

SECOND CARNEGIE INQUIRY INTO POVERTY  
AND DEVELOPMENT IN SOUTHERN AFRICA

Regional variations in tuberculosis  
policy in South Africa

by

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## ABSTRACT

This study examines national tuberculosis policy and regional variations (Cape Town, Paarl and the Ciskei), as well as problems experienced by health workers in implementing policy. South African policy is related to modern trends and recommendations drawn from the international literature. It is found that policy conforms in many respects, although tuberculosis services are not always integrated with curative services. The majority of problems in implementing policy relate to lack of funds and medical infrastructure. The major deviation from policy occurs in the Ciskei, where policy requires hospitalisation of as many patients as possible. It is suggested that there is a need for further evaluative research to assess whether the tuberculosis programme is helping to reduce the incidence of tuberculosis.

## REGIONAL VARIATIONS IN TUBERCULOSIS POLICY IN SOUTH AFRICA

### Introduction

It is generally agreed that tuberculosis (TB) is a major health problem in South Africa. In 1982 there were 61 980 cases of TB notified in South Africa, including the independent homelands (1). Table 1 shows the breakdown of these notifications by race.

However these figures only represent the 'tip of the iceberg'. Prevalence surveys (2) have shown that there are two to three times more infectious cases in South Africa than reflected by the incidence figures notified to the Department of Health. Therefore a more realistic figure would be 124 000 - 186 000 infectious cases of TB in 1982. Figure 1 shows the annual incidence of TB in South Africa from 1921-1982 (3). These figures are affected by many factors e.g. the completeness of notification, the intensity of case finding, and changes in the population being considered, such as the exclusion of the independent homelands. It is therefore difficult to comment on the trend.

The annual risk of infection, derived from the results of tuberculin testing a representative sample of unvaccinated children, is thought to provide a more reliable estimate of the

epidemiological trend (4). In South Africa this has declined over the last 20 years. Although the risk of infection has declined in all population groups, the gap between Blacks and other population groups has widened. Twenty years ago the risk of infection for Blacks was 3,3 times greater than that for whites. Today it is 22 times greater in South Africa (excluding the independent homelands) and 50 times greater in the Transkei (3).

The starting point in attempting to control TB is obviously the formulation of a rational and easily implemented TB policy. This is not always an easy matter as pointed out by Rouillon, Executive Director, International Union Against TB (IUAT) (5):

'The present situation of tuberculosis in the world constitutes a paradox: tuberculosis represents the prototype of a disease for which the natural history is known and substantially quantified and against which an effective, simplified, standardized technology has been developed and organized into national tuberculosis programmes, and yet there is a continuing gap between expectations and achievements which is creating concern.'

This study forms the first of a 3-part series on TB policy and its implementation in three areas of South Africa: a large city (Cape Town), a country town (Paarl, and its surrounding farms), and a homeland (the Ciskei). In this study national TB policy, its regional variations, and problems experienced by health workers responsible for its implementation are examined. In the second study the implementation of TB policy at clinic and hospital level will be examined and in the third, TB patients' experience in relation to their disease will be ascertained.

## METHODS

A questionnaire covering national TB policy (see Table 2) with respect to diagnosis, treatment, management of contacts and control methods, as outlined by Glatthaar(1) was completed by the superintendents of three health districts in the Ciskei, as well as by the Cape Town Divisional Council TB Officer, the Medical Officer of Health for the Cape Town City Council, the Paarl Municipality Medical Officer of Health and the Paarl Divisional Council Chief Health Inspector.

The 3 districts in the Ciskei were selected to include an urban area (Mdantsane(M)), a more rural district (Peddie(P)) and a rural area without a hospital (Hewu(H)). In addition, the Ciskei TB Officer and the Matron of TB Services were interviewed using the same questionnaire, and their comments are included in the section on results where they provide additional information, although they are not part of the study sample.

It was explained to the interviewees that the questionnaire aimed to investigate official TB policy in various regions of South Africa, and to establish how the various alternatives within the basic policy are implemented in different areas and at different levels of the health services. Each section of the questionnaire ended with an open-ended question about the problems pertaining to that particular aspect of policy and its implementation.

## RESULTS

### 1. Regional variations in tuberculosis policy.

#### A Diagnosis

##### Methods

All 7 authorities interviewed used a combination of X-rays and direct microscopy of sputum routinely in the diagnosis of pulmonary TB in adults. Sputum cultures were only done in 4 areas, however: the Cape Town City Council (CCC), the Cape Town Divisional Council (CDC) and Paarl Divisional Council (PDC) areas, and the Peddie district of the Ciskei. All areas used Heaf tuberculin tests in the diagnosis of TB in children, although the cut-off age for this technique ranged between 5 years and 18 years. One area (Peddie) Heaf-tested all suspects, including adults, using Mantoux tests.

Two authorities did not treat patients on X-ray diagnosis alone (M and CCC). The others reported that they would begin treating cases where disease was extensive on X-ray, and sputa would be done later.

#### B Treatment

##### Regimes

The treatment schedules recommended by the Department of Health for the treatment of adult pulmonary TB are shown in Table 3.

All 7 authorities used rifampicin containing schedules for the treatment of some patients. The policy according to which patients were treated with rifampicin varied from area to area. In the Ciskei only hospitalized patients received rifampicin, except for those involved in a small experimental project on the use of rifampicin as outpatient therapy in a rural area in the Hewu district. In the Paarl Divisional Council area, where there are no daily clinics, tuberculosis treatment is administered by sisters who do mobile daily treatment rounds. Only patients who live in outlying areas not reached by the mobile teams receive rifampicin. The Cape Town City Council has ceased to treat new patients with rifampicin containing regimes since November 1982 (City of Cape Town Department of Health Admin. Circular 82/18), due to insufficient funds for supplies. Other authorities (CDC + PM) use rifampicin but do so for periods of less than 6 months (100-120 days), due to cost considerations. Patients who were already receiving rifampicin in the City Council area now receive a maximum of 450mg of rifampicin per day for 100 days. When rifampicin-containing schedules are not used, schedule 3 is normally substituted. No authorities reported using intermittent therapy.

Policy in all areas was to treat infected children having grade 3-4 Heaf tests with INH for 6-12 months; children with uncomplicated primary disease, with INH and Ethambutol for 1 year; and those with progressive primary disease, with rifampicin, INH and Ethambutol for 6 months. The latter are usually hospitalised.



## Supervision

Supervision, defined as all drugs being personally administered by a responsible person other than the patient, was not automatically employed; 5/7 areas responded that therapy was supervised 'sometimes'. All hospitalized patients receive supervised therapy. In the Ciskei, apart from the experimental project where supervised therapy is administered by clinic staff or a responsible person who is not a health worker, hospital supervision is the only form of supervised therapy. In other areas supervision is done by clinic staff (3/4 areas), mobile staff (2/4 areas) and other people considered to be reliable, such as employers, factory sisters, etc.(3/4 areas). All patients who receive either rifampicin or streptomycin, receive supervised therapy in all areas. In the 5 areas (M,H,PM,PDC,N) where supervision only occurred sometimes, patients not receiving streptomycin or rifampicin (including children with strongly positive Heaf tests and uncomplicated primary disease) collected their treatment at weekly to monthly intervals.

The seriously ill were hospitalised in all areas, but other indications for hospitalisation were chronic defaulting (2/7 areas), poor home circumstances, or no home (2/7 areas), the patient's choice (to go to hospital) (3/7 areas), and distance from the clinic (in the Ciskei only). One district, (P) hospitalised all TB patients, in keeping with Ciskei policy, except for non-parenchymal primary TB in children.

## Defaulters

In all areas the policy regarding defaulters is to trace and retreat. The Cape Town Divco. area defined defaulters as those who missed more than 4 consecutive treatments, or more than 11 in a month, and their policy was to restart treatment from scratch.

## C Management of contacts

### Tracing and investigation

In all areas contacts are traced by means of home visits and in some areas this is combined with a policy of asking the patient to ask the contacts to come in to the clinic. Other methods include tracing contacts by telephoning or writing letters to employers, (CDC), and the use of village health workers (P).

Adult contacts in 6 of the 7 areas are X-rayed. The seventh area (PDC) uses X-rays only if sputa are positive. Five out of the 7 areas routinely did sputum investigations, while the remaining 2 areas only did sputums on suspicious cases. Child contacts in all 7 areas were tuberculin tested. Only 2 areas followed up adult contacts after the initial tracing for repeat investigation. The main reason given for failure to do this was lack of staff.

### Chemoprophylaxis

Chemoprophylaxis is given to child contacts of sputum positive cases in all areas. The upper age limit varied between 13 and 15

years of age. Most areas put the children on INH for 3 months after which they were Heaf tested. Children with negative Heaf tests were then given BCG vaccination and those with positive Heaf tests (Grade 3-4) kept on chemoprophylaxis for a further 3-9 months. The Cape Town City Council has a more complicated policy in which they distinguish between uninfected and infected contacts from the outset.

#### D General and continuous control measures

##### Notification

All areas reported that all cases of TB were notified, the medical officer being responsible for signing the forms, usually filled in by the sister. Notification forms in Cape Town and Paarl are sent first to the local authority, and from there to the Regional State Health office, and then to Pretoria for statistical purposes. In the Ciskei forms are sent to the Ciskei Department of Health offices in King William's Town.

##### BCG

In all areas children receive BCG at birth at maternity units, or on first presentation at the immunization clinic if not done at birth. In 3 areas (PM,H and M) children are subsequently Heaf tested to check for conversion. All areas have BCG programs in schools with all children entering school receiving BCG vaccine. In most areas children receive further BCG immunization, either in standard 5 (coloured children in CDC,PM,and PDC), or standard

8 (white children in CDC, PM and PDC). In the Ciskei, school leavers are supposed to receive BCG but this was only reported in Mdantsane.

#### Screening and case-finding

Mass miniature X-ray surveys were done among selected groups of people in 4 areas (CCC, CDC, PM, PDC). None of the authorities interviewed in the Ciskei did X-ray surveys in their areas, although in other areas of the Ciskei a very limited number of surveys of government and factory employees are undertaken, according to the Ciskei TB officer. When surveys are done they are focussed mainly on workers, including pre-employment surveys of contract workers, some factory employees, and in the case of the Paarl Divisional Council, all farm workers on farms where there is a known case of tuberculosis. No community based surveys are done. The Paarl Divisional Council occasionally does bacteriological sputum surveys on farms where there is a proven case of TB. No other authority does these. Tuberculin test screening was done in schools in 4 areas (PM, PDC, CCC, H).

#### E Health Education

All areas reported that health education was part of their TB programme, although the Paarl Divisional Council said this was 'not on a regular basis'.

All areas also reported using trained TB health educators. Apart from this, health education was done by clinic sisters. At Nompumelelo, doctors, community health sisters and village health

workers also participated in health education.

Education takes place mainly in clinics, schools and people's homes. In the Ciskei, meetings are also held in the villages. In Cape Town, the Cape Divisional Council reported doing health education at bus stop queues, in the street, 'anywhere', while Cape Town City Council also reported doing education in factories.

The aims of TB health education were described as 'preventive' by Cecilia Makiwane and by the Ciskei TB Officer. In four areas, (CCC, CDC, N, H) the stated aims were to motivate the patient to use the clinics for treatment and follow-up; and to serve as a means of case-finding, by encouraging self-referrals. Cape Town Divisional Council included the education of GP's and day hospital doctors to X-ray patients with possible signs of TB as an aim, and Cape Town City Council mentioned the aim of dispelling the stigma attached to TB. Hewu listed further aims as being to equip the individual with knowledge and skills, and to counteract superstition.

## 2. Problems in implementing tuberculosis policy.

Each health authority interviewed was asked an open ended question about the problems of implementing the various aspects of TB policy in their particular area. The results presented below thus represent an indication of the priority issues in the implementation of tuberculosis, rather than a comprehensive list of every problem experienced. For the purposes of analysis, the

problems experienced were divided into 4 categories:

1. Clinical problems.
2. Problems related to medical infrastructure.
3. Problems related to socio-economic conditions.
4. Patient related problems.

In general few clinical problems were experienced, the commonest being problems of interpreting results for the purposes of diagnosis, for example, false negative Heaf tests and the reading of X-rays. The side effects of drugs and the problems of obtaining adequate sputum specimens also arose. Two authorities questioned the effectiveness of BCG inoculation (CDC, PDC).

The majority of problems cited related to medical infrastructure. The area of most concern was that of bacteriology where problems related mainly to getting back results quickly and efficiently. For example, it takes 2 weeks for health authorities in a rural area of the Ciskei to get the results of direct microscopy of sputa back, since they have to be sent to the neighbouring town, whereas a hospital in a similar area with its own microscope and technician gets results back within a day. Even in Cape Town one authority reported delays of 2 weeks in getting results back on specimens sent for direct microscopy when they were sent to the State Health laboratory in the same town. In the Ciskei in particular it was felt that laboratory facilities were inadequate (2/3 authorities). Tuberculin testing presented problems of faulty Heaf guns and tuberculin supply. Lack of staff and the rising costs of tuberculosis services were also an area of concern for 5 authorities.

The only area which saw socio-economic conditions as a major problem was the Ciskei. Transport affected a number of aspects of policy such as getting sputum specimens to laboratory facilities, tracing contacts, and control measures such as screening. Poverty related problems such as unemployment, lack of disability grants, drought and lack of food were mentioned by all 3 authorities.

The commonest patient related problems were failure to come back to have Heaf tests read and defaulting treatment. The high mobility of the population especially in the rural areas is also a problem.

## DISCUSSION

### 1. Diagnosis

Current TB policy places emphasis on the bacteriological as well as the radiological diagnosis of TB as a result of the difficulty of diagnosing TB correctly on X-ray alone (6). In fact Grzybowski (7) advocates smear diagnosis as the main method of diagnosis in developing countries, especially in the rural areas. Studies (8) have shown that smear microscopy done by non-specialized health workers may be fairly reliable. Glatthaar, outlining South African policy, states that, 'it is essential to submit a sputum specimen for bacteriological investigation of any patient presenting with symptoms and signs suggestive of TB. While bacteriology may suffice for the diagnosis of TB, radiological investigation must always be accompanied by bacteriological investigation to reduce misdiagnosis.' Other authorities (9)

however, emphasize the importance of radiology for the early diagnosis of tuberculosis before it has become significantly infectious.

Culture is thought to yield better results than direct microscopy (10) and is suggested as the preferred means of diagnosis for areas with limited laboratory facilities and long distances. However, it is at the level of bacteriological investigations, and particularly that of culture, that most problems in implementing TB policy were mentioned. 3 authorities interviewed did not do cultures at all. Culture does not seem feasible in the rural areas where transport problems and the long distances to be travelled make getting specimens to laboratories difficult. Problems also exist with direct microscopy. Nearly all authorities send their specimens to central laboratories and report difficulties in getting results back quickly and efficiently.

Tuberculin testing is an important aspect of TB diagnosis in children. Mantoux tests are widely recommended over other methods such as Heaf or Tine as the most accurate skin test for the diagnosis of tuberculosis infection. Multiple puncture tests are useful for screening out non reactors, but for definitive diagnosis the Mantoux test should be used (11). In the areas studied, Heaf testing is used almost exclusively, mainly because of its relative cheapness and alleged ease of administration. False negative reactions are also common, reflecting often the poor nutritional status of the children involved.



## 2. Treatment

The advantages, both medical and economic, of ambulatory, supervised treatment for pulmonary TB using short course, rifampicin-containing regimes have been emphasized both internationally (12) and locally (13).

In Cape Town and Paarl rifampicin is widely used on an ambulatory basis. The main limitation on its use is the availability of funds from the Department of Health for its purchase. Both authorities in Cape Town have had to limit its use because of lack of funds.

In the Ciskei rifampicin is used only for hospitalized patients. The Chief Medical Officer in charge of infectious diseases estimated that there were 800 hospitalized patients and 2 400 people under treatment as outpatients at any given time. Thus only a small proportion of TB patients receive rifampicin-containing regimes. An experimental study is being conducted in the Hewu district of the Ciskei on the use of supervised rifampicin for out-patient treatment. A previous study in a rural area in South Africa (14) has shown that supervised ambulatory therapy can be successful. Another study however, (15) discusses the problems of rural out-patient therapy such as inadequately trained staff, frequent staff changes, transport, communication, and inadequate address systems in large semi-urban townships. In the areas under consideration staff and transport were also major problems.

The main problem with treatment remains non-compliance. Few

explanations were offered as to the reasons for this, though on the whole the blame was placed on the patients who were seen as 'people who don't want to take treatment'. Little research exists in South Africa as to why TB patients do not comply. A study (16) of non-compliance among other chronic patients (hypertensives and diabetics) at a black urban hospital has linked non-compliance to factors such as failure of the patient-therapist interaction e.g. not seeing the same doctor each visit and lack of interest on the doctors part. In the same study it was found that only 28% of diabetics and 26% of hypertensives knew what disease they were suffering from.

### 3. Management of contacts

Contact tracing is an important part of tuberculosis control. In the Cape Town city area it has been found that while the highest yield of cases is to be found by screening people with symptoms, the second highest at risk group comprises domestic contacts of known sputum positive cases. All areas trace and screen contacts, although sometimes this is difficult due to lack of staff.

The role of chemoprophylaxis is controversial (7,17). The WHO Expert Committee report states that chemoprophylaxis is irrational even for special risk groups unless the treatment programme for patients with infectious TB is wide-spread, well organized and achieves a high rate of cure. In the areas studied, chemoprophylaxis with INH is widely used for child contacts of infectious cases. This therapy is not supervised and no information exists on compliance rates or on how effective it is.

#### 4. General and continuous control measures

BCG is widely used. It is described by Glatthaar as 'a highly effective vaccine'. He suggests that protection against infection is about 80%. Recent research done in Madras (15) came to the conclusion that BCG did not confer any protection against the development of pulmonary tuberculosis during the first 7 and a half years after vaccination. The results of other studies are summarized in Table 4. Further research in the SA context would seem necessary before a false sense of complacency about the effectiveness of BCG is allowed to develop.

The best methods of screening and case finding are also controversial. Glatthaar suggests that the most important method of case-finding is passive, that is, referral of persons for investigation by members of the public because of signs and symptoms of TB. Interestingly, Cowie and Escreet (19) found, in an investigation of 300 miners in Welkom, that only 17% of these patients were detected after self-presentation, whereas 83% were admitted after routine chest X-ray. Similar results were obtained in a TB prevalence survey in KwaZulu (2), which found that questioning people about symptoms did not help to detect open cases.

Radiological screening by mass miniature X-ray campaigns has fallen into disfavour mainly as a result of its expense. (7,12). Bacteriological case-finding has been recommended as a substitute. This is practised only on a very limited scale and

the problems of inadequate laboratory facilities have already been discussed. Tuberculin testing is officially recommended only for screening of positive from negative reactors for BCG administration and investigation of contacts. 5 areas investigated still did routine tuberculin testing of scholars, however. Correct policy is controversial since children with uncomplicated primary tuberculosis rarely have symptoms. Kendig states that 'failure to utilize the tuberculin test on a routine basis will preclude establishment of the diagnosis in the many symptomless children whose contact with a Tuberculosis adult is not known'(20).

#### 5. Health Education

Officially, health education is regarded as the single most important measure in the control of TB. The aim of this health education is intended to be to motivate the community to assist with therapy, case-finding and improvement of socio-economic factors. 'Without the community's involvement and participation, the tuberculosis programme cannot succeed'(3). The aims of health education, as practised by the authorities surveyed, were mainly to motivate the patient to come to the clinic to get treatment. Some of this health education tends to be 'victim blaming' in approach; in other words, it stresses individual rather than social causes of illness (21), for example: 'Unfortunately too many people waste money on liquor and cigarettes and not enough on good food, such as milk, eggs, fruit and vegetables. When an adult or a child does not get enough of the right kind of food, the resistance of the body is lowered and he is more likely to get TB.'

Very little evaluative research has been done into the effectiveness of health education in the prevention and control of tuberculosis in South Africa. Evaluative research is made more difficult by the lack of precise statements of practical objectives (22), such as, for example, what exactly is meant by terms such as community participation. It would seem that before faith is placed in health education, policy objectives need to be better defined and more evaluative research done.

## CONCLUSIONS

National TB policy in South Africa conforms with international policy in many respects. However, for certain controversial aspects of TB policy on which great reliance is placed locally, little research exists in the South African context, such as chemoprophylaxis, BCG and health education. The World Health Organization also places strong emphasis on the integration of TB services with other primary health care services. While this is allowed for in the National Health Services Facilities Plan, at present in South Africa TB services are run in conjunction with preventive services but separate from curative services.

Other aspects of TB policy are difficult to put into practice because of the problems of lack of funds and health services infrastructure, such as, for example, the use of rifampicin and bacteriological diagnosis. The major deviation from accepted TB policy occurs in the Ciskei, where there is a policy of hospitalization of as many TB patients as possible. This has serious economic consequences both for the patients concerned,

who are unable to work, and for the health services who have to bear the high costs of hospitalization.

Before any assessment can be made of whether the national TB programme is in fact succeeding in reducing the TB problem within the community, it would seem that further evaluative research is required. Before such research can be carried out it is necessary for policy makers to spell out their objectives in more concrete terms, to make evaluation feasible.

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TABLE I. TB NOTIFICATION BY RACE FOR 1982,  
 C  
 INCLUDING THE INDEPENDENT HOMELANDS (IH)

Whites		626
Coloureds		10 422
Asians		556
Blacks	RSA	40 578
	IH's	9 678
	Total	50 257
TOTAL		61 980

TABLE II. NATIONAL TB CONTROL PROGRAMME (3)

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The control measures of the Department of Health and Welfare, in order of priority, are:

1. Tuberculosis Health Education.

This is aimed at involving the community in

- a) supervised ambulatory treatment.
- b) case finding.
- c) improvement of socio-economic conditions.

2. Supervised Therapy.

i.e. supervised, short course, ambulatory treatment with full community involvement and participation.

3. Case finding.

- a) active (i.e. authorities seek out cases)

Mass miniature X-ray and tuberculin campaigns are recommended only in selected cases. Bacteriological screening is recommended in remote areas.

- b) passive (i.e. the patient seeks treatment)

This is considered the most important method of case finding.

4. BCG vaccination.

All children must be immunized before 6 months of age.

**TABLE III: TB TREATMENT SCHEDULES (November 1979)**

Recommended by the Department of Health

Schedule 1

Isoniazid X 6 months

Streptomycin X 4-6 months

Rifampicin X 6 months

Pyrazinamide X 2-3 months

Schedule 2

Isoniazid X 6 months

Rifampicin X 6 months

Ethambutol X 6 months

Pyrazinamide X 2 months

Schedule 3

Isoniazid X 9-12 months

Streptomycin X 6 months

Ethambutol X 9-12 months

Pyrazinamide X 6 months

Schedule 4 (Intermittent therapy 2-3X/week)

Isoniazid X 6 months

Streptomycin X 6 months

Rifampicin X 6 months

Pyrazinamide X 6 months

TABLE IV. PROTECTION OBTAINED IN EIGHT  
CONTROLLED TRIALS OF BCG VACCINATION AGAINST  
TUBERCULOSIS (15)

Trial and subjects	Intake period	Duration of observ. (yr)	% protection
N. American Indians: (1 to 18 yr age)	1935/38	9-11	80
Chicago: infants	1937/48	12-23	75
Georgia: school children (6 to 17 yr age)	1947	20	Nil
Puerto Rico: general population (below 20 yr age)	1949/51	5-7	31
Georgia and Alabama: general population (5 yr age & above)	1950	14	14
Great Britain: school children (14 to 15 1/2 yr age)	1950/52	15	78
Madanapalle, south India: general population (all ages)	1950/55	9-14	30
Chingleput, south India: general population (all ages)	1968/71	7	Nil

FIGURE 1 ANNUAL INCREASE OF TUBERCULOSIS IN SOUTH AFRICA, 1921-1982.

