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# **Tuberculosis Control in South Africa**

## **Joint Programme Review**

**Conducted by a joint team  
Department of Health, South Africa and WHO**

**June 1996**

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## LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ARI	Annual Risk of Infection
CHASA	Community Health Association of South Africa
DHS	District health System
DOT	Directly Observed Treatment
DOTS	Directly Observed Treatment, Short-Course
EDL	Essential drugs list
GNP	Gross National Product
HIV	Human Immunodeficiency Virus
IUATLD	International Union Against Tuberculosis and Lung Disease
MASA	Medical Association of South Africa
MDR	Multi-drug resistance
MRC	Medical Research Council
NEHAWU	National Educational, Health and Allied Workers Union
NGO	Non-governmental Organization
PHC	Primary Health Care
R	Rand (1 rand = approximately US\$ 0.24)
RDP	Reconstruction and Development Programme
SAIMR	South African Institute for Medical Research
SAMS	South African Medical Services
SANA	South African Nursing Association
SANTA	South African National Tuberculosis Association
SATCI	Southern African Tuberculosis Control Initiative
STD	Sexually-transmitted diseases
TB	Tuberculosis
TBCP	Tuberculosis Control Programme
TBRP	Tuberculosis Research Programme (of the Medical Research Council)
WHO	World Health Organization

## 1. Executive Summary

### Background

South Africa plays a dominant economic and political role in the sub-Saharan African region. With a GNP per capita of \$2,670 in 1992, South Africa ranks among middle-income countries and has the largest economy in the region. However general health indicators such as life expectancy and infant mortality rate are similar to those of low-income countries. South Africa has recently undergone profound political changes, with a government elected by universal franchise for the first time in 1994. The discrepancy between average per capita income and general health indicators is the legacy of the inequalities of the previous apartheid era. South Africa is a nation composed of population groups which differ enormously in socio-economic and health status.

The structure of the public service in South Africa is undergoing considerable change following the political changes. Government policies in the health sector are directed at attempting to redress the imbalances of the past in provision of health care, for example through the establishment this year of a free comprehensive primary health care system. South Africa introduced a revised National Tuberculosis Control Programme (TBCP) in 1995, several years after many of its neighbours in the region. In most provinces there has been so far only limited implementation of the revised TBCP policies. The development of an effective TBCP has the potential to act as a model for strengthening the new comprehensive primary health care system.

### Burden of disease

With an estimated population in 1995 of about 41.4 million and an estimated 130,000 tuberculosis cases in 1995, South Africa has one of the highest annual tuberculosis incidences (311 per 100,000 population) in the world. Tuberculosis incidence varies dramatically by geographical region and by population group. For example, the annual tuberculosis case rates per 100,000 population for different population groups are as follows: 713 for Coloureds, 207 for Blacks, 51 for Asians, 19 for Whites. Despite a good health care infrastructure and an annual expenditure of about R 500 million on tuberculosis control activities, the tuberculosis burden in South Africa is increasing.

The high tuberculosis case rates, emergence of multi-drug resistance and the impact of the growing HIV epidemic combine to make the tuberculosis crisis in South Africa the most serious in the world. In 1995 about 1% of new tuberculosis cases had multi-drug resistant organisms, a reflection of the poor performance of tuberculosis control activities until now. South Africa has had a lower HIV incidence than many other countries in the region, but the HIV incidence is expected to increase. Currently, approximately 25% of new tuberculosis cases are attributable to HIV co-infection. In the absence of improvements in current HIV and tuberculosis control efforts, an estimated 3.5 million new cases of tuberculosis will occur over the next decade.

### Expected benefits of full, nationwide implementation of revised TBCP

Full, nation-wide implementation of the revised TBCP will result over the next 10 years in the prevention of 1.7 million new tuberculosis cases, the saving of over R 2 billion at today's value, and the prevention of spread of multi-drug resistance.

### Review findings

#### Strengths

1. Excellent human and financial resources and health infrastructure.
2. Acceptance by provinces of the internationally recommended Directly Observed Treatment, Short-course (DOTS) strategy incorporated in the national policy guidelines.
3. A well-functioning pilot project in Mpumalanga incorporating all elements of the recommended DOTS strategy.
4. A reliable drug supply system to provide anti-tuberculosis drugs to all tuberculosis patients.
5. Considerable resources for tuberculosis control within nongovernmental and private organizations, which have all adopted the national guidelines.
6. International cooperation with 11 neighbouring countries through the Southern African Tuberculosis Control Initiative (SATCI).

#### Weaknesses

1. Failure of the national and provincial Departments of Health to respond adequately to the tuberculosis epidemic.
2. Lack of visible commitment at all levels to effective tuberculosis control, as evidenced by an inadequate tuberculosis management system.
3. Incomplete implementation of the DOTS strategy, resulting in inadequately treated tuberculosis patients and the development of multi-drug resistance.
4. Inadequate investment in tuberculosis management, resulting in inefficient allocation and utilisation of resources.
5. Absence of an appropriate tuberculosis microscopy service.
6. Inadequate use of the new tuberculosis register as the key tuberculosis management tool and the lack of a financial management system to track resource allocation and ensure accountability.

## Recommendations

1. The Department of Health should publicly declare the seriousness of the tuberculosis epidemic in South Africa, and the urgency of the necessary response.
2. The Department of Health should make control of the tuberculosis epidemic a top priority by ensuring optimal tuberculosis management at all levels. Consideration should be given to the creation of a Directorate of Tuberculosis Control. At the national level, a manager, a person responsible for provincial support, a trainer, an advocacy officer and a financial administrator should be appointed. Provincial authorities should designate coordinators responsible for tuberculosis control in every Province and District.
3. Health services should implement the DOTS strategy as described in the National Guidelines in order to achieve an 85% cure rate of new smear positive cases.
4. National and Provincial authorities should invest adequate resources in tuberculosis management and training in order to prevent 1.7 million new tuberculosis cases and save over R 2 billion at today's value over the next 10 years and to prevent the spread of multi-drug resistance.
5. National and Provincial Departments of Health should ensure appropriate tuberculosis microscopy services.
6. The Tuberculosis Control Programme should ensure accountability through the use of the tuberculosis register to measure the key programme outcome indicators and by establishing a financial management system.

## 2. Introduction

### Background

South Africa plays a dominant economic and political role in the sub-Saharan African region. With a GNP per capita of \$2,670 in 1992, South Africa ranks among middle-income countries and has the largest economy in the region. However general health indicators such as life expectancy and infant mortality rate are similar to those of low-income countries. South Africa has recently undergone profound political changes, with a government elected by universal franchise for the first time in 1994. The discrepancy between average per capita income and general health indicators is the legacy of the inequalities of the previous apartheid era. South Africa is a nation composed of population groups which differ enormously in socio-economic and health status.

The structure of the public service in South Africa is undergoing considerable change following the political changes. Government policies in the health sector are directed at attempting to redress the imbalances of the past in provision of health care, for example through the establishment this year of a free comprehensive primary health care system. South Africa introduced a revised National Tuberculosis Control Programme (TBCP) in 1995, several years after many of its neighbours in the region. In most provinces there has been so far only limited implementation of the revised TBCP policies. The development of an effective TBCP has the potential to act as a model for strengthening the new comprehensive primary health care system.

Four factors reflect the seriousness of the tuberculosis epidemic in South Africa: a high tuberculosis case notification rate, an increasing HIV seroprevalence in tuberculosis patients, emerging multi-drug resistance, and failure of an annual R500 million expenditure to control tuberculosis. Recognising the seriousness of the tuberculosis epidemic, the government of South Africa requested the assistance of the World Health Organization in an evaluation of tuberculosis epidemiology and control activities, with the aim of producing recommendations to improve tuberculosis control in South Africa.

### Objectives of the programme review

The objectives of the review were to:

- conduct a situational analysis of TB control in South Africa;
- identify barriers to implementation of the new TB control guidelines;
- propose solutions to problems encountered by the provinces in TB control activities;
- involve all important role players in a united effort to improve TB control;
- build a shared vision to improve TB control in the context of strengthening primary health care services within the district health system.

## Expected outcomes

The expected outcomes of the review were:

- recommendations to provinces and to the TBCP on next steps to improve TB control in order to achieve an 85% cure rate of new sputum smear-positive TB cases by the year 2000;
- political commitment to implement recommendations.

## Review method

National staff and WHO consultants prepared 4 background documents before the review: a situation analysis of tuberculosis laboratory services, an assessment of the tuberculosis epidemic, a review of demography, infrastructure and management for health and tuberculosis control, and a paper on costs and financing of tuberculosis control. The review team consisted of officers of the Government of South Africa Department of Health at national and provincial levels, representatives from academic institutions in South Africa, representatives of nongovernmental organizations (NGOs) involved in tuberculosis control activities, WHO staff from Headquarters and the Regional Office, and WHO temporary advisers (from the International Union Against Tuberculosis and Lung Disease, the Southern Africa Tuberculosis Control Initiative, the Government of Mozambique TBCP and the United States Centers for Disease Control and Prevention). A list of all the review participants appears in Annex 1.

In order to conduct a comprehensive review of the entire country, review teams visited all 9 provinces. The review team divided into 5 smaller teams: one team reviewed tuberculosis control activities at national level and in one province; the other 4 teams each reviewed tuberculosis control activities in 2 provinces. Each team had at least one international expert, one national expert and 2 provincial tuberculosis coordinators. Within the provinces, considerations for selection of sites for field visits included the following: accessibility, tuberculosis patient load, and a representative mix of different health facilities in urban and rural areas. A list of institutions visited appears in Annex 2. After a briefing day for the whole review team, each of the 5 smaller teams undertook field trips for 2 weeks.

Each team reported its findings to provincial health authorities. The report included a summary indicating 5 main strengths, 5 main weaknesses and 5 main recommendations. After the 2 weeks' field trips, the teams met for presentation and discussion of the provincial reports and the report on activities at national level. A smaller writing group prepared a draft report which was finalised after discussion with representatives from all of the teams. The final report was presented to the Director-General of Health, other national authorities, provincial authorities and representatives of all the important role players in tuberculosis control. The Director-General of Health accepted the main findings and endorsed the main recommendations of the report.

## Geography and demography

South Africa is divided into nine provinces (see map, Annex 3). This follows the integration of the four provinces of the "old South Africa" with the nine "independent homelands" and "self-governing" states. The size of the population is not precisely known and varies according to data source. The most recent population census was in 1991, which was incomplete because of the unknown contribution of the previously self-governing and independent states. Since birth and death registrations are incomplete, particularly in the black population, population projections have been based on an estimated annual population growth rate. The estimated total population in South Africa in 1995 was 41.4 million (Table 1, Annex 4). Estimates from the 1994 election put this figure closer to 48 million. An additional factor leading to uncertainty is that the number of illegal inhabitants is not known. Illegal immigration to South Africa from neighbouring countries has escalated: unofficial estimates put the number of illegal immigrants between 4 and 5.5 million. The redrawing of provincial borders has resulted in considerable changes in provincial population estimates. Adults (over 15 years) comprise approximately 65% of the total population.

### 3. Epidemiology of Tuberculosis and Anticipated Impact of HIV

#### *Epidemiology of tuberculosis*

The extent of the problem and the trend of the tuberculosis epidemic is not accurately known, mainly because of a lack of standardised case definitions. Under-utilisation of bacteriological services and over-reliance on radiography for diagnosis have resulted in considerable under- and over-reporting of tuberculosis cases. Most importantly, the size of the infectious pool (those responsible for sustaining and spreading the epidemic) is not known. Registration of cases in the new recording and reporting system has recently started and has already shown wide discrepancies with previous notification data. Accurate registration of detected cases now indicates that some provinces previously notified twice, and other provinces half, the current figures for true case detection.

The most recent estimates of annual risk of infection (ARI) were calculated by the Tuberculosis Research Programme (TBRP) of the Medical Research Council (MRC) of South Africa, based on tuberculin surveys between 1972 and 1985. The estimates of ARI for different population groups in 1985 are as follows: Asians 0.1%, Coloureds 0.9%, Blacks 1.6%. In rural black populations, bacteriological prevalence based on TBRP surveys between 1979-1984 was 0.9% by sputum smear microscopy and 1.3% by sputum culture.

The TBRP has used the figures for reported tuberculosis cases in 1994 to derive estimates of the incidence of smear-positive tuberculosis, shown in Table 2 (Annex 4). These estimates are based on initial results from the new recording and reporting system, and the assumptions shown in Table 2. In 1994 the case notification rate for all forms of tuberculosis was 223 per 100 000 population and the estimated incidence of smear positive tuberculosis was 140 per 100 000. Table 3 (Annex 4) shows estimated total incidence of all forms of tuberculosis by age group and by HIV status. The overall estimated incidence of tuberculosis was 311 per 100 000, with 80% of these occurring in the 15-49 year age group. This confirms South Africa as a country with one of the highest tuberculosis incidence rates in the world. Estimated incidences vary considerably between different provinces, with incidences in the Western and Eastern Cape approximately twice those in other provinces.

#### *Anticipated impact of HIV*

##### HIV seroprevalence in the general population

South Africa has had a lower HIV incidence than other African countries for the first decade of the HIV epidemic, probably because of geographical, social and political barriers. Heterosexual spread of HIV was first recorded in South Africa in 1985 and unlinked anonymous surveillance of HIV seroprevalence in women attending antenatal clinics was started in 1990. This has provided estimates of the size and trend of the HIV problem in the general population. Figure 1 (Annex 5) summarizes the results of these surveys. HIV seroprevalence in women attending antenatal clinics was 0.8% in 1990. By 1995, HIV

seroprevalence in this group had reached 10.4%. HIV prevalence, and thus the impact of HIV on tuberculosis incidence, differs widely between provinces.

#### Estimated HIV seroprevalence in tuberculosis patients

The TBRP has made projections for HIV seroprevalence in tuberculosis patients, based on antenatal HIV seroprevalences. The HIV seroprevalence in tuberculosis patients is assumed to be 2.5 times that in women attending antenatal clinics. Thus in 1994, the HIV seroprevalence in tuberculosis cases (sputum smear-positive and smear-negative) was estimated to be 18.9%. Estimated HIV seroprevalences in tuberculosis patients vary between provinces, e.g. 36% in Kwazulu/Natal and 3% in the Western Cape.

#### *Projected future trends of the tuberculosis epidemic*

The MRC has developed a model of the impact of HIV on the tuberculosis epidemic in South Africa. Estimates of the future trend of tuberculosis, and the impact of HIV, rest on the following assumptions:

- a) the ratio of the number of sputum smear positive to sputum smear negative tuberculosis cases remains stable over the next 10 years, at 1:1.22 in HIV-negative patients and 1:1.81 in HIV-positive patients;
- b) among HIV-infected patients, 95% of the risk of developing tuberculosis is attributable to HIV;
- c) the annual rate of increase in HIV prevalence in the general population over the next 10 years is calculated using the cubically smoothed mathematical model based on a 10% HIV seroprevalence in 1995 in women attending antenatal clinics;
- d) a 2% ARI, 60% prevalence of tuberculosis infection, and 10% HIV seroprevalence in the general population gives rise to an annual increase in the number of sputum smear positive cases of 3.75% in the whole population (5% in the 15-49 year age group).

The MRC has projected future tuberculosis trends under 4 different scenarios, shown in Table 4 (Annex 4) and Figure 2 (Annex 5).

In scenario 1, there is no improvement in the control of tuberculosis and of the HIV epidemic. This would lead to a doubling of incidence by the year 2000, and a 4.5-fold increase by 2005. This would result in an annual caseload of approximately 640 000 by the year 2005. The cumulative number of cases over the next 10 years would be 3.5 million.

Scenario 2 assumes the following: a) progressively successful HIV control measures, achieving a level of 20% prevention of new HIV infections by 2005; b) no tuberculosis

control programme impact. The overall impact would be significant, but not enough initially to curb the rise in tuberculosis incidence resulting in a 2.5 fold increase in incidence by the year 2005.

In scenario 3, the assumption is that HIV control is not effective, but that tuberculosis control is almost optimal. Styblo and others have shown that the achievement of a cure rate of at least 80% results in an annual decrease of 11%-13% in disease transmission. This would halve the tuberculosis epidemic in 5 to 6 years. Assuming an 11% annual decrease from 1997 in the incidence of sputum smear positive tuberculosis, the impact of effective tuberculosis control on tuberculosis incidence is considerable, despite the HIV epidemic. There would be a 1.5-fold increase in incidence by 2005 as opposed to the 4.5-fold increase under scenario 1. The cumulative number of cases over the next 10 years would be 1.7 million.

Finally, scenario 4 assumes effective control of both tuberculosis and HIV. There would be an initial rise in cases, followed by a decrease from 2003 onward. By 2005 the annual incidence would be lower than in 1995.

### *Conclusions*

The burden of tuberculosis in South Africa is great, with an estimated 160 000 cases in 1996, including more than 42 000 cases attributable to HIV infection. In the absence of effective tuberculosis control, 3.5 million people will develop tuberculosis over the next ten years. An improvement in the current cure rate to at least 80% (an achievement which has already been reached in some countries on the continent) would prevent half of these cases.

#### **4. Organization of Tuberculosis Services**

##### **i. Introduction**

The structure of the public service in South Africa as a whole is undergoing considerable change following the recent political changes. While Provincial boundaries have been largely finalized, regional and district boundaries are in the process of being established. The health service structure is also undergoing profound change.

##### **ii. Previous organisation of health services up to 1994**

Prior to the end of the apartheid era in 1994, the organisation of health services reflected the government policy of "separate development". There were 4 central Departments of Health (one "general affairs" and one "own affairs" for each of the White, Coloured and Indian population groups), autonomous health authorities in each of the 10 "black homelands", and 4 provincial health authorities in the rest of S. Africa. The health services in the "black homelands" were poorly funded and inadequate. There was little, if any, coordination between these 18 different health authorities. The fragmentation of poorly funded and inadequate health services (worse in rural than in urban areas), with limited coordination between different health authorities, seriously compromised tuberculosis case finding, case holding, cure rates and recording and reporting.

The complex relationship between the TBCP and the general health services, and the absence of a relationship between the TBCP and the organisation of TB services in the "black homelands", are apparent from the "Simplified Organogram TB Control Programme" (TBCP Strategy and Policy Manual, 1992), shown in Annex 6.

##### **iii. The reform process**

The first government elected under universal franchise in 1994 has begun to institute changes, as with other government departments, in the organisation of health services at national and provincial level. The reform process is under way but the organisation of health services will be in a state of flux until it is completed. Therefore at present, some elements of the organisation of health services reflect both the previous structure and the reformed structure. Present government policies for reform in the organisation of health services are based on the following principles: a) decentralisation, b) strengthening of Primary Health Care (PHC), and c) development of a district-based system with appropriate referral mechanisms between primary, secondary and tertiary levels of health care.

##### **iv. Transition period**

The period of transition from the previous to the present reformed organization of health services is likely to be a period of some confusion and uncertainty over responsibilities for funding and providing health services. Until the reform process is completed, elements of

the previous structure will persist alongside the newly introduced structure, with the concomitant problems of the previous structure.

v. **Present organisation of health services**

A) **General health services**

The organogram for the Ministry of Health appears in Annex 7. Government health services in South Africa are managed through three separate structures: a) *National Department of Health*, b) *Provincial Departments of Health*, c) *Local Health Authorities*. A District Health System (DHS) is currently being established.

a) *National Departments of Health*

The National Department of Health is responsible for the formulation of health policy, quality assurance through formulation of norms and standards, capacity building, resource allocation to priorities, planning and strategic management, and the provision of some specialised services. Funding for these institutions is entirely through national taxes.

b) *Provincial Departments of Health*

The Provincial Departments of Health are responsible for implementing the DHS and for providing general hospital and clinic services within each province. During the process of establishing the DHS, regions have been established in all provinces to carry out functions which will eventually be devolved to the districts. Each provincial capital has a provincial health office. At the periphery, district hospitals are usually found in every town, while rural health services are delivered at clinics. These are usually small buildings staffed by nursing and auxiliary staff who provide comprehensive PHC. In sparsely populated rural districts, services are often delivered through mobile clinic units, which visit villages at regular intervals of 4 to 6 weeks. The national level provides funding for nearly all provincial health services, with, however, some additional funding from the provincial level.

c) *Local Health Authorities*

Local Health Authorities exist in major towns and provide hospital and clinic services restricted to the urban areas. Local taxes and national subsidies fund these facilities. Thus two separate structures (provincial and local), often with little co-ordination between them, provide health services in urban areas. However, health service provision in rural areas is entirely a function of provincial health authorities.

d) *District Health System*

District boundaries and management structures are still being developed in most provinces. Districts will be responsible for managing their health budgets, provision and/or purchase

of a comprehensive PHC service, and monitoring and evaluation of health and health service provision. The principles of the DHS include: overcoming fragmentation of services, ensuring equity in the provision of PHC services, effectiveness, efficiency, universal access to services, local accountability, community participation, decentralisation to encourage local initiative and flexibility, developmental and inter-sectoral approach, and sustainability.

## **B) Services for TB patients**

Many organisations provide health services for TB patients, including the following: government (at national, provincial and local levels), academic institutions (teaching hospitals and affiliated institutions), NGOs, e.g. South Africa National Tuberculosis Association (SANTA) and mission hospitals, the private sector, employers. In general, few TB patients consult private medical practitioners. There may be some overlap between these different health providers, e.g. between government health services and the teaching hospitals, and between SANTA and the government (which pays for SANTA facilities).

### *Position of TBCP within government health services*

The TBCP currently falls under the Directorate of Communicable Disease Control, within the Chief Directorate of National Programmes, as shown in the organogram for the Department of Health (Annex 7). The administrative position of the TBCP is low profile within the Directorate of Communicable Disease Control and does not allow the TBCP to exert the strong leadership and coordination role needed in the face of the complex array of providers of TB services (see Section 13 "Intersectoral Collaboration").

### *Health facilities*

Within the health service facilities outside large cities, one of the nursing staff usually takes responsibility for tuberculosis patients, along with other general duties, and works with community health workers to trace treatment interrupters. In some rural areas which were visited, an estimated 80% of patients live within easy (5km) access of the clinics and are able to come daily for their treatment. With rare exceptions, these facilities do not have immediate access to a decentralized network of laboratories.

Where specialised facilities exist, they are often overcrowded and patients frequently have to wait long periods of time. There are frequently large patient loads (especially in the urban areas) and a relatively high patient to staff ratio. These facilities often do not have microscopy services and rely heavily on radiography for the diagnosis of tuberculosis and follow-up of tuberculosis patients.

### *Tuberculosis control management*

In most districts, there is a limited tuberculosis management system to ensure case holding and to provide support and in-service training on tuberculosis control activities. The

exception is Mpumalanga, where Communicable Disease Coordinators fulfil this function. Several other provinces (Northern Province, Northwest and KwaZulu-Natal), have now adopted this approach and will appoint Communicable Disease Coordinators at the district level.

While there are Communicable Diseases Control Officers in all provinces, only Northern Province, Mpumalanga, and Northern Cape have as yet appointed a manager for tuberculosis services. While some provinces have an organogram for health services with a specific administrative responsibility for tuberculosis services, for public health laboratories, and for pharmaceutical supplies, many others do not.

At national level, tuberculosis services are part of the Chief Directorate, National Health Programmes, under the responsibility of Communicable Disease Control. In this service, there is a Chief Nurse and a consultant in tuberculosis control. The post of National Manager of the Tuberculosis Control Programme has been advertised and interviews have been held. At national level, the number of staff is clearly inadequate to perform the necessary tasks (management, support, training, advocacy and financial planning).

There is a newly developed Directorate for Laboratory Services which has the task of formulating a strategy for a Public Health Laboratory Service. There is a Directorate for Pharmaceutical Services which is responsible for the Essential Drugs List and Pharmaceutical Supplies.

International cooperation is achieved through an organization comprised of 12 nations in the region, called the Southern African Tuberculosis Control Initiative. There is increasing mobility of populations across international boundaries and South Africa provides employment for large numbers of citizens of neighbouring countries in the mining industry where they are at risk of developing tuberculosis. This initiative aims to standardize management of tuberculosis in the region and ensure the proper care of patients across international boundaries.

#### vi. Recommendations

- o The TBCP should provide training and support for health care personnel who treat tuberculosis as part of comprehensive primary health care.*
- o District level TBCP management should be based on units of approximately 100 000 population, as internationally recommended.*
- o The functions of these units are: training and quality assurance of services delivered (ensuring that guidelines are followed) and of information collected; support to those providing the services at local facilities; coordination of care among providers, administrators and adjacent areas.*

- o *Each such unit of management requires: a coordinator with a register in which all diagnosed patients are recorded and evaluated; a manual of guidelines; medication supplies; a competent microscopist; a tuberculosis laboratory register; equipment and supplies for smear microscopy.*
- o *The support required unit consists of a designated provincial coordinator who visits regularly (at least every 3 months) and is responsible for training, logistics, and coordination.*
- o *Provincial tuberculosis coordinators should be appointed to coordinate, monitor and support district coordinators.*
- o *At the national level, a manager, a person responsible for provincial support, a trainer, an advocacy and liaison officer and a financial administrator should be appointed.*

## 5. Advocacy and Public Awareness

Considering the severity of South Africa's tuberculosis epidemic, awareness of the problem among policy-makers is surprisingly low. The same interest which exists among journalists, government officials, and NGOs for addressing the AIDS epidemic or childhood immunizations does not currently exist for controlling the tuberculosis epidemic.

There seem to be many reasons for this apathy. Tuberculosis is an old disease, and there is much fatalism on whether anything can be done to eliminate it. Tuberculosis primarily affects poor people, those with little political voice in society. Additionally, there is little awareness among policy makers of many recent developments in the tuberculosis epidemic, such as the emergence of multi-drug resistant tuberculosis, and the synergistic alliance tuberculosis has formed with HIV. Likewise, there is little awareness of the success that the DOTS strategy has achieved throughout the world, and of World Bank studies that have demonstrated that the DOTS strategy is one of the most cost-effective health interventions available.

### *NGO involvement*

The Western Cape Tuberculosis Alliance has distinguished itself in implementing some of the best NGO advocacy efforts on tuberculosis to be found anywhere in Africa, Asia or Latin America. The Western Cape Tuberculosis Alliance's World Tuberculosis Day activities succeeded in involving Archbishop Tutu, the former Miss Universe and South African cricket teams, and resulted in extensive media coverage. SANTA has prepared many good materials for patient education, and its communications strengths are needed for advocacy. The Global Tuberculosis Education Fund, a U.S. NGO, has recently become active in tuberculosis advocacy in South Africa. AIDS NGOs, women's health organizations, welfare and development organizations, labour organizations, and professional associations have not been visibly involved in tuberculosis advocacy activities. In the Northern Cape Province, World Tuberculosis Day involved SANTA as well as the Member of the Executive Council for Health. Meetings were held with local business men and the community to explain tuberculosis and the efforts to control it. Under the leadership of SANTA, street parades with health education messages were held on World Tuberculosis Day and on National Tuberculosis Day.

### *Publications and materials*

Many creative tuberculosis education and community awareness materials have been developed at the national, provincial and local level. The most useful of these attempt to educate health workers and tuberculosis patients about the disease. Unfortunately, a good share of limited publications and communications budgets seems to be devoted to educating the general public, rather than targeted to reaching specific audiences that influence health policy decisions. Health promotion, and health education initiatives that reach the general public are most useful when a well-functioning tuberculosis programme is in place.

Otherwise, these strategies can be counterproductive in actively attracting an unmanageable number of patients into already overburdened and poorly functioning programmes. Attractive and well-written advocacy materials, designed to educate health policy makers on the extent of South Africa's tuberculosis problem, and justify the DOTS strategy as a solution, are virtually non-existent.

#### *Media coverage*

The National Tuberculosis Control Programme and the Western Cape Tuberculosis Alliance successfully encouraged media coverage surrounding this year's World Tuberculosis Day, on 24 March. Most major papers carried news coverage surrounding World Tuberculosis Day. SANTA holds an annual national publicity campaign utilizing the mass media, high profile people (for example, Archbishop Desmond Tutu) and Members of the Executive Councils for Health. Discussions with journalists indicate that they may actually be more aware of the global tuberculosis epidemic than the specific situation being faced in South Africa. Journalists seemed legitimately interested in reporting on the epidemic, provided information is presented in a newsworthy fashion.

#### *Recommendations*

- o *Develop mechanisms to sustain tuberculosis advocacy. The National Tuberculosis Control Programme, the National Directorate of Communications, SANTA, the Western Cape Tuberculosis Alliance and the Global Tuberculosis Education Fund must take greater responsibility in coordinating and implementing an advocacy strategy to make tuberculosis a higher priority.*
- o *Develop advocacy materials targeted to policy makers. The National Tuberculosis Control Programme needs to develop a concise, well-written and attractive advocacy document that makes clear the seriousness of the tuberculosis epidemic and persuasively presents the benefits of the DOTS strategy.*
- o *Spearhead efforts to put tuberculosis on the agenda of other NGOs and other organizations. Conferences and briefings should be organized to educate and involve more potential advocacy partners in addressing tuberculosis.*
- o *Enhance advocacy and communications capacity of the National Tuberculosis Control Programme. The National Tuberculosis Control Programme should appoint an advocacy and communications officer.*

## 6. Patient-Centred Care

In most provinces, the staff approach to patients seemed courteous and friendly. In some clinics health workers found some aspects of tuberculosis management frustrating, e.g. the need to request patients to return several times before a diagnosis was made, and sometimes to refer patients to institutions as far away as 70 km for diagnosis. The clinic opening hours, 8.00 - 16.00, Monday to Friday, in most provinces, were not always convenient, especially for working patients. The clinics that did offer 24 hour services did not include tuberculosis care. Even in rural areas, most people live in settlements with access to a health facility. In the Western Cape, special efforts were taken to make clinics more user-friendly.

Most provinces did not provide directly-observed treatment (DOT). In some cases, patients attend health facilities daily for DOT. In most cases patients either receive their supply of one or more months of drugs for self administration at home or are admitted to hospital for a number of months. Lack of proper patient transfer mechanisms between health facilities (hospital to clinics) resulted in high loss to follow-up.

There was widespread lack of knowledge by both professionals and patients of the treatment regimens used. In addition, the heavy workload particularly in the urban areas of KwaZulu-Natal left little time for health workers to offer health education and counselling to their clients except during the voluntary HIV testing that was offered in some facilities. The high population mobility often makes follow-up difficult, especially in provinces with a large mining workforce.

### *Recommendations:*

- o All health facilities caring for TB patients should implement directly observed treatment (DOT) urgently.*
- o For patients who do not have ready access to health facilities, health workers should facilitate the most convenient delivery of DOT to patients by involving employers, community care groups (including AIDS care groups), and community members as treatment supporters.*
- o District coordinators should ensure an efficient patient transfer system from one health facility to another.*
- o Provincial Health Authorities should ensure that tuberculosis services are integrated into comprehensive primary health care at district level.*
- o The National Tuberculosis Control Programme should implement health education programmes for both health professionals and patients.*

## 7. Case finding, diagnosis and laboratory services

### *Case finding*

Although the TBCP recommends "passive" case-finding (actually active testing by smear microscopy of tuberculosis suspects), certain sectors (eg. the mining industry) and provinces (for example, the Free State and certain areas of the Northern Cape) follow active case-finding by routine radiographic screening of workers or household contacts of an index case of tuberculosis. In most instances suspects start tuberculosis treatment on the basis of chest x-ray diagnosis. In some cases, health workers investigate tuberculosis suspects with chest x-ray abnormalities by also requesting sputum smear microscopy and often culture.

### *Diagnosis*

Diagnosis of tuberculosis by sputum smear microscopy forms the cornerstone of the revised TBCP yet the extent of bacteriological confirmation of tuberculosis varies greatly in the different provinces, from less than 10% to over 80%. A standardised approach to diagnosis (following the algorithms of the revised TBCP) is largely lacking and in some provinces almost all patients start tuberculosis treatment on radiographical or clinical suspicion only. In other provinces, microscopy results are largely ignored and patients are treated before results are received. Delays in obtaining laboratory results and the absence of a reliable and an accessible smear microscopy service are often cited as the main reasons for not using sputum smears for diagnosis.

### *Laboratory services*

Although laboratory services existed previously in all the independent and self-governing states, a central Directorate for Laboratory Services has only recently been established at the Department of Health. There has been little coordination of laboratory services, which have developed largely as a result of clinical demand. The various providers, e.g. South African Institute for Medical Research (SAIMR), provincial laboratory services and private laboratory services are all attempting to negotiate a stake in a future Public Health Laboratory network. This network will be linked to primary health care services and will be designed to accommodate specific provincial/regional needs. The positions adopted by some role players may constitute constraints to the implementation of an effective Public Health Laboratory system.

The provision of tuberculosis laboratory services varies widely between provinces. Diagnostic smear microscopy is performed in 208 laboratories. The distribution of microscopy services varies between provinces, ranging from four in Northern Cape to 46 in KwaZulu-Natal. Nearly all microscopy centres are in urban areas or in the district hospitals in rural areas. Quality control and proficiency testing programmes are largely absent. On average, less than 25% of laboratory time is devoted to tuberculosis bacteriology.

The laboratory turn-around time between sample receipt and microscopy result is usually less than 48 hours. Almost half of laboratories reported a turn-around time of less than 24 hours. However, there are often delays in dispatch of samples from health facilities to laboratories and in receipt of results by health facilities. In one survey of health staff, 38% reported a delay of 7-14 days and an additional 23% a delay of more than 14 days between dispatch of sputum sample and receipt of result. More than 80% of health care workers regarded this practice as satisfactory. This may reflect an uninformed acceptance of the situation by health staff or a reluctance to openly criticise this aspect of the laboratory service. The main problem appears to be delay in disseminating results, rather than delay in processing of specimens.

The TBCP is unable to function without an accessible laboratory network which rapidly reports results, since sputum microscopy is the basis for diagnosis of tuberculosis and monitoring of treatment outcome.

### *Recommendations*

- o National and provincial health authorities should address the specific requirements of the TBCP in developing the Public Health Laboratory service. Successful implementation of the revised TBCP requires immediate attention and the provision of a reliable diagnostic smear microscopy service.*
- o A specific requirement of the TBCP is the rapid communication and dissemination (within the same working day) of microscopy results. This can be achieved principally by the establishment of a network of microscopy centres, and also by an improved system of communications. The location of new centres will be determined on the basis of population density and distance from existing services. This will also require the immediate training and appointment of laboratory staff within the framework of a Public Health Laboratory Service.*
- o Provincial authorities should introduce the internationally recommended Tuberculosis Laboratory Register to microscopy laboratories to ensure that all diagnosed patients are registered and started on treatment.*
- o The Public Health Laboratory System should implement a support, training and supervision mechanism with standardised quality assurance and proficiency testing procedures (internal and external) in all laboratories.*
- o Practitioners should strictly adhere to algorithms for identifying tuberculosis suspects and the standardised TBCP principles for diagnosis and treatment, which will lead to more cost-effective utilisation of laboratory services.*

## 8. Treatment and Case Management

### *Treatment*

#### Treatment regimens for new cases

Six of the nine provinces are implementing the recommended standardised treatment regimens. However, some individual medical officers have continued to prescribe the previously recommended or non-standardised treatment regimens. The provinces which have not yet fully implemented the recommended standardised treatment regimens are Western Cape, Eastern Cape and KwaZulu-Natal.

The national recommended regimen for new adult sputum smear positive patients during the intensive phase is isoniazid (400 mg), rifampicin (600 mg), ethambutol (1200 mg) and pyrazinamide (1250 mg). This differs from internationally recommended drug doses: isoniazid 5mg/kg (maximum 300 mg), rifampicin 10 mg/kg, ethambutol 15 mg/kg and pyrazinamide 25 mg/kg. The international recommendation provides a ratio of isoniazid /rifampicin /ethambutol /pyrazinamide of 1/2/3/5, whereas the national policy gives a ratio of 1.3/2.0/4.0/4.1, resulting in an under-dosage of pyrazinamide and an over-dosage of isoniazid and ethambutol. This issue, while not urgent, should be considered during the course of the next revision of the tender for tuberculosis drugs.

#### Retreatment regimens

Five of the nine provinces have implemented the recommended standardised retreatment regimens. The provinces which have not implemented the recommended standardised retreatment regimens are Western Cape, Eastern Cape, KwaZulu-Natal and Gauteng. The ratio of isoniazid, rifampicin, ethambutol and pyrazinamide in the national treatment regimen for adult patients in this category is 1/2/4/5.

#### Monitoring during treatment

In most cases, monitoring of treatment for new cases is by chest x-ray at 3 months and at 6 months. In addition, some health facilities also monitor treatment by the recommended sputum smear investigations at 2 months and at 6 months. Health facilities often routinely request sputum culture in addition to sputum smear and do not follow the algorithms in the new TB CP guidelines.

### *Case Management*

#### Hospitalisation

The number of tuberculosis beds and the proportion of patients hospitalised vary from province to province. In almost all provinces, many patients spend varying lengths of

time in hospital, often for at least the first 2 to 3 months and sometimes for the whole duration of treatment. Nationally, there are at least 10 000 tuberculosis beds, of which private (Lifecare) and non-governmental (SANTA) organisations provide about 8 000. The government provides beds in tuberculosis hospitals and also chronic disease beds, of which tuberculosis patients occupy a variable number. It is impossible, therefore, to provide the exact number of government beds occupied by tuberculosis patients. SANTA and Lifecare charge the government a fixed daily rate to provide in-patient care for tuberculosis patients, who usually spend 2 to 3 months, and sometimes the whole duration of treatment, in hospital.

There has, until recently, been no standardised criteria for admission or discharge of tuberculosis patients to hospital. Lifecare has recently drawn up criteria which may have an impact on the average duration of in-patient stay, if implementation is supervised by national and provincial managers. Those patients with severe forms of extrapulmonary tuberculosis (e.g., spinal, meningeal, pericardial) who require hospitalisation do not usually occupy tuberculosis beds but are admitted to general hospitals. Apart from a few pulmonary tuberculosis patients who are initially too ill for out-patient treatment, the vast majority of tuberculosis patients occupying tuberculosis beds are fit enough for ambulatory treatment.

There is no standardised policy for the treatment of multi-drug resistant tuberculosis patients, who usually receive treatment in hospital although some receive out-patient treatment, often without direct specialist supervision of treatment. The success rate of treatment in these patients varies from 10% to 30%, which is similar to the outcome without treatment. Multi-drug resistant tuberculosis patients admitted to hospital pose a threat to nursing and other staff, as reflected by 4 out of 120 nursing staff in Rietfontein Hospital, Gauteng, developing multi-drug resistant (MDR) tuberculosis in the last year.

#### Interruption of treatment

The standardised policy as to when to initiate tracing after interruption of treatment, and re-initiation of treatment following interruption, is not followed and interruption rates are high. Efforts at tracing those who interrupt their treatment vary but are generally not very successful. Detection of interruption is usually by checking patient treatment cards and by checking tablet containers brought by patients to clinic appointments. SANTA community health workers help with tracing patients in some areas. Accurate information on provincial and national rates of interruption is not widely available since the recommended recording and reporting system is not implemented on a wide scale.

#### Treatment outcomes

During the visits to peripheral health facilities, cohort evaluation of treatment results was completed from the registers in the health facilities. The table below shows the results of this evaluation for new cases of sputum smear positive tuberculosis.

Cure rates varied from 29% to 36% and rates of interruption of treatment from 16% to 30%. These results contrast dramatically with a reported success rate of 84% in Mpumalanga Province, the chosen pilot province. The rates of interruption in Odi Hospital, North Western Province, and at Komga Clinic, Eastern Cape, were 55% and 90% respectively. Table showing results of treatment outcome of new sputum smear positive patients registered at health facilities where information was available for cohort analysis.

PROVINCE	n	Cure (%)	Rx completed (%)	Interrupted (%)	Transferred (%)	Died (%)	Failure (%)
Kwazulu- Natal	242	29	17	24	28	2	0
Northern	542	36	25	16	14	6	3
North West	120	34	29	30	2.5	1.5	3

n = number of sputum smear positive patients for whom complete outcome data were available

#### Incentives to improve adherence to treatment

In some areas, food incentive schemes are in place to promote adherence to treatment, but there has been no formal evaluation of their effectiveness.

#### *Recommendations*

- o Provincial Departments of Health should ensure uniform implementation of the nationally recommended standardised treatment regimens.*
- o The TBCP should recommend anti-tuberculosis drug doses in line with internationally recommended standards.*
- o Provincial Departments of Health should ensure the full implementation of the policy of Directly Observed Treatment (DOT).*
- o Provincial Departments of Health should ensure the full implementation of the policy of patient monitoring by sputum smear microscopy, rather than by chest x-ray.*
- o Provincial Departments of Health should ensure the most cost-effective use of financial resources for tuberculosis control activities by defining policies for hospital admission and discharge of tuberculosis patients and policies for the treatment of MDR tuberculosis.*
- o The TBCP should initiate a review of the role of hospitals in the management of tuberculosis. Such a review should determine need for hospitalization, now and in the future; criteria for entry into hospitals and expenditure in relation to hospitalization.*

## 9. Recording and Reporting System

The power of information to effect change within public health programmes cannot be overestimated. A standardized tuberculosis register, modified from that recommended by WHO and IUATLD, has been approved and distributed to health facilities in the country. The accuracy of completion of this register was highly variable. In those areas where there was a good support structure (such as in Mpumalanga), the registers were completed accurately. The register was judged by some nurses who were using it to be a very useful management tool. However, in most clinics, quarterly reports were not being completed and it was extremely difficult for support staff to rapidly gain a picture of the accuracy of results reported to the Information System. In addition, a large number of patients were not adequately evaluated. The lack of coordination of information among institutions and among neighbouring areas resulted in loss of continuity of care of individual patients. The most successful use of the register was in Mpumalanga, where the register was held by the District Coordinators, as recommended by the WHO and IUATLD. A register held at District level includes all patients diagnosed in the district, ensuring that all diagnosed patients are evaluated and that there is complete information on patients moving from one institution or area to another.

There was no method to identify the total number of patients identified as smear positive as the internationally recommended Tuberculosis Laboratory Register was not in use. This seriously hampered the ability to ensure that all diagnosed infectious patients were registered, started on treatment and evaluated. Regular quarterly reports of cohort evaluation of case-finding and of treatment results are now being integrated into the Health Information System. However, the accuracy of completion of the reports is questionable (comparison of information in the registers and in the quarterly reports indicated discrepancies). Also the correct reporting categories are not yet being used, due to a lack of training, coordination and support visits from managers within the Tuberculosis Control Programme. Moreover, quality control of reports is difficult for the following reasons: the large numbers of reporting sites, the small number of patients in many facilities, and the absence of district coordinators. Thus the register as the key management tool for the control of tuberculosis is not in use as intended.

### *Recommendations*

- o The TBCP should establish a support structure to ensure training and quality assurance of the information collected as an urgent priority.*
- o To ensure the quality of information collected and to facilitate evaluation of the programme, District Coordinators should utilize a comprehensive register from which all quarterly reports are completed.*
- o The Laboratory Service should use the internationally recommended Tuberculosis Laboratory Register to ensure all diagnosed patients are enrolled on treatment.*

## 10. Training and Supervision

### *Training*

There is no plan for systematic training on tuberculosis control policy and guidelines at national or provincial levels, with the exception of Mpumalanga, Northern Province and Northern Cape provinces. In Mpumalanga, a training curriculum on tuberculosis control policy and a training manual have been developed. There is a 3-day training course for clinic nurses and a shorter course for doctors. There are plans to conduct similar training courses in the Free State, Northern Province, North West and the Western Cape Provinces. In Northern Cape, staff training is held for all cadres except doctors.

At present, there is no systematic evaluation of training. It was noted that in general, clinic nurses were aware of the new tuberculosis control policy, but that not all doctors were following the national tuberculosis policy. There is, therefore, a need to target all cadres of health care providers, in the public and private sector, for training in tuberculosis control.

Some provinces, such as the Western Cape, Free State and Mpumalanga, conduct training for institutions (for example, SANTA, Lifecare, SAMS, mining hospitals, academic hospitals). These training initiatives vary in quality and are not coordinated.

MRC staff trained at least one clinic nurse at each of the peripheral health facilities on the use of the register before its introduction in 1995. However, there has been no systematic follow-up of training, (necessary because of staff turn-over) or refresher training. In North West and KwaZulu-Natal, district development and information directorate staff conducted training on use of the register. Based on findings that staff frequently have insufficient knowledge and understanding of the principles of tuberculosis control, there is an urgent need for a more systematic approach to training in tuberculosis control.

### *Supervision*

There is no supervision/support plan at national or provincial level (Mpumalanga excluded) to ensure effective staff performance. In Mpumalanga, designated staff at provincial and district levels conduct visits for supervision and support. In the absence of supervision/support plans, managers at national and provincial levels cannot monitor the quality of tuberculosis services or provide feedback on programme performance to staff in health facilities. The only province with standard supervisory check lists is Mpumalanga. The National Tuberculosis Programme needs to develop a standard supervisory check list for use at provincial and regional/district levels.

A major constraint faced by provincial Communicable Disease Control managers is the lack of funds for training and supervision/support activities. Some provinces conduct training activities with assistance from NGOs (for example, SANTA) and academic

institutions. The HIV/AIDS and STD Directorate is conducting systematic training for managers at provincial and regional/district levels. This Directorate is willing to incorporate tuberculosis training during these training sessions, for which an adequate budget is available.

#### *Recommendations*

- o The TBCP and the provincial Communicable Disease Control managers should develop a training plan to ensure that all health workers dealing with tuberculosis patients (in public, private and other sectors) have a good working knowledge of the new tuberculosis control policy and guidelines.*
- o The TBCP and the provincial Communicable Disease Control managers should develop a plan for training and supervisory/support activities for provincial and district Tuberculosis Coordinators.*
- o The allocation of funds at national and provincial levels must be sufficient to ensure that the training and supervisory/support plan is implemented.*
- o The TBCP should develop a standard supervisory check list with indicators for measuring programme performance.*

## 11. Drug supplies

The drugs which are recommended in the national guidelines have been included in the Essential Drugs List (EDL). The review team found adequate supplies of drugs at all levels of the health services, with very rare instances of interruption of treatment for patients. Some delays had been encountered in delivery of supplies when there was a change from the use of one preparation to another; this did not lead to interruption of treatment as buffer stocks were sufficient to compensate. Distribution of supplies to peripheral sites was, as a whole, carried out through the Pharmacy Department of the hospital in the area. The pharmacist coordinated management of distribution based on requests from the health facilities, without reference to managers in the TBCP. In some sites, medications used in private facilities were procured by those facilities and in others, these were provided through the state system, free-of-charge.

The system of drug distribution is not yet established in some provinces due to the incomplete transition from the previous administration. This resulted in multiple systems with different sources of supply and different methods of distribution. The Northern Province provides a useful model in drug procurement and distribution which works efficiently. The procurement of supplies within all systems was through tender at the national level with medications obtained from locally-registered firms. It was difficult to obtain a list of the prices paid for medications; these have been estimated by recent evaluation undertaken for the Programme. From these estimates, it appears that prices paid for medications may be significantly higher than those paid by neighbouring countries or obtained through international consortia. Moreover, there have been increases in the price of drugs in South Africa at a time when international prices have fallen substantially. An immense amount of money is currently being spent in drugs for the treatment of multi-drug resistant tuberculosis patients.

### *Recommendations*

- o National and Provincial authorities should establish a clear and integrated structure for the procurement and distribution of drug supplies. For this purpose, the experience of the Northern Province should be studied for possible application elsewhere.*
- o Pharmaceutical Services should pay close attention to ensure that quality supplies are obtained at the most favourable prices to efficiently utilize resources.*
- o The TBCP should ensure strong control over expenditure for drugs in the management of multi-drug resistant cases with clear accountability for expenditures based on the results obtained.*
- o Distribution of tuberculosis drugs to peripheral health facilities should be based on quarterly reports of case-finding at the health facilities.*

## 12. Cost Analysis of the South African Tuberculosis Control Programme

Funding for tuberculosis control activities in South Africa is entirely from resources within the country. The estimated cost of tuberculosis control activities in 1995 was R 500 million. Financial resources for tuberculosis control in South Africa are adequate if used cost-effectively. It is apparent from the failure to control tuberculosis in South Africa that the R 500 million current expenditure does not represent a cost-effective use of resources. Implementation of the revised strategy will result in cumulative savings of at least R 2 billion over the next 10 years.

A study of the costs associated with tuberculosis control activities was conducted in preparation for the National Tuberculosis Review. As access to financial information for the TBCP is difficult in all provinces, three provinces with accessible data were used for the study - Mpumalanga, Kwazulu/Natal and the Western Cape.

The three main cost analyses included in the report were:

1. Current costs of tuberculosis control activities.
2. Costs if the revised TBCP using the strategy based on the WHO model were implemented.
3. Costs of a programme which incorporates community based supervision to extend DOTS based on a pilot project in Western Cape which has achieved cure rates approximating that aimed for by the revised TBCP.

Mpumalanga has allocated a large portion of its budget to management and training activities, as reflected in the provincial management expenditures. With this relatively small investment, it has managed to achieve close to 80% success rates, based on reliable data.

### *Cost benefits of modified programme with community supervision*

Calculations for the Western Cape included the costs of community supervision of patients based on the model of the Tuberculosis Alliance Project intervention which is achieving greater than 80% of patients completing their treatment.

The table on the next page shows current and revised programme expenditures for the three provinces.

**Current and revised programme expenditures**

	Mpumalanga	KwaZulu-Natal	Western Cape
Patient number	2 401	10 352	25 530
<b>Total cost (R)</b>			
Current programme	6,573,023.62	41,526,989.44	97,321,998.93
Revised programme	5,228,553.38	28,839,821.89	not available
Savings	1 344 470.30	12 687 167.55	
<b>Cost per patient</b>			
Current programme	2,738.00	4,011.00	3,812.00
Revised programme	2,177.66	2,785.92	not available
Savings	560.34	1 225.08	

The table below shows current expenditure distribution by item for the 3 provinces.

**Current expenditure distribution for three provinces  
(% of total expenditure by item)**

	Mpumalanga	KwaZulu-Natal	Western Cape
Hospitals (excluding MDR*)	36.3	58.5	9.6
Clinics (full ambulatory)	3.8	1.4	62.3
Radiography	11.1	10.9	included in hospital and clinic costs
Laboratory	3.5	2.4	
Drugs (excluding MDR)	7.1	4.8	5.1
MDR cases	31.9	21.8	22.9
Provincial TB management	5.4	0.1	0.2

\*MDR = multi-drug resistance (found in 2.3% of cases)

The incremental cost for the Tuberculosis Alliance Project per patient on 6 months treatment was R 868.62. The costs of the revised programme and the incremental costs of implementing community supervision were modelled to measure their impact on the tuberculosis epidemic and on expenditure.

A five to seven year period will be required to implement the programme before the full impact of the new programme will be seen. The number of cases receiving tuberculosis treatment will continue to increase but at a much slower rate for the next ten years. The number of cases will plateau and then decline after 10 years. The impact of the HIV epidemic was included in the model. The implementation of the modified programme will require a large initial investment (approximately R 100 million over the first five years) but the net present value of future costs and savings over an evaluation period of twenty years is expected to be between R 120 and R 750 million in the Western Cape.

Full implementation of the new strategy will result in savings of more than R 1 million per year in Mpumalanga. KwaZulu-Natal will have savings of more than R 12 million per year. These estimates could be viewed as minimum and maximum savings. Savings on average cost per patient range from R 560 in Mpumalanga to R 1 225 in KwaZulu-Natal. Using this minimum savings estimate of R 560 for current patients and the savings incurred by preventing 1.7 million additional cases over the next 10 years, at a marginal cost per patient of R 863.05, an estimated total savings of more than R 2 billion has been calculated. The approach adopted in Mpumalanga Province is likely to prove more cost-effective and sustainable than the current approach of the Tuberculosis Alliance Project.

#### *Recommendations*

- o National and provincial authorities should implement the revised TBCP which will result in cost savings (as shown in Mpumalanga).*
- o National and provincial authorities should increase the proportion of total expenditure on tuberculosis control activities allocated to the management system for tuberculosis. Greater investment in programme management will significantly increase programme effectiveness and reduce overall expenditures.*
- o National and provincial authorities should allocate financial resources from less cost-effective to more cost-effective tuberculosis control activities.*
- o National and provincial authorities should reallocate resources from treatment of multi-drug resistant cases to prevent multi-drug resistant tuberculosis by improved TBCP performance.*

### 13. Intersectoral Collaboration

A number of institutions, NGOs and departments are presently involved in Tuberculosis activities in the country. Major stakeholders include the South African National Tuberculosis Association (SANTA), Community Health Association of Southern Africa (CHASA), LIFECARE, Mine Medical Officer's Association, Chamber of Mines, Medical Research Council (MRC), Correctional Services, South African Medical Services (SAMS), Medical Association of South Africa (MASA), Tuberculosis Drug Logistics Forum, South African Nursing Association (SANA), Reconstruction and Development Programme (RDP) and various programmes/directorates in the Department of Health (eg. HIV/AIDS and STD, Health Systems Research, Human Resource Planning, District Health Services, Pharmaceutical Services and Laboratory Services). Discussions with the above stakeholders indicated their keen interest to follow the national policy guidelines on Tuberculosis control and to receive clear guidance and advice from the Department of Health on a number of issues and in their operations. The role of each of the stakeholders in tuberculosis control is described below:

*SANTA* provides hospital services for tuberculosis patients through a network of 22 tuberculosis hospitals with 5,000 beds in 6 provinces. Clinical, social and rehabilitative services are provided to tuberculosis patients through 134 SANTA branches and 122 care groups. The average daily cost per tuberculosis patient has been estimated to be R 43.00. A lack of communication between SANTA health care workers and those of the provincial and national health services is regarded as a constraint in implementing the new TBCP guidelines. SANTA would like to collaborate with the TBCP in advocacy and health education.

*LIFECARE* is a private company responsible for 7 tuberculosis hospitals with approximately 3000 beds. The daily cost per patients is R65.00. Constraints faced in implementing the new TBCP strategy are a need for prolonged hospitalization due to lack of DOT facilities and lack of training on the new TBCP guidelines. Criteria for admission and discharge of tuberculosis patients have recently been developed. LIFECARE presently buys anti-tuberculosis drugs privately but would like to be able to buy drugs at government tender prices.

*CHASA* is an independent, not-for-profit organization involved in an innovative Tuberculosis Alliance Project based on active community involvement in the Western Cape. The project initiated in 1993 has shown good patient adherence to treatment. However, critical analysis of costs and treatment outcomes are required. CHASA has facilitated the creation of the Tuberculosis Drugs Logistics Forum, a collaboration between all pharmaceutical companies involved in tuberculosis drug development and distribution in the country. The granting of two-year tenders for tuberculosis drugs was accepted by the forum, but not splitting of tenders. Further work needs to be done on issues such as methods of accurate drug estimates, buffer stocks, and bio-availability testing of combination preparations.

*Mine Medical Officers Association, Epidemiological Research Unit, National Centre for Occupational Health and Chamber of Mines* recognize tuberculosis as a major problem in the mining industry and have, in principle, adopted the national TBCP guidelines. A number of issues require discussion and there is a strong need for a pro-active approach by the TBCP to ensure dialogue and communication with the mining industry, both at national and provincial levels. Much of the diagnosis is still radiologically based and changing to bacteriological diagnosis was seen as an extra expense. There was concern from some of the medical officers that tuberculosis was not under control. There was a proposal that the mines be supplied with drugs free of charge in exchange for accurate quarterly reports. The Mine Medical Officers Tuberculosis Advisory Group will make contact with the TBCP. Representation of the industry on governmental advisory bodies is recommended.

*Medical Research Council* coordinates research on tuberculosis in the country, broadly on epidemiological and operational research, clinical trials and experimental research to enhance knowledge about the basic mechanisms of Tuberculosis host and pathogen relationship. The MRC maintains a close relationship with the TBCP and has been instrumental in the development of the new TBCP strategy, especially the new recording and reporting system and the diagnostic and treatment guidelines. The MRC Tuberculosis laboratory is involved in drug resistance surveillance and operational quality assurance.

*Department of Correctional Services* treats a significant number of Tuberculosis patients. The treatment is mostly provided by district surgeons who are reluctant to follow the TBCP guidelines. There is a commitment from this department to implement the TBCP guidelines.

*SAMS* provides medical services to the military. It has developed a comprehensive tuberculosis control package according to the new TBCP guidelines. SAMS provides health care services (including tuberculosis services) in areas where governmental services are lacking and is willing to be involved in training activities with the TBCP.

*MASA* represents approximately 16 000 registered doctor and has 21 branches throughout the country. The association has a strong advocacy and support function and has been responsible for extensive distribution of the new TBCP guidelines. MASA would like to collaborate with the TBCP in dissemination of the review findings and recommendations.

*South Africa Nursing Association, South Africa Nursing Council and National Educational Health and Allied Workers Union (NEHAWU)* are supportive of implementing the new TBCP guidelines. Exposure of nursing staff to tuberculosis infection is a major concern. The Department of Health needs to develop policy guidelines for the protection of health care staff.

*The Reconstruction and Development Programme* are supportive of tuberculosis control and would assist the Department of Health in preparation of the business plan (5 year TBCP development plan). Economic analysis of current overall health budget expenditure by implementing the new TBCP guidelines will save lives, prevent new tuberculosis cases and many millions of rands on the health budget over the next decade.

*The Directorate of HIV/AIDS and STD* would like to collaborate with NTCP on training, advocacy and community based care of dually infected individuals. The directorates of Health Systems Research, Health Resource Planning and District Health Services are willing to cooperate with the TBCP in implementing the new TBCP guidelines.

#### *Recommendations*

- o The TBCP should maintain close collaboration with other directorates in the Department of Health and other stakeholders involved in tuberculosis activities in the country. These players should be represented in the Tuberculosis Advisory Group.*

## 14. Summary

In 1995, there were an estimated 140 000 new cases of tuberculosis in South Africa. Of these, at least 25% were attributable to infection with HIV and 1% were harbouring multi-drug resistant (MDR) tuberculosis organisms. If current trends continue (in the absence of effective control programmes), 3.5 million new cases of tuberculosis will occur in South Africa over the next decade. However, with effective tuberculosis and HIV control put in place now, this burden would be halved; at least 1.7 million cases and more than 50 000 tuberculosis deaths would be prevented and more than R 2 billion would be saved.

National expenditure on tuberculosis control activities in 1995 was estimated at R500 million. There has been increasing concern about the cost-effectiveness of these activities. Recognising the seriousness of the tuberculosis epidemic in South Africa, the Department of Health is in the process of implementing the DOTS strategy. The DOTS strategy focuses on patient-centred care, cost-effective diagnosis through smear microscopy, effective standardized treatment regimens, supporting patients through directly observed treatment, and monitoring treatment outcomes through cohort analysis using the tuberculosis register. A Review Team of 40 international and national tuberculosis experts reviewed the implementation of the new strategy in all nine provinces from 10 to 25 June 1996. The Review Team identified the following strengths and weaknesses of tuberculosis control in South Africa.

### **Strengths**

#### *Excellent Resources and Infrastructure*

The quality and motivation of the health care personnel in South Africa are impressive and represent a precious resource. An estimated R 500 million was spent in 1995 on tuberculosis control. There is an extensive network of hospitals and clinics and the potential for good communication by telephone and fax in those areas where this is available.

#### *National Policy Guidelines*

The internationally recommended DOTS strategy has been incorporated into the *South African Tuberculosis Control Programme Practical Guidelines 1996*. These guidelines were developed through an extensive process of consultation and consensus-building with the involvement of national and international experts and the participation of representatives from every province. The guidelines have been endorsed by the Global Tuberculosis Programme of the World Health Organization and have been accepted by each province.

### *Reliable Drug Supply*

All health facilities which were visited reported a reliable drug supply system which provided sufficient drugs for all of their tuberculosis patients.

### *Nongovernmental and Private Organizations*

There are several important nongovernmental (NGO) and private organizations with considerable resources which are involved in tuberculosis control activities in South Africa. The South African National Tuberculosis Association (SANTA) is an NGO which provides tuberculosis health education and operates 22 tuberculosis hospitals with 5 000 tuberculosis beds. LIFECARE is a private organization which operates 7 tuberculosis hospitals with 3 000 tuberculosis beds. The Tuberculosis Alliance Project in the Western Cape has developed an innovative model for community involvement in the tuberculosis management. All of these organizations have adopted the national tuberculosis guidelines.

### *International Cooperation*

South Africa has joined 11 neighbouring countries in the Southern African Tuberculosis Control Initiative (SATCI). The major goal of the initiative is to standardize tuberculosis control in the southern African region. This will help ensure the cure of tuberculosis patients who travel across borders.

### **Weaknesses**

#### *Failure to Clearly Understand the Seriousness of the Tuberculosis Epidemic*

Tuberculosis is currently the leading infectious disease killer of young adults in South Africa. Although tuberculosis is recognized as a major public health problem, the potential exponential growth of the epidemic, the threat of HIV and the resultant costs of tuberculosis control are not well appreciated. The availability of the effective DOTS strategy which is capable of curing more than 85% of tuberculosis cases is not widely realized.

#### *Inadequate Tuberculosis Management System*

The management system for tuberculosis is currently inadequate. There is an urgent need to strengthen capacity in most provinces to train, supervise and support primary health care workers in the effective management of tuberculosis control. This capacity is required at district, provincial and national levels.

### *Inadequate Implementation of DOTS*

The DOTS strategy as described in the national guidelines ensures the cure of smear positive tuberculosis patients. It was introduced into most areas of the country in 1995 but has not been fully implemented. As a result, the provinces currently report cure rates of between 40% and 80%. The current prevalence of multi-drug resistance (3%) is likely to increase if the strategy is not universally implemented.

### *Inefficient Allocation of Resources*

The human and financial resources for tuberculosis control have not been used efficiently. Health care staff have not been optimally used to strengthen the link between hospitals and clinics and between clinics and communities. Financial resources are wasted on x-rays and sputum cultures rather than focusing on sputum smear microscopy for diagnosis. Hospitalisation consumes between 10% and 60% of provincial tuberculosis budgets and patients are unnecessarily kept in hospital for up to 6 months. The financing mechanism for private and NGO tuberculosis hospitals is based on a patient-day rate which is an incentive for hospitals to keep their beds filled. There are no standardized admission and discharge criteria used by tuberculosis hospitals. Although there remains a need to maintain some tuberculosis hospital beds until out-patient services are fully in place there is currently an over-reliance on hospitalising tuberculosis patients. The treatment of multi-drug resistant tuberculosis cases consumes between 20% and 30% of tuberculosis costs. Resources are not adequately invested in the DOTS strategy which would reduce hospitalization and prevent the development of multi-drug resistance.

### *Inadequate Tuberculosis Microscopy Service*

Most health workers must wait one to two weeks for the results of smear microscopy from the time that the patient submits the specimen. This has fuelled their reliance on chest X-rays which are more expensive and which do not reliably detect infectious tuberculosis cases. The two important reasons for the long delay in obtaining smear results are lack of peripheral laboratories and inadequate transport and communications. Delays in obtaining sputum smear results and difficulty in tracing patients with positive smears may result in some sputum smear-positive tuberculosis patients never even starting treatment.

### *Inadequate Use of the Tuberculosis Register*

The tuberculosis register held at district level is the key tuberculosis control management tool. The register is used for recording all smear-positive tuberculosis cases and measuring their treatment outcomes. Standardized indicators can be used at every level to evaluate programme performance, to identify areas which require strengthening and to institute corrective measures. The register allows the calculation of the cure rate of smear-positive cases which is the key indicator of TBCP performance.

## Recommendations

The Review Team made the following recommendations:

### *Declare the Seriousness of the Tuberculosis Epidemic*

The Minister of Health should publicly declare the seriousness of the tuberculosis epidemic. The citizens of South Africa must understand that tuberculosis is killing more than 3 000 people per year and that three in every one hundred tuberculosis patients have multi-drug resistant disease. At most, only one in three multi-drug resistant cases are curable and the cost of treating these cases is twenty five times greater than treating other tuberculosis cases. The Minister of Health should also call for an urgent response to curb the epidemic by country-wide implementation of the effective DOTS strategy: the DOTS strategy cures tuberculosis patients and prevents the development of multi-drug resistance. The TBCP guidelines incorporate the DOTS strategy.

### *Ensure Optimal Tuberculosis Management*

Management of tuberculosis services should provide training and support for health care personnel who treat tuberculosis as part of comprehensive primary health care. A person responsible for tuberculosis management and a microscopist should be designated for each unit of approximately 100 000 population, adapted to the geographic and political realities. Provincial authorities should establish these units of management by designating district coordinators to ensure the effective implementation of the national guidelines and for the training, supervision and technical support of primary health care workers. In provinces with large populations, Regional Coordinators should be designated. Provincial Coordinators should be appointed to coordinate, monitor and support Regional and District Coordinators. At the national level, a manager, a person responsible for provincial support, a trainer, an advocacy and liaison officer and a financial administrator should be appointed.

### *Implement National Guidelines*

Although all provinces have adopted the national guidelines, these have not yet been fully implemented. The DOTS strategy can prevent 50 000 tuberculosis deaths in the next 10 years.

### *Invest Adequate Resources in Tuberculosis Management*

National and provincial authorities should allocate sufficient human and financial resources for tuberculosis programme management. This includes the capacity for monitoring, evaluation, training, supervision, advocacy and health promotion. The investment in human and financial resources will result in future savings by preventing new tuberculosis cases and multi-drug resistance. This investment could prevent 1.7 million cases of tuberculosis and save more than R 2 billion over the next ten years.

### *Establish Adequate Tuberculosis Microscopy Services*

Smear results should be available promptly. An appropriately staffed microscopy centre should be established as part of the each unit of tuberculosis management at the district level. This will ensure the rapid communication and dissemination of microscopy results. The link between the microscopist and the district tuberculosis coordinator will also result in more effective tuberculosis control. The role of the SAIMR should be clarified as soon as possible.

### *Ensure Accountability*

The use of the tuberculosis register will provide information on the effectiveness of the TBCP by documenting the cure rate of smear positive cases. A financial management system will provide accurate costs for key aspects of tuberculosis control (diagnostics, drugs, ambulatory care, hospitalization). The combination of outcome and cost data will allow cost-effectiveness analysis and will ensure accountability. Regular evaluation of the Programme should be undertaken to determine if it is reaching its targets as efficiently as possible. For this purpose, specific research into health services delivery is recommended.

## **ANNEX 1: REVIEW TEAM MEMBERS**

### **TEAM 1**

#### **National Level and North West**

Dr Jacob Kumaresan (Global TB Programme, World Health Organization)  
Dr Neil Cameron (National Director, Communicable Disease Control)  
Mr Hylton Smith (Executive Director, South African National TB Association)

#### **National**

Dr David Allen (Centers for Disease Control and Prevention)  
Dr Karin Weyer (Medical Research Council)  
Dr John Matjila (Department of Community Health, MEDUNSA)

#### **North West**

Dr David Coetzee (National HIV/AIDS and STD Directorate, Department of Community Health, University of Witwatersrand)  
Ms Ann Preller (TB Coordinator, Senior Nursing Service Manager, Communicable Disease Control, North West)  
Dr Johann van Eyk (Health Information Systems, North West)  
Dr Doreen Kritzinger (Clinician/Training, North West)  
Mr Hoque (Statistician, North West)

### **TEAM 2**

#### **Kwazulu-Natal and Mpumalanga**

Dr Don Enarson (International Union Against TB and Lung Disease)  
Dr Alfredo MacArthur (National TB Manager, Mozambique)  
Dr Harry Hausler (National TB Control Programme)  
Dr Elsa Balt (TB Coordinator, TB Specialist, Mpumalanga)

#### **Kwazulu-Natal**

Mr Kraig Klautdt (Global TB Programme, World Health Organization)  
Dr Robin Whittaker (TB Coordinator, Senior Specialist, Communicable Disease Control, Kwazulu-Natal)  
Dr Yacoob Coovadia (Principal Specialist, Microbiology, Kwazulu-Natal)  
Mr Atom Dilraj (Health Information Systems, Senior Specialist, CERSA, MRC)

#### **Mpumalanga**

Dr Stephen Knight (Rep. for TB Coordinator, Community Health Specialist, Kwazulu-Natal)  
Dr Dave Durrheim (Consultant, Communicable Disease Control, Mpumalanga)  
Ms Nomonde Bam (Director, Primary Health Care Services, Mpumalanga)  
Dr Boniface Wankya (Advisor, Programme Development, Mpumalanga)

### **TEAM 3**

#### **Northern Province and Gauteng**

Dr Peter Eriki (African Regional Office of WHO)  
Ms Salome Rathete (TB Coordinator, Northern Province)  
Mr Aidan Keyes (Microbiologist, South African National TB Association)  
Dr Mary Edginton (University of Witwatersrand)

#### **Northern**

Ms Nelly Manzini (Director, Primary Health Care Services, Northern Province)  
Ms Reshoketsoe Lamola (Deputy Director: Communicable Disease Control, Northern Province)  
Dr Gert Marinkowitz (Clinician, Former Acting TB Coordinator, Northern Province)

#### **Gauteng**

Dr Liz Floyd (TB Coordinator, Gauteng)  
Dr Milt Chellapa (Acting TB Coordinator, East Rand Region, Gauteng)  
Dr Reana Louw (TB Coordinator, Vaal Region, Gauteng)  
Ms Josephine Makutulela (Acting TB Coordinator, West Rand Region, Gauteng)  
Dr Johann Van den Heever (Communicable Disease Coordinator, Pretoria Region, Gauteng)

### **TEAM 4**

#### **Free State and Northern Cape**

Dr Dermot Maher (Global TB Programme, World Health Organization)  
Ms Nokuzola Mqoqi (Epidemiological Research Unit)  
Ms Dianne Phillips (National Directorate Medical Schemes, Supplies, and Pharmaceutical Services)  
Ms Maria Meintjies (TB Coordinator, Northern Cape)

#### **Free State**

Ms Ann Preller (TB Coordinator, North West)  
Ms M Norman (Rep for TB Coordinator, Chief Professional Nurse, Region C, Free State)  
Mr S Shuping (Director, Regions A,B,C, Free State)  
Ms Jeanette Hunter (Community Health Nurse, Northern Cape)

#### **Northern Cape**

Maria Griessel (TB Coordinator, Free State)  
Dr Brian Parker (Principal TB Specialist, Northern Cape)

## **TEAM 5**

### **Western Cape and Eastern Cape**

Mrs Joyce Lotter (Senior Nursing Service Manager, National TB Control Programme)  
Dr Lilian Dudley (TB Coordinator, Western Cape)  
Dr Roger Rafols (TB Coordinator, Eastern Cape)  
Professor Eric Bateman (South African Pulmonology Society)

### **Western Cape**

Dr Eddy Maganu (Southern African TB Control Initiative)  
Dr Michael Tatley (Cape Metropolitan Council, Western Cape)  
Dr John Simpson (South African Institute of Medical Research)

### **Eastern Cape**

Dr Robin Huebner (Centers for Disease Control and Prevention)  
Dr M Semoko (TB Coordinator, Region D, Eastern Cape)  
Ms Pricilla Mzetywa (TB Coordinator, Region B, Eastern Cape)

## **ANNEX 2: INSTITUTIONS AND SITES VISITED**

### **National Level**

Department of Health  
Medical Research Council (MRC)  
Mine Medical Officers Association  
South African Institute of Medical Research (SAIMR)  
National Centre for Occupational Health (NCOH)  
South African National TB Association (SANTA)  
LIFECARE  
Community Health Association of South Africa (CHASA)  
Chamber of Mines  
South African Medical Services (SAMS)  
Reconstruction and Development Programme (RDP)  
Medical Association of South Africa (MASA)  
South African Nursing Association (SANA)  
South African Nursing Council (SANC)

### **Province: Eastern Cape**

Provincial Department of Health, Bisho  
Nkqubela Hospital, Mdantsane  
Nu 8 Clinic, Mdantsane  
Pfefferville Clinic, East London  
Mjanyana Hospital, Encongoba district  
Umtata Chest Hospital, Umtata  
Fort Grey Clinic, Fort Grey settlement, East London  
Departments of Public Health and Medicine, Cecelia Makewane Hospital, Mdantsane  
Komga Clinic

### **Province: Free State**

Provincial Health Directorates (Information Systems, Human Resources, Pharmacy Services),  
Bloemfontein  
South African Institute for Medical Research, Bloemfontein  
Bloemfontein Local Health Authority  
Bainesvlei Local Authority Clinic  
  
Botshabelo Community Hospital  
"M" Clinic, Botshabelo  
Goangalelwe Clinic, Thaba Nchu  
Mafane Clinic, Thaba Nchu

Bothaville Municipal Clinic  
Maile Clinic, Bothaville  
Allanridge TB Hospital (LIFECARE)  
Freddies Shaft 5 Clinic, Freegoods Consolidated Mines, Welkom  
Western Holdings Shaft 2 Clinic, Freegoods Consolidated Mines, Welkom  
Ernest Oppenheimer Hospital, Welkom

**Province: Gauteng**

Provincial Level

Department of Health, Gauteng, Pretoria  
SAIMR Laboratory Services  
Rietfontein Hospital

Regional Site visits

Team A: Westonaria mining area:  
Goldfields West Hospital  
Bekkersdal Clinic

Kuathema Clinic  
SANTA Hospital

Team B: Kathlehong township and hospital services  
Germiston Health Department  
Natalspruit Hospital  
Randfontein Local Authority Clinics  
LIFECARE Hospital, Randfontein

**Province: Kwazulu/Natal**

Head Office in Durban  
SANTA Centre  
LIFECARE  
Durban Chest Clinic  
King George V Hospital  
Umlazi Polyclinic  
Microbiology Laboratory: Medical School  
Port Shepstone  
Murchison Hospital  
Gamalakhe Clinic  
Health Systems Trust Durban

**Province: Mpumalanga**

Biyathemba Clinic - Balfour  
Standerton SANTA Hospital - Standerton  
Seslfuba Hospital Out Patient Clinic - Ermelo  
Mhluzd Clinic - Middelburg  
Mashinging Clinic - Lydenburg  
Burgersfort Clinic - Burgersfort  
Mendi Clinics - Sabie  
Nelsville Clinic - Nelspruit  
White River - Town Hall

**Province: Northern Cape**

Northern Cape Provincial Administration  
South Africa Institute for Medical Research (SAIMR), Kimberley Hospital  
South Africa National Tuberculosis Association (SANTA), Provincial Office, Kimberley  
Diamantveld District Council Clinic at Windsorton  
Schmidtsdrift Bushman settlement run by the South Africa National Defence Force (SANDF)  
Bultfontein Local Authority Clinic, Kimberley Municipal Health Services  
De Beers Mine Clinic, Kimberley  
Kimberley Correctional Services Clinic  
Kimberley West End Hospital

**Northern Province**

Provincial Health Directorates (Human Resources, Primary Health Care, Support Services, Policy and Planning)  
SANTA  
The Aids Centre  
The Department of Correctional Services  
Pietersburg Provincial Hospital  
Potgietersrus Local Authority Clinic  
Moletlane Clinic  
Lebowakgomo Clinic  
Tzaneen Mobile Clinic  
Letaba Hospital  
Nkowankowa Health Centre  
J.C.I. Mine Clinic, Gravelotte

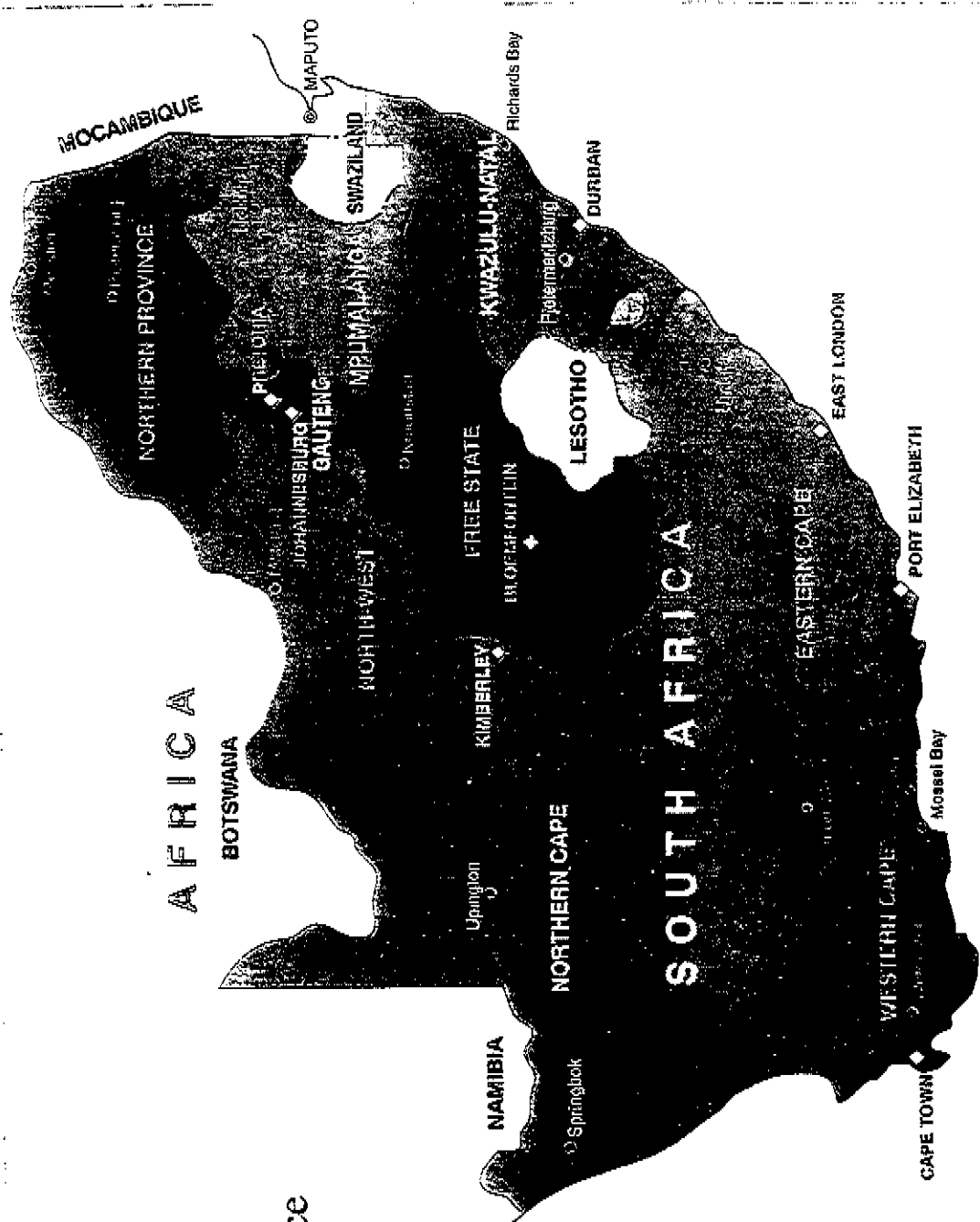
**Province: Northwest**

Mmabatho Provincial Office  
Mmabatho clinic  
West Vaal Mining Hospital  
Tshepong Hospital, Klerksdorp  
Hlabane clinic  
Rustenburg clinic  
Odi Health District

**Province: Western Cape**

Cape Metropolitan Council (CMC)  
Brooklyn Chest Hospital  
NGOs: SANTA, CHASA, TB Care Committee  
SAIMR  
Brown's Farm Health Centre  
DP Marais Hospital  
Lavender Hill Health Centre  
Respiratory Unit, GSH Hospital  
Brewelskloof Hospital  
Worcester/Hex River Clinic

ANNEX 3: MAP OF SOUTH AFRICA



- PROVINCES
- Northern Province
- Mpumalanga
- North-West
- Gauteng
- Free State
- Kwazulu/Natal
- Northern Cape
- Western Cape
- Eastern Cape
- Africa

## ANNEX 4

Table 1. Population distribution in South Africa by province in 1994 and 1995\*

Province	Population (x1000)		Proportion of total population
	1994	1995	
Western Cape	3,650	3,725	0.09
Eastern Cape	6,489	6,623	0.16
Northern Cape	811	828	0.02
Free State	2,839	2,898	0.07
Kwazulu/Natal	8,516	8,693	0.21
North West	3,244	3,311	0.08
Gauteng	6,894	7,037	0.17
Mpumalanga	2,839	2,898	0.07
Northern Province	5,272	5,381	0.13
Total	40,554	41,393	1.00

\* Epidemiological Comments 1993; 20(2).

## ANNEX 4

Table 2. Reported tuberculosis case rates (all forms) and estimated smear positive pulmonary tuberculosis incidence.

Province	Rate per 100,000 total population		
	Reported All forms (a)	Estimated SM+ (b)	Proportion of total population
Western Cape	737	221	0.09
Eastern Cape	241	193	0.16
Northern Cape	442	133	0.02
Free State	513	103	0.07
Kwazulu/Natal	120	129	0.21
North West	112	102	0.08
Gauteng	164	142	0.17
Mpumalanga	84	101	0.07
Northern Province	44	102	0.13
<b>Total</b>	<b>223</b>	<b>140</b>	<b>1.00</b>

a. Source: Directorate Epidemiology, Department of Health, 1995

b. Estimated of SM+ tuberculosis

- 30% of notified for WC and NC: WC case registration data, 1995
- 80% of notified for EC: reporting already largely based on smear microscopy
- 20% of notified for FS: Steenekamp survey (Sept. of Health, 1992/3) and policy of X-ray diagnosis
- 50% of notified for NW and NP: MPL case registration data 1995/6 as proxy
- KZN: published data from Hlabisa used as proxy
- MPL and GT: case registration data, 1995/96

## ANNEX 4

Table 3. Estimated total TB incidence per 100,000 by HIV infection status and by age group, South Africa 1994

Province	All age groups			15-49 years			other age groups			Proportion of all cases HIV+ (%)		
	All			HIV-			HIV+				All	
	SM+ (a)	SM- (b)	Total	SM+ (c)	SM- (d)	Total	SM+ (e)	SM- (f)	Total			
Western Cape	221	270	491	172	209	381	5	9	14	44	51	2.9
Eastern Cape	193	235	428	137	167	304	17	31	48	39	37	11.3
Northern Cape	133	162	295	102	124	226	5	8	13	27	30	4.5
Free State	103	126	229	63	77	140	19	34	53	21	15	23.0
Kwazulu/Natal	129	157	286	66	81	147	37	66	103	26	11	35.9
North West	102	124	226	68	83	151	14	24	38	20	17	16.8
Gauteng	142	173	315	95	116	211	18	32	50	28	24	16.1
Mpumutanga	101	123	224	56	69	125	25	44	69	20	11	30.4
Northern Province	102	124	226	75	92	167	6	11	17	20	21	7.6
Total	140	171	311	91	111	202	21	38	59	28	22	18.9

a. From Table 2

b. SM+ x 1.22 (Sudire P et al. Bull WHO 1992, 70:149-159)

c. 80% of SM+ occur in age group 15-49 years (WC and MPL register data; also Dolin PJ et al. Bull WHO 1994; 72:213-220)

d. (c) x 1.22

e. As for (c)

f. HIV+ component, based on (g)

g. Prevalence of HIV infection in TB patients taken to be 2.5 times the prevalence in women attending antenatal clinics (eg. Hlabisa data MRC TB drug trials, T Aisu quoted by Narain et al. Tuberc Lung Dis 1992; 73:311-321)

## ANNEX 4

Table 4. Estimated future annual TB case rate under four different scenarios.

	1995		2000		2005	
	Number of cases	Incidence per 100,000 (%HIV+)	Number of cases	Incidence per 100,000 (%HIV+)	Number of cases	Incidence per 100,000 (%HIV+)
Scenario 1 - current						
Total	141,187	341	273,365	600	637,999	1,285
HIV+	32,701	79 (23.4%)	130,304	286 (47.6%)	450,323	907 (70.6%)
Scenario 2 - improved HIV control only						
Total	141,095	341	267,245	586	379,700	765
HIV+	32,688	79	124,045	272 (46.4%)	192,084	387 (50.6%)
Scenario 3 - improved TB control only						
Total	141,187	341	171,516	376	223,527	450
HIV+	32,709	79	81,653	179 (47.6%)	157,959	318 (70.6%)
Scenario 4 - improved TB and HIV control						
Total	141,095	341	167,676	368	183,030	268
HIV+	32,688	79	77,915	171 (46.4%)	67,011	135 (50.6%)

Figure 1 HIV seroprevalence in women attending antenatal clinics  
RSA Department of Health surveys 1990-1995

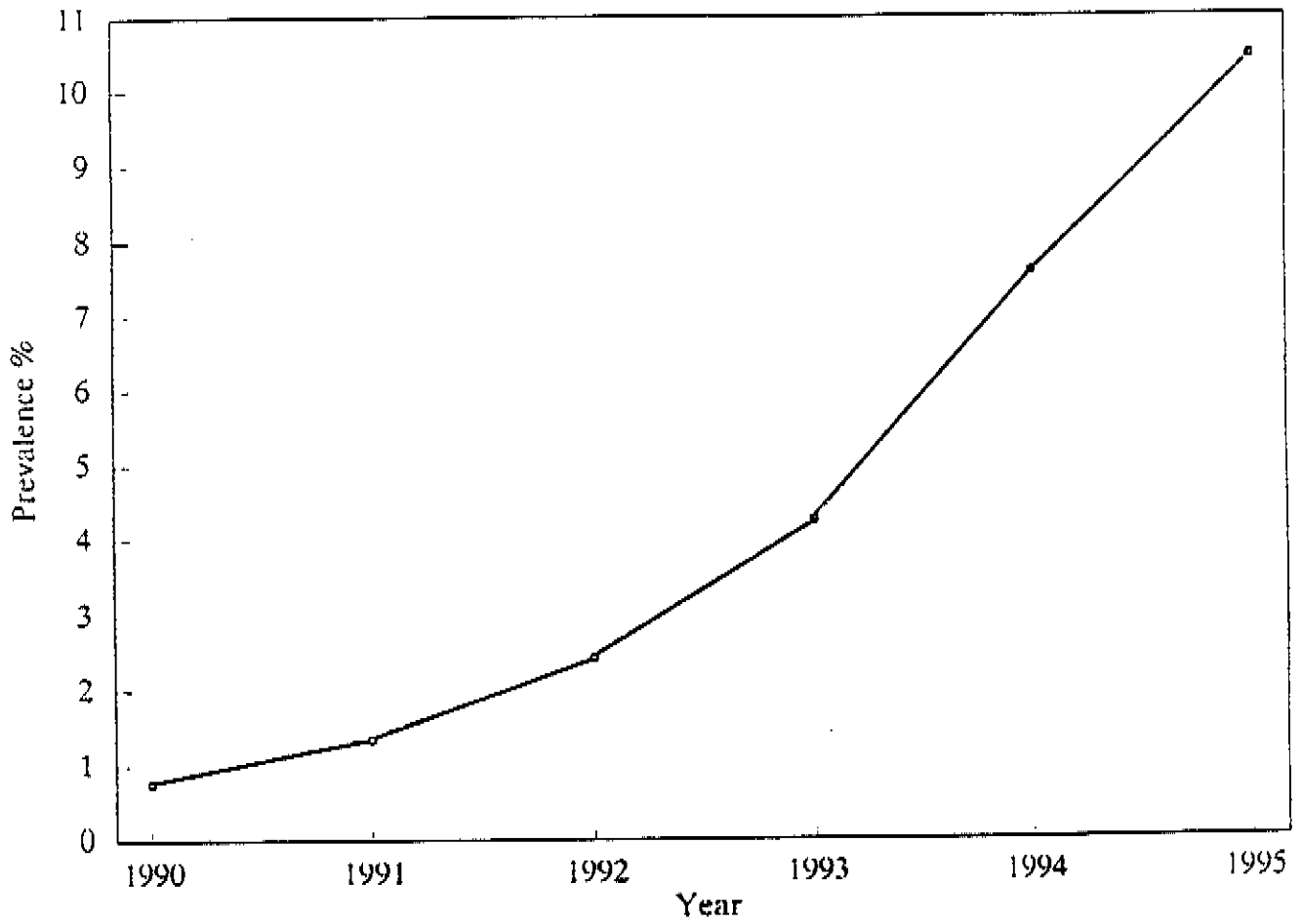
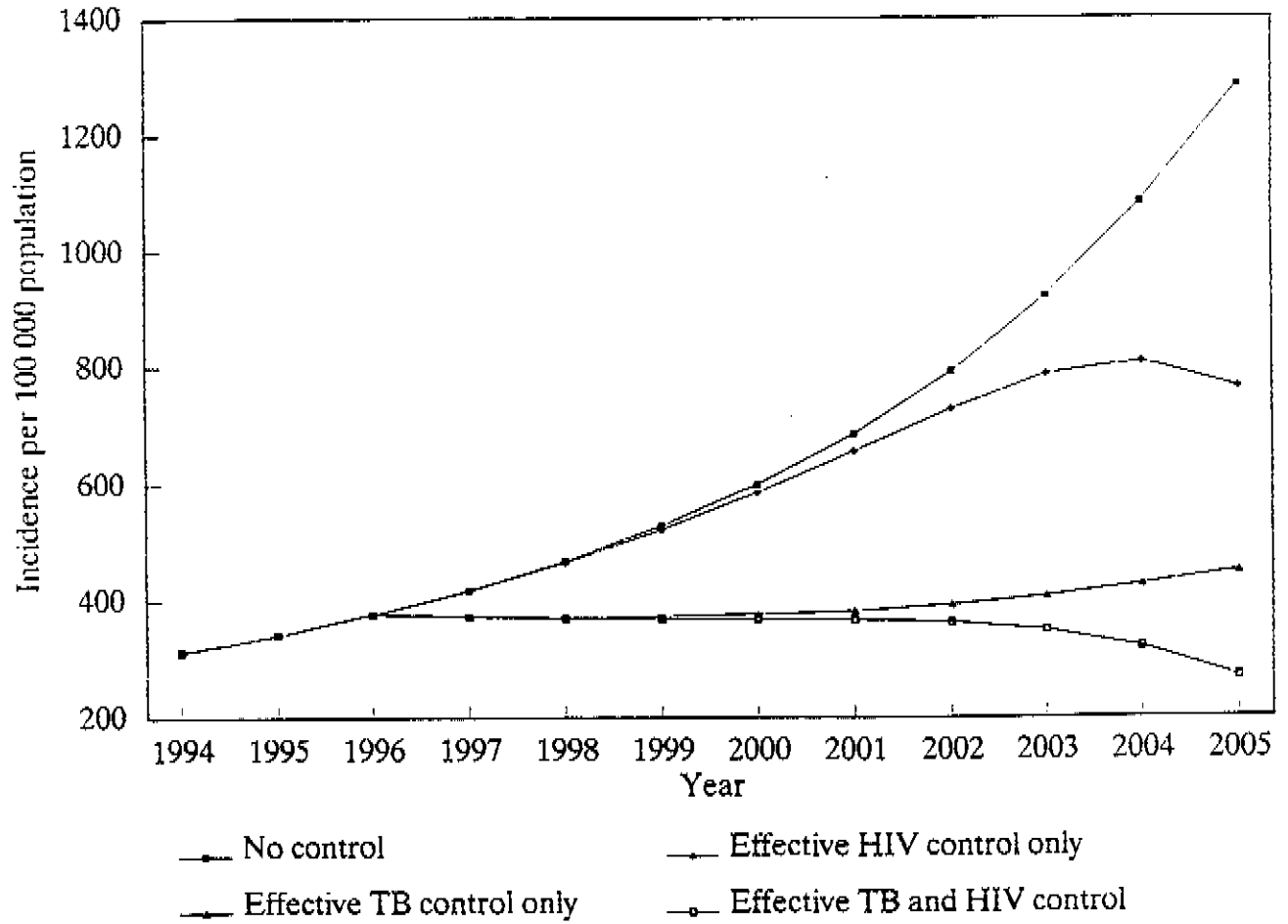
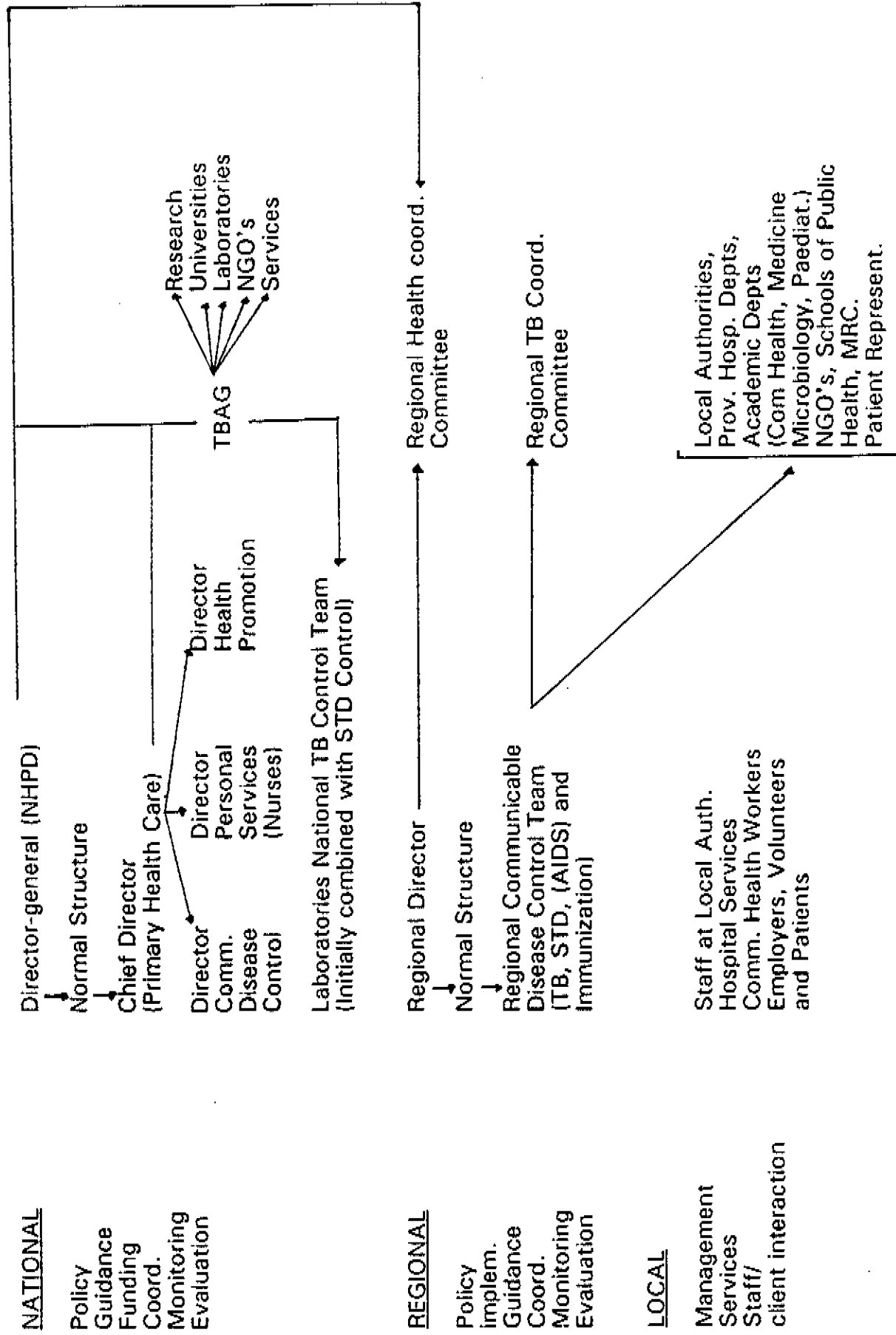


Figure 2 TB incidence in South Africa 1995–2005  
 Future trends under different control programme scenario's



**SIMPLIFIED ORGANOGamme TB CONTROL PROGRAMME - 1992**



NATIONAL

- Policy Guidance Funding Coord. Monitoring Evaluation

REGIONAL

- Policy implem. Guidance Coord. Monitoring Evaluation

LOCAL

- Management Services Staff/ client interaction

**DEPARTMENT OF HEALTH ORGANISATION STRUCTURE**

