Evolution of WHO policies for tuberculosis control, 1948–2001

M C Raviglione, A Pio

We examine the evolution of WHO managerial policies for tuberculosis control during 1948–2001 to provide a new framework that will accelerate control expansion in the near future. In the first period (1948–63), a vertical approach to tuberculosis control was the policy adopted by WHO and the international community. However, although this approach was successful in more-developed countries, it largely failed in resource-poor settings. As a result, involvement of general health services was soon deemed essential. During 1969–96, a new framework for effective tuberculosis control was created and a new five-element strategy was branded with the name of DOTS. This period was characterised by the recognition of tuberculosis control as a public-health priority, the intensification of tuberculosis control efforts worldwide, and the return of tuberculosis to the political agenda of governments. However, although nominal adoption of DOTS increased rapidly due to massive promotion by WHO and partners, expansion to provide full access was too slow and only 23% of all infectious cases in 1999 were managed under DOTS. A truly multisectoral approach based on advocacy and social mobilisation, community involvement, and engagement of private-for-profit practitioners is becoming the way forward for tuberculosis control. HIV-associated tuberculosis and multidrug-resistant tuberculosis must be tackled as priority issues. We conclude that, based on the lessons of the past, the future of tuberculosis control should be focused on a pragmatic approach combining a specialised, well-defined management system with a fully integrated service delivery. A multisectoral approach that builds on global and national partnerships is the key to future tuberculosis control.

In 1947, the prioritisation by WHO of tuberculosis control was driven by the high prevalence and wide distribution of the problem throughout the world, and the feasibility to carry out mass BCG vaccination campaigns as promoted by the Danish Red Cross in some Central European countries. Further, the discovery of streptomycin in 1944, shown to have striking therapeutic effects, meant that it was available in 1946 for wide use. The advent of antituberculosis chemotherapy raised the expectations for the development of an effective weapon for rapid tuberculosis control worldwide. The first Expert Committee of WHO met in Paris in August, 1947. The Tuberculosis Section was then established within the WHO secretariat to assist governments in developing effective control programmes based on BCG vaccination and case management. Since then, case management has persisted as the central technical strategy for tuberculosis control. The major worldwide improvements of the case management strategy resulted from the introduction of isoniazid in the early 1950s, followed by that of pyrazinamide, and the discovery of rifampicin some 20 years later. The discovery of rifampicin led to the development of short-course chemotherapy regimens, largely as a result of the work of the British Medical Research Council in the 1960s and 1970s.

The technology of vaccination and chemoprophylaxis has remained almost the same since the 1950s. The predominant epidemiological role attributed to BCG vaccination in the 1950s was downsized in the following decades when it was clear that vaccination had almost no beneficial effect on the transmission of tuberculosis infection. Although technically very effective, the role of systematic isoniazid treatment for latent tuberculosis infection (secondary chemoprophylaxis) has always been limited to special risk groups such as household contacts, and, more recently, HIV-positive individuals.

Meanwhile, the managerial policies for tuberculosis control underwent substantial changes as a result of the successive doctrines that guided the management and organisation of health services in the second half of the 20th century. We discuss the evolution of WHO managerial policies for tuberculosis control, examine the lessons learned, and analyse the current trends.

The vertical programme (1948–63)

After the Second World War, the discovery of effective chemotherapeutic agents against communicable diseases of public health importance (eg, tuberculosis, leprosy, syphilis, yaws) and insecticides against vectors transmitting infectious diseases (malaria, yellow fever, plague) prompted the building of vertical control programmes, also known as categorical or specialised programmes. Each of these programmes established its own structure staffed with specialised personnel from a central level through to the local level in which the technical control activities were delivered. This single-purpose machinery, independent of both the general health infrastructure and the structure of other vertical programmes, was necessary because it dealt

Search strategy and selection criteria

To document the historical evolution of WHO policies assessed in this paper, a thorough review of WHO documents was done. The search focused particularly on policy publications, such as those of the WHO Expert Committees on Tuberculosis, and other published documents available in the official list of WHO documents. We did a Medline search addressing tuberculosis policy to ensure that relevant papers were identified and analysed. We searched for articles under keywords “Tuberculosis”, “Control”, “Policy”, and “DOTS”. Studies were selected on the basis of their historical relevance in influencing policy decisions by the international community.

Lancet 2002; 359: 775–80

Tuberculosis Strategy and Operations, StopTB, WHO, Geneva, Switzerland (M C Raviglione MD); and Mar del Plata, Argentina (A Pio MD)

Correspondence to: Dr M C Raviglione, Stop TB Department, WHO, 20 Avenue Appia, CH-1211 Geneva 27, Switzerland (e-mail: raviglioneM@who.int)
with experimental treatment methods that required, in the beginning, specialised services for delivery. Indeed, tuberculosis programmes had been developed and managed in most high-income countries in line with such a vertical structure. There was a direct line of command from a central tuberculosis division or unit down to the specialised hospitals, tuberculosis clinics, x-ray mobile units, and tuberculosis test and BCG teams. The central level operated through its own officers for training, supervision, logistics, and health education, and offered its own laboratory services.

This vertical approach, backed by socioeconomic development, was successful in industrialised countries in producing an acceleration of the decline in the annual risk of infection from 5% yearly in 1910–39 to 13% following the introduction of chemotherapy in the 1940s until 1970. The same approach was proposed by subsequent WHO Expert Committees to less-developed countries and introduced or reinforced through the establishment of Training and Demonstration Centres in less-developed countries, satellite tuberculosis clinics responsible for case finding through mass radiography and bacteriological diagnosis, and tuberculosis hospitals for segregation of patients during chemotherapy.

By the late 1950s, it became clear that, unlike more-developed countries, in most less-developed countries there was no decline in tuberculosis. The reasons were obvious. Mass case finding and specialised case management used in the more-developed countries could not be transferred effectively to other parts of the world; the cost was far beyond the resources of less-developed countries. In particular, drugs such as rifampicin and pyrazinamide were unaffordable. Finally, the vertical programme could not provide services to the whole population through its specialised structure, and therefore, without adequate coverage, it could not bring tuberculosis under control.

The main lessons from this period for less-developed countries were that mass campaigns, with mobile units and a few specialised services, could not produce a durable effect on tuberculosis epidemiology. General health services were also essential in dealing with the continuous emergence of new cases and the maintenance of vaccination coverage. In addition, it was clear that the high costs of drugs needed to be reduced in order to make them widely accessible.

The situation called for new managerial directions. A series of research studies supported by the Indian Government, WHO, and the British Medical Research Council in two Indian institutions (Tuberculosis Chemotherapy Centre in Madras and National Tuberculosis Institute in Bangalore) provided the foundations for a radical move towards the integration of tuberculosis programmes into the general health services.

**Integration of service delivery (1964–76)**

The first wave of integration was mainly promoted by tuberculosis experts with a long scientific and programmatic experience in less-developed countries. Madras Chemotherapy Centre indicated the efficacy of home treatment and suggested that tuberculosis hospital beds were no longer necessary to cure the disease. The team also highlighted the efficacy of intermittent regimens, which facilitated the full supervision of isoniazid intake as the companion drug of streptomycin injection, given twice weekly at the health centres. Importantly, Wallace Fox’s concept of “entirely supervised administration as medicines”, today called “directly observed therapy” (DOT), began to emerge as a result of the work of the Madras Chemotherapy Centre. The concept was not original in the tuberculosis field, but inspired by the existing experience of supervised administration of sulphonamides in leprosy, hetrazan in filariasis, and prophylactic antimalariais, mostly in African programmes.

The National Tuberculosis Institute at Bangalore showed that most sources of tuberculosis infection could be diagnosed through bacteriological examination of patients with respiratory symptoms attending general health services. The tuberculosis specialised centre of a district could barely deal with 200–300 cases annually. By contrast, it was possible to diagnose and treat 1630 sputum-positive tuberculosis patients in a pilot implementation of the integrated programme involving the district general health infrastructure in which 22 microscopy centres were established and 60 health units participated in supervising home treatment.

These demonstrations provided a rational basis to promote in less-developed countries the concept of a national programme that is countrywide, permanent, and based upon simplified technology delivered through the general health services. The integration of case finding and treatment activities into the general outpatient services resulted in the dismantling of the mobile radiography units, and the transformation of the tuberculosis clinics and hospitals into health centres and general hospitals.

The new policies were spelt out in the eighth report of the WHO Expert Committee on Tuberculosis, in 1964. The report, comprised of contributions by experts such as Georges Canetti, Johannes Holm, and by WHO’s Halfdén Mahler, placed emphasis on the integration of service delivery. However, the specialised approach was kept intact for the managerial functions and support to the health facilities. An important rationale was, now that tuberculosis treatment had been simplified and standardised, that multipurpose health personnel could be trained to prevent, diagnose, and treat the disease. The tuberculosis control experts continued to be responsible for providing managerial support as a vertical activity, including training, supervision, logistics, health education, information system evaluation, and operational research. These policies were refined and reaffirmed in the ninth report of the WHO Expert Committee on Tuberculosis in 1973 chaired by Wallace Fox. This report, the last in a series of nine, established the principles of the current WHO strategy of tuberculosis control.

During this period, the delivery of case management activities through the general health infrastructure became the national policy for tuberculosis control in almost all less-developed countries. However, implementation was far from satisfactory. Whereas in a few the countries transfer of responsibilities to general services was backed by increased resources, in most, dismantling of specialised services and delegation to general services was not accompanied by any extra resources. Thus, no significant impact on tuberculosis indicators could be achieved in the less-developed countries. In middle-income countries the annual rate of decline of the risk of infection was generally less than 50% of what was seen in more-developed countries. The epidemiological gap was becoming progressively wider.

Strong objections were raised during the 1970s against the specialised management of the tuberculosis programme. The prevailing view among public-health experts was that integration of service delivery could not be efficient without the integration of all the managerial functions. The primary health care movement, with its universal declaration of Alma Ata, impelled a second wave of integration.

**Integration of managerial functions (1977–88)**

The second wave of integration was driven by general public-health experts and primary health care promoters.
They set aside managers’ reluctance to give up their traditional functions in training, supervision, logistics, and communication. Tuberculosis specialists were confined to providing technical guidance to general health managers. The rationale behind these changes was that, because all programmes operated through the same type of managerial and support activities, integration would make a more efficient use of human and financial resources, eliminate duplication of tasks, and provide more effective support to the units responsible for tuberculosis.

Examples of success included integration of immunisation activities (Expanded Programme on Immunization) as well as the integration of drug logistics into a single Essential Drugs Programme, and that of labour and services. In some countries specialised laboratories such as those for tuberculosis were integrated into general public-health laboratories.

However, the benefits that could be brought by the integration of immunisation, logistics, and laboratory services were overshadowed by the failures in key areas of tuberculosis control in many less-developed countries. Compounded by economic crises that caused a weakening of the public-health infrastructure at that time, in general, managerial integration meant deterioration of the quality of case finding and treatment. General health experts without proper training were unable to provide adequate supervision and training for tuberculosis control. The integration and simplification of the information system did not provide basic data to monitor and evaluate case finding and treatment results, and critical tuberculosis drug shortages were frequent. During this period, WHO, many international agencies, most ministries of health, and academic institutions were perceived to have lost interest in tuberculosis control.

In the annual report by the WHO Director-General to the World Health Assembly, tuberculosis activities were reported first under the mycobacterial disease programme (together with leprosy) and later under other bacterial disease programmes. The International Tuberculosis Conference that had been held every 2 years until 1978, started to be convened every 4 years. There was a dramatic decrease in the publication of scientific papers on tuberculosis, tuberculosis research journals were transformed into respiratory disease journals, and the Bulletin of the WHO ceased to produce special issues on tuberculosis. The closure, in 1985–86, of the British Medical Research Council Tuberculosis Units, that had played a key part in the development and testing of modern tuberculosis control interventions, was yet another dramatic example of the loss of interest.

The individuality of the tuberculosis programmes was further diluted by a WHO Executive Board decision in 1977, asking the WHO secretariat to expand control activities to the control of communicable and chronic diseases of the respiratory system. 13 The WHO Tuberculosis Unit was transformed in 1978 into a Tuberculosis and Respiratory Infections Unit with the responsibility of developing a programme for the control of acute respiratory infections but without an increase in human and financial resources.

In the late 1980s, managerial integration was further accelerated with the globalisation of the so called “health sector reform” process. Set up to increase equity, efficiency, and quality, this process had progressed; decentralisation of authority (local empowerment), managerial integration of programmes, and public consultation. 14 Excessive speed in implementing health-sector reforms with too little participation of tuberculosis managers was particularly destructive for the tuberculosis programme in many countries. 15

When the HIV/AIDS pandemic began to spread, causing a sharp increase in tuberculosis morbidity, the neglect of tuberculosis control everywhere, including large towns of industrialised countries, became evident. The integration policies, although correct in theory, had resulted in a loss of visibility of tuberculosis control and a gradual loss of expertise in organising effective case-management activities.

**Return to a specialised managerial approach (1989–98)**

The result of the philosophical changes in the guiding concepts of the management of health services and programmes had a staggering effect on tuberculosis control during the 1980s. In 1989, the WHO Headquarters staff devoted to tuberculosis had shrunk to two professionals managing a tiny budget for operations. In most WHO Regional Offices, tuberculosis activities were one of the many responsibilities of a general epidemiologist, and no permanent consultants were posted at country level. The contributions provided by outside agencies like the British Medical Research Council Tuberculosis Units had ceased to exist, and with it, the stimulus of research that drives policy changes. There was a substantial gap between the international resources for tuberculosis control and the major public-health concerns that the disease represented world-wide.

Meanwhile, the HIV pandemic was producing sharp increases in tuberculosis notifications particular in African countries. 20 The dissolution of the former USSR was accompanied by a major socioeconomic crisis and the collapse of the health services, which resulted in a significant increase of the tuberculosis incidence in that part of the world. The declining trend in incidence in large towns of the industrialised countries reversed and notification rates were increasing year after year. 21 The deterioration of socioeconomic conditions in many countries resulted in increased poverty, overcrowding, and malnutrition, which are favourable to transmission of tuberculosis infection and progression of infection to disease. In 1990, it was estimated that the global incidence of tuberculosis was 8 million new cases and resulted in around 3 million deaths. 22,23 With only a handful of exceptions, countries did not have sound tuberculosis control programmes to be able to achieve high cure rates and monitor progress of control efforts. 24

The expanding global tuberculosis problem could no longer be ignored. The experience of a few national programmes promoted and assisted by the International Union against Tuberculosis and Lung Disease (IUATLD) during the 1980s provided the bases of a revised managerial approach to control programmes. This focused primarily on improvement of cure rates through effective short-course chemotherapy regimens, a regular supply of drugs, full supervision of drug intake (at least during the initial phase of treatment) and rigorous cohort analysis of the treatment outcomes. Expansion of case finding should be pursued only after improving substantially the cure rates. 25 Through this approach, Karel Styblo of the IUATLD showed that it was possible to achieve 80% cure rates in field conditions in Tanzania and, later, in other poor countries such as Malawi and Mozambique. 26 In essence, this experience proved that effective case management of tuberculosis could be achieved in any situation.

WHO finally responded by establishing pragmatically the fundamentals of a new strategic approach to tuberculosis control, emphasising specialised managerial functions at central, regional, and district levels and, therefore, marking a clear retreat from the managerial integration theories.
Nevertheless, the principles of integration of case-management delivery into the primary health care infrastructure were maintained. Such moves were a return to the managerial policies of the 1960s with the technical innovations of the 1990s. Standard 12-month treatment regimens were abandoned; short-course chemotherapy with rifampicin (finally affordable in all countries) became the standard treatment for every new patient; direct observation of drug intake was no longer an option carrying the same weight as self-administered treatment, but the highly preferred way of administering drugs during the initial phase to both hospitalised patients and outpatients. In 1991, the 44th World Health Assembly, through resolution WHA44.8, adopted the new strategy and formulated the two global targets for the year 2000 of curing 85% of infectious cases detected and detecting 70% of cases. Later, targets proved a crucial stimulus in many countries to focus efforts.

The new strategy, subsequently labelled DOTS, provided a framework for effective tuberculosis control. The strategy comprised five essential elements. Two elements are technical: case finding through bacteriological examinations of patients with respiratory symptoms attending primary health care units and administration of short-course chemotherapy mostly by direct observation. The other three elements are managerial: generating greater political commitment to mobilise sufficient resources for tuberculosis control; securing a regular supply of antituberculosis drugs; and establishing a reliable information system to provide data for monitoring and assessing case finding and treatment activities.

Meanwhile, the World Development Report of 1993 emphasised that a sound strategy of tuberculosis control is one of the most cost-effective health interventions available today. Also, sound international monitoring and surveillance systems, able to measure progress towards the achievement of the global targets set by the World Health Assembly in 1991 and to monitor drug resistance prevalence, were established. Country support to review and revise tuberculosis control strategies was intensified by WHO. Finally, tuberculosis research, from the most basic to the more operational research on health policy, systems, and services, attracted new interest both at WHO and in many public health and academic institutions. Thus, tuberculosis came back on the global public health agenda.

The WHO Global Tuberculosis Programme carried out a massive advocacy campaign to make the DOTS strategy widely acceptable and to promote adoption of clear objectives and targets among countries. International financing invested in tuberculosis control in less-developed countries increased substantially during the 1990s (figure 1). In short, efforts to promote the adoption and implementation of DOTS in less-developed countries were successful. Whereas in 1990 less than ten countries worldwide had a proper system of tuberculosis control, by 1999 at least 127 countries had adopted DOTS (figure 2). Among those were the 22 highest-burden countries responsible for 80% of the global morbidity. However, the coverage reached in many countries was limited and only 23% of the estimated infectious cases worldwide were treated under DOTS in 1999. The managerial challenge, therefore, was not that of adopting DOTS, but rather, of expanding coverage from pilot areas to the entire country. As a consequence, nearly 80% of estimated infectious cases in 1999 still lacked access to rapid diagnosis and proper treatment. It became evident that the approach used by the WHO Global Tuberculosis Programme needed to be revised if tuberculosis control was to be more widely available and reach all, especially the under-privileged in the poorest countries.

In March, 1998, a WHO ad-hoc committee was convened in London to discuss the global constraints to widening tuberculosis control and to identify potential solutions. The resulting report was visionary and recommended that political will and commitment must be strengthened through increased social mobilisation and that technical consensus could be achieved via a global partnership with non-governmental organisations (NGOs) and the private sector. The donor community was encouraged to help countries do better economic analysis and better planning to overcome financial constraints. Training of personnel on management should improve, especially in view of health-sector reforms. The committee’s report recommends that proper balance should be established between integration and specificity, and between decentralisation and centralised functions.

The old-fashioned vertical infrastructure is not acceptable, but key functions must remain specific to the programme, such as surveillance, regular supervision, and rigorous monitoring of performance. The importance of the quality, timeliness, security, and supply of the antituberculosis drugs is essential. The committee suggested the creation of a global drug facility as a mechanism for procurement and distribution of quality drugs. The committee also noted that the health-reform process might reduce the financial resources for tuberculosis control and alter the trends in foreign health financing by compromising support to control of tuberculosis and other priorities.

The resurgence of the integrated approaches (1999–2000)

While the cooperation agencies (mostly governmental agencies) and the ministries of health were planning the expansion of the control programmes after the London Declaration, by the end of 1998 WHO was reorganised. This led to the closure of the Global TB Programme at

---

**Figure 1:** External financing (US$) for tuberculosis control in less-developed countries, inclusive of both aid funds and bank loans

**Figure 2:** Number of countries adopting DOTS, 1990–99

Source: reference 33.
WHO headquarters. The guiding concept for this decision was to integrate the managerial functions of WHO’s separate control programmes. The staff working on tuberculosis were incorporated into various new teams organised to address surveillance, prevention and control, and research and development. At the same time, a small StopTB Initiative secretariat was created to establish, expand, and nurture a new international partnership of agencies, institutions, organisations, and groups involved in tuberculosis control.

This wave of integration at WHO headquarters did not last long. The risk was that the integrated structure could lead to a gradual loss of visibility and specific expertise within WHO. At the beginning of 2001, the main sections dealing with tuberculosis activities at WHO headquarters, with the exception of basic research and new-tool development, were re-grouped under a renewed StopTB department. In essence, it was recognised that the best way to achieve a wider implementation of DOTS was through a clearly defined managerial approach and a more visible structure.

During this period of reorganisation two constraints were addressed: the tuberculosis and HIV coepidemic and the spread of multidrug-resistant tuberculosis (MDR-TB). In the case of tuberculosis and HIV, it is clear that without functional integration of tuberculosis by restorative immunocompetence, will reduce reactivation of latent tuberculosis infection among HIV-infected individuals. At the same time, treatment of latent tuberculosis infection is a concern of AIDS programmes, because it minimises the risk of active tuberculosis among HIV-infected individuals. Ultimately, achieving better tuberculosis control is also a concern of AIDS programmes, because access to diagnosis and treatment of tuberculosis is a key care issue among HIV-infected individuals. The ProTest initiative, coordinated by WHO, will further explore the principles of collaboration of tuberculosis and HIV/AIDS programmes.

The threat of MDR-TB is today much better quantified than a few years ago. Surveys in 72 countries have shown that MDR-TB is a major constraint to tuberculosis control. Modelling analyses suggest various possible evolutions of the epidemic and some uncertainty with present knowledge. The perceived competition for resources between “standard” control of tuberculosis and prevention and control, little can be achieved, especially in Africa. The tuberculosis and HIV/AIDS communities need to appreciate that these two health priorities are not competing for funding and resources. Rather, there are reciprocal benefits: adequate tuberculosis control contributes to AIDS care, and prevention of HIV transmission results in tuberculosis control. Highly active antiretroviral therapy (HAART), by restoring immunocompetence, will reduce reactivation of latent tuberculosis infection among HIV-infected individuals. At the same time, treatment of latent tuberculosis infection is a concern of AIDS programmes, because it minimises the risk of active tuberculosis among HIV-infected individuals. Ultimately, achieving better tuberculosis control is also a concern of AIDS programmes, because access to diagnosis and treatment of tuberculosis is a key care issue among HIV-infected individuals. The ProTest initiative, coordinated by WHO, will further explore the principles of collaboration of tuberculosis and HIV/AIDS programmes.

The threat of MDR-TB is today much better quantified than a few years ago. Surveys in 72 countries have shown that MDR-TB is a major constraint to tuberculosis control. Modelling analyses suggest various possible evolutions of the epidemic and some uncertainty with present knowledge. The perceived competition for resources between “standard” control of tuberculosis and management of MDR-TB as part of a DOTS-Plus strategy is being resolved by clearly defining that the former is the sine qua non for the latter. Starting in 1998, there has been major progress in exploring whether programmes can effectively introduce expensive second-line drugs into their routine activities with adequate supervision, monitoring, and assessment. Access to expensive second-line drugs has been a major problem. The establishment of the WHO-hosted Green Light Committee (GLC) by a group of partners provides a possible solution by negotiating lower prices with the drug industry, pooling procurement, and assessing the quality of programmes and projects that propose to manage MDR-TB.

**Post-modern tuberculosis control**

The post-modern era began with the creation of a partnership aimed at promoting tuberculosis control as an element for health-system development, a basic human right, and an integral part of poverty alleviation strategies. Thus, the StopTB partnership is working in such a way that governments of endemic countries receive, where needed, the adequate support to fulfill their commitments to tuberculosis control. National organisations and institutions, both public and private, have been enlisted based on their capacity and desire to contribute. International organisations, agencies, and foundations involved in technical and financial support are coordinating their interventions to be as effective as possible. This is the aim of the Global DOTS Expansion Plan (GDEP) launched in 2001 by WHO with the 22 high-burden countries (responsible for 80% of the global burden), the major bilateral development agencies, non-governmental organisations and foundations, and other international partners. The GDEP represents the concrete outcome of the StopTB Ministerial Conference on tuberculosis held in Amsterdam on March 22–24, 2000. GDEP promotes establishment of national coalitions between country programmes and local and international partners, creation of long-term DOTS expansion plans within countries, and development of regional coalitions addressing the needs of all countries. GDEP also estimates that the financial resources needed to expand DOTS and achieve the new 2005 targets (70% case detection and 85% cure rate) in all countries worldwide is about US$1.2 billion per year. The resource gap is estimated to be around US$300 million. Part of this gap is being filled by a Global TB Drug Facility that will ensure uninterrupted access to quality drugs.

**Conclusions**

The history of the managerial policies for tuberculosis control shows that the vertical approaches of the early days did not succeed in less-developed countries. It also shows that the integration waves of the 1970s and 1980s have produced mixed results. However, the experience of the past decade, when tuberculosis control again became a special priority at WHO and elsewhere, suggests that without a wider alliance encompassing public and private sectors, public health academic institutions, and communities and social movements, it will not be possible to expand tuberculosis control globally. Therefore, future work needs to build on the concept that specialised and integrated approaches are not mutually exclusive. The conviction is that the best results are achieved with a sound combination of integrated and specialised activities. Certain aspects of disease control and its technology are hard to integrate into other components of primary health care, and a specialised approach may be the practical solution to achieve success. For instance, maintaining visibility of the tuberculosis programme at the central level of the ministries of health and enlisting experts in tuberculosis management to help planning, training, monitoring, and assessing programmes are essential.

Thus, the future in most countries is a pragmatic system combining a strong central unit and well-defined regional and district management teams in charge of training, supervision, and monitoring (specialised management), with the full participation of primary health care in case finding and treatment activities (integrated service delivery). This approach should be complemented by additional measures, such as integration of drug logistics, where this is feasible, and of laboratory support.

Engagement of other sectors beyond health, such as private, educational, and development sectors, should be targeted as an opportunity to widen national coalitions against tuberculosis and promote sustainable approaches. Increasing access to DOTS is the global priority and needs to be pursued beyond government health services, although coordination by the government is essential. Depending on...
the setting, DOTS should include engagement of private-for-profit practitioners, involvement of community health workers, and effective approaches for special populations such as prisoners, refugees, and immigrants.

Internationally, tuberculosis control must be promoted as a top priority for health and development, with due consideration to human rights and social justice. The monitoring of progress towards established targets, demonstration of epidemiological and economic benefits of control, exploration of new effective ways to deliver services, and a strong research agenda targeting new tools for diagnosis and treatment are essential elements of global advocacy campaigns. Support to endemic countries is the ultimate goal of international efforts and a responsibility of the international community, above all of WHO. However, WHO will not succeed without the strong contribution from its partners—bilateral development agencies, international non-governmental organisations, technical agencies, foundations, private enterprises including the drug industry, and other UN agencies. To succeed, national government commitment and resources should be coupled with international aid funds and donations, in addition to loans, because tuberculosis control is a top health and development priority for all. The global StopTB movement needs to be supported and financed in such a way that the Global DOTS Expansion Plan can become reality and the start of an effort ultimately conducive to elimination of tuberculosis as a public-health issue.

Contributors
Both the authors searched for basic policy documents and wrote the paper. M C Raviglione searched the Medline database.

Conflict of interest statement
M C Raviglione is currently a WHO staff member, therefore, a potential bias exists in favour of this institution. However, WHO did not influence the statements made in the article. The article underwent the normal WHO clearance procedure.

Acknowledgements
We thank M Espinal, F Luziho, H Rieder, M Uplekar, and D C Weil for their valuable comments.

References

For personal use. Only reproduce with permission from The Lancet Publishing Group.