

# STOPPING Tuberculosis



World Health Organization

12, rue de la Harpe, 75005 Paris, France

Telephone: (1) 47 79 02 44

Telex: 236 11 1136 WHORG

Telefax: (1) 47 79 02 43

# STOPPING Tuberculosis



World Health Organization  
Regional Office for South-East Asia  
New Delhi

This advocacy booklet was conceptualized and edited by Dr. Jai Narain, who is a Coordinator in the WHO South-East Asia Regional Office in New Delhi. Dr. Nani Nair provided valuable inputs during the preparation of this document. Dr. Emanuele Pontali updated it in 2002. Addressed primarily to political leaders and policy-makers, the document can be a useful tool for the general public, nongovernmental organizations and the private sector, to understand the unprecedented challenge posed by TB and to help respond to it effectively.

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For additional information, please contact:

**WHO South-East Regional Office**

Coordinator, Tuberculosis, HIV/AIDS and  
Other Communicable Diseases,

World Health House,

Indraprastha Estate,

New Delhi 110 002,

India

Tel: 0091 11 3370804

Fax: 0091 11 3370197

Email: [narainj@whosea.org](mailto:narainj@whosea.org)



**Dr Uton Muchtar Rafei**

Tuberculosis (TB) can affect all sections of society and all countries and communities are vulnerable to this infectious disease. The rapid increase in the incidence of TB in developing countries and its re-emergence in the developed world led the WHO to declare TB a Global Emergency in 1993.

The maximum morbidity and mortality from TB is borne by the most economically productive age group (15-60 years) of our society. Multi-drug resistant TB (MDR-TB) and HIV-TB co-infection pose further challenges to health planners.

The good news is that TB can be completely cured through directly observed treatment, short-course (DOTS) which is also the most cost effective way of controlling the disease. I urge you to join hands in addressing this serious public health challenge.

*Tuberculosis (TB) is generally caused by a bacterium called Mycobacterium tuberculosis.*

*TB mainly affects the lungs; pulmonary TB constitutes 80% of cases.*

*M. tuberculosis can also attack other parts of the body such as the lymph nodes, meninges, intestines, joints, kidneys and bones causing what is termed extra-pulmonary TB.*

*The commonest symptoms of pulmonary TB are:*

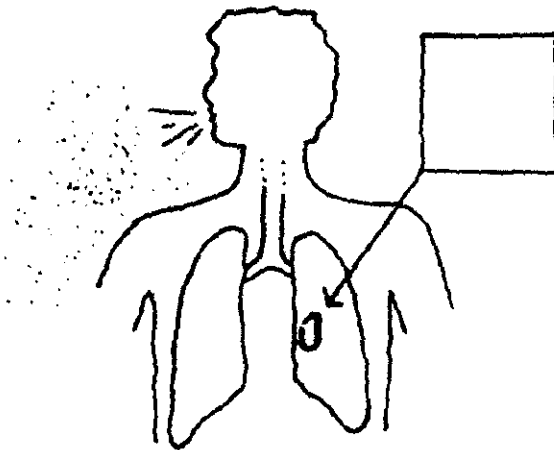
- # cough for three weeks or more*
- # fever.*

*Other symptoms of pulmonary TB are:*

- # lethargy*
- # lassitude*
- # loss of appetite*
- # loss of weight.*

*In extra-pulmonary TB, symptoms depend on the organ involved.*

*Untreated TB may lead to serious complications and to death.*



WHO declared tuberculosis a Global Emergency in 1993.

TB kills about 2 million people every year, constituting about 26% of avoidable adult deaths worldwide.

TB is the largest single infectious cause of death among women; it is responsible for more female deaths than all causes of maternal mortality combined.

The greatest burden of the morbidity and mortality is borne by adults aged 15-60 years. They are the most productive members of society.

Every year, more than 8.5 million new cases of TB (pulmonary and extra-pulmonary) occur, of which about 95% are in developing countries. India, China, Indonesia and Nigeria account for nearly half of the world's TB cases.



Even though TB is completely curable, large numbers of people continue to become ill and die from disease.

Many cases remain undiagnosed due to a lack of awareness both on the part of patients regarding the disease and the facilities available for diagnosis and health staff regarding the best protocols for diagnosis and treatment.

Moreover, many smear-positive patients, after having started treatment, do not complete their course of medicines. This leads to multidrug-resistant tuberculosis (MDR-TB) which is difficult to treat.

Infection with HIV increases the risk of active tuberculosis disease among individuals infected with TB.

In Africa where HIV infection is common, the number of TB cases has doubled or tripled in just a few years.

Rapid population growth, migration and poor socio-economic conditions pose major challenges favouring the spread of the disease.

## The TB Epidemic Is Getting Worse



The South-East Asia Region has 25% of the world's population but contributes to nearly 40% of the TB cases in the world.

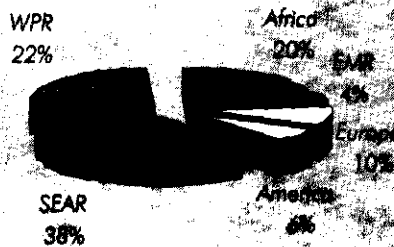
Every day, approximately 2 000 people die of TB in the South-East Asia Region.

Every year, nearly 3 million cases and 750 000 deaths due to TB are estimated to occur in the Region; five countries - Bangladesh, India, Indonesia, Myanmar and Thailand - account for more than 95% of the total cases in the Region.

Every year, TB is responsible for the death of at least 250 000 women in the Region. However, fewer women than men are diagnosed, suggesting in part that women may have reduced access to TB control services.

In India alone, about 2 million new cases occur every year. More than 40% of adults are infected, approximately 1.5 million patients are put on treatment yearly; and about 500 000 deaths from TB occur every year.

### **SEAR accounts for nearly 40% of world TB cases**





TB can affect the young and old, men and women, rich and poor. Some groups, however, are more vulnerable:

Individuals with HIV/AIDS.

Those suffering from:

- *poorly-controlled diabetes mellitus*
- chronic lung diseases such as chronic bronchitis and silicosis
- cancer
- advanced renal disease
- malnutrition
- alcoholism
- diseases for which steroid therapy is prescribed

*Heavy smokers*

The elderly

Those belonging to low-income groups

Those who use intravenous drugs

Those living/working in nursing homes, prisons, homeless shelters, drug treatment centres



Pulmonary TB is the infectious form of the disease. When a person with pulmonary TB coughs, sings, or sneezes, droplets containing TB bacteria are released into the air. People nearby who inhale the bacteria get infected.

However, not all those who inhale the TB bacteria and become infected go on to develop the disease. The incubation period - defined as the time from infection to the development of disease - is highly variable, ranging from a few weeks to a lifetime. The overall lifetime risk of disease is estimated at about 10%. However, the risk of developing TB is many times higher in persons with HIV infection.

Extra-pulmonary TB is virtually never infectious.

**Since pulmonary TB is responsible for the spread of the disease, curing patients with the pulmonary form of the disease (especially those who are sputum smear-positive) is the most effective method of disease prevention. Treating the disease prevents spread by stopping the disease at the source of infection.**



TB is now the most common, life-threatening opportunistic infection associated with HIV infection. The rate of progression to clinical TB is at least 30 times higher among those infected with both TB and HIV than among those infected only with TB.

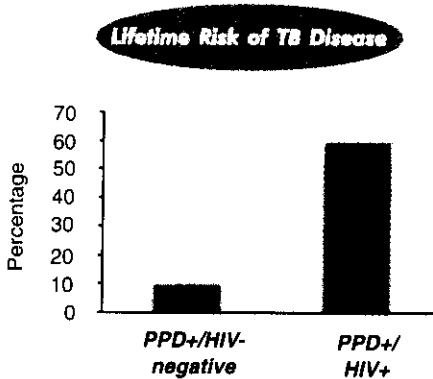
A parallel epidemic of TB is following the AIDS pandemic. This is already occurring in many developing countries, particularly in sub-Saharan Africa.

WHO estimates that over 2 million people are coinfecting with HIV and TB in South-East Asia Region.

Of the 40 million people worldwide who had HIV infection in 2001, about one-third are believed to be infected with TB.

Between 56% and 82% of AIDS cases diagnosed in India, Myanmar, Nepal and Thailand also have TB.

TB accounts for at least one-third of AIDS deaths worldwide and 40% of AIDS deaths in Asia.



**TB and AIDS**

HIV-associated TB poses many challenges to health care workers in the diagnosis, treatment and management of patients.

### **Difficulties encountered in diagnosis**

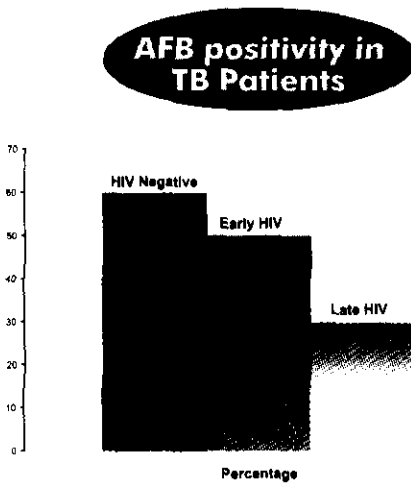
HIV-infected patients are more likely to have disseminated or extra-pulmonary TB.

X-ray abnormalities, which are not specific for TB, are even more non-specific in HIV-infected patients. This may lead to under-diagnosis of TB.

HIV-infected TB patients are less likely to have positive sputum smears, particularly at later stages of HIV infection.

### **Difficulties encountered in treatment**

Although the response to short-course treatment in HIV-positive TB patients is as good as that among HIV-negative TB patients, relapse rates tend to be higher in the former.



HIV-positive individuals appear to be more susceptible to developing drug-resistant TB.

A higher case fatality is observed during treatment, hence cure rates could be lower in HIV epidemic areas.

### **Difficulties encountered in management**

The increasing caseload of TB attributable to HIV and the need to provide treatment may overstretch the already overburdened health infrastructures in the developing world.

**TB therapy has been proven to be equally effective in HIV-positive individuals, and the management of TB remains the same irrespective of the HIV status of the patient.**



The emergence of MDR-TB is an indicator of poor programme performance. Effective implementation of DOTS can prevent and reverse the trend of MDR-TB in the community.

Common causes of MDR-TB include:

- incorrect prescriptions in terms of drug dosages, combinations and duration of treatment.
- incomplete treatment when patients are not motivated to take treatment until cured.
- use of drugs of unproven bioavailability.

Emergence of MDR-TB is a serious concern and an obstacle to successful treatment of TB because

1. commonly used medicines are no longer effective.
2. medicines used for the treatment of patients with MDR-TB may have severe adverse reactions
3. these medicines cost at least 100 times as much as a course of routine treatment; this cost cannot be borne by most TB control programmes.



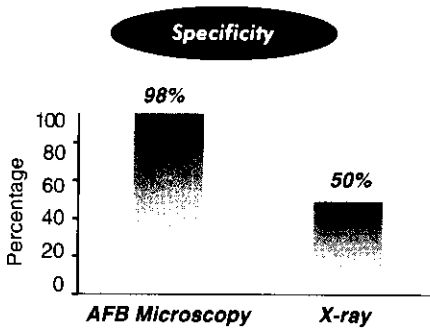
Among the diagnostic tools currently available to evaluate patients who may have TB, sputum microscopy is the most specific and is therefore recommended by WHO for diagnosis.

### **Sputum Smear Microscopy**

At present, bacteriological examination of sputum is the only way by which the diagnosis of pulmonary TB can be confirmed.

Sputum smear examinations are better than X-rays because microscopy:

- has much less inter-observer variability
- is more objective and reliable
- is more specific than X-rays for the diagnosis of TB
- provides information regarding infectiousness of patients who must be treated on a priority basis (which X-rays do not)
- can be used to follow the progress of patients on treatment



**Microscopy is a more specific test than X-ray for TB diagnosis**

## X-ray

Diagnosis of TB by X-ray is unreliable because

- other chest diseases can resemble TB on an X-ray
- pulmonary TB may show various types of radiographic abnormalities
- observer variations are greater with X-rays.

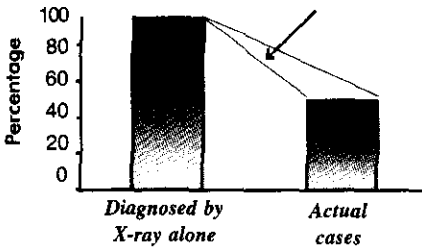
## Tuberculin Skin Test

This test is not useful in diagnosing TB disease, because a positive test only indicates that an individual is infected by TB bacilli; it does not indicate the presence of active disease. Similarly, a negative test does not rule out TB.

Tuberculin testing can however be useful for:

1. evaluating children who may have TB
2. carrying out epidemiological surveys to estimate the prevalence of TB infection in a population and to assess the annual risk of infection.

**Therefore, sputum smear microscopy is recommended as the primary means of diagnosing pulmonary TB.**



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



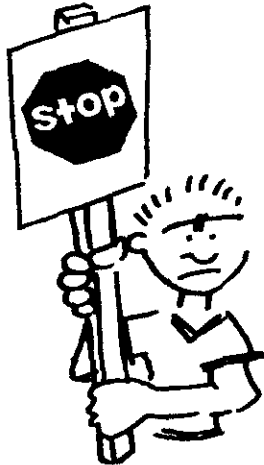
An important component of prevention is identifying the people who are the source of infection and making them non-infectious by treating them successfully.

Smear-positive pulmonary TB patients are the source of infection. Early diagnosis of TB in a patient is therefore important.

Rendering the identified pulmonary smear-positive patients non-infectious through directly observed treatment with short-course chemotherapy can break the chain of transmission.

Educating the general population about TB and letting them know that free facilities where TB can be diagnosed and cured easily are available, in areas under DOTS, will help increase the number of patients coming for treatment.

**Treatment of smear-positive TB cases stops TB at the source and is the most effective means of preventing TB.**



## **Preventive therapy**

The increased risk of TB disease among those infected with both TB and HIV has prompted a need for preventive therapy. However, this can be considered only in areas where treatment of smear-positive patients is being adequately carried out. So far, preventive therapy has not been recommended as a part of national TB programmes in most developing countries.

## **BCG: the anti-TB vaccine**

The effectiveness of BCG is limited only to protection against severe forms of TB in children. It is not effective in preventing TB in adults or in controlling TB in the community.

It is not recommended for children with AIDS due to the risk of disseminated BCG disease.

**WHO and UNICEF have recommended that BCG should still be given to asymptomatic HIV-infected children, but that it should be withheld in infants through to have symptomatic HIV infection.**



The DOTS (Directly Observed Treatment, Short-course) strategy was developed by the International Union Against Tuberculosis and Lung Disease (IUATLD) and is recommended by WHO as the strategy for TB control worldwide.

DOTS has five components, which include:

- Political commitment: TB can be cured and the epidemic reversed if all the governments accord it top priority.
- Good quality diagnosis by sputum smear microscopy of patients presenting to the health facilities.
- An uninterrupted supply of quality anti-TB drugs.
- Short-course chemotherapy given under direct observation: health workers or other trained treatment providers supervise each patient as s/he takes the medicines in their presence.
- Systematic recording and reporting that evaluates the outcome of every patient put on treatment.



The strategy emphasizes completion of treatment, and thereby, cure.

DOTS can prevent TB complications including relapse and death. Effective treatment of TB can prolong the survival of patients with AIDS.

DOTS prevents the transmission of infection and the development of MDR-TB.

DOTS can easily be integrated into the general health services and can, therefore, be widely used.

The global targets for TB control are to cure 85% of new sputum smear-positive cases and to detect at least 70% of them.

**DOTS has been shown to be the only strategy which can achieve an 85% cure rate on a programme basis.**

**Direct observation ensures  
treatment for the entire course  
with the right drugs  
in the right dose  
at the right intervals**

TB is a serious health problem, with adverse social and economic consequences.

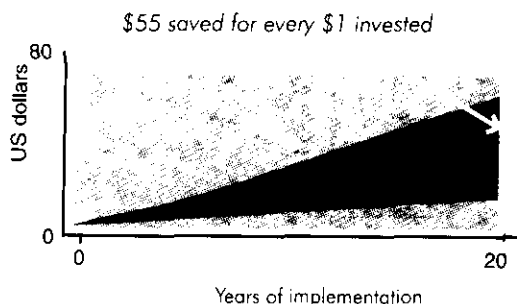
TB mainly affects adults aged 15-60 years. They are the most productive members of any society. Therefore, TB imposes current and future costs on the economy due to ill health premature deaths.

The World Bank ranks the DOTS strategy as one of the most cost-effective of all health interventions. A study from Indonesia showed that every dollar invested in TB control gives a 'return' of US\$ 55 to the community over a 20-year period.

The direct tangible economic benefits of DOTS include:

- improvement in the efficiency and productivity of workers by reducing their forced absenteeism on account of ill health
- an increase in the productive capacity by averting deaths among current and future workers.

#### Return on each dollar invested in DOTS



#### **Economic benefits of DOTS: Indonesia**

There are many misconceptions associated with TB.

TB is a curse.

**Reality:** TB spreads through the air from a patient with smear-positive pulmonary TB (infectious TB patients).

All forms of TB are infectious.

**Reality:** Pulmonary TB is the infectious form of the disease. Extra-pulmonary TB is virtually never infectious.

TB patients need to be isolated and should not be allowed in the workplace.

**Reality:** Patients with TB need not be isolated and should be allowed to work. Only patients with pulmonary TB are infectious, but the treatment regimens available are *extremely effective and make them non-infectious within a few days to three weeks after the beginning of treatment.* Close contacts of TB patients, however, should be evaluated for the presence of active disease.

TB can be diagnosed only by X-rays.

**Reality:** Diagnosis of TB by X-rays is unreliable and, at present, sputum bacteriology is the best way to confirm the diagnosis of pulmonary TB.

There is no complete cure for TB.

**Reality:** TB can be completely cured if the patient takes the prescribed anti-TB medicines for the entire duration of *treatment.*

TB can be cured only by injections.

**Reality:** Most anti-TB drugs - rifampicin, ethambutol, isoniazid, thiacetazone and pyrazinamide - are taken orally. Streptomycin, an injectable drug, is necessary for some patients only.

TB can only be treated in a hospital.

**Reality:** Curing TB does not require hospitalization. A patient who takes the drugs as prescribed and for the full duration will do equally well whether treated in or out of hospital. Hospitalization is required only for a few weeks in the severely ill, for those with complications of TB, or with other serious accompanying diseases.

Only a regular drug supply is required for patients to be reliably cured.

**Reality:** A regular drug supply is necessary, but not enough for cure. Patients can be reliably cured only through directly observed treatment that ensures they take the prescribed anti-TB drugs on time and for the entire duration of treatment.

Treatment regimens must be individualized.

**Reality:** The widespread disparity in the length of treatment and combinations of drugs prescribed has resulted in ineffective treatment regimens, which failed to cure patients. According to a survey in India, 100 private doctors prescribed 80 different regimens, most of which were inappropriate and expensive.

Active case-finding in the community is necessary.

**Reality:** Studies in India conclusively show that most TB patients present to medical facilities soon after the onset of illness. Active case-finding is presently neither necessary nor cost-effective.

A woman suffering from tuberculosis should not breastfeed.

**Reality:** Breastfeeding of infants should continue. If the mother is sputum smear-positive for AFB, the infant should receive treatment with isoniazid for six months, followed by BCG vaccination.

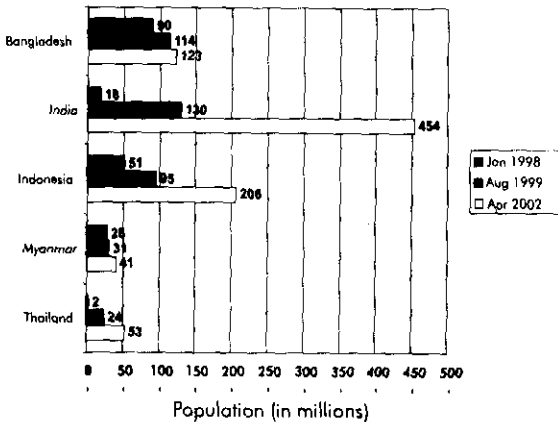
All countries in the SEA Region have adopted DOTS and are implementing it. The population-wise coverage of DOTS has increased from 10% in 1998 to 56% at the end of 2001. DOTS has achieved excellent results wherever it has been implemented.

**Bangladesh:** The DOTS strategy was adopted in 1993 and by 1996, as many as 80% of the patients receiving treatment were cured. DOTS is currently being implemented in 95% of the country.

**Bhutan:** Due to its hilly terrain, Bhutan has employed a strategy of hospitalization throughout the intensive phase of treatment for TB. The entire country is covered by the DOTS strategy. The treatment success rate exceeds 90%.

**DPR Korea:** The government introduced DOTS in demonstration and training areas in 1998, with good results. Correctly 66% of the population has access to DOTS. Treatment success is over 90%.

**India:** The national programme was able to cover more than 400 million by the year 2001. Over the past three years, there has been a 20-fold expansion of DOTS – one of the fastest in recent history.



**Population covered with DOTS in high burden countries**



**Indonesia:** DOTS is available to 90% of the population. Case detection and treatment success rates are steadily improving.

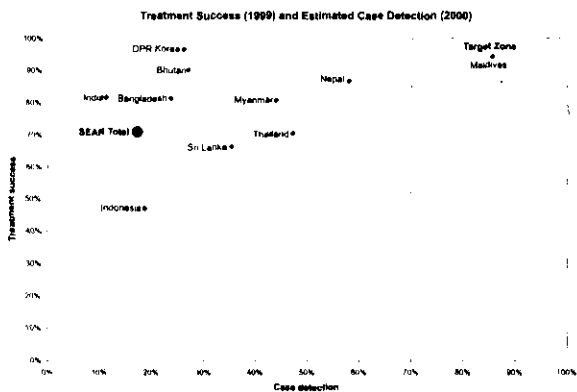
**Maldives:** The entire country is covered by the DOTS strategy. Maldives was one of the first five countries in the world to achieve global targets for TB control.

**Myanmar:** DOTS covers 85% of the population currently. Treatment success rates are high at 81%.

**Nepal:** DOTS covers 89% of the population with at least one DOTS centre in every district. Case detection and treatment success rates are close to global targets.

**Sri Lanka:** DOTS has resulted in high cure rates among new smear-positive cases. The strategy has been expanded to cover nearly 70% of the country's population.

**Thailand:** At the end of 1998, DOTS was introduced in all provinces of the country and is now available to 92% of the population. The treatment success rate was nearly at 70% in the 1999 cohort.



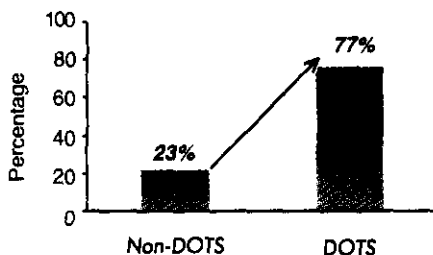
DOTS has more than doubled the accuracy of diagnosis of tuberculosis in the SEA Region; laboratory confirmation of the disease increased from 27% in non-DOTS areas to 70% in areas where DOTS had been implemented.

DOTS has tripled the treatment success in the Region; the success rate with treatment increased rapidly from 23% in non-DOTS areas to 77% in areas that have implemented DOTS.

Directly observed treatment (DOT) prolongs the survival of HIV-infected TB patients. According to one study, the survival rate among cases of HIV-infected TB patients was 56.7% among those receiving short-course chemotherapy without DOT and 85.4% among those receiving short-course chemotherapy with DOT.

Experience in the Region shows that DOTS can be rapidly expanded without compromising the quality of programme implementation.

**DOTS is the most cost-effective strategy for TB control.**



**DOTS triples treatment success in South-East Asia**

Effective TB control requires a coordinated approach with standardized diagnostic, treatment and information systems. It also requires the dedication of physicians, hospitals, self-help groups, communities, NGOs, donor agencies and other take holders for its acceptance, effective implementation, monitoring and evaluation.

### **Physicians and other health care personnel**

Should keep abreast of developments and follow the WHO/national guidelines in diagnosing and treating TB patients.

Should collaborate with the district/local health officers in TB control activities, particularly in treating TB patients using DOTS.

Should refer all patients with cough for three weeks or more for three sputum examinations for acid-fast bacilli (AFB) and ensure that at least all those found to be AFB smear-positive are placed on DOTS, receive complete treatment and are cured.



## District health officers/small hospitals

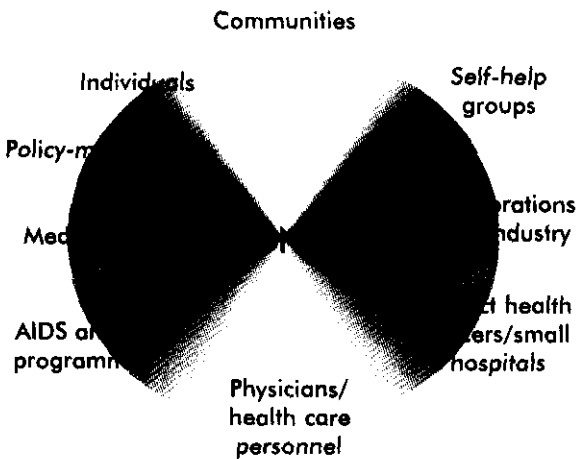
District health officers must coordinate TB control activities, namely referral of suspected TB cases for diagnosis, administration of DOT for diagnosed patients, and monitoring and evaluation of cases for sputum conversion and treatment success with the TB programme staff.

Small hospitals should maintain a TB clinic operated on the basis of national guidelines for case detection and treatment using DOTS.

## Self-help groups

Rapidly growing self-help groups and patient organizations, particularly people with HIV/AIDS and other chronic illnesses could be involved in TB control activities. Micro-credit groups, adult literacy groups and organizations for people affected by HIV/AIDS could provide:

- a social network for patients and their families,
- information and education about specific conditions
- advocacy and support for those affected by the disease



## Communities

Community involvement is one of the main requirements for TB control. The community must:

utilize its strengths to ensure proper DOTS implementation,

find local solutions to local problems, such as how to organize observation of treatment and

work towards removing the stigma attached to the disease.

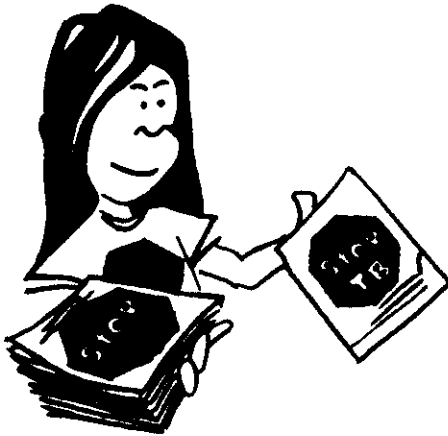
## Individuals

must be informed about the potential risk to themselves and their families.

must be aware of the early signs of TB and seek timely medical attention.

must be informed about the need to take treatment as prescribed and the consequences of not doing so.

individuals with TB should ensure screening of their family and close contacts for TB and help them to get treated, if necessary.



## AIDS and TB Programmes

At the local level, AIDS and TB programmes must collaborate with each other in the areas of prevention, surveillance and provision of care involving families, communities and local health services.

At the national and international levels this collaboration would also include coordinated planning, pooling of resources for HIV/AIDS and TB care, as well as collaboration for the public information and education programmes.

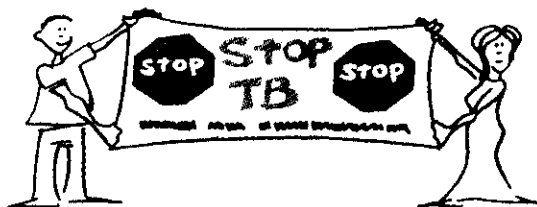
## Media

Health education, information and communication are important strategies in TB control. The media must:

- make people aware that TB can be cured provided anti-TB medicines are taken for the prescribed duration.

- provide greater impetus to TB control programmes through unbiased news reporting and documentation of successful approaches.

- develop educational approaches to help increase awareness of the links between HIV and TB.



## **Corporate Business and Industry**

must be made aware of the burden of TB and that it reduces productivity and weakens economic output by affecting the most productive age groups of the society and the work force.

promote national policy for implementation of DOTS in the workplace.

**Complete control of TB can become a reality with support from all sections of society.**



## **NGOs can contribute to TB control by:**

*providing TB treatment services:* the traditional model for NGO involvement in TB control has been service delivery through TB clinics and hospitals; the NGO is responsible for diagnosing and treating patients with TB.

*supporting existing health care services for TB control:* NGOs can also support the government in needs assessment, planning, training, supervision, logistics, quality control of smear microscopy and reporting of cases.

*educating the community about TB treatment:* NGOs, especially those involved in health education, can help spread awareness about TB in the community.

*providing community-based care:* many NGOs are committed to a community-based approach, in which members of the community themselves take responsibility for identifying their own needs, planning interventions, implementing activities, and monitoring and evaluating outcomes.





advocating for and mobilizing enhanced TB control efforts: many NGOs have been very effective in advocating on behalf of people affected by TB.

conducting and supporting operational research: NGOs may have greater flexibility, a capacity for innovation and more resources to conduct research.

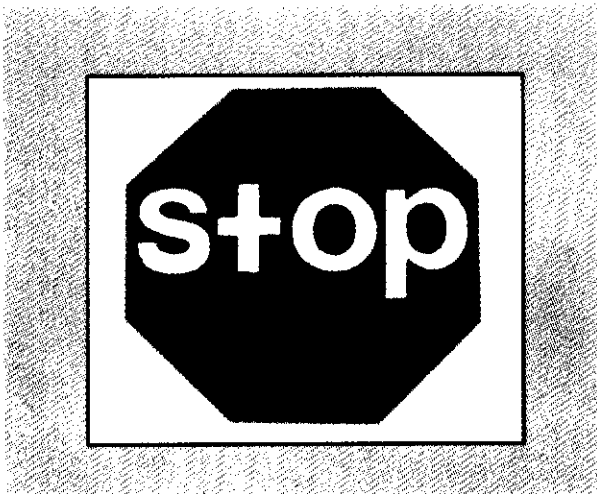
**NGOs can mobilize a wide range of services - from supporting research to providing treatment.**



To add impetus to TB control worldwide, the Director-General of the WHO, Dr Gro Harlem Brundtland at the World Lung Health Conference in Bangkok in November 1998, outlined a new initiative called STOP TB. WHO, in partnership with several international agencies, is mobilizing global commitment, collaboration and investment in TB control, especially in the 22 high burden countries, five of which are in this Region.

**This initiative has four main components:**

1. A Global TB Charter for advocacy and commitment to TB control;
2. A Global TB Action Plan to facilitate effective collaboration for TB Control;
3. A Global TB Drug Facility, to ensure low cost access to quality TB drugs; and
4. A Global TB Research Agenda, to facilitate collaboration on key research issues such as control on MDR-TB and new tools for diagnosis and treatment.



Under this initiative, the first of its kind, Member Countries re-affirmed their commitment at international, regional and national levels to control TB and increase awareness among all stakeholders, and are being assisted to

enhance regional collaboration and form partnerships with donors, including NGOs and others such as the private sector to maximize resources.

undertake a systemic analysis of their constraints and identify effective solutions.

build sustainable resources to strengthen management, training, supervision and quality diagnostic and treatment standards.

ensure universal access to high quality anti-TB drugs.

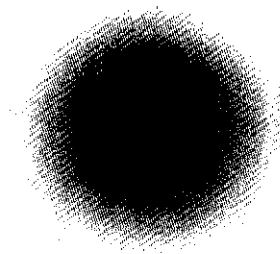
strengthen the capacity for needs-based research in areas of programme implementation, and for the development of new diagnostic agents, drugs and vaccines.

provide definite mechanisms to monitor and evaluate progress of implementation.

This global initiative therefore provides a framework for action within which countries with their identified partners can coordinate activities to create a new sustained environment of support and commitment for the expanded implementation of DOTS.

Bilateral and multilateral donor/partner agencies play a very important role in TB control activities, particularly in the following areas:

- advocating among policy-makers for policy support;*
- mobilizing financial support;*
- assisting in training, planning and implementation of TB programmes at the national, regional, provincial and district levels;*
- facilitating study/observation tours to countries with successful DOTS implementation;*
- providing technical support through consultants; and*
- providing assistance in programme monitoring and evaluation.*



Private practitioners can help control TB in their communities by:

- using sputum microscopy for diagnosis and following national policy in managing patients.

- ensuring that every person with cough for three weeks or more gets their sputum examined at a recognized laboratory.

- helping in accurately identifying TB cases and reporting the same to the national TB programmes.

- emphasizing the importance of regular and complete treatment, through DOTS.

- educating the community about signs and symptoms of TB and the need to report to designated centres.

- including their clinics as DOTS centres in the national network in coordination with the government.



WHO considers TB a global emergency and spearheads the global response to combat TB by:

*advocating for greater political commitment and assisting with mobilizing resources*

*developing guidelines, policies and strategies for TB control and providing operational and logistical support.*

*providing technical support to all member states in planning, implementing, monitoring and evaluating their TB control programmes*

*assisting in capacity building through training activities and by providing a forum for exchange of country experiences and lessons learnt*

**BANGLADESH, DHAKA**

WHO Representative  
House No. 12, Road No.7  
Dhanmondi Residential Area  
Dhaka-1000, Bangladesh  
Fax: 8613247  
Tel: 8614653-55, 8616097-98,  
8612882 (WR)  
E-mail: acharyas@whoban.org,  
wit@whoban.org  
(Friday closed)

**BHUTAN, THIMPHU**

WHO Representative  
Ministry of Health & Education  
Kawangjansa  
Above Telephone Exchange  
Thimphu, Bhutan  
Fax: 323319 (WHO)  
Tel: 322864, 322940  
E-mail: wrbhu@druknet.bt

**DPR KOREA, PYONGYANG**

WHO Representative  
The Ministry of Public Health  
Munsudong  
Pyongyang, DPR Korea  
Fax: 850-2-381-7916 (WR)  
Tel: 850-2-381-7913/7914  
E-mail:  
eigil.sorensen@undp.org

**INDIA, NEW DELHI**

WHO Representative  
Room 534, 'A' Wing,  
Nirman Bhawan, Maulana Azad  
Road  
New Delhi-11 0011, India  
Fax: 3012450 (WR), 3318607  
(WHO)  
Tel: 3018955, 3792179,  
3017993  
E-mail: wrindia@whoindia.org

**INDONESIA, JAKARTA**

WHO Representative  
9<sup>th</sup> Floor, Bina Mulia Building,  
Jl. H.R. Rasuna Said Kav. 10  
Jakarta, Indonesia  
Fax: 5201164 (WHO)  
Tel: 5204351 (6 lines)  
E-mail: who@who.or.id

**MALDIVES, MALÉ**

WHO Representative  
Fifth Floor MTCC  
Millennium Tower  
Malé, Republic of Maldives  
Fax: 324210 (WHO)  
Tel: 327519, 322410,  
313564  
E-mail: whomav@who.org.mv

**MYANMAR, YANGON**

WHO Representative  
7<sup>th</sup> Floor, Yangon International  
Hotel,  
330, Ahlone Road Dagon  
Township  
Yangon, Myanmar  
Fax: 212 605  
Tel: 212 607 (direct), 212  
606/608/609  
E-mail:  
borraa.whomm@undp.org

**NEPAL, KATHMANDU**

WHO Representative  
UN Building, Pulchowk,  
Lalitpur  
Kathmandu, Nepal  
Fax: 527756 (WHO), 523993,  
526921 (UNDP)  
Tel: 523993, 523200 Ext.451/  
452/418  
E-mail: wr@who.org.np

**SRI LANKA, COLOMBO**

WHO Representative  
No. 226, Baudhaloka  
Mawatha .  
Colombo-7, Sri Lanka  
Fax: 502845,  
Tel: 502319, 502842, 502841  
E-mail: wr@who.lanka.net

**THAILAND, BANGKOK**

WHO Representative  
C/o Ministry of Public Health  
Building 3, 4th Floor,  
Tiwanond Road  
Nonthaburi 11000, Thailand  
E-mail:  
whothai@health.moph.go.th  
whobkk@ksc15.th.com

