

# Indonesia

Indonesia is entering a phase of rapid and comprehensive acceleration of its TB activities thanks to a substantial increase in funding for 2004 and 2005. With a fully-funded budget, many opportunities are being taken to improve surveillance, case detection and laboratory services, to extend the involvement of other health-care providers in DOTS and to improve TB/HIV coordination. A population-based TB prevalence survey was carried out in 2004; the data will provide a more accurate estimate of the national burden of TB, and provide a basis for assessing the future impact of the NTP on the TB epidemic. Although Indonesia has achieved a high level of DOTS coverage (98%), this has not yet been matched by high levels of case detection because of several factors, including a backlog of staff to be trained, suboptimal laboratory support and the lack of effective links with the hospi-

tal sector and private practitioners. Substantial improvements in the weaker areas of the programme should accrue from the greatly increased investment in the NTP.

## System of TB control

In the decentralized primary health-care system, TB control is offered through the district health services. District populations range from under 10 000 to more than 2 million, with the majority between 50 000 and 150 000.

Indonesia does not yet have a designated NRL for TB. A fully functioning national TB laboratory network is currently being developed. The existing laboratory network, which is not formally linked with the NTP, consists of microscopy health centres and independent health centres where trained laboratory staff carry out smear diagnosis. Provincial health

laboratories provide some assessments of the quality of smear microscopy, and perform culture and drug susceptibility testing on request.

## Surveillance and monitoring

Since the burden of TB has been estimated from old (>20 years) and possibly unreliable data, Indonesia carried out an important national disease prevalence survey during 2004. Analysis of the survey data was still in progress in January 2005, and it is not yet clear whether the best estimate of smear-positive prevalence for 2003 will be significantly different from the WHO estimate of 295 per 100 000 population. Because TB cases have been reported with variable effort and consistency since 1980, the notifications over time give no indication of the underlying trend in incidence. However, the higher notification rates among older men suggest that the epidemic could be in slow decline. The national HIV infection rate remains low (0.1% in adults aged 15–49 years in 2003), but HIV appears to be generating more TB cases among young adults in some parts of Java and Papua.

The very high reported DOTS coverage (98% since 2000) has not been matched by high rates of case detection, although the smear-positive case detection rate has increased markedly between 2000 (19%) and 2003 (33%). Optimizing the functional capacity of health centres plus improved collaboration between the NTP, lung clinics and a limited number of public and private hospitals contributed to this success, and further strengthening of these links is needed. The NTP DOTS programme has been recruiting smear-negative and extrapulmonary cases faster than smear-positive cases since 1995. This may be a result of the heavy reliance on X-ray diagnosis in smear-negative patients, particularly in lung clinics and lung hospitals (involvement since 2002). Among new smear-positive patients, treatment success exceeded the 85% target in

## PROGRESS IN TB CONTROL IN INDONESIA

### Indicators

DOTS treatment success, 2002 cohort	86%
DOTS case detection rate, 2003	33%
NTP budget available, 2004	100%
Government contribution to NTP budget, including loans, 2004	57%
Government contribution to total TB control costs, including loans, 2004	63%
Government health spending used for TB control, 2004	5%

### Major achievements

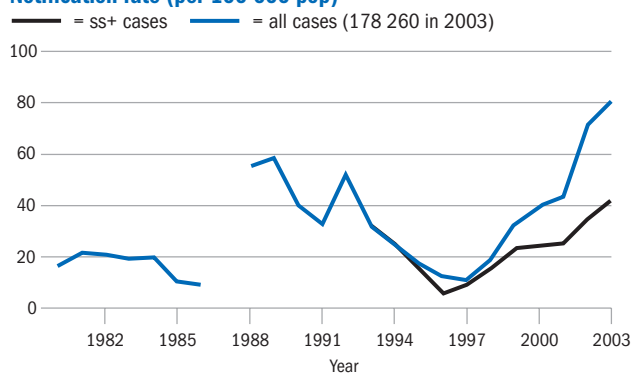
- Strengthening of management capacity by placing staff at central and provincial level
- Step-wise and cascade training as part of human resource development
- Detailed planning and budgetary exercises conducted at district level for smooth disbursement of donor funds
- Improved supervision and monitoring from central and provincial level
- Involvement of public chest clinics and limited public and private hospitals in PPM DOTS

### Major planned activities

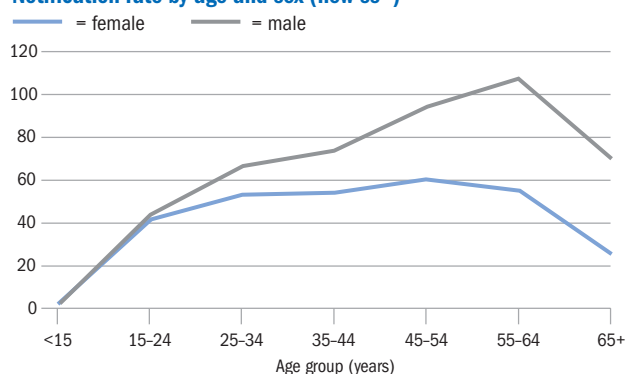
- Expand hospital DOTS linkage projects in a phased manner in all provinces and districts
- Develop and implement an advocacy and communications framework for sustaining political commitment and increasing case detection rate
- Strengthen laboratory network and cooperation between NTP and laboratory directorates at all levels, through joint planning, supervision and monitoring activities at district level
- Accelerate HR development activities by accelerating the training backlog of health-centre staff and by training staff from hospitals and other sectors

LATEST ESTIMATES <sup>a</sup>		TRENDS	2000	2001	2002	2003
<b>Population</b>	<b>219 883 460</b>	DOTS coverage (%)	98	98	98	98
Global rank (by est. number of cases)	3	Notification rate (all cases/100 000 pop)	40	43	71	81
Incidence (all cases/100 000 pop/year)	285	Notification rate (new ss+/100 000 pop)	25	25	35	42
Incidence (new ss+/100 000 pop/year)	128	Detection of all cases (%)	14	15	25	28
Prevalence (all cases/100 000 pop)	675	Case detection rate (new ss+, %)	19	20	27	33
TB mortality (all cases/100 000 pop/year)	65	DOTS case detection rate (new ss+, %)	19	20	27	33
TB cases HIV+ (adults aged 15-49, %)	0.5	DOTS case detection rate (new ss+)/coverage (%)	19	20	28	34
New cases multidrug resistant (%)	0.7	DOTS treatment success (new ss+, %)	87	86	86	—

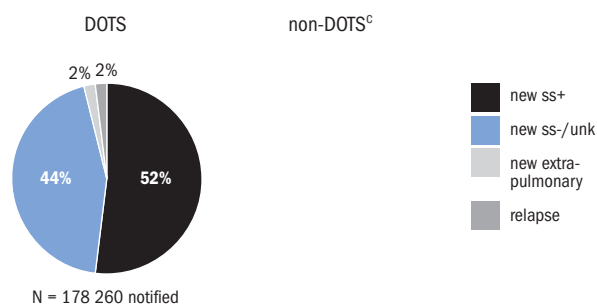
### Notification rate (per 100 000 pop)



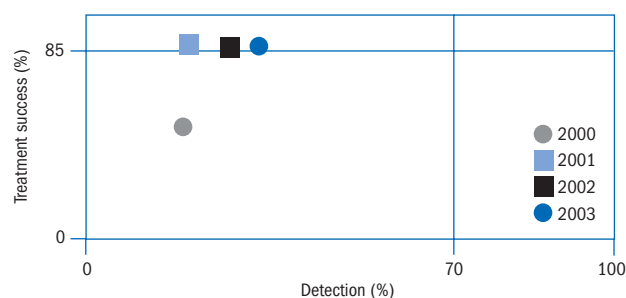
### Notification rate by age and sex (new ss+)<sup>b</sup>



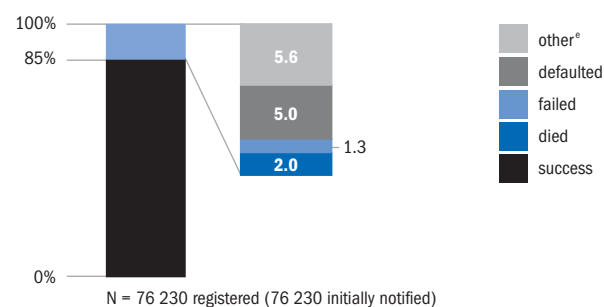
### Case types notified



### DOTS progress towards targets<sup>d</sup>



### 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.

<sup>a</sup> See Methods for data sources. Prevalence and mortality estimates include patients with HIV.

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

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

<sup>d</sup> DOTS case detection rate for given year, DOTS treatment success rate for cohort registered in previous year.

<sup>e</sup> "Other" includes transfer out and not evaluated, still on treatment, and other unknown.

the 2002 cohort. Treatment results have been consistently good since the NTP began to evaluate outcomes comprehensively in 2000, although many patients complete treatment without evidence of cure (15% in 2002). There is no evidence yet that DOTS is reducing the burden of TB in Indonesia, but the 2004 prevalence survey data will give a baseline against which performance can be assessed towards the end of the decade.

### Improving programme performance

The decentralization of health-care delivery has unfortunately had a negative effect on human resource capacity and development. Constraints include a high rotation of staff and hiring restrictions. As of December 2003, only 34% of health centre staff were adequately trained. Steps are being taken to alleviate this situation, and Indonesia was approved for additional funding through ISAC, which will help to reduce the training backlog by intensifying activities through mobile "master trainer's teams". As part of HR development, management capacity has been strengthened at the central and provincial levels during 2004, leading to a considerable improvement in supervision and monitoring by staff at these levels. Closer collaboration between the central, provincial and district health authorities is having a positive impact on TB control activities.

As a result of increased donor support and funding, Indonesia has carried out detailed planning and budgetary exercises at the district level for efficient disbursement of new funds.

Drug resistance surveillance has not yet been instituted in Indonesia. However, laboratory facilities at Surabaya have been upgraded because this laboratory will be used as the reference laboratory for future drug resistance surveys. Limited surveys in Jakarta have found MDR-TB in more than 4% of previously untreated cases; a fully representative survey is needed to determine whether this situation prevails throughout the country (the national WHO estimate is 0.7%). A survey in Central Java is planned for early 2005. There is no national policy

for the management of MDR-TB, and pulmonologists treat MDR-TB cases on an individual basis. Some of the second-line drugs are produced in the country.

### Diagnostic and laboratory services

The link between TB laboratories and the NTP remains weak but will be made stronger with the establishment of a central laboratory working group and an NRL. A national assessment carried out in November 2004 evaluated the current laboratory services and will be used to guide planning for future improvements. There is also a need to improve and strengthen the EQA system. Priorities should include training of laboratory staff and preparation of a plan and timetable to carry out training and supervision at the provincial level.

### TB/HIV coordination

Indonesia is classified as a country with low HIV prevalence but with concentrated epidemics, primarily among injecting drug users. A TB/HIV workshop was held in 2002 to consider experiences from central and provincial levels and to develop an action plan for tackling the dual epidemic. A national TB/HIV coordinating body was established and a situation analysis undertaken to assess the linkages between the HIV and TB control programmes in four provinces with high HIV burdens. Guidelines on the management of TB in PLWHA have been published and a pilot project on collaborative TB/HIV activities at the district level is in progress, with funding from WHO.

### Links with other health-care providers

Indonesia has developed a national strategy for PPM DOTS, focusing primarily on the involvement of public chest clinics and public and private hospitals. Several small-scale pilot projects have been started, and the hospital DOTS linkage project in Yogyakarta has shown a dramatic increase in case detection (>400%) since it began in 2000. Countrywide, very few general hospitals, medical colleges or prison health facilities are involved in DOTS, and there are no treatment providers outside the NTP

that notify cases. However, plans are under way to scale up the successful pilot projects and to start involving private medical practitioners in DOTS.

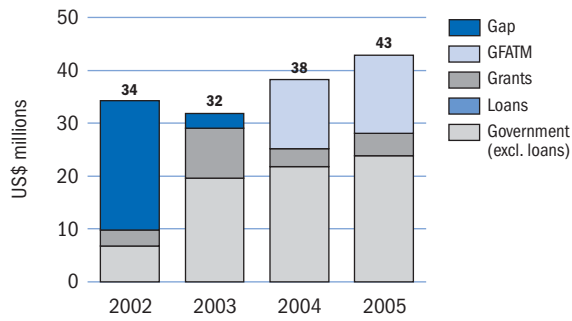
### Partnerships

KNCV and WHO are the lead technical partners in Indonesia and support all aspects of DOTS expansion activities. Other technical partners include Kuis/Johns Hopkins, MSH, NLR, TBCTA and World Vision. Major financial partners are the ADB, CIDA, the Dutch Government, GFATM and USAID. A national TB Partners forum meets three to four times a year to share information with partners and donors and to strengthen collaboration between the various participants in TB control.

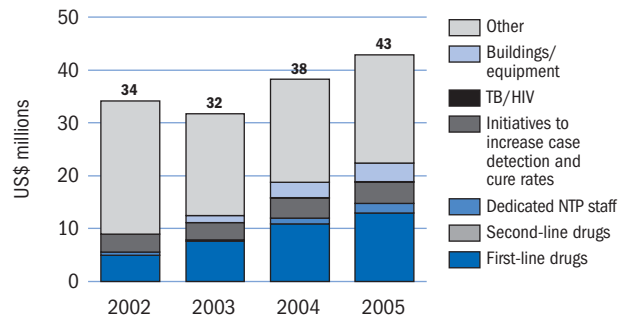
### Budgets and expenditures

Funding for TB control has improved substantially since 2002, when the NTP reported a funding gap exceeding 50% of the total budget requirement, and expenditures amounting to US\$ 18 million. Available funding more than doubled between 2002 and 2003, although a small funding gap remained. The 2004 budget was fully funded, as is the projected budget of US\$ 43 million for 2005. If the funds are fully disbursed, spending by the NTP in 2005 will more than double that in 2002. This impressive growth in funding is primarily because of a large grant from the GFATM, which will provide 34% of the NTP budget in 2005, in addition to the increase in government funding. The additional funds allow for an increase in the anti-TB drug budget, as well as more spending on initiatives to improve case detection and cure rates. As projected total case detection and total spending increase, the NTP budget and total TB control costs (i.e. the NTP budget plus estimated spending on health clinic visits not covered by the NTP budget) are expected to remain relatively constant per patient, at about US\$ 150–160 and US\$ 180, respectively. It remains to be seen whether the increased funding can be absorbed, and whether increased expenditures result in improved case detection.

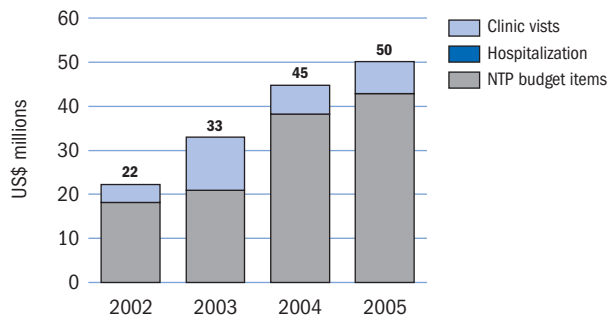
(a) NTP budget by source of funding



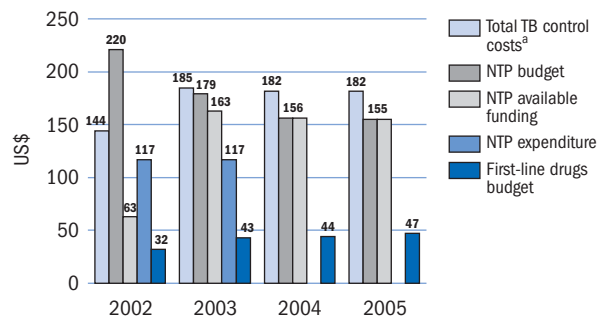
(b) NTP budget by line item



(c) Total TB control costs by line item<sup>a</sup>



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



<sup>a</sup> 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.

# Kenya

Kenya adopted the DOTS strategy in the early 1990s and achieved nationwide DOTS coverage in 1996. The diagnosis and treatment of TB are integrated into the Kenyan public health services. TB notification rates have increased five-fold in the past 10 years, the main explanation is probably the impact of the HIV epidemic, although improvements in programme performance may also have contributed; encouraging private physicians to provide DOTS services has increased case-finding in recent years. Furthermore, in collaboration with NGOs, DOTS services are being extended to remote areas, nomadic populations and urban slums. PPM-DOTS initiatives are succeeding but there is still scope to increase the involvement of community workers. An estimated 29% of TB patients are HIV-positive, and TB/HIV coinfection is now a significant problem. Kenya is actively promoting collaboration between the TB and HIV programmes, supported by the "3 by 5" initiative and funding from the President's Emer-

gency Plan for AIDS Relief. It is anticipated that up to 35% of those who start ART in the public sector will be TB patients.

## System of TB control

The NTP (known locally as the National Leprosy and TB Programme) adopted the DOTS strategy in the early 1990s, and TB diagnosis and treatment are integrated into the public health services at all levels. At the central level, the NTP develops TB control policies and offers technical assistance to health-service providers. Other central level responsibilities include surveillance, training, advocacy and resource mobilization activities.

Kenya's laboratory system includes the Central TB Reference Laboratory based at the Kenya Medical Research Institute, which functions as an NRL, four private medical laboratories in Nairobi that are able to perform culture and susceptibility testing for first-line drugs and 619 laboratories that perform smear microscopy. All public and faith-based hospitals, health

centres and some dispensaries carry out sputum microscopy. About three quarters of all registered medical laboratories in Kenya – government, NGO and private – do smear microscopy for the NTP.

## Surveillance and monitoring

The TB notification rate increased five-fold between 1980 and 2003, but the rate of increase is declining. In assessing the case detection rate, it has been assumed that the increase in case notifications reflects a real increase in incidence; it is also possible that case detection has improved in recent years. The spread of HIV infection in Kenya has almost certainly been responsible for much of the increase but also makes it difficult to estimate the true case detection rate without more detailed analysis of subnational data. The proportion of notified cases that are diagnosed as smear-positive has fallen steadily since 1995, possibly because HIV-positive people are more likely than HIV-negative people to present with smear-negative TB. A similar pattern is seen in other countries in eastern and southern Africa where the prevalence of HIV is high.

The treatment success rate in 2002 was 79%, still below the 85% target, largely because 15% of patients defaulted or were transferred to other treatment centres without follow-up, and 5% died. The loss of patients from the cohort could be associated with HIV infection but may also reflect weaknesses in programme management. For either or both of these reasons, the treatment outcomes for new smear-positive patients have not improved much since 1994. The treatment outcomes among patients registered for re-treatment following relapse were somewhat worse, and the death rate was 10%. Outcomes are not available for patients treated after failure or default.

As long as the incidence of TB remains high because of the HIV epidemic in Kenya, the epidemiological

## PROGRESS IN TB CONTROL IN KENYA

### Indicators

DOTS treatment success, 2002 cohort	79%
DOTS case detection rate, 2003	46%
NTP budget available, 2004	75%
Government contribution to NTP budget, including loans, 2004	25%
Government contribution to total TB control costs, including loans, 2004	38%
Government health spending used for TB control, 2004	7%

### Major achievements

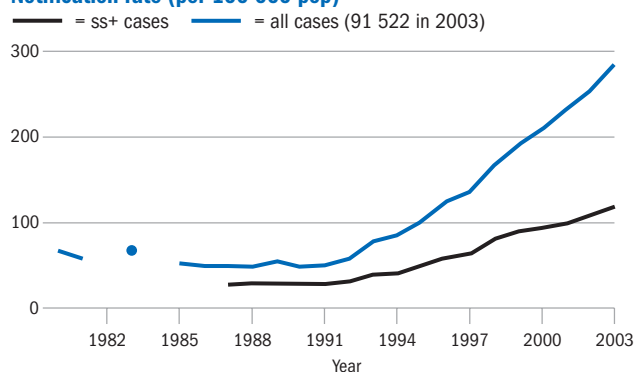
- Significant improvement in human resources capacity in the central unit
- Expansion of PPM DOTS, reinstatement of NRL, establishment of the TB/HIV coordinating body, and development of several guidelines and of the urban TB control strategy
- Secured sufficient drugs and funds for DOTS implementation and expansion
- Increased case-finding through decentralization of TB diagnostic services, coupled with improvement of diagnostic procedures
- Development and implementation of the COMBI plan that is aimed at influencing the health-seeking behaviour of the population to improve early case detection

### Major planned activities

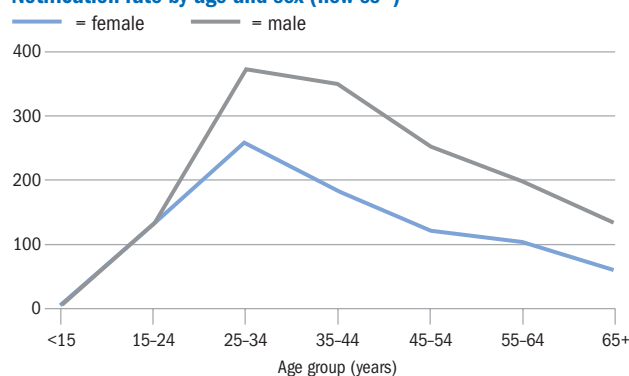
- Implement effective TB/HIV collaborative programme: VCT, co-trimoxazole preventive therapy and ART for HIV-infected TB patients
- Improve human resources by recruiting additional staff at central and peripheral levels to boost training and supervision

LATEST ESTIMATES <sup>a</sup>		TRENDS	2000	2001	2002	2003
<b>Population</b>	<b>31 987 119</b>	DOTS coverage (%)	100	100	100	100
Global rank (by est. number of cases)	10	Notification rate (all cases/100 000 pop)	210	235	254	286
Incidence (all cases/100 000 pop/year)	610	Notification rate (new ss+/100 000 pop)	94	101	109	119
Incidence (new ss+/100 000 pop/year)	262	Detection of all cases (%)	46	47	46	47
Prevalence (all cases/100 000 pop)	884	Case detection rate (new ss+, %)	48	47	46	46
TB mortality (all cases/100 000 pop/year)	133	DOTS case detection rate (new ss+, %)	44	47	46	46
TB cases HIV+ (adults aged 15-49, %)	29	DOTS case detection rate (new ss+)/coverage (%)	44	47	46	46
New cases multidrug resistant (%)	0.0	DOTS treatment success (new ss+, %)	80	80	79	—

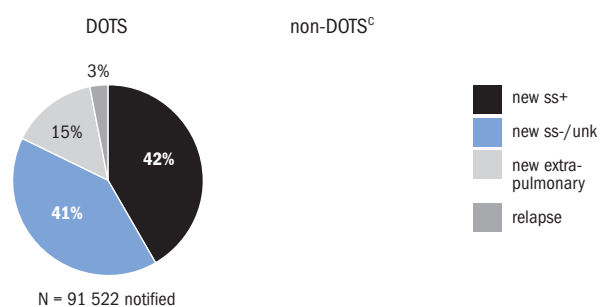
### Notification rate (per 100 000 pop)



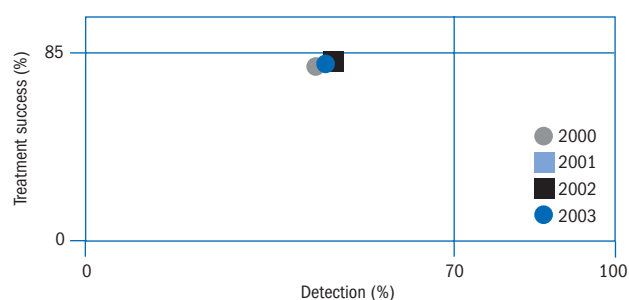
### Notification rate by age and sex (new ss+)<sup>b</sup>



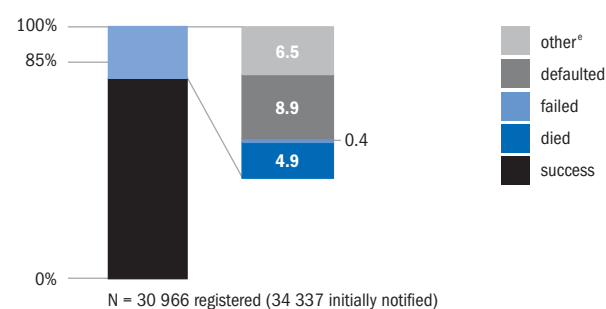
### Case types notified



### DOTS progress towards targets<sup>d</sup>



### 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.

<sup>a</sup> See Methods for data sources. Prevalence and mortality estimates include patients with HIV.

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

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

<sup>d</sup> DOTS case detection rate for given year, DOTS treatment success rate for cohort registered in previous year.

<sup>e</sup> "Other" includes transfer out and not evaluated, still on treatment, and other unknown.

impact of the DOTS programme will be hard to evaluate from routine surveillance data alone. A population-based survey of disease prevalence would give a better estimate of the current burden of TB in Kenya and provide a baseline against which to assess the future impact of control programmes.

### Improving programme performance

The Government of Kenya is committed to providing anti-TB drugs for all new patients. The NTP also receives support for drugs from the GDF. The last official data from a drug resistance survey were reported in 1995. In December 2004, the GLC approved a DOTS-Plus pilot project, with funding from the GFATM.

A national TB control plan is being developed for 2005–2010. Tuberculin surveys were carried out in 1958–1959, 1986–1990 and 1990–1995. A fourth tuberculin survey has already started, in collaboration with KNCV, and should be completed in 2006.

An urban TB control project is planned, with a focus on expanding TB services to slum populations in cities; funds from the GFATM will allow several new activities to start. Diagnostic and treatment services are expanding, and NTP activities in collaboration with the national AIDS programme, private sector representatives (physicians and pharmacies), prison authorities and selected NGOs are continuing in several districts.

The COMBI communication plan was launched in April 2004, when materials developed by several agencies were presented. A system to monitor and evaluate the implementation, distribution and impact of these materials is being established.

Three other areas in which programme performance needs to be improved are diagnostic and laboratory services, TB/HIV coordination and links with other health-care providers and the community.

#### Diagnostic and laboratory services

Expansion of the diagnostic services continues, with the number of laboratories that perform smear microscopy

increasing from 542 in 2003 to 619 in 2004. EQA for smear microscopy, in accordance with international guidelines, is being adopted for regional and district laboratories and its implementation started in May 2004 in some districts. Discussions on the establishment of a network of public and private laboratories and the inclusion of these laboratories in the existing EQA system are in progress. Major constraints for the laboratory services include inadequate human resources and an insufficient budget allocation for supervisory activities. Until 2003, the Central TB Reference Laboratory did not have a clear mandate to function as an NRL. At present, one of the main priorities for the NTP is to continue to improve the technical capacity of this laboratory. The NRL is currently equipped to carry out rapid liquid culture techniques and DST on all re-treatment cases from Nairobi as well as re-treatment and failure cases from other provinces. New laboratory guidelines for sputum examination by AFB microscopy have been developed and are to be published in 2005.

#### TB/HIV coordination

Kenya, like many other countries in sub-Saharan Africa, is severely affected by the HIV/AIDS epidemic. An estimated 29% of adult TB patients in Kenya are HIV-positive; a new survey of HIV in TB patients is planned for 2005. In 2003, a national TB/HIV coordinating body was set up, including representatives from the TB and HIV programmes, research institutions, technical agencies, donors and representatives of PLWHA. A national TB/HIV coordinator was appointed and is the secretary of the steering committee. TB/HIV activities have started in Nakuru District, and by the end of 2005, should have started in about 30 other districts.

Kenya is one of the pilot sites for the "3 by 5" initiative and is receiving funding from the President's Emergency Plan for AIDS Relief. In 2005, about 45 000 TB patients should be offered HIV testing and a package of prevention and care, including ART. It is estimated that about 35% of patients who are eligible for ART will be

identified through the TB control services. A monitoring and evaluation system for TB/HIV activities is now being developed and tested in selected districts.

#### Links with other health-care providers

An initiative to encourage private physicians to provide DOTS services in Nairobi was started in 2001 and is now being implemented in several other towns and settings. This has led to an increase in case notification rates, and treatment results have been satisfactory. Guidelines for PPM-DOTS have been developed and staff trained. Collaboration between the NTP, NGOs and a variety of public sector health providers and related institutions, including general hospitals, medical colleges and health services in refugee camps, prisons, military and the police, is still in progress.

#### Links with the community

Community-based DOTS was successfully pilot tested in Machakos District between 1998 and 2000, and 11 other districts have recently started training community volunteers. District teams, comprising nurses, social workers, health educators and public health workers, train community volunteers in increasing awareness of TB, early referral of suspects and treatment support.

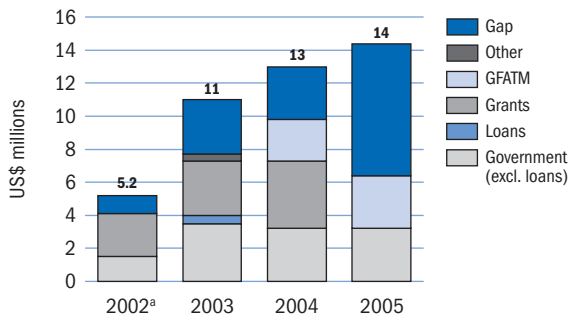
#### Partnerships

Financial support to the NTP in Kenya is mostly provided by CIDA, CDC and USAID. The NTP has a three-year agreement with the GDF for anti-TB drugs, which expired at the end of 2004. The World Bank supported the NTP through a loan for the purchase of anti-TB drugs. A GFATM grant agreement was signed in round 2 and will provide significant funding for DOTS expansion activities. KNCV and WHO are the main technical partners.

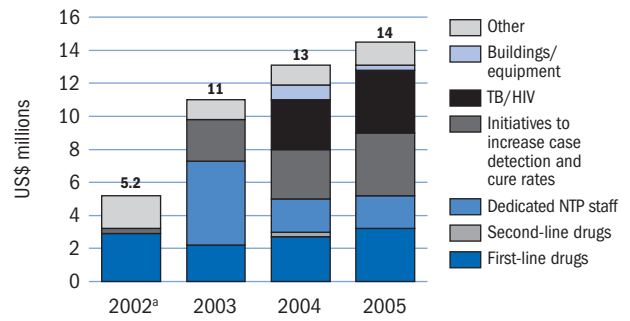
#### Budgets and expenditures

The NTP budget has increased steadily from US\$ 5.2 million in 2002 to US\$ 14 million in 2005; the budget per patient has increased from about US\$ 67 per patient in 2002 (for about 60 000 patients) to US\$ 142 per

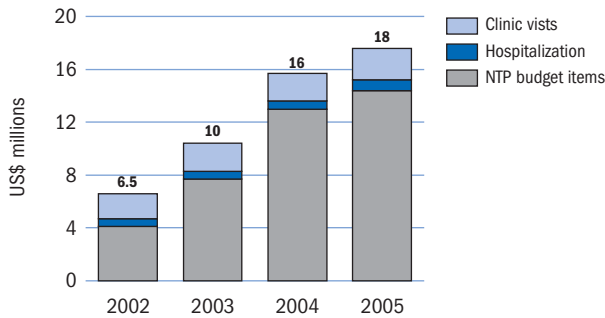
**(a) NTP budget by source of funding**



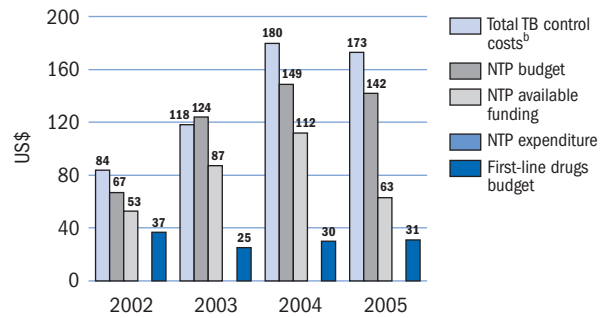
**(b) NTP budget by line item**



**(c) Total TB control costs by line item<sup>b</sup>**



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



<sup>a</sup> Does not include budget for buildings/equipment and dedicated NTP staff.

<sup>b</sup> Total TB control costs for 2002 and 2003 are based on available funding, 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.

patient in 2005 (based on a projection by the NTP that about 100 000 patients will be treated in 2005). The government contribution to the NTP budget has been fairly constant at about US\$ 3.5 million per year (although this is underestimated to some extent because funds budgeted for investment in buildings and equipment are not reflected in the NTP budget). All grants, except the GFATM grant, end in June 2005 and need to be renegotiated. This explains why a funding gap of US\$ 8 million, equivalent

to about 50% of the NTP budget, is reported for 2005. It is anticipated that external funding will be secured to reduce this gap.

The increased budgets in 2004 and 2005 are to allow increased spending on collaborative TB/HIV activities and initiatives aimed at improving case detection and cure rates. Implementation of these activities will depend on closing the funding gap. No expenditure data are available for the years 2002 or 2003.

If the NTP budget is fully funded

and the money is spent, total TB control costs (which include visits to health clinics and expenditures related to hospitalization in addition to NTP budget items) will be about US\$ 16–18 million in 2004 and 2005, or about US\$ 180 per patient treated (compared with about US\$ 120 in 2003). The increase in total costs per patient is almost entirely due to changes in costs included in the NTP budget.

# Mozambique

Mozambique has a longstanding commitment to TB control, and the DOTS strategy was introduced in all districts by 2000. Nevertheless, the NTP still faces substantial difficulties in providing adequate TB services throughout the country. Efforts are being made to strengthen the country's health infrastructure, which has suffered in the past from inadequate resources as well as the destructive effects of civil unrest and natural disasters. Despite these difficulties, TB case detection and cure rates have improved in recent years. The award of a GFATM grant will greatly increase the amount of funds available for TB control in 2005 and make it possible to address problems related to staffing, training and medical supplies and equipment. With improvements in facilities for diagnosis and patient care, case detection and cure rates should continue to improve in the next few years. Progress will be gradual because it will take time to build up the necessary cadre of well-trained staff to carry out the full programme of DOTS activities. With the help of in-

ternational partners, Mozambique is beginning to tackle the special challenges associated with high rates of Tb and HIV coinfection. The extent of MDR-TB is being investigated in a new national survey.

## System of TB control

The NTP was officially established in 1977 and consists of a central unit, 3 regional coordinators, 12 provincial coordinators and 149 health area district coordinators. There are 3 central hospitals (one in each region), 7 provincial hospitals, 27 rural hospitals and 162 health centres, all involved in DOTS implementation. There are also approximately 800 health posts, managed by rural health workers, which are not part of the DOTS programme.

The TB laboratory network has an NRL in Maputo City that performs culture and DST. There are 45 intermediate laboratories, 11 of which are located in the capital cities of the provinces, and 163 peripheral laboratories located mostly in health centres of the district capital cities. There are no

microscopy services in any of the health posts.

## Surveillance and monitoring

The total number of TB cases notified, both smear-positive and all forms, continued to increase between 2002 and 2003. The proportion of new pulmonary cases diagnosed as smear-positive was 67% in 2003. This is towards the lower end of the expected range of 65–80%, as often seen in countries with high rates of HIV infection. For Mozambique, as for some other countries in southern Africa, the accuracy of the estimated case detection rate (45% in 2003) is uncertain. The treatment success rate was 78% for the 2002 cohort and has improved each year since 1995. In 2002, 11% of patients died and 10% defaulted or were lost to follow-up after transfer to other treatment centres. Both of the latter indicators were high for patients undergoing re-treatment following relapse, failure or default; the overall re-treatment success rate was 67%. Considering progress towards the MDGs, the priority for Mozambique is to bring treatment success and case detection rates closer to target levels.

## PROGRESS IN TB CONTROL IN MOZAMBIQUE

### Indicators

DOTS treatment success, 2002 cohort	78%
DOTS detection rate, 2003	45%
NTP budget available, 2004	44%
Government contribution to NTP budget, including loans, 2004	30%
Government contribution to total TB control costs, including loans, 2004	46%
Government health spending used for TB control, 2004	6%

### Major achievements

- Implementation of a five-year strategic national plan for the NTP (2003–2008)
- Approval of GFATM funding for overall NTP strengthening, and GDF funding for FDC anti-TB drugs
- Development of a national TB/HIV collaborative project

### Major planned activities

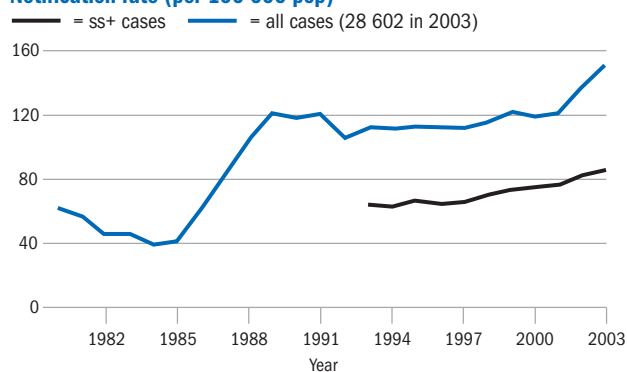
- Develop a drug management system to estimate the number of drugs and supplies needed at central and provincial level, and a plan to manage drug shortages
- Establish laboratory quality control in collaboration with provincial laboratory supervisors
- Commence collaborative TB/HIV activities in demonstration project sites, including surveillance of HIV in TB patients in 2005 and the introduction of isoniazid preventive therapy and co-trimoxazole preventive therapy

## Improving programme performance

Implementation of the NTP's five-year national strategic plan began in 2003. Financial constraints have hindered almost all aspects of programme performance in Mozambique, partly because of a change in financial transfer mechanisms at the central level. Future improvements in the programme rely heavily on the GFATM grant, which was signed in April 2004. Disbursement of funds started in September 2004 but has not yet reached the sub-recipients. However, it may prove difficult for the central unit to meet the staffing requirements needed to begin implementation of the overall GFATM plan. A number of key staff need to be recruited, including TB coordinators for the central, southern and northern regions as well as

LATEST ESTIMATES <sup>a</sup>		TRENDS	2000	2001	2002	2003
<b>Population</b>	<b>18 863 291</b>	DOTS coverage (%)	100	100	100	100
Global rank (by est. number of cases)	18	Notification rate (all cases/100 000 pop)	118	121	138	152
Incidence (all cases/100 000 pop/year)	457	Notification rate (new ss+/100 000 pop)	74	77	82	86
Incidence (new ss+/100 000 pop/year)	190	Detection of all cases (%)	30	29	32	33
Prevalence (all cases/100 000 pop)	636	Case detection rate (new ss+, %)	45	44	45	45
TB mortality (all cases/100 000 pop/year)	129	DOTS case detection rate (new ss+, %)	45	44	45	45
TB cases HIV+ (adults aged 15-49, %)	49	DOTS case detection rate (new ss+)/coverage (%)	45	44	45	45
New cases multidrug resistant (%)	3.5	DOTS treatment success (new ss+, %)	75	77	78	—

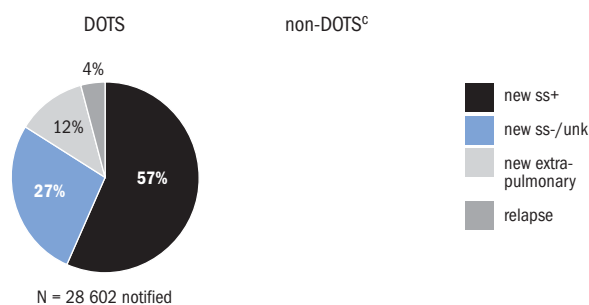
### Notification rate (per 100 000 pop)



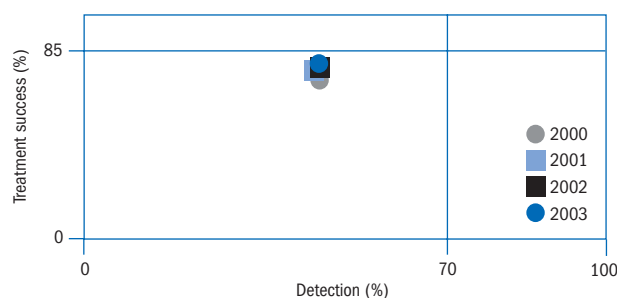
### Notification rate by age and sex (new ss+)<sup>b</sup>



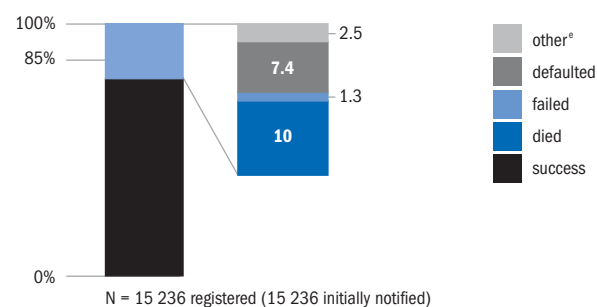
### Case types notified



### DOTS progress towards targets<sup>d</sup>



### 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.

<sup>a</sup> See Methods for data sources. Prevalence and mortality estimates include patients with HIV.

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

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

<sup>d</sup> DOTS case detection rate for given year, DOTS treatment success rate for cohort registered in previous year.

<sup>e</sup> "Other" includes transfer out and not evaluated, still on treatment, and other unknown.

technical and administrative support staff and laboratory technicians. In preparation for the GFATM grant, six TB managers were trained at the WHO Collaborating Centre for TB and Lung Disease in Sondalo, Italy, in July 2003.

In 2003 and 2004, a serious shortage of anti-TB drugs occurred because of lack of funds. In May 2004, there were no stocks of ethambutol or pyrazinamide at the central level and a severe shortage of drugs was reported in some provinces. Fortunately, a three-year grant was approved by the GDF at the time of these shortages. FDC anti-TB drugs will be procured in place of loose formulations from 2004. A drug management system will be developed with GFATM funds; this will include a simple computer spreadsheet to estimate the amount of drugs and supplies needed at the central and provincial levels, a mandatory one-year national buffer stock of drugs and laboratory reagents to be maintained at the central level, and a mechanism for responding to unforeseen shortages by mobilizing additional support.

A new national drug resistance survey is planned. The protocol has been finalized and implementation should

start in January 2005. DST is performed on isolates from patients failing re-treatment. However, no proper treatment is available for MDR-TB patients. A proposal will be submitted to the GLC in 2005.

Three other areas where programme performance needs to be improved are diagnostic and laboratory services, TB/HIV coordination and links with other health-care providers.

### Diagnostic and laboratory services

The quality of DOTS implementation is limited by the poor laboratory network. Existing laboratories are inadequately distributed throughout the country, and more than half of the population is served by health centres that are 10 km or further from a diagnostic facility. The protocol for quality assurance of smear microscopy has been finalized but was not put into practice as scheduled in January 2004 because of lack of funds. Regular laboratory supervision has also stopped due to a lack of funds. There are plans to establish laboratory quality control (LQC) in collaboration with provincial laboratory supervisors and to identify and train staff in LQC. Pro-

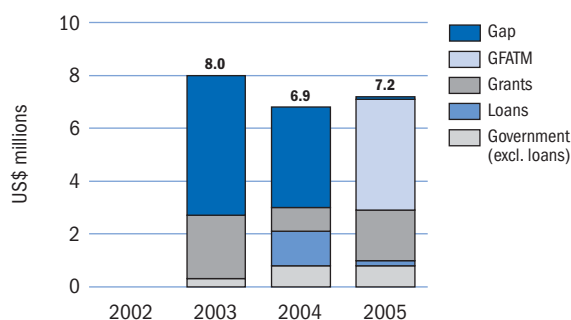
vision of culture testing and quality control call for the upgrading of laboratories in Beira (central region) and Nampula (northern region), but infrastructure improvements have been postponed until GFATM funding becomes available. The NRL will be strengthened only if funds can be obtained from sources other than the GFATM. During 2003, a number of health facilities that had been out of service were rehabilitated and several health posts upgraded to health centres with smear microscopy services.

The lack of technicians throughout the laboratory services in Mozambique will be addressed through intensified training of existing technicians and, with forthcoming funding, re-hiring of qualified technicians.

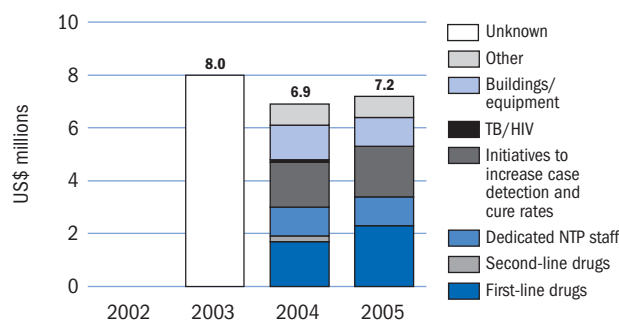
### TB/HIV coordination

A collaborative TB/HIV project (2004–2005) is being funded by WHO and USAID and implemented with support from KNCV. Good progress is being made at the central level. A TB/HIV coordinator has been recruited and a body to coordinate collaborative TB/HIV activities at all levels established. The team will oversee the develop-

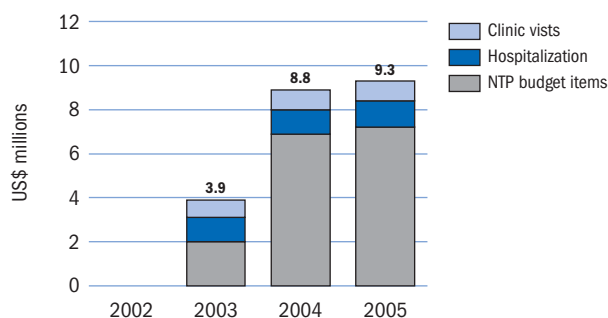
(a) NTP budget by source of funding



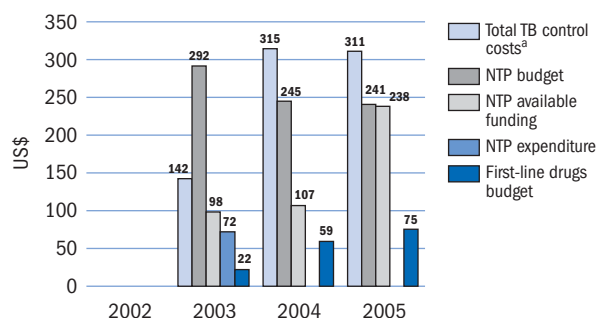
(b) NTP budget by line item



(c) Total TB control costs by line item<sup>a</sup>



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



<sup>a</sup> 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.

ment of a national policy for collaborative TB/HIV activities and its implementation, including planned demonstration projects. Planned project activities include surveillance of HIV in TB patients in 2005 and the introduction of isoniazid and co-trimoxazole preventive therapy. Training materials for TB/HIV are being developed and a workshop is planned. An important step has been the inclusion of the TB/HIV monitoring and evaluation indicators in the integrated health network system for HIV/AIDS; good progress is being made.

### *Links with other health-care providers*

Private sector involvement is restricted to a few private hospitals that diagnose and treat TB under NTP guidance. The NTP is beginning to involve medical colleges, specialist TB clinics, and prison, army and police health facilities in DOTS activities.

### **Partnerships**

External funding for TB control comes from the governments of Italy, Norway and the USA (USAID) and from the

GFATM. WHO and KNCV are the main technical partners; CARE International, CDC and MSF-Belgium/Luxembourg are additional partners in the TB/HIV project.

### **Budgets and expenditures**

The NTP budget decreased from an estimated US\$ 8.0 million in 2003 to US\$ 6.9 million in 2004. However, available funding has increased from around US\$ 3 million in 2003 to almost US\$ 7 million in 2005. This means that the funding gap has fallen from 66% of the budget in 2003 to a projected 1% of the budget in 2005. This improved funding situation is mainly a result of an increase in loans and grants, including approval of a GFATM grant in round 2. The 2005 budget will be highly dependent on external financing, with around 85% of funds provided by grants, even though the government's contribution to the NTP budget has remained constant in absolute terms.

One of the largest budget line items is first-line anti-TB drugs. This budget has been increasing in recent years

to allow creation and consolidation of a buffer stock (this is why the budget per patient for first-line drugs has increased since 2003). There has also been a large increase in the budget for initiatives to increase case detection and cure rates between 2003 and 2005. These initiatives will be scaled up once GFATM funds become available. For the first time, there is a budget for collaborative TB/HIV activities in 2004 and 2005; however, this represents only around 1% of the NTP budget.

The total TB cost per patient based on budget data is about US\$ 300 for the years 2004 and 2005. However, the total cost per patient based on actual expenditure was substantially lower in 2003 at US\$ 142 because of the large funding gap. The total annual cost of TB control (including visits to health clinics and hospitalization as well as NTP budget items) is projected to increase from US\$ 3.9 million in 2003 to US\$ 9.3 million in 2005.

# Myanmar

After a period of rapid DOTS expansion, Myanmar achieved nationwide DOTS coverage by the end of 2003. That year, more than 75 000 TB cases were reported, corresponding to a case detection rate of 73%; more than 80% of the 2002 cohort were treated successfully. With a strong national health infrastructure and government recognition of TB as a top priority, the country is now within sight of becoming the second of the current group of HBCs<sup>1</sup> to reach the global targets for DOTS implementation (after Viet Nam). Myanmar has made these commendable achievements with little external donor support. This situation will change radically with a massive

increase in funding, mainly from the GFATM. When they become accessible, these funds will provide major opportunities for capital investment in infrastructure as well as important improvements in staffing at all levels and in the quality of laboratory services. They will also enable sustainability and strengthening of all aspects of the NTP including further boosting of treatment outcomes. Several NGOs now participate in the provision of TB control services, and the NTP is promoting the involvement of other health-care providers, particularly private physicians and clinicians from large hospitals. A national TB prevalence survey would provide a more

accurate estimation of incidence and a baseline for assessing the impact of DOTS services on the TB epidemic.

## System of TB control

The NTP functions through a central level office and 12 state or divisional TB centres. There is one central drug store and two subnational stores in upper and lower Myanmar. Township hospitals serve as the DOTS treatment units, and TB registers are maintained at this level for the population in each township.

The NRL was established in 2001, and there are two subnational laboratories. Since 2003, all state and divisional laboratories participate in a quality assurance network. Sputum smear microscopy is done in 309 of 324 townships. The NRL carries out drug susceptibility testing and, together with the subnational laboratory in Mandalay, also performs culture.

## Surveillance and monitoring

The total number of reported TB cases increased from less than 15 000 in 1998 to more than 75 000 in 2003, with DOTS coverage reported to be 95% of the population during 2003 (rising to 100% towards the end of the year). During the same period, the smear-positive case detection rate increased from 29% to an estimated 73%, exceeding the 70% target. During this period of rapid DOTS expansion, the proportion of all new cases diagnosed as smear-positive fell from 68% (1998) to 36% (2003), which raises questions about the accuracy of the microscopic diagnosis. Treatment success has exceeded 80% since 1997, but moderately high default rates (9% in 2002) have limited the rate of success. As expected, the treatment success rates are somewhat lower for patients undergoing re-treatment (76% among relapses, 75% among all re-treatment cases combined). Nonetheless, on current evi-

<sup>1</sup> Peru was excluded from the original group of HBCs, having met the targets and successfully reduced incidence.

## PROGRESS IN TB CONTROL IN MYANMAR

### Indicators

DOTS treatment success, 2002 cohort	81%
DOTS case detection rate, 2003	73%
NTP budget available, 2004	34%
Government contribution to NTP budget, including loans, 2004	6%
Government contribution to total TB control costs, including loans, 2004	18%
Government health spending used for TB control, 2004	0.4%

### Major achievements

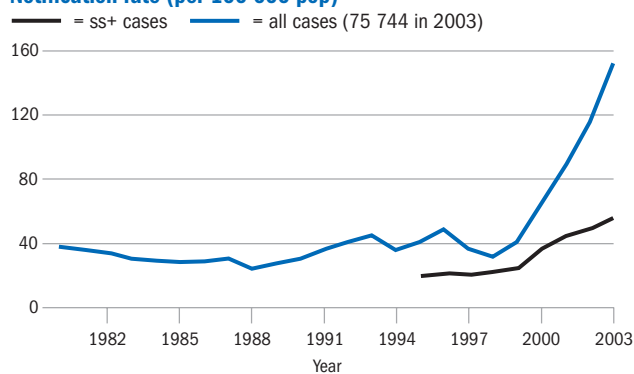
- DOTS expanded to all townships and case detection of new smear-positive patients above global target
- Operational guidelines on the involvement of private practitioners in DOTS published
- Treatment guidelines for HIV-infected TB patients published
- Nationwide introduction of FDC anti-TB drugs
- GFATM grant agreement signed in August 2004 and first funds distributed to principle recipient (UNDP)
- First nationwide drug resistance survey completed
- Technical Working Group on TB established by WHO to facilitate coordination and collaboration between agencies

### Major planned activities

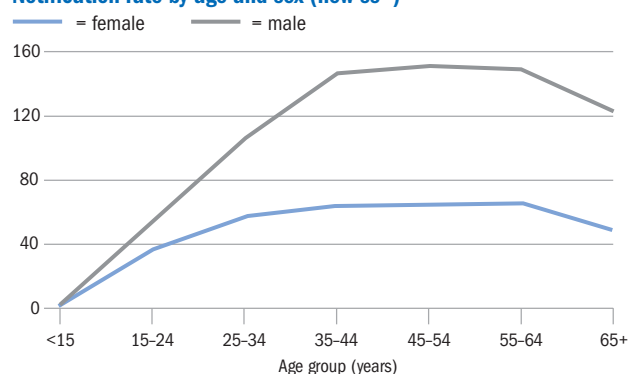
- Strengthen the national laboratory network by expanding the network of smear microscopy centres, improve quality control and upgrade the subnational laboratory in Mandalay
- Increase programme management capacity through GFATM funding (training, case management, supervision and monitoring, drug management, human resource development)
- Implement pilot project on ARV for HIV-infected TB patients in Mandalay
- Scale up PPM-DOTS projects
- Prepare 10-year plan for NTP (2006–2015), with emphasis on achievement of MDGs
- Apply to GDF for a second three-year grant
- Apply to ISAC for funding of technical assistance in GFATM project implementation

LATEST ESTIMATES <sup>a</sup>		TRENDS	2000	2001	2002	2003
<b>Population</b>	<b>49 485 491</b>	DOTS coverage (%)	77	84	88	95
Global rank (by est. number of cases)	20	Notification rate (all cases/100 000 pop)	65	89	117	153
Incidence (all cases/100 000 pop/year)	171	Notification rate (new ss+/100 000 pop)	36	44	49	55
Incidence (new ss+/100 000 pop/year)	76	Detection of all cases (%)	38	52	68	90
Prevalence (all cases/100 000 pop)	187	Case detection rate (new ss+, %)	48	58	65	73
TB mortality (all cases/100 000 pop/year)	25	DOTS case detection rate (new ss+, %)	48	56	65	73
TB cases HIV+ (adults aged 15-49, %)	6.8	DOTS case detection rate (new ss+)/coverage (%)	62	67	74	77
New cases multidrug resistant (%)	4.0	DOTS treatment success (new ss+, %)	82	81	81	—

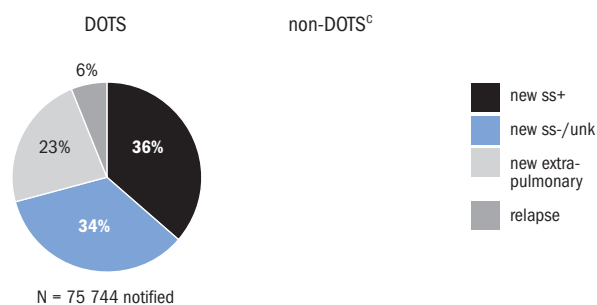
### Notification rate (per 100 000 pop)



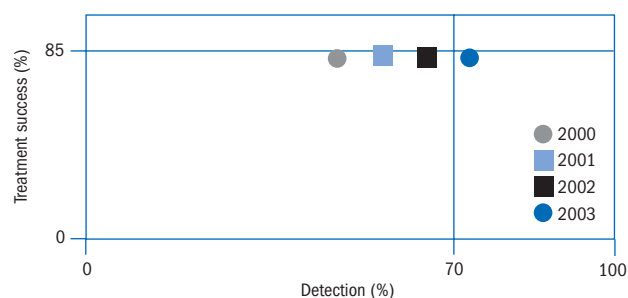
### Notification rate by age and sex (new ss+)<sup>b</sup>



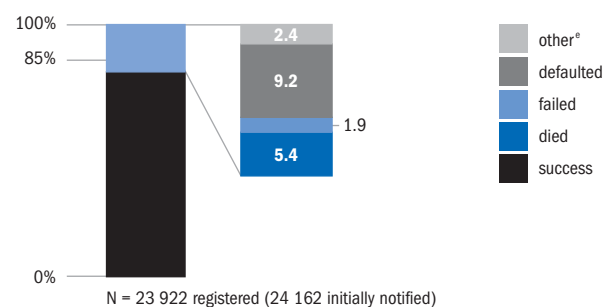
### Case types notified



### DOTS progress towards targets<sup>d</sup>



### 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.

<sup>a</sup> See Methods for data sources. Prevalence and mortality estimates include patients with HIV.

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

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

<sup>d</sup> DOTS case detection rate for given year, DOTS treatment success rate for cohort registered in previous year.

<sup>e</sup> "Other" includes transfer out and not evaluated, still on treatment, and other unknown.

dence, Myanmar is close to reaching the targets for case detection and treatment success. One important caveat is that the denominator of the case detection rate – the estimated smear-positive incidence rate – is based on disease prevalence surveys carried out up to 1994. A decade later, a new national prevalence survey would provide a valuable reassessment of the burden of TB in Myanmar, give a baseline against which to evaluate DOTS impact and yield important information about the quality of diagnosis and treatment.

### Improving programme performance

Development of human resource capacity has been strengthened, but many challenges still remain. An HR database is in place and shows that approximately a quarter of all sanctioned posts in the NTP are vacant. An HR development plan was prepared with WHO in 2003 and has already resulted in intensified training activities and the appointment of new staff. Future plans include cascade training of staff involved in TB control at all levels, including community volunteers, national NGOs and private physicians. The GFATM will support training activities and HR development; the NTP will apply for additional support through ISAC's second round of funding.

GFATM funding will also be used to increase monitoring, supervision and evaluation of programme activities and to strengthen DOTS by involving community and national NGOs and private providers, and by improving tracing of defaulters. The role of WHO will be to provide technical support to the principal recipient and subrecipients for planning, implementation and monitoring and evaluation of the TB component of the GFATM grant.

Myanmar currently receives anti-TB drugs through the GDF, which will provide a third year's supply of drugs for 2005, including a buffer stock. The GDF is considering a second term of three years beyond 2005. Following a successful pilot project to introduce FDC anti-TB drugs in the divisions of Mandalay and Yangon, all State/Divisional TB Officers were trained in FDC anti-TB drug management, and FDCs

have been introduced nationwide through cascade training of the Township Medical Officers. A nationwide drug resistance survey was completed in 2003, with the prevalence of MDR-TB among new cases estimated at 4.0%. There is no national policy on MDR-TB management; patients are treated on an individual basis.

Three other areas where programme performance needs to be improved are diagnostic and laboratory services, TB/HIV coordination and links with other health-care providers.

#### *Diagnostic and laboratory services*

Although the TB laboratory infrastructure is improving, strengthening of the national laboratory network is needed, especially the expansion of sputum smear microscopy centres, reinforcement of quality assurance at the township level and upgrading of the subnational laboratory in Mandalay. Another constraint is the shortage of qualified staff, especially junior laboratory technicians, which will be addressed as a priority for 2005. In addition, strengthening techniques for culture and drug susceptibility testing at the NRL in Yangon and the subnational laboratory in Mandalay are planned. It is also planned to introduce culture in four state/divisional laboratories in Bago, Mawlamyine, Patheingyi and Taunggyi.

#### *TB/HIV coordination*

The HIV prevalence among TB patients was estimated to be 4.5%, based on surveillance carried out in 20 sentinel sites from 1995–1997. This is lower than the current WHO estimate of 6.8%. No recent estimates from surveys are available, but a new HIV prevalence study among TB patients is planned once funding from the GFATM becomes accessible. Funding from GFATM will also support TB/HIV training for NTP staff at all levels. Political commitment has been demonstrated by the establishment by the MoH of a high-level coordinating body on TB/HIV. TB/HIV prevention and control activities were implemented in five pilot townships in 2000, including VCT for TB patients and provision of HIV education and prevention for HIV-infected TB patients. These activities were discontinued because of lack of

funding. Currently, there are limited collaborative TB/HIV activities in the country. Treatment guidelines for TB/HIV have been developed. VCT is available at a small number of VCT centres, at some drug treatment centres and at hospitals offering prevention of mother-to-child transmission programmes.

Although a supply of drugs for ART has arrived in Myanmar, ART is not yet available through the public sector. Some international NGOs such as MSF Holland and MSF Switzerland are providing ART to TB patients on a small scale. A WHO/National AIDS Programme/NTP/IUATLD/Total Exploration and Production Myanmar project will put 200 TB patients on ART in five townships in Mandalay Division in 2005. Partners within the government, and national and international NGOs have expressed interest in working with the NTP to strengthen existing TB/HIV activities and to actively engage in extending TB/HIV activities.

#### *Links with other health-care providers*

Involvement of general hospitals has increased rapidly during the past two years. In some areas, TB cases notified from general hospitals represent a substantial proportion of all cases registered under DOTS. However, a high proportion of the cases notified from hospitals are extrapulmonary or sputum smear-negative pulmonary TB, which raises some concern about the diagnostic quality in these hospitals. Involvement of army, police and prison health services has started but is still limited.

The Myanmar NTP has developed national guidelines for involvement of private practitioners in TB control. So far, two initiatives to involve private providers have been launched. In Mandalay Division, the NTP, together with the Department of Medical Research, started a project in 2002 to involve private physicians in diagnosis and treatment under the NTP. In Yangon, an international NGO (Population Services International) started implementing DOTS in 2004 as part of its existing franchising scheme, under which private physicians deliver diagnostic services at low cost and provide treatment with drugs free of charge from the NTP. Both initiatives

have contributed substantially to increased case detection in targeted townships. Several additional initiatives are planned, including a training programme for private physicians, which will be coordinated by the Myanmar Medical Association, and a joint initiative by JICA and NTP to involve private practitioners in selected townships in Mandalay and Yangon Divisions.

## Partnerships

Many national and a limited number of international NGOs work together on TB control in Myanmar. IUATLD supports operational research, TB/HIV activities including ART, and procurement of cars and laboratory equipment and supplies. WHO provides technical support and assists with HR development and procurement of drugs and laboratory supplies. JICA offers laboratory training, and anti-TB drugs are supplied by the GDF. The GFATM will soon be the main funding partner. The Country Coordination Mechanism has merged its working group with the Technical Working Group on TB hosted by WHO. The role of this working group is to support the United Nations Theme Group on Health (UNTGH) and the GFATM principal

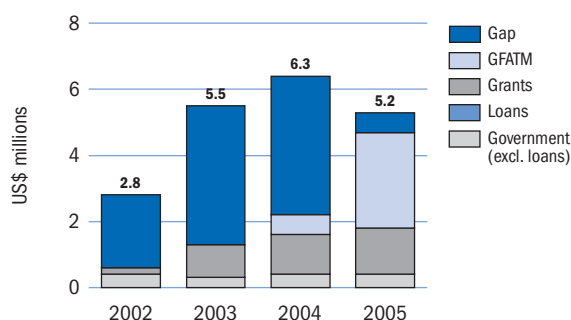
recipient, the UNDP, by providing technical advice on all aspects of the implementation of the TB control programme funded by the GFATM and by other external sources, and by coordinating all operational and technical aspects between implementing agencies.

## Budgets and expenditures

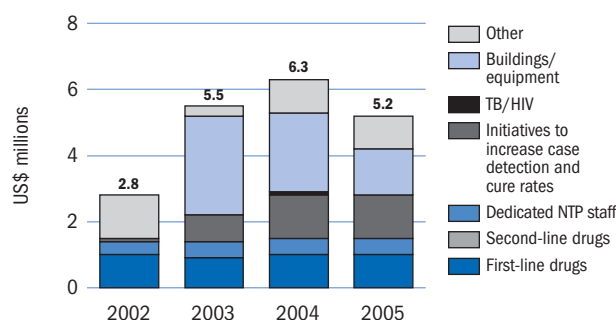
The NTP budget was around US\$ 3 million in 2002, but a large funding gap meant that actual expenditures were only around US\$ 1 million, primarily for staff and first-line drugs. The establishment of the GFATM has created new funding opportunities for the NTP, and following a successful GFATM application in 2003 the budget for 2004 was US\$ 6.3 million. It was anticipated that the GFATM would provide about US\$ 4 million of the required funds. However, because of delays in signing the initial two-year grant agreement, the first disbursement was only received by the GFATM principal recipient in September 2004, and thus a substantial funding gap remained. Provided that GFATM funds can be transferred to subrecipients and further disbursements are made according to the grant agreement, funding for the NTP will dramatically

improve in 2005, and the GFATM will be by far the most important source of financing. If this happens, funding per patient treated is likely to rise as well, from expenditures of US\$ 20 per patient in 2002 to a budget of US\$ 70 per patient in 2005. Since case detection is already high, increased funding will mainly provide for improvements in the quality of the existing infrastructure, which are needed to sustain the achievements that have already been made, and to support further improvements in case detection. Much of the increased budget in 2005 is for capital investments that will benefit patients for many years. Thus budgets for subsequent years will be lower (some of these investments were originally planned for 2004, but needed to be deferred to 2005 because of lack of funds; this explains why the budget developed for 2004 was higher than that for 2005). Costs beyond those reflected in the NTP budget are limited in Myanmar, at about US\$ 1 million per year. If the NTP budget is fully funded in 2005, total TB control costs will rise from about US\$ 2 million in 2002 and 2003 (about US\$ 30 per patient treated) to US\$ 6.1 million in 2005 (about US\$ 80 per patient treated).

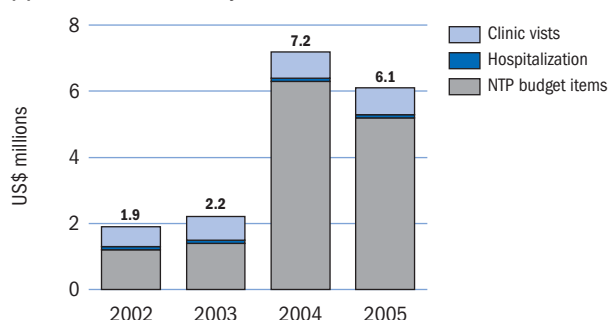
(a) NTP budget by source of funding



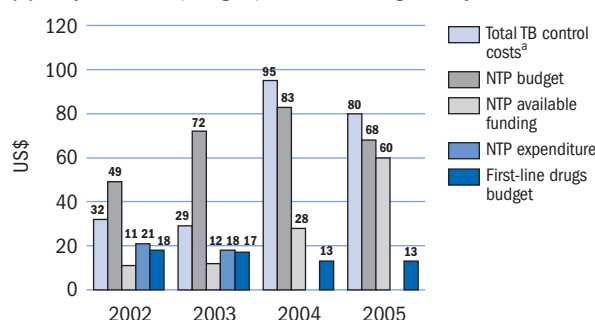
(b) NTP budget by line item



(c) Total TB control costs by line item<sup>a</sup>



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



<sup>a</sup> 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.