

India

India, the country with the greatest burden of TB, is also the country where the most dramatic advances are being made in DOTS expansion. Thanks to a massive recent scale-up, TB services were available to some 67% of the population by 2003, and full nationwide DOTS coverage is planned for 2005. During 2003 alone, some 250 million additional people were included and treatment provided to more than 900 000 TB patients. At the same time, there has been a considerable improvement in the level of case detection, with India making a greater contribution than any other country to the global increase in case-finding since 2000. Mobilizing all public sector health-care providers, especially medical colleges, as well as many private and other health-care providers outside the government service, has been important to achieving such swift progress, and successful efforts continue to increase their involvement. Maintaining quality during rapid growth is a priority, while addressing the urgent need for addi-

tional staff and laboratory support for the expanded services. The Indian TB control programme is outstanding not only because of the recent progress but also because it has been made at a lower than predicted cost.

System of TB control

India's Revised National TB Control Programme (locally RNTCP, hereafter NTP) was introduced on a pilot scale in 1993 and, after a period of pilot testing, was formally launched by the government in 1997. By mid-1998, the programme had expanded to serve some 20 million people. There followed a phase of rapid expansion from late 1998 so that, by 2003, the areas covered by the DOTS strategy included 778 million people (around 67% of the population).

The laboratory network currently comprises 3 national reference laboratories (these are the LRS Institute of TB and Respiratory Diseases, Delhi; the National TB Institute, Bangalore and the TB Research Centre, Chennai), 15 state laboratories, 522 district

laboratories and nearly 9000 peripheral NTP-designated microscopy centres. The national reference laboratories train state-level laboratory staff, and monitor and oversee the state laboratories. The state laboratories train district laboratory and supervisory staff, and monitor and oversee the peripheral microscopy centres; some of them perform culture and drug susceptibility testing. Sputum smear microscopy services are provided by the district and peripheral level microscopy centres.

Surveillance and monitoring

Coverage was extended by 250 million people during 2003, with more than 900 000 patients placed on DOTS treatment during that year. Based on this remarkable progress, it is planned to cover a total of 850 million people by the end of 2004 and to reach 100% coverage by October 2005. The estimated smear-positive incidence was revised on the basis of a three-year national tuberculin survey that was completed during 2003. There was a striking improvement in the DOTS case detection rate in 2003, with an estimated 47% of all new smear-positive cases in the country detected by the NTP compared with 31% in 2002, and 69% detected in the areas already covered by the DOTS programme. This increase in case detection represents 39% of the increase in cases detected by DOTS programmes worldwide, and India has made a larger contribution than any other country to the acceleration in global case-finding observed since 2000. The reported treatment success has also increased over the past three years (to 87% for 2002), despite the rapid growth of the national DOTS cohort (to more than 37 000 new smear-positive patients in 2003).

In contrast to the upward trend in case notifications seen in the NTP, the notification rate of all TB cases, from all sources in India, has been falling gradually since 1992. It remains unclear whether this downward trend

PROGRESS IN TB CONTROL IN INDIA

Indicators

DOTS treatment success, 2002 cohort	87%
DOTS case detection rate, 2003	47%
NTP budget available, 2004	100%
Government contribution to NTP budget, including loans, 2004	74%
Government contribution to total TB control costs, including loans, 2004	86%
Government health spending used for TB control, 2004	2%

Major achievements

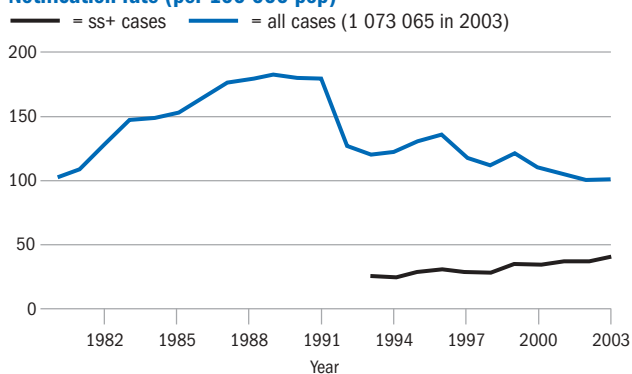
- Expansion of DOTS to cover an additional 250 million population during 2003
- Scaling up of PPM DOTS project in 12 sites
- GFATM round 1 activities started and round 2 agreement signed
- Involvement of medical colleges through national, subnational and state task forces
- Involvement of health facilities under other ministries
- Publication of new guidelines on EQA and development of a DRS protocol for two states
- Development of guidelines for management of paediatric TB

Major planned activities

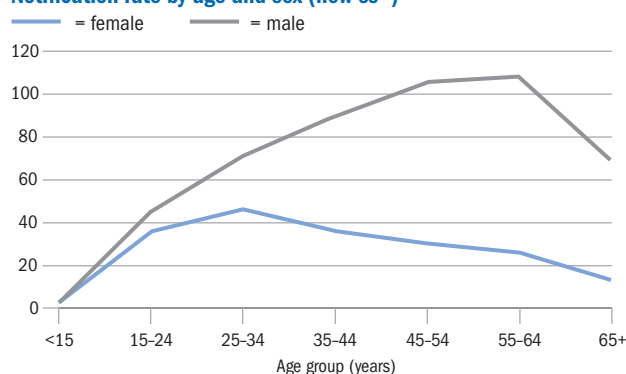
- Prepare for DOTS expansion in remaining states (laboratories, human resource, procurement) – entire country to be covered by October 2005
- Sustain quality of existing DOTS services by implementing a revised supervision and monitoring strategy
- Continue human resource capacity building through revision of all training material

LATEST ESTIMATES ^a		TRENDS	2000	2001	2002	2003
Population	1 065 462 272	DOTS coverage (%)	30	45	52	67
Global rank (by est. number of cases)	1	Notification rate (all cases/100 000 pop)	110	105	101	101
Incidence (all cases/100 000 pop/year)	168	Notification rate (new ss+/100 000 pop)	34	37	38	41
Incidence (new ss+/100 000 pop/year)	75	Detection of all cases (%)	65	63	60	60
Prevalence (all cases/100 000 pop)	290	Case detection rate (new ss+, %)	46	50	50	54
TB mortality (all cases/100 000 pop/year)	33	DOTS case detection rate (new ss+, %)	12	24	31	47
TB cases HIV+ (adults aged 15-49, %)	5.2	DOTS case detection rate (new ss+)/coverage (%)	42	53	60	69
New cases multidrug resistant (%)	3.4	DOTS treatment success (new ss+, %)	84	85	87	—

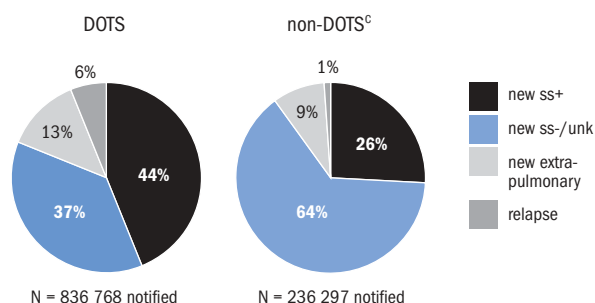
Notification rate (per 100 000 pop)



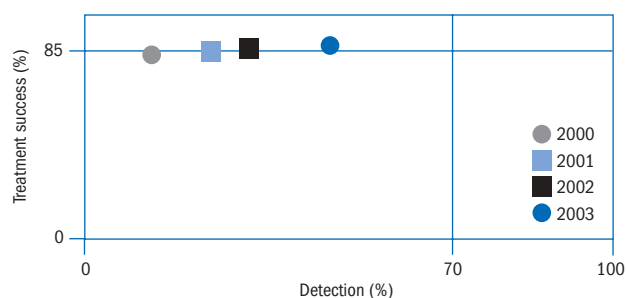
Notification rate by age and sex (new ss+)^b



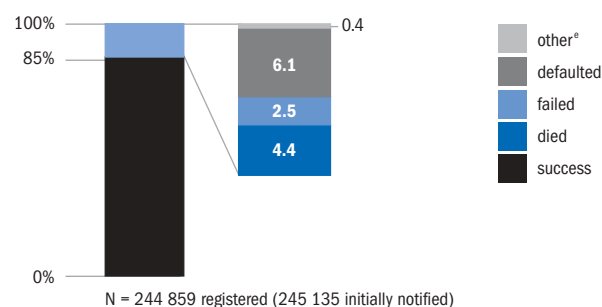
Case types notified



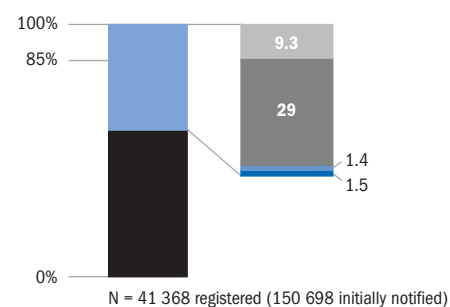
DOTS progress towards targets^d



DOTS treatment outcomes (new ss+)



Non-DOTS treatment outcomes (new ss+)



Notes

ss+ indicates smear-positive; ss-, smear-negative; pop, population; unk, unknown.

Absence of a graph indicates that the data were not available or applicable.

^a See Methods for data sources. Prevalence and mortality estimates include patients with HIV.

^b The sum of cases notified by age and sex is less than the number of new smear-positive cases notified for some countries.

^c Non-DOTS is blank for countries which are 100% DOTS, or where no non-DOTS data were reported.

^d DOTS case detection rate for given year, DOTS treatment success rate for cohort registered in previous year.

^e "Other" includes transfer out and not evaluated, still on treatment, and other unknown.

reflects a real decrease in incidence, or improvements in diagnosis (eliminating false-positives). National data for the years up to 2003 do not yet provide evidence that the NTP has reduced incidence and prevalence, although it is clear that there are significantly fewer deaths among cases notified (18 deaths averted per 100 patients treated are reported at www.tbcindia.org). The epidemiological evidence for impact is most likely to come from areas where the programme has been operating for longest and where the implementation of DOTS has been studied most intensively, notably in the "model DOTS project" being carried out by the Tuberculosis Research Centre in Chennai.

Improving programme performance

Maintaining the quality of TB services is crucial as the programme moves towards full coverage, and this will be a major challenge in the coming years. To address it, several activities are under way, including the development of guidelines for the management of paediatric TB and the introduction of a revised supervision and monitoring strategy with detailed indicators for activities at all levels.

The most important constraint to the extension of quality TB services is the shortage of staff to manage the rapidly expanding programme, particularly at central and state levels. To improve this situation, additional technical staff have been recruited to assist the NTP manager, the limits on hiring contractual laboratory technicians have been relaxed and efforts are being made to achieve an adequate distribution of laboratory technicians to states where laboratories are understaffed. Subdistrict contracted laboratory supervisors have greatly contributed to the success of the programme, and efforts will be made to sustain capacity over the next few years. Further political commitment at the state level is needed to ensure that the programme is fully staffed with stable management. The capacity of current staff will be increased through training programmes run in part by expert consultants.

It is estimated that 3.4% of previously untreated TB cases are multidrug resistant. Currently, the NTP does not supply second-line drugs for MDR-TB patients. There are plans to build capacity at the state level for DRS and DOTS-Plus. Although MDR-TB patients are not treated under the NTP, second-line drugs are widely available and used by many practitioners, both public and private.

During 2005, priority will be given to preparing the remaining districts for DOTS implementation. The preparatory activities include the improvement of laboratories and stores, recruitment, relocation and training of staff, and procurement of equipment and supplies. Some of the districts are in areas where operations are difficult to access and where intensive monitoring will be required. Funds secured through the GFATM will be used to expand the programme to cover 56 million population in all 47 districts of the three newly-created states of Chhattisgarh, Jharkhand and Uttaranchal (round 1), and 110 million population in 56 districts of the states of Bihar and Uttar Pradesh (round 2). In addition, GFATM funds will be used to maintain DOTS coverage in 110 million population in the states of Andhra Pradesh and Orissa (round 4).

Diagnostic and laboratory services, TB/HIV coordination and links with other health-care providers and the community are three priority areas to improve programme performance.

Diagnostic and laboratory services

The TB laboratory network is being strengthened to meet the needs of the expanding programme, by upgrading existing laboratories, creating new microscopy centres and establishing EQA. Based on new international guidelines, an EQA system for sputum microscopy was adopted at the beginning of 2004 for the NTP smear microscopy laboratory network, and includes a random blinded cross-check of routine slides each month. Panel testing at the district level is done by the state laboratories once a year. Currently, only NTI Bangalore and TRC Chennai are quality assured for both culture and drug susceptibility testing. The national reference labo-

ratories participate in annual proficiency testing coordinated by the Antwerp and Chennai supranational laboratories. Building capacity for DST at the intermediate laboratory level has started in two state-level laboratories in 2004 and is planned for two others by the end of the 2004; a national plan has also been developed to systematically perform DRS surveys in large states of the country.

TB/HIV coordination

An estimated 5.1 million people are infected with HIV in India. HIV is likely to have a significant impact on the TB epidemic in the six states where the prevalence of HIV is greater than 1%, namely Andhra Pradesh, Karnataka, Maharashtra, Manipur, Nagaland and Tamil Nadu. The prevalence of HIV in TB patients has been measured in a number of tertiary care hospital settings, reaching 25% in one such hospital in Pune, Maharashtra, in 2001. However, the results from such studies are not representative of the HIV levels in TB patients in India as a whole. In 2004, HIV surveillance in TB patients has started in four districts in the six high-prevalence states, using a more representative sampling methodology.

Coordination of HIV and TB services has been prioritized in the six states with the highest HIV prevalence. HIV and TB staff have been cross-trained, referral linkages between the district VCT centres of the HIV programme and microscopy centres of the DOTS programme established and a surveillance system to document cross-referrals is currently in the pilot phase. Joint HIV/TB coordination committees will be established at the national and state levels with support from GFATM, and a referral system will be created at the sub-district level between the existing NTP infrastructure and the VCT centres.

Links with other health-care providers

Private and other health-care providers, including NGOs and medical colleges, play an extremely important role in DOTS implementation in India. The Government of India has formulated and published schemes to promote participation of NGOs (2001) and pri-

vate practitioners (2002) in implementing DOTS. During the past few years, several local initiatives have emerged in both urban and rural settings; the NTP has provided drugs free of charge and has taken responsibility for supervision and monitoring of laboratory and treatment services. The evaluated initiatives have shown an increase in case notification between 3% and 30%. Most projects have also achieved treatment success greater than the programme target of 85%. Encouraged by the success of these early experiments, the NTP, in collaboration with WHO, has embarked on scaling up PPM DOTS in 14 cities across the country. The strategy is to offer technical support to the city TB control programmes to facilitate partnership development through a full-time PPM consultant assisted by two field supervisors. Future expansion of PPM DOTS will link all public, corporate, voluntary and private individual and institutional providers to the NTP. The programme has adapted the existing recording and reporting system in order to evaluate the PPM-DOTS activities. Monitoring during the two initial quarters showed that PPM-DOTS

providers other than those under the DoH contributed 39% of the cases detected under DOTS in the pilot cities. Public and private medical colleges alone accounted for 18%.

Links with the community

Community volunteers are used as DOT providers all over the country. In some parts, there has been effective involvement of the community through patient-provider-community meetings. IEC campaigns also involve the community at large, especially during events such as World TB Day.

Partnerships

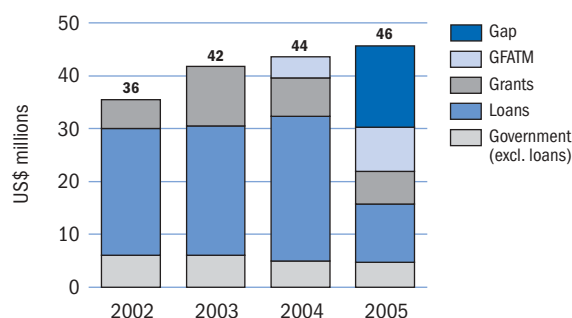
WHO has helped to establish a network of more than 85 field consultants and provides technical support for all aspects of the programme. These field consultants work with the programme managers at state and district level and report directly to the central unit of the NTP. India receives anti-TB drugs for 240 million of its population through the GDF. Financial partners include CIDA, DANIDA, DFID, GFATM, USAID and the World Bank.

Budgets and expenditures

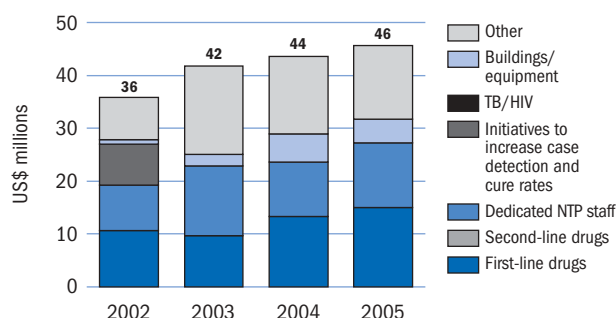
In line with the rapid DOTS expansion taking place in India, the NTP budget has increased from US\$ 36 million in 2002 to a projected US\$ 46 million in 2005. Most funding is provided by the government, through a World Bank credit and domestic government revenue. With an increase in funding from the GFATM, grants will provide about 30% of the budget in 2005. No budget gaps were reported for 2002–2004; although there is currently a funding gap of US\$ 15 million for 2005, it is expected that this will be filled by a combination of additional grants and a new World Bank credit.

The largest budget items are first-line drugs and dedicated staff, which together account for more than 50% of the total budget in each year 2002–2005. The budget per patient treated has remained stable as DOTS has expanded, at about US\$ 35–40. The same is true of total TB control costs (which include visits to health facilities and expenditures on dedicated TB hospital beds in addition to items covered by the NTP budget). The total TB control cost per patient treated has consistently remained at about

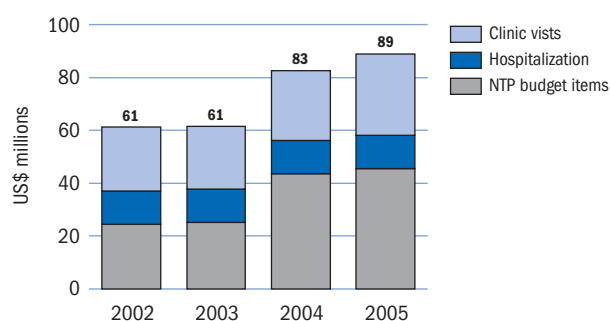
(a) NTP budget by source of funding



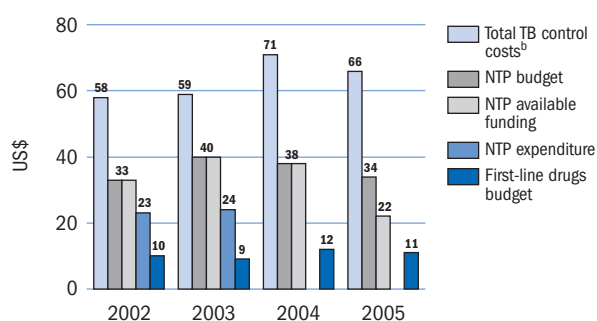
(b) NTP budget by line item^a



(c) Total TB control costs by line item^b



(d) Per patient costs, budgets, available funding and expenditures



^a TB/HIV collaborative activities and initiatives to increase case detection and cure rates are not budgeted separately, and are thus included under other budget lines.

^b Total TB control costs for 2002 and 2003 are based on expenditures, whereas those for 2004 and 2005 are based on budgets. Estimates of the costs of clinic visits and hospitalization are WHO estimates based on data provided by the NTP and from other sources. See Methods for further details.

US\$ 60–70, as total TB control costs have increased from about US\$ 60 million in 2002 to a projected US\$ 89 million in 2005; these figures may be overestimates because they assume that 75% of all DOT is undertaken at health facilities and that about 10 000 dedicated hospital beds are still being used for TB patients. In practice, community workers or volunteers may provide DOT to more than 25% of patients, at no cost to the health system, and increasing numbers of hospital beds previously dedicated to TB patients are being reallocated to other uses. A costing study will be undertaken in 2005 to further refine these estimates. While progress has been made at the planned rate, actual expenditures were lower than budgets in both 2002 and 2003, so the cost of DOTS expansion has been lower than anticipated.