WHO REPORT ON THE TUBERCULOSIS EPIDEMIC 1997
DOTS Keeps you on the right course!
Today, for the first time since the discovery of the first anti-TB medicines in 1944, there is hope of reversing the course of a frightening global TB epidemic. This breakthrough is a strategy known as DOTS, (Directly Observed Treatment, Short-course).

DOTS is symbolized by the outstretched hand of the health worker who provides powerful anti-TB medicines to patients, and watches them swallow the pills. Because of the DOTS strategy, we now have the means of preventing up to 50 million deaths from tuberculosis in the next few decades. For the first time, we have a winning hand to defeat TB in poor and wealthy countries alike.

"What is all of this excitement about DOTS?"

"You mean that TB can be controlled in my country?"
The DOTS strategy provides extraordinary benefits. No other TB control strategy comes close to being as effective and as affordable as DOTS. Because of its advantages, it is easy to see why so many countries are beginning to use DOTS. Here are ten reasons to use DOTS more widely:

1. **Cures the Patient** No other TB control strategy has consistently demonstrated such high cure rates. DOTS produces cure rates as high as 95 percent, even in the poorest of countries. TB programmes not using DOTS often cure only 40 percent of their patients.

2. **Prevents New Infections** DOTS stops the TB bacteria at the source by curing the infectious patient. When an infectious TB patient is cured, that person can no longer pass the germ on to others. When a patient is not cured, he or she will infect, on average, 10 to 15 friends, family and co-workers each year.

3. **Stops MDR TB** The treatment provided through DOTS makes it virtually impossible for a person to develop incurable and ultimately fatal forms of TB. Other treatment strategies can actually cause multidrug-resistant TB (MDR TB), and may be doing more harm than good.

4. **Cost Effective** A six-month supply of medicines for DOTS costs only US $11 per patient in some parts of the world, and rarely more than $40. This can be less than the price of a few bottles of aspirin. The World Bank has ranked the DOTS strategy as one of the “most cost-effective of all health interventions”. Treatment of infectious cases with DOTS costs between $1 and $5 for each healthy year of life (DALY, or disability-adjusted life year) saved. Even at 50 times this cost, the DOTS strategy would still be extremely cost-effective.

5. **Community Based** DOTS does not require hospitalization, a massive infusion of new technology or resources, nor the creation of a new health structure. Rather, existing health systems can use DOTS and rely on health workers and trained volunteers. It is possible to use the DOTS strategy in existing primary health care systems, AIDS care programmes and other health programmes.

6. **Extends Lives of AIDS Patients** Compared to currently available protease inhibitors, DOTS has been demonstrated to add as many years of life to HIV positive people with TB in developing countries. Yet, the medicines used for DOTS are only one-hundredth the cost of protease inhibitors.

7. **Protects the Workforce** Nearly 80 percent of those inflicted with fever and coughing from TB are in their most economically productive years of life. This represents a workforce equal to the size of all international employees of IBM, Coca Cola, General Motors, Kodak, Microsoft, Xerox, Motorola, Procter & Gamble, Unilever, Philips, Fiat, Siemens, Volkswagen, Benetton, British Petroleum, Tata Group, Toyota, Mitsubishi, Sony and Samsung combined. Without the DOTS strategy, the TB epidemic will continue to burden the workforce and can reduce self-sustaining families to beggars or welfare recipients.

8. **Protects International Travelers** There is no other feasible way to protect the world’s 500 million annual international travelers – and the people they return home to – from TB. The only safeguard is to use DOTS more widely and reduce the number of infectious TB cases worldwide.

9. **Stimulates Economies** The DOTS strategy offers relatively quick payoffs to the economies of developing countries. Studies in India and Thailand have shown that a small investment in the DOTS strategy can save their economies billions of US dollars.

10. **Proven Effective** The initial prototypes of the DOTS strategy were pioneered by the International Union Against TB and Lung Disease ten years ago. DOTS has been successfully implemented in a wide variety of conditions in Tanzania, Guinea, China, Bangladesh, New York City and Peru. Currently, nearly 70 countries have begun using DOTS and are achieving results. Last year, approximately one million TB patients were treated under the DOTS strategy.

**DOTS Works!**

DOTS is the only TB control strategy to consistently produce 85 percent cure rates. WHO’s TB control targets are to cure 85 percent of the detected new smear positive TB cases and detect 70 percent of estimated cases. DOTS is also one of the most cost-effective health interventions, compared to those available for other diseases.
The first priority of every TB programme must be to **direct** resources toward identifying sick, infectious TB cases, so they can be cured.

Patients must be **observed** swallowing each dose of their medicines by a health worker or trained volunteer.

TB patients must be provided complete **treatment** and be monitored to ensure that they are being cured.

The correct combination and dosage of anti-TB medicines – known as **short-course** chemotherapy – must be used for the right length of time.

Governments must support the DOTS strategy emphatically and make TB control a high political priority.

**The Five Elements of the DOTS**

The DOTS strategy depends on five elements for its success. If any of these elements are missing, our ability to consistently cure TB patients slips through our fingers.

DOTS succeeds for one pivotal reason. DOTS makes the health system – not the patient – responsible for achieving a cure. This is critical, as most TB patients start to feel better after just a few weeks of medication and are often tempted to stop taking their pills. Yet it takes several months to rid the body of TB bacilli. With DOTS the health system is required to observe that TB patients take all of their medications, to monitor their progress, ensure all bacilli are gone, and to document that they are cured.
Resources should first be directed toward identifying sputum smear positive cases for treatment, as these people are the sources of infection. Until high cure rates are achieved, programmes should not actively search for other people in the community who might have TB, as this diverts scarce resources from curing the worse-affected cases who are spreading the disease.

This is especially critical during the first two months of treatment when the patient may be seriously ill, at risk of acquiring drug resistance, and an infectious threat to others. Patients that fail to make their appointments with the health worker must be immediately contacted and helped to resume treatment. There can be flexibility and innovation in observing treatment, provided that the observer is accountable to the health services and accessible to the patient.

There are two means of ensuring successful treatment. First, in the case of contagious patients, sputum must be examined under a microscope after two months and again at the end of treatment to ensure that a patient is free of the TB bacilli. Second, a recording and reporting system is needed to rigorously monitor and evaluate the progress made in treating and curing each TB patient. Through analysis of each group of patients, this system makes it possible for health services to quickly identify districts and communities that are not achieving 85 percent cure rates, and then to intervene with additional support and training.

These drugs provide a knock-out punch to kill the TB bacilli. They include isoniazid, rifampicin, pyrazinamide, streptomycin and ethambutol, and are typically administered for 6 or 8 months in accordance with WHO's TB Treatment Guidelines. The establishment of a dependable, high-quality supply of anti-TB drugs throughout the health system is an essential part of the DOTS strategy to ensure that the treatment of TB patients is never interrupted.

Governments and NGOs must be financially committed to long-term TB control, ensuring that all TB patients can have free access to treatment. TB control should be integrated into the existing health system, and supported with leadership from a central TB unit. A well-supported National TB Programme will have a programme manual, a training programme in place, a plan of supervision, and a development plan.

DOTS strategy

"DOTS is a strategy with five important elements"

"DOTS can cut TB deaths in half?"

What is DOTS?

DOTS (Directly Observed Treatment, Short-course) is the name for a comprehensive strategy which primary health services around the world are using to detect and cure TB patients. As part of the DOTS strategy, health workers counsel and observe their patients swallowing each dose of a powerful combination of medicines, and the health services monitor the patients' progress until each is cured. Political and financial commitment and a dependable drug supply are essential parts of the DOTS strategy.
Yet, DOTS is Still Not Used Widely

Only about 10 percent of all TB patients were treated through the DOTS strategy last year. The consequences of not using DOTS more widely are alarming. Needless TB cases and deaths will certainly continue. The worst scenario, however, is that TB will eventually become untreatable due to multidrug-resistant TB. MDR TB usually kills its host, but only after allowing the victim years of life to spread the lethal drug-resistant germs to family members and others in the community.

Everyone who breathes air, from Wall Street to the Great Wall of China, needs to worry about this risk. Once MDR TB is unleashed, we may never be able to stop it. We will face a deadly infectious disease that spreads through the air, yet is virtually as incurable as AIDS or Ebola. This frightening prospect must be avoided at any cost.

Explanation of the figures

In the country profiles that follow, the World Health Organization has compiled data from each country on the severity of the TB epidemic and the extent that the DOTS strategy is being used to address the situation. The figures below present two important indicators. First, the total number of estimated TB cases in each country. Second, the number of those TB cases that are benefitting from the DOTS strategy.

- **Non-DOTS cases** Represents every 10,000 TB cases not having access to DOTS, who often remain uncured and a threat to others.
Thirteen countries will largely determine whether the battle against TB will be won or lost. These 13 countries are home to nearly 75 percent of the world’s TB cases. If DOTS is used more widely in these countries, a powerful blow will be dealt toward defeating the global TB epidemic.

But countries with a low number of TB cases cannot be complacent. In the past decade, the dismantling of TB control services in the United States and Eastern Europe has helped trigger increases in new cases and the emergence of drug resistant TB.

In the following section of this report, the World Health Organization presents information on the magnitude of the TB epidemic in each of these 13 priority countries, and describes the extent to which the DOTS strategy is being used to control the epidemic.

Estimates are based on reports made by countries to the World Health Organization and WHO incidence estimates. All numbers are based on most recent year of available data.

DOTS cases Represents every 10,000 cases documented as having access to DOTS.
To date, Pakistan has been losing the war against tuberculosis. Over half the country has little or no access to health care. Approximately 25 percent of new TB cases are ever diagnosed, and only a fraction of doctors know how to prescribe effective treatment. Drug-resistant strains are likely increasing at an alarming rate.

**Pakistan**

A Country Under Attack

In this poor and crowded country of 130 million people, some 1.5 million suffer from TB, and more than 210,000 new cases occur each year. In fact, only one in four or five new cases is ever diagnosed. The irony is that efficient diagnosis would in most cases serve only to identify a disease that would not be treated effectively or cured in any event.

Last year, the TB Association of Karachi conducted a study to find out how much local doctors knew about effective treatment of tuberculosis. The Association asked 100 doctors to write a prescription for a TB patient whose case details and body weight were given. Only one physician in seven was able to prescribe effective treatment.

Until very recently there were no official guidelines for TB control in Pakistan, nor any agreement on standardized drug regimens for treatment. Instead, health professionals took the action they saw fit: often ineffective – even harmful – therapies based on inadequate knowledge. This environment has proven fertile ground for TB to rage out of control in Pakistan’s population.

In 1994, WHO’s recommended DOTS strategy was adopted as national policy for TB control. Small pilot projects have since been established, with eventual plans for expansion nationwide once pilot efforts achieve high cure rates. However, the minimal resources needed for realistic TB control have yet to be **non-DOTS**.
allocated. At present, only 1 percent of central government expenditure is spent on health care - one of the lowest levels in the world. Sufficient resources need to be allocated annually for TB control in order to sustain a successful DOTS programme and end Pakistan’s TB epidemic.

New Focus on a Neglected Problem
Primary health care programmes aimed at improving access to care for the rural poor have been a goal of recent administrations. But much remains to be done to achieve the government’s hopes. With increasing recognition of the seriousness of TB in Pakistan, the disease has now been made a priority.

A national TB control policy based on the DOTS strategy has been defined and a full-time director for the national programme appointed. Selected staff from the federal and provincial health departments have been trained. Pilot projects have started in the cities of Rawalpindi, Karachi, in the ancient walled town of Peshawar, as well as the rural area of Tangi Tehsil in North West Frontier Province.

Recent WHO evaluations of these pilot projects found that the basics of the DOTS strategy were being carried out correctly and treatment of each patient was being observed by paramedics at the clinics. As has been the case elsewhere, 85 percent of new infectious TB cases treated with the DOTS strategy were no longer infectious after two months, and were well on their way to cure.

As Pakistan struggles to both improve its overall health services and begins an urgent battle against TB, it needs a practical approach for integrating the DOTS strategy into its nascent community-based programmes. Each of the five elements of the DOTS strategy must be adhered to if it is to succeed.

There must be sustained commitment by government authorities at all levels to make TB control work. Physicians and health workers must be confident that the supply of high quality anti-TB drugs for standardized treatment regimens is dependable. The health services must be equipped and trained to diagnose the disease at local levels with simple sputum smear microscopy. Most importantly, health workers must be trained and accountable for consistent performance in implementing DOTS. Only the rigorous recording and evaluation system of the DOTS strategy can help Pakistan to provide relief from the scourge of tuberculosis.

Ambitious Plans
Encouraged by the early experience of its small pilot projects, the government intends to aim at expanding the DOTS strategy nationally by the year 2000. Once expansion is complete, the programme will seek to detect 70 percent of infectious TB cases - two to three times the present detection rate - and cure at least 85 percent of them, over twice the cure rate now being achieved.

A 5-year development plan describes what needs to be done to achieve these results. The laboratory system will be strengthened to create a network of simple microscopy units, each responsible for no more than 100,000 people. All treatment centres will have a copy of the “Guidelines for TB Control in Pakistan” and reliable, high quality drug supplies. These centres will also use the special recording and reporting forms which allow health staff and government supervisors to manage the performance of each health district and accurately monitor progress toward cure of all infectious patients. Staff will receive regular training in the DOTS strategy.

Where Will the Money Come From?
At present, the biggest obstacle to these ambitious plans is lack of money. There has never been a separate budget for TB control in Pakistan, and it is not clear where financial support to enable the primary health programme to adopt the DOTS strategy will come from. Already some DOTS projects – notably one among Afghan refugees in Baluchistan – have experienced financial difficulties as foreign aid funding agreements have expired.

The DOTS strategy is inexpensive to employ, it makes excellent use of the existing health care infrastructure and staff and it is ranked by the World Bank as one of the most cost-effective of all health interventions, costing only US $1-5 for each year of healthy life saved.

DOTS puts the tax-based savings of national economies to benefit an entire society, providing real value for money. But DOTS is not free. It must be funded dependably, or TB control efforts will predictably slide back toward today’s low cure rates, low case finding rates and continued epidemic spread of the disease. The lives of many in Pakistan will hinge on the government’s success in financing its DOTS strategy.

Assessment
Last year, the TB Association of Karachi conducted a study to find out how much local doctors knew about effective treatment of tuberculosis. Only one physician in seven was able to prescribe effective treatment.
India has provided an environment in which tuberculosis can thrive. Because the disease carries a social stigma, many leave treatment too soon, becoming chronic and drug-resistant cases. TB has often been misdiagnosed and treated ineffectively. Drug supplies have been erratic. Against these odds, India today is prepared to fight and defeat TB.

Among the more than 900 million people in India today, every second adult is infected with the tuberculosis bacterium. Each year, more than 2 million people develop active tuberculosis, and up to 500,000 people die. The pool of infection – and the resulting risk of becoming infected with the disease – is as great as in any country on earth.

Tuberculosis carries a heavy stigma, and rejection by neighbors, employers and co-workers is still a fear of TB patients in many communities. Young brides who develop symptoms of tuberculosis could in many cases expect to be returned to their parents as unfit to bear children, their dowries forfeited.

The problems facing effective tuberculosis control in India appear at first glance to be much the same as those that too often exist throughout much of southern Asia. There are real and potential conflicts between the interests of private physicians and the public sector. The quality and supply of drugs is erratic. Errors in diagnosis, based predominantly on X-ray and sometimes non-DOTS.
Infectious cases are frequently missed, while other people are mistakenly diagnosed with TB and inappropriately treated. Training, support and supervision of staff is not adequate. In some places, morale among health workers has been low.

As a result, at least two thirds of TB patients have dropped out of treatment early, often becoming chronic sufferers; sources of infection to others. Very often these chronic cases become incubators for deadly drug-resistant bacteria.

Against this outlook pointing to a dark future, India has decided to take decisive action to halt the spread of tuberculosis. The core strategy: shrink the pool of contagion and the risk of becoming infected with the disease by attacking TB aggressively. To date, a strategy consistent with DOTS has been applied in demonstration areas covering over 12 million people. This strategy has achieved a cure rate over 80 percent among detected patients.

In fact, several of the fundamental principles of DOTS were first developed in India. The ability to treat TB patients effectively at home, without the cost and duress of hospitalization, was first tested and documented in India in the 1950s and 60s.

**Everyone's Problem**

In these pilot areas, staff receive intensive training in the DOTS strategy. Microscopy services for sputum testing are in place; and a new drug supply system procures drugs and supplies high-quality medications.

With this community-based system, health workers watch their patients take and swallow their drugs. This additional responsibility – which might have overwhelmed busy health workers – now serves to raise these health workers' status in their communities and to motivate them to approach this important work with real dedication. Patients have responded positively in most cases to the DOTS strategy. The personal attention of the DOTS strategy makes them feel cared for. The strategy also shows them that they can be cured of TB without going to a private doctor – who usually charges a fee they can seldom afford and then fails to achieve a real cure. Today, in the pilot DOTS areas, the drop-out rate from treatment has plummeted. Tuberculosis is now cured in 4 out of every 5 patients.

The success of the pilot programmes have shown patients that tuberculosis can be cured, and health workers that their efforts can save lives. Demand for DOTS services has grown and momentum continues to build. No less important, the stigma attached to tuberculosis can now begin to diminish.

**Assessment**

Several of the fundamental principles of DOTS were first developed in India. The ability to treat TB patients effectively at home, without the cost and duress of hospitalization, was first tested and documented in India in the 1950s and 60s.
No one knows exactly how many tuberculosis cases occur each year in Bangladesh. But TB is extremely common and spreads easily in this densely populated country. A vast number of chronic, potentially drug-resistant cases is a cruel legacy of the past. But the future promises to be far different—and has already begun.

Bangladesh

A Model TB Control Strategy Beats Tough Odds

Since Bangladesh made a national commitment to combat and control tuberculosis in 1993, DOTS coverage has expanded from a pilot area of one million people to nearly half the country—56 million people. Today, the DOTS strategy is detecting and curing infectious TB cases in unprecedented numbers.

Before 1993, there was no well-coordinated national programme for TB control, nor any standard method of treating people for the disease. TB was not given high priority. Patients were referred by local primary health care clinics to their district TB facility. There they could expect to be given whatever treatment a specialist believed best, or more practically, whatever happened to be available. Anti-TB drugs were in chronic short supply. And doctors had little incentive to follow-up on patients who quit treatment, or even to ensure that TB patients were cured.

Today, a successful DOTS project offers real hope for curing the many Bangladeshi suffering from tuberculosis. In 1992, a five-year TB Control Programme under the Fourth Population and Health Project was funded by the World Bank and The
Netherlands. This meant two important aspects of the DOTS strategy were being met - political commitment and money to tackle TB.

**DOTS Takes on the Doubters**

At first, the DOTS strategy was greeted with broad skepticism in Bangladesh. The prospect that every patient could and would be observed taking every dose of medicine struck many as unrealistic. The TB clinics could not imagine taking on the extra responsibility: the health system could be flooded with up to 2 million people seeking TB treatment. Most health professionals were skeptical that the strategy could be implemented.

But support from the World Bank, and technical assistance provided by the World Health Organization, made it possible to build a community-based DOTS pilot programme using community health workers in the thanas (sub-districts).

The pilot project involved four thanas covering approximately one million people. Before the new service was offered, thana staff were trained in all aspects of the DOTS strategy. Reliable drug supplies - crucial to the project's success - were guaranteed and new registers and record books for following each TB case through treatment to cure were developed. Simple laboratories for routine clinical work already existed and staff were given extra training in how to do sputum smear microscopy.

At first, demand was slow. The new DOTS programme had avoided publicity for fear of raising expectations it could not meet. Patients with TB did not realize that effective treatment was now available virtually at their doorstep.

But success proved the best advertisement. Of the first group of patients, 92.5 percent were rendered non-infectious and 87 percent were cured. As word spread, patients presented themselves in growing numbers.

**NGOs Join the Effort**

The dramatic gains being made against TB in one small corner of Bangladesh attracted attention from non-governmental organizations. In late 1994, an NGO network, including the local Bangladesh Rural Advancement Committee (BRAC) and the Brussels-based Damien Foundation, signed an agreement with the government to join the national TB programme and expand the DOTS strategy. With BRAC providing the leadership necessary to establish a large training initiative for health staff at all levels, the TB programme was able to expand rapidly.

Imagination has been displayed in abundance in adapting the DOTS strategy to local conditions in Bangladesh. The responsibility for observing the patients taking their medication has been taken mainly by health assistants working out of thana health centers and village health posts. These workers deliver drugs on bicycles to patients too far away or too busy to visit the clinic. For TB patients working at a textile mill, health assistants provide treatment at the mill. The new duties have enhanced the status of health assistants and provided them new motivation.

**Supervision: The Weak Link**

The weakest part of the system is supervision. This is the duty of the district TB clinic staff, who need to visit health assistants at the thanas weekly to counsel them and check drugs dispensed against the number of cases on the register. But district health staff earn so little from government service that they see private patients after hours. Supervision takes time away from private practice they are unwilling to lose. Solutions to this dilemma have not yet been found. Cash incentives used successfully in other countries are not considered practical, and they are difficult to sustain.

So far, intensive foreign technical assistance has been an important vehicle in getting the DOTS programme off the ground. But the long-term sustainability of TB control in Bangladesh will depend on building capacity within the Government's Directorate of Mycobacterial Diseases Control to a point where no further technical assistance is needed. Energetic advocacy is needed from the Ministry of Health, NGOs, and the community at-large to further the DOTS programme.

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**Assessment**

Imagination has been displayed in abundance in adapting the DOTS strategy to local conditions in Bangladesh. Today, the DOTS strategy is detecting and curing infectious TB cases in abundant numbers.
In the past decade, tuberculosis has returned to Thailand with a vengeance, traveling in the wake of the explosive spread of AIDS. Once controlled effectively, TB incidence is now climbing alarmingly. HIV positive people are 30 times more likely to develop TB – a force now expanding the risks of TB infection throughout the population.

Thailand

Where AIDS and TB Attack in Concert

101,700 new TB cases annually
First launched in 1949, Thailand’s TB control programme was a notable success. Tuberculosis cases and death rates declined year after year. Despite pockets of high incidence, the majority of Thais could be confident that they were effectively protected from tuberculosis. In 1992, this reassuring picture began to change frighteningly.

With the rapid spread of HIV in Thailand, new cases of TB began to climb alarmingly in the northern regions of the country, particularly those heavily afflicted by HIV. And the upsurge was occurring not just among HIV infected people, but throughout the population.

Today there are an estimated 100,000 new cases of TB per year in Thailand. In 1994, 10 percent of cases were in people infected with HIV. But these national averages hide a more alarming picture. In the northern provinces, the proportion of HIV-associated TB cases soared to nearly 40 percent from only 5.4 percent in late 1989. In Bangkok, HIV-related TB cases almost doubled in the same four year period.

New Life in an Old Enemy

A person with dormant TB (an infection kept in check by the body’s immune system) who becomes infected with HIV is 30 times more likely to develop active tuberculosis than someone who is HIV-negative. TB is now the most common opportunistic infection in Thailand’s AIDS patients, a life-threatening disease in some 40 percent of those HIV/AIDS cases admitted to hospital.

But the risk is not limited to the sero-positive. Tuberculosis is now a more potent threat to everyone in Thailand, as the pool of infectious sources swells. In the year 2000 there are expected to be 120,000 new cases of TB, a 20 percent increase over today’s incidence. At least twenty thousand of these patients are likely to be co-infected HIV/TB cases.

Worse, TB’s association with HIV has doubled its old social stigma. People with obvious symptoms of TB are increasingly suspected of having AIDS and are at risk of being shunned by their communities.

TB Services Under the Spotlight

Thailand’s TB control programme has been based on clinics within provincial and district hospitals, supported by 12 Zonal TB Centers responsible for staff supervision and training. An unknown but certainly sizable number of people seek care at private health clinics. Laboratory facilities are good throughout the country, and anti-TB drug supplies reliable. But the extra burden imposed by HIV has begun to highlight weaknesses in Thailand’s response to TB.

Treatment was normally unsupervised and patients had to collect their drugs weekly or monthly from the hospital, often a long and costly journey from home. Supervision and training of staff was infrequent, and monitoring of treatment spotty and unreliable. Up to half of the patients in some areas did not complete treatment, adding to the risk of multidrug-resistant (MDR) TB emerging. Last year there were an estimated 3,000 cases of MDR TB. The problem was exacerbated by the fact that anti-TB drugs can be bought without prescription in Thailand, allowing people to treat themselves without instruction or supervision.

In these circumstances the outcome of treatment of TB patients could not be systematically recorded or evaluated. No one knew exactly what proportion of patients were cured.

Defusing the TB Time Bomb.

In 1997 it is widely recognized that Thailand stands uneasily on a time bomb of HIV-associated TB, and the need to expand and intensify the TB control programme is urgent.

To meet the government’s policy goal of providing DOTS coverage across the entire country by the year 2000, the national budget may need to be increased. But the challenge may also demand that other key elements to enable DOTS to be deployed more widely be put in place. The recent downsizing of the specialized Zonal TB Centers may leave a gap, as crucial supervision and training activities need a base to ensure they are carried out effectively. TB care is not yet firmly integrated into community-level primary health services and getting access to treatment remains difficult for many patients.

A Model for the Region?

Since neighboring countries face a similar threat from the dual epidemics of TB and HIV, Thailand has the potential to become a model of effective TB control in the region. Now, action must be taken to implement the DOTS strategy in its entirety, nationwide. Thailand, and its neighbors, have much to gain by bold reform, and no time to waste.

DOTS

Assessment

Up to half of the patients in some areas did not complete treatment, adding to the risk of multidrug-resistant (MDR) TB emerging. Last year there were an estimated 3,000 cases of MDR TB.
A legacy of haphazard treatment has left Indonesia with a huge burden of chronic and often drug-resistant TB cases. Tuberculosis remains a leading cause of death throughout the country. But the performance of a DOTS pilot project suggests that this could change dramatically.

Indonesia
Where the Future is on Trial

When Dr Siti
Wuwungan, a physician with a busy private practice on Sulawesi island, was asked to attend a seminar on tuberculosis by the provincial health department, she did not hesitate to accept. She had observed the new TB control programme in the local health center, at first with open skepticism and then growing interest, during the past three years.

The new TB control project was achieving stunning results. Fewer than 3 percent of patients dropped out of treatment, while elsewhere over 50 percent typically defaulted. More than 90 percent were being cured of TB by the end of their treatment. Like many of her colleagues, Dr Siti wanted to find out how to adopt the new approach.

The impressive achievements of the experimental DOTS programme have now attracted the attention of policy makers in the Ministry of Health. Until recently, leaders in Jakarta had been largely unaware that TB – far from being under control – was growing more serious. Hidden in data being reported from hospitals and health centers was evidence that tuberculosis was, in fact, the leading infectious disease problem in Indonesia and – costing 175,000 lives a year – its top infectious killer. In fact, in the 1990s, TB was taking a higher toll on Indonesian society than anywhere else in Asia. Now, TB is clearly poised to become an even more deadly threat in partnership with HIV.
Today, Indonesians can be grateful that their government is alert to the threat. Jakarta is now committed to deploying the sound DOTS-based TB control activities that proved such a stunning success in Sulawesi throughout the country within five years.

**Poor Services Made the Problem Worse**

In most areas of Indonesia, TB patients can get diagnosis and treatment at local health centers. But tuberculosis has been just one of many diseases health center staff deal with day to day, and until now TB treatment was assigned no special priority. Diagnosis was often unreliable. Lab technicians frequently lacked both training in smear microscopy and adequate equipment. The medical record keeping system did not require health care workers to determine whether TB cases were new or recurrent, so the drug regimens prescribed were sometimes ineffective. In many areas, drug supplies were erratic and a newly diagnosed TB patient could wait up to seven months to start treatment – often the difference between life and death.

The evidence of low probability of cure gave people little confidence in their TB treatment. Even the poor turned to private practitioners if at all possible. But few could afford private practitioners for the lengthy treatment required for TB and the majority stopped taking their medicines after one or two months, when they began to feel better.

Until now, about half of all TB patients went to hospitals or private practitioners for treatment. Most of these patients were not diagnosed through sputum examination, nor provided the DOTS regimen nor even a combination of drugs effective against TB. As a result, even with the impressive results now being achieved in government health centers on Sulawesi, TB will continue to spread until private physicians and hospitals also adopt the DOTS strategy.

These patterns of poor diagnosis and interrupted treatment have been so widespread that today Indonesia has developed a huge backlog of chronic TB cases. The large pool of chronic sufferers transmits TB bacilli to the not-yet-infected, often over many years. Now, a proportion of chronic cases will be spreading drug resistant strains that are virtually impossible to cure. The spread of HIV/AIDS in Indonesia will also lead to sharp increases in infectious TB among young and middle aged Indonesians.

**A Race Against Time**

In 1990, the Ministry of Health invited KNCV, the leading Dutch NGO, to help design what was to be one of the most innovative control projects to date in South-East Asia. Overcoming initial stumbling blocks, the Sulawesi project took off successfully in each of the four provinces and is curing 9 out of 10 infectious patients.

Subsequently, WHO staff and the government documented the seriousness of the situation throughout the country, and the need to make fundamental changes in the national TB control programme. Since then, the Ministry of Health has increased the central TB control budget enormously – in 1995 to nearly ten times that of the previous year. A new 5-year plan has been developed to implement the DOTS strategy throughout all 27 provinces of this island nation.

Already a team of Australian, Dutch and Indonesian experts and representatives of WHO is at work in Indonesia supporting the Ministry of Health in building a strong national TB control programme based on the DOTS system. A new TB officer has been appointed at central government level to confront the challenge of building resources and training a skilled management team. Rapid expansion of the DOTS strategy is not enough. Experience shows that it can only be sustained by the ability and depth of management. Staff in the provinces need training to understand the seriousness of tuberculosis and the rationale and principles of the DOTS strategy. They must also acquire the skills and resources to manage their individual DOTS programmes on a daily basis.

Once the anti-TB services offered by the health centers improve significantly, people will start using them again as they have in Sulawesi. This is the only way to ensure universal access to effective treatment and check the spread of infection throughout the country. It's a race against time: the next two years will be crucial in determining whether Indonesia can turn the tide on TB, or is swamped by the disease as it feeds on the HIV/AIDS epidemic.
The Philippines has one of the highest rates of tuberculosis in the world. TB is common throughout all regions of the country and all levels of society, unchecked by a treatment system with too many channels and weak management.

Over the last five years, the surging economy in the Philippines has grown at a rate of over 6 percent per year. With a boom in employment, people are rising out of poverty and leaving urban slums in extraordinary numbers. This new social mobility means that TB is becoming widely distributed throughout the population. Some studies suggest that the average Filipino has a 1 in 40 chance of becoming infected with TB each year.

Currently, around 22 million people in the Philippines are infected, and about 270,000 a year are reported to develop tuberculosis. Seventy percent are men and women of working age whose illness changes them quite suddenly from productive members of society to dependents in need of care.

The disease will cast a pall over the Philippines' current economic boom unless the government acts to improve the effectiveness of its TB control programme. At present, there are too many players, a confusing array of treatment options for the patient and insufficient supervision to ensure that patients are, in fact, being cured.

An Inadequate Response
In 1986 the Department of Health launched a revitalized TB control programme emphasizing the detection non-DOTS
and treatment of infectious cases. Two thousand smear microscopy units were established in primary health care centers nationwide for detecting TB cases. Short-course treatment with a combination of three antibiotics was recommended. The programme set targets for health workers to treat at least 40 percent of the estimated number of infectious cases each year.

In regions where the program was supplemented by primary health care services, the risk of dying from TB declined substantially even though cures were not always achieved. But the active search for people with infectious TB is not the most effective TB control policy. It is more effective to spend resources on accurate diagnosis and effective cure for people who present themselves with TB symptoms in primary health clinics and hospital out-patient departments.

**Health Workers Need More Support**
A strength of the Philippines is that general health care is available even in rural village health units, or Barangay health stations. Health workers known as “midwives” are responsible for finding suspected cases of TB, referring them for diagnosis to local clinics, and handing out drugs to patients. Most midwives are very familiar with TB because it is so common, and they work closely with the community on a variety of other health needs. But the management system currently overseeing village midwives is not equal to the task. Decentralization of health services from the central to local governments in the last five years has broken down traditional lines of authority and accountability. Staff are not adequately trained for the DOTS strategy, and are unclear about their roles and responsibilities.

With inadequate supervision and with frequent lapses in supplies, some negative practices have surfaced. Diagnostic and treatment guidelines are often not followed. Drug supplies run out and patients are treated with whatever is available. There is no direct observation of treatment in the majority of cases and health workers typically say they are too busy to follow-up on defaulters or confirm that their patients have been cured.

**Too Many Options, Too Little Control**
Besides government health services, TB care is offered by many non-governmental organizations such as the Philippines Tuberculosis Society, plus a variety of private practitioners and pharmacists who can sell anti-TB drugs without prescription. These other providers are under no obligation to follow government guidelines. Many treat patients without proper diagnosis, actually undermining government efforts to control the spread of tuberculosis and seriously risking the creation of multidrug-resistant strains of TB.

**Hopeful Signs**
A pilot project which is trying to improve programme implementation in coordination with local government officials has been operating on the island of Cebu, since 1992. It is curing more than 80 percent of TB patients. But the project covers only part of the island. It needs to be expanded throughout the country, and be used as a national training center as soon as possible.

Since October 1996, the TB control programme, with the collaboration of the World Health Organization, has initiated the DOTS strategy in areas covering two percent of the population. Initial assessment showed that of those people seeking treatment, the number of smear-positive patients – the main source of transmission of tuberculosis to the community – more than doubled. And 90 percent of these tested negative after two months of directly observed treatment showing that they were making good progress toward cure.

Although the number of cases currently receiving DOTS treatment is still small, the project has convinced many skeptics that the DOTS strategy can succeed even in the Philippines. In 1997, an additional eight percent of the population will be covered by DOTS. By the year 2001, the goal is to extend DOTS to eighty percent of the population.

**Assessment**
The disease will cast a pall over the Philippines’ current economic boom – unless the government acts to improve the effectiveness of its TB control programme.
China is one of the most remarkable success stories of the DOTS strategy. In the past 5 years, DOTS treatment has been expanded to reach nearly one-half billion people and has saved the lives of hundreds of thousands of China’s citizens.

In regions of China not yet covered by the DOTS strategy, deaths from TB remain commonplace. Everyone tends to know someone within their own family who has suffered, and usually died, from the disease. TB has been a leading cause of poverty in China’s recent past, with some poor families having to sell their property to pay for drugs that were all too often inadequate or ineffective in curing TB.

Today, in villages where an effective DOTS programme is working, TB is no longer dreaded. Word of mouth spreads quickly. Those who become sick with TB know it can be cured; and within weeks of starting treatment most are back to work. The family’s out-of-pocket costs to fight this old killer are minimal, if anything.

While China is an outstanding example of a successful DOTS strategy, the vastness of the country and its population still presents formidable challenges to expanding DOTS more widely. Although dramatic gains have been made, TB still kills approximately 250,000 Chinese every year. Some provinces have yet to adopt the DOTS strategy. Unfortunately, even in areas where effective TB services are non-DOTS.
operating, a new private health sector is emerging, with hospitals and clinics providing ineffective TB treatments.

**China Proves the Effectiveness of DOTS**

Prior to China's adoption of the DOTS strategy, a nationwide survey in 1990 estimated that up to 600 people per 100,000 had some form of tuberculosis. Roughly one quarter of these people were infectious and fewer than half who started treatment were cured. The rest lingered on, often for many years, spreading infection to others in the community. Some inevitably developed drug resistant tuberculosis which is nearly impossible to cure.

Recognizing that existing TB controls were ineffective and that prevalence of the disease was incompatible with its ambitious economic and social development prospects, the Chinese government invited the World Bank and WHO to review its national programme. The DOTS strategy was tuned to China's needs and, in early 1991, the Chinese government launched pilot projects in five counties near Beijing, covering two million people.

The strategy relied only on available technology and was a sharp departure from nearby urban hospitals where TB's victims were often treated, as long as they could pay, with expensive (and toxic) second and third line drugs and a variety of supplementary services to "augment health". The DOTS programme used a standard cocktail of four inexpensive drugs provided to patients in their villages and relied on the constant involvement of existing health staff with minimal formal training. As the DOTS strategy took hold, the standing of the village doctors in the eyes of their neighbors - and their morale - took a giant leap.

**A Creative Incentive Scheme**

Suspected TB patients identified by village doctors were given free diagnostic services and, if found ill, were provided free treatment. The village doctor was responsible for holding the patient taking each dose and ensuring that sputum was checked by the laboratory to prove progress and cure.

Since the early 1980s, village doctors in China had all become private practitioners. They no longer received salaries from local government. To earn a living, they relied on patients paying for services and drugs.

Few rural doctors could afford to offer free TB care, even if the drugs were provided free by the government. However, inability to pay was a key reason many TB patients failed to finish their treatment. This problem was solved when the Chinese government agreed to pay village doctors US $1 for every TB case identified and a further US $5 for every patient they successfully supervised until proven cured.

By the end of the first year, it was evident that the pilot projects were a stunning success. The results were better than anyone had imagined possible. Bearing comparison with some of the best cure rates in the world, 94 percent of the new TB cases in the pilot projects were cured.

**Expanding the Pilot Projects**

On the strength of these results, China's Ministry of Public Health introduced the new DOTS strategy to twelve provinces. With backing from a US $58 million World Bank credit, China embarked on a 7-year DOTS expansion programme. Today, nearly 600 million Chinese are covered by the DOTS strategy.

As part of the expansion, a public information campaign was carried out to attract people who had been already treated for TB but who were still sick. Over half the patients initially seen by the new programme were retreatment cases. These cases can often be more difficult to treat since often their TB germs have developed a degree of resistance to one or more of the antibiotics. The sheer numbers of retreatment cases underscored the dangerous inadequacy of the former TB control approach. Despite this, the DOTS strategy was able to cure more than 80 percent of these previously treated, chronic cases.

**Significant Challenges**

New funds are now needed to continue and extend coverage of the DOTS programme to the whole country. Measures also must be taken to include hospitals and train the growing private healthcare sector so that their TB treatment efforts are equally successful and integrated with the DOTS strategy.

**DOTS**

93% DOTS cure rate!

While China is an outstanding example of a successful DOTS strategy, the vastness of the country and its population still presents formidable challenges to expanding DOTS more widely.
In 1990, the federal government in Brazil abruptly terminated what had been a fairly successful TB control programme. Within months, TB treatment became unavailable throughout much of the country. The timing could not have been worse. HIV was just beginning to rage across the landscape.

**Brazil**

The Law of Unintended Consequences

**Infection and death** rates from TB had been declining in Brazil every year. But, determined to slash the federal budget and rapidly decentralize administration to the states, then-President Fernando Collor de Mello canceled the National Campaign Against Tuberculosis. The resulting lack of funding meant that, within six months, local drug supplies were exhausted and the structure supporting the staff working in communities collapsed. The states were not prepared financially or technically to fill the gap and Brazil had not yet adopted the full DOTS strategy recommended by WHO.

By the mid-1990s, public reaction, orchestrated by a dynamic media campaign, made the government rethink its strategy. News about the DOTS strategy and its impact on TB was permeating Latin America. But Brazil's decentralized health system was not ready. Today, the TB control programme has to be rebuilt from the ground up to learn to operate successfully in the new environment.

Government's task is complicated since health services are now being further decentralized from 25 states to more than 5,000 municipalities. This decentralization should produce benefits in the long run, if health services can become more responsive to community needs as well as more efficient. But this transition will take time.

**Not Just a Disease of the Poor**

Today, tuberculosis ranks among the leading causes of illness and death in Brazil. While many Brazilians are affluent by any world standard, sixty-five million people - half the population - live in poverty. Infant mortality rates are high, almost a third of the working population earns the legal minimum wage equivalent to US $100 per month and annual per capita spending on health amounts to less than US $43.

**non-DOTS**

161,800 new TB cases annually
Amid all the problems of poverty, it is easy for administrators to lose any sense of urgency about old, slowly-progressing diseases like tuberculosis. Both its victims and medical staff too easily become complacent about the need for sustained treatment and constant monitoring to ensure each infectious TB patient is cured. In the first half of this decade the number of people becoming sick with tuberculosis in Brazil increased. Over 90,000 cases are now recorded each year. Many more go unreported and probably badly treated.

Part of this increase is due to the HIV epidemic, which attacks the very immune defenses which can keep the TB infection in check. Currently, an estimated 200,000 Brazilians are believed coinfected with TB and HIV. This pattern is most marked in Rio de Janeiro and Sao Paulo – cities with very high levels of both TB and HIV/AIDS.

Firm Foundations for a New Programme

In 1992, the Brazilian government began to rebuild the TB control programme. Technical policies were developed and issued at the federal level. States were made responsible for training, monitoring treatment, and maintaining public alertness to the risk of TB. Municipalities were charged with delivering health care, including anti-TB services.

Municipalities Struggle to Cope

Appreciation of the seriousness of the TB epidemic and a corresponding commitment to the DOTS strategy are strong at senior levels of the government. But it is proving much harder than first thought to convince municipalities that TB is a top priority among all other health services they must now provide. The silent, insidious spread of a killer disease like TB is easily ignored as it moves among those who have little voice. It is easy for the rest of the community to pay little attention until it is too late and the infection has already spread among them. For this reason, sustained public education about the danger of TB is one of the important elements of the DOTS strategy.

In Brazil, demands on community health facilities are enormous. Clinics are typically overcrowded with patients who wait hours to see a doctor. Under these circumstances, getting staff to accept the need for direct observation of TB treatment, a second critical feature of the DOTS strategy, has been very difficult. Overburdened health workers are tempted to believe they can achieve good cure rates by just giving patients the right drugs and telling them to take all their medicine. In reality, they cannot know whether the patients are being cured or not unless they adopt the monitoring practices which guarantee that the DOTS approach really works. These practices are not well established at local levels in Brazil, and even many medical professionals are still skeptical of their necessity.

Some argue, correctly, that the laboratory network is too weak to support DOTS, with long delays in reporting results of the sputum tests needed to prove that TB is being cured, and lack of quality controls. But action to improve it, not skepticism, will be Brazil’s best defense.

Re-gaining the Initiative

Changing attitudes and practices at community levels calls for strong leadership, advocacy, and training – all elements of the DOTS strategy. They must be coupled with a secure drug supply, insistence on direct observation of treatment of each infectious case, and proof, through monitoring, that cure is achieved.

Within the national TB control programme in Brazil today, efforts to achieve each of these elements of the DOTS strategy are now being concentrated in 250 municipalities selected for high incidence of TB, high mortality, low cure rate and spread of AIDS. From these bases, a model of treatment and community participation is now being developed for eventual deployment throughout the country. The challenge recognized in Brazil today is to spread DOTS more widely, as quickly as possible without risking the loss of quality which could create an incurable plague of MDR TB.

Assessment

The silent, insidious spread of a killer disease like TB is easily ignored as it moves among those who have little voice. It is easy for the rest of the community to pay little attention until it is too late and the infection has already spread among them.