. In Bhutan, after a declining slope during 2000-2005, a steady increase has been observed since 2005. A consistently declining trend has been observed in Maldives in the last 15 years. The trends in Timor-Leste reflect periods of civil strife when services were seriously disrupted for considerable periods of time. Notification rates increased significantly in 2009 and 2010.

3.2.2 Case notifications in 2010

Table 7 shows the absolute numbers of cases notified by type of TB, in each Member State for the year 2010. The eleven Member States of the WHO South-East Asia Region together notified 2 126 414 cases of tuberculosis (new and relapses, all forms) which represent a case-notification rate of 118 per 100 000 population. Of those, 1 048 543 were new smear-positive pulmonary cases (58% of all new pulmonary cases and relapse). Five countries in the Region (Bangladesh, India, Indonesia, Myanmar and Thailand), which belong to the global list of 22 countries with the highest burdens of TB (HBCs), notified a total of 2 189 359 cases, or 94% of all cases notified in the Region.
<table>
<thead>
<tr>
<th>Country</th>
<th>Estimated incidence - All forms (in thousands with 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>330 (270-400)</td>
<td>105 772</td>
</tr>
<tr>
<td>Bhutan</td>
<td>1.1 (0.9-1.3)</td>
<td>457</td>
</tr>
<tr>
<td>DPR Korea</td>
<td>84 (72-97)</td>
<td>31 240</td>
</tr>
<tr>
<td>India</td>
<td>2,300 (2 000-2 500)</td>
<td>630 165</td>
</tr>
<tr>
<td>Indonesia</td>
<td>450 (370-540)</td>
<td>183 366</td>
</tr>
<tr>
<td>Maldives</td>
<td>0.11 (0.10-0.13)</td>
<td>41</td>
</tr>
<tr>
<td>Myanmar</td>
<td>180 (160-210)</td>
<td>42 318</td>
</tr>
<tr>
<td>Nepal</td>
<td>49 (40-58)</td>
<td>15 569</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>14 (11-17)</td>
<td>4 635</td>
</tr>
<tr>
<td>Thailand</td>
<td>94 (78-110)</td>
<td>33 450</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>.**</td>
<td>1 530</td>
</tr>
<tr>
<td>SEA Region</td>
<td>3 500 (3 200–3 700)</td>
<td>1 048 543</td>
</tr>
<tr>
<td>SEA Region (2009)</td>
<td>3 500 (3 300–3 800)</td>
<td>1 028 565</td>
</tr>
<tr>
<td>Percentage change 2010 vs. 2009</td>
<td>1,9%</td>
<td>-3,0%</td>
</tr>
</tbody>
</table>

*This category includes "cases with unknown history of previous treatment", except for India that includes “other new cases”.

** Timor-Leste incidence estimates calculated with methodology revised by WHO in 2010, is to be revised upon availability of better quality data. Therefore in this table figure is reported for the country. Refer to country profile for further details.

There was an increase of 0.4% in the numbers of cases (all forms) notified in 2010 as compared with 2009 (Table 7); this small increase is mainly driven by new smear-positive cases and relapses. Although relapses and treatment after failure seem to have increased from 2009 to 2010, it is difficult to evaluate whether this change reflects epidemiological variation or is due to changes in recording and reporting: in fact it is likely that certain types of re-treatment cases are still underreported or misclassified in some countries.

About half of all notified new cases in the Region (53%) were new smear-positive cases (Figure 12). This proportion was relatively lower in Bhutan (37%), DPR Korea (38%), Maldives (43%), Myanmar (33%), and Timor-Leste (32%); on the other hand the proportion is significantly higher in Bangladesh (70%).

Among all new cases of PTB, 63% were smear-positive in the Region as a whole, ranging from 35% in Timor-Leste to 83% in Bangladesh.

Sixteen percent of all new cases in the Region were extrapulmonary cases. This proportion varied largely in different countries, going from a minimum of 4% in Indonesia to maximum of 41% in Bhutan (Figure 12).

The proportion of smear-positive re-treatment cases out of all smear-positive cases was 18% in the whole Region, ranging between 3% (in Indonesia
and Timor-Leste) and 24% (in India) (Figure 13). Low proportions of re-treatment of smear-positive cases were also reported by Bangladesh (4%), Maldives (5%), Sri Lanka (7%) and Thailand (8%). The proportion of relapses out of all smear-positive cases had a regional average of 10%, ranging between 3% and 14%, with the highest proportions in Nepal (14%), India (13%) and Bhutan (11%).

An increasing trend in the proportion of relapse cases out of all newly notified (new and relapse) smear-positive cases was seen over the previous years in Bhutan and DPR Korea, while the proportion of relapses was decreasing for India in 2009 and 2010.

### 3.2.3 Age and sex distribution of notified NSP cases in 2010

Figure 14 shows the distribution of notified new smear-positive cases by age and sex in 2010 in the Region as a whole; approximately 77% of the cases belonged to the most productive age-groups between 15–54 years; 75% among males and 81% among females. Compared with 2009 there is a minor increase of cases belonging to the age-group of >54 years.

The percentage of 0–14 year-old cases is 1.7 for the whole Region, suggesting underreporting of paediatric cases. In 2010, breakdown by age-groups 0-4 and 5-14 years was reported by Bangladesh, DPR Korea, Indonesia and Maldives.
The male-to-female ratio of the numbers of notified NSP cases in 2010 varied from 1.1 in Bhutan to 2.9 in Sri Lanka, and was 2.0 for the Region as a whole.

### 3.3 Treatment outcomes

The treatment success rate among new smear-positive cases enrolled for treatment during 2009 was 88% in the Region as a whole. It was 85% or more in 10 of the 11 Member countries (Table 8). The overall cure rate in the Region for new smear-positive cases was 85% and the completion rate 3%, for the 1 023 588 cases registered in 2009.

The overall case-fatality rate (CFR), default and failure rates were 4%, 5% and 2% respectively among new smear-positive cases registered for treatment in 2008.

In Maldives, the treatment success among NSP cases was lower than the target due to 11% of defaulters and 7% of non-evaluated. This is probably due to recent changes in the structure of NTP leading to problems in follow up of patients and recording and reporting. High default rates (>5%) among NSP cases were observed also in India.
Table 8: Treatment outcomes expressed as percentage among cases notified in 2009 by type of cases, Member States of the WHO SEA Region

<table>
<thead>
<tr>
<th>Countries</th>
<th>New smear-positive cases</th>
<th>Re-treatment cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Notified (number)</td>
<td>Success rate</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>109 076</td>
<td>92</td>
</tr>
<tr>
<td>Bhutan</td>
<td>434</td>
<td>92</td>
</tr>
<tr>
<td>DPR Korea</td>
<td>29 366</td>
<td>90</td>
</tr>
<tr>
<td>India</td>
<td>624 617</td>
<td>88</td>
</tr>
<tr>
<td>Indonesia</td>
<td>169 213</td>
<td>91</td>
</tr>
<tr>
<td>Maldives</td>
<td>46</td>
<td>78</td>
</tr>
<tr>
<td>Myanmar</td>
<td>41 811</td>
<td>85</td>
</tr>
<tr>
<td>Nepal</td>
<td>15 468</td>
<td>90</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>4 754</td>
<td>86</td>
</tr>
<tr>
<td>Thailand</td>
<td>27 597</td>
<td>86</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>1 206</td>
<td>87</td>
</tr>
<tr>
<td><strong>SEA Region</strong></td>
<td><strong>1 023 588</strong></td>
<td><strong>88</strong></td>
</tr>
</tbody>
</table>

Source: Annual Reports, National TB programmes, SEAR Member States, 2011;

N.B. Sum of treatment outcomes may be >100% due to rounding of decimals. For some countries there are discrepancies between cases notified in 2009, 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.
The higher case-fatality rates were registered in Myanmar (6%), Sri Lanka (6%) and Thailand (7%). In Myanmar and Thailand the relatively high case-fatality may be explained by the high mortality among HIV-positive NSP cases, being respectively 18% and 27%.

As expected, the success rate among re-treatment cases is lower than among new cases, being 75% for the whole Region and ranging from 68% to 83% within the countries (Maldives is not counted in the range as it reported only one re-treatment case whose outcome is unknown). Similarly, the case-fatality rate and failure rate among the re-treatment cases are higher, being respectively 7% and 4% for the whole Region. Case fatality ranges between 2% in DPR Korea and Timor-Leste and 11% in Myanmar and Thailand, while failure rate is ranging between 1% in Sri Lanka and 11% in DPR Korea. Default rates among re-treatment cases is also high in the Region (12%), and is particularly high in India, Sri Lanka (13% for both) and Indonesia (12%). These high default rates among re-treatment cases are a cause for concern, as well as the rates of failure in DPR Korea (11%) and Bhutan (7%), since many of these cases could be expected to have multidrug resistance.

3.4 Reporting progress towards global targets

With the fifteenth annual report, *Global Tuberculosis Control 2010*, WHO ceased publishing data on case-detection rate of new smear-positive TB cases. The CDR of new smear-positive TB >70% is no longer a global target. One of the reasons behind this decision is the difficulty encountered to obtain reliable estimates for the denominator to this indicator, which is not routinely and directly measurable. Another reason is the current focus on universal case detection. In fact, due to new diagnostics that allow a definite diagnosis of people with smear-negative TB, it is outdated to focus only on the detection of smear-positive cases.

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

In 2010, 10 countries in the Region have achieved or surpassed the 85% treatment success target among new smear-positive cases; the overall treatment success rate in the Region as a whole was 88%, close to the current target of 90%, and already five Member States have achieved the newly set target.
Case-notification rate of all forms of TB is steadily increasing since 2000, at a slower pace in the last three years (Figure 15). However, notification rate in 2010 is still far from the estimated TB incidence that represents the ideal goal in terms of universal access; in 2010 the estimated case-detection rate was 61 (57–66).

Regarding the Stop TB Partnership’s targets of halving prevalence and mortality rates compared with the 1990 baseline, the SEA Region is on track to reach both targets. In fact, according to Figures 16 and 17, considering only the best estimate, and not taking into account the uncertainty bands, in 2010 the prevalence and mortality rates both decreased by 39% compared with the 1990 levels. According to the projections based on the assumption that current trend will not change, the Region would reach a 50% reduction of baseline data by 2015.

According to WHO estimates the incidence rate has started reverting, compared with the 1990 baseline (Figure 15) mainly driven by high-burden countries such as India.
**Figure 16:** Trends in estimated TB prevalence rate 1990–2010 and forecast for TB prevalence rate 2011–2015, WHO SEA Region (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 the 1990)

**Figure 17:** Trends in estimated TB mortality rate 1990–2010 and forecast for TB prevalence rate 2011–2015, WHO SEA Region (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 the 1990)
4.1 DOTS

The entire population in the SEA Region is living within access to DOTS services since 2007.

Considering DOTS coverage and the continuous increase of cases notified over time, with almost 20 million TB patients treated during the past 10 years, the SEA Region is on the move towards universal access.

4.2 Strengthening national laboratory networks

Quality-assured smear microscopy services are available through the laboratory networks in all the eleven Member States of the Region.

National reference laboratories (NRLs) in all Member countries (with the exception of Maldives and Timor-Leste) have capacity for mycobacterial culture and DST. Although this capacity is limited in some countries, efforts have been made to strengthen laboratory capacity within countries according to national plans and with the support of supranational reference laboratories (SNRL). In Nepal, culture and DST facilities are being provided through an NGO-run laboratory, quality-assured by the SNRL at Gauting, Germany. A national reference laboratory which has been recently upgraded is supported by the SNRL.

The national reference laboratories in Bangladesh, Indonesia and Myanmar have recently been accredited for quality assurance for culture and drug
susceptibility testing, while Sri Lanka is in the process of upgrading the national reference laboratory for TB.

All eleven countries have formally established linkages with SNRLs. The National Institute of Research in Tuberculosis, formerly the Tuberculosis Research Centre, Chennai, India, and the Bureau of TB at Bangkok, Thailand, are the two designated supranational TB reference laboratories in this Region. These two laboratories are part of a global network of 26 supranational reference laboratories. However, NRL in some countries are linked to SRLs outside the region: Bangladesh to the SRL in Antwerp, Belgium; DPR Korea to the SRL in Hong Kong; Indonesia and Timor-Leste to the laboratory at Adelaide, Australia, and Nepal to the Gauting Laboratory in Germany.

The national reference laboratories in India and Thailand are also undertaking drug susceptibility test (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 re-treatment regimens, through linking with the SRNLs in the global network.

Efforts are also on 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 and from the global laboratory initiative (GLI), Foundation for Innovative New Diagnostics (FIND) and SEARO.

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

#### 4.3.1 TB/HIV

An estimated 3.5 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 at different stages across different countries and geographical areas within individual countries. For example, approximately two-thirds of the estimated HIV burden in India lies in six states in the South and North-East, which make up only a third of the country’s population. In four states in southern India, the HIV prevalence appears to be slowly decreasing. In Indonesia, where the overall prevalence of HIV is low, and three provinces have been reported to have much higher rates of HIV. In other countries, such
as Bangladesh and Nepal, increasing HIV prevalence among high-risk groups such as IDUs, has raised concern about the potential risk of a generalized HIV epidemic.

Regionally, the number of new infections every year is showing a downward trend in four of the five high-HIV-burden countries, namely India, Myanmar, Nepal and Thailand. In Indonesia, the HIV epidemic is still on the rise (Figure 18).

The South-East Asia Region accounts for nearly 15% of the global burden of new HIV-positive tuberculosis cases. HIV prevalence among new TB patients is 5.7%.

The need to urgently address TB/HIV is well understood in the Region. A Regional Strategic Plan for HIV-TB has been developed, adapting global strategies and guidelines to the unique needs of the Region.

National TB/HIV guidelines and a comprehensive package of interventions comprising joint advocacy, coordination, training of staff, and integrated service delivery are being implemented in nine countries. TB/HIV activities are widely available in Thailand, which continues to lead the Region in implementing such activities. Services are being further expanded in 29 states in India (aiming to
cover the entire country by 2012), in Myanmar, Nepal and in ten provinces in Indonesia. The current population which has access to a comprehensive package of TB/HIV services is estimated to be around one billion in the Region.

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. Infection control measures have been included in national plans in Bangladesh, Bhutan, DPR Korea, India, Indonesia, Myanmar, Nepal, Sri Lanka and Thailand.

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 on the screening of TB cases for HIV infection, and vice versa.

Isoniazid preventive treatment (IPT) proves 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 and India is conducting operational research on IPT; Bhutan and Maldives have included IPT in national guidelines.

### 4.3.2 MDR-TB

In 2011, SEARO published *Regional Response Plan on MDR-TB* in collaboration with staff of WHO Country Offices. There is an ongoing initiative to establish the Regional Advisory Committee on MDR-TB in the WHO Regional Office for South-East Asia. A nine member committee will be established to review and provide guidance on the implementation of interventions for M/XDR-TB in countries of the Region.

During recent years, steady progress has been made in the Region in initiating MDR-TB cases on treatment. The Green Light Committee had approved the case management of patients with MDR-TB under national programmes in 10 Member States. Bangladesh, India, Indonesia and Myanmar are in the process of expanding these services, while Nepal has already established ambulatory case management services for MDR-TB throughout the country.

Maldives continues to treat the few cases that occur on a case-by-case basis. Bhutan and Sri Lanka have begun enrolling cases in 2010, and Timor-Leste in 2011. DPR Korea developed Programmatic Management of Drug
Resistant TB (PMDT) guidelines in line with WHO recommendations and is expected to start enrolling patients on second-line treatment by early 2012. In Thailand MDR-TB treatment is currently provided at about 100 treatment units throughout the country. Four selected sites will serve as centres of excellence for the management of MDR-TB and have been selected for the GLC project.

Poor availability of data on testing for drug resistance, number of MDR-TB cases detected and treatment outcomes suggests that the recording and reporting system is a challenging issue in most countries in the Region.

In 2010, more than 3937 patients with MDR-TB had been registered for treatment in the Region, and by September 2011 India alone reported 5000 patients initiated on second-line treatment. Although the absolute number of TB cases tested for drug resistance, diagnosed with MDR-TB and started on appropriate treatment remains low, it is consistently increasing at the pace of implementation of the plan for management of drug-resistant TB. Initial treatment success rates of 65% and higher have been reported.

### 4.3.3 Paediatric TB

The first WHO guidelines for national TB control programmes on management of tuberculosis in children were published in 2006 and aimed at optimizing outcomes, including quality of life and survival of children with tuberculosis. It served as a reference tool for countries to adopt.

Guidelines for diagnosis and treatment of paediatric TB have been widely disseminated in India and partly in Indonesia. In India patient-wise drug boxes for children are also available under the programme. National guidelines for the management of childhood TB have also been finalized in Bangladesh and Myanmar. Bangladesh, DPR Korea, India, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste received grants for anti-TB paediatric formulations through the Global Drug Facility (GDF).

Despite these achievements, paediatric TB remains a neglected area, as is demonstrated by the very low notification rate in the age-group below 15 years. 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. Member States need to revise national guidelines according to the Rapid Advice issued in October 2010 by WHO that provides evidence-based recommendations on treatment of childhood TB, while considering the risks and benefits, feasibility, cost and financial implications.
In 2010, notification data with breakdown by paediatric age groups were available for four of the eleven Member States.

4.3.4 Other challenges
National plans for TB control in the 11 Member States are addressing 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.

Airborne infection control measures have been included in national plans in Bangladesh, Bhutan, DPR Korea, India, Indonesia, Myanmar, Nepal, Sri Lanka and Thailand.

4.4 Public and private partnerships
A major strategy towards increasing case detection and treatment success rates has been the inclusion of public health-care providers operating outside the Ministry of Health, such as the railways, military, corporate sectors and prison health services, as well as private providers in TB management. Particularly in some countries, the percentage of patients seeking services through the private health sector is very high. Currently all Member countries have clear policies and strategies to involve other sectors. The contribution of case notification from these sectors stands at about 25%.

Universities and medical schools are contributing to evidence-based policies and strategies through technical advisory groups at the national level.

The International Standards of TB Care have been endorsed by professional bodies such as medical associations in Bangladesh, DPR Korea, India, Indonesia, Maldives, Myanmar, Nepal and Thailand. Intersectoral collaboration and public-private partnerships for delivery of services have been further scaled up in eight Member countries (Bangladesh, India, Indonesia, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste). More than 1000 medical colleges, 25 000 private practitioners, 1800 large public and private hospitals, 250 corporate institutions, 2500 nongovernmental organizations, nearly 100 faith-based organizations and over 900 prisons are now working with national TB control programmes.

Other recent initiatives have been the formal inclusion of the principles and practices of TB control in pre-service training and the establishment of referral mechanisms through providing lists of DOTS centres to teaching
institutes. 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. The country 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 Clinics and the NTP plans further expansion of public-private mix services through the Myanmar Medical Association.

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 BRAC, Dhaka and Damien Foundation through MoUs with the government in Bangladesh is an outstanding example of large-scale service delivery by NGOs that is contributing to achieving national targets for TB control.

Several thousand community-based initiatives are also being incorporated into routine service delivery by national programmes. However, successful approaches should be systematically documented in order to replicate winning models in similar settings in countries of the Region.

Business alliances in the Region such as the Thai Business Coalition and the Business Alliance in India are emerging as key players from the non-health private sector introducing TB services in their workplaces.

### 4.5 Surveillance, monitoring and evaluation

Efforts are being made to strengthen national TB surveillance systems, focusing on quality of data, through attention to ensuring completeness of case reporting, accurate compilation and timely reporting of data.

In-depth analysis of several years’ programme data to determine trends were undertaken in India in 2011.

However with the exception of the Maldives and Bhutan, trends in case-notification rates cannot be used as a proxy for trends in the incidence of TB. Population-based surveys, therefore, continue to serve as independent tools for evaluating the burden of TB and estimating the trends in the TB epidemic and impact of control strategies implemented in most countries.
Efforts were made to improve the corpus of data on notification and monitoring of treatment outcomes of MDR-TB case, both on paper and through electronic recording and reporting systems.

In 2011, joint monitoring missions on TB control were conducted in Indonesia and Myanmar.

### 4.6 Resources for TB control

In the entire SEA Region, domestic funding for TB control continues to account for about 55% of the funding for national TB control programmes; and the Global Fund accounts for about 40% of funding for TB activities. Ten Member countries currently benefit from funds mobilized through the Global Fund over the previous Rounds of GF grants. Applications to the Global Fund from Myanmar and DPR Korea have been approved during Round 8 and 9 respectively, and Bangladesh, Indonesia and Thailand were approved for Round 10. Nepal is successfully implementing the National Strategy Application (NSA) grant.

In addition, nine Member states benefit from funds from other development partners and donor governments. The exceptions are Bhutan and Maldives, where the only external funds are provided through WHO country budgets.

Despite funding being available through government and various donors in the Region, there is a 20% funding gap for the budgets of TB control programmes estimated for 2012.

Considering the threshold of 2.28 health professionals per 1000 population, five of the eleven Member States have sufficient human resources for health. Human resource development plans are available for six countries in the Region.

All 11 Member countries continue to access quality-assured affordable anti-TB drugs on a regular basis through grants or direct procurement services of the Global Drug Facility. All SEA Region countries successfully transitioned from grants to direct procurement services using domestic sources and/or Global Fund, World Bank, or other sources of bilateral funding for adult anti-TB drugs. An exceptional seventh year of GDF grant of drugs was secured for DPR Korea and Myanmar.
4.7 Operational research

National TB programmes and partners are engaged in carrying forward several operational research projects. Research proposals in the area of TB are being supported through the WHO SEA Regional Office and TDR funding. Several other research projects are supported by WHO country offices through funds available at the country level. Examples are KAP studies in Bangladesh, Bhutan, Indonesia, Myanmar and Sri Lanka; public-private mix (PPM) models in Bangladesh and Myanmar; hospital DOTS in Indonesia; seasonality in TB notifications; ambulatory management and outcome from MDR-TB case management in Nepal; use of IPT in India and 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. A study in India demonstrated that routine counselling and HIV testing of persons presenting with symptoms suggestive of pulmonary TB leads to early detection of HIV. Consequently, pilot projects for HIV testing of persons with symptoms of pulmonary TB and providing access to HIV care and support services have been initiated, and this would further aid towards controlling TB. Based on another study, the state of Kerala in India has taken a policy decision to screen all TB cases detected under the TB control programme for diabetes and provide access to treatment for diabetes under the general health system. India, in collaboration with UNION and other stakeholders is conducting several other operational researches.

Bangladesh, India, Indonesia, Myanmar, Nepal, Sri Lanka and Thailand were also benefited by several TBREACH approved projects in 2011.
5.1 Technical assistance

All 11 Member States in the Region continue to receive technical assistance through the WHO Regional Office for South-East Asia and country offices, in coordination and collaboration with international technical partners, namely, the Centres for Disease Control and Prevention (CDC) USA, the International Centre for Veterinary and Medical Sciences in Australia, the Royal Foundation for Tuberculosis in the Netherlands (KNCV), the United States Agency for International Development (USAID), USAID-supported TBCARE I and II, 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 TB Institute, (NTI), Bangalore, India, the National Institute of Research in Tuberculosis (NIRT), Chennai, India, formerly TB Research Centre, (TRC), and the SAARC TB and HIV/AIDS Centre in Kathmandu, Nepal, and technical partners based in countries in the Region have also actively provided technical assistance to national TB programmes during the year 2011.

Technical missions were undertaken to all eleven Member countries during the year to provide support to national programmes in various areas, such as laboratory assessments and laboratory capacity building, development and implementation of guidelines for TB, MDR-TB, TB/HIV and infection control, PPM, improvement of drug procurement and supply management, data management and use, and impact assessments.
Support was provided to review and update five-year national plans in Bhutan, India and Sri Lanka; to update the NTP manual on MDR-TB management in Bangladesh, DPR Korea, Indonesia, Maldives, Nepal, Thailand and Timor-Leste; to develop national expansion plans for MDR-TB in Bangladesh, Myanmar and Nepal; to revise PPM strategy for India and Nepal; to establish infection control interventions in Bangladesh, DPR Korea, India, Indonesia, Myanmar, Nepal and Thailand; to elaborate the human resource development plan for India and Indonesia; and to expanded the Practical Approach to Lung Health in Nepal and initiate it in India, Indonesia and Sri Lanka.

In 2011 Bhutan was supported to undertake assessment of ARTI survey, Myanmar assisted in dissemination of prevalence survey and Nepal and Thailand were supported to develop a protocol for the prevalence survey. Bangladesh, DPR Korea, Indonesia were also supported to prepare/undertake drug resistance surveys.

Bhutan, DPR Korea, Sri Lanka and Thailand were assisted to obtain approval from the WHO Green Light Committee and in developing guidelines and training materials for the management of MDR-TB cases in 2011.

Countries were also assisted in developing and implementing measures to address the needs of vulnerable populations at higher risk, including those residing in cross-border areas, through the national plans for TB control.

The TB Technical Assistance Mechanism (TBTEAM) has been utilized to provide technical assistance to countries. The SEA Region TBTEAM focal point identified national TBTEAM focal point(s) in collaboration with all national and external partners involved in respective countries. The SEA Region TBTEAM regularly monitors the functioning of the national TBTEAM to ensure information is up-to-date and that they are performing the tasks in the standard terms of reference for a national TBTEAM focal point. The regional roster of experts was further expanded and all proposed technical assistance missions to countries mapped, with the aim of deploying suitable consultants to meet the technical assistance needs of countries. This will also serve to facilitate the seeking of additional funding from the Global Fund, TBREACH, UNITAID and other partners to support necessary technical assistance to countries.

5.2 Strengthening national laboratory networks

Technical assistance, coordinated through WHO, is being provided through the supranational reference laboratories (SNRLs) based at the Institute of Medical and
Veterinary Science (Australia), Institute of Tropical Medicine (Belgium), Central Reference Laboratory, Gauting (Germany), NIRT (India) and at the Bureau of TB at Bangkok, Thailand, to help establish culture and drug susceptibility testing (DST) facilities in countries in a phased manner in line with national plans. All eleven countries have formally established linkages with SNRLs.

Laboratory staff from several Member States were trained in the management of TB laboratories, quality assurance, mycobacterial culture techniques, and drug susceptibility testing. An informal consultation on roll-out of Xpert RIF/MTB and strengthening of laboratory services was held at the National Tuberculosis Institute, Bangalore, India, in October 2011.

In 2011, in-country assessments of quality-assured national laboratory network and technical assistance to strengthen laboratory capacity for quality assurance were conducted in Bangladesh, Bhutan, DPR Korea, India and Indonesia. In Bangladesh support was provided for drug-resistance survey implementation, and Sri Lanka received technical support to develop the DRS protocol.

In 2011, the EXPAND TB (Expanding Access to New Diagnostics for TB) project was implemented in India and Myanmar. EXPAND TB is a collaboration between WHO, the Global Laboratory Initiative (GLI), the Foundation for Innovative New Diagnostics (FIND) and GDF, to ensure access to quality-assured new diagnostic technologies endorsed by WHO, including liquid culture, rapid speciation and molecular line-probe assay. Diagnostic technologies are properly integrated into TB control programmes and implemented in appropriate laboratories in countries, and local knowhow and sustainability are promoted through technology transfer efforts. Bangladesh signed a memorandum of understanding (MoU) with FIND and is expected to implement the terms of the same in early 2012. Indonesia is due to sign an MoU.

5.3 Capacity-building and information exchange

Training, exchange of information and in-country technical support for policy formulation, guideline development and monitoring have been the key areas of work for WHO-SEARO and country office staff during the past years.

In 2011 all Member States participated in three meetings organized by the SEA Regional Office. A Regional Workshop on PPM/PAL in TB Control was held in Kathmandu on September 2011 to provide updated guidance on implementation of PPM approaches and on the establishment of PAL in the
country. An informal consultation on Xpert MTB/RIF and laboratory scale-up was held on October 2011 to provide guidance on the scope and feasibility of introducing newer molecular tests for diagnosis of TB and MDR-TB in countries, and implementation of these technologies. The NTP Managers and Partners’ Meeting was held in December 2011 in Bangkok.

The regional and country offices have also supported the facilitation of several national-level trainings as well as trainings held at the three WHO collaborating centres in the Region. Among others, training for the drug resistance survey and strengthening of urban TB control were conducted in Bangladesh; training on the drug management course was conducted in Bangladesh and Bhutan and a global workshop held in Sri Lanka; training on PPM strategy for all TB control stakeholders was conducted in India and Nepal; a workshop on design of prevalence survey was held in Indonesia; and in Bhutan there was a National workshop on clinical management of MDR-TB.

5.4 Resource mobilization

Several Member States were assisted in mobilizing resources from development partners and donor governments during the year.

Bhutan, DPR Korea, Sri Lanka, Myanmar and Timor-Leste were supported to develop proposals for submission during the Global Fund Round 11 call for applications. However, the Global Fund Round 11 call was cancelled. Bangladesh, Indonesia, Thailand and Timor-Leste were supported in Global Fund grant negotiations. Developing workplans, conducting evaluations, and preparing the necessary documentation required for continued funding.

The activities undertaken and co-ordinated by the TB unit at the Regional Office are supported almost entirely through USAID’s regional funding. Additional funds for technical assistance to countries are being sourced through Office of Global AIDS Control (OGAC), and Green Light Committee (GLC) were also funded through USAID. Some funding also continued through the Stop TB department at WHO headquarters, for organizing regional workshops and to support some staff working on TB in the Region.

5.5 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 eleven countries in the Region embarked on use of Global Drug Facility services and products in one
or the other way and accessed the low-cost and quality-assured fixed dosage combination drugs. No stock-outs were reported from any country at the point of treatment delivery. However, due to global shortage of streptomycin, delays in replenishing stocks of the drug in some countries of the Region was also anticipated and countries were alerted in advance.

All countries in the Region successfully transitioned from grants to direct procurements in 2009 for first-line anti-TB drugs and their adult formulations. Eight of the eleven Member States receive GDF grant for paediatric formulations of first-line drugs.

Second-line anti-TB drugs are procured through the GDF and funded by UNITAID or Global Fund for most of the countries in the Region: UNITAID supported countries are Myanmar, Nepal and Timor-Leste, Global Fund supports Bangladesh, Bhutan, Indonesia and Sri Lanka and India is receiving support from both UNITAID and Global Fund.

In 2011, in-country technical support and training to strengthen procurement and supply management systems were undertaken in Bhutan, DPR Korea, Indonesia, Maldives and Thailand.

Bangladesh and Indonesia received support to develop their procurement and supply management (PSM) plan.

In 2011, the first South-East Asia anti-TB drug manufacturers workshop was organized jointly by GDF and U.S. Pharmacopeial Convention (USP) in Indonesia to sensitize and make aware TB drug manufacturers on WHO’s prequalification of medicines programme. GDF organized two workshops in India for Indian anti-TB drug manufacturers to build capacity on submission of dossiers for prequalification.

5.6 Operational research

Countries were provided guidelines for submission of research proposals through the newly launched TBREACH initiative. Bangladesh, India, Indonesia, Myanmar, Nepal, Sri Lanka and Thailand submitted proposals concerning access to diagnosis and treatment of TB and/or MDR-TB and all were approved in 2011.

India, Indonesia and Myanmar are being supported in deploying newer TB diagnostics in the field in collaboration with the Foundation for Innovative New Diagnostics (FIND), to field-test the use of newer diagnostics such as line probe assays, liquid cultures and LED microscopes. Plans for supporting this initiative in Bangladesh are being initiated.
Myanmar, Thailand and India were assisted in developing protocols for initiating INH preventive therapy (IPT) at selected sites and were supposed to have evidence for the implementation of IPT among people living with HIV/AIDS by early 2012.

5.7 Coordination, collaboration and partnerships

To mobilize greater commitment for TB control in the Region, WHO, at the 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 in and contributed to workshops and meetings held by WHO HQs and partner agencies, namely: Stakeholders Transition Meeting on Scale-Up of MDR-TB organized by WHO/HQ; the STAG meeting; Global TB Planning Regional Advisers Meeting; the TBTEAM Meeting; the Seventh Meeting of the Subgroup on Public-Private Mix for TB Care and Control: Strengthening health systems through engaging all care providers; the meeting of the DOTS Expansion Working Group; the TB Symposia on Women and TB; and the Health Partners Forum in SEARO.

5.8 Advocacy, communication and social mobilization (ACSM)

The Regional Strategy for Advocacy, communication and social mobilization (ACSM) was developed and the framework for ACSM activities at country levels has been finalized.

Bangladesh and Indonesia were supported to develop advocacy and communication roadmaps. Many community-based initiatives have been established through the active involvement of NGOs in Bangladesh, India, Indonesia, Myanmar and Thailand. Ongoing ACSM activities need to be properly documented, analysed for cost-effectiveness and best practices emanating from these utilized for wider replication. In 2011, success stories on best practices on ACSM activities have been made available for Bangladesh, India, Indonesia, Myanmar, Nepal and Sri Lanka. Similarly, best practices on community-based initiatives and for civil society organizations, have been mapped and documented in Bangladesh, India, Indonesia, Myanmar, Nepal and Sri Lanka and Thailand.
5.9 Monitoring and evaluation

Over the last few years the impact assessments were supported in six Member States in the form of prevalence or annual risk of infection surveys in Bangladesh, Bhutan, India, Indonesia, Myanmar and Thailand. Additionally, mortality surveys were supported in India, Indonesia and Myanmar. In-depth analysis of several years’ programme data to determine trends were undertaken in India, Nepal and Sri Lanka.

In-country technical assistance for improving data management software and trainings on data management were completed in Bangladesh, Bhutan, India and Nepal. In Bangladesh and Indonesia the e-TB MIS (management information system) was established in collaboration with MSH USA. Countries were also assisted in further improving supervision and monitoring of programme performance. Joint monitoring missions on TB control were conducted in Indonesia and Myanmar in 2011.
Country Profiles
With a population of about 150 million, Bangladesh ranks sixth among countries with the highest burdens of TB. The estimated prevalence and incidence rates of all forms of tuberculosis were respectively 411 and 225 per 100,000 population in 2010. Bangladesh completed the National TB Prevalence Survey in 2009. A reassessment of the epidemiological burden of TB, using data from the survey combined with an in-depth analysis of surveillance and programmatic data, was undertaken in 2011.

The number of peripheral laboratories performing smear microscopy was increased to extend greater access to TB diagnostic services, being 1050 in 2010 or 0.7 per 100,000 population. The number of laboratories performing culture increased from one to three, two of which were also performing DST for first-line drugs. In 2010 the notification rates of all forms of TB and new smear-positive cases were respectively 103 and 71, showing an increase against previous years but a marginal decrease compared with 2009. Treatment success rate among new smear-positive cases is steadily 92% for the cohort of patients registered since 2006.

The National TB Guidelines were updated in line with more recent international recommendations in 2008. The e-TB Manager pilot site has been established in six sites and planned to expand in an additional seven sites by 2012. The data collection system from the field is planned to be collected both in hard and soft copies to expedite the process.
The Childhood TB Guidelines have been finalized and ToT has been conducted. A total of 40 trainers have been trained in the ToT. The TB Infection Control Operational Guidelines have been developed in 2011. The operational guidelines for drug-resistant TB have been revised and SOP for PMDT developed in 2011. The PAL guidelines have been drafted and are likely to be finalized by early 2012.

Data from previous drug resistance surveys indicate low levels of MDR-TB. Isolated surveys have indicated that MDR-TB rates among newly diagnosed cases range between 0.4% and 3%, and among previously treated cases between 3% and 15.4%.

A limited survey of drug susceptibility among patients failing re-treatment regimens showed that 88% had MDR-TB. A nationally representative population-based survey has been initiated in 2010 (supposed to be completed by end 2011) to better assess the magnitude of drug resistance nationwide. The National Tuberculosis Reference Laboratory was accredited for culture and DST by the Supranational Reference Laboratory Antwerp, Belgium in 2010, though linked since 2007. Upgrading and renovation of National TB reference laboratory (NTRL) at the National Institute of Diseases of the Chest and Hospital (NIDCH) in Dhaka have been conducted in 2010. Establishment of three additional regional reference laboratories for culture and drug susceptibility testing in a phase-wise manner is ongoing.

In a GLC-approved project for the management of MDR-TB cases at the National Institute of Diseases of Chest and Hospital, Dhaka, started in August 2008, 468 cases have been reported being on treatment in 2009, and an additional 184 MDR-TB cases have been detected and started on treatment in 2010. The Damien Foundation extended its support for MDR-TB case management to an additional 30 million population in 2010, 155 confirmed MDR-TB cases were enrolled on treatment.

HIV prevalence in the adult population (15-49 years) has been estimated to be low at 0.02%. A recent survey revealed an HIV prevalence of 7% among injecting drug users. This has raised concern 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, the collaboration between National AIDS and STI programme and National TB Programme for TB/HIV activities needs to be strengthened. A
limited number of NGOs provide HIV counselling, and prevention and care for TB/HIV coinfected individuals. Capacity-building for wider implementation of TB/HIV interventions started in 2009 and is ongoing.

In 2010, for the first time, Bangladesh reported case notification for age-groups 0-4 and 5-14 years, showing commitment towards addressing childhood TB.

TB services are integrated under the new Health Population and Nutrition Sector Development Programme (HPNSDP), implemented through the primary health care system of the country. 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 garment manufacturers, which account for three million employees and are 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 a total, 110 non-NTP public providers (including public hospitals, medical college hospitals, and military hospitals) and 81 private providers have been involved so far. Services have also been established in the prison system. The data management software has been upgraded and the financial management software has been installed. The international standard of TB care (ISTC) has been formally endorsed by professional associations. An HRD plan has been developed and a focal point for HR designated at the central level. NTP guidelines have been included in the curricula for basic training of different categories of health staff and curriculum for undergraduate/postgraduate medical, paramedical and nursing students on DOTS, TB/HIV and MDR-TB will be developed.

The TB programme benefits from Global Fund support through Rounds 3, 5, 8 and 10. This support is channelled through two principal recipients: the External Resource Division (ERD) of the Ministry of Finance (MoF) for NTP (Government) and BRAC for the NGO consortium. WHO provides strong technical and operational support to the programme. In addition, USAID TB CARE II provides financial assistance to the NTP directly while several other donors are funding TB activities through NGOs. Support for TB control is also made available through the HPNSDP.
Major achievements

- The first National Drug Resistance Survey (DRS) is in the completion phase and the draft report of this survey will be available in the first quarter of 2012.
- The national TB prevalence survey was completed in 2009 and disseminated in 2010.
- MDR-TB was piloted successfully in NIDCH and was scaled up to one more site in Chittagong.
- Upgrading and renovation of NTRL at NIDCH, Dhaka, completed.
- RTRL Chittagong has been made operational.
- Further expansion of public-private mix TB and involving the workplace, e.g. BGMEA.
- Drug storage capacity strengthened by establishing a separate store in the newly constructed hospital at Shyamoli, Dhaka.
- Installation of Financial Management software.
- Piloting of e-TB Manager in six sites.
- PAL guidelines drafted and will be finalized by December 2011.
- The Childhood TB Guidelines have been finalized and ToT conducted.
- MDR-TB guidelines have been revised and updated.
- TB infection control Operational Guidelines developed.
- SoP for cPMDT finalized.

Major challenges

- Ensuring uninterrupted supply of drugs and logistics.
- Ensuring sustainability of skilled and trained staff at different levels.
- Ensuring continuation of financial support.
- Scaling up the management of DR-TB and piloting of cPMDT.
- Further scaling up and strengthening private-public collaborative interventions.
- Strengthening linkages with the National AIDS and STI programme for TB/HIV.
- Quality control of and sustaining the quality of DOTS is a major issue.
- Strengthening system for diagnosis of smear-negative, extrapulmonary and child TB cases.

**Planned activities for 2012**

- Establishment of regional reference laboratories at Khulna, Barisal and Sylhet for culture and drug susceptibility testing in a phase-wise manner.
- Introduction of new diagnostic tools like Gene Expert.
- Implementation of Practical Approach to Lung Health (PAL).
- 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 the e-TB Manager.
- Implementation of TB infection control.
- Scaling up of comprehensive advocacy, communication and social mobilization (ACSM) activities.
- Conducting an assessment of the impact of the IEC campaigns on the population and service recipients.
- Capacity-building for diagnosis and management of smear-negative, extrapulmonary and childhood TB.
- Establishing a pharmaco-vigilance system.
- Establishment of electronic data collection system.
- Conduct operational research on validation of data, TB-diabetes relationship, etc.
Case-notifications by type of patients, 2010

Trends in notified new smear-positive TB cases by age group among males, 2001–2010

Trends in notified new smear-positive TB cases by age group among females, 2001–2010

Treatment outcomes of new smear-positive cases, 2009 cohort

Trends in treatment outcomes of new smear-positive cases, 2000–2009
### Estimates and notification rates for 2010, Bangladesh

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Population</strong>*</td>
<td>149 715 654</td>
</tr>
<tr>
<td><strong>Incidence of all forms of TB</strong></td>
<td>330 000</td>
</tr>
<tr>
<td></td>
<td>(270 000–440 000)</td>
</tr>
<tr>
<td><strong>Incidence rate of all forms of TB (per 100 000 population per year)</strong></td>
<td>225 (184–269)</td>
</tr>
<tr>
<td><strong>Prevalence of all forms of TB</strong></td>
<td>610 000</td>
</tr>
<tr>
<td></td>
<td>(280 000–1 000 000)</td>
</tr>
<tr>
<td><strong>Prevalence rate of all forms of TB (per 100 000 population per year)</strong></td>
<td>411 (188–671)</td>
</tr>
<tr>
<td><strong>TB death rate (per 100 000 population per year, excluding deaths among TB/HIV coinfected)</strong></td>
<td>43 (32–57)</td>
</tr>
<tr>
<td><strong>Notification rate of all forms of TB (per 100 000 population for the year 2010)</strong></td>
<td>103</td>
</tr>
<tr>
<td><strong>Notification rate of new smear-positive cases (per 100 000 population for the year 2010)</strong></td>
<td>71</td>
</tr>
<tr>
<td><strong>Case detection rate (all forms of TB)</strong></td>
<td>46 (38–56)</td>
</tr>
<tr>
<td><strong>Treatment success rate (%) of new smear-positive cases for 2009 cohort</strong></td>
<td>92</td>
</tr>
</tbody>
</table>

With a population of approximately 695,000 in 2010, Bhutan had an estimated TB prevalence and incidence rate of all forms of TB respectively of 187 and 158 per 100,000 population. The notification rate of all forms of TB (new cases and relapses) and new smear-positive cases were respectively 188 and 66, showing a steady increase compared with previous years. Comparing the rates of estimated incidence and notification of all forms, case-detection rate results being above 100% showed underestimation of the real burden of TB in the country and the need to revise current estimates. The treatment success for the cohort of new smear-positive cases registered during 2009 was 92%. The TB Control Programme is fully integrated into the general health services with the majority of activities decentralized to the districts.

There is no representative data on levels of anti-TB drug resistance in the country. The Drug Resistance Surveillance is ongoing to better assess levels of drug-resistant TB in the country. However, based on modelling, it is estimated that 0.6% of newly diagnosed smear-positive TB cases have MDR-TB. The Public Health Laboratory (PHL) has been linked to the Regional Supranational Reference Laboratory in Bangkok, Thailand, and accredited for culture and first-line DST. All 17 MDR-TB cases diagnosed in 2010 were among re-treatment cases; not a single case of MDR-TB was reported among NSP cases tested for DST. Culture facilities are being upgraded at the two Regional Referral Hospitals. Additional laboratory staffs were trained for undertaking quality-assured culture and DST. DST will be done for all re-treatment cases and extended to all smear-positive cases initiated on treatment once the national laboratory is fully set up. GLC approval for the management of MDR-TB cases has been obtained, guidelines for MDR-TB management have been finalized, medical doctors
trained on MDR-TB management and second-line drugs are being procured through GDF. In 2010, 37% of re-treatment cases and 9% of new smear-positive cases were tested for MDR-TB. Seventeen patients have been enrolled on second-line drugs treatment.

The NTCP has introduced fixed-dose combination drugs (FDCs), and has procured them through Global Drug Facility (GDF) replacing single drug formulations for first-line treatment for both adult and paediatric cases. 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, being only 0.02%. HIV sentinel surveillance carried out annually has also revealed a low level of HIV infection. A national body responsible for coordinating TB/HIV activities was formed in 2007 and a national plan for collaborative TB/HIV activities has been developed.

A comprehensive HRD masterplan is in place in the HR Division of the Ministry of Health. The programme coordinates with the Human Resource Division at the central level on HR issues.

There is strong collaboration between NTP and partners, including the military hospitals. All military hospitals are involved in delivering TB services. The National TB Control Programme is financially supported through the government and both Rounds 4 (up to end-2010) and 6 of the Global Fund.

**Major achievements**

- ARTI survey data validation and analysis completed.
- Drug resistance surveillance ongoing.
- Culture and DST established at the Public Health Laboratory.
- Quality control of smear microscopy expanded to BHU Grade I.
- Transfer referral mechanisms for TB developed in prisons.
- Advocacy, communication and social mobilization on TB strengthened.
- Training of trainers on electronic reporting system for TB completed.
- Training on electronic reporting system for TB conducted.
- Revised TB guidelines in line with the latest WHO TB guidelines.
- MDR-TB guidelines and infection control plan developed.
- Fixed-drug combinations of anti-TB drugs introduced.
Major challenges

- Lack of adequate human resources.
- Frequent change of TB focal persons.
- Inadequate monitoring and supervision.
- Inadequate contact tracing and follow-up.
- MDR-TB and TB/HIV collaborative activities.
- DOT implementation.
- Limited capacity to conduct operational research in priority areas;
- Maintaining sustainability of financial resources.
- TB surveillance and improving data management.

Activities planned for 2012

- Development of a Training of Trainer’s manual on comprehensive TB control.
- Strengthening monitoring and supervision and improving data management.
- Strengthening TB/HIV collaborative activities.
- Addressing TB control among cross-border and vulnerable populations.
- Training of medical doctors on MDR-TB management and revised TB guidelines.
- Refurbishment of the MDR-TB hospitalization room of two regional referral hospitals.
- Advocacy, communication and social mobilization, including development and printing of IEC materials on TB.
- Procurement of both first- and second-line drugs through GLC/GDF.
- Annual TB laboratory and annual TB review meeting.
- In-country and international training of laboratory technicians on DST in SNRL.
- Procurement of DST reagents and health products for the Public Health Laboratory and district hospitals.
- Quality assessment visit to the PHL by the SNRL.
- Introduction of electronic reporting system in all reporting centres.
Tuberculosis Control in the South-East Asia Region 2012

Case-notifications by type of patients, 2010

Case-notifications by type of patients, 2010

- New Smear-positive: 34%
- New Smear-negative: 21%
- New Extra-pulmonary: 39%
- Relapse: 4%
- Other: 2%
- Treatment After Failure: 1%
- Treatment After Default: 1%

Trends in TB case-notifications, 2001–2010

Trends in TB case-notifications, 2001–2010

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Notified new smear-positive TB cases by age group and sex, 2010

Notified new smear-positive TB cases by age group and sex, 2010


Notification rate of new smear-positive TB cases by age group and sex, 2010

Notification rate of new smear-positive TB cases by age group and sex, 2010


Notified new smear-positive TB cases by age group and sex, 2010

Notified new smear-positive TB cases by age group and sex, 2010


Treatment outcomes of new smear-positive cases, cohort of 2009

Treatment outcomes of new smear-positive cases, cohort of 2009

- Cured: 86%
- Completed: 6%
- Died: 3%
- Other: 8%
- Failed: 3%
- Defaulted: 2%

Trends in treatment outcomes of new smear-positive cases, 2000–2009

Trends in treatment outcomes of new smear-positive cases, 2000–2009

- Cured: 95, 90, 85, 80, 75
- Completed: 6%
- Died: 3%
- Failed: 3%
- Defaulted: 2%
- Not-evaluated: 3%
### Estimates and notification rates for 2010, Bhutan

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Population*</td>
<td>695,822</td>
</tr>
<tr>
<td>Incidence of all forms of TB</td>
<td>1,100 (920–1,300)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100,000 population per year)</td>
<td>151 (127–177)</td>
</tr>
<tr>
<td>Prevalence of all forms of TB</td>
<td>1,300 (320–2,300)</td>
</tr>
<tr>
<td>Prevalence rate of all forms of TB (per 100,000 population per year)</td>
<td>187 (46–330)</td>
</tr>
<tr>
<td>TB death rate (per 100,000 population per year, excluding deaths among TB/HIV coinfected)</td>
<td>9.6 (7.8–12)</td>
</tr>
<tr>
<td>Notification rate of all forms of TB (per 100,000 population for the year 2010)</td>
<td>188</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100,000 population for the year 2010)</td>
<td>66</td>
</tr>
<tr>
<td>Case detection rate (all forms of TB)</td>
<td>120 (102–142)</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2009 cohort</td>
<td>92</td>
</tr>
</tbody>
</table>

*Source: National Statistical Bureau of Bhutan.*
Democratic People’s Republic of Korea

With a population of about 24 million, the Democratic People’s Republic of Korea (DPR Korea) has an annual incidence and prevalence of TB (all forms) of, respectively, 345 and 399 per 100 000 population. In 2010, the notification rate of all forms of TB and new smear-positive cases was respectively 344 and 127, showing a steadily increasing trend over time, particularly since 2007.

The expected incidence was revised upwards significantly in 2007 following 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 such as health facilities under the ministries of the military, security and railways have led to an increase in case notifications. As result, in 2010, the estimated case-detection rate is 100%. The treatment success rate is above 85% since 2001, being 90% in the cohort of patients registered in 2009.

Patients with possible drug resistance were not being diagnosed and second-line regimens were not available through the programme. However, the National Reference Laboratory for culture and DST have been established at the central TB Institute in Pyongyang with support from Stanford University and Christian Friends of Korea. The 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. There is no reliable data on the extent of MDR-TB in the country. However, re-treatment cases comprised 16% of all notified cases during 2010. Drug-resistance survey will be started in 2012.
HIV has not been reported in the country. There is a plan to establish HIV prevention activities.

Training materials on paediatric TB treatment has been developed and trainings conducted. More trainings are planned for 2012. TB case-notification by age groups 0–4 and 5–14 years has been initiated.

A multi-year strategic plan has been developed for 2008–2015, in line with the Global Plan to Stop TB and the Regional Plan for TB Control, 2006–2015. The government provides for over half of the programmes’ 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 SEARO exceptionally secured funds to provide up to 90% of funding for a further one years’ supply of drugs to cover the needs in 2010. Currently, anti-TB drugs are being procured through the Global Fund Round 8 TB grant. GDF is also providing grant for paediatric anti-TB drugs and adult drugs for one province. Support for SLDs is also received through the Eugene Bell Foundation.

**Major achievements**

- DOTS firmly in place with service delivery extending to the most peripheral level.
- National TB Reference Laboratory for culture and DST established.
- M&E and supervision of DOTS implementation strengthened.
- Logistic management system for drug supply and management strengthened.
- Health facilities in other sectors involved.
- Involvement of household doctors in DOTS institutionalized.
- Patient-wise kits introduced.
- Global Fund supported project being implemented satisfactorily.
- High case-detection and treatment success rates are sustained.
- Draft of ACSM Strategic Plan is developed.
- PMDT guidelines and expansion plan developed.
- National TB IC plan drafted.
- A National TB Training Centre established.
- Human resource capacity strengthened through regular trainings (programme management, laboratory work and EQA, ACSM, supply management, data management).

**Major challenges and constraints**

- Sustaining funding to implement basic DOTS: shortages of laboratory reagents and first-line drugs.
- Inadequate laboratory capacity for undertaking laboratory QA.
- Diagnosis of TB in children not widely in practice.
- Lack of information on pattern of MDR-TB in the country and drugs for MDR-TB.
- Logistics for computerized data management is insufficient.
- Lack of experience in implementing PMDT (e.g. programme management, management of MDR-TB patients, management of SLD, TB IC, R&R, etc.)
- Lack of vehicles and petrol, oil and lubricants (POL) for supervisory visit.

**Activities planned for 2012**

- Strengthening partnership with donor agencies for expansion of resource pool.
- Strengthening of coordination with other sectors.
- Undertaking systematic supportive supervision at all levels.
- Expansion of microscopy centres for TB diagnosis.
- Trainings on approaches to ACSM at all levels.
- Printing and dissemination of IEC materials on TB prevention and control.
- Initiate programmatic management of DR-TB at selected sites.
- Undertake a drug resistance survey.
- Technical support to National TB Reference Laboratory for early accreditation.
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Case-notifications by type of patients, 2010

- New Smear-negative 38%
- New Extra-pulmonary 14%
- Relapse 4%
- Other 12%
- Treatment After Failure 3%
- Treatment After Default 2%
- Other Re-treatment 7%

Trends inTB case-notifications, 2001–2010

- Number of cases per 100,000 population
- Years: 2001 to 2010
- Graph showing trends over the years

Case-notifications by type of patients, 2010

- New Smear-positive 32%
- New Smear-negative 38%

Treatment outcomes of new smear-positive cases, 2009 cohort

- Cured 84%
- Died 2%
- Failed 4%
- Defaulted 2%
- Other 10%

Trends in treatment outcomes of new smear-positive cases, 2000–2009

- Treatment success rate (%)
- Years: 2000 to 2009
- Graph showing success rate over the years
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<tbody>
<tr>
<td><strong>Population</strong>*</td>
<td>24 605 065</td>
</tr>
<tr>
<td><strong>Incidence of all forms of TB</strong></td>
<td>84 000 (72 000–97 000)</td>
</tr>
<tr>
<td><strong>Incidence rate of all forms of TB (per 100 000 population per year)</strong></td>
<td>345 (295–398)</td>
</tr>
<tr>
<td><strong>Prevalence of all forms of TB</strong></td>
<td>97 000 (24 000–170 000)</td>
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<tr>
<td><strong>Prevalence rate of all forms of TB (per 100 000 population per year)</strong></td>
<td>399 (100–689)</td>
</tr>
<tr>
<td><strong>TB death rate (per 100 000 population per year, excluding deaths among TB/HIV coinfected)</strong></td>
<td>23 (17–39)</td>
</tr>
<tr>
<td><strong>Notification rate of all forms of TB (per 100 000 population for the year 2010)</strong></td>
<td>344</td>
</tr>
<tr>
<td><strong>Notification rate of new smear-positive cases (per 100 000 Population for the year 2010)</strong></td>
<td>127</td>
</tr>
<tr>
<td><strong>Case-detection rate (all forms of TB)</strong></td>
<td>101 (87–118)</td>
</tr>
<tr>
<td><strong>Treatment success rate (%) of new smear-positive cases for 2009 cohort</strong></td>
<td>90</td>
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With a population of about 1230 million, India is the largest country in the Region. It is the highest TB-burden country in the world in terms of absolute numbers of incident cases that emerge each year and it contributed one fourth of the estimated global incident TB cases in 2010.

In July 2011, national consultations to estimate the TB burden took place. Revised estimated prevalence and incidence rates of all forms of tuberculosis were respectively 256 and 185 per 100000 population in 2010. 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, therefore, be considered provisional. The notification rate of all forms of TB and new smear-positive cases were respectively 109 and 51 in 2010.

Since its inception in 1997, the Revised National TB Control Programme (RNTCP) has initiated almost 14 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 2009.

In 2010, 19 laboratories were accredited by the Government of India’s (GoI) RNTCP to undertake quality assured culture and drug susceptibility testing for first line drugs for the programme; in addition three laboratories implemented
line probe assay for diagnosis of MDR-TB cases. By the end of 2011, culture and DST facilities, using conventional method and rapid test (LPA), were expanded to 31 and 16 laboratories respectively; rapid DST through Xpert MTB/RIF will be introduced in 18 sites for field demonstration to guide rapid scale-up.

MDR-TB prevalence is estimated to be 2.3% among new cases and 12%-17% among re-treatment cases. However, due to the size of population and number of TB cases reported annually, India ranks second among the 27 MDR-TB high-burden countries worldwide after China. By the end of 2009, treatment services for MDR-TB patients were available in sites of ten states, with a cumulative total of 1415 patients started on standard second-line treatment since 2007. The RNTCP has developed a plan to scale-up considerably MDR-TB services in order to treat annually at least 30 000 MDR-TB patients in the country, supported by the Global Fund Round 9 and UNITAID to enable a rapid expansion of MDR-TB services in the next few years. As on September 2011, 34 states are providing MDR-TB diagnostic and treatment services and a cumulative total of 5810 MDR-TB cases have been started on treatment.

It is estimated that around 2.4 million Indians are currently living with HIV. Recent country-level data shows that about 5% of TB patients are HIV-positive. 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 of 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 in 11 states and was expanded to 29 states in 2011. By 2012, it is planned that all 35 states will have implemented the “intensified TB/HIV package”. Intensified TB case-finding has been implemented nationwide at all 5223 HIV testing centres (known as integrated counselling and testing centres, or ICTCs), with better reporting from ICTCs in States implementing the intensified TB/HIV package. During 2010, in just the seven highest-HIV burden states implementing the intensified TB/HIV package, more than 393 000 TB suspects were referred from ICTCs to RNTCP and of them 35 500 were diagnosed as having TB.

In 2010, 480 752 TB patients (59% of total TB patients registered in the 19 states implementing the intensified TB/HIV package for at least 2 quarters) were tested for HIV; 41 476 (9% of those tested) were diagnosed as HIV-positive and were offered access to HIV care. Cotrimoxazole preventive therapy (CPT)
for HIV-infected TB patients has been included into national policies and, in 2010, 88% of coinfected patients were receiving CPT; access to ART is more challenging with 49% of coinfected patients started on treatment.

In April 2010, RNTCP drafted provisional guidelines for airborne infection control in health-care facilities. 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 concludes by mid-2012.

In 2008, the revised guidelines and schemes to operationalize RNTCP activities with NGOs and the private sectors were implemented. The RNTCP training material specifically designed for private practitioners has been revised and updated. Utilizing support received under the Global Fund’s Rolling Continuation Channel (RCC), RNTCP has further expanded its collaborative public-private mix (PPM) TB activities. The PPM project with the Indian Medical Association (IMA) is being expanded from six states to 16, and that with the Catholic Bishops’ Conference of India (CBCI) from 11 to 19 states across the country. The RNTCP progressively is successfully involving an ever greater number of medical colleges, NGOs, private practitioners and the corporate sector in it’s activities: in 2010, a total of 10 230 private providers were collaborating with RNTCP.

Health services are administered in a decentralized manner at the level of the states and union territories 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 services delivery at the grassroots 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 three-yearly joint GoI/WHO monitoring mission of RNTCP was successfully conducted in April 2009.

The Government of India supports around half of the central-level budget for RNTCP activities, including a World Bank credit. The RNTCP additionally benefits from donor funding and support from DFID, the Global Fund (Round 2 RCC, Round 6 and 9), and USAID.
Major achievements

- Since its inception, the programme has initiated nearly about 14 million patients on treatment, thus saving more than 2.5 million additional lives.
- Since 2007, RNTCP has also consistently achieved the NSP case-detection rate of more than 70% in line with the global targets for TB control while maintaining the treatment success rate of >85%.
- Decentralized diagnosis through a network of about 13 000 quality assured sputum microscopy laboratories ensure quality of sputum microscopy, external quality assurance is being routinely conducted throughout the country as per a standardized protocol based on international guidelines (onsite evaluation, panel testing and blinded cross-checking).
- Treatment services decentralized through a network of hundreds of thousands of DOT centres/providers using patient-wise boxes both for adults and paediatric patients.
- Increasing engagement of the new cadre of community-based accredited social and health activists (ASHAs).
- Successful involvement of 292 medical colleges, 1965 NGOs, 10 230 private practitioners and over 150 corporate sector health units.
- Revised RNTCP guidelines and schemes for the involvement of NGOs and private providers in RNTCP activities implemented.
- Basic national framework for TB/HIV collaborative activities implemented nation-wide, with “intensified TB/HIV package” implemented in 29 states covering a population of over 900 million.
- Revised diagnostic algorithm and case definitions for smear-positive TB implemented since April 2009.
- Thirty four laboratories are accredited for TB culture and drug susceptibility testing; another ten are currently in the process undergoing accreditation.
- Treatment for MDR-TB patients introduced in 34 states, with 5810 MDR-TB patients initiated on treatment; and the last state has been permitted to initiate diagnostic services by CTD in December 2011.
Validation and demonstration study on LPA is completed and it is now a national policy and the preferred diagnostic test for MDR TB over other technologies for patient care;

Three-yearly joint GoI/WHO monitoring mission of RNTCP successfully conducted in April 2009;

Signing of the RCC agreement between GoI and GF in mid-2009; and GF R9 in 2011.

GF supported IMA and CBCI projects for enhancing the involvement of private practitioners and NGO services in RNTCP being expanded to sixteen and nineteen states respectively.

GF Round 9 support to accelerate scale-up of diagnostic and treatment services of MDR-TB cases and enhancing quality of DOTS services through civil society engagement.

National PPM consultation was done in February 2011 to review public-private collaborative experiences globally and other health sectors in India and develop recommendations for engaging the private sector for TB control in India successfully, and for taking these efforts to scale in the third phase of RNTCP.

**Major challenges**

- Ineffective and delayed diagnosis of TB in both the private and public sector. Patients accessing private providers not linked or engaged with 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 human resource development, 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.
Banning use of commercially available sero-diagnostic kits for TB in the country.

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

Scaling up culture, DST and treatment services for drug-resistant TB.

Developing and implementing airborne infection control measures in health facilities.

Effectively promoting operational research to address local challenges.

**Planned activities in 2012**

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

- Widening the network of quality assured laboratory and strengthening capacity of the four national reference laboratories to undertake second-line DST.

- Complete geographical coverage for diagnostic and treatment services for MDR-TB cases to all states.

- Monitoring the implementation of the revised schemes for involvement of NGOs and private practitioners across the country.

- Phased scale-up of the implementation of the intensified TB/HIV package.

- Piloting the Practical Approach to Lung Health initiative in Kerala.

- Introduction of rapid DST through Xpert MTB/RIF in 18 sites.

- Finalising RNTCP guidelines for airborne infection control in healthcare facilities and handing it over for integration with the general health system (Indian Public Health Standards, MCI, NCDC, NRHM and IDSP).

- Conducting workshop for dissemination of the results of the ongoing RNTCP epidemiological impact assessments.

- Evaluating the effect of the revised diagnostic algorithm, suspect and case definitions on case notifications;
Tuberculosis Control in the South-East Asia Region 2012

Case-notifications by type of patients, 2010

- New Smear-negative 24.1%
- New Extra-pulmonary 15.2%
- Other New Cases 0.1%
- Relapse 7.3%
- Other 11.9%

Trends in TB case-notifications, 2001–2010

- New Smear-positive cases by age group among males, 2001–2010

- New Smear-negative cases by age group among females, 2001–2010

- Treatment outcomes of new smear-positive cases, 2009 cohort

- Treatment success rate (%)

- Trends in treatment outcomes of new smear-positive cases, 2000–2009
### Estimates and notification rates for 2010, India*

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<tbody>
<tr>
<td>Population**</td>
<td>1 232 770 485</td>
<td></td>
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<tr>
<td>Incidence of all forms of TB</td>
<td>2 300 000 (2 000 000–2 500 000)</td>
<td></td>
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<tr>
<td>Incidence rate of all forms of TB (per 100 000 population per year)</td>
<td>185 (167–205)</td>
<td></td>
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<tr>
<td>Prevalence of all forms of TB</td>
<td>3 100 000 (2 000 000–4 600 000)</td>
<td></td>
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<tr>
<td>Prevalence rate of all forms of TB (per 100 000 population per year)</td>
<td>256 (161–373)</td>
<td></td>
</tr>
<tr>
<td>TB death rate of all forms of TB (per 100 000 population per year, excluding deaths among TB/HIV coinfected)</td>
<td>26 (17–39)</td>
<td></td>
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<tr>
<td>Notification rate of all forms of TB (per 100 000 population for the year 2010)</td>
<td>109</td>
<td></td>
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<tr>
<td>Notification rate of new smear-positive cases (per 100 000 population for the year 2010)</td>
<td>51</td>
<td></td>
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<tr>
<td>Case detection rate (all forms of TB)#</td>
<td>59 (53–65)</td>
<td></td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2009 cohort</td>
<td>87</td>
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</table>

*Estimated incidence, prevalence and mortality rates and numbers should be considered provisional as they have not been officially approved by Ministry of Health and Family Welfare - Government of India; #consequently, estimate of case detection rate is also provisional.

With a population of about 240 million, Indonesia carries the fourth highest TB burden globally. The estimated prevalence and incidence rates of all forms of tuberculosis were respectively 289 and 189 per 100 000 population in 2010. Tuberculin surveys and mortality studies were conducted successfully during 2006–2008 and data indicate that TB prevalence in Indonesia continues to decrease.

Indonesia is planning to implement nationwide TB prevalence survey in 2013 to improve TB burden estimates and trends assessment. The notification rate of all forms of TB and new smear-positive cases were respectively 124 and 76. Treatment success rate among new smear-positive cases is consistently above the target of 85%, being 91% for the cohort of patients registered in 2009.

Rapid expansion of DOTS over the last decade led to significant improvement in case detection and treatment success. The National TB Programme 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 new TB Control National Strategy 2010–2014 was finalized and the leading theme is “Breakthrough toward Universal Access”. Strategies such as Hospital DOTS linkages, MDR-TB management, improvement of laboratory network and strengthening of a quality assurance system, and HIV collaborative activities are currently being scaled up.
Notification of sputum smear-positive cases slightly increased by about 10% in the last four years, as well as extrapulmonary cases that increased by about 20%; This is likely the result of increased notification by hospitals and clinics being linked to the national TB programme.

However, the number of sputum smear-negative cases is rather stable over the last few years. The TB programme is scaling up public-public and public-private partnerships and especially linkages with 560 public hospitals and medical college hospitals are in the process of being engaged in the programme. In addition, 408 prisons and 119 military hospitals are being involved. In 2010, 446 non-NTP public providers and 221 private providers actively collaborated with NTP, with a yield of 48 391 new TB cases diagnosed according to NTP guidelines. Teaching of the principles and practices of DOTS have been integrated into the medical school curriculum.

The ISTC has been endorsed by the professional associations and is 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 proportion of re-treatment cases out of all cases diagnosed is steady at around 2%, 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 the non-NTP public sector are not yet captured by the NTP. There are no nationwide representative data on prevalence of MDR-TB. Subnational drug-resistance surveys (DRS) 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 rate of 1.8% among the new cases and 16.7% among re-treatment cases.

Another DRS survey is ongoing for East Java (results not available yet) and the Drug Resistance Surveillance and Sentinel DRS system will be put in place in 2012 aiming to provide data geographically representative of the whole country.

Even if MDR-TB prevalence is considered to be low, due to the size of the population and number of TB cases reported annually, Indonesia is one of the 27 MDR-TB high-burden countries worldwide. GLC approval for the management of MDR-TB cases was obtained in 2008. In 2009, national programmatic
management of drug resistant TB (PMDT) and treatment guidelines have been developed and MDR-TB diagnostic and treatment services have commenced at 2 sites (Jakarta at the Persahabatan Hospital and in Surabaya city). In 2010 there were a total of five PMDT sites, where 182 MDR-TB cases were detected and 142 started on treatment.

It is estimated that the prevalence of HIV among the adult population is 0.2% nationally, and there are about 190 000 people living with HIV in the country. The estimated number of people coinfected with TB/HIV is 12 000 (ranging between 7200 and 19 000). While HIV is characterized as a concentrated epidemic in Indonesia, it is at the stage of a generalized epidemic in Papua province, with an HIV prevalence of 2.5% in the general population. 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, e.g. in DKI Jakarta (95%), Papua (68%), and East-Java (38.6%).

The national policy for TB/HIV collaboration activities is in place and guidelines and training materials have been developed. The NTP has revised the recording and reporting system, to include the information on TB/HIV. Twelve provinces have been identified as priority areas for TB/HIV interventions; collaborative activities are being implemented in 10 of these provinces. In these provinces, about 20 hospitals are involved in delivery of ART, VCT and DOTS services, while 10 centres are involved in VCT and DOTS services. Facilities for CD4 counts are available totally in 26 hospitals in the country.

Efforts to expand and strengthen the national laboratory network are ongoing, with assistance from the supranational reference laboratory in Adelaide, Australia. In 2010, there were ten EQA culture facilities and five EQA DST facilities.

A comprehensive HRD plan is in place and a focal point for HR has been designated at the central level. Drug management remains suboptimal and needs strengthening. The NTP’s plan and budget are aligned with the national health sector development plan. However, there are challenges due to the decentralization of health services down to the level of each district in the country, and because of cuts in overall government budgets.

The Indonesian programme received support from several sources including the Global Fund Round 8 and 10, USAID (Tuberculosis Coalition for Technical Assistance), KNCV, and DFID. Technical assistance is being provided by WHO, KNCV, Management Sciences for Health (MSH), FHI, JICA, ATS and IVMS.
Major achievements

- TB control has been included in the National Development Plan 2010–2014 with secure budget lines.
- TB is the priority in the Strategic Plan of MoH.
- TB/HIV interventions were included in ministerial decree in December 2009.
- The new TB Control National Strategy 2010–2014 is finalizing with the theme “Breakthrough toward Universal Access”.
- Hospital DOTS expansion covered 30% of the public and private hospitals.
- Microscopic reference laboratories in seven new provinces.
- PMDT expansion from two sites to three more sites. A five year expansion plan was also developed.
- Five laboratories were quality assured for culture and DST of FLD and SLD with linkages with supra national reference laboratory.
- DRS was completed in Central Java and in the data collection stage in East Java.
- DRS plan was developed and planned for sentinel sites according to the PMDT expansion plan and aimed for geographically representative parts of the country.
- TB/HIV collaborative activities covered high HIV prevalence provinces.
- NTP worked in collaboration with the Human Resources Development (HRD), Ministry of Health to strengthen HRD on TB and standardize the training curriculum and materials.
- The Indonesian Medical Association is fully involved in improving medical professionals on ISTC, including private practitioners.

Major challenges

- Commitment and contribution of local governments to TB control.
- There are still unreached populations in remote areas (eastern part of the country, particularly), migrants in big cities, in prisons, and populations at high risk of HIV.
- Expanding quality DOTS in hospitals, both government (MoH and other ministries) and private, including private practitioners.
Rapid expansion of PMDT and maintaining high quality.

Expansion of laboratory networks for culture and DST in other islands other than Java and EQA.

Introduction of new diagnostics (LPA, Xpert MTB/RIF) and integration into the system.

Expansion of TB/HIV collaborative activities to cover more provinces.

Maintain the capacity of TB-related staff amid high turnover rate.

Prevent the problem of stock-out of first-line drugs, second-line drugs and commodities.

**Activities planned for 2012**

- Advocate to increase commitment and contribution from local governments to support TB control.
- Support a comprehensive approach to increase performance of DOTS in low-performance areas (unreached, under-served populations).
- Support quality DOTS expansion in hospitals of the government and private and private practitioners.
- PMDT expansion with nine additional new PMDT sites.
- Support PMDT expansion and quality improvement and implementation of DRS.
- Support laboratory network expansion and EQA for DST and microscopy.
- Facilitate EXPAND-TB collaboration with NTP and introduction/integration of new diagnostics into the system.
- Support expansion of TB/HIV collaborative activities.
- Support initiation of TB and diabetes collaborative activities (recommendation from Global Fund Round 10).
- 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.
Tuberculosis Control in the South-East Asia Region 2012
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<tbody>
<tr>
<td>Population*</td>
<td>241 588 521</td>
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<tr>
<td>Incidence of all forms of TB</td>
<td>450 000 (370 000–540 000)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100 000 population per year)</td>
<td>189 (155–226)</td>
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<td>Prevalence of all forms of TB</td>
<td>690 000 (300 000–1 200 000)</td>
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<td>Prevalence rate of all forms of TB (per 100 000 population per year)</td>
<td>289 (123–484)</td>
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<tr>
<td>TB death rate (per 100 000 population per year, excluding deaths among TB/HIV coinfected)</td>
<td>27 (18–38)</td>
</tr>
<tr>
<td>Notification rate of all forms of TB (per 100 000 population for the year 2010)</td>
<td>124</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100 000 population for the year 2010)</td>
<td>76</td>
</tr>
<tr>
<td>Case-detection rate (all forms of TB)</td>
<td>66 (55–81)</td>
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<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2009 cohort</td>
<td>91</td>
</tr>
</tbody>
</table>

With a population of about 300 000, Maldives has an estimated prevalence and incidence rate of all forms of TB respectively of 13 and 36 per 100 000 population. The notification rate of all forms of TB and new smear-positive cases were respectively 30 and 13, showing a steady decrease both for smear-positive and all cases. Treatment success rate among new smear-positive cases was 78% for the cohort of patients registered in 2009.

The National TB Control Programme (NTP) at the Centre for Community Health and Disease Control, Ministry of Health and Family, Male, Maldives, is the central body for registration, planning, monitoring, training and evaluation of TB control activities since its establishment in 1976. TB is a notifiable disease and DOTS remains the core element of the National TB control programme. Close coordination and collaboration with other health-care institutions, especially private health-care institutions, in diagnosing and accurately reporting identified cases has been established. The considerable rate of treatment outcome “non-evaluated” up to 6 months after due timing for one year. Cohort outcomes reporting suggest problems in completeness and/or timeliness of reporting. All anti-TB drugs are available only through the government-run national TB control programme.

The main objectives of the NTP are to effectively improve and strengthen TB preventive activities, in addition to diagnosis and treatment of TB cases. In this regard, the establishment of critical infrastructure and human resource development for intensified case-finding, early case detection and strengthening the microscopy network are critical. At the same time, social mobilization for
increased community involvement and utilization of available services and strengthening NTP management have also been identified as key areas. In 2010 the IEC information package on transmission and prevention was developed and disseminated for schoolchildren, and training workshops for community health workers on TB management and contact tracing was conducted.

Available data suggest that TB is relatively uncommon in Maldives; HIV prevalence is estimated to be less than 0.1% in the adult population and TB/HIV is not a major problem yet. Screening of all HIV-positive cases for active TB is in place in collaboration with the HIV programme since 2003. All TB patients who are above 15 years of age are being tested for HIV starting form 1 December 2011.

Drug susceptibility testing, if deemed clinically necessary for a particular patient, is undertaken by shipment of samples to the National Tuberculosis Institute (NTI), Bangalore, India, which is also the designated supranational reference laboratory for the country. Patients diagnosed with MDR-TB are managed clinically at the tertiary-care hospital, the Indira Gandhi Memorial Hospital (IGMH) 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 and Family on a case-by-case basis. In 2010 no MDR-TB case was detected nor started on treatment.

The NTP is technically supported by WHO and benefits from the direct procurement mechanism of the Global Drug Facility to access the quality-assured first-line drugs.

**Major achievements**

- 100% geographical coverage of DOTS achieved.
- Diagnosis and treatment policies are in accordance with the WHO guidelines.
- Quality assured first-line anti-TB drugs are purchased through MoHF funds and provided free of charge to patients.
- Full treatment is ensured through use of patient kits.
- WHO recommended treatment regimens are being used to treat TB patients.
**Major challenges and constraints**

- The council members managing public health programmes and corporations managing hospitals are not completely aware of the technical guidelines for the TB control programme.
- With just two staff at the central level (relatively new to the programme), the capacity to manage, monitor and supervise the programme from the central level is very weak.
- There have been substantial delays in submission of reports as well as errors.
- Strengthening supervisory mechanism on quality assurance of smear microscopy and EQA in decentralized settings.
- Ensuring adequate supervision and monitoring of the DOTS centre in the regions and atolls.
- Need to ensure proper ventilation for infection control in the main DOTS centres and the laboratory at the Indira Gandhi Memorial Hospital.

**Planned activities for 2012**

- Continuation of postgraduate training in chest and respiratory medicine.
- Establish DOTS services for drug users linked to voluntary counselling and testing centres.
- Establish a MDR-TB review committee.
- Regional short-term fellowship on TB programme management.
- Develop and disseminate IEC packages to all MDR-TB patients on treatment adherence.
- Develop guidelines for infection control.
- Strengthening National TB team and provide international training for two staff members of DOTS centres on DOTS.
- Monitoring of provincial TB programmes.
- Integrate TB surveillance information into the SIDAS system.
- Development of IEC packages for DOTS.
- Conduct programme external review.
- Celebration of World TB Day 2012.
Notified smear-positive cases by age group and sex, 2010

Notification rate of new smear-positive TB cases by age group and sex, 2010

Trends in TB case-notifications, 2001–2010

Case-notifications by type of patients, 2010

Treatment outcomes of new smear-positive cases, 2009 cohort

Trends in Treatment outcomes of new smear-positive cases, 2000–2009

New Smear-negative 22%
New Extra-pulmonary 34%
Relapse 1%
Treatment After Failure 1%
New Smear-positive 42%

Notified smear-positive cases by age group and sex, 2010

Number of cases

0–14 15–24 25–34 35–44 45–54 55–64 65+

Cases per 100,000 population

0 10 20 30 40 50 60

Male Female

0–14 15–24 25–34 35–44 45–54 55–64 65+

Cases per 100,000 population

0 10 20 30 40 50 60 70 80

Male Female

Cured 78%
Died 2%
Failed 2%
Defaulted 11%
Non-evaluated 7%

Cured 78%
Died 2%
Failed 2%
Defaulted 11%
Non-evaluated 7%
### Estimates and notification rates for 2010, Maldives

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>317,866</td>
</tr>
<tr>
<td>Incidence of all forms of TB</td>
<td>110 (98–130)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100,000 population per year)</td>
<td>36 (31–42)</td>
</tr>
<tr>
<td>Prevalence of all forms of TB</td>
<td>40 (10–110)</td>
</tr>
<tr>
<td>Prevalence rate of all forms of TB (per 100,000 population per year)</td>
<td>13 (2.4–34)</td>
</tr>
<tr>
<td>TB death rate (per 100,000 population per year, excluding deaths among</td>
<td>3.4 (2.1–5.4)</td>
</tr>
<tr>
<td>TB/HIV coinfected)</td>
<td></td>
</tr>
<tr>
<td>Notification rate of all forms of TB (per 100,000 population for the</td>
<td>30</td>
</tr>
<tr>
<td>year 2010)</td>
<td></td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100,000 population</td>
<td>13</td>
</tr>
<tr>
<td>for the year 2010)</td>
<td></td>
</tr>
<tr>
<td>Case-detection rate (all forms of TB)</td>
<td>83 (72–97)</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2009 cohort</td>
<td>78</td>
</tr>
</tbody>
</table>

Myanmar is among the 22 countries in the world with the highest burdens of TB worldwide. TB control is a priority in the country’s National Health Plan. DOTS was introduced in 1997 and was expanded to the entire country by 2003.

According to WHO, based on the results of the prevalence survey successfully conducted in 2009–2010, the estimated prevalence and incidence rates of all forms of tuberculosis were revised upward to respectively 525 and 384 per 100 000 population (in 2010). Data showed that TB affects mainly the young adults, which is characteristic for significant ongoing transmission. The survey also provided important information about reasons for missing cases that are crucial to improve case-finding strategies.

More than 51 000 people living in 70 geographical areas of the country were screened. It was made possible with technical and financial support from the Japan International Cooperation Agency (JICA), Population Services International (PSI), the Three Diseases Fund, the Research Institute of Tuberculosis, the United States Agency for International Development and WHO.

In 2010, the notification rate of all forms of TB and new smear-positive cases were respectively 272 and 88 per 100 000 population. Treatment success rate among new smear-positive cases was 85% for the cohort of patients registered in 2009.

The reference laboratories in Yangon and Mandalay perform externally quality assured cultures and first-line DST (both conventional method and rapid test). Second-line DST is being undertaken at the SNRL in Bangkok.
With support from EXPAND-TB (Expanding Access to New Diagnostics for TB) new TB diagnostic tools are being implemented in the two national reference laboratories, including liquid culture, first-line drug susceptibility testing, rapid immunoassay for species identification and line-probe assay for rapid diagnosis of MDR-TB. With the upgraded laboratory capacity, MDR-TB diagnosis can be confirmed within three days compared to the earlier two to three months.

A nationwide drug resistance survey carried out in 2008 had shown an MDR-TB prevalence of 4.2% among new and 10% among previously treated cases. Myanmar is on the list of the 27 MDR-TB high-burden countries worldwide. The next nationwide DRS is planned to be conducted in 2012. The Ministry of Health has established a national committee on drug-resistant TB including hospital specialists, NTP, WHO and NGOs, to oversee the national response.

A GLC-approved project is in place and patient enrolment commenced in July 2009. Since the start of the project in 2009 till the end of August 2011, a total of 298 MDR-TB patients have initiated treatment. A total of 28 MDR-TB patients have completed the treatment out of which 71% have been cured. In April 2011, the Green Light Committee approved the expansion of MDR-TB management to treat an additional 1800 patients under the Global Fund’s Round 9 support. An MDR-TB scale-up plan has been finalized for 2011–2015. This plan aims to build capacity for diagnosis, treatment and care for 10 000 MDR–TB patients over five years. All states and regions will have diagnostic capacity through rapid DST (by Xpert MTB/RIF) and MDR-TB treatment centres.

While the national prevalence of HIV infection is estimated at 0.6%, the prevalence of HIV among TB patients was reported to be 10.4%, based on data from the annual HIV sentinel surveillance (2010). TB/HIV collaborative activities are being implemented jointly by the NTP and the National AIDS Programme in 15 sites. HIV screening for TB patients is presently available through 45 VCCT sites. ART was available for about 28 000 PLHIV by the end of 2010, provided by NAP, MSF-Holland, and various international NGOs; CPT was included in national guidelines.

A pilot project to provide IPT to PLHIV is being conducted in nine townships and 333 PLHIV are reported being provided with IPT by 2009.

A new five-year Strategic Plan 2011–2015 has been finalized with all partners. The NTP’s plan and budget are aligned with the national health sector development plan. An international review of the NTP took place in November.
2011 to assess the progress in implementing the Stop TB Strategy and in reaching the TB-related Millennium Development Goals.

In line with the global Stop TB Strategy, the NTP has engaged private providers at a nationwide scale through partnerships with the Myanmar Medical Association and the Sun Quality Health network of PSI, which together now account for 15% of TB case-finding nationally. The collaboration with private providers as well as other non-NTP providers such as NGOs and public hospitals are currently contributing close to 20% of all TB notifications. The ISTC has been endorsed by specialists and the professional associations in the country. Data management software has been implemented and central, state and divisional staff trained in data management and its use.

NTP is being supported by increased funding from the government, supplemented significantly by funding from external sources such as UNITAID, the Total/Yadana Consortium, WHO, JICA and the Japan Anti-TB Association (JATA). After the Global Fund unilaterally withdrew support to Myanmar, in 2006 the Three Diseases Fund (funding interventions for AIDS, TB and malaria) was established as a donor consortium by the European Commission and the governments of Australia, Denmark, the Netherlands, Norway, Sweden and the United Kingdom.

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) while up to US $ 37 million may be granted in Phase 2. The Three Diseases Fund agreed to continue supporting TB control efforts till the middle of 2012 to ensure coverage of essential activities not covered by the Global Fund.

**Major achievements**

- The nationwide survey of the prevalence of TB disease was successfully completed.
- The Global Fund to Fight AIDS, Tuberculosis and Malaria proposal (2011-2015) was approved and the Phase 1 grant agreement signed in November 2010. Implementation started on 1 January 2011.
- The Three Diseases Fund will support TB control efforts till mid-2012 to ensure coverage of essential activities.
- TBREACH approved three projects for accelerated TB case finding.
- The Tuberculosis National Strategic Plan for 2011–2015 was developed in collaboration with partners and was approved by the Ministry of Health.
An MDR-TB scale-up plan was developed for 2011-2015 forming part of the National Strategic Plan.

Upgrade of and implementation of newer diagnostic tools carried out in national reference laboratories in Yangon and Mandalay.

The MDR-TB pilot projects in Yangon and Mandalay, implemented by the NTP and MSF-Holland, have been successfully completed. Based on the experiences of the pilot project, the NTP is putting MDR-TB management into scale.

The involvement of private practitioners to fight TB is expanding continuously with support from Population Services International and the Myanmar Medical Association.

TB/HIV collaborative activities continued successfully and the need to scale up Activities was acknowledged by all partners working on TB and HIV/AIDS control in the country.

Guidelines on community involvement in TB prevention, care and control were developed with national and international partner organizations.

**Major challenges**

- Despite significant resources from the Global Fund to Fight AIDS, Tuberculosis and Malaria, the funding gap from 2011–2015 is about US $ 10-19 million per year. Moreover, additional funding will be needed to find the unreached TB cases and to scale-up TB/HIV collaborative activities and MDR-TB management.

- Resource mobilization needs to continue to ensure sustainability of the progress achieved by the NTP but also to expand TB control activities to newer areas.

- The National TB Prevalence Survey showed that the majority of bacteriologically-confirmed TB patients found were undetected and did not present with chronic cough. Significant efforts will be needed to increase activities to find the unreached.

- The MDR-TB pilot project is only treating a small fraction of the MDR-TB cases in the country. Major challenges are foreseen to decentralize MDR-TB management to areas other than Yangon and Mandalay.

- TB/HIV collaborative activities are only implemented in 11 out of the 325 townships in the country. It is estimated that 11% of TB patients are living with HIV/AIDS.
Activities planned for 2012

- Frameworks and scale-up plans will be developed for accelerated TB case-finding and TB/HIV collaborative activities.
- Xpert will be introduced to improve TB and MDR-TB diagnosis.
- The third drug-resistance survey will be conducted.
- Resources will be mobilized to ensure improved case-finding, TB/HIV expansion and scale-up of MDR-TB diagnosis, treatment and care.
### Estimates and notification rates for 2010, Myanmar

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>48 324 262</td>
</tr>
<tr>
<td>Incidence of all forms of TB</td>
<td>180 000 (160 000–210 000)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100 000 population per year)</td>
<td>384 (328–445)</td>
</tr>
<tr>
<td>Prevalence of all forms of TB</td>
<td>250 000 (180 000–310 000)</td>
</tr>
<tr>
<td>Prevalence rate of all forms of TB (per 100 000 population per year)</td>
<td>525 (381–643)</td>
</tr>
<tr>
<td>TB death rate (per 100 000 population per year, excluding deaths among TB/HIV coinfected)</td>
<td>41 (24–65)</td>
</tr>
<tr>
<td>Notification rate of all forms of TB (per 100 000 population for the year 2010)</td>
<td>272</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100 000 population for the year 2010)</td>
<td>88</td>
</tr>
<tr>
<td>Case detection rate (all forms of TB)</td>
<td>71 (62–84)</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2009 cohort</td>
<td>85</td>
</tr>
</tbody>
</table>

With a population of about 30 million, Nepal has an estimated incidence and prevalence of all forms of TB of respectively 163 and 238 per 100,000 population (2010). The notification rate of all forms of TB and new smear-positive cases were respectively 117 and 52, showing no significant change for the last few years, despite increased access to DOTS through decentralization of services, outreach projects and strong community involvement. In the last five or six years there has been a slight shift to the older age group, indicating a possible decline in the TB burden in Nepal in recent years. The national ARTI survey completed in 2007 was also indicative of a declining trend.

However, according to evidences currently available TB incidence 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 missing out TB cases, Nepal is planning to conduct a prevalence survey in 2012.

Treatment success rate among new smear-positive cases was 90% for the cohort of patients registered in 2009, and is consistently above target of 85% since 2001. Six months’ treatment regimen has been introduced throughout the country.

Tuberculosis control is identified as a priority programme within the Ministry of Health and Population; the NTP can count on several fully dedicated staff at the central, regional and district levels.
According to results from DRS conducted in 2007, MDR-TB prevalence is 2.9% and 11.7% among new and re-treatment cases respectively. Culture and DST facilities are provided by two quality assured laboratories: the national reference laboratories that has been recently upgraded and the GENETUP laboratory (NGO-run laboratory in public private partnership with NTP), both supported by the SNRL at Gauting, Germany.

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 culture-demonstrated 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 12 treatment and 54 sub-treatment centres offering MDR-TB treatment services through primary health-care services and health facilities managed by other sectors. Average cure rates among MDR-TB patients registered during 2005–2008 was 66.7%.

Further improvement of MDR-TB management was achieved in 2011 through the establishment of hostels for drug-resistant TB cases, and introduction of shortened treatment regimen for MDR-TB (20 months). NTP is planning to introduce electronic database for programme and cohort analysis for MDR-TB cases on treatment.

Estimated HIV prevalence among adult populations in Nepal is 0.4%. Sentinel surveys of HIV among TB patients conducted in 2006–2007 showed an HIV prevalence of 2.4%. 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.

A national infection control plan and guidelines have been developed. An assessment of needs to introduce infection control measures at selected facilities has been undertaken.

The NTP’s plan and budget are aligned with the national health sector development plan. The programme has successfully involved private practitioners in Kathmandu and Lalitpur, several NGOs, public hospitals, all 13 medical college hospitals both in the public and private sectors, and two major prisons in the country. The military hospital is also collaborating with NTP in providing TB Services.
Data management is presently paper-based; the programme is now introducing windows-based EPI centre software. The Practical Approach to Lung Health (PAL) was introduced in two districts in 2007 and the NTP expanded PAL to a total of nine districts in the country; 27 out of 977 primary health-care facilities were implementing PAL in 2010.

The NTP is heavily dependent on donor funding. The programme also received support through the GF Rounds 4 and 7 and successfully applied for NSA grant.

**Major achievements**

- Full implementation of all six components of the Stop TB Strategy.
- Successful implementation and nationwide coverage of MDR/XDR-TB management programme.
- Full DOTS health institutional coverage in the primary health system including 100% coverage in primary health care centres, health posts and 99% of the sub-health posts in the country.
- Successful resource mobilization through the GF (Rounds 4 and 7 and NSA grant) and LHL, Norway.
- Introduction of shortened (20 months) treatment regimen for MDR-TB management.
- Revision of national drug-resistant tuberculosis management.
- Revision of NTP General Manual (with introduction of childhood TB management section).
- Nationwide introduction of the six-month treatment regimen.
- Establishment of PAL in nine districts in the country.
- Development of infection control policy, strategy, plan and guidelines and resource mobilization for implementation.
- Establishment of hostels for drug-resistant TB cases.

**Major challenges**

- Programme sustainability at risk due to heavy dependence on external funding.
- Addressing operational issues of accommodation and inadequate socioeconomic support for MDR-TB cases.
Expansion of DOTS in urban areas.

Introducing infection control in TB programme setting.

**Activities planned for 2012**

- Planning and initiation of Prevalence Survey.
- Expansion of DOTS in urban areas.
- Introduction of infection control in TB programme settings.
- Expansion of PAL initiative in additional five districts.
- Expansion of TB/HIV collaborative activities.
- Introducing an electronic database for the programme and cohort analysis for MDR-TB cases enrolled for treatment.

### Case notifications by type of patients, 2010

<table>
<thead>
<tr>
<th>Type of Patient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Smear-negative</td>
<td>27%</td>
</tr>
<tr>
<td>New Smear-positive</td>
<td>44%</td>
</tr>
<tr>
<td>New Extra-pulmonary</td>
<td>20%</td>
</tr>
<tr>
<td>Relapse</td>
<td>7%</td>
</tr>
<tr>
<td>Treatment After Failure</td>
<td>1%</td>
</tr>
<tr>
<td>Treatment After Default</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
</tr>
</tbody>
</table>

### Trends in notified new smear-positive TB cases by age group among males, 2001–2010

- **0–14 years**
- **15–24 years**
- **25–34 years**
- **35–44 years**
- **45–54 years**
- **55–64 years**
- **65+ years**

### Trends in notified new smear-positive TB cases by age group among females, 2001–2010

- **0–14 years**
- **15–24 years**
- **25–34 years**
- **35–44 years**
- **45–54 years**
- **55–64 years**
- **65+ years**
Estimates and notification rates for 2010, Nepal

<table>
<thead>
<tr>
<th>Estimate / Rate</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>30 099 144</td>
</tr>
<tr>
<td>Incidence of all forms of TB</td>
<td>49 000 (40 000–58 000)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100 000 population per year)</td>
<td>163 (134–195)</td>
</tr>
<tr>
<td>Prevalence of all forms of TB</td>
<td>71 000 (29 000 –120 000)</td>
</tr>
<tr>
<td>Prevalence rate of all forms of TB (per 100 000 population per year)</td>
<td>238 (96–405)</td>
</tr>
<tr>
<td>TB death rate (per 100 000 population per year, excluding deaths among TB/HIV coinfected)</td>
<td>21 (13–31)</td>
</tr>
<tr>
<td>Notification rate of all forms of TB (per 100 000 population for the year 2010)</td>
<td>117</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100 000 population for the year 2010)</td>
<td>52</td>
</tr>
<tr>
<td>Case-detection rate (all forms of TB)</td>
<td>72 (62–84)</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2009 cohort</td>
<td>90</td>
</tr>
</tbody>
</table>

The country has an estimated population of 21 million and is among the low-TB prevalence countries in the Region.

The estimated prevalence and incidence rates of all forms of tuberculosis were respectively 101 and 66 per 100 000 population in 2010. The notification rate of all forms of TB and new smear-positive cases were respectively 48 and 22, showing slight but steady increase compared with previous years for all forms of TB. Sri Lanka reached and sustained the target of 85% treatment success rate among new smear-positive cases since 2004. Success rate was 86% for the cohort of patients registered in 2009.

The overall default rate has dropped from 15% to 4% in the last ten years, due to intensified default tracing efforts involving the district and field Public Health Inspectors (PHIs) and other categories of health staff. Innovative case-finding strategy will be implemented through TB/diabetes collaborative activities.

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

A national drug resistance survey was completed in 2006, and this confirmed the very low levels of drug resistance of 1.4% among new patients and 8.8% among previously treated cases in the country. Culture and DST is 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 re-treatment regimens, contacts of MDR-TB cases, health-care workers, HIV- infected TB cases, migrants and prisoners. MDR-TB is low: only eight cases were detected in 2010 and four of them (plus two MDR-TB suspects) were started on treatment under the GLC project. MDR-TB is diagnosed at the National Reference Laboratory which is supported by the supranational laboratory at TRC, Chennai, India. Patients are treated initially at the Central Chest Hospital after which they are referred for treatment at Chest Clinics in their respective districts. The success rate among MDR-TB cases is not yet known. National guidelines for the management of MDR-TB have been developed. The programme initiated MDR-TB case management under GLC approval with support through the Global Fund in 2010. Previously, second-line anti-TB drugs for treatment of MDR-TB cases were procured by the government from the open market.

HIV coinfection rate among TB patients is currently estimated at 0.1%. Since 1993, TB patients have been included under the HIV sentinel sero-surveillance. In 2009, of 1574 TB patients tested, none were found to be HIV-positive. In 2010, of 1015 TB patients counselled and tested for HIV, only 2 were found to be HIV-positive. A national policy for the provision of CPT and ART to HIV-positive TB patients is in place.

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 NTP. The ISTC will be used as a tool for establishing effective TB services within other sectors. There is a plan for initiation of Practical Approach to Lung Health (PAL).

The government provides the major part of funding for the TB programme, with additional resources from the Global Fund Round 6, and WHO.

**Major achievements**

- Expansion of DOTS throughout the country (100% coverage).
- Reaching and sustaining the global targets.
- Further reduction in default rates.
- Revision of the National Strategic Plan for 2012-2016.
- Development of electronic Patient Information Management System.
- Re-introduction and scaling up of the TB control activities in resettled areas of the Northern and Eastern provinces.
Establishment of systematic screening of high-risk groups (prisoners, estate population, food handlers, solid waste handlers, and diabetics).

Expansion of TB culture facilities to the regional level.

Development of infection control plan for chest clinics, TB wards and other health-care institutions.

Strengthening of an infection control at TB treatment facilities.

Refurbishment of MDR-TB ward.

Improved quality assurance of all chest clinic smear microscopy centres.

Systematic review of TB related deaths.

Strengthening links with parallel health services, the estate sector, private sector, and migration services.

Further improvement of TB/HIV collaborative activities.

Operational research on the prison community and urban TB.

**Major challenges**

- Maintaining an adequate number of human resources in the face of the high turnover of trained staff.

- Reaching the unreached population groups (e.g. population groups with limited access to services, urban slums, prison population, and population in tea and rubber estates.

- Scaling up TB control services among returning migrants and the re-settled population in the Northern and Eastern provinces.

- Addressing the high disease burden and high defaulter rate in urban areas, especially in Colombo City.

- Overcoming the TB-related stigma.

- Financial sustainability.

**Activities planned for 2012**

- Screening of tuberculosis among diabetics and diabetes among tuberculosis patients, diagnosis and management of those diseases in respective clinics.

- Improving sputum microscopy laboratory network and Introduction of new technology in laboratory diagnosis of TB and MDR-TB.
Establishment of three regional TB culture laboratories.

Capacity-building for quality testing of anti-TB drugs including fixed-dose combinations.

Capacity-building of central and district staff by training on procurement and supply management, MDR-TB, TB/HIV coinfection, computer software and data management and operational research.

Further improvement of infrastructure facilities for the delivery of quality TB services.

Developing a five-year advocacy, communication and social mobilization strategy with costed workplan.

Strengthening public-private mix 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 the existing primary health-care network. Improved defaulter tracing and contact screening through field Public Health Inspectors.

Initiating PEN-PAL as a pilot project.

Printing and distribution of manuals and guidelines.

Conduct drug resistance survey, pharmaco-vigilance survey and KAP study on TB.


Case notifications by type of patients, 2010

- New Smear-negative 21%
- New Extra-pulmonary 25%
- Relapse 2%
- Treatment After Failure 1%
- Treatment After Default 1%
- Other (unknown history of treatment) 4%
- Others 6%
- New Smear-positive 46%

Trends in TB case notifications, 2001–2010

- All Cases
- New Smear-positive

Tuberculosis Control in the South-East Asia Region 2012
Estimates and notification rates for 2010, Sri Lanka

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>21 165 871</td>
</tr>
<tr>
<td>Incidence of all forms of TB</td>
<td>14 000 (11 000–17 000)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100 000 population per year)</td>
<td>66 (54–79)</td>
</tr>
<tr>
<td>Prevalence of all forms of TB</td>
<td>21 000 (8 800–35 000)</td>
</tr>
<tr>
<td>Prevalence rate of all forms of TB (per 100 000 population per year)</td>
<td>101 (42–170)</td>
</tr>
<tr>
<td>TB death rate (per 100 000 population per year, excluding deaths among TB/HIV coinfected)</td>
<td>9.1 (5.9–13)</td>
</tr>
<tr>
<td>Notification rate of new and relapsed TB (per 100 000 population for the year 2010)</td>
<td>46</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100 000 population for the year 2010)</td>
<td>22</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 2009 cohort</td>
<td>86</td>
</tr>
</tbody>
</table>

With a population of approximately 70 million Thailand is one of the 22 high TB-burden countries. In 2010, the estimated prevalence and incidence rates of all forms of tuberculosis were 182 and 137 per 100 000 population, respectively. Thailand will conduct its second national TB prevalence survey, which will provide data that will improve current estimates and guide future TB programming. The country has achieved full DOTS coverage.

Thailand has made considerable progress in expanding and enhancing TB diagnosis and care, particularly among vulnerable populations (i.e. migrants, people living with HIV and AIDS, and populations in closed settings). However, TB services are not yet provided in all hospitals. The notification rate of all forms of TB and new smear-positive cases were respectively 94 and 48, in 2010, showing an increase compared with previous years but a slight decrease from that of 2009.

Treatment success rate among new smear-positive cases was 86% for the cohort of patients registered in 2009, reaching and overcoming for the first year the target of 85% treatment success rate. When compared with the 2008 cohort, this positive result seems to be primarily driven by defaulters and failures which decreased by about 50% and 30%, respectively. Another contributing factor to these improved results has been the completeness of reporting that was suboptimal in previous years. By targeting large urban settings such as Bangkok, non-evaluated cases decreased by 50%.

Based on a national drug-resistance survey in 2006, MDR-TB rates were reported to be 1.7 % among newly diagnosed cases and 34.5% among previously
treated cases. Thailand has an extensive and well-developed laboratory network. The capacity for first-line DST is being expanded through the establishment of culture facilities at selected regional laboratories. 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.

In 2010, all 15 established DST facilities were quality assured, but only 45 of the existing 65 culture facilities were quality assured. In 2011, it was planned to expand quality control to 100% of facilities. Laboratory strengthening is being supported through the Global Fund and Thailand MoPH and US/CDC collaboration (TUC). The national reference laboratory has capacity for second-line DST, and has recently been formally designated as the second SNRL in the South-East Asia Region. Culture, DST and second-line drugs for eligible patients (failure of initial and re-treatment regimens, contacts of MDR-TB cases, any patient commencing re-treatment regimen) are available free of cost for Thai citizens through the National Health Security Office (NHSO). With support from the Global Fund, a large number of non-Thai citizens have also been able to access TB diagnostics, care and treatment.

At present, most patients with drug-resistant tuberculosis are diagnosed and managed by university, regional/provincial and some private hospitals, which procure second-line anti-TB drugs using local resources such as the Government Pharmaceutical Organization. The Chest Institute in Bangkok is identifying rather large numbers of MDR-TB cases (40 to 50 annually) and is initiating treatment for them. Recording and reporting should be strengthened for these cases. The NTP began implementation of MDR case management in 2008; national MDR guidelines were developed and recording and reporting mechanisms modified in line with international recommendations. Due to the frequent modifications of forms, limited experience of TB programme staff in training provision and supervision, and delay in DST results, only 376 confirmed MDR-TB cases were reported to the NTP in 2009.

Out of about 100 hospitals registered by the NHSO as MDR treatment centres, four hospitals were selected as treatment centres meriting the support of the GLC approved project in 2010, funded through the Global Fund Round 8. Unfortunately, due to constraints related to adherence to GLC conditions, only nine MDR-TB cases have been enrolled. Model facilities for MDR-TB case management have been selected based on their performance in DOTS implementation, the presence of good referral systems and measures for infection control.
In the South-East Asia Region, Thailand has the highest HIV burden (an estimated 1.3% of the adult population being infected with HIV). The estimated HIV prevalence among TB cases is 17%. Substantial progress has been made in implementing TB/HIV collaborative activities throughout the country. Provider-initiated HIV testing and counselling (PITC) of TB patients has been integrated into national guidelines and is implemented throughout the country. TB/HIV collaborative activities are monitored and supervised mainly by TB programme staff. Routine HIV screening is recommended nationally for all registered TB patients. In 2010, the HIV counselling and testing rate among TB patients was 77% and 16% among all those tested were found to be HIV-positive.

Care and treatment for HIV-infected persons is highly subsidized and widely available through National health security office (NHSO) and GF-supported programs. Cotrimoxazole preventive therapy (CPT) and anti-retroviral treatment (ART) was provided to, respectively, 71% and 53% of HIV-positive TB patients. This increase reflects progress made in previous years, particularly for the provision of ART. Engagement of all care/treatment providers would be necessary to achieve the national targets of 80% and 60% respectively for CPT and ART. In 2010, the treatment success rate for smear-positive HIV coinfected TB patients was 73%. Improved identification of HIV-infected TB patients, together with effective linkage 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 antiretroviral therapy is made. In 2009, the proportion of newly diagnosed HIV patients screened for TB was 85% and the proportion diagnosed with TB was 20%.

An HRD plan has been developed and a focal point for HR designated at the central level. TB services are fully integrated within primary health care. Thailand has made remarkable progress in involving NGOs and the private sector. Recently, memoranda of understanding were signed between the National Health Security Office, Ministry of Labour, Ministry of Justice and Médecins Sans Frontières (MSF) for implementation of TB in workplaces, prisons and among migrants. The programme has involved private hospital associations, NGOs (World Vision International, American Refugee Committee, Thailand Business Coalition on AIDS to Control TB, the Raks Thai Foundation and the
National Catholic Commission on Migration) to provide TB care according to International Standards for TB Control (ISTC).

The country’s TB programme is supported mainly by the government’s budget through the National Health Security Office. Additional support has been provided by GF Round 6 and Round 8, GF Single Stream Funding, and other health partners.

**Major achievements**

- Funding from the National Health Security Office ensured to support TB activities at the provincial and local levels.
- High utilization rate for HIV/TB patients (77% of TB patients counselled and tested for HIV in 2010).
- Efforts made to enhance collaborative mechanisms between HIV-TB at the national, subnational, and provincial levels.
- Sustained TB services among marginalized populations such as migrants and cross-border populations through NGOs supported by the Global Fund.
- Sustained TB services ensured in about 140 prisons.
- Greater commitment from the Ministry of Public Health: designation of a “Mr/Ms TB” at all hospitals and provisional health offices for improved coordination and oversight.
- Managing Information for Action (MIFA) course introduced.
- Global Fund support secured through Rounds 6 and 8, and Single Streaming Funding ensured.

**Major challenges**

- Improving quality of DOTS under the decentralized health system and in large urban centres such as Bangkok.
- Further strengthening of TB/HIV integrated activities, particularly revitalization of the TB/HIV committee, intensified case-finding among known HIV-positive people and IPT.
- Better managing systematic and regular supervision of programme activities.
- Ensuring the successful revision of the national MDR guidelines and training materials to support the MDR implementation.
Effectively involving private hospitals in TB control.

Obtaining adequate commitment towards implementing TB control activities in the Bangkok Metropolitan Area.

Addressing human resource constraints at the central and regional levels.

Activities planned for 2012

- Capacity-building of village health-care volunteers in decentralized settings and in large urban centres (i.e. Bangkok) to enhance treatment adherence.
- Strengthening of regular supervision, monitoring and evaluation of the programme.
- Implementing IPT service for HIV-infected persons, after successfully implementing pilot and demonstration projects.
- Strengthening MDR-TB treatment under the programme, and negotiation with the NHSO for the procurement of second-line drugs through GLC.
- Conducting TB prevalence survey and the drug resistance survey.
- Increasing the involvement of private hospitals and ensuring that practices are in line with the national and international guidelines.
- Advocating with the Bangkok Metropolitan Administration for greater commitment to address fragmented service delivery.
- Conducting National Programme Review by the end of 2012.
### Estimates and notification rates for 2010, Thailand

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>70,277,411</td>
</tr>
<tr>
<td>Incidence of all forms of TB</td>
<td>94,000 (78,000–110,000)</td>
</tr>
<tr>
<td>Incidence rate of all forms of TB (per 100,000 population per year)</td>
<td>137 (112–163)</td>
</tr>
<tr>
<td>Prevalence of all forms of TB</td>
<td>130,000 (55,000–210,000)</td>
</tr>
<tr>
<td>Prevalence rate of all forms of TB (per 100,000 population per year)</td>
<td>182 (80–300)</td>
</tr>
<tr>
<td>TB death rate (per 100,000 population per year, excluding deaths among TB/HIV coinfected)</td>
<td>16 (10–23)</td>
</tr>
<tr>
<td>Notification rate of all forms of TB (per 100,000 population for the year 2010)</td>
<td>94</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100,000 population for the year 2010)</td>
<td>48</td>
</tr>
<tr>
<td>Case detection rate (all forms of TB)</td>
<td>70 (59–85)</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2009 cohort</td>
<td>86</td>
</tr>
</tbody>
</table>

Timor-Leste has a population of about 1.1 million. The notification rate in 2010 was very high, being 427 and 136 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 estimate of burden clearly needs to be revised upwards because they are lower than the notification rate and case-detection rate is far over 100% (133%). New estimates for the years 2005–2010 were calculated by WHO using updated methodology, but they are not reported in this report as they are based on poor assumptions and historical data. Also, these estimates have very large uncertainty intervals and do not properly reflect the considerable efforts made in the country to provide access to TB diagnosis and care.

Current TB burden estimates need to be further revised in order to describe the country situation with more reliability and accuracy. Information to improve burden estimates may come from in-depth analysis of TB case notifications over time, better application of the “onion model”, research, results of house-to-house survey of pulmonary TB carried out in 2006-2007 in the sub-district of Bazartette and the district Liquiça and additional evidence from recent prevalence studies carried out in Indonesia.

The notification rates of all forms of TB and new smear-positive cases were increasing since 2007; this reflects efforts made in TB control in recent years. Treatment success rate among new smear-positive cases was 87% for the cohort of patients registered in 2009.
The NTP has established services in all 13 districts and 65 sub-districts of the country. District TB coordinators (DTCs) are working with the district health management teams in all districts and in the 65 community health centres (CHCs) at the sub-district level. Community health centres (CHCs) 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; and all of them have been covered by external quality assurance activities. Retraining of laboratory technicians in smear microscopy and EQA took place in 2011. Timor-Leste is implementing the external quality assurance system for all microscopy centres, but the re-checking is not blinded and reporting of errors is not as per international recommendations.

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.

Four NGO facilities are providing ambulatory care and one 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 Global Fund through Round 7.

It is estimated that MDR-TB rates are 2.1% among newly diagnosed and 17% among previously treated TB cases. In 2010 there were no culture and DST facilities in the country. A Green Light Committee-approved MDR-TB case management project is in place. A small number of patients with MDR-TB, two in 2010, were identified through culture and DST conducted at the Institute of Medical and Veterinary Sciences (IVMS), Adelaide, Australia. In 2011, four patients have been enrolled on MDR-TB 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.

HIV remains relatively uncommon in Timor-Leste. In 2010, the nationwide survey based on representative samples of TB patients showed a 1.1% of TB/HIV co-infection rate; 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 in the process of being established. Initial training for staff at VCTs has been
completed and a formal mechanism for referral from VCTs to DOTS centres has been initiated.

**Major achievements**

- Continued funding under Global Fund Round 7 Phase II secured.
- Laboratory manual on smear microscopy translated in Tetum, printed and disseminated.
- Two rounds of laboratory technicians’ training conducted.
- Sample transportation to SNRL for culture and sensitivity testing strengthened.
- TB/HIV collaboration established at the national level and key staff trained.
- Local and Cuban doctors working in various health facilities trained on TB control.
- Interpersonal communication training conducted for peripheral TB staff.
- Joint NTP and WHO supervision of the districts enhanced.
- Availability of adequate quantities of first- and second-line anti-TB drugs in the country ensured.

**Major challenges**

- Improving the quality of DOTS implementation.
- Ensuring adequate access to health-care services in many remote and hilly areas.
- Overcoming high default rates, particularly in the two major towns of the country.
- Increasing community awareness about TB as well as available services.
- Improving effective collaboration between the NACP and NTP at the facility level.
- Promoting adherence to standard diagnostic and treatment practices by all levels of health staff.
- Improve access to diagnosis for DR-TB amongst re-treatment and failure cases.
- Improving drug logistics and management.
- Improving data management.
- Building adequate capacity and improving commitment of health staff at the district and sub-district level.

**Activities planned for 2012**

- Implementing the external quality assurance system for all microscopy centres.
- Revision of NTP Manual to reflect changes in international guidelines.
- Developing training modules based on the NTP guidelines.
- Training of newly trained Timor doctors from Cuba.
- Approve TB and HIV collaborative framework and policy.
- Retraining of laboratory technicians in smear microscopy and EQA.
- Continue meetings of the TB Technical Working Group and PMDT Committee.
- Continue PMDT activities.
- Improving involvement of community volunteers in TB suspect referral and DOT provision.
- Improving routine programme data recording and reporting, and feedback to districts.
- Streamlining regular supervision from the national to district level and from the district level to the sub-district level.
- Improving drug management through logistics and drug management training for DTCs.
- Improving programme management capacity at the national and district level.
Table: Estimates and notification rates for 2010, Timor Leste

<table>
<thead>
<tr>
<th>Description</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population*</td>
<td>1,127,293</td>
</tr>
<tr>
<td>Notification rate of all forms of TB (per 100,000 population for the year 2010)</td>
<td>427</td>
</tr>
<tr>
<td>Notification rate of new smear-positive cases (per 100,000 population for the year 2010)</td>
<td>136</td>
</tr>
<tr>
<td>Case detection rate (all forms of TB)</td>
<td>133**</td>
</tr>
<tr>
<td>Treatment success rate (%) of new smear-positive cases for 2009 cohort</td>
<td>87</td>
</tr>
<tr>
<td>TB death rate (per 100,000 population per year, excluding deaths among TB/HIV coinfected)</td>
<td>46 (28–79)</td>
</tr>
</tbody>
</table>


**The estimates of prevalence and incidence, and case detection rate, are the former estimates for 2007. The new estimates, as revised by WHO in 2010, are based on poor assumptions and are not reported until further revision.
MDG
Country Profiles
Situation analysis of achievement of MDGs goal 6 for tuberculosis

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

The MDG target for tuberculosis control is:

- By 2015 halt and begin to reverse the incidence of tuberculosis
- Additionally, the situation towards 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 death rate by 2015, compared with 1990 levels

For prevalence and mortality rates, trends over time from 1990 to 2010 were analyzed and projections for the years 2011–2015 were made using log-linear regression models fitted to data from 2007–2010, with the assumption that recent trends would continue.\(^1\) Trends and projections have uncertainty bands whose width reflects the quality and completeness of data on which estimates are based. For some countries, particularly for prevalence, projections are very uncertain.

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\(^1\) For details on methodology refer to Annex 1 of Global Tuberculosis Control: WHO Report 2011
For countries with poor TB burden estimates, 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 >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) is showing a declining trend from 1990 to 2010, with lesser declining slope in the last five years. According to projections till 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 to better assess achievement of prevalence target.

TB mortality rate is showing a declining trend from 1990 to 2010, with rather steep slope between 2000 and 2005, and a slighter decline afterwards. Despite progress in reducing mortality (decreased by about 25% in 2010 compared with 1990 level), according to projections, it seems unlikely that Bangladesh will reach the target of halving TB mortality by 2015 compared with 1990 baseline (Graph 2).

The analysis of trend in TB incidence from the notification data proves to be difficult due to the considerable change in case notification due to enhanced 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 in order to better assess whether Bangladesh would 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 TB programme on treatment success rate (target of 90% was steadily reached since 2004), estimated case detection of all forms of TB is still low (about 50% in 2010).
Graph 1: Trend in estimated TB prevalence rates 1990–2010 and forecast TB prevalence rates 2011–2015, Bangladesh (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015).

Graph 2: Trend in estimated TB mortality rates 1990–2010 and forecast TB prevalence rates 2011–2015, Bangladesh (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015).

Graph 3: Trend in case-notification rates (new and relapse cases, all forms) (black) and estimated TB incidence rates, 1990–2010, Bangladesh (Black line represents notification rate, violet line represents estimated incidence (including HIV), red line represents incidence of HIV-positive TB cases, shaded areas represent uncertainty bands).
TB prevalence rate shows a constant declining trend from 1990 to 2010, and Bhutan has already reached the target of halving TB prevalence by 2015 compared to the 1990 baseline (Graph 1). Projection for 2011–2015 is showing wider upper uncertainty because current prevalence estimates might be underestimated; however, even after correction of prevalence estimates upward, Bhutan is likely to reach prevalence target by 2015.

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

The analysis of trend in TB incidence from the notifications data shows a steady decline in the past decade. However, latest yearly notification data are showing increasing figures that probably depend on enhanced case finding efforts but may also reflect underestimation of real incidence level in the country (Graph 3). Estimates of incidence rate should be revised if the 2011 notification data confirms the recent increasing pattern. Despite low HIV prevalence in the population, estimates of incidence of HIV-positive TB case show slightly increasing trend that might jeopardize TB control efforts to date. Although Bhutan is well on track for the achievement of MDG target of reverting TB incidence by 2015, further efforts should be made to improve burden estimates and address new challenges in TB control.
**Graph 1:** Trend in estimated TB prevalence rates 1990–2010 and forecast TB prevalence rates 2011–2015, Bhutan (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015).

**Graph 2:** Trend in estimated TB mortality rates 1990–2010 and forecast TB prevalence rates 2011–2015, Bhutan (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015).

**Graph 3:** Trend in case-notification rates (new and relapse cases, all forms) (black) and estimated TB incidence rates, 1990–2010, Bhutan (Black line represents notification rate, violet line represents estimated incidence (including HIV), red line represents incidence of HIV-positive TB cases, shaded areas represent uncertainty bands).
Estimates for DPR Korea have not been revised in many years and are based on information that may be outdated. Uncertainty bands around best estimates are very large, even larger for projections (for mortality, the shrinking effect of uncertainty is an optical illusion related to small numbers); therefore, the analysis of TB prevalence, mortality and incidence trend need to be cautiously considered.

TB prevalence rate seems to consistently decrease since 2000, almost reaching the target of having the 1990s prevalence level in 2010 (Graph 1). Projection for 2010–2015 seems to confirm a decreasing trend, however, uncertainty is very wide, particularly the upper band, and projections could not be considered reliable.

TB mortality rate seems to sharply decrease since 1990, going beyond the target of 50% reduction of 1990 level (Graph 2). Projections until 2015 seem to confirm this achievement.

The analysis of trend in TB incidence from the notifications data proves to be difficult due to the substantial change in case notification; increased notification rate is likely to be related to enhanced case detection efforts, however there are not enough evidences to exclude parallel increase in TB incidence. 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 DPR Korea would achieve the target of reverting TB incidence trend by 2015.
Despite analysis of TB burden, indicators do not allow reliable evaluation of the likelihood to achieve MDG goals and progress toward TB control in DPR Korea are 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 2009 cohort; notification rate for smear-positive and all TB cases is steadily increasing over time, particularly in recent years. There is 1.2 microscopy laboratories per 100 000 population and one culture and DST facility has been established within the country. No indicators are available to assess implementation of TB/HIV and MDR-TB control activities.

**Graph 1:** Trend in estimated TB prevalence rates 1990–2010 and forecast TB prevalence rates 2011–2015, DPR Korea (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015)

**Graph 2:** Trend in estimated TB mortality rates 1990–2010 and forecast TB prevalence rates 2011–2015, DPR Korea (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015)

**Graph 3:** Trend in case-notification rates (new and relapse cases, all forms) (black) and estimated TB incidence rates, 1990–2010, DPR Korea (Black line represents notification rate, violet line represents estimated incidence, shaded areas represent uncertainty bands)
TB prevalence rate is showing a steady and important declining trend since 2001 (Graph 1). Projection for 2011–2015 is showing continuation of the current trend reaching a more than 50% reduction of the 1990 level by 2015. Despite large uncertainty intervals, India is likely to reach the prevalence target by 2015.

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

The analysis of trend in TB incidence from the notifications data shows that incidence started to revert in mid 2000s (Graph 3). In fact, taking into consideration efforts and achievements in TB control and recent revision of TB burden estimates, the declining trend of notification rate is considered to reflect a real decrease in TB incidence. The results for India in reaching the MDG goal related to halting and reverting TB incidence by 2015 positively reflect on the overall situation of the South-East Asia Region towards achievement of MDG goals.
Graph 1: Trend in estimated TB prevalence rates 1990–2010 and forecast TB prevalence rates 2011–2015, India (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015)\(^1\)

Graph 2: Trend in estimated TB mortality rates 1990–2010 and forecast TB prevalence rates 2011–2015, India (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015)\(^1\)

Graph 3: Trend in case-notification rates (new and relapse cases, all forms) (black) and estimated TB incidence rates, 1990–2010, India (Black line represents notification rate, violet line represents estimated incidence (including HIV), red line represents incidence of HIV-positive TB cases, shaded areas represent uncertainty bands)\(^1\)

\(^1\) All graphs are based on provisional estimates (not yet endorsed by GoI)
TB burden estimate of Indonesia should be revised in early 2012, therefore, assessment of progress towards MDG goals in this report should be considered provisional.

TB prevalence rate shows declining trend from 1995 to 2010, with smoother slope in the last five-year period. Projections for 2011-2015 is showing a further slight decline, although not sufficient to reach 50% decline compared to 1990 level (Graph 1). Uncertainty interval around estimates and projection are very large, suggesting the need for estimate revision. According to current data, Indonesia seems unlikely to achieve the prevalence reduction target by 2015.

As TB prevalence, TB mortality rates declined considerably from 1995 to 2010, with a lesser decrease in the last five years. Differently from prevalence, the mortality rate in 2010 almost reached 50% of the 1990 baseline and projections for 2015 suggest that the target of mortality reduction 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 analysis of trend in TB incidence from the notifications data proves to be difficult due to the substantial change in case-notification; increased notification rates over time are likely to be related to enhanced case-detection efforts. However, there are not enough evidences to exclude parallel increase in TB incidence that might be also supported by increased estimates of incidence of HIV-positive TB cases. 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 Indonesia would achieve the target of reverting TB incidence trend by 2015.
The TB prevalence rate in Maldives has showed a steep decline from 1990 to 1995, with reduction of prevalence to more than 50% of the 1990 level. From 1995 to 2010 further decline to a low prevalence level is observed; projections for 2010–2015 confirm that Maldives is likely to maintain prevalence rate at the low level (despite minor increase and large upper confidence interval) and achieve prevalence target by 2015 (Graph 1).

TB mortality rate follows a similar trend as the prevalence rate, with a sharp decline until 1995 and less steep but steady decrease until 2010. Projections until 2015 show a continuation of declining trends up to very low mortality rate, which is far below MDG target (Graph 2).

Incidence target was also achieved, with a steady 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 the notification rate is considered to reflect a real decrease in TB incidence.

TB epidemiology in Maldives seems to be shifting from the epidemic phase to the low endemic phase. However, efforts towards TB control should continue to be strengthened as estimated incidence is still above 20 per 100 000 population (threshold for a low incidence country). Moreover, the recording and reporting system for TB is recently having problems with timeliness and accuracy, therefore TB surveillance should be strengthened in order to reliably monitor further progress in TB control.
**Graph 1:** Trend in estimated TB prevalence rates 1990–2010 and forecast TB prevalence rates 2011–2015, Maldives (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015)

**Graph 2:** Trend in estimated TB mortality rates 1990–2010 and forecast TB prevalence rates 2011–2015, Maldives (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015)

**Graph 3:** Trend in case-notification rates (new and relapse cases, all forms) (black) and estimated TB incidence rates, 1990–2010, Maldives (Black line represents notification rate, violet line represents estimated incidence, shaded areas represent uncertainty bands)
The TB prevalence rate has a rather flat trend until 2000 and decreases afterwards. Projections for 2011–2015 suggest that Myanmar is unlikely to achieve 50% reduction of 1990 prevalence level by 2015 (Graph 1). However, except for 2009–2010 figures, prevalence estimates and projection are very imprecise, with large uncertainty bands, making difficult a reliable assessment of country situation in regard to the prevalence indicator. Since Myanmar is planning to conduct another prevalence survey in 2015, prevalence trend and achievement of prevalence target would be directly measured.

TB mortality rates follow a steep declining slope from 1998 until 2010, falling to below 50% reduction of 1990 mortality baseline. Projections until 2015 describe a continuing declining trend and indicate that Myanmar could reach the target of halving 1990 mortality rate by 2015 (Graph 2).

The analysis of trend in TB incidence (of all cases and HIV-positive TB cases) from the notifications data shows that incidence slightly increased from 1990 to 2000; afterwards, due to case-detection efforts and strengthening of TB control activities, the trend started to revert and in 2010 the incidence is slightly lower than the 1990 level (Graph 3). Considering uncertainty bands around best incidence estimates, the reversion of trend is less clear and apparently increasing incidence of HIV-positive TB cases might hamper the achievement of the incidence goal. However, in the light of efforts to strengthen TB control in the country, increased case finding and addressing challenges such as TB/HIV coinfection and MDR-TB, Myanmar seems to be on track for achieving MDGs goal for incidence reduction.
**Graph 1:** Trend in estimated TB prevalence rates 1990–2010 and forecast TB prevalence rates 2011–2015, Myanmar (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015)

**Graph 2:** Trend in estimated TB mortality rates 1990–2010 and forecast TB prevalence rates 2011–2015, Myanmar (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015)

**Graph 3:** Trend in case-notification rates (new and relapse cases, all forms) (black) and estimated TB incidence rates, 1990–2010, Myanmar (Black line represents notification rate, violet line represents estimated incidence (including HIV), red line represents incidence of HIV-positive TB cases, shaded areas represent uncertainty bands)
TB prevalence rate, after a declining trend from 1990 to 2000, stabilized around 240 per 100,000 population. Projections for 2011–2015 reflect this trend and do not show any 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 indeed planning to conduct a prevalence survey in order to better understand the real burden in the country and the reasons for missing cases despite continuous efforts in expanding coverage of TB services and outreach activities. To date it seems unlikely that Nepal will achieve the target of prevalence reduction to 50% of the 1990 baseline level.

As for prevalence, TB mortality rate is also showing a rather flat trend in 2001–2010 after a declining trend from 1990 to 2000. Projections until 2015 do not suggest any further decrease. Differently from prevalence, the best estimate for 2015 projection is very close to the 1990 baseline (Graph 2). Although it is not possible to affirm that Nepal will halve mortality rate compared with the 1990 level by 2015, the country is on track to achieve the mortality reduction target. 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 to be difficult due to the 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 evidences of change in TB determinants which could have led to a significant change in TB incidence, current data were considered insufficient to determine reliable trends. 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 would achieve the target of reverting TB incidence trend by 2015.
TB prevalence rate presented a slightly declining trend from 1990 to 2010, although in the last decade the trend is fairly constant at around 100 per 100 000 population. According to projections till 2015, it seems unlikely that Sri Lanka will reach the target of halving TB prevalence by 2015 compared with the 1990 baseline (Graph 1). However, estimates and particularly projections have very large uncertainty bounds underlining the need for more accurate burden estimates to better assess achievement of prevalence target.

TB mortality rate shows a declining trend from 1990 to 2010, with minor fluctuations in the last six years. Despite progress in reducing mortality (decreased by about 20% in 2010 compared with the 1990 level), and further decreasing trend described by projections, it seems unlikely that Sri Lanka could reach the target of halving TB mortality compared with the 1990 baseline by 2015 (Graph 2).

The notification rate has been increasing from 1995 to 2000 and remained fairly stable until 2010. Implementation of DOTS in a phased manner between 1997 and 2005, phased improvement of smear diagnosis through the establishment of new laboratories and recruitment and training of staff might partly explain the slow increase in case notifications. However, in the absence of evidences of change 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 Sri Lanka would achieve the target of reverting TB incidence trend by 2015.
Graph 1: Trend in estimated TB prevalence rates 1990–2010 and forecast TB prevalence rates 2011–2015, Sri Lanka (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015).


Graph 3: Trend in case-notification rates (new and relapse cases, all forms) (black) and estimated TB incidence rates, 1990–2010, Sri Lanka (Black line represents notification rate, violet line represents estimated incidence (including HIV), red line represents incidence of HIV-positive TB cases, shaded areas represent uncertainty bands).
TB prevalence rate shows limited fluctuations between 1990 to 2010, with some increasing trend in the year 1998–1999 and slightly declining trend thereafter until 2010. Projections for 2011–2015 do not indicate any further decline, suggesting that it is unlikely that Thailand will achieve the target of prevalence reduction to 50% of 1990 baseline level (Graph 1). However, estimates and particularly projections are affected by wide uncertainty bands. The need for improving current estimates is recognized by Thailand, that is implementing a prevalence survey whose results could be used to better understand the burden of disease and revise assumptions to calculate trends over time.

TB mortality rates sharply increased in the late 1990s, and started declining afterwards until 2010. Projections for 2011–2015 show a continuation of recent declining trend although it seems unlikely in Thailand that the target of mortality reduction to 50% of the 1990 level could be reached by 2015 (Graph 2).

The analysis of trend in TB incidence from the notifications data proves to be difficult due to the substantial changes in case notification, especially between 1995 and 2000, that is most probably an artifact of changes in the reporting and recording system. After 2000, notification rates show a constant slight increase that could be related to changes in the TB programme (i.e. case-finding efforts, improvement of the quality of smear laboratories and implementation of TB/HIV
activities), but also to impact of HIV epidemic, although the latter seems to decrease from 1995 onwards. Similarly, other factors might impact TB notifications and/or incidence in the rapidly changing environment in Thailand (i.e. GDP, smoking and diabetes). Given all these factors that are difficult to quantify and disentangle, it is complex to estimate change in TB incidence. Therefore, the incidence was assumed to follow a horizontal trend going through the most recent estimate of incidence (Graph 3), until more convincing evidence becomes available. Additional information is needed in order to better assess whether Thailand would achieve the target of reverting TB incidence trend by 2015.

Graph 1: Trend in estimated TB prevalence rates 1990–2010 and forecast TB prevalence rates 2011–2015, Thailand (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015)

Graph 2: Trend in estimated TB mortality rates 1990–2010 and forecast TB prevalence rates 2011–2015, Thailand (Shaded areas represent uncertainty bands. The horizontal dashed line represents the target of a 50% reduction by 2015 compared with 1990. The other dashed lines show projections up to 2015)

Graph 3: Trend in case-notification rates (new and relapse cases, all forms) (black) and estimated TB incidence rates, 1990–2010, Thailand (Black line represents notification rate, violet line represents estimated incidence (including HIV), red line represents incidence of HIV-positive TB cases, shaded areas represent uncertainty bands)
Burden estimates for Timor-Leste have been recently revised by WHO. However, they are based on poor assumptions and historical data and they have very large uncertainty bands around best estimates, even larger for projections. The analysis of TB prevalence, mortality and incidence trend cannot be considered accurate and reliable, and it is not reported in this report.

Although it is not possible to assess the country situation toward the achievement of TB-related MDGs goals, some indicators could be considered in order to describe the efforts to control the TB burden in Timor-Leste.

Notification rate of TB cases, increased from 2002 to 2010, although the trend was not linear and the increase was more evident in the years 2004–2005 and 2009–2010. All forms of TB follow this pattern, but the increase is mainly driven by smear negative TB cases (Graph 1). Changes in case notification may have been influenced by political instability leading to flux of refugees and migration of population to the peripheral areas, although they are likely to be mainly related to case-finding efforts by national TB programme such as 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 afterwards, reaching and surpassing the former target of 85%, particularly thanks to reduction of defaulters; the country seems on track to reach the new target of 90% by 2015.
There are 1.6 laboratories with sputum smear microscopy services per 100,000 population; no culture and DST facility is available in the country but links with SNRL have been established and the transportation system for samples strengthened. To date, the percentage of previously treated TB patients tested for MDR-TB is negligible. Only 5% of notified TB patients had HIV test results recorded; although the target of 100% is still far, HIV testing among TB patients increased compared with the previous year. All detected HIV-positive TB patients were treated with ART.

Progress towards TB-related MDG goals have been made, as showed by increasing case notification and high treatment success rate. However, burden estimates should be revised in order to assess the current case-detection rate and need for DOTS expansion and enhancement. Some components of the Stop TB Plan 2011–2015, such as drug-resistant TB, TB/HIV and laboratory strengthening, are to be currently poorly implemented.
Countries in the WHO South-East Asia (SEA) Region have made significant progress towards the TB-related Millennium Development Goals (MDGs). The estimated incidence and prevalence of all forms of TB and estimated TB mortality all continue to show a downward trend. The treatment success rate among new smear-positive pulmonary TB cases has remained above 85% since 2005, and was 88% in 2010. Approximately 40% of the estimated global number of cases occur in the SEA Region (based on current estimates) as well as more that one fourth on the MDR-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 underlying weaknesses and under-financing of national health systems in general, many of which are already overstretched in terms of both infrastructure and staffing. To enable continuing scale-up of critical interventions there is an urgent need to sustain current financial commitments and to advocate for additional financial resources.