

Rapid DOTS expansion in India

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Abstract Since late 1998 the coverage of the DOTS strategy in India has been expanded rapidly. In both 2000 and 2001 the country probably accounted for more than half the global increase in the number of patients treated under DOTS and by early 2002 more than a million patients were being treated in this way in India. As a result, nearly 200 000 lives were saved. The lessons learnt relate to the importance of the following elements of the programme: (1) getting the science right and ensuring technical excellence; (2) building commitment and ensuring the provision of funds and flexibility in their utilization; (3) maintaining focus and priorities; (4) systematically appraising each area before starting service delivery; (5) ensuring an uninterrupted drug supply; (6) strengthening the established infrastructure and providing support for staff; (7) supporting the infrastructure required in urban areas; (8) ensuring full-time independent technical support and supervision, particularly during the initial phases of implementation; (9) monitoring intensively and giving timely feedback; and (10) continuous supervision.

Tuberculosis (TB) control still faces major challenges in India. To reach its potential, the control programme needs to: continue to expand so as to cover the remaining half of the country, much of which has a weaker health infrastructure than the areas already covered; increase its reach in the areas already covered so that a greater proportion of patients is treated; ensure sustainability; improve the patient-friendliness of services; confront TB associated with human immunodeficiency virus (HIV) infection. It is expected that HIV will increase the number of TB cases by at least 10% and by a considerably higher percentage if HIV becomes much more widespread.

India's experience shows that DOTS can achieve high case-detection and cure rates even with imperfect technology and often with an inadequate public health infrastructure. However, this can only happen if the delivery programme is appropriately designed and effectively managed.

Keywords BCG vaccine; *Mycobacterium bovis*/immunology/genetics; *Mycobacterium tuberculosis*/immunology/genetics; Drug evaluation, Preclinical; Models, Animal; Clinical trials, Phase I; Research (*source: MeSH, NLM*).

Mots clés Vaccin BCG; *Mycobacterium bovis*/immunologie/génétique; *Mycobacterium tuberculosis*/immunologie/génétique; Evaluation préclinique médicament; Modèle animal; Essai clinique phase I; Recherche (*source: MeSH, INSERM*).

Palabras clave Vacuna BCG; *Mycobacterium bovis*/inmunología/genética; *Mycobacterium tuberculosis*/inmunología/genética; Evaluación preclínica de medicamentos; Modelos animales; Ensayos clínicos fase I; Investigación (*fuentes: DeCS, BIREME*).

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Voir page 463 le résumé en français. En la página 463 figura un resumen en español.

Background

Between October 1998 and October 2001 the DOTS strategy in India increased its coverage by more than 350 million people. Access to the strategy is now provided to a population of more than 450 million. The number of patients placed on treatment per day has increased from 80 to over 1300. By early 2002 more than a million patients had been started on treatment under DOTS. This represented savings of nearly 200 000 lives and more than US\$ 400 million in indirect costs.

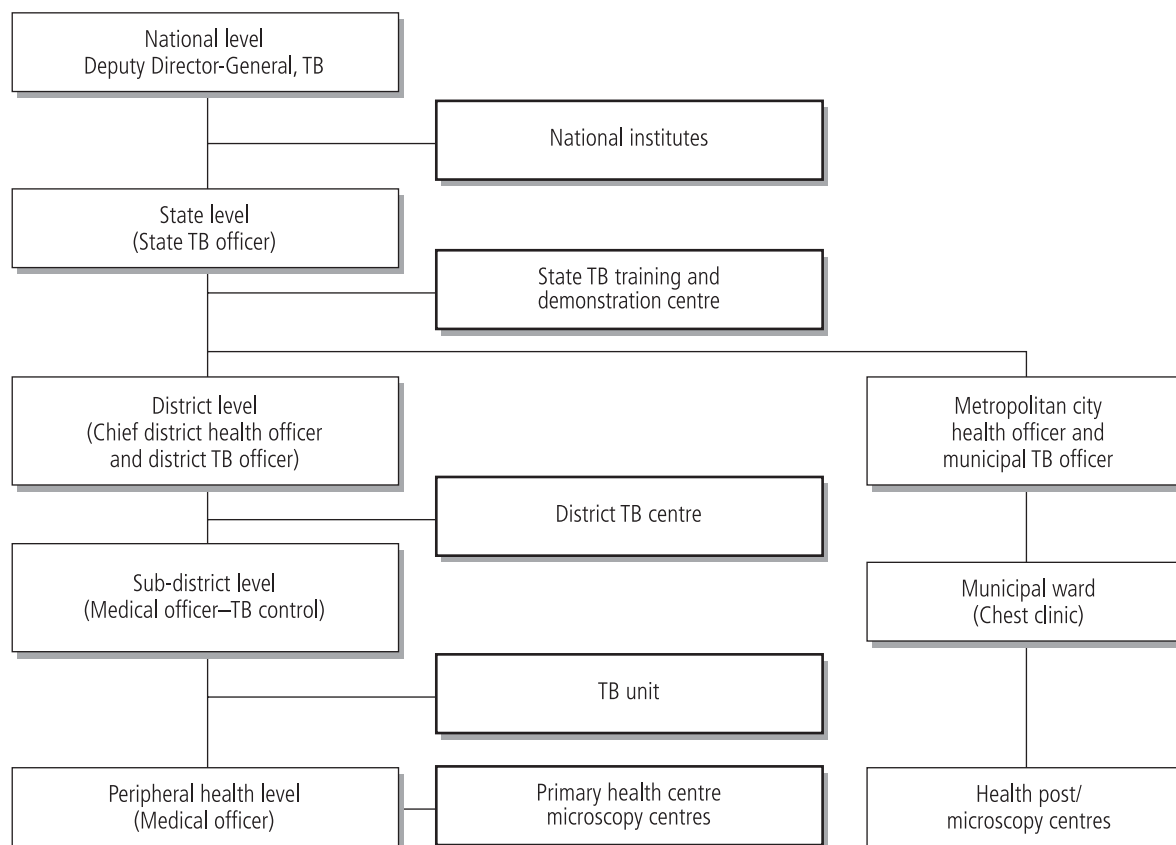
This article describes the methods, results, and lessons of this rapid expansion. Ten elements have been essential to the success and may be significant in other settings where it is desired to improve tuberculosis control or other public health services on a large scale. However, it is important to note that much remains to be done in tuberculosis (TB) control in India.

The DOTS strategy is effective but not easy to implement. Diagnosis requires multiple visits to a health facility. Use of microscopy requires trained technicians, a regular supply of reagents of good quality, a satisfactory microscope, and, ideally, a reliable electricity supply. Treatment requires the availability of a range of drugs for at least six months. Minor adverse effects of drugs are common. Record-keeping is simple but requires training and supervision. Thus, although TB control is inexpensive and effective, it is more complex than some other public health programmes, e.g. immunization. Furthermore, TB disproportionately affects the poorer segments of society. Many TB patients die in remote areas away from hospitals. The low visibility of the disease and its disproportionately high risk to the poor often result in low priority being given to anti-TB programmes. The establish-

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Fig. 1. Schema showing organization of the tuberculosis programme (TB) in India



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ment of TB control services is more difficult and often less popular than the provision of some other services.

Current status of DOTS in India

India consists of 35 States or Union Territories. These are divided into more than 550 districts, each with an average population of 2 million. Fig. 1 shows the organization of TB control in the country.

The Revised National Tuberculosis Control Programme, implementing the DOTS strategy, began on a pilot basis in October 1993. Gradual growth until late 1998 was followed by large-scale implementation. As of December 2001 the DOTS programme covered more than 450 million people (Fig. 2). By late 2001 more than 5000 persons were being evaluated for TB every day and 1300 patients were being placed on treatment daily in the areas covered. In order to prepare for service delivery on this scale, more than 3000 small laboratories were upgraded, 2500 contractual staff were hired, nearly 200 000 health workers were trained and more than 500 million tablets of anti-TB medication were purchased and distributed. Most of these activities were completed during 2000–1. The quality of diagnosis is good: only 5% of districts have an unexpectedly high proportion of cases that are not confirmed in a laboratory. This contrasts with the previous programme, in which diagnosis was of poor quality in nearly all districts. The results of treatment results are acceptable: cure rates exceed 80% and the treatment success rate is 83%, slightly below the global target of 85% (Fig. 3). Detection rates

in DOTS areas are 55–60% of the estimated new infectious cases, somewhat below the global target of 70% (Fig. 4). The States of Rajasthan, Kerala and Himachal Pradesh (populations, 56 million, 32 million and 6 million, respectively) are close to achieving the global control targets. Conservative estimates suggest that the implementation of the Revised National Tuberculosis Control Programme has produced net savings of more than US\$ 400 million and that effective nationwide implementation by 2005 would save more than US\$ 27 billion by 2020 (1).

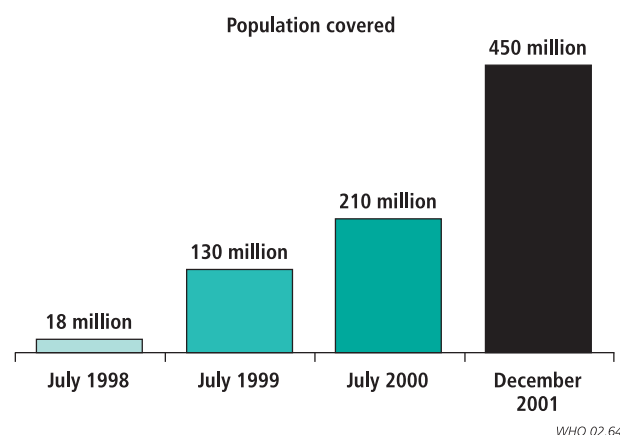
Ten elements contributing to success

The application of the following principles has contributed to the success achieved with the DOTS strategy.

1. Getting the science right and ensuring technical excellence

The importance of technical excellence cannot be overestimated. Before embarking on large-scale expansion, all technical policies and detailed training modules for every level of staff were written, extensively revised, field tested over a period of several years, finalized, and disseminated widely (2). This ensured that the technical policies were appropriate and that there was a sense of ownership among key individuals throughout the country. Furthermore, the content of the technical policies is important. In India, as in China, all treatment is given on an intermittent basis. Intermittent treatment is as effective as daily treatment (3) and greatly

Fig. 2. Expansion of Revised National Tuberculosis Control Programme, India, 1998–2001



facilitates direct observation for both patients and staff. All treatment is directly observed by someone outside the family of the person being treated. We consider that the observation of treatment by family members is often ineffective and that its use may undermine TB control. This was found in detailed studies conducted in India in the 1950s and 1960s (4) and was reported more recently in Nepal (5).

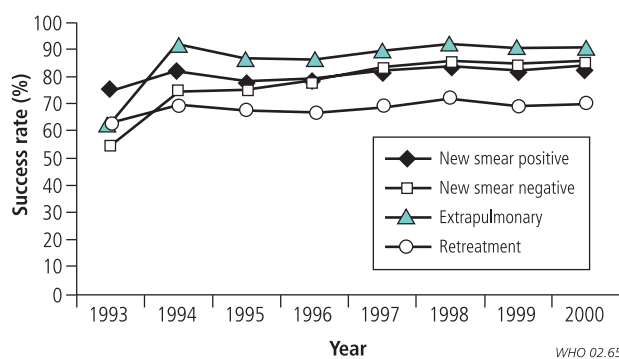
2. Building commitment and ensuring the provision of funds and flexibility in their utilization

Government commitment is the engine that drives any health programme. Commitment to a public health programme inevitably waxes and wanes; it must be built gradually. Starting with a coherent policy basis and effective pilot programmes, the project gained the support of widening and successive groups of policy-makers. The strong Central Tuberculosis Division, guiding policy and giving technical guidance to the programme, has played a vital role. Regular interaction among all levels of staff has led to the creation of a large body of highly skilled, motivated and accountable workers.

Funding from the World Bank in the form of a soft (low-interest) credit of US\$ 142 million over five years has been very important in ensuring the availability of funds and budgetary allocations for TB control. Funds are also provided by bilateral donors, WHO, and India's central and state governments. Implementation has proved much less expensive than initially anticipated. Less than 30% of the total credit has been spent so far, allowing further expansion without increased funding. The costs of the programme have been consistently low, with lower-than-expected unit cost of drugs and microscopes. A full course of anti-TB drugs costs less than US\$ 7 per patient. The total programme expenditure has been approximately US\$ 0.05 per person covered per year.

It is essential that funds be properly used. In India's TB control programme, as in the country's programmes for blindness control, leprosy elimination and control of acquired immunodeficiency syndrome (AIDS), funds are released to registered state and district societies, which are nongovernmental organizations, rather than to state and district governments. TB control societies include members from civil society and each is chaired by the administrative director of the district concerned. The TB officer serves as secretary. The state and district societies make decisions on budget formulation, hire contractual staff, purchase whatever items are necessary, oversee programme

Fig. 3. Success rate among tuberculosis patients in the Revised National Tuberculosis Control Programme, India, 1993–2000



planning, implementation and monitoring, and perform other functions. This greatly facilitates the work of the programme. The societies have some flexibility in the use of funds.

3. Maintaining focus and priorities

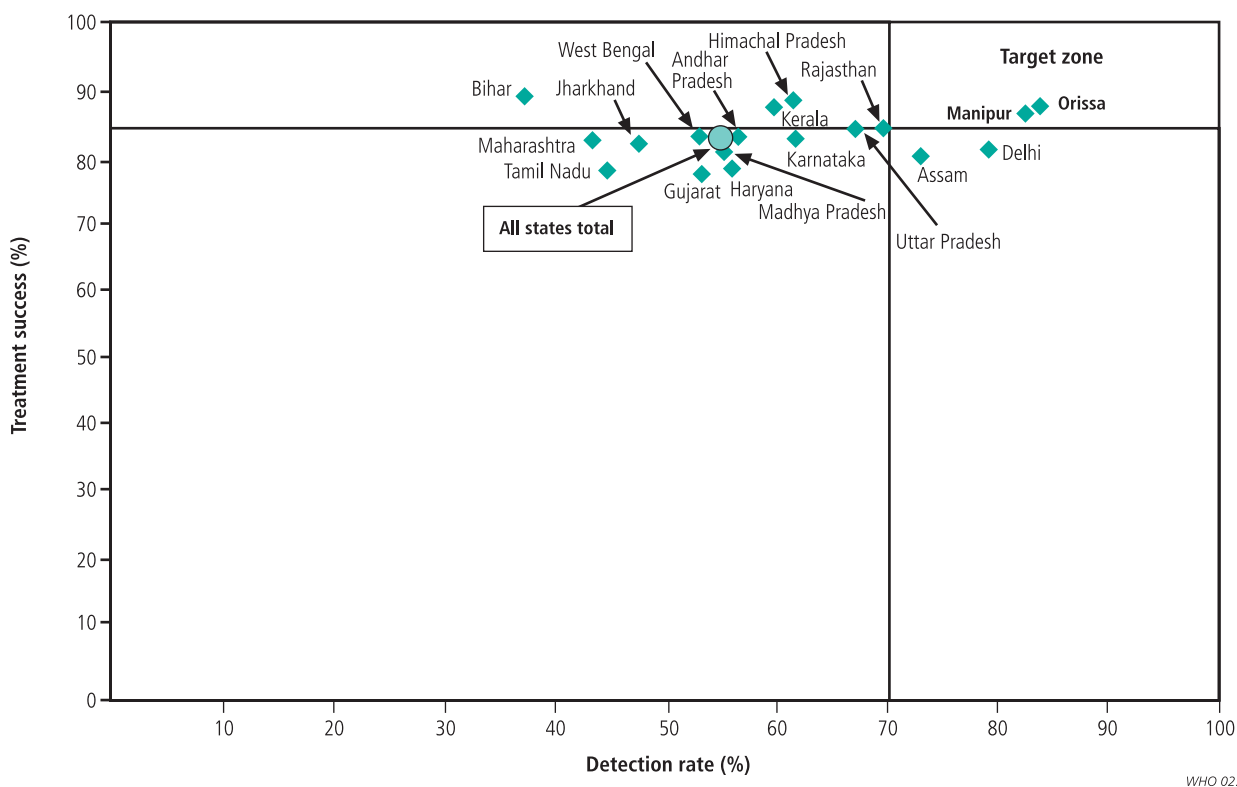
There are many potential areas for programme activities and many competing demands. Only by focus and prioritization can success be achieved. Government programmes have a finite capacity for effective implementation. Any diversion from the basic goal of effective expansion with technical excellence can be detrimental. The following three points illustrate this.

- (i) Operational research is an integral part of continuous programme improvement. However, the priority must be effective implementation, because operational research on a poorly implemented programme serves little purpose.
- (ii) Private sector involvement is extremely important in India and many other countries. However, no policies for private sector involvement can be successful unless the government can effectively provide and monitor treatment. In the initial stages of DOTS implementation the involvement of the private sector is, in our opinion, of secondary importance. The priority is to establish a public DOTS programme that provides free, respectful, and convenient treatment with drugs of good quality. Once this infrastructure is in place, efforts to involve the private sector are much more likely to succeed. If there is no such infrastructure, TB control is likely to fail, regardless of the level of involvement of the private sector.
- (iii) During DOTS expansion there is a need to improve services in areas not yet covered by the strategy. Unless the focus is on effective implementation of DOTS, however, the remaining areas can never be effectively covered. In order to achieve the greatest possible output the areas of focus for efforts must be carefully selected and scrupulously maintained.

4. Systematically appraising each area before it starts service delivery

Phased expansion is essential. Preparatory activities can be expedited but none must be neglected. DOTS represents a considerable improvement in functioning. It is important to make a clear distinction between previous, often ineffective services and the new DOTS paradigm. The appraisal process serves as a quality control mechanism for the programme by ensuring that each district meets a minimum standard before

Fig. 4. Case detection (2001) and treatment success rates (2000) in Revised National Tuberculosis Control Programme areas, India



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starting service delivery. Rapid, uncontrolled expansion of DOTS could result in ineffective service provision and the development and spread of multidrug-resistant tuberculosis (MDR-TB). In India, no area can begin implementation of DOTS until it has met predefined criteria, including the completion of modular training of over 80% of doctors and laboratory technicians and of more than 50% of allied health workers, as well as the hiring of contractual staff for supervision. This can be a long process; however, periodic review meetings, the assignment of local supervisors, and intensive monitoring have substantially reduced the time required for preparation and appraisal. Preparatory activities are monitored frequently by the state and central governments and there is frequent feedback. This not only hastens the start of service provision but also improves the quality of preparatory activities and therefore of subsequent programme implementation. Appraisal includes a review of the quality of training of different categories of staff. Retraining may be required if problems are found. Several regions began service delivery without all the required inputs. This invariably resulted in poor quality implementation, which was very difficult to correct. Unduly rapid action may result in implementation being substantially delayed.

5. Ensuring an uninterrupted drug supply

An uninterrupted drug supply is vital to the DOTS strategy. Many public programmes suffer from drug shortages and, sometimes, from problems with the quality or perceived quality of drugs provided by the government. Drug shortages not only result in interrupted treatment but also, perhaps even more critically, damage the reputation of government services and thereby undermine all the efforts associated with

programmes. Even if there are sufficient drugs at the national, state and district levels, there may be shortages locally. Any potential shortage of drugs should be treated as an emergency. Sufficient buffer stocks should be kept at all levels. All parts of the procurement and supply chain should be carefully monitored. Potential shortages should be anticipated well in advance and alternative arrangements should be made. This is possible if reporting is prompt and accurate. The aid agencies of Denmark (DANIDA) and the United Kingdom (DFID) have supplied drugs on two occasions and thereby circumvented shortages. Medicines have been shipped by air when the exhaustion of stocks was imminent. Frequent meetings and communication by phone, fax, and email are used to ensure information flow about drug requirements and supply. The recent introduction of computerized monitoring has greatly improved the distribution of drugs.

In India, all drugs for an individual patient's treatment are packaged in blister strips and then in pouches. One pouch is used for the intensive phase and one for the continuation phase of treatment. The pouches are placed in a box containing the entire treatment for a single patient. The use of a box makes the logistics simpler, reduces the possibility of some medicines disappearing from the supply chain, and greatly increases the patient's confidence in the health system. When treatment starts, the patient's name is written on the box, so that each patient is assured of a sufficient supply of drugs. The use of the box ensures that no patient ever runs out of drugs in the middle of treatment, although the possibility always exists of there being no boxes with which to start new patients on treatment. Drug quality should be systematically and independently monitored, both to ensure the effectiveness of treatment and to prevent loss of confidence in the programme.

6. Strengthening the established infrastructure and supporting the staff

India's Revised National Tuberculosis Control Programme is built on the strengths of the earlier National Tuberculosis Programme, which laid down an infrastructure in most districts, with a TB officer and staff in each district and a building for its TB centre. The revised programme has invested considerable energy in supporting, strengthening and building the morale and skills of state and district TB control officers. Officers are trained for two to three weeks at central institutions and are provided with funds through TB control societies so that they can function effectively. A jeep, a computer with email access, and other equipment is provided for each district. Perhaps even more importantly, there has been a concerted effort to raise the status of the TB control officer. In the past this post was considered undesirable. Now it is increasingly seen as an important, successful and interesting post with a positive image in society and respect from the medical profession. TB control has assumed increased importance in health sector review meetings at the state and district levels. During visits to the states and districts, central staff learn from the local TB officers about the problems and challenges they face, and then advocate for them with the administrative or political authorities. The attitude taken toward staff in the programme mirrors the attitude that the programme encourages health workers to take toward patients, i.e. one of supportiveness, orientation towards problem-solving, and accountability. TB control officers are fully supported and are also fully accountable for any lapses in performance.

TB control requires specialized supervisory staff who can ensure the accountability of the general health staff who perform most of the service delivery. Key supervisory staff include one full-time doctor for each district, and one TB treatment supervisor and one TB laboratory supervisor for each TB unit with an average population of 500 000. A doctor from the general health service is asked to oversee the treatment and laboratory supervisors. In urban areas a TB health visitor is provided for every 100 000 population. This person undertakes or arranges for the observation of treatment, which can be done by either staff or community volunteers. It is essential in both the public and the private sector that responsibility for critical tasks be assigned to an individual with defined backup and clear relationships with the rest of the organization.

7. Supporting the required infrastructure in urban areas

In India as in much of the world, many urban areas lack an effective health care system, and specialized services for TB, effectively integrated with the primary health care system, may be essential (6). Staff have been specifically provided to large areas implementing the programme for smear microscopy and the observation of treatment in urban slum populations. In urban areas that have not received these additional inputs, performance has been poor. The addition of specialized staff is fully justified because large numbers of patients can be treated more efficiently by them.

8. Ensuring full-time independent technical support and supervision, particularly during the initial phases of implementation

Together with WHO, the Central Tuberculosis Division began hiring, training and deploying doctors to act as consultants to

the central, state and local governments in 1999. A professional recruitment firm advertises, screens, interviews and shortlists applicants. Final selection is undertaken by a panel representing WHO and the central and state governments. Consultants undergo intensive training, after which each is assigned to cover a population of 10–30 million. They are provided with a jeep, a laptop computer, a portable printer, a mobile telephone and Internet access. These consultants have been extremely important in hastening preparations for service delivery and improving the quality of training, diagnosis, treatment, the observation of treatment, recording and reporting. It is intended that most areas should have consultants in the initial three to four years of programme implementation, after which the patterns of effective implementation should be established and much less intensive support should be required.

9. Monitoring intensively and giving timely feedback

Intensive monitoring and supervision of all aspects of the programme at every level has been essential. Quarterly reporting from implementing areas has been exemplary. Regular reporting is a requirement for the release of funds and drugs. For example, in the fourth quarter of 2001 every one of the 221 implementing districts, representing about 1000 register units, reported within three weeks of the due date. The central government and some state governments write to each district every quarter, providing feedback on reports. These communications comment in detail on every important aspect of the very powerful DOTS quarterly reporting system. Analyses are made of the quality of diagnosis and treatment, of consistency within reports and with reports from previous quarters, and of performance and epidemiological trends over time, and detailed suggestions are made for further improvement. Districts are asked to resubmit reports that contain discrepancies and to provide detailed explanations. Automated analysis software provides input on discrepancies, common errors, and possible solutions. Each quarter, a set of tables and figures summarizing the comparative performances of each state and district is widely circulated (Fig. 4), along with a letter from the programme director summarizing current performance, trends, emerging issues and policy directions. Periodic review meetings are held at the state and central levels.

Blind re-checking of slides is important in order to ensure the quality of microscopy. This applies both to panels of proficiency testing slides sent from central institutions to peripheral centres and to slides prepared under routine conditions. In India, panel slides have been sent to various levels for several years but blind re-checking of slides at the periphery is only beginning. Previously, slides from primary care centres were re-checked during supervisory visits, not in a blinded fashion.

Thus far the implementation of the revised programme in districts has been monitored directly from the central level. As more than 200 districts are now covered by the programme, decentralization of implementation and monitoring to the states is important. Decentralization is being planned in a phased manner, taking into account the preparedness of individual states.

10. Supervise, supervise, supervise

"What gets supervised gets done." Supervision at all levels has been critically important to the programme. The intake of

medicine by patients is directly observed, generally by health workers and increasingly by persons in the community who are not members of the families concerned. The senior treatment supervisors and senior TB laboratory supervisors who oversee the treatment observers and laboratory technicians are provided with motorcycles because transportation is vital. Travel and fuel expenses are reimbursed. Medical officers who supervise the programme in local areas are permitted to hire vehicles or are reimbursed for the use of their own vehicles in this work. District TB officers have been provided with jeeps along with funds for fuel and maintenance. Consultants contracted by WHO provide support to the supervisors at all levels. State TB officers, who have been provided with vehicles, training and funds for travel, actively supervise in their areas. Central government staff regularly visit areas to give supervision and support.

Continuing challenges

The success of DOTS in India is far from assured. The country faces several major challenges. The first is to continue expanding effectively so as to cover the remaining half of the country, much of which has a weaker health infrastructure than that in the areas already covered. Coverage of the entire country requires the training of 20 000 more doctors, 5000 more laboratory technicians and over 100 000 allied health staff. More than 6000 laboratories need to be expanded and properly equipped, about 100 new district TB offices are required, more than 3000 contractual staff have to be hired, and drugs have to be procured for approximately a million patients every year. Expansion on this scale is possible but far from certain.

The second challenge is to increase the reach of the programme in areas where it is already functioning by ensuring that a greater proportion of patients is treated. Even where health facilities are functional a large and poorly regulated private sector provides a substantial proportion of outpatient care, including some diagnosis and treatment of unsatisfactory quality (7). The private sector consists of small private hospitals, clinics run by registered and unregistered doctors, and licensed and unlicensed pharmacists who sell anti-TB drugs over the counter without prescription. Although many areas have mandatory notification requirements for TB, no area has been known to enforce them. Other governmental sectors, including employees' health services, workers' health insurance, the armed forces, the railway system and other large employers, and public sector industries have, in general, not participated fully. The recent development of draft national policy guidelines outlining defined schemes demonstrates the commitment of the government to greater involvement of the private sector in the implementation of the Revised National Tuberculosis Control Programme.

The third challenge is to ensure the sustainability of the programme. This requires continued financial support (approximately US\$ 40–50 per year for country-wide coverage), particularly for drugs and contractual supervisors, as well as continued and intensified supervision and monitoring. The creation and equipping of small laboratories and the initial training of large numbers of health workers are inputs that

should have long-term benefits. However, good management is required indefinitely.

The fourth challenge is to establish patient-centred services — one of the essential ingredients of successful DOTS implementation. This contrasts markedly with the long-standing hierarchies in society and the health system in India, and has generally not been followed. It is an aspiration of the programme that no patient should have to pay for transport or miss work in order to participate in treatment observation, but patients living in remote areas, the working poor, and women of marriageable age may still face significant barriers to care. The interpersonal communication skills of health care providers leave much to be desired. However, the recent incorporation of such skills into training programmes should help to overcome this deficiency.

The fifth challenge is to confront MDR-TB, which is present in 1–3.3% of new patients in the districts that have been surveyed (8). MDR-TB is a reflection of poor programme performance, either currently or in the past. A poorly performing programme can create MDR-TB faster than any programme can cure it, even if unlimited resources are available. The prevention of MDR-TB by the rapid expansion of DOTS of high quality therefore remains the first priority. In states that have covered their entire areas and have relatively good performance, trials of the treatment of MDR-TB on a programme basis are to be considered. However, the availability of laboratory services of good quality is a prerequisite.

The sixth and most serious challenge is that presented by the epidemic of human immunodeficiency virus (HIV) infection. It is estimated that there are nearly 4 million HIV-infected people in India (9) and that approximately half of them are infected with *Mycobacterium tuberculosis* (10). If 7% of co-infected individuals develop active TB annually (10), there would be 140 000 new TB cases each year among HIV-infected persons with positive tuberculin skin tests. At the current level of the HIV epidemic, therefore, the number of TB cases can be expected to increase by at least 10% or by a much greater amount should HIV prevalence increase substantially. The continued spread of HIV can be expected to further increase the number of TB cases, making the epidemic uncontrollable in some areas.

Conclusion

India's experience shows that appropriately designed and effectively managed DOTS programmes can achieve high case-detection and cure rates even with suboptimal technology and a suboptimal public health infrastructure. ■

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Conflicts of interest: none declared.

Résumé

Extension rapide du DOTS en Inde

Depuis la fin 1998, la couverture de la stratégie DOTS a été rapidement étendue en Inde. En 2000 et 2001, ce pays a probablement représenté plus de la moitié de l'augmentation mondiale du nombre de patients traités selon la stratégie DOTS, et au début de 2002 plus d'un million de patients y étaient traités par cette méthode. Près de 200 000 vies ont ainsi été sauvées. Les leçons de ce programme soulignent l'importance des éléments suivants : 1) bien utiliser les connaissances et veiller à l'excellence technique ; 2) susciter l'engagement des pouvoirs publics, assurer le financement et en même temps une certaine souplesse d'utilisation des fonds ; 3) maintenir les objectifs et les priorités ; 4) évaluer systématiquement chaque secteur avant de mettre en route les services ; 5) assurer la fourniture de médicaments sans interruption ; 6) renforcer l'infrastructure existante et apporter un appui au personnel ; 7) soutenir les infrastructures nécessaires dans les zones urbaines ; 8) assurer un appui et un encadrement techniques indépendants et à plein temps, en particulier pendant les premières étapes de la mise en œuvre ; 9) assurer une surveillance intensive et un retour

d'information en temps utile ; et 10) assurer une supervision permanente.

La lutte antituberculeuse se heurte encore à de graves difficultés en Inde. Le programme de lutte devra : continuer à s'étendre de façon à couvrir le reste du pays, qui dans la plupart des cas possède une infrastructure plus faible que les parties déjà couvertes ; augmenter son accessibilité dans les parties déjà couvertes de façon à pouvoir traiter un plus grand nombre de patients ; assurer sa viabilité ; améliorer la convivialité des services ; s'occuper des cas de tuberculose associée à l'infection par le virus de l'immunodéficience humaine (VIH). On prévoit que le VIH fera augmenter le nombre de cas de tuberculose d'au moins 10 % et même beaucoup plus selon le degré d'extension de l'infection à VIH.

L'expérience de l'Inde montre que le DOTS permet d'atteindre des taux élevés de détection des cas et de guérison, même avec une technologie imparfaite et souvent avec une infrastructure de santé publique insuffisante. Cependant, ces résultats ne peuvent être obtenus que si le programme est correctement conçu et efficacement géré.

Resumen

Rápida expansión de la DOTS en la India

Desde finales de 1998 la cobertura de la estrategia DOTS en la India ha aumentado rápidamente. Tanto en 2000 como en 2001 el país concentraba probablemente más de la mitad del aumento mundial del número de pacientes tratados con DOTS, y a comienzos de 2002 más de un millón de enfermos estaban siendo tratados así en el país. Como consecuencia de ello, se han salvado casi 200 000 vidas. Las enseñanzas extraídas guardan relación con la importancia de los siguientes elementos del programa: (1) consolidar la base científica y asegurar la excelencia técnica; (2) conseguir el compromiso necesario y asegurar la provisión de fondos y el uso flexible de los mismos; (3) mantener la orientación deseada y las prioridades; (4) evaluar sistemáticamente cada área antes de comenzar la prestación de servicios; (5) asegurar el suministro ininterrumpido de los medicamentos; (6) fortalecer la infraestructura establecida y prestar apoyo al personal; (7) sostener la infraestructura requerida en las zonas urbanas; (8) asegurar de forma permanente el apoyo y la supervisión técnica independientemente, en particular durante las fases iniciales de la ejecución; (9) implantar una vigilancia intensiva y proporcionar retroinformación oportunamente; y (10) asegurar una supervisión continuada.

La lucha contra la tuberculosis tropieza aún con problemas importantes en la India. El programa de lucha debe acometer lo siguiente: proseguir su expansión hasta llegar a cubrir la mitad restante del país, gran parte de la cual tiene una infraestructura sanitaria más precaria que las zonas ya cubiertas; aumentar su alcance en las áreas que ya gozan de cobertura, para tratar a una mayor proporción de pacientes; asegurar la sostenibilidad; hacer los servicios más cómodos para los pacientes; hacer frente a la tuberculosis asociada a la infección por el virus de la inmunodeficiencia humana (VIH). Se prevé que el VIH aumentará el número de casos de tuberculosis al menos en un 10%, y en un porcentaje considerablemente mayor si el VIH se extiende mucho más.

La experiencia de la India muestra que con la estrategia DOTS se pueden conseguir altas tasas de detección y curación de casos, aun con una tecnología imperfecta y con, a menudo, una infraestructura inadecuada de salud pública. Sin embargo, para ello es imprescindible que el programa de prestación de esos servicios se diseñe adecuadamente y se administre con eficacia.

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