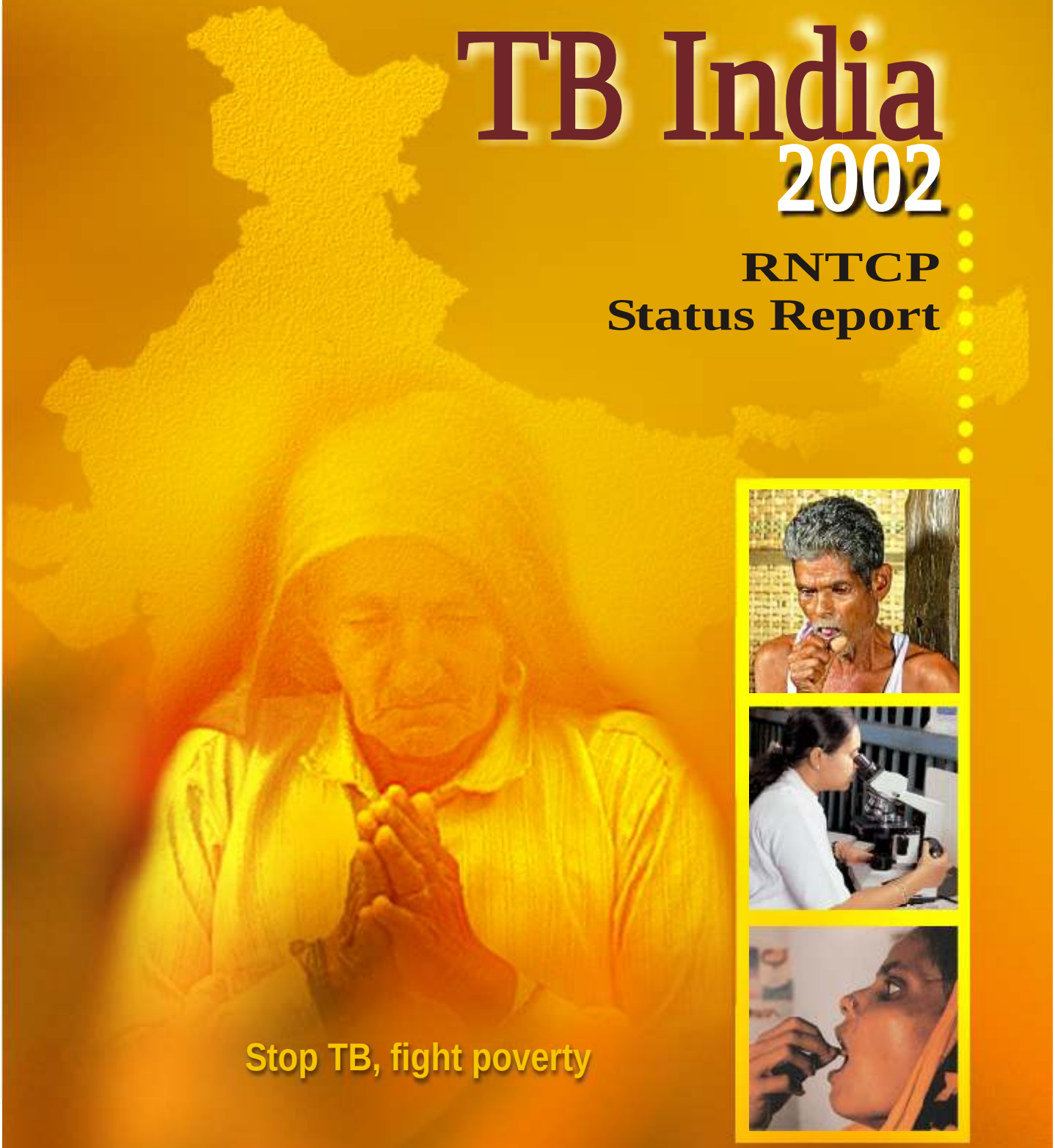
TB India 2002

RNTCP Status Report



Stop TB, fight poverty

Central TB Division, Directorate General of Health Services
Ministry of Health and Family Welfare, Nirman Bhavan, New Delhi 110011
http://www.tbcindia.org

TB Facts

- Each year, nearly 20 lakh (2 million) people in India develop tuberculosis (TB) and nearly 5 lakh die from it.
- TB is a major barrier to economic development, costing India approximately Rs 12 000 crore a year.
- Directly Observed Treatment, Short-course (DOTS) is the most cost-effective health intervention available for TB control.
- The Revised National TB Control Programme, based on the principles of DOTS, now covers nearly half the country's population. It has placed more than 10 lakh patients on treatment, saving nearly 2 lakh lives.

For more information, visit our website: www.tbcindia.org

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stop TB

Foreword

It gives me great pleasure to bring out TB India 2002, the second Status Report on the Revised National Tuberculosis Control Programme (RNTCP). In the 2001 report, I quoted the statement made fifteen years ago by the then Director General of the World Health Organization that "the whole world benefits from the fruits of Indian tuberculosis research ... the whole world, except India". In contrast to this is the recent statement made by WHO's Director of the Stop TB Programme: "Remarkable progress made in DOTS expansion in India, which now has the largest DOTS programme in the world, treating more people per year than any other country. I should also add that the technical excellence that your programme has maintained from its inception has been a model for the world."

Although pilot tested in 1993, RNTCP began large-scale expansion in late 1998. Since then the RNTCP has achieved remarkable success. By the end of 2001, a population of over 450 million was covered by the RNTCP, making it in terms of population coverage the second largest such programme in the world. In 2001, by placing over 450 000 patients on treatment, Indian RNTCP has initiated on treatment the largest number of patients that have ever been done in a year by any TB Control Programme in the world.

There has been a 25-fold expansion in RNTCP coverage since 1998. Treatment success rates have tripled from 25% to 84% and death rates cut 7-fold. Since its inception, RNTCP has placed over 10 lakh patients on treatment, saved more than 180 000 lives and prevented 20 lakh infections. Every month more than 40 000 patients are put on treatment, saving more than 7000 lives. To achieve this, nearly 2 lakh health workers have been trained. Quality of services, reflected in a treatment success rate of 84%, has been maintained during this rapid expansion. The RNTCP's success has increased the credibility of the public sector health services with the community and their trust in these services.

Since 1999, progress in global TB control has been determined by India's success and this will continue over the coming years. In 1999, expansion of the RNTCP accounted for one-third of the

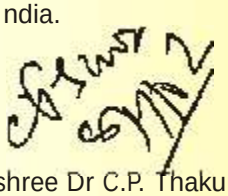
global increase in TB patients treated under the DOTS strategy. In the years 2000 and 2001, progress of the RNTCP accounted for over half of the global increase in DOTS coverage.

Many challenges lie ahead. The planned expansion of the RNCTP is both ambitious and timely. With the looming risks of HIV/AIDS and multidrug-resistant tuberculosis (MDR-TB), there is an urgent need to attain nationwide coverage of the RNTCP at the earliest possible date. The good news is that through an extension of the World Bank support, the RNTCP is planned to cover a population of 700 million. With DANIDA and DFID assistance to the RNCTP in Orissa and Andhra Pradesh, respectively, a total of 800 million will be covered by 2004. To widen access to high quality uninterrupted services, the involvement of medical colleges, NGOs and the private sector in TB control activities is needed. This Status Report shows that some progress has been made on this front, but a lot still needs to be done.

The next few years will be crucially important for India in laying the foundation to finally tackle the problem of tuberculosis. Great efforts from all sectors of the community—both public and private—are required. The patients' needs must remain paramount to all activities. We must all hold fast to some simple truths:

- Cough for 3 weeks—think TB—check 3 sputum smears;
- Ensure cure by treatment completion through direct observation of treatment;
- Ensure that diagnostic and treatment services are free of cost; and
- Provide patient-friendly services.

I give my continued congratulations to all those associated with the remarkable accomplishments of the RNTCP. The key components of the DOTS strategy were formulated in India by dedicated researchers who carried out pioneer work in TB in the 1950s and 1960s, thereby making available to us today the tools for accurate diagnosis and effective treatment of TB. By redoubling our efforts and by successfully implementing, via the RNTCP, the DOTS strategy in a population of 800 million, we will be providing a most fitting tribute to the pioneers of TB research in India.



Padmashree Dr C.P. Thakur

Union Minister for Health and Family Welfare

stop TB

"India's Revised National Tuberculosis Control Programme is succeeding well, both in terms of quality and quantity of diagnosis and treatment."

K.R. Narayanan, President of India
24 March 2001

"India has taken great strides towards control of tuberculosis. The Revised National Tuberculosis Control Programe has expanded rapidly and with good quality."

A.B. Vajpayee, Prime Minister of India
24 March 2001

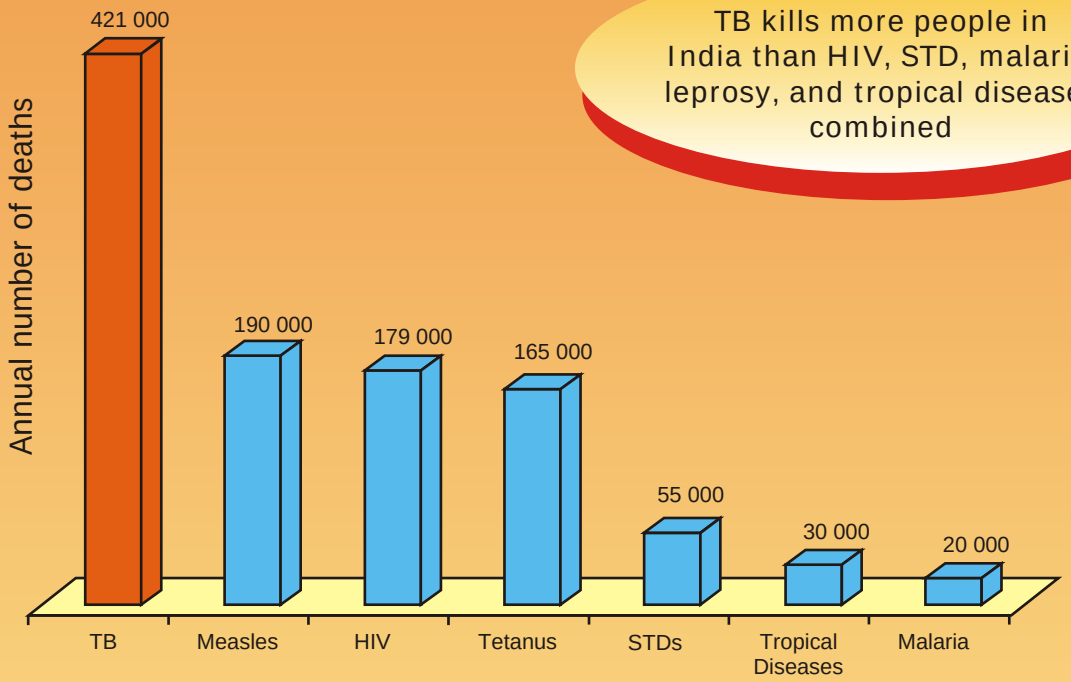
"I am now confident that India will tackle the problem of tuberculosis."

Dr C.P. Thakur, Union Minister for Health and Family Welfare
24 March 2001

"In areas where the RNTCP is being implemented, for the first time, we are beginning to win skirmishes in the battle against tuberculosis."

Dr S.P. Agarwal, Director General of Health Services
24 March 2001

TB: Disease Burden in India



TB kills more people in India than HIV, STD, malaria, leprosy, and tropical diseases combined

Daily burden of TB in India

- More than 20 000 people become infected with the tuberculosis bacillus
- More than 5000 people develop TB
- More than 1000 people die

stop TB

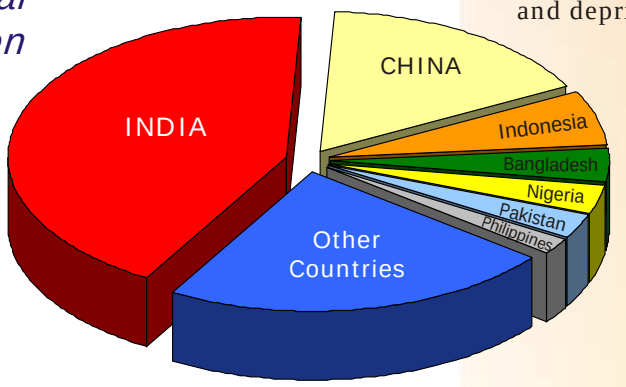
Tuberculosis is nearly 100% curable, yet lakhs of persons continue to die of TB every year in India. Every day, more than 1000 persons die from TB in India, 5 lakh per year, 1 every minute. India accounts for nearly a third of all TB cases in the world. TB kills more adults than any other infectious disease. TB kills more women than all causes of maternal mortality and may create more orphans than any other disease.

Rajan's story

Rajan, a 40-year-old tailor from South India, was affected with TB. His family has 5 members including his wife and 3 children. The eldest son was 13 years old studying in a corporation school. Following Rajan's death due to TB, the family went through a severe financial crisis as he was the only earning member. The eldest son was forced to shoulder the family responsibilities and had to discontinue his schooling even though education in the corporation school was free of cost. At present, the boy is working as a tailor.

TB caused Rajan to die prematurely and deprived his son of education.

INDIA accounts for nearly one-third of the global TB burden



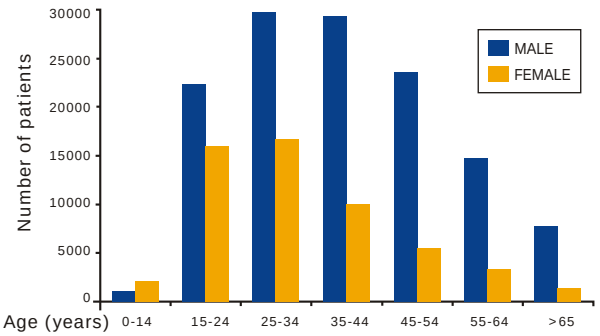
A study conducted by the Tuberculosis Research Centre (TRC), Chennai in 1997 demonstrated that 8% of rural and 13% of urban children (equivalent to 300 000 nationally) were taken out of school when a parent (usually the father) developed TB. Other long-term consequences include indebtedness; more than two-thirds of the households went into debt to cover the costs due to TB; the average family debt was US$ 59 which is equivalent to 12% of the annual household income. On an average, 83 work-days were lost.

The negative impact of TB carries over to the next generation, as the coping mechanisms of poor families adversely affect their children.

Use dots

TB and Poverty

More than 80% of the patients are in the economically productive age group 15–54 years



New smear-positive case detection by age and sex—2001

TB and poverty are closely related. Malnutrition, overcrowding, poor ventilation and sanitation—factors associated with poverty—increase both the risk of infection and the probability of developing clinical disease. Poverty and TB form a vicious circle; TB decreases a person's capacity to work and adds the burden of treatment expenses, thereby exacerbating their poverty. Moreover, the poor seek and receive inadequate health care that often inhibits the detection of TB and adds to the impact of the disease. Treatment, if received at all, is often inconsistent or partial. Ill health and death worsen poverty for caregivers and survivors. TB is a serious obstacle to sustainable development. Because more than 80% of the patients are in the economically productive age group (15–54 years), the economic and social costs to them and to their families are enormous. These patients are the breadwinners, the parents of young children who need their economic and emotional support in order to thrive. They have elderly parents and relatives who depend on them. They are the citizens whose productivity and talents are essential to their countries' development. TB blocks access to opportunities and choices—a key principle of human development.

TB costs India Rs 12 000 crore annually. Other non-disease costs of TB are 300 000 school drop-outs due to parental TB. The costs to the patient for diagnosis and successful treatment average US$ 100–150, more than half of the annual income of a daily-wage labourer.

TB exerts an enormous social and economic toll on India

Indirect costs to society: US$ 3 billion per year

Direct costs: US$ 300 million

Loss of 100 million productive work-days per year due to illness alone

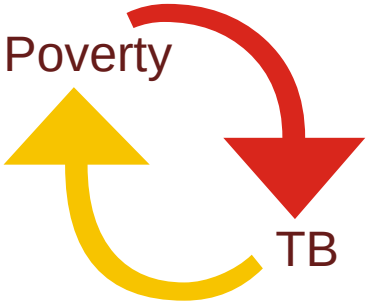
Each year, India loses more than 13 billion productive work-days due to TB deaths

More than 300 000 children leave school as a result of parents' TB

More than 100 000 women are rejected by their families on account of TB

TRC. IJTLD, 1999, 3:869–877

On an average, 3 months of work time are lost if an adult has TB, resulting in the loss of 20–30% of annual household income, and an average of 15 years of income is lost if the patient dies from the disease.



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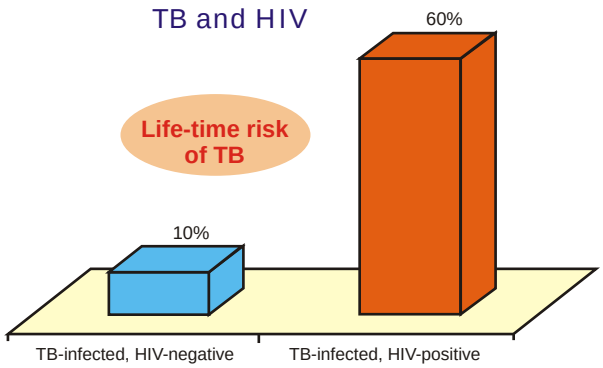
HIV and TB: the deadly combination



HIV and TB form a lethal combination, each speeding up the other's progress. Infection with HIV is the most powerful known risk factor for progression to active TB among adults. Persons infected with the TB bacillus and HIV have a 60% risk of developing active TB, whereas an HIV-negative person infected with the TB bacillus has only a 10% life-time risk of developing TB.

TB is the commonest opportunistic infection occurring among HIV-positive persons in India and throughout the world. TB shortens the survival of patients with HIV infection. Worldwide, TB is a leading cause of death among AIDS patients. In a developing country like India, the potential burden of new TB cases attributable to HIV could overwhelm budgets and support services, as has already happened in those countries heavily affected by the HIV epidemic.

The HIV epidemic could rapidly increase the incidence of TB in India.

The number of HIV-positive persons in India is estimated to be 3.86 million. Among the AIDS cases, approximately 60% have TB.

Multidrug-resistant tuberculosis

Multidrug-resistant tuberculosis (MDR-TB) refers to the strains of tubercle bacilli that have developed resistance to the two most effective antituberculosis drugs available—isoniazid and rifampicin. MDR-TB can be diagnosed only in a specialized laboratory.

The treatment of MDR-TB requires at least 18–24 months of chemotherapy, which is 100 times more expensive and often highly toxic with a high failure rate.

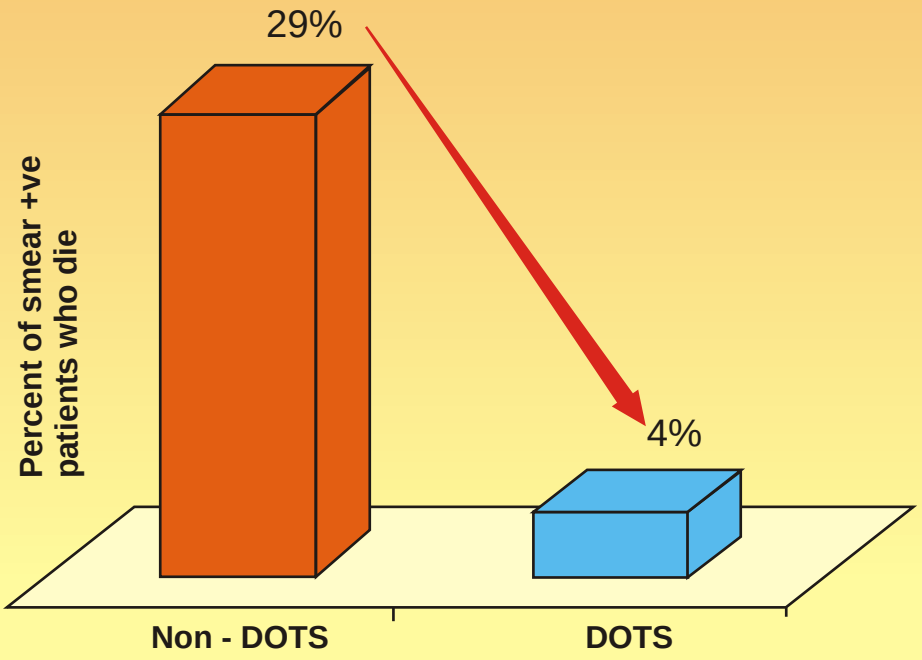
In a country like India, MDR-TB is almost equivalent to a death sentence, as very few patients have the financial capacity or the resources to complete the required long-term regimen.

MDR-TB is a symptom of an underlying problem of poor programme implementation. The priority of a TB control programme should be to prevent MDR-TB by effective primary treatment.

Directly Observed Treatment, Short–course DOTS

Effective implementation of DOTS can save millions of lives in India. Every cured patient stops spreading TB. Each life saved represents a child, mother, or father who will go on to live a longer, productive, TB-free life

DOTS cuts TB deaths 7-fold in India



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DOTS (Directly Observed Treatment, Short-course) is a WHO-recommended strategy for the detection and cure of TB. DOTS is a five-point strategy. All the components are essential.

Political commitment for sustained tuberculosis control

1

Sputum smear microscopy to detect infectious cases among those people attending health care facilities with symptoms of pulmonary tuberculosis

2

Regular, uninterrupted supply of antituberculosis drugs

3

DOTS has been identified by the World Bank as one of the most cost-effective health strategies available

Mr Josef M. Ritzen, Vice President of World Bank administering a dose of TB medicines to a TB patient, Mr Nagaraj at the District TB Centre, Mandya district, Karnataka

Use dots

Short-course chemotherapy for all tuberculosis cases to be given under direct observation

4

Systematic monitoring and accountability for each patient diagnosed. Outcome of 95 091 new smear +ve patients placed on treatment during 2000

5

A successful DOTS programme has substantial economic benefits for India. In a study conducted in 1996 by IIM Ahmedabad, the following benefits of DOTS were documented:

Direct tangible benefits of DOTS

- Reduction in the incidence and prevalence of TB, which improves the efficiency and productivity of workers by reducing forced absenteeism on account of ill health
- TB deaths averted, which adds to the productive capacity of the economy
- Release of hospital beds occupied by TB patients

Indirect benefits of DOTS

- Reduced suffering of TB patients
- Quicker and surer relief from the disease
- Poverty alleviation

Benefits of DOTS

- DOTS produces cure rates as high as 95 per cent.
- DOTS more than doubles the accuracy of diagnosis of TB.
- DOTS prevents TB bacilli from spreading to others, thus reducing the incidence and prevalence of TB.
- DOTS is a strategy for alleviating poverty. Saving lives, reducing the duration of illness, and preventing new infectious cases would mean fewer years of employment lost.
- DOTS prolongs survival of HIV-infected TB patients.
- DOTS prevents treatment failure and the emergence of multidrug-resistant tuberculosis by ensuring patient compliance and uninterrupted supply of anti-TB drugs.
- DOTS strengthens health services. The DOTS strategy has been remarkably successful in promoting the development of peripheral health services.
- DOTS lends credence to the TB control efforts.

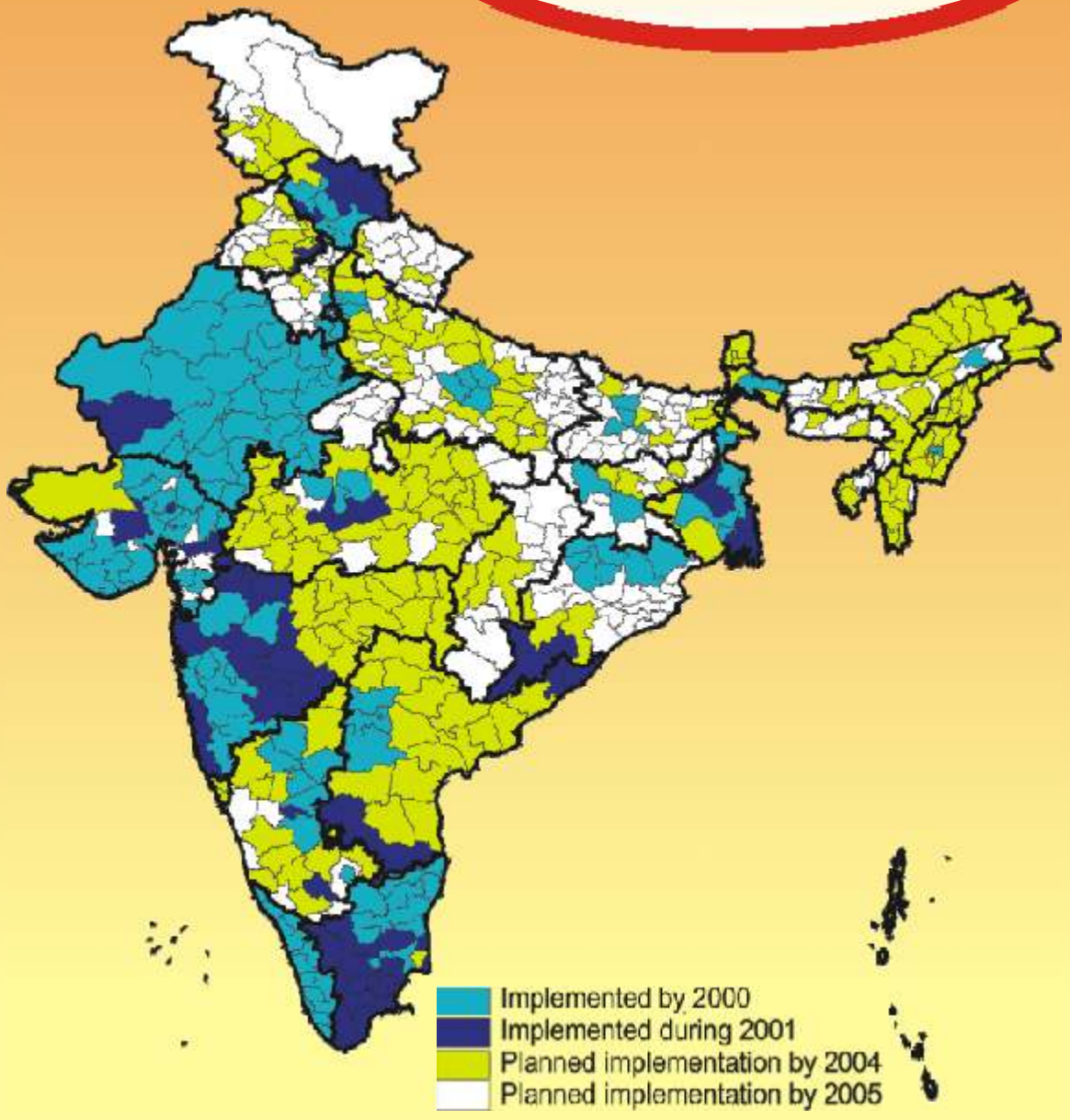
stop TB

The principles of DOTS were first formulated in India. In the 1950s and 1960s, pioneering studies conducted at the Tuberculosis Research Centre (TRC), Chennai demonstrated the safety and efficacy of domiciliary treatment of TB, the efficacy of intermittent treatment with anti-TB drugs, and the necessity and feasibility of direct observation of treatment. In the 1960s, studies at the National Tuberculosis Institute, Bangalore documented the efficacy, feasibility and importance of case detection by sputum microscopy in primary health care institutions. These findings formed the foundation of the DOTS strategy, which has been adopted by 148 countries worldwide. In India, DOTS is implemented as the Revised National Tuberculosis Control Programme.

Honourable Health Minister, Padmashree Dr C.P. Thakur
at the treatment room in TRC, Chennai, where the first dose under
direct observation was given in 1962

RNTCP: Implementation Status

"The new strategy is achieving astounding success. Not since childhood immunization campaigns 20 years ago in India has a health project expanded so rapidly and maintained quality services."
—Dr Arata Kochi, Director
Global TB Programme, WHO
24 March 2000



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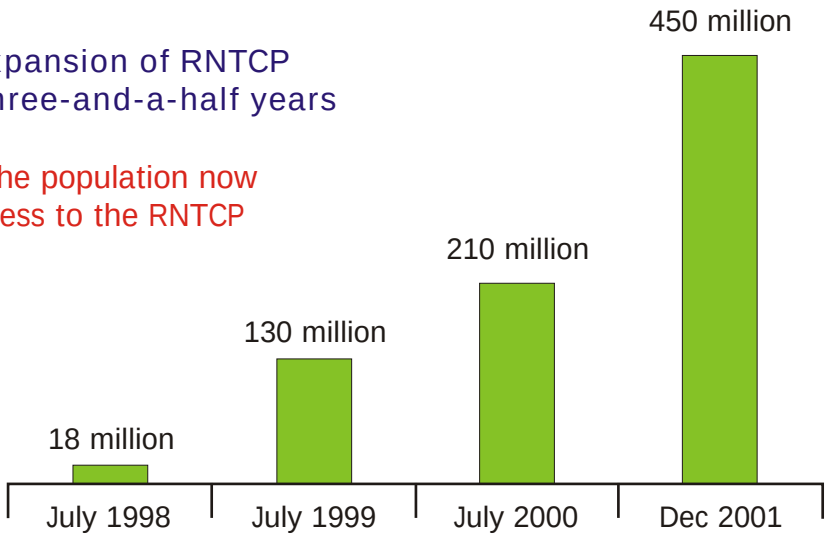
RNTCP Implementation

The Revised National Tuberculosis Control Programme (RNTCP) is an application of the principles of DOTS to the Indian context. Following a comprehensive review of national TB control activities in 1992, the Government of India adopted the RNTCP using the World Health Organization's (WHO) recommended strategy of directly observed treatment, short-course (DOTS). The programme was implemented in pilot areas beginning in 1993, and large-scale implementation began in late 1998. The RNTCP has now expanded to cover nearly half the country.

25-fold expansion of RNTCP
in the past three-and-a-half years

45% of the population now
has access to the RNTCP



RNTCP implementation time-line

1992: National programme review of tuberculosis concluded that efforts to control the disease had not made any significant impact.

1993: The RNTCP was pilot-tested applying the principles of DOTS.

1997: Government of India obtained a soft loan from the World Bank for US$ 142 million to implement RNTCP in at least one-third of the country and to prepare the rest of the country for implementation of the RNTCP at a later date; the RNTCP in Orissa is supported by the Danish Government and the RNTCP in Andhra Pradesh is supported by the British Government.

1999: The RNTCP expanded 7-fold to become the second-largest such programme in the world.

2001: 450 million population covered under the RNTCP.

2002: One millionth patient started on treatment.

2004: 800 million population planned to be covered.

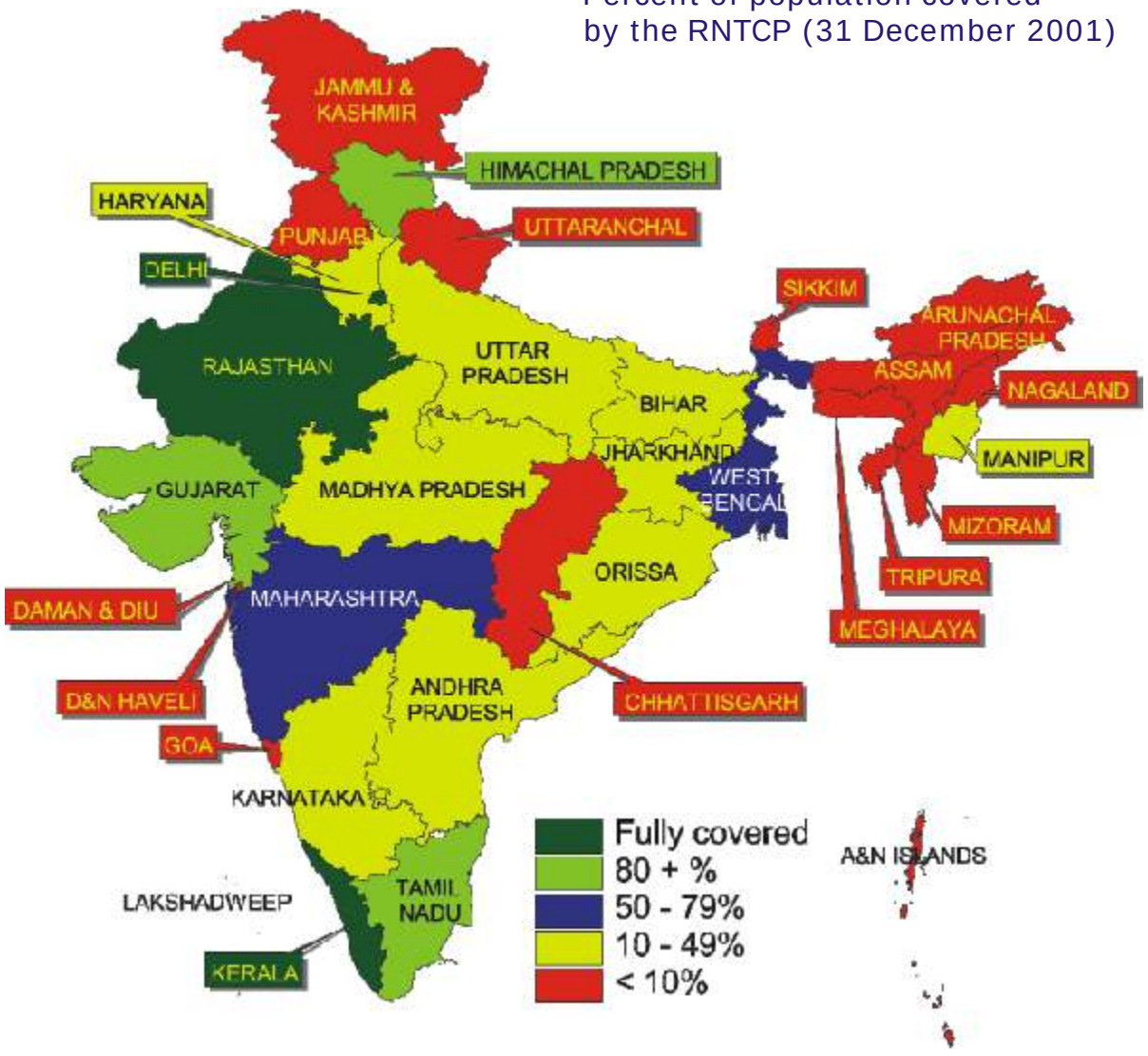
2005: Plan to cover the entire country.

Use dots

Expansion Plan

Expansion of the RNTCP in India has in the past two years been one of the fastest accomplished by any country in the world. India now has the second largest DOTS programme in the world. As of December 2001, a population of more than 450 million in 221 districts in 21 states/Union territories had been covered under DOTS. It is planned to cover a population of 800 million (approximately 80% of the total population) by 2004, and the entire country by the year 2005. Sixteen states/Union territories have been approved for total coverage (Andhra Pradesh, Arunachal Pradesh, Chandigarh, Delhi, Goa, Gujarat, Himachal Pradesh, Kerala, Lakshadweep, Maharashtra, Manipur, Nagaland, Rajasthan, Sikkim, Tamil Nadu, West Bengal).

Percent of population covered by the RNTCP (31 December 2001)



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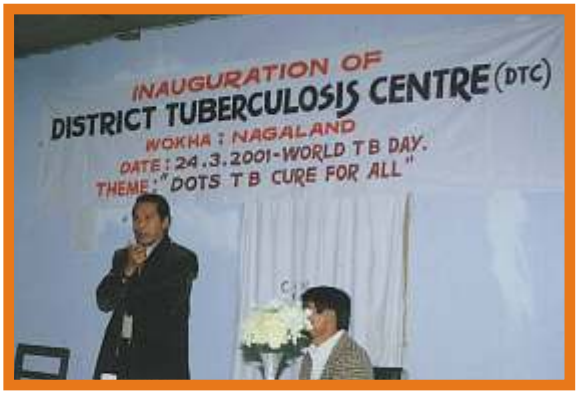
Elements for RNTCP success

- Increased political commitment: The TB Control Programme has received increased budgetary allocation from the Government of India: from Rs 52 crore in 1996–97 to Rs 136 crore in 2001–02.
- Monitoring of districts preparing for RNTCP implementation: Stringent appraisal criteria have been laid down to ensure quality of preparedness, which are verified by an external team. The district is not given permission for RNTCP implementation unless appropriate actions are taken to rectify the deficiencies identified by the appraisal team.
- Good quality of diagnosis: More than 7000 state-of-the-art binocular microscopes have been distributed to facilitate accurate diagnosis.
- Uninterrupted supply and availability of drugs to all implementing districts: All drugs are in patient-wise boxes to ensure standard treatment and to guarantee that no patient will ever stop treatment because of shortage of drugs.
- Rigorous training of more than 200 000 health staff: More than 25 000 Medical Officers and more than 5000 microscopists have been trained using the modular approach.
- Reliable and accurate reporting and implementation of a new monitoring system which accounts for each and every case diagnosed.



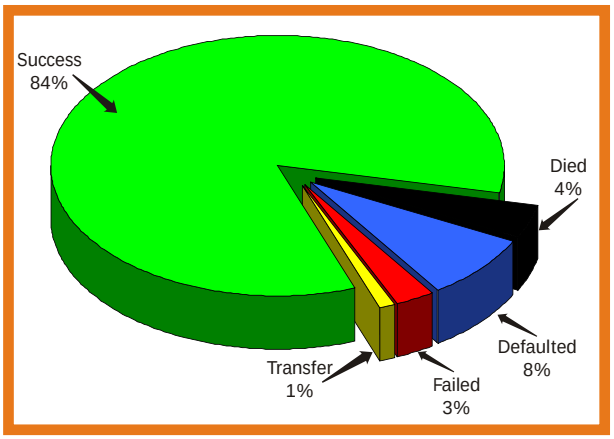
Inauguration of DTC, Wokha, Nagaland

Patient–provider interaction meeting, Orissa

Use dots

Good quality of treatment

In the RNTCP, more than 8 out of 10 patients have been successfully treated.



> "Results of treatment have been most encouraging."
>
> *Sir John Crofton*
> *Editorial: Int J Tuberc Lung Dis*
> *4(3): 189–190, 2000*

Economic benefits from national coverage with the RNTCP

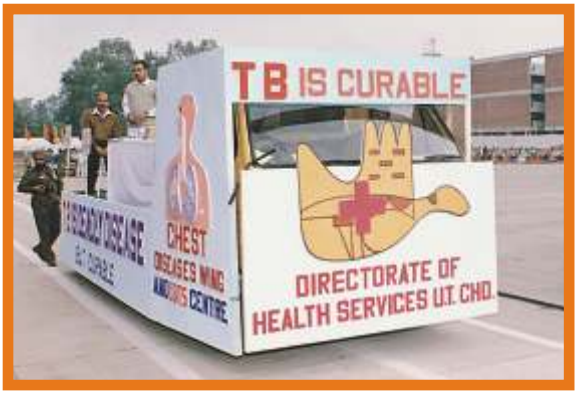
By conservative estimates, countrywide effective DOTS implementation by 2005 would result in cumulative savings of more than US$ 27 billion through the year 2020.

For an investment of US$ 50 million per year, the yield would be more than US$ 2.5 billion per year.

Full coverage would transfer US$ 160 million every year to patients in medical expenses averted.

Chief Minister of Andhra Pradesh, Mr Chandrababu Naidu administering directly observed treatment to a patient on DOTS

Republic Day parade 2002, Chandigarh, Punjab



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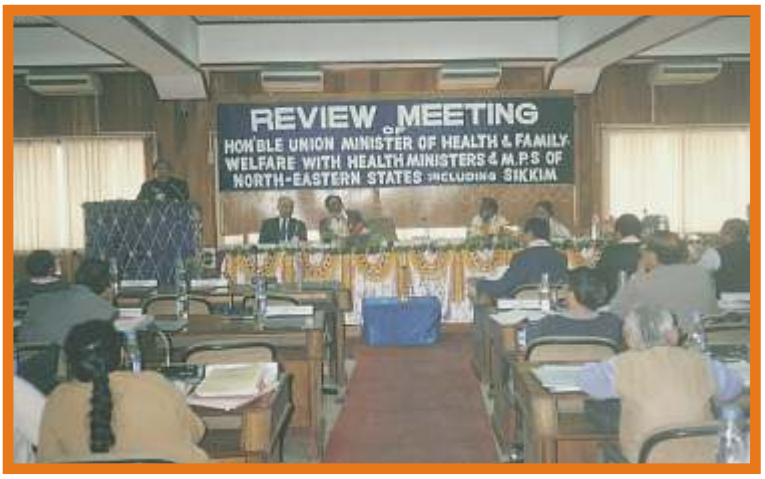
RNTCP Accomplishments

- More than 25-fold expansion in the past 3½ years.
- One of the fastest DOTS expansion in the world.
- In 2001, India treated more than 4.7 lakh cases. More patients were treated under DOTS than in any other country in the world.
- Till date, the RNTCP has placed more than 10 lakh patients on treatment, prevented more than 20 lakh people from being infected, and saved nearly 2 lakh lives.
- More than 200 000 health workers trained in DOTS.
- More than 7000 binocular microscopes distributed.
- Every month:
  - More than 160 000 patients examined
  - More than 4 lakh smears examined
  - More than 40 000 patients placed on treatment

"Remarkable progress has been made in DOTS expansion in India, which now has the largest DOTS programme in the world treating more people than any other country. The technical excellence that the programme has maintained from its inception has been a model for the world."
Dr J.W. Lee, Director Stop TB, World Health Organization
12 February 2002



"India has made considerable progress in expanding DOTS and in ensuring access to TB control services to all who need them. The technical performance has also been excellent.This is recognized worldwide."
Dr Uton Muchtar Rafei, Regional Director
Regional Office for South-East Asia, World Health Organization

Treatment and Treatment Observation

Treatment observation succeeds by building a human bond between the patient and the treatment observer

Anyone other than a family member, who is acceptable and accessible to the patient and accountable to the health system, can be a treatment observer.

stop TB

Treatment and Treatment Observation

Standardized treatment regimens are recommended by WHO for each category of treatment. These recommended treatment regimens are proven to be effective. The treatment for TB under the DOTS strategy is divided into two phases: the intensive and continuation phases. Direct observation of treatment is recommended for all patients. During the intensive phase, each dose has to be directly observed. During the continuation phase, at least the first of the three weekly doses should be given under direct observation.

Treatment regimens under the RNTCP

Category of treatment	Type of patient	Regimen
Category I	New sputum smear-positive Seriously ill sputum smear-negative Seriously ill extrapulmonary	$2(HRZE)_3$/ $4(HR)_3$
Category II	Previously treated Sputum smear-positive Relapse Sputum smear-positive Failure Sputum smear-positive Treatment After Default	$2(HRZES)_3$/ $1(HRZE)_3$/ $5(HRE)_3$
Category III	New sputum smear-negative, not seriously ill Extrapulmonary, not seriously ill	$2(HRZ)_3$/ $4(HR)_3$

Direct observation of treatment has emerged as the standard of care in developed as well as developing countries. Forty years ago, studies conducted at the Tuberculosis Research Centre, Chennai provided empirical evidence of the necessity and feasibility of directly observed treatment for achieving a high cure rate for TB. More recently, a study conducted in Pathanamthitta District, Kerala demonstrated that the probability of failure or relapse was 15 times higher among patients who did not receive directly observed treatment as against those who did. It is vitally important for the whole community that people with TB take all their medications on schedule. Interrupted treatment results in chronically infectious cases of TB, some of whom may develop multidrug-resistant TB.

RNTCP treatment regimens are scientifically proven and highly effective.

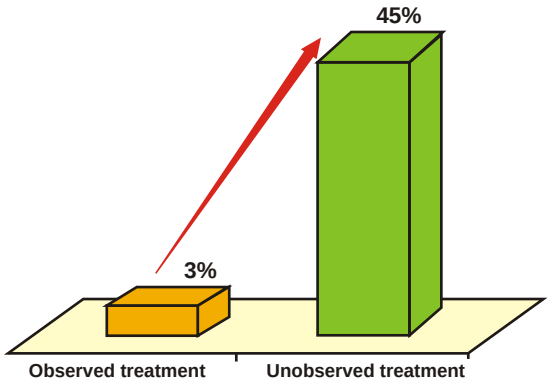
Use dots

Why do we need to observe treatment?

On their own, few people can be relied upon to take their medicines properly and for the correct period of time, particularly if the treatment is for a long period. Direct observation of treatment ensures that patients take treatment for the entire course with:

- the right drugs
- in the right doses, and
- at the right intervals.

Risk of failure or relapse was 15 times higher among patients treated without observation compared to patients receiving treatment under observation



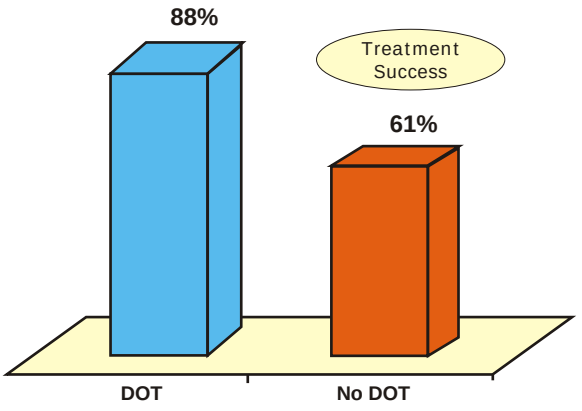
For effective treatment observation, the health staff should:

- Be respectful and considerate to the patient's needs.
- Ensure that the location and time of treatment observation is convenient to patients.
- Ensure that the patient does not lose wages.
- Ensure appropriate facilities such as drinking water, place to sit and cleanliness of the general surroundings.
- Make the patient feel that he/she is wanted.
- Retrieve the patient to return to treatment within one day of a missed dose.

Treatment observation is not "supervised swallowing". Treatment observation

- is a service to patients
- ensures cure
- protects the patient's family and community
- builds a bond between patients and health providers.

Direct observation of treatment is necessary even when drug supply is ensured



Even if drug supply is ensured, direct observation of treatment is necessary. Treatment without direct observation results in at best a 60% treatment success, compared with 85–95% with direct observation of treatment.

DIRECTLY OBSERVED TREATMENT SHOULD BE CONVENIENT TO THE PATIENT

"My name is Swaminathan. I am a watchman. In December 1998, I became sick with fever, cough and chest pain. After sputum tests, the doctor told me that I had TB. I was then asked to take 6 months of continuous treatment. The doctor arranged for my medicines for which I had to go to the clinic thrice a week. But when my shifts at duty changed, I couldn't go to the clinic as before and so I started missing my medicines. I told the health worker about my problem. They asked if I had a friend who could observe my treatment. I asked my friend Johnson to be my DOT provider. He now gives me my medicine while we change shifts. I never have to miss my doses now. My sputum results have become negative and I feel much better. I am sure that I am on the way to cure. I am thankful to my doctor, my friend Johnson and the health worker who have taken a keen interest in my recovery." —Mr Swaminathan

TREATMENT OBSERVATION IS A SERVICE TO PATIENTS

Mrs CS Pankajam is a housewife who volunteered to treat 15 TB patients through direct observation of treatment. Her commitment and care towards the patients has enabled them to complete 6 months of treatment. She is a shining example of how a citizen can contribute towards TB control. Even today, she continues her work with the same spirit.

TREATMENT OBSERVATION IS A SERVICE TO THE PROVIDER

"I gave medicines to my friend. Sometimes I would wait till 10 o'clock to observe him swallowing the drugs. I felt as though I was the 'doctor' of the patient and he was getting cured because of my efforts. If given an opportunity I would like to help more patients."—Mr Pasupathy

TREATMENT OBSERVATION SUCCEEDS BY BUILDING A HUMAN BOND BETWEEN THE PATIENT AND THE TREATMENT OBSERVER

Asiti Devi is a community health volunteer working in a large slum community of Patna. She is a DOT provider for 6 patients in her community, all of whom are on their way to recovery. By building a bond with her patients, Asiti Devi has made a difference in their lives.

Anokhabai, a patient from Madhya Pradesh, before and after TB treatment

stop TB

TREATMENT OBSERVATION IS FEASIBLE IN EACH COMMUNITY BY IDENTIFYING AND INVOLVING THE STRENGTHS OF THE COMMUNITY

DOT provider Yashpal Pulani, a shoe shop owner in Gurgaon, Haryana is the son of a cured TB patient. With the help of his brother, he is a DOT provider for 24 patients in his community. The shop is centrally located and the timings are convenient to patients.

GRANDMOTHER'S STORY

"I was treated for TB a few years ago. At that time, I had to travel very far to collect my medicines for a period of two long years. The whole system has become so convenient for the patient, they now have to take medicines only for 6 months and the medicines are made available near their house itself!"

Comments of Mrs Senthamarai, a 60-year-old lady living in one of the slums of south Chennai and a DOT provider for two TB patients in her community

AN ACCEPTABLE, ACCESSIBLE AND ACCOUNTABLE TREATMENT OBSERVER IS THE KEY TO THE SUCCESS OF DOTS

"My neighbours thought I was going to die of TB. I was bedridden, very sick and unable to move. This was the opinion of my neighbours when the doctor diagnosed me with TB. The doctor asked me to identify a responsible person who would supervise my treatment. I introduced my Village Headman to the doctor and the ACT social worker who handed over the 6 months course of medication to him. After 6 months, I was declared 'cured' by the doctor. I am now able to continue my work as a fisherman again. My neighbours are amazed at my recovery."—Raja, a fisherman

RNTCP Activities during 2001

Success of the RNTCP depends
on collaboration among
the government, private practitioners,
NGOs and medical colleges

Director of Health Services, Kerala inaugurating
a private Microscopy Centre

Private Health Sector in the RNTCP

Involvement of health providers in the private sector is critical in increasing the coverage of RNTCP services. In recent years, many steps have been taken to involve private health care providers. Meetings have been arranged with private practitioners at the local and the national levels. Districts have been advised to make a directory listing private practitioners (PPs) and proactively identify prominent and willing PPs/institutions for their involvement in the programme. District societies are seeking representation from the private sector. Several private–public partnership models are in place, which include projects in Pune (Maharashtra), Sitapur (Uttar Pradesh), Patna (Bihar), Hyderabad (Andhra Pradesh), Chennai (Tamil Nadu) and Delhi. Draft guidelines for involvement of the private health sector in the RNTCP were developed. A national workshop, convened on 28 October 2001, Delhi to discuss draft guidelines, was attended by about 80 participants including PPs from all RNTCP implementing states, representatives of the Indian Medical Association, and some District TB Officers. Alternatives outlined in the guidelines for participation of PPs are: (1) PPs refer patients or send sputum samples of patients suspected of having TB to a designated microscopy centre; (2) PPs provide directly observed treatment (DOT) to patients on RNTCP; (3) A private health facility having its own laboratory, serves as a designated microscopy centre, or as a designated microscopy centre-cum-DOT centre if it has a full-fledged doctor attached to it.

Private practitioners participating in the National Workshop held in New Delhi on 28 October 2001

District Collector, Dr V. Venu addressing private practitioners at Payyannur, Kannur District, Kerala

Meeting with private practitioners in Gujarat, 3 February 2002

Private microsocopy-cum-treatment centre in Thane Municipal Corporation, Maharashtra

stop TB

Involvement of private practitioners in Kannur District, Kerala

Kannur District in Kerala has a large number of private hospitals, nursing homes and clinics. More than 60% of patients consult private health facilities. The district RNTCP staff has taken several steps to increase the involvement of PPs in the RNTCP. These steps include:

(i) Identification of heavily utilized hospitals and nursing homes;

(ii) Identification of independent laboratories where sputum microscopy for AFB was being done;

(iii) Sensitization and training of leading PPs;

(iv) Training of senior qualified laboratory technicians working in private laboratories; and

(v) Training of DOT providers.

So far, 35 private health facilities (including 11 laboratories) have been involved in RNTCP implementation in Kannur. PPs screen and diagnose patients at their private clinics. Diagnosis is made by examination of 3 smears as per the RNTCP norms. When a patient is diagnosed to have TB, categorization is done by the private physicians, and a patient-wise box of drugs is procured from the District RNTCP staff. The private physician's clinic serves as the DOT centre and drugs are given free to the patient. The Senior Treatment Supervisor (STS), and the Medical Officer TB Control visit and supervise the DOT centres to provide the necessary support. The Senior TB Laboratory Supervisor visits laboratories and cross-checks slides as per RNTCP guidelines. While the staff of the PP administer treatment under direct observation, defaulter retrieval is assisted by the STS or other government health workers whenever required.

"This programme is really a blessing for the poor TB patients who find it difficult to buy their drugs. I can now help a number of poor TB patients. I should have been involved in the RNTCP much earlier so that a number of TB patients could have been saved."

Remark of a private practitioner, Kerala

Involvement of NGOs

NIDAN makes a difference in Patna, Bihar

NIDAN is an NGO supporting non-formal education and income-generation schemes for slum dwellers in 48 slum areas in Patna. In collaboration with the RNTCP, this NGO took up the provision of DOTS services to this population in a slum, Dusathi Pakadi with a population of 3.5 lakh. Within a short time, over 100 TB patients have been put on anti-TB treatment. Thirty-five DOTS centres are now in operation and provide services at convenient timings and locations. This has resulted in improved treatment outcomes among these TB patients.

Shri A. Raja, Honourable Minister of State for Health and Family Welfare delivering the inaugural address at the National workshop on RNTCP for involvement of medical colleges, 14 September 2001

"TB and its control are vitally important to the health of this country. Nearly four years back, we hosted a consensus conference which concluded that phased and effective implementation of the RNTCP is the best strategy and perhaps the only chance of controlling TB in India during this generation. In the past four years, the programme has succeeded beyond our highest expectations. The current conference is an important next step in making that chance a reality."

Dr S.P. Agarwal, Director General of Health Services, 14 September 2001

Dr S.P. Agarwal, Director General of Health Services, lighting the lamp during the medical college workshop, 14 September 2001

Use dots

Medical colleges

Under the RNTCP, the initiative to increase the involvement of medical colleges is gaining momentum. A 2-day workshop was inaugurated by the Honourable Minister of State for Health and Family Welfare, Government of India, Shri A. Raja, at the National Tuberculosis Institute, Bangalore in September 2001. Dr S.P. Agarwal, Director General of Health Services and other important policy-makers and 75 leading experts from 40 medical schools of the country participated in the workshop.

This workshop was built on an earlier consensus conference held in 1997. The earlier conference concluded that: "....phased and effective implementation of the RNTCP is the best strategy and perhaps the only chance of controlling TB in India during this generation."

The 2001 workshop was attended by leading medical professors throughout the country. This gathering of TB experts issued a consensus statement "....within its eight years of implementation and three years of large-scale service delivery, the RNTCP has proved its credibility as the most effective strategy to control TB in India".

Presently, two-thirds of the medical colleges in RNTCP implementing areas are participating in the programme. RNTCP nodal centres for medical colleges are proposed to be established in all zones of India to facilitate implementation of the recommendations.

Recommendations made by experts place emphasis on establishment of RNTCP centres in all medical colleges; prioritizaton and improvement of teaching on RNTCP; involvement in training, conducting operational research, monitoring and supervision; information, education and communication activities; private sector participation; quality assurance of drugs and sputum microscopy. Additionally, colleges should provide services for the management of complicated cases and develop model DOTS centres.

stop TB

RNTCP disability management projects

In accordance with the continuing effort to address problems related to TB more comprehensively, the programme has branched out to address the issue of disability due to TB. Disability due to TB can be:

- Locomotor disability caused by extrapulmonary TB resulting from affliction of the musculoskeletal and/or nervous system
- Respiratory disability due to pulmonary TB in patients with extensive parenchymal damage and chronic pleural involvement.

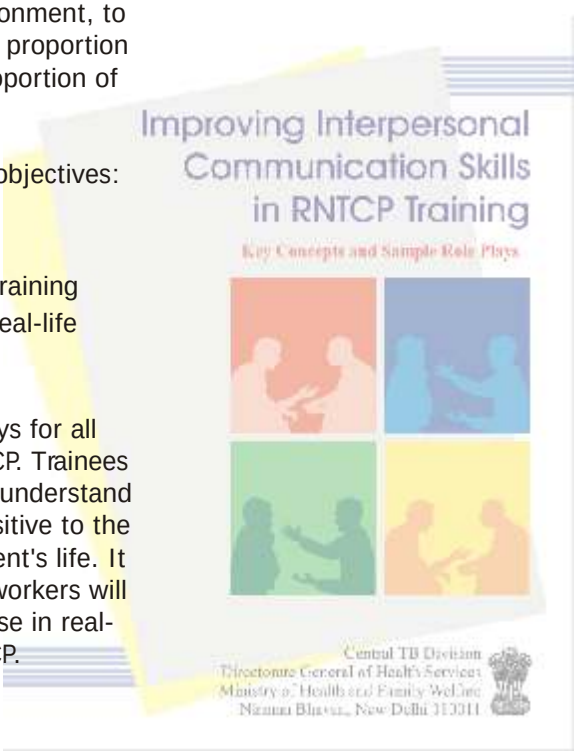
An action plan for implementing the disability management project on a pilot basis has been prepared. The disability management project will be able to reduce impairments and minimize the suffering caused by existing departures from good health. The districts of Jaipur, Imphal, Thiruvananthapuram, Patna and Mumbai have been identified for implementation of the project. Preparatory activities before service delivery include training of staff, coordinating with a general hospital where the Medical Rehabilitation Unit (MRU) is to be set up, identifying space and staff for the MRU and procuring gadgets and equipment for the Unit as well as for patients. Over 130 doctors have been trained under the project. MRUs have been established at Imphal, Jaipur and Thiruvananthapuram. So far, 57 patients have availed of the various services under the project. Two service delivery sites, one at Mumbai and the other at Patna are expected to start shortly.

Patient with extrapulmonary TB undergoing physiotherapy, Jaipur, Rajasthan

Use dots

Improved Interpersonal Communication in RNTCP

Interpersonal communication (IPC) skills are very important for the success of the programme. A training module for improved IPC skills has been prepared and incorporated in the training to help all categories of health workers. This module will help to create a patient-friendly environment, to enhance patients' compliance and to increase the proportion of patients that present for treatment and the proportion of those cured.



The module is expected to achieve the following objectives:

- Understand the importance of improved IPC
- Develop insights into one's own behaviour
- Practice good communication skills during the training
- Put good communication skills into practice in real-life situations.

The IPC training module is in the form of role-plays for all categories of health workers involved in the RNTCP. Trainees perform role-plays during the training in order to understand the patient's perspective and also to become sensitive to the social and cultural aspects that influence the patient's life. It is expected that through these role-plays health workers will learn good communication skills which they will use in real-life situations and add to the success of the RNTCP.

Quality Control of Diagnosis

Sputum microscopy is the cornerstone of the RNTCP both for diagnosis and follow-up of patients. Reliable laboratory microscopy results are essential for identification of infectious patients, proper categorization of patients, decision to start the continuation phase, and to declare patients as cured.

The microscopy quality in the RNTCP continues to improve. More than half the patients had laboratory confirmation of their disease (positive smears), compared with less than one in four in the previous programme. The Central TB Division, with inputs from National Institutes, developed a new protocol for quality assurance, incorporating blinded cross-checking of microscopy work, which was sent to all the states. Several states have already begun performing blinded proficiency testing of the districts by the State Training and Demonstration Centres (STDCs). The National Tuberculosis Institute (NTI), Bangalore and Tuberculosis Research Centre (TRC), Chennai are National Reference Centres for quality assurance and every six months prepare blinded quality control slides for evaluation of each of the 16 STDCs.

Schoolchildren performing a skit on TB in Tamil Nadu

Information, Education and Communication (IEC)

IEC activities in the RNTCP aim to improve the quality of TB patient care, promote better understanding of TB and its cure, and to reduce stigma. IEC activities at the national and state levels are complementary. While mass media activities are planned at the national level, state-level activities are more specific and need-based, with emphasis on sensitization of the health provider, production of state-specific IEC material, dissemination of this material to local levels and optimum use of folk media at the district levels. Effective, regular and consistent IEC activities are expected to enhance the performance of the RNTCP.

Rally of schoolchildren on World TB Day 2001 West Bengal

Research Activities

Dr P.R. Narayanan presenting the findings of operational research at TRC to the Union Minister for Health and Family Welfare, Padmashree Dr C.P. Thakur and Secretary of Health, Shri Javed Choudhary on 18 October 2001

stop TB

Research Dissemination Workshop

India's TB control programme must be supported by operational research that provides tools for continuous quality improvement. The goal is to improve the diagnosis, care and access for TB patients by translating the results of that research into policy. With financial support from the World Health Organization (WHO) and British Department for International Development (DFID), the Tuberculosis Research Centre conducted a workshop to disseminate findings of operational research conducted in India during the past 5 years. The workshop was attended by approximately 60 participants, which included RNTCP programmme officers, medical college professors, and representatives from TB research institutes and nongovernmental organizations. The participants discussed the implications of the research findings to date and recommended further research for improving private–public partnerships, care-seeking behaviour of chest symptomatics, effectiveness of DOT providers, and assessing the socioeconomic burden of TB.

Research Dissemination Workshop at TRC, Chennai on 16 and 17 March 2001

Annual Risk of Infection

To estimate the current annual risk of tuberculosis infection (ARI) in different regions of the country, the National Tuberculosis Institute, Bangalore in conjunction with the Tuberculosis Research Centre (TRC), Chennai initiated a countrywide survey in January 2000. The ARI is the most sensitive epidemiological indicator of the TB situation in the community as it expresses the overall impact of various factors affecting the transmission of the tubercle bacilli, i.e. the load of infectious cases in the community, duration of infectiousness and efficiency of case finding and treatment programmes. No epidemiological survey on TB of this magnitude has been conducted in India in the past except the national survey conducted by the Indian Council of Medical Research (ICMR) in the 1950s.

The survey is being conducted in 26 districts; eight in the East zone and six each in the North, South, and West zones. A total of about 165 000 children have been investigated till February 2002. The fieldwork is tentatively scheduled to conclude by the end of 2002. The analysis of the data pertaining to the North and South zones is at an advanced stage.

The survey results will provide information on the present epidemiological situation of TB in different parts of the country.

Use dots

Results of a large field trial started in 1968–70, and 15-year follow-up showed little decrease in the annual risk of infection (2% annually). The incidence of smear-positive TB decreased by only 2.3% per annum (157 to 113/100 000), approximately the same rate as population growth in this period. The prevalence of culture-positive tuberculosis decreased by only 1.4% per annum (870/100 000 in 1968–75 to 694/100 000 in 1984–86), and, reflecting the lack of effective treatment, there were 3.5 times as many prevalent cases as incident cases. In fact, "the ratio of prevalence to incidence increased steadily over time, as a symptom of ineffective treatment and 'pooling' of partially treated cases". Furthermore, even the slight decrease in cases was entirely due to a decrease in the development of TB in persons with abnormal radiographs at baseline, which "was likely due to a greater likelihood that subjects with radiographic abnormalities had received antituberculosis drugs, as treatment became more widespread". The study meticulously documents the continuing burden of TB and the need for effective control measures; the area has begun implementing the DOTS strategy, and the impact of DOTS on TB epidemiology will be documented in the years to come.

TRC. IJTLD, 2001, 5:142–157

Surveillance for Drug Resistance

Monitoring of drug resistance in TB programmes is an important indicator of programme performance in the community. Drug-resistant TB is a symptom of poor programme performance. It is important to document the level of drug resistance in the community in order to monitor the impact of the programme over time and also to ensure that treatment regimens are appropriate. In an effective programme, drug resistance is not created, and the prevalence of drug resistance should decrease with time. The Tuberculosis Research Centre, Chennai, which is a WHO-Collaborating Centre for TB control, research and training in mycobacteriology, is coordinating this multicentric project. Preliminary results show the prevalence of MDR-TB to range from 1% to 3% among previously untreated patients. Among previously treated patients the prevalence was 5 times higher. These findings indicate the need for DOT and the need to achieve high cure rates among new patients.

The possibility of increase in drug resistance in patients receiving short-course treatment was explored. If patients resistant to isoniazid develop resistance to rifampicin during short-course treatment, TB treatment would become very difficult. This study reports the response of treatment, relapse rates and emergence of drug resistance of several trials at the TRC, Chennai. Patients were treated with short-course chemotherapy. Of 1817 patients, 320 (17.6%) had initial drug resistance, of which 58 (3.2%) had MDR-TB. Response to treatment was not influenced by the duration of previous anti-tuberculosis treatment. Relapse rates were higher among patients with drug resistance (13% vs 7%). Patients whose isolates were initially resistant to isoniazid had more failures compared to patients with drug-susceptible organisms (19% vs 2%). However, of the 320 patients who had drug-resistant organisms, 260 (81%) had a favourable response. Emergence of resistance to isoniazid, rifampicin or both occurred in only 1% of patients with drug-susceptible organisms and in 11% of patients with organisms resistant to isoniazid. Overall, the emergence of resistance to rifampicin was only 2%, despite a high level of isoniazid resistance. The study concludes that standard short-course treatment can safely and effectively treat sputum-positive pulmonary TB patients with minimal emergence of rifampicin resistance.

TRC. IJTLD, 2001, 5:40–45

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Missed opportunities for diagnosis of pulmonary TB: a study among rural patients seeking relief on their own under the TB programme in India

Chest symptomatics in the community reportedly shop around, seeking relief at various health facilities, before they are diagnosed as tuberculosis cases and put on appropriate treatment. This investigation explored the delay in seeking care on the part of the patient following chest symptoms (patient delay), time taken for diagnosis as TB and starting treatment, following his/her first action to seek relief from symptoms (health system delay), reasons for patients shifting from one health facility to another prior to diagnosis, and expenditure incurred by patients before diagnosis. The participants were from an NTP area and an RNTCP area. Patient delay was similar in the two areas but there was a significant reduction in health system delay in the RNTCP area (1.8 months vs 0.7 months, $p \leq 0.05$), probably due to efficiency of the health services. Expenditure incurred was significantly less in the RNTCP area compared to the NTP area ($p<0.05$). Patients had to make a number of visits (mean of 12 visits per patient), but these were less in the RNTCP area. The DTC diagnosed 58.5% of cases, 9% were diagnosed at other government facilities and 20% by traditional medicine practitioners.

The study concludes that there is considerable delay in the diagnosis of TB patients even after the onset of symptoms and is independent of age, sex, educational status or income. It is suggested that wider distribution and upgradation of diagnostic facilities are required to minimize the missed opportunities for diagnosis of TB. Service delivery facilities should include traditional medicine practitioners, other government health institutions and private practitioners who contribute towards increasing the available diagnostic opportunities.

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Use dots

Socioeconomic impact of parental tuberculosis on children

The impact of parental pulmonary TB on children was examined from a larger study of socioeconomic effects of the disease. The effect on children was studied in respect of (i) socioeconomic and demographic characteristics of the parents (who were patients), (ii) the child care functions of mothers who were patients, and (iii) effect on children's education.

In all, 276 children of 167 tuberculous parents were studied. Child caring on the part of mothers fell from 64% to 35% for rural females and from 74% to 33% for urban females; 11% of children (8% rural, 13% urban) dropped out of school; 34% of the study parents could not buy school books or adequate food because of loss of income and 20% of the children were obliged to take up jobs in order to supplement income.

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Public–private partnership in tuberculosis control: experience in Hyderabad, India

This study aimed to determine whether private practitioners and the government can collaborate with a nongovernmental intermediary to implement DOTS effectively. A non-profit hospital provided DOTS services to a population of 100 000 for 3 years, then expanded coverage to 500 000 in October 1998. After diagnosis, patients received directly observed treatment free of charge at the trust hospital or at 30 conveniently located small hospitals. No financial incentives were used. Medicines and laboratory reagents were provided by the government.

Of 2244 persons referred, 969 (43%) had TB. The detection rate increased from 50 to 200/100 000 over the first 2–3 years of the project, and has increased gradually since expansion; 90% of new smear-positive patients and 77% of re-treatment patients were successfully treated. Compared with those treated at a neighbouring government DOTS centre, patients in this project paid less for diagnosis and treatment. Collaborative efforts between private practitioners and the government can achieve moderately high rates of case detection and high rates of treatment success. Public–private services appeared to be more convenient to patients.

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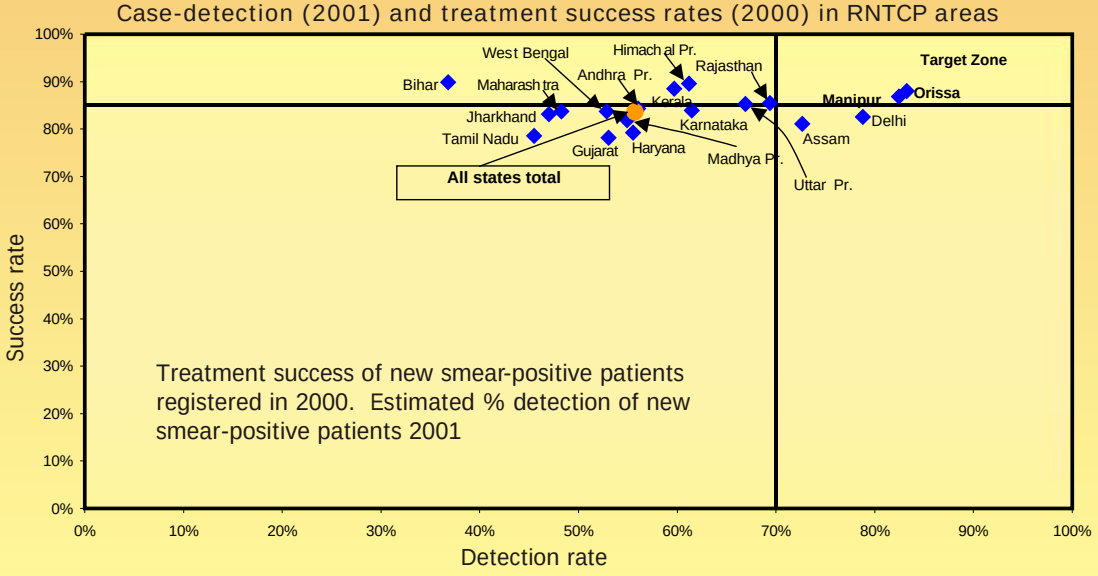
National Tuberculosis Institute, Bangalore

Performance of the RNTCP

Case detection rate in RNTCP areas—2001

Case-detection (2001) and treatment success rates (2000) in RNTCP areas



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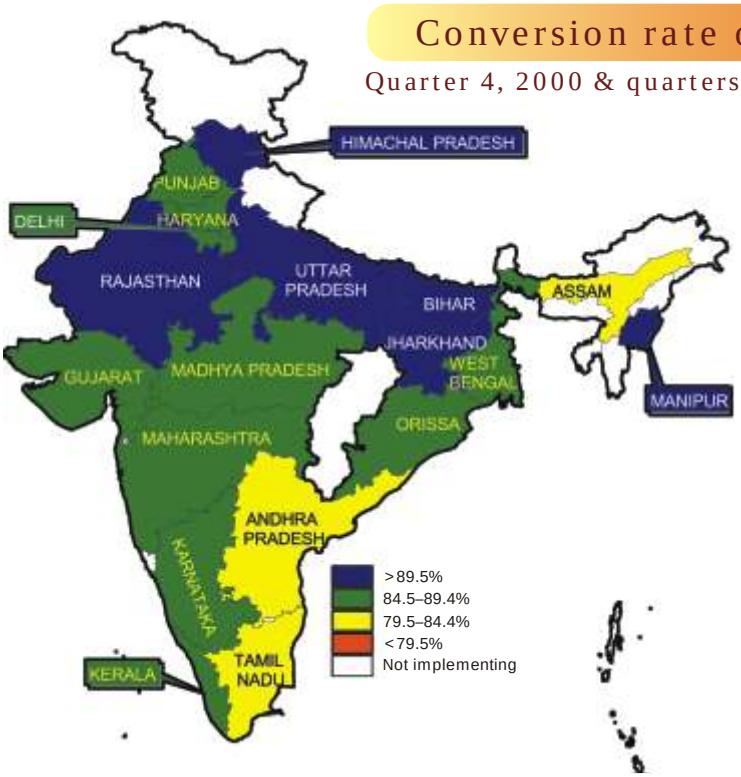
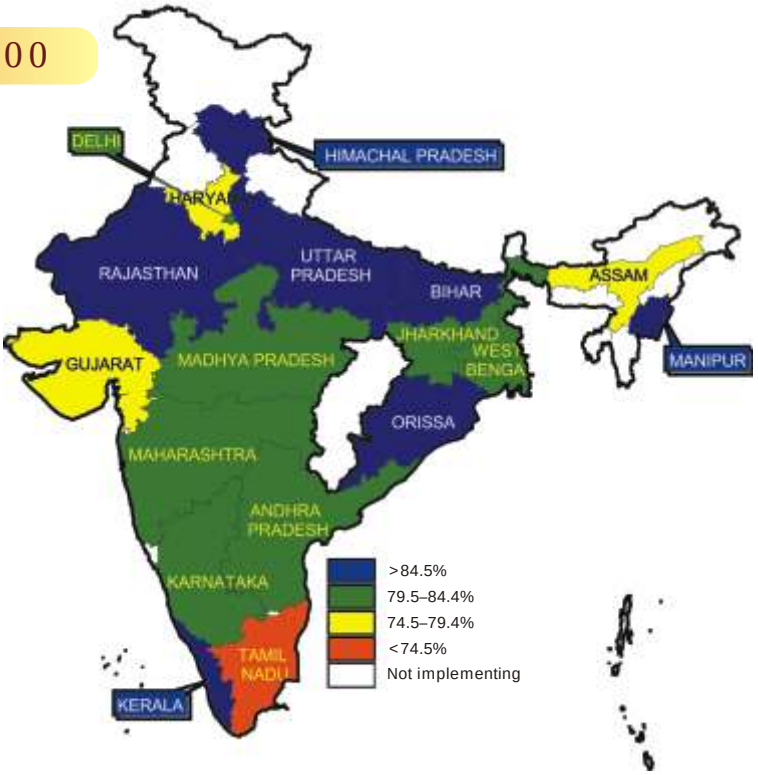
Conversion rate of India

Quarter 4, 2000 & quarters 1-3, 2001



Cure rate of India, 2000



Use dots

Performance of states

Case Finding (2001), Smear Conversion (4th quarter 2000 and quarters 1-3, 2001) and Treatment Outcomes (2000)

State	Popn covered in lakhs by 31.12.01	Total cases treated	Annual total detection rate *	New S+ve cases treated	Annual new S+ve detection rate *	Proportion of estimated new S+ve cases detected**	Ratio S-ve to S+ve patients	3-month conversion rate of new S+ve patients	Success rate of new S+ve patients
Andhra Pradesh	255	22745	104	10472	48	56%	0.8	82%	84%
Assam	12	1629	139	724	62	73%	0.6	83%	81%
Bihar	112	8822	79	3493	31	37%	0.8	95%	90%
Delhi	138	26380	196	8744	67	79%	0.7	88%	83%
Gujarat	461	50551	117	19635	45	53%	0.7	87%	78%
Haryana	51	6655	130	2422	47	56%	0.9	86%	79%
Himachal Pradesh	56	9762	188	3674	70	61%	0.6	93%	90%
Jharkhand	49	4443	91	1948	40	47%	0.9	92%	83%
Karnataka	199	20959	113	9646	52	61%	0.7	86%	84%
Kerala	318	22590	71	9500	30	60%	0.6	89%	89%
Madhya Pradesh	65	6472	133	2261	47	55%	1.2	87%	82%
Maharashtra	678	56885	120	19818	41	48%	1.0	88%	84%
Manipur	8	1767	212	687	82	82%	0.8	93%	87%
Orissa	108	14060	149	6835	71	83%	0.6	89%	88%
Punjab	18	637		276			0.2	86%	
Rajasthan	565	84557	150	33304	59	69%	0.7	90%	85%
Tamil Nadu	603	46546	103	17428	39	45%	1.0	84%	79%
Uttar Pradesh	206	28057	136	11727	57	67%	0.8	91%	85%
West Bengal	600	58141	119	22584	45	53%	0.9	86%	84%
Grand Total	**4503**	**471658**	**121**	**185178**	**47**	**56%**	**0.8**	**88%**	**84%**

* Rate calculations include only districts implementing for all of 2001

** Estimated new smear-positive cases adjusted for available data on annual risk of infection for Kerala (50/lakh), Himachal Pradesh (115/lakh) and Manipur (100/lakh)

stop TB

Performance of Districts

Case Finding (2001), Smear Conversion (4th quarter 2000 and quarters 1–3, 2001) and Treatment Outcomes (2000)

District	Popn (lakhs)	Total cases treated	Annual total detection rate *	New S+ve cases treated	Annual new S+ve detection rate *	Ratio S-ve to S+ve patients	3-month conversion rate of new S+ve patients	Cure rate of new S+ve patients	Success rate of new S+ve patients
ANDHRA PRADESH									
Anantapur	36	3421	94	1552	43	0.8	70%		
Chittoor	37	2106		1010		0.6	64%		
Hyderabad	37	4478	121	1644	45	0.8	85%	83%	83%
Mahbubnagar	35	3586	102	1836	52	0.7	72%		
Medak	27	2632	99	936	35	1.4	85%	79%	86%
Rangareddi	35	1977	56	1062	30	0.5	86%		
Srikakulam	25	685		296		1.2	100%		
Vizianagaram	22	3860	172	2136	95	0.7	96%		
ASSAM									
Dibrugarh	12	1629	139	724	62	0.6	83%	78%	81%
BIHAR									
Muzaffarpur	36	2669	71	755	20	1.1	91%		
Patna	47	3450	73	1512	32	0.8	96%	89%	89%
Vaishali	27	2703	100	1226	45	0.7	95%	90%	90%
DELHI									
BJRM Chest Clinic	3	163		44		0.6			
DDU Chest Clinic	7	2048		429		1.4	82%	74%	78%
GTB Chest Clinic	8	1024		364		0.4	82%	85%	85%
Gulabi Bagh	9	1228	136	415	46	0.6	91%	89%	89%
Jhandewalan	5	778	156	197	39	1.1	93%	84%	84%
Karawal Nagar	9	2264	252	890	99	0.7	87%	78%	83%
Kingsway	4	1698	425	579	145	0.5	96%	88%	88%
LN Chest Clinic	3	259		81		0.6	81%		
LRS	16	2942	184	1012	63	0.5	86%	83%	83%
Moti Nagar	5	2240	448	654	131	0.9	89%	81%	82%
Narela	5	683	137	238	48	0.7	95%	82%	82%
NDMC	4	414	104	145	36	0.6	88%	87%	87%
NDTC	2	673	337	201	101	0.6	89%	88%	89%
Nehru Nagar	18	2290	127	861	48	0.7	86%	78%	78%

* Rate calculations include only districts implementing for all of 2001

Performance of Districts (continued)

District	Popn (lakhs)	Total cases treated	Annual total detection rate *	New S+ve cases treated	Annual new S+ve detection rate *	Ratio S-ve to S+ve patients	3-month conversion rate of new S+ve patients	Cure rate of new S+ve patients	Success rate of new S+ve patients
DELHI (continued)									
Patparganj	7	1490	213	528	75	0.7	85%	78%	78%
RK Mission	8	1255	157	412	52	0.7	88%	83%	83%
RTRM Chest Clinic	4	500		143		0.7	83%	81%	81%
SGM Chest Clinic	8	1847		652		0.6	91%	83%	84%
Shahadra	8	1758	220	579	72	0.7	87%	84%	84%
SPM Marg	5	826	165	320	64	0.5	85%	72%	73%
GUJARAT									
Ahmadabad	23	2429	106	898	39	0.9	94%	88%	88%
AMC	35	7266	207	2070	59	0.8	84%	68%	70%
Amreli	14	1130	81	425	31	0.6	90%	72%	74%
Anand	19	2405	130	1143	62	0.5	82%	73%	73%
Banas Kantha	27	2846	104	942	34	0.9	85%	79%	79%
Bhavnagar	25	1997	81	792	32	0.5	76%	58%	61%
Dahod	16	2268	139	960	59	0.5	92%	81%	83%
Gandhinagar	8	499		202		0.9	87%		
Jamnagar	19	1989	104	777	41	0.6	85%	77%	80%
Junagadh	30	3035	102	1291	43	0.6	81%	73%	75%
Kheda	20	2484	123	1015	50	0.5	86%	71%	72%
Mahesana	17	1930	115	758	45	0.8	94%	86%	87%
Mansa-Gj	16	2310	142	890	55	0.9	93%	87%	87%
Panch Mahals	20	3638	180	1432	71	0.7	91%	78%	78%
Rajkot	32	2872	91	1159	37	0.6	89%	79%	80%
Sabar Kantha	21	3382	162	1167	56	1.3	90%	87%	89%
Surat	15	914	60	495	33	0.5	92%	83%	84%
Surat Municipal Corp	24	1042	43	439	18	0.8	87%	77%	77%
Surendranagar	15	123		62		0.2			
Vadodara	14	920		471		0.4	86%		
Vadodara Corp	13	1063		399		0.8	85%		
Valsad	26	2558	97	1104	42	0.5	85%	75%	75%
Vyara (Surat)	10	1451	138	744	71	0.6	76%	70%	76%
HARYANA									
Faridabad	22	2978	136	1105	50	0.9	89%	83%	84%
Gurgaon	17	2170	131	747	45	0.8	81%	68%	73%
Sonipat	13	1507	118	570	45	0.9	86%	80%	81%

* Rate calculations include only districts implementing for all of 2001

Performance of Districts (continued)

District	Popn (lakhs)	Total cases treated	Annual total detection rate *	New S+ve cases treated	Annual new S+ve detection rate *	Ratio S-ve to S+ve patients	3-month conversion rate of new S+ve patients	Cure rate of new S+ve patients	Success rate of new S+ve patients
HIMACHAL PRADESH									
Bilaspur-Hp	3	380		169		0.4	93%		
Hamirpur-Hp	4	910	221	387	94	0.6	94%	88%	88%
Kangra	13	2195	164	772	58	0.7	94%	91%	91%
Kinnaur	1	6		2		1.0			
Kullu	4	714		254		0.7	89%		
Lahul & Spiti	0.3	69	208	27	81	0.8	88%		
Mandi	9	2348	261	838	93	0.5	91%	90%	90%
Shimla	7	1053	146	321	44	1.0	97%	89%	89%
Sirmaur	5	814	178	345	75	0.3	93%	85%	85%
Solan	5	802	161	380	76	0.3	94%	89%	89%
Una	4	471		179		0.8	92%		
JHARKHAND									
Palamu	21	2216	106	1083	52	0.7	92%	75%	75%
Ranchi	28	2227	80	865	31	1.1	92%	85%	85%
KARNATAKA									
Bagalkot	17	1842	111	911	55	0.8	87%	82%	82%
Bangalore City	50	3527	70	1383	28	0.7	88%	85%	85%
Bangalore U	15	1057	70	540	36	0.5	90%	82%	82%
Bellary	20	3509	173	1675	83	0.8	74%	64%	73%
Bijapur	18	1735	96	788	44	0.6	87%	75%	75%
Chitradurga	15	2604	172	1251	83	0.5	88%	72%	78%
Davanagere	18	959		372		1.0	74%		
Koppal	12	1612	135	817	68	0.6	89%	86%	86%
Mandya	18	1552		725		0.8	78%		
Raichur	16	2562	155	1184	72	0.7	94%	86%	86%
KERALA									
Alappuzha	21	1456	69	565	27	0.9	72%	100%	100%
Ernakulam	31	2973	96	1107	36	0.9	89%	87%	88%
Idukki	11	432	38	186	16	0.5	85%	100%	100%
Kannur	24	1909	79	771	32	0.6	91%	91%	91%
Kasaragod	12	645	54	311	26	0.4	88%	86%	86%
Kollam	26	2066	80	968	37	0.6	91%	89%	89%
Kottayam	20	1739	89	735	38	0.7	87%	88%	88%
Kozhikode	29	1932	67	680	24	0.9	89%	83%	86%

* Rate calculations include only districts implementing for all of 2001

Performance of Districts (continued)

District	Popn (lakhs)	Total cases treated	Annual total detection rate *	New S+ve cases treated	Annual new S+ve detection rate *	Ratio S-ve to S+ve patients	3-month conversion rate of new S+ve patients	Cure rate of new S+ve patients	Success rate of new S+ve patients
KERALA (continued)									
Malappuram	36	1768	49	757	21	0.6	88%	89%	91%
Palakkad	26	2064	79	894	34	0.6	89%	86%	86%
Pathanamthitta	12	776	63	386	31	0.3	92%	90%	90%
Thiruvananthapuram	32	1996	62	860	27	0.6	92%	91%	91%
Thrissur	30	2358	79	1055	35	0.4	90%	86%	86%
Wayanad	8	476	61	225	29	0.4	90%	91%	91%
MADHYA PRADESH									
Bhopal	18	2474	135	864	47	1.1	91%	84%	84%
Raisen	11	284		108		1.0	82%		
Rajgarh	13	1419	113	532	42	1.0	86%	79%	83%
Sehore	11	466		144		1.3	84%		
Vidisha	12	1829	151	613	50	1.3	82%	77%	79%
MAHARASHTRA									
Ahmednagar	41	1596		517		1.2	84%		
Aurangabad-Mh	20	1751	86	679	33	1.0	92%		
Aurangabad Mun Corp	9	682		271		0.7	91%		
Bid	22	117		51		0.5			
Dhule	17	948		404		1.1	90%		
Jalgaon	37	2130		778		0.9	82%		
Jalna	16	891		413		0.5	90%		
Kolhapur	30	3063	101	1036	34	1.2	88%	100%	100%
Kolhapur Mun Corp	5	413		137		1.1	89%		
Latur	21	519		173		0.9	75%		
Mumbai	119	17764	149	5228	44	1.2	88%	80%	81%
Nasik	39	4311	111	1690	44	0.9	93%	67%	67%
Nasik Corp	11	780	70	238	21	1.1	79%		
Navi Mumbai	7	1219	173	396	56	1.4	76%		
Osmanabad	15	158		54		1.0			
Pimpri Chinchwad	10	1431	142	486	48	0.7	93%	91%	91%
Pune	25	2799	110	1160	46	0.5	91%	88%	88%
Pune Rural	37	3607	98	1388	38	0.9	92%	86%	86%
Raigarh-Mh	22	3020	137	1199	54	1.0	91%	85%	86%
Ratnagiri	17	748		333		0.8	75%		
Sangli	21	2184	102	690	32	1.1	84%		

* Rate calculations include only districts implementing for all of 2001

Performance of Districts (continued)

District	Popn (lakhs)	Total cases treated	Annual total detection rate *	New S+ve cases treated	Annual new S+ve detection rate *	Ratio S-ve to S+ve patients	3-month conversion rate of new S+ve patients	Cure rate of new S+ve patients	Success rate of new S+ve patients
MAHARASHTRA (continued)									
Sangli Muni Corp	4	356		109		0.9	69%		
Satara	28	2514	90	956	34	1.0	84%		
Sindhudurg	9	331		89		1.7	100%		
Solapur	30	132		61		0.7			
Solapur Muni Corp	9	72		17		1.6			
Thane	45	1701		684		0.9	88%		
Thane Muni Corp	13	1648	131	581	46	0.8	79%		
MANIPUR									
Imphal	8	1767	212	687	82	0.8	93%	87%	87%
ORISSA									
Debagarh	3	262	96	118	43	0.6	92%	84%	86%
Jharsuguda	5	778	153	316	62	0.7	93%	82%	82%
Kendujhar	16	1862	119	879	56	0.7	89%	85%	85%
Koraput	12	671		392		0.3	90%		
Malkangiri	5	614		298		0.6	70%		
Mayurbhanj	22	3632	163	1847	83	0.6	92%	89%	89%
Nabarangapur	10	612		379		0.3	82%		
Rayagada	8	1425	173	813	99	0.3	75%		
Sambalpur	9	1041	112	503	54	0.6	87%	82%	83%
Sundargarh	18	3163	173	1290	71	0.8	96%	92%	92%
PUNJAB									
Patiala	18	637		276		0.2	86%		
RAJASTHAN									
Ajmer	22	3751	172	1543	71	0.6	92%	81%	82%
Alwar	30	4217	141	1893	63	0.7	86%	79%	82%
Banswara	15	2343	156	983	66	0.7	95%	87%	87%
Baran	10	1536	150	563	55	0.6	93%	90%	90%
Barmer	20	1780	91	654	33	1.0	85%		
Bharatpur	21	2133	102	822	39	0.8	91%	83%	85%
Bhilwara	20	4516	225	1749	87	0.6	92%	91%	91%
Bikaner	17	2085	125	749	45	0.9	86%	74%	74%
Bundi	10	1723	179	720	75	0.9	91%	82%	82%
Chittaurgarh	18	2506	139	945	52	0.4	91%	91%	91%
Churu	19	2519	131	977	51	0.8	91%	87%	87%

* Rate calculations include only districts implementing for all of 2001

Performance of Districts (continued)

District	Popn (lakhs)	Total cases treated	Annual total detection rate *	New S+ve cases treated	Annual new S+ve detection rate *	Ratio S-ve to S+ve patients	3-month conversion rate of new S+ve patients	Cure rate of new S+ve patients	Success rate of new S+ve patients
RAJASTHAN (continued)									
Dausa	13	2168	165	927	70	0.5	92%	89%	89%
Dhaulpur	10	1479	150	478	49	0.5	89%	83%	83%
Dungarpur	11	2082	188	1198	108	0.3	85%	85%	87%
Ganganagar	18	2583	144	929	52	1.1	85%	55%	55%
Hanumangarh	15	2524	166	934	62	0.5	91%	80%	82%
Jaipur	53	9399	179	3293	63	0.9	90%	85%	85%
Jaisalmer	5	496	98	212	42	0.8	81%	89%	89%
Jalore	14	1704	118	659	45	0.8	87%	70%	70%
Jhalawar	12	1613	137	644	55	0.7	89%	89%	89%
Jhunjhunun	19	2817	147	1077	56	0.8	87%	80%	81%
Jodhpur	29	2953	103	907	31	1.4	91%	77%	77%
Karauli	12	2331	193	856	71	0.7	90%	94%	94%
Kota	16	2191	140	769	49	1.1	92%	84%	84%
Nagaur	28	3384	122	1166	42	0.9	94%	87%	87%
Pali	18	2492	137	1183	65	0.6	93%	87%	87%
Rajsamand	10	1871	190	753	76	0.7	86%	77%	77%
Sawai Madhopur	11	1929	173	706	63	0.5	93%	88%	88%
Sikar	23	2899	127	1112	49	0.8	93%	88%	88%
Sirohi	9	1306	154	550	65	0.8	87%	89%	89%
Tonk	12	2304	190	1065	88	0.5	97%	92%	93%
Udaipur	26	4923	187	2288	87	0.4	82%	78%	80%
TAMIL NADU									
Chennai	42	4544	108	1734	41	0.9	90%	82%	83%
Coimbatore	42	758		283		0.9	69%		
Cuddalore	23	3941	173	1372	60	0.9	93%	77%	85%
Dharmapuri	28	2387	84	848	30	1.0	79%	55%	62%
Dindigul	19	1561		592		1.1	92%		
Erode	26	2066		845		0.9	73%		
Kancheepuram	29	1381	48	372	13	1.8	80%		
Kanniyakumari	17	698		84		4.4			
Karur	9	36		14		1.0			
Madurai	26	63		13		3.5			
Nagapattinam	15	888		365		1.0	87%		
Namakkal	15	1804	121	590	39	1.2	91%	76%	76%
Perambalur	5	532		232		0.7	73%		

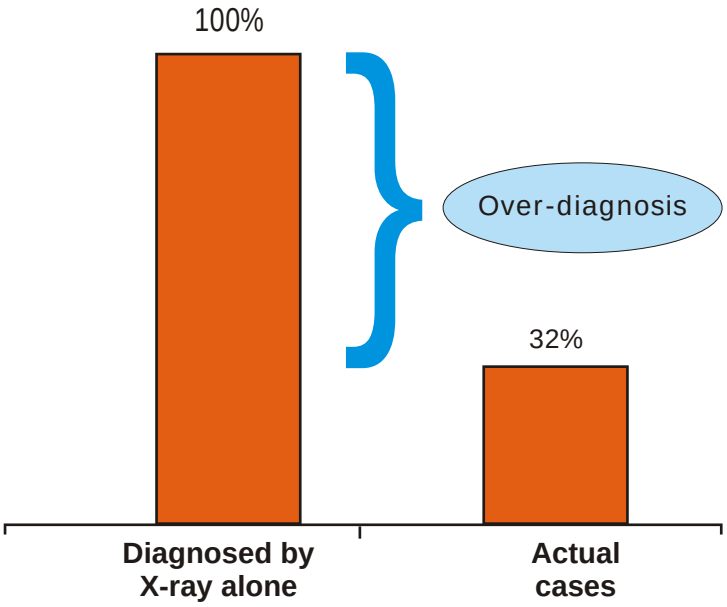
* Rate calculations include only districts implementing for all of 2001

Performance of Districts (continued)

District	Popn (lakhs)	Total cases treated	Annual total detection rate *	New S+ve cases treated	Annual new S+ve detection rate *	Ratio S-ve to S+ve patients	3-month conversion rate of new S+ve patients	Cure rate of new S+ve patients	Success rate of new S+ve patients
TAMIL NADU (continued)									
Pudukkottai	15	1231		483		0.9	85%		
Ramanathapuram	12	903		365		0.7	77%		
Salem	30	2750	92	1301	43	0.2	90%	90%	90%
Sivaganga	12	703		269		1.2	85%		
Thanjavur	22	2401	109	877	40	0.7	78%	59%	66%
Theni	11	127		38		1.8			
The Nilgiris	8	288		124		0.6	81%		
Thiruvallur	27	3825	140	1370	50	1.2	62%	77%	78%
Tiruchirappalli	24	2100	88	996	42	0.5	89%	77%	81%
Tirunelveli	28	1406		446		1.7	74%		
Tiruvanamalai	22	2025	93	857	39	1.0	79%		
Toothukudi	16	1148		498		0.8	85%		
Vellore	35	3417	98	1354	39	1.0	84%		
Viluppuram	29	2899	98	945	32	1.3	78%	100%	100%
Virudhunagar	18	664		161		2.4	77%		
UTTAR PRADESH									
Baghpat	12	1522	131	577	50	1.0	89%	80%	84%
Barabanki	27	3771	141	1576	59	0.8	89%	81%	81%
BCM Hospital Sitapur	0.5	310		56		1.3	83%	80%	80%
Gautam Budh Nagar	12	1740	146	613	51	0.9	85%	56%	58%
Ghaziabad	33	4495	137	1859	57	0.8	91%	76%	77%
Lucknow	37	4560	124	1931	52	0.6	93%	93%	93%
Meerut	30	5792	193	2706	90	0.6	96%	89%	90%
Rae Bareli	29	3145	109	1345	47	1.0	92%	87%	87%
Unnao	27	2722	101	1064	39	1.1	88%	79%	80%
WEST BENGAL									
Bankura	32	4648	146	2020	63	0.8	91%	87%	88%
Barddhaman	69	6764		2783		0.8	83%		
Birbhum	30	2246		1060		0.7	80%		
Haora	43	4209	98	1457	34	1.0	80%	72%	75%
Hugli	50	6899	137	2511	50	1.1	88%	85%	86%
Jalpaiguri	34	4741	139	2171	64	0.6	87%	81%	82%
Kolkata	46	4423	97	1724	38	0.6	88%	86%	86%
Maldah	33	4933	150	1497	45	1.7	83%	73%	78%
Murshidabad	59	6861	117	2473	42	1.3	91%	83%	88%
Nadia	46	4096	89	1535	33	1.1	84%	78%	80%
North 24 Parganas	89	5270		2010		0.7	79%		
South 24 Parganas	69	3051		1343		0.7	83%		
Grand Total	**4503**	**471658**	**121**	**185178**	**47**	**0.8**	**88%**	**82%**	**84%**

* Rate calculations include only districts implementing for all of 2001

X-ray-based evaluation causes over-diagnosis of TB



A systematic evaluation of well-functioning District TB Centres by the National Tuberculosis Institute, Bangalore found that nearly 70% of the cases diagnosed and put on treatment on the basis of X-ray did not actually have tuberculosis. These patients are subjected to unnecessary, expensive and potentially toxic medicines.

Indian Journal of Tuberculosis, 1974

At present, sputum smear microscopy is the best test for diagnosis of pulmonary tuberculosis.

Cover and text design: Ishita Banerjee and Yogesh Grover
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Tuberculosis Control: 3 Truths

- Every patient with cough for more than 3 weeks should have 3 sputum smears examined in a competent laboratory. No patient should start treatment for pulmonary TB without 3 sputum tests.
- All smear-positive patients should be effectively treated. Only observed treatment with proven regimens can ensure cure.
- The public system has a responsibility to monitor the diagnosis and treatment of every smear-positive (infectious) patient.