

## **SECTION 4**

### **THE INTERVIEW STUDY**

This section will describe a series of interviews performed, both on individual patients at different stages of their treatment, and on groups of patients and community members. The chapters of the section are:

- 18     Interviews on individual patients**
- 19     Group Interviews**

## CHAPTER 18

### INTERVIEWS ON INDIVIDUAL PATIENTS

*This chapter describes the series of interviews which were conducted on all patients on treatment for tuberculosis, and includes:*

*Objectives*

*Methods*

*Results*

*Discussions and implications for management of tuberculosis in this district.*

#### 18.1 Objectives

- i) To determine from each patient on treatment their knowledge, beliefs, attitudes and actions relating to tuberculosis, as well as a number of selected socio-economic variables about the patients and their households.
- ii) To measure any associations between these variables and treatment outcomes

#### 18.2 Methods

##### **Population:**

The study population for the interviews was all patients with tuberculosis who lived in the Tintswalo district, who were registered at Tintswalo in the period 1st July 1994 to 31st December 1995, as well as those patients admitted in January 1996, who were due to complete treatment during July 1996. The population was not sampled.

**Measurement:**

A series of interviews were conducted by trained field researchers at three points during treatment:

- i) As close to the day of discharge from hospital as possible. Those not admitted were interviewed before they left hospital.
- ii) After 2 months of treatment, either at the hospital or a clinic when the patients attended for review, or at home.
- iii) At the end of treatment when the patients attended Tintswalo hospital for their final discharge from treatment.

Each interview used a set of structured questions designed for this study. A copy of each is attached as Appendices C5, C6 and C7. The mothers or minders of patients under the age of 15 years were interviewed.

**The first interview** (5 pages long) had questions about:

Demographic characteristics of patients and their households

Previous tuberculosis

First actions when sick

Knowledge about treatment (patients were asked the duration of their treatment and the number of doses of pills per day. If both were correctly stated, knowledge was categorised as correct)

Beliefs about cause

Anticipated problems with treatment

**The second** (2 pages long) asked about the process of treatment:

Time to reach supporter and costs

Means of transport to clinic or hospital & problems experienced

Satisfaction with treatment

Services consulted since discharge

The third (3 pages long) reviewed the process of treatment:

For clinic attenders (intervention group):

time to reach, mode of transport, cost, waiting time, problems experienced,  
preferences about treatment place

Hospital attenders (control group and those nearest the hospital):

time to reach, mode of transport, cost, waiting time, problems experienced,  
preferences about treatment place

General comments

[This third interview was only administered from the 1st of January 1995.]

### *Pilot study:*

An interview study of 100 patients admitted during 1994 was completed during early 1994, and acted as a pilot for this study. Members of the local community and the hospital staff reviewed the questions, and modifications were made according to their suggestions. The initial English version was translated into Tsonga, the language of the majority of residents, then back into English by another translator. Any changes in meaning were corrected, and discussed further with interviewers. A number of patients who did not form the study population were interviewed to test the understanding of the questions, and the time needed for each interview.

### *Conduct of the interviews:*

The two field workers shared responsibility for the interviews, one usually conducting the

first and third interviews, the other the second. They were trained through extensive discussions and practice. The nurse manager and the author monitored the process regularly by observing random interviews to ensure a sensitive approach, completeness, and correct documentation. Interviews were conducted in the language of choice of each patient - most in Tsonga and some in Sotho. The author reviewed all interview forms and coded answers, and once a month discussed all interviews conducted during the preceding four weeks, to clarify obscure answers, any problem issues, and ensure that patients whose interviews were incomplete or missing were traced to complete these.

Confidentiality, and the right to refuse or to stop at any point during interviews without prejudice to treatment was explained to every patient, and was ensured by the researchers.

#### *Limitations:*

Interviews were achieved only with considerable organisation and management of time and resources.

- \* For more than a year, only one vehicle was available to the research team. This was needed by the research nurse for daily visits to clinics as well as for follow-up visits to non-adherent patients. It became necessary to organise a second car.
- \* The field workers required in-service training, monitoring and support in the planning of interviews. Not all interviews took place according to the planned timing; patients were sometimes discharged without the interviewers' knowledge.
- \* Travelling in the district was a time-consuming, energy sapping process, not always with successful outcomes. The homes of many patients were visited many times. Unsuccessful attempts were discussed in detail, and plans made for each person,

depending on the likelihood, as stated by family or neighbours, of the patient's return. A data sheet was used for these searching visits for patients not found for interviews. (Appendix C8) After a maximum of five visits without success, the patient was usually considered "lost". If patients' families said they were out of the district (usually working or seeking work), they were categorised as such, but only after attempting to find them at home at weekends or whenever they were expected by the families. Some patients died before interviews took place.

### **Repeatability:**

A random sample of patients were scheduled to have one of their interviews repeated at a subsequent date by one of the interviewers, not necessarily the same as the original interviewer. There were 39 such repeats planned (5% of all 778 interviews), 12 for the first interview (4% of 303), 15 for the second (5% of 286) and 12 for the third (6%). If the individual selected was not available after 2 visits to their homes, that individual was replaced by another randomly selected patient. The purpose of the re-interviews was to see if answers to the same questions at different times were comparable, and thus to assess validity of answers. BMDP statistical software (University Press of California, 1988) was used to calculate percentage agreements and, for continuous variables, Wilcoxon correlation coefficients.

### **Analysis:**

Results of the interviews were entered into the EpiInfo 6 programme and analysed. Descriptive univariate, then bivariate analysis was performed, the latter studying associations between certain variables using chi square tests. Multivariate analysis, using

the Stata programme modelled a number of dependent variables against treatment outcomes.

### 18.3 Results

Results are presented under the following headings:

- Response rate
- Place of interviews
- Demographic and personal characteristics
- Health service first attended
- Knowledge about treatment
- Beliefs about cause
- Anticipated problems
- Supporter visits - time and cost
- Transport to clinic or hospital
- Satisfaction with treatment
- Services consulted since discharge
- Clinic attenders: access issues and preferences
- Hospital attenders: access issues and preferences
- General comments
- Repeat interview results
- Analysis of treatment outcome associations

#### 18.3.1 Response rate:

There were 327 patients eligible to be interviewed three times during the course of their treatment, but the 99 registered in 1994 were eligible for two interviews only as the questionnaire was not designed by the time this subgroup completed treatment. The number of each of the interviews completed, the numbers not done, and the reasons for the failure are shown in table 49.

**TABLE 49: NUMBERS OF PATIENTS INTERVIEWED AND REASONS FOR THOSE NOT DONE**

|                          | Interview 1         | Interview 2         | Interview 3                          |
|--------------------------|---------------------|---------------------|--------------------------------------|
| Interviews done          | 303<br>(93% of 327) | 286<br>(87% of 327) | 189<br>(58% of 327 OR<br>83% of 228) |
| Interviews not done      | 24                  | 41                  | 138                                  |
| Reasons for no interview |                     |                     |                                      |
| died                     | 10                  | 13                  | 15                                   |
| outside the district     | 5                   | 14                  | 14                                   |
| unknown                  | 7                   | 11                  | 18                                   |
| refused                  | 2                   | 2                   | 2                                    |
| unfit for interview      |                     | 1                   |                                      |
| excluded*                | -                   |                     | 99                                   |

\* excluded were 99 patients registered during 1994, who were not interviewed because the third interview form was not yet ready

The number of patients who had 3,2 and 1 interview, and for those who had 1 or 2, and which interview(s) were done is shown in table 50.

**TABLE 50: NUMBERS OF EACH CATEGORY OF INTERVIEW DONE**

| INTERVIEW    | All 3        | Two          | One     | None    | Total      |
|--------------|--------------|--------------|---------|---------|------------|
| 1            |              | 102          | 16      |         | 303        |
| 2            |              | 100          | 1       |         | 286        |
| 3            |              | 4            |         |         | 189        |
| <b>Total</b> | 185<br>(56%) | 103<br>(31%) | 17 (5%) | 22 (7%) | 327 (100%) |

Just over half the patients had all three interviews.

Twenty two patients were not interviewed at all. Eight of these patients died before any interviews could be done, two refused, five had moved out of the district, and seven could not be found.

*Possible bias due to non-respondents:*

In order to assess any differences between those interviewed and those who were not, a comparison was done between those who had three interviews and those who had none, and between those who had no or one interview, and those who had two or three. Variables compared were age, sex, the distance from homes to hospital, and treatment outcomes. Table A21 with these results is in the appendix. There were no differences in age categories, sexes, nor in distances from home to hospital for these groups. However those who had two or three interviews were more likely to have successful outcomes than those who only had one or two. ( $X^2=120.5$ ;  $df1$ ;  $p=0.00000$ ). Those who had one or no interviews were more likely to have died. The latter is obvious since those patients who died during treatment would not have had three interviews. The greater likelihood of interrupting treatment for those not interviewed, or who did not complete at least two interviews may have introduced some bias into results. There was the possibility that interruptors had different beliefs, levels of knowledge, and experienced more problems with treatment. However 25 of the 35 interruptors (71%) had the first interview, with information on knowledge, beliefs and socio-economic data.

### 18.3.2 Place of interviews:

Of the 303 first interviews, 233 (77%) took place as scheduled at Tintswalo or Mapulaneng hospitals. The remaining 70 were mostly done at patients' homes (66 patients), with only four at a clinic. About half the second interviews (150 of 286, or 52%) were done at patients' homes, 118 (41%) at Tintswalo hospital at the time of a patient visit, 15 (5%) at a clinic and 3 (1%) at the patient's place of work. Half (96 of 189 or 51%) of the third interviews took place at Tintswalo hospital as scheduled. Most of the rest (89 or 47%) were done at the patients' homes. Two interviews were done at work, and 2 at a clinic. Interviews taking place later than scheduled were not expected to influence answers to questions. It used more research time to visit patients at home if they had been missed before discharge or at a hospital visit.

### 18.3.3 Demographic characteristics of patients:

#### *Educational status:*

The highest school standard obtained by the 303 patients is shown in table 51.

**TABLE 51: EDUCATIONAL STATUS OF PATIENTS**

| Highest schooling attained         | n    | %    |
|------------------------------------|------|------|
| Less than 4 years formal education | 133  | 44   |
| Primary (std 2-5)                  | 83   | 27   |
| Secondary (std 6-10)               | 87   | 29   |
| (std 9 and 10)                     | (37) | (12) |
| Total                              | 303  | 100  |

Forty four percent had no formal education, 29% had at least some secondary schooling, 37 of whom (12% of all) had achieved standard 9 or 10. Five, all teachers, had some tertiary education. Eleven people mentioned some form of post-school course, 4 of these were trade certificates.

The relationship between age and education was explored in the data in table 52.

**TABLE 52: RELATIONSHIP BETWEEN AGE AND EDUCATIONAL STATUS**

| Age Groups<br>(in years) | HIGHEST EDUCATION ACHIEVED  |          |           |                     |
|--------------------------|-----------------------------|----------|-----------|---------------------|
|                          | Less than 4<br>years formal | Primary  | Secondary | Total               |
| Under 15                 | 18 (51%)                    | 6 (17%)  | 11 (31%)  | 35 (100%)<br>(12%)  |
| 15-29                    | 10 (16%)                    | 14 (23%) | 38 (61%)  | 62 (100%)<br>(20%)  |
| 30-59                    | 76 (45%)                    | 59 (35%) | 35 (21%)  | 170 (100%)<br>(56%) |
| 60+                      | 29 (81%)                    | 4 (11%)  | 3 (8%)    | 36 (100%)<br>(12%)  |
| <b>Total</b>             | 133 (44%)                   | 83 (27%) | 87 (29%)  | 303 (100%)          |

The educational status measured for patients under 15 years of age was that of their mothers, who were interviewed. This age group was excluded when those under 30 and under 60 were compared with all others. Significantly more patients under 30 had completed more than 4 years of schooling ( $X^2=23.5$ ;  $df1$ ;  $p=0.0000$ ), and had completed some secondary education ( $X^2=42.9$ ;  $df1$ ;  $p=0.0000$ ).

There was no association between sex and education. ( $X^2=0.01$ ;  $df1$ ;  $p=0.93$ ) (Appendix

Λ.

### ***Occupation:***

Two hundred and eleven patients, 78% of those aged 15 years or more, said they had worked for money outside their own homes at some time. Almost one quarter (23%) had worked for up to 5 years, another quarter (26%) for 6 to 10 years, and the rest for more than 10 years. The nature of the work is shown in table 53.

**TABLE 53: TYPE OF WORK OF INTERVIEWEES**

| Type of work        | n          | % within sub-group | % of total |
|---------------------|------------|--------------------|------------|
| <b>MANJAL</b>       |            |                    |            |
| miner               | 27         | 18                 |            |
| manual labour       | 105        | 69                 |            |
| domestic/gardener   | 21         | 14                 |            |
| <b>Total</b>        | <b>153</b> | <b>101 *</b>       | <b>73</b>  |
| <b>SEMI-SKILLED</b> |            |                    |            |
| driver              | 10         | 33                 |            |
| clerk               | 4          | 13                 |            |
| salesperson         | 8          | 27                 |            |
| security            | 8          | 27                 |            |
| <b>Total</b>        | <b>30</b>  | <b>100</b>         | <b>14</b>  |
| <b>SKILLED</b>      |            |                    |            |
| tradesman           | 15         | 54                 |            |
| machine- operator   | 8          | 29                 |            |
| professional        | 5          | 18                 |            |
| <b>Total</b>        | <b>28</b>  | <b>101 *</b>       | <b>13</b>  |
| <b>TOTAL</b>        | <b>211</b> |                    | <b>100</b> |

\* percents rounded

The results of educational status and type of work are shown in table 54.

**TABLE 54: EDUCATIONAL STATUS AND WORK**

| EDUCATION | TYPE OF WORK |           |              |         |            |
|-----------|--------------|-----------|--------------|---------|------------|
|           | Unemployed   | Manual    | Semi-skilled | Skilled | Total      |
| Informal  | 36 (27%)     | 76 (57%)  | 9 (7%)       | 12 (9%) | 133 (100%) |
| Primary   | 14 (17%)     | 55 (66%)  | 7 (8%)       | 7 (8%)  | 83 (100%)  |
| Secondary | 42 (48%)     | 22 (25%)  | 14 (16%)     | 9 (10%) | 87 (100%)  |
| Total     | 92 (30%)     | 153 (51%) | 30 (10%)     | 28 (9%) | 303 (100%) |

Significantly more of those with some level of secondary education were unemployed ( $X^2=18.4$ ;  $df1$ ;  $p=0.0000$ ), and, if they were working, were engaged in semi-skilled or skilled occupations. ( $X^2=15.9$ ;  $df1$ ;  $p=0.0000$ )

*Household information:*

The total number of people living in the households of the 303 patients interviewed was 1870. The mode per household was 5, and the range 1-17. In 230 homes (76% of all) there was at least one young person under 15 years of age (mode 1, range 1-9), and there was a child under 5 years of age in 126 of the homes, 42% of all (mode 1, range 1-3). There were one or two old-age pensioners in 86 homes (28% of the total) (one in 61 homes and two in 25), and one or two disability pensioners in 16 homes (5% of all) (one in 15 homes, and two in one).

In 179 homes, 59% of all, there was at least one person earning money (mode 1, range 1-4). In 124 homes, 41%, there was said to be no one earning. Total monthly income (which included pensions) per household as estimated by the interviewees were nil in 64 households (21%), R100-480 in 64 (21%), R500-1970 in 146 (48%) and more than R2000 in 29 homes (10%).

#### 18.3.4 Previous and family tuberculosis:

Thirty five patients (12% of all) admitted to a previous episode of tuberculosis, two thirds of which had been during the six years preceding the interview. Most, 29 or 83%, had been treated in Bushbuckridge at Tintswalo or Mapulaneng hospital. Twenty of the 35 (57%) said the duration of their treatment had been 6 months; the rest were either less (8) or more (6) or uncertain (1).

Ninety one patients (30%) said a family member was either currently on treatment for tuberculosis (24 patients) or had been in the past (67 patients).

#### 18.3.5 Service first attended:

Patients were asked where they went first when sick with their current (tuberculosis) illness. Results are shown in table 55. In response to this open question, one quarter (77 patients) said they had first attended a traditional or faith healer. When specifically asked if they had ever attended traditional or faith healers, 117 (39%) said they had.

**TABLE 55: FIRST PLACE ATTENDED FOR CURRENT ILLNESS**

| Place                                  | n            | %          |
|----------------------------------------|--------------|------------|
| Tintswalo hospital                     | 106          | 35         |
| Other hospital                         | 30           | 10         |
| <b>Total hospital</b>                  | <b>136</b>   | <b>45</b>  |
| Clinic                                 | 64           | 21         |
| Private dr                             | 25           | 8          |
| <b>Total allopathic health service</b> | <b>225</b>   | <b>74</b>  |
| Traditional/faith healer               | 77           | 26         |
| <b>TOTAL</b>                           | <b>302 *</b> | <b>100</b> |

\* 1 patient of the 303 did not answer this question

### *Associations with place first consulted:*

Patients over the age of 15 years were more likely to attend traditional healers ( $X^2=8.13$ ;  $df1$ ;  $p=0.004$ ), those under 15 were more likely to be taken to the hospital. ( $X^2=11.76$ ;  $df1$ ;  $p=0.0006$ ). Females and manual workers were more likely to go to a clinic. ( $X^2=14.5$ ;  $df1$ ;  $p=0.03$  and  $X^2=4.8$ ;  $df1$ ;  $p=0.02$  respectively) Manual workers were less likely to go to private practitioners ( $X^2=7.1$ ;  $df1$ ;  $p=0.007$ ).

Those patients who lived more than 9 kilometres from the hospital were more likely to have gone first to a traditional healer than those who lived closer ( $X^2=14.5$ ;  $df1$ ;  $p=0.034$ ), while those who lived within 9 kilometres were more likely to have first attended the hospital ( $X^2=17.5$ ;  $df1$ ;  $p=0.00002$ ).

There was no difference in educational status between patients who first attended traditional or faith healers, and those who attended allopathic health services.

### **18.3.6 Knowledge about treatment:**

Most respondents, 272 or 90%, had correct information about the frequency and duration of drugs. Of the 31 with incorrect replies, 13 had the dose correct but the duration incorrect, 10 the duration correct but said pills were to be taken more than once daily, and 8 had both incorrect. Those who had less than four years of schooling were less likely to be correct. ( $X^2=5.5$ ;  $df1$ ;  $p=0.01$ ) There was no association between knowledge and age categories, sex, previous episodes of tuberculosis, nor with patients on treatment at Tintswalo hospital compared with those attending clinics.

### **18.3.7 Belief about the cause of tuberculosis:**

The first question in this section was open and asked patients what they believed was the cause of their disease. Results are given in table 56.

**TABLE 56: PATIENTS' BELIEFS ABOUT THE CAUSE OF TUBERCULOSIS: OPEN QUESTIONS**

| Belief                                          | n          | %            |
|-------------------------------------------------|------------|--------------|
| Unknown                                         | 91         | 30           |
| Spread from others or inadequate past treatment | 90         | 30           |
| Dust or work on mines                           | 50         | 17           |
| Cigarettes and/or alcohol                       | 34         | 11           |
| Work exposure to chemicals/fumes                | 21         | 7            |
| Cultural                                        | 17         | 6            |
| <b>Total</b>                                    | <b>303</b> | <b>101 *</b> |

\* percentages rounded

A list of possible answers was then offered. Affirmative answers were ranked as presented in table 57.

**TABLE 57: BELIEFS ABOUT THE CAUSE OF TUBERCULOSIS: CLOSED QUESTION ANSWERS**

| Stated Cause                 | %  |
|------------------------------|----|
| Spread                       | 95 |
| Mine work                    | 95 |
| Poor nutrition               | 89 |
| Inadequate treatment         | 88 |
| Contaminated food            | 86 |
| Cigarette smoking            | 79 |
| Alcohol use                  | 74 |
| STD                          | 71 |
| Disobeying traditional rules | 63 |
| Bewitchment                  | 14 |

Stated beliefs from the open questions were divided into 4 categories: cause unknown, spread or inadequate treatment, environmental or personal habits (lifestyle), and traditionally ascribed causes. These categories were tested for associations with a number of other variables.

**Belief in spread:** Those who believed in the spread of disease from others were more likely to have secondary education ( $X^2=6.5$ ;  $df1$ ;  $p=0.01$ ), have attended hospital first ( $X^2=6.99$ ;  $df1$ ;  $p=0.008$ ), to be female ( $X^2=12.02$ ;  $df1$ ;  $p=0.0005$ ), and young (under the age of 15 years) ( $X^2=17.3$ ;  $df1$ ;  $p=0.00003$ ). [This meant that mothers of young children were more likely to take their children to hospital, since measured belief of children under 15 years was that of the mothers]

**Traditional belief:** Traditional beliefs in the cause of tuberculosis were more likely to be

associated with stated first attendance at traditional healers ( $X^2=19.12$ ;  $df1$ ;  $p=0.00001$ ).

They were not associated with educational status.

*Belief in environmental and lifestyle causes:* These were features of males ( $X^2=33.9$ ;  $df1$ ;  $p=0.0000$ ), and of those with less than secondary education ( $X^2=110.4$ ;  $df1$ ;  $p=0.00000$ )

*Unknown cause:* Those who said they did not know the cause of tuberculosis were more likely to be female ( $X^2=9.6$ ;  $df1$ ;  $p=0.0019$ ), and have less than secondary education ( $X^2=58.9$ ;  $df1$ ;  $p=0.0000$ ). [Female sex and educational status were not themselves associated - Appendix A22]

Factors not associated with beliefs were knowledge about treatment, previous episodes of disease, HIV status, occupation, distance from patient's homes to hospital, and different treatment groups.

#### **18.3.8 Anticipated problems with treatment:**

Only 3% of patients (10 of 303) anticipated problems with their treatment, all citing lack of money or lack of transport. Five of these 10 were due to receive treatment at Tintswalo hospital, and four of those five lived within nine kilometres of it.

Eighteen patients (6% of 303) asked questions about their treatment. These were answered by the interviewers.

#### **18.3.9 Supporter visits: time and costs**

The presence or absence of a supporter for each patient was measured against educational status. Those patients who had had some level of formal education were more likely not to have a treatment supporter. ( $X^2=4.1$ ;  $df1$ ;  $p=0.04$ ) Most respondents who had supporters (74% or 190 of 256) said it took up to 5 minutes to reach their supporters.

Fifty six (22 %) said between 6 and 15 minutes, and 10 (4 % of 256) more than 15 minutes. Only 4% took more than 15 minutes. For almost all (178 of 179 asked), there were no costs.

#### **18.3.10 Transport to clinic or hospital and problems experienced:**

More than half of the 286 (180 or 63 %) asked about transport to clinic or hospital (180 or 63%) used taxis or buses, 100 (35 %) walked, and 6 (2 %) used a car. Forty one (14 %) experienced problems, 31 of these were lack of money, 9 said the place was too far to walk, and 1 said transport was not available.

#### **18.3.11 Satisfaction with treatment:**

All but 3 of 286 patient said they were satisfied with the treatment given at the clinic or hospital. Problems mentioned were staff (2) or excessive waiting time (1).

#### **18.3.12 Services consulted since discharge:**

Fifty five of 286 patients (19%) said they had consulted one of the following since their discharge from hospital, while still on treatment: traditional healer (25), faith healers (11), a private doctor (9), another hospital or clinic (10).

#### **18.3.13 Clinic and hospital attenders: Access issues and preferences**

Time to reach clinics or hospitals, modes of transport, direct cost, waiting times, problems experienced and the preferred place for follow-up treatment appear in table 58.

**TABLE 58: CLINIC AND HOSPITAL ATTENDERS: VARIABLES**

| Variable                      | Categories        | CLINIC<br>ATTENDERS<br>n=75 |    | HOSPITAL<br>ATTENDERS<br>n=114 * |    |
|-------------------------------|-------------------|-----------------------------|----|----------------------------------|----|
|                               |                   | n                           | %  | n                                | %  |
| Time to reach                 | Up to 15 minutes  | 28                          | 37 | 23                               | 20 |
|                               | 15-30 mins        | 29                          | 39 | 40                               | 36 |
|                               | More than 30 mins | 18                          | 24 | 50                               | 44 |
| Mode of transport             | Walk              | 39                          | 52 | 33                               | 29 |
|                               | Taxi              | 31                          | 41 | 76                               | 67 |
|                               | Other             | 5                           | 7  | 5                                | 4  |
| Cost                          | Nil               | 39                          | 52 | 33                               | 29 |
|                               | R1-R2.5           | 26                          | 35 | 22                               | 19 |
|                               | R3-10             | 10                          | 13 | 56                               | 50 |
|                               | More than R10     |                             |    | 2                                | 2  |
| Waiting time                  | Less than 30 mins | 53                          | 71 | 11                               | 10 |
|                               | 30-60 mins        | 17                          | 23 | 21                               | 19 |
|                               | More than 60 mins | 5                           | 7  | 81                               | 72 |
| Problems experienced          | Yes               | 8                           | 11 | 31                               | 27 |
|                               | No                | 67                          | 89 | 83                               | 73 |
| Preferred place for treatment | Clinic            | 70                          | 93 | 48                               | 52 |
|                               | Hospital          | 5                           | 7  | 45                               | 48 |

\* some questions were answered by 113 patients, and preferences by only 93

Three quarters of clinic attenders had taken 30 minutes or less to reach the clinic, while 44% of hospital attenders had taken more than 30 minutes. Half the clinic patients walked, most of the other half had to pay less than R3 for transport. Seventy percent of hospital patients used some form of transport, half of them paid more than R3. The hospital waiting times were longer - 72% of patients spent more than one hour waiting. More of the hospital patients expressed problems.

*Preferred place for treatment:*

Of the 189 patients interviewed at the end of their treatment, 168 gave a preference for where they would like to have their tuberculosis treatment. One hundred and eighteen (70%) preferred a clinic, 116 (98% of the 118) because it was more convenient, 2 because they said the treatment was better there. Fifty (30%) preferred the hospital, 27 (54% of the 50) because it was closer, 23 because they believed the treatment was better. (Several specifically mentioned the presence of a doctor, or of X-rays at the hospital.)

Of the 75 respondents who were actually attending clinics for their treatment, 70 (93%) said that was the place they preferred, for reasons of easy access (68 patients) or better treatment (two). The other five preferred the hospital either because it was closer (1) or that they felt the treatment was better (four).

Forty six of the 93 respondents attending the hospital were "control clinic" patients (who lived in villages where the clinics did not provide tuberculosis follow-up treatment). Preference for clinic treatment was stated by 37 of those 46 (80%), all of whom said this would be more convenient. The remaining nine preferred the hospital because they believed treatment was better (six), there was a doctor there (two), or they worked there (one).

The other 47 were in the hospital group for whom Tintswalo hospital was the closest health facility). Most of these (36 of 77%) did prefer the hospital, but 11 (23%) said they would rather attend a clinic, if this were closer.

#### **18.3.14 General comments:**

Patients were asked what they would tell a friend or neighbour about their experiences with tuberculosis and its treatment, if that person was diagnosed with tuberculosis. Nearly all (183 of 187 that replied) had a positive message, that treatment was important. Of the remaining four, two said the treatment made them hungry, one that there were problems getting the treatment, and one that treatment was difficult at first, but became easier.

Answers to a series of direct questions about the treatment were as follows: Twenty percent (38) said the pills caused side effects, 14% (26) that the nurses were not good, and 31% (58) that they did not feel that they were cured, as they still had symptoms. Four percent, in answer to a specific question, said they would recommend patients should attend a traditional healer. However, 11%, in response to an open question about where they would recommend someone should go if sick with tuberculosis, said they did not believe traditional healers could help this disease.

#### **18.3.15 Results of repeat interviews:**

The percentage agreement for each of the interview questions is tabled in Appendix 23. There was good agreement for questions other than those described here. The main group of questions with less than 75% agreement were statements of numbers of people in households, and times to reach and wait at facilities. The only other major discrepancies were in belief about cause (38% agreement), type of work (57%) and the means of

transport to hospital or clinic (55%). There were some differences in the general section about whether there were side effects of treatment, and whether the staff were kind (54% and 69% respectively)

#### **18.3.16 Analysis of treatment outcome associations:**

*Bivariate analysis* was used to examine associations between treatment outcomes and a number of the variables measured from the interviews. Outcomes were grouped as for the intervention study results in chapter 16. The full table of results is in Appendix 24. Significant associations with successful outcomes, p values less than 0.05 at 95% confidence level, were as follows: Age less than 30 years, female sex (only if deaths as an outcome are excluded), belief in spread or belief in causes other than lifestyle and environmental factors, being in the same home as the treatment supporter, and stating no problems with treatment.

#### *Multivariate analysis:*

The multivariate model used to identify predictors of successful treatment outcomes for patients who lived in the district, and who were interviewed, was described in chapter 16, page 216. The explanatory variables found to be significantly related to successful outcomes were having a treatment supporter, the belief that the disease was caused by spread from other people, presentation as a new rather than a re-treatment patient, and more than three years of formal education at school.

### **18.4 Discussion and implications for management of tuberculosis in this district**

The series of interviews revealed much important information, and provided insights into

patients' experiences, attitudes towards tuberculosis, and their behaviours when sick. Health workers need to have this patient-centred view in order to provide health services to meet patients' needs, both social and cultural and logistic.

Interview studies can experience limitations in their ability to extract valid information. The interviewers in this study were remarkably sensitive and caring people, who did an enormous amount of travelling, and spent hundreds of hours talking to patients. The repeatability study found good agreement for most variables. It was not really surprising that stated numbers of people and times were inconsistent. For people with less formal education and without means of keeping time, exact numbers and time periods must have been unimportant in their lives. It is possible that household size changed over periods, for example at weekends, month ends and school holidays. Discrepancies in stated beliefs about cause of tuberculosis might have been because people really were confused and changed their minds, or because they had been exposed to health education during treatment (one hoped that was the case!). There were some variations in the means of transport patients said they used to reach health facilities. These would have depended on the availability of finances and transport facilities, and thus were not surprising differences identified in the repeat interviews.

There were certainly fewer interruptors than "completers" available for the interviews, but at least three quarters of the interruptors had interviews about their beliefs and early behaviours.

The study confirmed the low socio-economic status of patients. Of those who had ever worked, most were in the manual category. Half said their total monthly household income was less than R2000, with a mode of 5 people per household. Forty one percent of

households had no earners. This was comparable with the findings of the study quoted earlier from the same area in 1993, where the mean monthly household income was R520.<sup>387</sup> Nearly half of our patients had not completed four years of schooling. Lower educational status was associated with lack of knowledge about the cause of tuberculosis, or in belief that it was due to dust, smoking and drinking alcohol. On the other hand, better education was associated with knowledge that it was due to spread, which in turn was associated with hospital attendance when first sick.

It was salient to note that there were 1870 household contacts of the 303 patients with known disease, many of which contacts were young children.

The high proportion of patients who reported having had a previous course of treatment (12%) was similar to that in hospital records. Nearly a third of patients knew of a family member who had past or present tuberculosis.

One quarter of responders stated that their first attendance had been at a traditional healer. The issue will be returned to when the focus group interviews are discussed in chapter 19. Those patients were more likely to be adults, and more likely to live far from the hospital, probably reflecting the relative availability of traditional healers, and the non-availability of allopathic services. Although only six percent stated an unprompted belief in traditional causes of the disease, 63%, specifically asked, agreed that this was a cause. It seemed that female patients tended to believe either that the cause was spread from people with disease, or they did not know. These views are somewhat contradictory. They were more likely to attend clinics first, which would seem logical as clinics are nearer to their homes. Children were more likely to attend hospital, reflecting their mothers actions, and probably their concern to seek a higher level of care for their sick children.

Patients attending "treatment" clinics for their follow-up tuberculosis treatment said it cost less in travel and waiting times, and in money, and the vast majority preferred that source of care. Hospital attenders took longer to reach there, waited far longer, had more to pay for transport, stated more problems, and half would have preferred clinics. These results seem to provide adequate justification for decentralisation of tuberculosis services.

Successful treatment outcomes were related, in multivariate analysis, to the presence of supporters and first time treatment, as well as to the stated belief in germs and spread of disease from person to person, and in some level of formal education. This would justify attention to information and education on tuberculosis for communities. These results did not show any relationship between outcomes and traditional beliefs about the disease.. Such beliefs may not be readily identifiable, but do exist, as became apparent in the group interviews (chapter 19). Farmer has stated that causal beliefs about tuberculosis are not predictive of adherence to treatment, predictors being fundamentally economic.<sup>271</sup>

## CHAPTER 19

### GROUP INTERVIEWS

*This chapter includes:*

*Introduction*

*Objectives*

*Methods*

*Results*

*Discussion*

*Conclusions*

#### 19.1 Introduction

Interviews with individuals provide answers to questions, but are limited in that they do not explore attitudes and perceptions, and do not allow the subject to listen and respond to views of others from the same population. The opinions of interviewees who are reticent, for whatever reason, to share their views, are not heard in these research situations. This applies especially to taboo subjects.

A focus group interview is a qualitative method of studying a particular topic using an in-depth discussion by a small group of people, under the guidance of a facilitator. Group members are usually a purposive sample of the population, selected because they have characteristics in common.<sup>402</sup> Such methods have been in use for market research. However the application to social science is rather new.

This qualitative study method has a particular role in studying attitudes and experiences.

It is useful to complement quantitative studies to answer questions of "why" and "how",

rather than "how many".<sup>403</sup> They allow participants to explore issues of importance to them, initiated by a series of planned open ended questions. There is no discrimination against those who cannot read or write. The fact that focus groups for social science and related subjects are relatively new on the research scene, means that methods do not have empirical backup. Issues such as the number of sessions with each group, and group composition are still debatable. It is suggested that groups should be as homogeneous as possible, to allow discussion on issues in common to members. The ideal size is between four and 12 people. A facilitator, who should be trained in the technique, needs to explain the purpose, pose the questions, following which that person has a role only in facilitating discussion, encouraging non-participant involvement, keeping the discussion within the broad topic, clarifying and summarising. An appointed research scribe, not part of the group, should record everything said.<sup>403</sup> Where possible discussions should be tape recorded, and written transcripts of the tapes, as well as notes made by the scribe, analysed. Analysis is a process of drawing out themes from the discussions, distinguishing between individual opinions and group consensus.

Focus groups do have limitations. There is a chance of introducing errors when preparing transcripts from tapes, especially when different languages are used. Results need to be interpreted with caution, as they may not indicate attitudes or beliefs of the whole population. However if carefully selected, groups may reflect generally held opinions.<sup>402</sup> A number of focus group studies have been reported, and have demonstrated the power of the method in investigating people's opinions and attitudes. Groups of women in Bombay were shown to have different perceptions of their health priorities from health

professionals, with significant implications for health services delivery.<sup>265</sup> Tuberculosis researchers in Pakistan, Vietnam and the Philippines uncovered a stigma (for patients and staff) and fear relating to the disease, with consequent delays in accessing treatment, and patients problems with treatment adherence.<sup>257, 261, 264</sup> Priority research areas in tuberculosis for the 21st Century, as identified by the Centers for Disease Control and Prevention, USA, are community knowledge, "myths and misconceptions" about the disease, and social and cultural factors that affect adherence.<sup>404</sup>

The present study sought to complement the findings from interviews on individual patients with group interviews.

## **19.2 Objectives**

To explore perceptions and attitudes about tuberculosis of patients and community members, specifically beliefs about the cause, attitudes to those affected, and problems with taking treatment.

## **19.3 Methods**

### **Training course for interview facilitators:**

A course in qualitative research methods was organised for the researchers involved. They were the research nurse and interviewers (these three individuals were to have responsibility for the group interviews). A number of staff from Tintswalo and the neighbouring district hospital, and the Health Systems Development Unit were invited to participate in a course, conducted over eight days, organised in three sessions over an

eight week period, by an experienced qualitative researcher attached to Soul City, part of the Institute for Primary Health Care in Johannesburg.

**Selection of focus groups:**

Several different groups were selected for the focus group study. The numbers in the 14 groups, the dates and venues are listed in table 59. Individuals within each group were not selected, so recruitment involved explaining the purpose to various groups who were tuberculosis ward patients, community groups, and interested people, and inviting them to attend on a set date.

**TABLE 59: FOCUS GROUP INTERVIEWS: GROUPS AND DATES**

| Date    | Group               | Sexes | No. in Group | Venue      |
|---------|---------------------|-------|--------------|------------|
| July 95 | Indunas             | M     | 10+          | Dixie      |
| Aug 95  | Community           | M+F   | 10           | Hluvukani  |
| Aug 95  | Community           | M+F   | 15           | Gottenburg |
| Sept 95 | TB patients         | M     | 8            | Tintswalo  |
| Sept 95 | Traditional healers | M+F   | 8            | Cottondale |
| Sept 95 | TB patients         | F     | 4            | Tintswalo  |
| Sept 95 | TB patients         | M     | 9            | Tintswalo  |
| Oct 95  | TB patients         | M     | 9            | Mapulaneng |
| Jan 96  | Traditional healers | M+F   | 12           | Acornhoek  |
| Feb 96  | TB patients         | M     | 12           | Tintswalo  |
| Mar 96  | Traditional healers | M+F   | 15           | Timbavati  |
| Apr 96  | Student nurses      | F     | 15           | Tintswalo  |
| May 96  | TB patients         | M     | 5            | Mapulaneng |
| May 96  | Workers             | M     | 12           | Timbavati  |

**Measurements:**

Each group was limited to not more than 15 people. Discussions were held outside the ward (for hospital in-patients), or in some community setting, usually under a tree. They lasted not more than 1 hour. Audio-recording of interviews was done (except for three groups when the tape recorder did not work). Each group discussion had a facilitator and a scribe, who had been trained. These were the research nurse, and the two interviewers. The audio-record was transcribed within a day of the discussion. Questions were posed around the following broad topics:

1. What is TB, and what causes it?
2. How do patients feel when they have TB and what are the attitudes of others to people who have TB?
3. How can it be prevented?
4. How should it be treated and where, and what are the problems in completing treatment?

**Analysis** was done by a group consisting of the research team of five people and two experienced focus group workers from Soul City. Themes were identified in the written records, cut up and glued together and discussed.

#### *Limitations:*

There may have been some bias in results of group discussions with patients who had been in hospital for varying periods, subject to information and education about tuberculosis and who may have been reticent to discuss "traditional" beliefs in a hospital setting. The researchers were aware of these possibilities and tried to ensure impartiality, and to encourage free discussion. For community groups outside the hospital, there was the possibility that discussion would have been limited because of the association of the researchers with the health system. In fact the two male interviewers were not health workers, and all facilitators were skilled in introducing the topic objectively, explaining interest rather than prejudice. The nurse did not wear a uniform when facilitating these group interviews.

## 19.4 Results

Results will be presented as a summary of analysed discussion transcripts, interspersed with direct quotations of what was said. The term TB is used in this section, as that is how people refer to tuberculosis.

### WHAT IS TB AND WHAT CAUSES IT?

Local people believe there are two types of "TB" disease, with similar but not identical features, with different causes. There is the "medical" type disease, as known to hospital and clinic staff. Some say that this is a serious illness, others say it is not, because early treatment can cure it. There were some who spoke of this disease being caused by a germ, resulting in a illness with a cough, spreading from person to person, diagnosed by X-rays, and not amenable to cure by traditional healers. Many believe it is contracted from working on mines and in dusty work places, in fields when ploughing by tractor, in cement works, and in kraals where cow-dung is newly laid. Fumes from chemicals in work situations, including insecticides and paint fumes, are also thought to be related. People also believe it affects people who drink excessive amounts of alcohol, especially "strong" alcohol as opposed to local beer, largely because heavy drinkers do not eat good food. It is associated with smoking cigarettes, and can be contracted from sharing cigarettes with an affected person. Children who are exposed to cigarettes can develop disease. If air from a person with TB is breathed in, this can result in TB. This spread happens in adults and in children. Some people are puzzled about TB, because they do not remember being in contact with anyone with the disease. TB is similar to what is known culturally as "6 month cough" in children.

The other type of TB has, for many people, a traditional origin. "We Africans believe strongly in this (traditional belief about the origin of TB)" A disease, with features similar to "TB" is transmitted sexually and called "Tindzaka". When there is a death in a family, if a member of that family has sex with someone who is not a family member, those two people will get a sickness called "Tindzaka". This is not exactly the same as TB, but it causes coughing. It happens if a man sleeps with a woman when she is still in her black clothes (in a period of mourning) after her husband has died. Another reason for getting sick when someone dies, is if someone, usually a woman, fails to observe the custom of abstaining from sex for the period stipulated by the elders of the family, then prepares or serves food to others. The persons who eat that food get this sickness called "Tindzaka". Patients with this sickness cough, often with blood, always look down, and are shy. The whole body swells up including the abdomen and knees, they are pale with long nails. It can be fatal if not treated within a month. No doctor can cure this. If they are given an injection, they can die. A traditional healer can treat it within two days.

There is a disease called "Mafulari" (Makhuma), which is caused by ancestors turning against a person who has disregarded traditional customs. It is difficult to distinguish between Mafulare and Tindzaka.

If a woman, recently delivered of a baby sleeps with her husband within 6 months of the birth, that child will develop TB. Similarly, if a woman has sex within 3-6 months of aborting, or after her recently delivered child had died, that can cause TB in the man. He develops a cough, is unable to pass urine, and frequently dies within 2-4 days. That sickness is called Rixixa, and only occurs in males. Only a traditional healer can cure that sickness.

"It is difficult to tell people what you have done when you get Rixixa or Tindzaka. That is why there are a lot of deaths due to these conditions." People who have Tindzaka and Rixixa must not delay in going to traditional healers for treatment. Going first to hospital causes a delay. Traditional healers must be the first people to be consulted when a person gets sick. They give medicines to wash the family members after a death. Some have been charged R100.

Young women today often disregard what their elders tell them. Nurses give out contraceptives, and tell them they can sleep around. In this way TB results.

A type of cough in children called "inkakha" can be cured by traditional healers using donkey milk,ameleon soup, gum tree bark and bitter spinach.

There are similarities between the traditional sickness, and TB. That is why "black" and "white" doctors must come together and discuss their management.

#### **ATTITUDES ABOUT TB AND PEOPLE WHO HAVE TB:**

There is a fear of spread from affected people. People who have TB should abstain from sex or from kissing, and often are not well enough for sex. This can cause family disorganisation, because partners of patients look elsewhere for sexual gratification. African people share the same plates and cups. TB can spread in this way, especially if the person is not on treatment. Before the person is diagnosed, this is a problem.

Patients with TB feel guilty because they can spread it. Some know that if they are on treatment, it will not happen.

"Anyone can get TB, so we should not be afraid of it".

## **PREVENTION OF TB:**

"Some say that TB can be prevented if people stop smoking and drinking alcohol". Regarding the association with mining and dust, "we cannot stop working on the mines, as we need the work." Once a person has TB, it is difficult to prevent spread in the family when all eat together. Family members must be checked for TB.

## **TREATMENT OF TB and associated problems:**

There are contradictions about treatment. Some believe that hospital treatment is essential, but many say that most people attend traditional healers first. "Most of us patients start treatment at the traditional healers". In a group of 9 male patients, 6 had been first to a traditional healer.

"A person who has TB should go to hospital for treatment. We have heard this on the radio." "When a person with TB is taking treatment, they cannot spread the disease." It was said that patients who were very sick, and recovered with treatment have stated that people with TB should take their treatment regularly. Some people are dishonest about taking treatment, not telling relatives that they are not taking their treatment. Proper treatment means taking tablets as the nurses tell us. Many difficulties in taking treatment as prescribed were described:

"It is really difficult to take treatment every day." (Some said it is not difficult.) "Some people stop taking treatment when they feel better." Patients say they cannot have sex while on treatment. "At the hospital no-one discussed this." Fears include spreading TB, and that red urine affects sex. Abstinence is difficult for 6 months, so many stop taking pills. Pills cause other side effects, especially vomiting and dizziness in some people,

which makes it difficult to continue. If sick people react to treatment (injections), the disease is not TB, but is Tindzaka or Mafulare. Going to hospital for treatment is difficult because of the cost of transport. "I would prefer to take treatment at the clinic." "Nurses must be careful how they treat patients, especially older men. If they are disrespectful, people stop taking treatment. In addition, they do not always explain the treatment well."

"I stopped taking treatment for TB because the clinic nurses scolded me, so I started drinking heavily." "Alcohol makes a person forget to take pills."

Patients who move out of an area to work or to attend school stop taking treatment. Some believe that treatment should not be from supporters outside the family, as they are afraid of being bewitched. Others say supported treatment from the nearest shop or relatives is best. Patients would like nurses to discuss with them who they would prefer as supporters.

### 19.5 Discussion

It is apparent that people's perceptions of tuberculosis vary widely. There are those who have the concept of germs, spread from others, and treatment using "Western" drugs, having learned this from some source. However, there is widespread belief in this community that there is an association between a serious tuberculosis-like illness and disobeying traditional norms and practices after a family death, and after a woman has aborted. This illness, it is strongly believed, can only be managed by traditional healers. In the same way as it is believed that delaying traditional healer treatment is dangerous for this type of illness, others recognise that delay in receiving hospital pills will prevent cure and promote the spread to family and community members. Of concern is the possibility

that the association between tuberculosis and sexually spread HIV-infection will confirm in many people's minds the sexual nature of tuberculosis, and further stigmatise the tuberculosis and HIV problems. References to a sexual link with tuberculosis such as identified in this study was not found in the literature, other than in the report of Buch, who studied tuberculosis patients at Tintswalo hospital in the 1980s, and outlined the same traditional beliefs as were found in this study.<sup>245</sup> The general stigma associated with the disease is frequently cited. Nichter has described "weak lungs", and the reluctance of Philippino patients to discuss their illnesses.<sup>264</sup> Jenkins found that Florida American Africans say it is a disease that affects "bad people".<sup>256</sup> Ndeti, writing about East Africans, describes 50% of people presenting for traditional methods of treatment. He argues that patients can be torn between traditional community and medical staff influences, which differing views can have negative effects on treatment adherence.<sup>269</sup> This dichotomy may well exist for people in the Tintswalo district.

Other suspected causes are heavy physical activity or injury, or witchcraft.<sup>269</sup> Interviews with South African patients identified beliefs including alcohol excesses, smoking of cigarettes or dagga, inhaling fumes, and poor food intake. No patients described a direct association with the infectious sexually transmitted diseases. The closest was "infidelity" by only 5% of respondents.<sup>267</sup> This confirms opinion of Nichter that cultural beliefs and practices are specific to groups.<sup>264</sup>

There are many logistic issues that prevent people taking pills for many months. The shame and disgrace of having a disease because of improper behaviour must be a potent

factor in preventing early presentation to hospital. The sensitive difficulties relating to having sex while on treatment, and the perceptions that side effects prove the cultural nature of the sickness would make adherence to treatment problematic. An important issue raised by patients, that supporters who are from outside the families of patients may be able to perpetrate witchcraft, demands careful discussion of supporters with each patient. The results of discussions with groups of patients and community members confirmed and expanded on information provided by individual patients where only 25% stated their belief in a traditional cause of tuberculosis. The focus group evidence leads to the conclusion that individual interviewees were reticent to discuss their true feelings with interviewers, who were associated, despite their attempts to counter this, with the health services.

## 19.6 Conclusions

There is a great need for further clarification by health workers about beliefs and perceptions of tuberculosis by local communities, as these clearly constrain prompt presentation and successful treatment outcomes. Lack of understanding and impatience with local practices and beliefs are harmful to patient-health worker relationships. It is recommended that doctors and nurses have a responsibility to determine local beliefs, and to interact, and, as far as possible, to collaborate with traditional practitioners for the benefit of their patients. Otherwise patients will receive confusing messages, and will have to make their own choices about treatment. Cultural ideas being more ingrained into the fabric of a society, will dominate, unless feasible, logical and acceptable complementary solutions to illness are provided.

## **SECTION 5**

### **CONCLUSIONS AND RECOMMENDATIONS**

This section will summarise the study conclusions and discuss key aspects that influenced the results. It will make recommendations for tuberculosis service delivery for this and other rural districts. The chapters included are:

20. Conclusions, Issues and Constraints concerning tuberculosis management in this district
21. Recommendations for good, sustained tuberculosis control

## CHAPTER 20

### CONCLUSIONS, ISSUES AND CONSTRAINTS CONCERNING TUBERCULOSIS MANAGEMENT IN THIS DISTRICT

*This chapter includes:*

*Study Conclusions*

*Issues and Constraints*

#### 20.1 Conclusions

- \* *There was an improvement after intervention in treatment outcomes of those patients who lived in the district served by Tintswalo hospital*
  
- \* *The improvement was not confined to those patients attending decentralised treatment clinics, but was shown to occur for all patients, whether receiving hospital-based or clinic-based treatment. This shows that decentralised tuberculosis services can work well when managed efficiently.*
  
- \* *A community-based support system was implemented, and worked well. Supporters in patients' communities are easily accessible, and were shown to positively influence treatment outcomes.*
  
- \* *A high rate of resistant disease was measured. This was not surprising, considering the erratic management and drug taking of patients during previous years. It is essential that this new epidemic of MDR be prevented and well managed.*

- \* *There was no improvement in treatment outcomes for patients resident outside the district. Patients have the right to have good health services within the district in which they are resident. There must be clearly defined areas of responsibility for services, with availability and accessibility for patients. Good referral systems for inter-district referrals is essential.*
  
- \* *The diagnosis of tuberculosis on the basis of sputum microscopy was an improvement on how this was done in the earlier period of the study (1992-1994). However the rate of monitoring during and at the end of treatment was unacceptable low (55% were tested at two months, and 30% at the end of treatment), even for those patients attending the hospital regularly.*
  
- \* *Interviews with patients, both individuals and groups, and with groups of community members, revealed that there are traditional beliefs about the origin and treatment of tuberculosis that must impact on case-holding and case-finding*
  
- \* *Interviews also showed that there were a number of access problems experienced by patients, and that community clinics, or decentralised services were preferred by most*

## 20.2 Issues and Constraints

The study has measured processes and outcomes over a 4 year period during which there was a change in the district tuberculosis control programme from poor to good.

In order to formulate feasible and useful recommendations on the provision of tuberculosis

health services for this and other rural districts, a number of important issues need to be considered. These are:

How was this improvement achieved?

- \* What were the main constraints in the process?
- \* How can the improvements be sustained and further improvements achieved?
- \* How can the perspectives and needs of the community and of patients, be incorporated into the planning and implementation of services?

#### 20.2.1 How was this improvement achieved?

- \* The general effect of the research team and their resources:

This district was part of the poorest province in South Africa, and was suffering from the inequities of the old *apartheid* system. As such, resources, both material and managerial were limited. Little was being achieved without a policy, a tuberculosis control programme and the essential infrastructure including transport, training materials, laboratory networks. There was limited knowledge about the disease control and international warnings about the severity of the global epidemic.

The research project provided policy guidelines, endorsed by international documents and a visit from a team of WHO and local experts on tuberculosis team during 1995. The research nurse visited every intervention clinic on a regular basis to train, support and monitor the staff. She was independent of the erratic supply of hospital transport, with the use of a research vehicle. The research team including the interviewers, who were stimulated by employment and by continuing training and monitoring, spread their enthusiasm to the hospital and community tuberculosis workers. Tuberculosis became an

interesting and acceptable area in which to work. Comfortable research office space was shared with the service staff.

A computerised data base of all patients and their management was set up by the researchers. This preceded the new national register system. Before this data base, there had been no means of measuring outcomes or processes, and with no measures, no incentives to improve poor results. The service team had full access to his data base, and used it to plan their visits and assess results.

The insistence on accurate and timeous data collection and recording, and for patient-centred care set a standard for health workers.

#### **\* The manageable size of the study area**

The defined area of one district with 12 clinics and 200-300 patients per year made the study manageable. It acted as a useful "demonstration" district, with results of interventions generalisable to other rural districts.

#### **\* Staff training**

Clinic nurses received training and education about tuberculosis from the researchers, both continually at individual clinics, and at three formal training sessions. The latter were organised for a total of 83 nurses, including senior district managers, with the objective of providing basic training in tuberculosis management for every professional nurse working at a district clinic, and for managers who had overall responsibility for the services. Two sessions were for staff of "treatment" clinics, and the third for nurses of all the other district clinics. The sessions included practical exercises and role plays, and were evaluated by the nurses as very useful.

**\* Supervision and monitoring of the intervention clinics**

Regular weekly visits were made to every intervention clinic. The research nurse examined every tuberculosis patient clinic card for details of sputum monitoring, supporter attendances (these were copied onto clinic cards from the patients' cards), and clinic attendances with clinical details documented at each visit. Drug supplies were inspected, and patient management issues and problems were discussed with staff. The author visited each clinic every three months for the same purpose.

**\* Follow-up of non-attending patients**

Clinic nurses were trained to identify any patient who missed a monthly clinic appointment within one or two days. Strategies for follow-up that involved clinic staff action were encouraged. Although emphasis was laid on the clinic staff taking responsibility for the follow-up, their lack of transport and their preoccupation with the daily load of sick patients at the clinic were limiting factors. It became clear that the back-up of researchers, was needed. Where necessary the research nurse went to patients' homes and to their supporters to discuss the problems.

**\* Interest and cooperation of clinic nurses**

Most clinic nurses were interested in the new decentralised tuberculosis service, and keen to help their patients. They completed the cards carefully, and some made special efforts in tracing non-attenders. They were receptive to advice and support, and clearly pleased to have regular supportive and instructional visits, and to have colleagues with whom they could discuss their work. The full day training sessions held at a nearby hotel, away from the work situation, were especially popular.

**\* Cooperation of hospital and community tuberculosis staff**

The key to the good treatment outcomes throughout the district, not confined to "treatment" clinics, was the cooperation and enthusiasm that developed among the senior nurses in the hospital tuberculosis ward and among the community tuberculosis team consisting of a nurse and two health educators. They all attended the training sessions, and set up regular meetings (monthly and more often as necessary) with the research team to discuss the control programme and issues arising. The ward sister fulfilled an important role in informing the researchers about discharged patients. Help was provided by the researchers in describing and reorganising the roles of the community tuberculosis staff, so that they performed more effectively and efficiently.

**\* Support of laboratory staff**

The laboratory staff had not previously been informed or consulted about tuberculosis work. Once they were invited to training sessions, and quality control systems were set up through the research programme (with their cooperation), the turn-around time for specimens improved. Measuring quality of laboratory work did not form part of the study, but a quality control system set up by the South African Institute of Medical Research as a result of the research, had results which were said to be excellent.

**\* Availability of drugs**

Anti-tuberculosis drugs were erratic in supply before the research project. Combinations drugs were unused and unknown. The pharmacist, with the help of the newly established provincial drug supply system, eventually responded to suggestions of the researchers and cooperated to ensure that all recommended drugs were available. Issues of supplies for up

to five months were given to the research nurse to take to "treatment" clinics to be stored for patients who attended there.

**\* Interest and willingness of community supporters**

The social system in this district whereby many community members took responsibility for one another was an asset to the tuberculosis supporter system. With appropriate initiation from research and service health workers, a variety of lay-people became supporters, and successfully trod the path to cure or completion of treatment with many patients.

**20.2.2 What were the constraints in the process?**

There were a number of factors that constrained the process of decentralising tuberculosis services to district clinics. These could be classified as factors in the physical and social environment of this area, health services deficiencies, and research deficiencies and limitations.

**\* Physical and social environmental factors**

Major constraints for the provision of all health care in this district are the long distances from where people live to the hospital and to clinics along bad, dangerous roads, and where public transport is expensive.

The researchers became aware of the social and cultural beliefs that were barriers to early health service attendance, both because the disease was stigmatised through local beliefs that the cause was unacceptable behaviour, and because traditional healers had to be consulted. Until different health care providers cooperate, patients will be torn, and will

present to clinics and hospitals with late stage tuberculosis.

\* **District management deficiencies**

In the absence of a district health system, management was actually that of the hospital. The district suffered from a number of management deficiencies, many consequent on the previous system of "homelands", two of which, Lebowa and Gazankulu, had formed part of the previous area of the district. Any initiatives that communities or health workers might have shown had been stifled by this system, so that demotivated staff and absent resources were the norm. Exceptions existed of course, at management and implementation levels.

The newly established provincial government could not be expected to facilitate immediate changes in attitudes or behaviours. Health service management was hospital-based, and there was poor understanding and limited activity around community services, including clinic management. Resources and support for clinics were minimal. As with many government services, senior staff spent long hours travelling to and attending meetings called at short notice at head office, with resultant disruption of routines, tiredness and frustration.

The research initiative met opposition from such managers. This was not overt, but manifest in lack of active support for the new decentralised system, failure to ensure accountability of clinic staff for their actions in tuberculosis patient management and failure to be seen supporting the work, resulting in confused lines of authority for clinic staff. Organising training sessions (at no cost to the hospital) was difficult as managers would not commit themselves to allowing staff to attend, and failed to help with forward planning. Much time and energy was expended in diplomatic negotiations, and in trying

to understand the underlying issues.

The old Lebowa clinics, under Mapulaneng hospital, posed particular problems. Drug and vaccine supplies were irregular, empty shelves were the norm, staff felt and were incompetent as they had to send patients away. The causes were multiple, including poor ordering, theft at various levels en route to clinics, and "lack of money". Water supplies for clinics were inadequate, indeed frequently non-existent. Accommodation facilities for clinic staff were below standard.

**\* Perceptions of researchers by district health workers**

Although it was not stated, the behaviours of managers and clinic staff, and experiences of academics working in the related University project, led the researchers to believe that they were perceived by some as temporary sojourners in the district working for academic recognition. Noone was impolite enough to state this, but it must have been part of the apparent demotivation that constrained full involvement. One had sympathy for health workers in difficult and constantly challenging situations, whose standards were being questioned, and who were being asked to do more in quantity and quality, without apparent personal satisfaction. This applied equally to senior district staff.

**\* Researchers as service providers**

The researchers assumed the role of tuberculosis service providers for "treatment" clinics. This, although discussed and agreed upon before the project started, inevitably caused some problems. Staff of the "treatment" clinics became accountable to the researchers, without the visible support of the hospital community nursing managers. The researchers had tried, without success, to organise management presence at an introductory meeting

at each of the clinics involved.

Another issue was that tuberculosis services became "verticalised", with a specific team discussing only that disease and its management. This could have lost credibility for the comprehensive approach, and may have alienated the researchers from clinic staff who had a number of responsibilities apart from management tuberculosis.

**\* Absence of districts and a functional district health system**

Productivity depends on clear work structures and lines of accountability. During the period of the study, the district system did not exist. In fact the three proposed districts of the Bushbuckridge sub-region were still non-functional in the first quarter of 1998! The hoped for changes in boundary lines of responsibility, described since 1994, did not occur, causing confusion and frustration of health staff, and contradicting the training on the district system that the researchers and others carried out. The delays were partly due to the need to ensure democratic decision-making by communities unused to involvement in local government. As a result of the non-district system, there was further demotivation of the clinic nurses, for whom this would have the greatest impact.

The (old) Mhala area clinics, many kilometers distant from Tintswalo hospital, remained the responsibility of that hospital's community health staff. They had neither staff capacity, time, nor vehicles to service these far areas, while assuming an increased load of work with responsibility for areas closer to the hospital (previously under Mapulaneng hospital). They had gained work load, but lost none. In fact it was surprising that the hospital-based community team managed to improve tuberculosis management, as they did. Referrals of patients who lived outside the proposed district was very difficult, as authorities responsible for other areas were far away, there was no means of

communication (senior staff were not even allowed to telephone other authorities from the hospital ward to enact referrals), and these other authorities were not clearly defined.

**\* The limited role of clinics in tuberculosis patient management**

During the period of the study, any patient who attended a clinic, and in whom tuberculosis was suspected, was asked to go to Tintswalo hospital for diagnosis, and initiation of treatment, usually as an in-patient. Only on discharge was the patient referred back to the clinic for continuation of the course of treatment, to be referred back to the hospital again for final assessment and discharge from treatment. The clinic staff saw the patients only three, four or sometimes five times at monthly visits, with roles limited to clinical assessment, checking of supporter attendances (and copying the supporter's ticks from the patient card to the clinic card), and making the next appointment. Clinic staff had no contact with supporters. Without the research team, who did random visits to patients and supporters, non-attendances of patients at their daily supporter visits would not have been identified until the next monthly clinic visit. Patients who failed to attend for their monthly appointments would be identified within a few days of the failure by clinic staff, but in the absence of time and transport to trace those patients at home, clinic staff would be powerless to act, and would need to contact the district tuberculosis team for them to seek out such patients. Contact was dependent upon reliable communication systems from the clinics, the ability of the district team to access transport, and upon sufficient district staff assigned to tuberculosis work. Frequently all three of these factors were absent. The role of clinic staff was thus limited, and frustrating for professionals trained in a comprehensive patient approach.

**\* Failure to monitor sputum bacteriology during and at the end of treatment**

Sputum tests during and at the end of treatment (2 and 5-6 months for new patients) were part of the research (and the national) policy, but were not done, despite the availability of the research nurse to transport the specimens. This was a combined deficiency of the researchers who failed to insist, and to remind clinic nurses about the timeous collection of specimens, and of the clinic nurses who did not accept responsibility for doing this. There was no help from management who should have insisted on the implementation of this policy.

**\* No organised laboratory network**

Tuberculosis services, as with many other clinic-based services, are dependent on a rapid and reliable laboratory link. The absence of an organised system of delivery of sputum specimens to the district laboratory, and the return of results within 48 hours, has been noted as a major constraint in many parts of the world.<sup>85</sup> The absent district system, long distances, bad roads, the tuberculosis control programme with emphasis on bacteriological diagnosis only just emerging, and inadequate organisational and management skills meant that there was no network.

For "treatment" clinics, the researchers themselves provided the transport for specimens to the laboratory and results back out during the last six months of the study, made strenuous attempts to get the service to organise the link. Suggestions were to utilise senior community nurses on supervisory visits, the hospital pharmacy team delivering drugs to clinics, ambulances transporting patients, or even local taxis. A system was never set up, since it was beyond the capacity of the researchers to establish this. The Tintswalo hospital laboratory was not part of the SAIMR network, so the improvements

taking place in other provinces, notably Gauteng and Mpumalanga (personal communications Drs. L Floyd and E Balt respectively), were not a feature of this area.

**\* Inadequate organisation and management of the community supporter system**

The organisation of the supporter system was well managed at an individual level by the research nurse or the hospital community team. They selected a person acceptable to the patient, informed that person what was expected, and made occasional visits to monitor the process of daily attendance. However, the process was unsystematic, and without community consultation. The considerable resources within the community could be better accessed and utilized if volunteers within villages were formally recruited and trained, so that they formed a team, ready for the task of supporting tuberculosis patients as needed. They could play a part in general health promotion, including the Extended Programme of Immunisation, nutrition, home-based management of diarrhoeal disease, family spacing, tuberculosis and other disease case-finding, and environmental control.

The system whereby patients attended clinics to fetch their tablets, and took these to their supporters, was illogical, and must have seemed so to patients. It would have been better for drugs to be taken to supporters, or for them to collect these at the clinic. These aspects needed further discussion and trials to formulate a district supporter plan.

A further important issue was the lack of any incentive for supporters. This would not necessarily be monetary, but could take the form of certificates presented at an annual function, transport allowances, or badges to denote membership of supporter groups. The strength of the community "care group" movement that contributed significantly to the control of trachoma in northern South Africa, was the authority and status given to members.<sup>405</sup>

**\* Poor provincial government commitment**

District management and commitment, even had these been present and adequate, would have been very difficult without provincial government commitment to a national tuberculosis policy, and appropriate allocation of resources, including provincial management and training staff. Only towards the end of the project in mid-1996, were provincial tuberculosis co-ordinator/manager and trainer posts filled.

**\* Non-involvement of hospital medical staff**

Although tuberculosis case management, community control and the research project were presented and discussed at at least three formal doctors' meetings at Tintswalo hospital, doctors did not award the disease priority status, and remained distant from the community-based system. Patients were often started on treatment without microscopy confirmation of diagnoses, sometimes with incorrect drugs, and occasionally discharged without notification or referral to the tuberculosis ward for notification and registration. Both clinical diagnosis and death certification (as discussed in chapter 17) sometimes incorrectly included tuberculosis when it was unproven or unlikely. It may well have been missed occasionally when it was present.

**20.2.3 How can the improvements be sustained and further improvement achieved?**

An operational model for the analysis of tuberculosis control programmes has been described.<sup>406</sup> The model states 8 steps: motivation (of patients to present to health facilities), selection (of suspect cases for smear microscopy), examination (of smears in the laboratory), sensitivity (of smears), prescription (of correct treatment), treatment

(patient obtains correct treatment), regularity (adherence) and effectiveness (probability of cure).

This model for good tuberculosis control and management requires efficient and effective actions of health workers at a number of levels. District, provincial and national management commitment and support means training of staff, and the provision of the infrastructure required for diagnosis and treatment, as well as those resources required for efficient follow-up of non-adherent patients, and for routine supervision of clinic staff.

The roles of district health workers need clear definition. An effective tuberculosis programme presupposes the existence of a functioning district health system, the acceptance of the priority status of tuberculosis at all levels of the health service, good district service management, which includes well managed and well motivated health personnel. The suggested roles of different levels of health staff are described hereunder.

#### **The district clinic nurse**

A clinic nurse has many duties in the provision of primary care to the people served by a district clinic. Regarding tuberculosis, which is best integrated within these duties, the nurse must be able to:

- + decide which patients have suspected tuberculosis
- + confirm the diagnosis, using the laboratory network
- + treat patients with confirmed disease
- + organise clinic drug supplies
- + refer patients with clinical problems or those who require hospitalisation
- + contact the appropriate person (district co-ordinator or hospital clinicians) for

clinic-based management problems

- + record all processes and outcomes on the relevant tuberculosis programme forms
- + follow-up patients who have adherence problems during treatment, or call on the district tuberculosis coordinator to help with this

The clinic should be organised according to the needs and comfort of the patients and the staff. It is well described that patients respond well to a relationship with the care provider. It is thus best for the same nurse to see the same tuberculosis patients for the duration of their treatment, as far as can be organised. It may be useful to have a tuberculosis patient day once a week, or alternatively to structure visits any day of the week.

For a district with a population of up to 250 000 people, with rates of tuberculosis of 200-300 per 100 000 population (double that measured over the last 5 years in the Tintswalo district, and allowing for the rise with the HIV epidemic), there would be 500-750 patients per year, or 250-375 at any one time. The Tintswalo study showed that 28% of patients lived close to the hospital, leaving 72% who would require treatment at one of the 12 district clinics. Assuming equal distribution of patients attending the clinics, between 15 and 20 could be on treatment at each. At clinics in more densely populated villages, this number could be 30. If each attended monthly on one specific day, there would be about five to eight patients per clinic day. This number would seem manageable, even in the context of clinics delivering comprehensive services. If the rise in incidence is more than double that in the early 1990s, and if case-finding rates improve, numbers will be higher, which is a good reason to ensure an efficient system now.

### **The district communicable disease coordinator**

This district-based health worker should have responsibility for all communicable diseases in a district, including malaria, meningitis, typhoid fever, diarrhoeal disease, haemorrhagic fevers, tuberculosis and any others. The job includes a knowledge of the district population, its distribution, health problems, and the health services. The role of this person is to:

- + train health staff about tuberculosis and its management
- + train tuberculosis patient supporters and organise appropriate incentives
- + visit all clinics in a district on a regular basis to teach and to supervise clinic staff
- + respond to calls for help in tracing non-attending patients
- + monitor laboratory and drug supply systems, and report problems to district management

Once the tuberculosis control programme was functioning well, with all clinic staff trained, the routine visits of one or sometimes two clinics per day could be completed in a few hours, so that all district clinics would be visited once in two weeks. This would leave time for training, and for tracing non-attenders at their homes.

Given the responsibilities for other communicable diseases, and outbreak investigations, the task may be too much for one person. An additional district staff member, at the level of a health educator, or nurse should assist. Both would require transport, always a limiting factor in the past. However, an efficient programme with cure rates exceeding 80%, would make the use of adequate staff and transport resources cost effective, particularly if other, less common communicable diseases and good surveillance and outbreak response systems are simultaneously managed in the district.

### **District management:**

District management has to take responsibility for the provision of the infrastructure, upon which a tuberculosis control programme depends. Clinic staff and the district communicable disease coordinator need to be consulted and to report problems, but district management should plan and organise the systems for:

- \* Laboratory network
- \* Drug supplies
- \* Vehicles
- \* Stationery
- \* Staff management

An efficient and reliable **laboratory network** between clinics and district laboratory is essential. In many urban areas, a daily collection service from clinics has been arranged, with results faxed back within 24 hours. (Gauteng province, personal experience) In rural districts such a service may be less easy to implement. For those new patients not sick enough to be referred for admission to hospital, and who are to be diagnosed at clinics, bacteriological results should be available within one or two days, so that treatment can start as soon as possible. This requires transport of specimens for which innovative ways of reaching the laboratory must be devised. They may include using health workers on supervisory visits, delivering drug supplies, or fetching patients in ambulances. It may necessitate specific communication with the district tuberculosis team, or the use of local taxis. Whatever the means, it has to be reliable. There is no reason why fax machines could not be installed and functional in every clinic for the results. The costs of organising a laboratory network would be balanced by savings in the short and long terms.

Another district management responsibility is the regular and timeous **delivery of drugs for tuberculosis**, as well as essential drugs for primary care use, to every clinic. Tuberculosis drugs were not available on shelves of "treatment" clinics in this study, for reasons described by hospital management as related to rules about dispensing drugs. These were not logical to researchers, and should be overcome without difficulty. The supply for each patient attending "treatment" clinics had to be hand-delivered by the research team.

**Vehicles** for the district communicable disease coordinator and assistant must be available for routine visits to clinics and supporters, for collecting specimens if required, and for tracing non-attending patients. The problem with sharing vehicles with other services is non-availability in times of need. Again a functioning control programme will cost far less than one which does not promote cure.

The provision and delivery of all **stationery** required for the tuberculosis control programme is the responsibility of district management. Without attention to this seemingly small detail, the ability to monitor and evaluate the programme is lost, and staff become demotivated and confused.

The descriptions of roles and responsibilities above assumes a comprehensive role for clinic staff to manage tuberculosis, different from their limited role during this study.

The increased responsibility for correctly diagnosing and treating tuberculosis, and the ability to evaluate progress of each patient should provide greater incentives to clinic nurses. Given the public health impact of this disease, the responsibility is large, but

should not be overwhelming for professionals required to manage a number of life threatening, as well as routine problems which include dehydrated infants, complicated birth deliveries, ordering of drugs and equipment, and responding to community needs and demands.

Adaptations would have to be made for those patients requiring hospitalisation for clinical or risk of interruption reasons, and for those on re-treatment regimens, for whom daily streptomycin injections are needed, either in hospital or from district clinics.

The logistics and the infrastructure described above require good planning, organisation and budgeting by district management.

**Staff motivation** and factors that demotivate are complex, although in many rural primary health care environments, problems are not difficult to identify. Herzberg's motivation-hygiene theory, based on a study of 200 professionals, proposes that motivators (achievement, recognition, work, responsibility and advancement) lead to satisfaction at work.<sup>407</sup> For maximum satisfaction, and thus productivity, from clinic nurses, attention needs to be paid to their "job-enrichment" factors. They certainly have work and responsibility, but little recognition and sense of achievement because of the remoteness of their posts, and the lack of management presence to acknowledge the challenges and difficulties of their jobs. Herzberg's "hygiene" factors, which he found to be most frequently quoted causes of dissatisfaction, are those related to the context of work. Named problems were with company policy and administration (management), technical supervision, salary and relationships with supervisor. Researchers studying nurses working at Agincourt Health Centre, one of the health facilities in Bushbuckridge, under Tintswalo

hospital management, found that the absence of close supervision and effective management impacted negatively on their morale, exacerbating feelings of isolation.<sup>408</sup>

The work context of clinic nurses does not always meet the needs of Maslow's hierarchy theory.<sup>409</sup> Some basic physiological needs may be covered, but acceptable accommodation, and adequate water and sanitation are often absent. Many clinic buildings in the Tintswalo district were in a poor state, certainly not conducive to high standards of productivity. Safety and security are often not assured, nor, at the next level of need, is a need to belong to a group catered for. The isolation and loneliness of professional life in far distant clinics, away from relatives and friends, without means of transport and often without any form of communication, can be profound. The higher needs of Maslow include the motivational factors of Herzberg already mentioned - status recognition and self-fulfilment.

The World Health Organisation have stated that "if health personnel are to provide a caring service, it is necessary for the public health services to show that it too cares".<sup>410</sup> Much is lacking in both the physical and social environment, and in the professional management of nurses assigned to work in rural clinics of Bushbuckridge, and in many other areas, both rural and urban.

#### **20.2.4      How can the community and patient perspectives be incorporated into planning and implementing tuberculosis services?**

This study identified some consistent beliefs about the origin of tuberculosis among local communities. Health workers confined to facilities, especially if they do not come from the community they serve, are in danger of missing important information that impacts on the management of diseases. They all have a responsibility to consult community groups

and leaders, and traditional healers, and to work with and through local beliefs and customs in order to provide an acceptable effective service. Traditional healers should be educated about the medical treatment of tuberculosis, and persuaded to refer their clients to clinics or hospitals for concurrent medical management. Continuing attempts to destigmatise the disease through community-based education would facilitate early patient presentation and treatment adherence.

## CHAPTER 21

### RECOMMENDATIONS FOR GOOD, SUSTAINED TUBERCULOSIS CONTROL

The findings of this study prompt a number of recommendations. In keeping with the principles of integrating all primary care activities, some are general health service recommendations, others relate specifically to tuberculosis. Many would be generalisable to other districts in South Africa, and perhaps to other developing countries.

#### GENERAL HEALTH SERVICE RECOMMENDATIONS

*Commitment to tuberculosis control as a priority for health services*

*A functioning district health system*

*Incentives and support for health workers*

*Task definitions and protocols for management of common health problems*

*Communication systems*

*Supervisory visits*

*Management of material resources - drugs, equipment, water and buildings*

The need for good management is a recurring theme in this thesis.

- \* A prerequisite in the context of tuberculosis is commitment by management to the priority status of this disease, recognition that the incidence will increase, that the disease is preventable by cost-effective means, and that tuberculosis care is best integrated within a district primary care network.
- \* The creation of a functional district health system is fundamental to all health care

delivery.

Staff and material resources need good management.

- \* Staff management starts with recruitment of appropriately trained and experienced health personnel. Much has been debated around issues of incentives for doctors who work in remote areas, but little attention has been given to salary supplementation, opportunities for promotion, extra leave and other forms of recognition for the onerous duties that nurses perform in rural primary care settings. Staff rotations should be considered, balancing the desire to give clinic nurses a break from work in remote areas with the need for some permanency and continuity of care. It certainly seems disadvantageous to leave a nurse at the same clinic for years on end.
- \* Tasks to be performed should be clearly defined, with protocols, training and retraining on the management of common important health problems (including tuberculosis). This aspect is important too for staff at other levels in the district, including district communicable disease coordinators and district management. Protocols on how to manage common health problems and their complications must be available, together with resources for implementation. Essential components are equipment, telephones, fax machines, and ambulances as well as available consultation services with technical guidance.
- \* There must be open communication channels between all clinics, the district communicable disease coordinator, the district headquarters and the hospital, to use routinely for common health problems and their complications.
- \* Regular supervisory and monitoring visits by district managers, notably the communicable disease coordinator and the community health nursing manager, are

essential to motivate staff, to address their problems, and to check that work is being performed according to set standards.

- \* Clinics cannot function without drugs, vaccines, equipment, constant water supplies and buildings in reasonable repair. Functioning systems for procurement and distribution of drugs and equipment have to be in place, with delegated responsibilities for their maintenance.

#### **SPECIFIC TUBERCULOSIS SERVICE RECOMMENDATIONS**

*Train all health workers in tuberculosis management*

*Decentralise tuberculosis care to district clinics*

*Organise laboratory network for diagnosis and monitoring*

*Organise community supporters*

*Provide district support for community outreach functions*

*Keep standardised records at clinic level, to be collated at district level*

*Transfer patients efficiently from one district to another*

Within the context provided by good general management, there are specific recommendations for tuberculosis management emanating from this study.

- \* All health workers, including nurses, doctors, managers, laboratory workers and pharmacists, must be trained in the management of tuberculosis. Education at tertiary and other levels for all health workers must include management of patients with tuberculosis, as well as the principles of the national and international control programmes. Continuing education with on-site training is an essential component to maintain standards and interest. Manuals must be produced, and

courses coordinated and standardised at the national tuberculosis directorate, with extra resources supplied as necessary to provinces unable to supply the needs.

- \* Tuberculosis can be and should be managed at district clinics by nurses trained in how to diagnosis and treat the disease. There is no reason why they should not have responsibility, with supervision and appropriate advice for problems, for managing suspects, making a definite diagnosis and initiating and continuing treatment. Simplification of treatment regimens currently recommended by the South African tuberculosis control programme has been suggested by many experts.
- \* Systems of transport and communication between all clinics and the district laboratory is essential for a functioning tuberculosis programme. Innovative ways and systems must be developed to supply drugs and other requisites, and to collect specimens, all of which will benefit the delivery of comprehensive health care.
- \* All patients should have supporters. Community members make excellent supporters, but need training, incentives, monitoring and evaluation.
- \* Backup support for recruiting community supporters, and for following up non-adherent patients will always be needed. To provide transport at each clinic for clinic staff to do this themselves is probably not cost-effective. At district level it would be, if the staff responsible for tuberculosis was also responsible for other communicable diseases, surveillance systems and outbreak responses.
- \* Completion of the various cards, register and regular reports should also be done by clinic nurses, who will find the reports easier and more acceptable when some modifications are made, and with continuing training. The district communicable disease coordinator should monitor the correct completion of all forms, and collate those of all clinics into a district report.

- \* Transfer of patients who are leaving the district should be facilitated by encouraging those with intended movements to discuss where they are going. Transfers to other services must be formalised with appropriate documentation and direct communication to the receiving health services. Work should proceed on implementing a national computerised register of all patients with tuberculosis, which will facilitate transfers as well as record details of current and previous treatment of all patients.

## REFERENCES

1. Cave AJE, The evidence for the incidence of tuberculosis in ancient Egypt. *Br J Tuberc* 1939;33:142-152.
2. Formicola V, Milanese Q, Scarsini C. Evidence of spinal tuberculosis at the beginning of the fourth millenium BC from Arene Candide Cave (Liguria, Italy) *Am J Phy Anthropol* 1987;72:1-6.
3. Stirland A, Waldron T. The earliest cases of tuberculosis in Britain. *J Arch Sc.* 1990; 17: 221-230. In: Ryan Frank *Tuberculosis: The Greatest Story never told.* Great Britain: Swift, 1992:5-6.
4. Dubos R, Dubos J. *The White Plague: Tuberculosis, Man and Society.* Second edition. Rutgers University Press, New Brunswick, New Jersey.1992.
5. Grigg ERN The Arcana of Tuberculosis. *Am Rev of Tuberc Pulm Dis* 1958;78:151-172.
6. Bignall JR. A century of treating tuberculosis. *Tubercle* 1982;63:19-22.
7. de Kruif P. *Koch: the Death Fighter* In: *Microbe Hunters* Pocket ed. New York:Pocket Books, Inc, 1926.
8. Snider Gordon J. Tuberculosis Then and Now: A Personal Perspective on the Last 50 Years. *Ann Intern Med* 1997; 126(3):237-243.
9. Comstock George W. Tuberculosis: Is the Past Once Again Prologue? *Am J Public Health* 1994;84(11):1729-1731.
10. Beyers AD, Donald PR, van Helden PD, Ehlers MRW, Steyn L, Mizrahi V. Tuberculosis research - the way forward. *S Afr Med J* 1996;86(1):30-33.
11. Horton R. Towards the elimination of tuberculosis. *Lancet* 1995;346:790.
12. Dunlap NE, Briles DE. Immunology of Tuberculosis. *Med Clin North Am* 1993;77(6):1235-1251.
13. Bloom B, Murray CJL. Tuberculosis: Commentary on a Reemergent Killer. *Science* 1992;257:1055-1064.
14. Stehbens WE. On the "cause" of Tuberculosis. *Pathology* 1987;19:115-119.
15. Rieder HL, Cauthen GM, Comstock GW, Snider DE Jr. Epidemiology of Tuberculosis in the United States. *Epidemiol Rev* 1989;11:79-96.
16. Grzybowski S, Barnett GD, Styblo K. Contacts of cases of active pulmonary tuberculosis. *Bull Int Union Tuberc* 1975;50:90-106.

17. Beyers N, Gie RP, Scaaf HS, Van Zyl S, Talbot JM, Nel ED, Donald PR. A prospective evaluation of children under the age of 5 years living in the same household as adults with recently diagnosed pulmonary tuberculosis. *Int J Tuberc Lung Dis* 1997;1(1):38-43.
18. Kenyon TA, Valway SE, Ihle WW, Onorato IM, Castro KG. Transmission of Multidrug-resistant *Mycobacterium Tuberculosis* during a long airplane flight. *N Engl J Med* 1996;334(15):933-938.
19. Styblo K, Meier J, Sutherland I. The transmission of tubercle bacilli: its trend in a human population. *Tuberculosis Surveillance Report no.1 Bull Int Union Tuberc* 1969;42:1-104.
20. Sudre P, ten Dam G, Kochi A. Tuberculosis: a global overview of the situation today. *Bull World Health Organ* 1992;70(2):149-159.
21. Sutherland I. Research into the control of tuberculosis and leprosy in the community. *Br Med Bull* 1988;44(3):665-678.
22. Armstrong JA, D'Arcy Hart P. Response of cultured macrophages to *Mycobacterium tuberculosis*, with observations on fusion of lysosomes with phagosomes. *J Exp Med* 1971;134:713-740.
23. Ehlers MRW. *Mycobacterium tuberculosis* : infection or disease? Key events in pathogenesis and the immune response. *Specialist Medicine* 1994;11:48-55.
24. Cole ST. Why sequence the genome of *Mycobacterium tuberculosis*? *Tubercle Lung Dis* 1996;77(6):486-490.
25. Styblo K. Epidemiology of Tuberculosis. Royal Netherlands Tuberculosis Association. The Hague, The Netherlands 1984. Reissued in: *Selected Papers* 1991.
26. Small PM, Moss A. Molecular epidemiology and the new tuberculosis. *Infectious Agents and Disease*, Raven Press 1993;2(3):132-138.
27. Small PM, Hopewell PC, Singh S, Paz A, Parsonnet J, Ruston DC et al. The Epidemiology of Tuberculosis in San Francisco: a population-based study using conventional and molecular methods. *N Engl J Med* 1994;330:1703-1709.
28. Murray CJL, Styblo K, Rouillon A. Tuberculosis in developing countries: burden, intervention and cost. *Bull Int Union Tuberc Lung Dis* 1990;65(1):6-24.
29. Comstock GW, Livesay VT, Woolpert SF. The prognosis of a positive tuberculosis reaction in childhood and adolescence. *Am J Epidemiol.* 1974;99:131-138.
30. Selwyn PA, Hartel D, Lewis VA et al. A prospective study of the risk of tuberculosis among intravenous drug users with human immunodeficiency virus

infection. *N Eng J Med* 1989;320:545-550

31. De Cock KM, Soro B, Coulibaly IM, Lucas SB. Tuberculosis and HIV infection in Sub-Saharan Africa. *JAMA* 1992;268:1581-1587
32. van den Broek J, Borgdorff MW, Pakker NG, Chum HJ, Klokke AH, Senkoro KP, Newell JN. HIV-1 Infection as a Risk factor for the Development of Tuberculosis: a Case Control Study in Tanzania. *Int J Epidemiol* 1993;22(6):1159-1165.
33. CDC. Tuberculosis-United States, 1985-and the possible impact of human lymphotropic virus type III/lymphadenopathy-associated virus infection. *Morb Mort Wkly Rep* 1986;35:76-86.
34. Brudney K, Dobkin J. Resurgent Tuberculosis in New York City. *Am Rev Respir Dis* 1991;144:745-749.
35. Reichman LB. The U-shaped Curve of Concern. (editorial). *Am Rev Resp Dis* 1991;144:741-742.
36. Richards SB, St Louis MB, Nieberg P, Coulibaly IM, Coulibaly D, Abouya I, Gayle HD, De Cock KM. impact of the HIV epidemic on trends in tuberculosis in Abidjan, Cote d'Ivoire. *Tubercle Lung Dis* 1995;76(1):11-16.
37. Daley CL, Small PM, Schechter GF, Schoolnik G, McAdam R, Jacobs W, et al. An outbreak of tuberculosis with accelerated progression among persons infected with the human immunodeficiency virus. *N Eng J Med* 1992;326:231-235
38. Nunn P, Mungai M, Nyamwaya J, Gicheha C, Brindle RJ, Dunn DT, Githui W, Were JO, McAdam KPWJ. The effect of Human Immunodeficiency Virus type-1 on the infectiousness of tuberculosis. *Tubercle Lung Dis* 1994;75:25-32.
39. Raviglione MC, Snider DE Jr, Kochi A. Global Epidemiology of Tuberculosis: Morbidity and Mortality of a Worldwide Epidemic. *JAMA* 1995;273:220-226.
40. Styblo K. The global aspects of tuberculosis and HIV infection *Bull Int Union Tubercle Lung Dis* 1990;65(1):28-33.
41. Grzybowski S. Tuberculosis in the Third World. *Thorax* 1991;46:689-691.
42. Tuberculosis, HIV on collision course in Asia. World Health Organisation, Office of Information, press release, August 10, 1994. (WHO/63)
43. Narain JP, Raviglione MC, Kochi A. HIV-associated tuberculosis in developing countries: epidemiology and strategies for prevention. *Tubercle Lung Dis* 1992;73:311-321.
44. Schulzer M, Fitzgerald JM, Enarson DA, Grzybowski S. An estimate of the future size of the tuberculosis problem in sub-Saharan Africa resulting from HIV-

- infection. *Tuber Lung Dis* 1992;73:52-58.
45. Dolin PJ, Ravigliione MC, Kochi A. Global tuberculosis incidence and mortality during 1990-2000. *Bull World Health Organ* 1994;72:213-220.
  46. UNAIDS Fact Sheet, December 1996
  47. Cantwell MF, Binkin NJ. Tuberculosis in sub-Saharan Africa: a regional assessment of the impact of the human immunodeficiency virus and National Tuberculosis Control Program quality. *Tuber Lung Dis* 1996;77:220-225.
  48. Spence DPS, Hotchkiss J, Williams CSD, Davies PDO. Tuberculosis and poverty. *Br Med J* 1993;307:759-761.
  49. Snider DE Jr. The relationship between tuberculosis and silicosis (Editorial) *Am Rev Respir Dis* 1978;118:455-460.
  50. Cowie RL. The Epidemiology of Tuberculosis in Gold Miners with Silicosis. *Am J Respir Crit Care Med* 1994;150:1460-1462.
  51. Yu G, Hseih C, Peng J. Risk factors associated with the prevalence of pulmonary tuberculosis among sanitary workers in Shanghai. *Tubercle* 1988;69:105-112.
  52. Buskin SE, Gale JL, Weiss NS, Nolan CM. Tuberculosis risk factors in Adults in King County, Washington 1988 through 1990. *Am J Public Health* 1994;84:1750-1756.
  53. Alcaide J, Altet MN, Plans P, Parron I, Folguera LI, Salto E et al Salleras LI. Cigarette smoking as a risk factor for tuberculosis in young adults: a case control study. *Tuber Lung Dis* 1996;77(2):112-116.
  54. Stead WW, Lofgren JP. Does the risk of tuberculosis increase in old age? *J Infect Dis* 1983;147:951-955
  55. Rocha M, Pereira S, Barros H, Seabra J. Does pulmonary tuberculosis change with ageing? *Int J Tuberc Lung Dis* 1997;1(2):147-151.
  56. Grzybowski S, Enarson DA. The fate of cases of pulmonary tuberculosis under various treatment programmes. *Bull Int Union Tuberc* 1978;53:70-75.
  57. Rieder HL. Epidemiology of tuberculosis in Europe. *Eur Respir J* 1995;8 Suppl.20:620s-632s.
  58. Styblo K. The relationship between the risk of infection and the risk of developing infectious tuberculosis. *Bull Int Union Tuberc* 1985;60(3-4):117-119.
  59. Grzybowski S. Natural history of tuberculosis. *Bull Int Union Tuberc Lung Dis* 1991;66:193-194.

60. Styblo K. Tuberculosis and its control: lessons to be learned from past experience, and implications for leprosy control programmes. The Kellersberger Memorial Lecture 1982. *Ethiop Med J* 1983;21:101-122.
61. Grzybowski S, Styblo K, Dorken E. Tuberculosis in Eskimos. *Tubercle* 1976; 57(4) Suppl;S1-S58.
62. Nunn PP, Elliot AM, McAdam KPWJ. Impact of human immunodeficiency virus on tuberculosis in developing countries. *Thorax* 1994;49:511-518.
63. World Health Organisation. The HIV/AIDS and Tuberculosis Epidemics: Implications for control. WHO, Geneva, 1994. WHO/TB/CARG(4)/94.4
64. Rouillon A, Perdrizat S, Parrot R. Transmission of Tubercle Bacilli: the effects of chemotherapy. *Tubercle* 1976;57:275-299.
65. Toman K. Sensitivity, specificity and predictive value of diagnostic tests. *Bull Int Union Tuberc* 1981;56(1):18-27.
66. Pust RE. The risk factor approach to sputum diagnosis. *World Health Forum* 1982;3(1):78-80
67. Rouillon A. The Mutual Assistance Programme of the IUATLD. Development, contribution and significance. *Bull Int Tuberc Lung Dis* 1991;66:159-172
68. Enarson DA. The International Union Against Tuberculosis and Lung Disease model National Tuberculosis Programmes. *Tuber Lung Dis* 1995;76:95-99
69. Grzybowski S. The value of different diagnostic and preventive programmes. *S Afr Med J* 1982; 17 Nov Special issue;6-8.
70. Toman K. How reliable is smear microscopy? In: Tuberculosis case finding and chemotherapy. Geneva: WHO, 1979:15.
71. Gebre N, Karlsson U, Jonsson G, Macaden R, Wolde A, Assefa A et al. Improved microscopical diagnosis of pulmonary tuberculosis in developing countries. *Trans R Soc Trop Med Hyg* 1995;89:191-193.
72. Schluger NW, Rom WN. Current Approaches to the Diagnosis of Active Pulmonary Tuberculosis. *Am J Crit Care Med* 1994;149:264-267
73. Elliott AM, Luo N, Tembo G, Halwiindi B, Steenbergen G, Machiels L, et al. Impact of HIV in tuberculosis in Zambia: a cross sectional study. *Br Med J* 1990;301:412-415.
74. Barnes PF, Bloch AB, Davidson PT, Snider DE, Jr. Tuberculosis in patients with human immunodeficiency virus infection. *N Eng J Med* 1991;324:1644-1650.

75. Toman K. What are the advantages and disadvantages of fluorescent microscopy? In: Tuberculosis case finding and chemotherapy. Geneva:WHO,1979:25.
76. Toman K. What is the additional case yield from repeated sputum examinations by microscopy and culture? In: Tuberculosis case finding and chemotherapy. Geneva: WHO,1979:40-42.
77. Urbanczik R. Present position of Microscopy and of Culture in Diagnostic Mycobacteriology. Zbl Bakt Hyg 1985;A260:81-87.
78. Harries AD, Kamenya A, Namarika D, Msolomba IW, Salaniponi FM, Nyangulu DS, Nunn P. Delays in diagnosis and treatment of smear positive tuberculosis and the incidence of tuberculosis in hospital nurses in Blantyre, Malawi. Trans R Soc Trop Med Hyg;1997;91:15-17.
79. Mitchison DA. Organisation of Tuberculosis Laboratory Services in Developing Countries. Bull Int Union Tuberc 1982;57(42):140-145.
80. Aluocho JA, Edwards EA, Stott H, Fox W, Sutherland I. A fourth study of case finding methods for pulmonary tuberculosis in Kenya. Trans R Soc Trop Med Hyg 1982;76:679-691.
81. Toman K. What is the probability of obtaining a negative culture from a sputum specimen found positive by smear microscopy? Tuberculosis case finding and chemotherapy. Geneva: WHO,1979:38-39.
82. Gordin FM, Slutkin G, Schechter G, Goodman PC, Hopewell PC. Presumptive diagnosis and treatment of pulmonary tuberculosis based on radiographic findings. Am Rev Respir Dis 1989;139:1090-1093.
83. Toman K. What is the clinical and epidemiological significance of consistent negativity by smear microscopy in patients positive by culture only? In: Tuberculosis case finding and chemotherapy. Geneva: WHO,1979:50-55.
84. Shaw JB, Wynn-Williams N. Infectivity of pulmonary tuberculosis in relation to sputum status. Am Rev Tuberc 1954;69:724-732.
85. Fox W. Short-course chemotherapy for pulmonary tuberculosis and some problems of its programme application with particular reference to India. Lung India 1984;II(2):161-174.
86. Tuberculosis research and development. Report of a WHO meeting Geneva October 1990. Tuberculosis Unit, Division of Communicable Diseases, WHO;1990.
87. Woodring JH, Vandiviere HM, Fried AM, Dillon ML, Williams TD, Melvin IG. Update: the radiographic features of Pulmonary tuberculosis. Am J Roentgenol 1986;146:497-506.

88. Toman K. How reliable is chest radiography? In: Tuberculosis case finding and chemotherapy. Geneva: WHO, 1979:28-37.
89. Toman K. Mass radiography in tuberculosis control. WHO Chron 1976; 30: 51-57.
90. WHO Technical Report Series, No. 552. Geneva 1974:15-16.
91. De Cock KM Impact of Interaction with HIV. In: Porter JDH, McAdam KPWJ, editors. Tuberculosis Back to the future. Chichester: John Wiley and sons Ltd, 1994:41.
92. Chaulet P. Diagnosis of tuberculosis in children. Children in the tropics: Childhood tuberculosis is still with us. Paris: International Children's Centre, 1992.
93. Godfrey-Fausset P. Of molecules and men: the detection of tuberculosis, past, present and future. In: Porter JDH, McAdam KPWJ, editors. Tuberculosis Back to the future. Chichester: John Wiley and sons Ltd, 1994:79-95.
94. Long R, Scalcini M, Manfreda J, Jean-Baptiste M, Hershfield E. The Impact on the Usefulness of Sputum Smears for the Diagnosis of Tuberculosis. Am J Public Health 1991;81:1326-1328.
95. Elliott AM, Namaambo K, Allen BW, Luo N, Hayes RJ, Pobee JOM, McAdam KPWJ. Negative sputum smear results in HIV-positive patients with pulmonary tuberculosis in Lusaka, Zambia. Tuber Lung Dis 1993;74:191-194.
96. Long R, Scalcini M, Manfreda J, Jean-Baptiste M, Hershfield E. The Impact of HIV on the Usefulness of Sputum Smears for the Diagnosis of Tuberculosis. Am J Public Health 1991;81:1326-1328.
97. Aluoeh JA, Oyoo D, Swai OB et al. A study of the use of maternity and child welfare clinics in case finding for pulmonary tuberculosis in Kenya. Tubercle 1987;68:93-103.
98. Banerji D, Anderson S. A Sociological Study of Awareness of Symptoms among persons with Pulmonary Tuberculosis. Bull World Health Organ 1963;29:665-683.
99. Elink Schuurman MW, Srisaenpang S, Pinitsoontorn S, Bijleveld I, Vaeteewoothacharn K, Methapat C. The rapid village survey in tuberculosis control. Tuber Lung Dis 1996;77:549-554.
100. Rieder HL. Case finding. In: Reichman LB, Hershfield ES, editors. Tuberculosis - a comprehensive international approach. New York: Marcel Dekker, Inc, 1993:167-182.
101. Pamra SP. Problems of tuberculosis in developing countries. Clin Chest Med 1980;1(2):265-271.

102. McAdam KPWJ. Back to the future: 'the ten commitments.' In Porter JDH, McAdam KPWJ eds: Tuberculosis: back to the future. Chichester: John Wiley, 1994;267-276.
103. Fine PEM. The BCG story, lessons from the past and implications for the future. *Rev Infect Dis* 1989;Suppl2:353-359.
104. Ferebee SH. Controlled chemoprophylaxis trials in tuberculosis. *Adv Tuberc Res* 1970;17:28-106.
105. Comstock GW, Woolpert SF. Preventive therapy. In: Kabuki GP, Wayne LG, editors. *The Mycobacteria. A source-book*. New York and Basel, Marcel Dekker, 1984:1071-1082.
106. IUATLD. Tuberculosis in children - guidelines for diagnosis, prevention and treatment. *Bull Int Union Tuberc Lung Dis* 1991;66:61-67.
107. American Thoracic Society/Centers for Disease Control. Treatment of tuberculosis and tuberculosis infection in adults and children. *Am Rev Respir Dis* 1986;134:355-363.
108. Centers for Disease Control. The use of preventive therapy for tuberculosis infection in the United States. Recommendations of the Advisory Committee for the Elimination of Tuberculosis. *Morb Mortal Wkly Rep* 1990;39(RR-6):9-12.
109. Comstock G. Prevention of tuberculosis. *Bull Int Union Tuberc Lung Dis* 1990/1991;66(Suppl):9-11.
110. Styblo K. Preventive therapy for tuberculosis control in developing countries. *Bull Int Union Tuberc Lung Dis* 1990/1991;66(Suppl):27-28.
111. Mwinga AG. Preventive therapy for tuberculosis. Discussion. In: Porter JDP, McAdam KPWJ, editors. *Tuberculosis: Back to the future*. Chichester: John Wiley and Sons Ltd, 1994:166-169.
112. Pape JW, Jean SS, Ho JL, Hafner A, Johnson WD. Effect of isoniazid on incidence of active tuberculosis and progression of HIV infection. *Lancet* 1993;342:268-272.
113. Hawken MP, Meme HK, Elliott LC, Chakaya JM, Morris JS, Githui WA et al. Isoniazid preventive therapy for tuberculosis in HIV-1-infected adults: results of a randomised controlled trial. *AIDS* 1997;11:875-882.
114. Centers for Disease Control. Purified protein derivative (PPD) - tuberculin anergy and HIV-infection: guidelines for anergy testing and management of anergic persons at risk of tuberculosis. *Morb Mortal Wkly Rep* 1991;40(supplRR-5):27-33.

115. Editorial. Africa's tuberculosis burden and chemoprophylaxis. *Lancet* 1991;335:1249-1250.
116. Grzybowski S. Preventive treatment for tuberculosis control in developing countries. *Bull Int Union Tuberc Lung Dis* 1990/1991;66 Suppl:25.
117. TB Programme. DOTS stops TB at the source: WHO report on the tuberculosis epidemic. 1995 (WHO/TB/95.183).
118. Harries AD, Maher D. TB/HIV: A Clinical Manual. World Health Organisation Global Tuberculosis Programme, 1996.
119. Porter JDH, McAdam KPWJ. Aspects of AIDS in Africa: 1.Tuberculosis in Africa in the AIDS era - the role of chemoprophylaxis. *Trans R Soc Trop Med Hyg* 1992;86:467-469.
120. Joint statement by the International Union against Tuberculosis and Lung Disease and the Global Programme on AIDS and the Tuberculosis Programme of the World Health Organisation. Tuberculosis preventive therapy in HIV-infected individuals. *Tuber Lung Dis* 1994;75:96-98.
121. Monaco A. Antituberculous chemoprophylaxis in silicotics. *Bull Int Union Tuberc* 1964;35:51-54.
122. Hong Kong Chest Service/Tuberculosis Research Centre, Madras/British Medical Research Council. A Double-Blind Placebo-controlled Clinical Trial of Three Antituberculosis Chemoprophylaxis Regimes in Patients with Silicosis in Hong Kong. *Am Rev Respir Dis* 1992;145:36-41.
123. Cowie RL. Short course chemoprophylaxis with rifampicin, isoniazid and pyrazinamide for tuberculosis evaluated in gold miners with chronic silicosis: a double-blind placebo controlled trial. *Tuber Lung Dis* 1996;77:239-243.
124. Mitchison DA. Chemotherapy of tuberculosis: a bacteriologist's viewpoint. *Br Med J* 1965;1:1331-1338.
125. Medical Research Council Investigation. Streptomycin treatment of pulmonary tuberculosis. *Br Med J* 1948;2:769-782.
126. Fox W. The modern management and therapy of pulmonary tuberculosis. *Proceedings of the Royal Society of Medicine* 1977;70:4-15.
127. Crofton J. Drug treatment of tuberculosis.1 Standard chemotherapy. *Br Med J*. 1960;2:370-373.

128. Tuberculosis Chemotherapy Centre, Madras: A concurrent comparison of intermittent (twice weekly) isoniazid plus streptomycin and daily isoniazid plus PAS in the domiciliary treatment of pulmonary tuberculosis. *Bull World Health Organ* 1964;31:247-54.
129. Tuberculosis Chemotherapy Centre, Madras. A Controlled Comparison of a Twice-weekly and Three Once-Weekly Regimens in the Initial Treatment of Pulmonary Tuberculosis. *Bull World Health Organ* 1970;43:143-206.
130. British Medical Research Council. Co-operative controlled trial of a standard regimen of streptomycin, PAS, and isoniazid and three alternative regimens of chemotherapy in Britain. *Tubercle* 1973;54:99-129.
131. Fox W. Whither short-course chemotherapy? *Br J Dis Chest*. 1981;75:331-357.
132. Styblo K, Chum HJ. Treatment results of smear positive tuberculosis in the Tanzania National Tuberculosis and Leprosy Programme: standard and short-course chemotherapy. Proceedings of the XXVIth World Conference on Tuberculosis and Respiratory Disease. Singapore 4-7 November 1986. Tokyo, Professional Postgraduate Services, 1987:122-126.
133. Grosset J. Bacteriologic basis of short-course chemotherapy for tuberculosis. *Clin Chest Med* 1980;1:231-241.
134. Mitchison DA. The action of anti-tuberculosis drugs in short-course chemotherapy. *Tubercle* 1985;66:219-225.
135. Hopewell PC. 'The cure':organisation and administration of therapy for tuberculosis. In: Porter JDH, McAdam KPWJ, editors. *Tuberculosis: Back to the future*. Chichester: John Wiley and Sons Ltd, 1994:99-121.
136. WHO. Treatment of tuberculosis: Guidelines for National Programmes. WHO, Geneva 1997.WHO/TB/97.220
137. Enarson DA, Rieder HL, Arnadottir T, Trebucq A. Tuberculosis Guide for low income countries. International Union Against Tuberculosis and Lung Disease. 4th ed. Frankfurt, Germany:pmi Verslagsgruppe GmbH. 1996.
138. Doyle JA, Lambertini A, Dolmann A. Intermittent chemotherapy with three drugs in the treatment of pulmonary tuberculosis. *Tubercle* 1970;51:397-402.
139. Hong Kong Chest Service/British Medical Research Council. Controlled Trial of 2, 4, and 6 Months of Pyrazinamide in 6-Month, Three-Times-Weekly Regimens for Smear-positive Pulmonary Tuberculosis, Including an Assessment of a Combined Preparation of Isoniazid, Rifampicin, and Pyrazinamide. *Am Rev Respir Dis* 1991;143:700-706.

140. Cohn DL, Catlin BJ, Peterson KL, Judson FN, Sbarbaro JA. A 62-Dose, 6-Month Therapy for Pulmonary and Extrapulmonary Tuberculosis. *Ann Intern Med* 1990;112:407-415.
141. Dutt AK, Moers D, Stead WW. Short-Course Chemotherapy for Tuberculosis with Mainly Twice-Weekly Isoniazid and Rifampicin: Community Physicians' Seven-Year Experience with Mainly Outpatients. *Am J Med* 1984;77:233-242.
142. Hong Kong Chest Service/British Medical Research Council. Acceptability, compliance, and adverse reactions when isoniazid, rifampicin, and pyrazinamide are given as a combined formulation or separately during three-times-weekly anti-tuberculosis chemotherapy. *Am Rev Respir Dis* 1989;140:1618-1622.
143. Macnab MF, Bohmer PD, Seager JR. Evaluation of the 3-drug combination, Rifater, versus 4-drug therapy in the ambulatory treatment of tuberculosis in Cape Town. *S Afr Med J* 1994;84:325-328.
144. Cowie RL, Brink BA. Short course chemotherapy for pulmonary tuberculosis with a rifampicin-isoniazid-pyrazinamide combination tablet. *S Afr Med J* 1990;77:390-391.
145. Singapore Tuberculosis Service/British Medical Research Council. Assessment of a daily Combined Preparation of Isoniazid, Rifampicin and Pyrazinamide in a Controlled Trial of Three 6-month Regimens for Smear Positive Pulmonary Tuberculosis. *Am Rev Respir Dis* 1991;143:707-712.
146. Fox W. Drug combinations and the bioavailability of rifampicin. *Tubercle* 1990;71:241-245.
147. Joint statement of the IUATLD and the Tuberculosis Programme of the WHO. The promise and reality of fixed combinations with rifampicin. *Tuber Lung Dis* 1994; 75: 180-181.
148. Rieder HL. Sputum smear conversion during directly observed treatment for tuberculosis. *Tuber Lung Dis* 1996;77:124-129.
149. Mitchison DA. Assessment of new sterilizing drugs for treating pulmonary tuberculosis by culture at 2 months [correspondence]. *Am Rev Respir Dis* 1993;147:1062-1063.
150. Rieder HL, Enarson DA. Rebuttal: time to call a halt to emotions in the assessment of thioacetazone. *Tuber Lung Dis* 1996;77:109-111.
151. Murray C, Styblo K, Rouillon A. Tuberculosis. In: Jamison DT, Mosley WH, Measham AR, Bobadilla JL, editors. *Disease Control Priorities in Developing Countries*. New York: Oxford University Press, 1993:233-259.

152. Nunn PP, Brindle R, Carpenter L, Odhiambo J, Wasunna K, Newnham R et al. Cohort study of HIV infection in tuberculosis patients, Nairobi, Kenya. Analysis of early (6-months) mortality. *Am Rev Respir Dis* 1992;146:849-854.
153. Perriens JH, Colebunders RL, Karahunga C, Willame J-C, Jengmans J, Kagoto M, et al. Increased Mortality and Tuberculosis Treatment Failure rate among Human Immunodeficiency Virus (HIV) Seropositive Compared with HIV Seronegative Patients with Pulmonary Tuberculosis Treated with "Standard" Chemotherapy in Kinshasa, Zaire. *Am Rev Respir Dis* 1991;144:750-755.
154. Wilkinson D, Moore DAJ. HIV-related tuberculosis in South Africa- clinical features and outcome. *S Afr Med J* 1996;86:64-67.
155. Hawken M, Nunn P, Gathua S, Brindle R, Godfrey-Faussett P, Githui W et al. Increased recurrence of tuberculosis in HIV-1 infected patients in Kenya. *Lancet* 1993;342:332-337.
156. Sepkowitz KA, Raffalli J, Riley L, Kiehn TE, Armstrong D. Tuberculosis in the AIDS era. *Clin Microbiol Rev* 1995;8:180-199.
157. Centers for Disease Control. Diagnosis and management of mycobacterial infection and disease in persons with human immunodeficiency virus infection. Centers for Disease Control, US Department of Health and Human Services. *Ann Intern Med* 1987;106:254-256.
158. Holt E, Cantave M, Johnson M, Clermont HC, Atkinson J, Chaisson RE. Efficacy of supervised, intermittent, short course therapy of tuberculosis in Haiti, Abst WS-B09-4:52 In: Program and abstracts of the 9th International Conference on AIDS 1993.
159. Small PM, Schechter GF, Goodman PC, Sande MA, Chaisson RE, Hopewell PC. Treatment of tuberculosis in patients with advanced immunodeficiency virus infection. *N Engl J Med* 1991;324:289-294.
160. Elliott AM. An approach to the management of tuberculosis in HIV endemic areas. *Trop Doct* 1992;22:147-150.
161. Elliott AM, Foster SD. Thiactezone: time to call a halt? *Tuber Lung Dis* 1996;77:27-29.
162. Ipuge YAI, Rieder HL, Enarson DA. Adverse cutaneous reactions to thiacetazone for tuberculosis treatment in Tanzania. *Lancet* 1995;346:657-660.
163. Nunn P, Porter J, Winstanley P. Thiacetazone - avoid like poison or use with care? *Trans R Soc Tropical Med Hyg* 1993;87:578-582.
164. Escreet BC, Langton ME, Cowie RL. Short-course chemotherapy for siliotuberculosis. *S Afr Med J* 1984;66:327-330.

165. Cowie RL, Langton ME, Becklake MR. Pulmonary Tuberculosis in South African Gold Miners. *Am Rev Resp Dis* 1989;139:1086-1089.
166. Lin TP, Suo J, Lee CN, Lee JJ, Yang SP. Short-course Chemotherapy of Pulmonary Tuberculosis in Pneumoconiotic patients. *Am Rev Respir Dis* 1987;136:808-810.
167. Cowie RL. Silicotuberculosis: long-term outcome after short-course chemotherapy. *Tuber Lung Dis* 1995;76:39-42.
168. Grange JM. Drug resistance and tuberculosis elimination. *Bull Int Union Tuberc Lung Dis* 1990;65(2-3):57-59.
169. Rieder HL. Drug-resistant tuberculosis: issues in epidemiology and challenges for public health. (Editorial) *Tuber Lung Dis* 1994;75:321-323.
170. Crofton J. Multidrug resistance: danger for the Third World. In Porter JDH, McAdam KPWJ. Editors: *Tuberculosis: Back to the future*. Chichester: John Wiley and Sons Ltd, 1994:231-233.
171. Nunn P, Felten M. Surveillance of resistance to anti-tuberculosis drugs in developing countries. *Tuber Lung Dis* 1994;75:163-167.
172. Cohn D, Bustreo F, Raviglione M. Drug resistance in tuberculosis: review of the worldwide situation and WHO surveillance. *Clin Infect Dis* 1996 (in press), quoted in: Crofton J, Chaulet P, Maher D. *Guidelines on the management of drug resistant tuberculosis*. World Health Organisation, Geneva. 1996 WHO/TB/96.210.
173. Bustreo F, Migliori GB, Nardini S, Raviglione MC. Antituberculosis drug resistance: is it worth measuring?. The WHO/IUATLD working group on antituberculosis drug resistance surveillance. *Monaldi Arch Chest Dis* 1996;51(4):299-302.
174. Centers for Disease Control. Nosocomial transmission of multidrug resistance among HIV infected persons; Florida and New York, 1988-1991. *JAMA* 1991;266:1483-1485.
175. Beck-Sague C, Dooley SW, Hutton MD, Otten J, Breedon A, Crawford JT, et al. Hospital outbreak of multidrug resistant *Mycobacterium tuberculosis* infections: factors in transmission to staff and HIV-infected patients. *JAMA* 1992;268:1280-1286.
176. Edlin BT, Tokars JJ, Grieco MH, Crawford JT, Williams J, Sordillo EM et al. An outbreak of multidrug resistant tuberculosis among hospitalised patients with the acquired immunodeficiency syndrome. *N Engl J Med* 1992;326:1514-1521.

177. Pearson ML, Jereb JA, Frieden TR, Crawford JT, Davis BJ, Dooley SW, et al. Nosocomial transmission of multidrug-resistant *Mycobacterium tuberculosis*: a risk to patients and health workers. *Ann Intern Med* 1992;117:191-196.
178. Nolan CM. Multidrug-resistant tuberculosis in the USA: the end of the beginning. *Tubercle* 1996;77:293-294.
179. Frieden TR, Fujiwara PI, Washko RM, Hamburg MA. Tuberculosis in New York City - Turning the tide. *N Engl J Med* 1995;333:229-233.
180. Neville K, Bromberg A, Bromberg R, Bonk S, Hanna BA, Rom WN. The Third Epidemic - Multidrug Resistant Tuberculosis. *Chest* 1994;105:45-48.
181. Enarson DA. Will HIV hasten appearance of resistance? Proceedings of the conference on Global Lung Health and the 1996 Annual Meeting of the International Union Against Tuberculosis and Lung Disease; 1996 Oct2-5; Paris. *Tubercle* 1996;77(suppl2):14.
182. Crofton J. The prevention and management of drug-resistant tuberculosis. *Bull Int Union Tuberc Lung Dis* 1987;62:6-11.
183. Chaulet P. Drug resistant tuberculosis: can it be cured? Proceedings of the conference on Global Lung Health and the 1996 Annual Meeting of the International Union Against Tuberculosis and Lung Disease; 1996 Oct2-5; Paris. *Tubercle* 1996;77(suppl2):9.
184. Crofton J, Chaulet P, Maher D. Guidelines on the management of drug resistant tuberculosis. World Health Organisation, Geneva. 1996 WHO/TB/96.210.
185. Kochi A. The global tuberculosis situation and the new control strategy of the World Health Organisation. *Tubercle* 1991;72:1-6.
186. WHO Tuberculosis Programme: Framework for effective tuberculosis control. WHO, Geneva, 1994. WHO/TB/94.179.
187. Fox W. The problem of self-administration of drugs: with particular reference to pulmonary tuberculosis. *Tubercle* 1958;39:269-74.
188. Fox W. Self-administration of medicaments: a review of published work and a study of the problem. *Bull Int Union Tuberc* 1962;32:307-331.
189. Sbarbaro JA. Compliance: Inducements and Enforcements. *Chest* 1979 Suppl;76:750-756.
190. Bayer R, Wilkinson D. Directly observed therapy for tuberculosis: history of an idea. *Lancet* 1995;345:1545-1548.

191. McDonald RJ, Memon AM, Reichman LB. Successful Supervised Ambulatory Management of Tuberculosis Treatment failures. *Ann Intern Med* 1982;96:297-302.
192. Weis SE, Slocum PC, Blais FX, King B, Nunn M, Matney GB, et al. The effect of directly observed therapy on the rates of drug resistance and relapses in tuberculosis. *N Engl J Med* 1994;330:1179-1184.
193. Idukitta GO, Bosman MCJ. The Tuberculosis Manyatta Project for Kenyan nomads. *Bull Int Union Tuberc Lung Dis* 1989;64:44-47.
194. Neher A, Breyer G, Shrestha B, Feldmann K. Directly observed intermittent short-course chemotherapy in the Kathmandu valley. *Tuber Lung Dis* 1996;77:302-307.
195. Chowdhury AMR, Chowdhury S, Islam MN, Islam A, Vaughan P. Control of tuberculosis by community health workers in Bangladesh. *Lancet* 1997;350:169-172.
196. Dick J, Schoeman JH, Mohammed A, Lombard C. Tuberculosis in the community: 1. Evaluation of a volunteer health worker programme to enhance adherence to anti-tuberculosis treatment. *Tuber Lung Dis* 1996;77:274-279.
197. Iseman MD, Cohn DL, Sbarbaro JA. Directly Observed Treatment of Tuberculosis: We Can't Afford Not to Try it. *N Engl J Med* 1993;328:576-578.
198. Floyd K, Wilkinson D, Gilks CF. Community-based, Directly Observed Therapy for tuberculosis: An economic analysis. Tygerberg, South Africa: Medical Research Council, 1997.
199. Nardell EA. Beyond Four Drugs: Public Health Policy and the Treatment of the Individual Patient with Tuberculosis [editorial]. *Am Rev Respir Dis* 1993;148:2-5.
200. Wilkinson D. Compliance with tuberculosis treatment in a rural district. [correspondence] *Tuber Lung Dis* 1995;76:180.
201. Wilkinson D, Davies GR. Coping with Africa's increasing tuberculosis burden: are community supervisors an essential component of the DOT strategy? *Trop Med Int Health* 1997;2(7):700-704.
202. DiFerdinando GT, Klein SJ, Novick LF. [correspondence]. *N Engl J Med* 1993;329:135-136.
203. Annas GJ. Control of Tuberculosis - the law and public's health. *N Engl J Med* 1993;328:585-588.
204. Maher D, Hausler HP, Raviglione MC, Kaleeba N, Aisu T, Fourie B, Nunn P. Tuberculosis care in community care organisations in Sub-Saharan Africa: practice and potential. *Int J Tuberc Lung Dis* 1997;1(3):276-283.

205. Iseman MD. Directly-observed therapy, patient education and combined drug formulations: complementary, not alternative, strategies in tuberculosis control [editorial]. *Tuber Lung Dis* 1996;77:101.
206. World Health Organisation. Breakthrough in TB control announced by the WHO. Press Release WHO/23, 19th March 1997.
207. Volmink J, Garner P. DOTS - are we over-optimistic? [correspondence]. *S Afr Med J* 1997;87:905-6.
208. Advisory Council for the Elimination of Tuberculosis. Initial therapy for tuberculosis in the era of multidrug resistance; recommendations of the Advisory Council for the Elimination of Tuberculosis. *Morb Mortal Wkly Rep* 1993;42:rr/7.
209. Nagpaul DR, Vishwanath MK, Dwarakanath G. A Socio-epidemiological Study of Out-patients Attending a City Tuberculosis Clinic in India to Judge the Place of Specialised Centres in a Tuberculosis Control Programme. *Bull World Health Organ* 1970;43:17-34.
210. Paramasivam R, Rajasekaran R, Selvaraj D. Evolution of admission policy in a tuberculosis hospital - a suggested model. *Lung India* 1992;X(3):110-114.
211. Chaulet P. Compliance with chemotherapy for tuberculosis. Responsibilities of the Health Ministry and of physicians. *Bull Int Union Tuberc Lung Dis* 1990/1991;66(Suppl):33-35.
212. Fox W. Compliance of patients and physicians: experience and lessons from tuberculosis-II. *Br Med J* 1983;287:101-105
213. Hong YP, Kwon DW, Kim SJ, Chang SC, Kang MK, Lee EP et al Survey of knowledge, attitudes and practices for tuberculosis among general practitioners. *Tuber Lung Dis* 1995;76:431-435
214. Marsh D, Hashim R, Hassany F, Hussain N, Iqbal Z, Irfanullah A et al Front-line management of pulmonary tuberculosis: an analysis of tuberculosis and treatment practices in urban Sindh, Pakistan *Tuber Lung Dis* 1996;77:86-92.
215. Allan WGL, Girling DJ, Fayers PM, Fox W. The symptoms of newly diagnosed pulmonary tuberculosis and patients' attitudes to the disease and to its treatment in Hong Kong. *Tubercle* 1979;60:211-223.
216. Rothe TB, Karrer W. Short-course therapy of pulmonary tuberculosis: doctors' compliance. *Tuber Lung Dis* 1996;77:93-97.
217. Menzies D, Adhikari N, Tannenbaum T. Patient characteristics associated with failure of tuberculosis prevention. *Tuber Lung Dis* 1996;77:308-314.

218. Ormerod LP, Prescott RJ. Inter-relations between relapses, drug regimens and compliance with treatment in tuberculosis. *Respir Med* 1991;85:239-242.
219. Sbarbaro JA. A challenge - to our practices and to our principles. [editorial] *Tuber Lung Dis* 1996;77:2-3.
220. Raviglione MC, Dye C, Schmidt S, Kochi A. Assessment of worldwide tuberculosis control. *Lancet* 1997;350:624-629.
221. Graf P. Tuberculosis control in high-prevalence countries. In: Davies PDO, editor. *Clinical Tuberculosis*. London: Chapman & Hall, 1994:325-339.
222. Chum HJ. The Tanzania National Tuberculosis/Leprosy Programme in the face of HIV infection. *Bull Int Union Tuberc Lung Dis* 1990/1991;66 Suppl:53-55
223. China Tuberculosis Control Collaboration. Results of directly observed short-course chemotherapy in 112 842 Chinese patients with smear-positive tuberculosis. *Lancet* 1996;347:358-362.
224. Salomao MA, Parkkali. Case-finding and treatment results of pulmonary tuberculosis in Mozambique, 1985-1988. *Bull Int Union Tuberc Lung Dis* 1990/1991;66 Suppl:47-49.
225. Chan SL, Wong PC, Tam CM. 4-, 5- and 6-month regimens containing isoniazid, rifampicin, pyrazinamide and streptomycin for treatment of pulmonary tuberculosis under programme conditions in Hong Kong. *Tuber Lung Dis* 1994;75:245-250.
226. Nyangulu DS, Nkhoma WN, Salaniponi. Factors contributing to a successful Tuberculosis Control Programme in Malawi. *Bull Int Union Tuberc Lung Dis* 1990/1991;66 Suppl:45-46.
227. World Health Organisation Report, Weil DC. Tuberculosis Control Programmes in Brazil. Tuberculosis Unit WHO, 1990
228. Kumaresan JA, Maganu ET. Case holding in patients with tuberculosis in Botswana. *Br Med J*;305:340-341.
229. Sukrakanchana-Trikham P, Puechal X, Rigal J, Rieder HL. 10-year assessment of treatment outcome among Cambodian refugees with smear-positive tuberculosis in Khao-I-Dang, Thailand. *Tuber Lung Dis* 1992;73:384-387.
230. Gninafon M. The Anti-tuberculosis Programme of Benin. *Bull Int Union Tuberc Lung Dis* 1990/1991;66 Suppl:57-58.
231. Arguello L. Results of the tuberculosis programme in Nicaragua in 1984-89. *Bull Int Union Tuberc Lung Dis* 1990/1991;66 Suppl:51-52.

232. Caselle MT, Galvagno S. Tuberculosis in a Rural Hospital in Northern Kenya. *E Afr Med J* 1992;69:464-467.
233. Mushtaque A, Chowdhury R. Controlling a forgotten disease: the case of tuberculosis in a primary health care setting in rural Bangladesh. *Proceeding of the Workshop on case studies for evaluation of Tuberculosis Control programmes in various primary care settings; 1990 May 25-28; Sturbridge, Massachusetts, USA: WHO, 1990.*
234. Datta M, Radhamani MP, Selvaraj R, Paramasivan CN, Gopalan BN, Sudeendra CR, et al. Critical assessment of smear-positive pulmonary tuberculosis patients after chemotherapy under the district tuberculosis programme. *Tuber Lung Dis* 1993;74:180-186.
235. Hopewell PC, Sanchez-Hernandez M, Baron R, Ganter B. Operational Evaluation of Treatment for Tuberculosis: results of a "standard" 12-month Regimen in Peru. *Am Rev Respir Dis* 1984;129:439-443.
236. Manalo F, Tan F, Sbararo JA, Iseman MD. Community-based Short-course Treatment of Pulmonary Tuberculosis in a developing Nation. *Am Rev Respir Dis* 1990;142:1301-1305.
237. Williame JC, Nsinga M, Mulumba K. Fate of smear-positive pulmonary tuberculosis patients after 12 months on an entirely ambulatory primary treatment in Kinshasa (Zaire). *Bull Int Union Tuberc Lung Dis* 1986;61:43-45.
238. Grzybowski S. Drugs are not enough [editorial]. *Tuber Lung Dis* 1993;74:145-146.
239. Gangadharam PRJ. Chemotherapy of tuberculosis under programme conditions. *Tuber Lung Dis* 1994;75:241-244.
240. Chakraborty AK.[correspondence]. *Tuber Lung Dis* 1994;75:316-320.
241. De Cock KM, Wilkinson D. Tuberculosis control in resource-poor countries: alternative approached in the era of HIV. *Lancet* 1995;346:675-677.
242. Wilkinson D, Bechan S, Connolly C, Standing E, Short G. Should we take a history of prior treatment, and check sputum status at 2-3 months when treatment patients for tuberculosis? *Int J Tuberc Lung Dis* 1998;2:52-55.
243. Trebucq A, Rieder HL. Two excellent management tools for national tuberculosis programme:history of prior treatment and sputum status at two months. *Int J Tuberc Lung Dis* 1998;2(3):184-186.
244. Helberg H Tuberculosis programme: fragmentation or integration? [Editorial] *Tuber Lung Dis* 1995;76:1-3

245. Fox W. Compliance of patients and physicians: experience and lessons from tuberculosis-I. *Br Med J* 1983; 287:33-35
246. Rouillon A. Problems in organising effective ambulatory treatment of tuberculosis patients. *Bull Int Union Tuberc Lung Disease* 1972;47:68-83
247. Rubel AJ, Garro LC. Social and Cultural Factors in the Successful Control of Tuberculosis. *Public Health Rep* 1992;107(6):626-636.
248. Grange JM, Festenstein F. The Human dimension of tuberculosis control. *Tuber Lung Dis* 1993;74:219-222.
249. Sumartojo E. When Tuberculosis Treatment Fails: a Social Behavioral Account of Patient Adherence. *Am Rev Respir Dis* 1993;147:1311-1320.
250. Haynes RB. Introduction. In: Haynes RB, Taylor DW, Sackett DL, editors. *Compliance in Health Care*. Baltimore: Johns Hopkins University Press, 1979;1-7.
251. Menzies R, Rocher I, Vissandjee B. Factors associated with compliance in treatment of tuberculosis. *Tuber Lung Dis* 1993;74:32-37
252. Wardman AG, Knox AJ, Muers MF, Page RL. Profiles of Non-Compliance with Antituberculosis Therapy. *Br J Dis Chest* 1988;82:285-289.
253. Pozsik CJ. Compliance with tuberculosis therapy. *Med clin North Am* 1993;77(6):1289-1301.
254. Becker MH, Maiman LA. Sociobehavioral Determinants of Compliance with Health and Medical Care Recommendations. *Med Care* 1975;13(1):10-24.
255. Williams B. Patient Satisfaction: a valid concept. *Soc Sci Med* 1994;38(4):509-516.
256. Jenkins CD. Group Differences in Perception: A Study of Community Beliefs and Feelings about Tuberculosis. *Am J Sociol* 1966;71:417-429.
257. Johansson E, Diwan VK, Huong ND, Ahlberg BM. Staff and patient attitudes to tuberculosis and compliance with treatment: an exploratory study in a district in Vietnam. *Tuber Lung Dis* 1996;77:178-183.
258. Dick J, Van der Walt H, Hoogendoorn L, Tobias B. Development of a health education booklet to enhance adherence to tuberculosis treatment. *Tuber Lung Dis* 1996;77:173-177
259. Cassell J. A comprehensive health program among South African Zulus. In: *Health, culture, and community*. editor Paul B. Russel Sage Foundation, New York, 1995:15-41

260. Metcalf CA, Bradshaw D, Stindt WW. Knowledge and beliefs about tuberculosis among non-working women in Ravensmead, Cape Town. *S Afr Med J* 1990;77:408-411.
261. Liefoghe R, Michiels N, Habib S, Moran MB, De Muynck A. Perception and Social Consequence of Tuberculosis: A focus group study of tuberculosis patients in Sialkot, Pakistan. *Soc Sci Med* 1995;41:1685-1692.
262. Cornwall J. Tuberculosis: a clinical problem of international importance. *Lancet* 1997;349:660-661.
263. Westaway MS. Knowledge and attitudes about tuberculosis of black hospitalised TB patients. *Tubercle* 1990;71:55-59.
264. Nichter M. Illness Semantics and International Health: the weak lungs/TB complex in the Phillipines. *Soc Sci Med* 1994;38(5):649-663.
265. Emmel ND, O'Keefe P. Participatory analysis for redefining health delivery in a Bombay slum. *J Public Health Med* 1996;18(3):301-307
266. Carey JW, Oxtoby MJ, Nguyen LP, Huynh V, Morgan M, Jeffery M. Tuberculosis Beliefs Among Recent Vietnamese Refugees in New York State. *Public Health Rep* 1997;112:66-72.
267. Molantoa KEM. Traditional attitudes towards tuberculosis. *S Afr Med J* 1982; Special Issue 17th November:29-31.
268. Westaway MS, Wolmarans L. Cognitive and affective reactions of black urban South Africans towards tuberculosis. *Tuber Lung Dis* 1994;75:447-453.
269. Ndeti K. Sociocultural aspects of tuberculosis defaultation: a case study. *Soc Sci Med* 1972;6:397-412.
270. Barnhoorn F, Adriaanse H. In search of factors responsible for noncompliance among tuberculosis patients in Warda district, India. *Soc Sci Med* 1992;34(2):291-306.
271. Farmer P. Social scientists and the new tuberculosis. *Soc Sci Med* 1997;44(3):347-358.
272. Thomson EM, Myrdal S. Tuberculosis-the patients' perspective. *S Afr Med J* 1986;70:263-264.
273. Westaway MS, Wessie GM. Tuberculosis diagnosis and treatment of young South African children: experiences and perceptions of care-givers. *Tuber Lung Dis* 1994;75:70-74.

274. Buchanan N, Shuenyane E, Mashigo S, Mtangai P, Unterhalter B. Factors Influencing Drug Compliance in Ambulatory Black Urban Patients. *S Afr Med J* 1979;55:368-373.
275. Morisky DE, Malotte CK, Choi P, Davidson P, Rigler S, Sugland B et al. A Patients Education Program to Improve Adherence Rates with Antituberculosis drug regimens. *Health Educ Q* 1990;17(3):253-267.
276. Cuneo WD, Snider DE Jr. Enhancing Patient Compliance with Tuberculosis Therapy. *Clin Chest Med* 1989;10(3):375-379.
277. Liefoghe R, Baliddawa JB, Kipruto EM, Vermeire C, De Munynck AO. From their own perspective. A Kenyan community's perception of tuberculosis. *Trop Med Int Health* 1997;2(8):809-821.
278. Ngubane H. Aspects of Clinical Practice and Traditional Organisation of Indigenous Healers in South Africa. *Soc Sci Med* 1981;15B:3.
279. McDonald SJ, Ma M. Identifying Compliance Incentives for Screening and Treatment of Tuberculosis. *J Community Health Nurs* 1987;4(3):131-143.
280. Sbarbaro JA. Strategies to improve compliance with therapy. *Am J Med* 1985;79 Suppl 6A:34-37.
281. Edginton ME. Tuberculosis: the need for bio-social care. *S Afr Med J* [editorial] 1997;87(8):1041.
282. Ellis JHP, Beyers N, Bester D, Gie RP, Donald PR. Sociological anthropological factors related to the community management of tuberculosis in the Western Cape communities of Ravensmead and Uitsig. *S Afr Med J* 1997;87:1047-1051.
283. Kimerling ME, Petri L. Tracing as part of tuberculosis control in a rural Cambodian District during 1992. *Tuber Lung Dis* 1995;76:156-159.
284. Wardman AG, Knox AJ, Muers MF, Page RL. Profiles of Non-Compliance with Antituberculosis Therapy. *Br J Dis Chest* 1988;82:285-289.
285. Dick J, Schoeman JH. Tuberculosis in the Community: 2. The perceptions of members of a tuberculosis health team towards a voluntary health worker programme. *Tuber Lung Dis* 1996;77:380-383.
286. Mellins RB, Zimmerman B, Clark NM. Patient Compliance: Are We Wasting Our Time and Don't Know It? [editorial] *Am Rev Respir Dis* 1992;146:1376-1377.
287. Dick J, Clarke M, Tibbs J, Schoeman H. Combating tuberculosis - lessons learned from a rural community project in the Klein Drakenstein area of the Western Cape. *S Afr Med J* 1997;87:1042-1047.

288. Werhane MJ, Snukst-Torbeck G, Schraufnagel DE. The Tuberculosis Clinic. *Chest* 1989;96(4):815-818.
289. Rideout M, Menzies R. Factors affecting compliance with preventive treatment for tuberculosis at Mistassini Lake, Quebec, Canada. *Clin Invest Med* 1994;17(1):31-36.
290. Buri PS, Vathesatogkit P, Charoenpan P, Kiatboonsri S, Buranaratchada S. A Clinic Model for a Better Tuberculosis Treatment Outcome and Factors Influencing Compliance. *J Med Assoc Thai* 1985;68(7):356-360.
291. Smukst-Torbeck G, Werhane MJ, Schraufnagel DE. Treatment of tuberculosis in a nurse-managed clinic. *Heart Lung* 1987;16(1):30-33.
292. Ramachandran P, Prabhakar R. Defaults, defaulter action and retrieval of patients during studies on tuberculosis meningitis in children. *Tuber Lung Dis* 1992;73:170-173.
293. Jin BW, Kim SC, Shimao T. The impact of intensified supervisory activities on tuberculosis treatment. *Tuber Lung Dis* 1993;74:267-272.
294. van der Werf TS, Dade GK, van der Mark TW. Patient compliance with tuberculosis treatment in Ghana: factors influencing adherence to therapy in a rural service programme. *Tubercle* 1990;71:247-252.
295. Teklu B. Reasons for failure in treatment of pulmonary tuberculosis in Ethiopians. *Tubercle* 1984;65:17-21.
296. Miles SH, Maat RB. A Successful Supervised Outpatient Short-Course Tuberculosis Treatment Program in an Open Refugee Camp on the Thai-Cambodian Border. *Am Rev Respir Dis* 1984;130:827-830.
297. Haynes RB. Determinants of Compliance: The Disease and the Mechanics of Treatment In: Haynes RB, Taylor DW, Sackett DL, editors. *Compliance in Health Care*. Baltimore: Johns Hopkins University Press, 1979;49-62.
298. Curry FJ. Neighborhood clinics for more effective outpatient treatment of tuberculosis. *N Engl J Med* 1968;279:1262-1267.
299. Hill JP, Ramachandran. A simple scheme to improve compliance in patients taking tuberculosis medication. *Trop Doct* 1992;22:161-163.
300. Giuffrida A, Torgerson DJ. Should we pay the patient? Review of financial incentives to enhance patient compliance. *Br Med J* 1997;315:703-707.
301. Collins TBF The history of southern Africa's first tuberculosis epidemic. *S Afr Med J* 1982;62:780-788.

302. Packard RM. White Plague, Black Labour. Pietermaritzburg: University of Natal Press, 1989.
303. Metcalf C. A history of tuberculosis. in: Coovadia HM, Benatar SR. A century of Tuberculosis. South African perspectives. Oxford: Oxford University Press 1991.
304. Dubovsky H. Rural Tuberculosis in the Republic of South Africa. Public Health 1987;101:85-91.
305. Benatar SR. Failure of the tuberculosis control in South Africa - the need for a unitary national health system. [editorial] S Afr Med J 1986;70:247-248.
306. Report of the Tuberculosis Research Committee 1932; Tuberculosis in South African natives, with special reference to the disease among the mine labourers on the Witwatersrand. Johannesburg: South African Institute for Medical Research.
307. Stevenson-Hamilton J. The Low-veld: its wildlife and its people. London, Toronto, Melbourne and Sydney. Cassell and Company, Ltd, 1929.
308. Schneider J. Tuberculin testing and Mass Miniature X-Ray Survey of the Northern and Eastern Transvaal. S Afr Med J. 1954;28:689-692.
309. Department of Health. Tuberculosis update. Epidemiological Comments 1995;22(1).
310. Department of Health. Tuberculosis Control Programme 1992. Epidemiological Comments 1994;21(3).
311. TB in South Africa The People's Plague. The Department of Health 1997.
312. Weyer K, Fourie PB. Assessment of the tuberculosis epidemic in South Africa: Historical perspective and critical evaluation of current information. 1996. Report for the Tuberculosis Control Programme Review Task Group. National Tuberculosis Research Programme, Medical Research Council, Pretoria.
313. Department of Health. Tuberculosis Control Programme 1991. Epidemiological Comments 1993;20(1):2-11
314. Weyer K, Kleeberg HH. Primary and acquired drug resistance in adult black patients with tuberculosis in South Africa: results from a continuous national drug resistance programme involvement. Tubercle Lung Dis 1992;73:106-112.
315. Strebel PM, Seager JR. The epidemiology of tuberculosis in South Africa. In: Coovadia HN, Benatar SR, editors. A Century of Tuberculosis: South African Perspectives. Oxford: Oxford University Press, 1991;58-0.
316. Botha JL, Bradshaw D. African vital statistics - a black hole? S Afr Med J 1985; 67: 977-981.

317. Weyer K. Tuberculosis in rural populations in Southern Africa: the association between sputum origin, sputum quality and bacteriological prevalence. 1990 Doctoral thesis, University of Pretoria.
318. Fourie PB, Knoetze K. Tuberculosis prevalence and risk of infection in Southern Africa. *S Afr J Sci* 1986;82:287.
319. Berman S, Kibel MA, Fourie P, Strebel PM. Childhood tuberculosis and tuberculosis meningitis: high incidence rates in the Western Cape. *Tubercle Lung Dis* 1992;73:349-355.
320. Styblo K. Recent advances in epidemiological research in tuberculosis. *Adv Tuberc Res* 1980;20:1-63.
321. Styblo K. Surveillance of tuberculosis. *Int J Epidemiol* 1976;5:63-68.
322. Department of Health. Further hypotheses on the tuberculosis epidemic in South Africa. *Epidemiological Comments* 1993;20(7):106-118.
323. Department of Health. Policy Statement: Tuberculosis Control in the Republic of South Africa. Pretoria: Department of Health, 1979.
324. Tibbit LR. The economics of short-course therapy for tuberculosis in the Cape Divisional Council area. *S Afr Med J* 1982; Special Issue 17th November:31-33.
325. Glatthaar E. Tuberculosis: Basic Perspectives. Pretoria: Medunsa 1982.
326. Tuberculosis Control Programme: Strategy and Policy Manual 1992. Department of National Health and Population Development.
327. Lee T, Buch E. Tuberculosis Control in South Africa. In Coovardia HM, Benatar SR, editors. *A Century of Tuberculosis: South African Perspectives*. Cape Town: Oxford University Press, 1991:287-302.
328. Glatthaar E. Tuberculosis control in South Africa: where have we gone wrong? *S Afr Med J*. 1982; Special Issue 17th November:36-41.
329. Thomson EM, Myrdal S. Regional variations in tuberculosis policy in the Cape and Ciskei. *S Afr Med J*. 1986;70:253-257.
330. Yach D, Hoffman M, van Herzeele A. Western Cape local authority compliance with tuberculosis policy, 1984. *S Afr Med J* 1988;73:33-35.
331. Koornhof HJ, Coetzee GJ. A National policy for the laboratory diagnosis of pulmonary tuberculosis [editorial]. *South Afr J Epidemiol Infect* 1995;10:94.
332. Benatar SR. Tuberculosis in the 1980s, with particular reference to South Africa. *S Afr Med J* 1982;62:359-364.

333. Taylor SP, Benatar SR. The Tuberculosis Control Programme - a time to re-evaluate? [editorial] *S Afr Med J* 1989;76:639-640.
334. La Grange MAC, Gluthaar E. The tuberculosis epidemic - why we are slipping up. *S Afr Med J* 1991;80:329-331.
335. Westaway MS, Fourie PB. Tuberculosis control. *Contin Med Educ* 1989;7:305-311.
336. Yach D. Tuberculosis in the Western Cape Health Region of South Africa. *Soc Sci Med*: 1988;27:683-689.
337. Styblo K. Report on an evaluation of the South African Tuberculosis Control Programme. March 1994. South African Department of Health. Pretoria.
338. Graf P, Chaulet P, Eriki P. Report on a Mission to South Africa, July 1995. World Health Organisation.
339. Lee T, Price M. Indicators and research methods for rapid assessment of a tuberculosis control programme: case study of a rural area in South Africa. *Tuber Lung Dis* 1995;76:441-449.
340. Arnadottir The. Assessment of tuberculosis: is 'rapid assessment' needed? *Tuber Lung Dis* 1995;76:375-376.
341. Burney P, Shahyar S. Tuberculosis in the Transkei. In: Wilson F, Westcott G, editors. *Economics of Health in South Africa. Volume II; Hunger, Work and Health*. Johannesburg: Raven Press, 1980.
342. Whitehouse AB. The Modern Management of Tuberculosis in a Rural Area. *S Afr Med J* 1980;58:695-696.
343. Saunders LD, Irwig LM, Wilson TD, Kahn A, Groenewald H. Tuberculosis management in Soweto. *S Afr Med J* 1984;66:330-333.
344. Griffiths ML, Makgothi MM, Nordesjö Gunilla. Tuberculosis management in a rural community - factors in failure. *S Afr Med J* 1981;59:14-16.
345. Buch E, Johnson K, Mashabane R. Can good tuberculosis care be provided in the face of poverty? Paper presented to the Second Carnegie Inquiry into Poverty and Development in Southern Africa. Cape Town:SALDRU, UNiversity of Cape Town. 1984.
346. Fredlund VG. Six-month intermittent chemotherapy for tuberculosis in the Mseleni Health Ward of KwaZulu. *S Afr Med J* 1990;77:405-407.
347. Conradie HH. Compliance to TB outpatient treatment in the Hewu district of Ciskei. Is hospitalisation necessary? *SA Fam Prac* 1986;7:356-361.

348. Yeats JR. Attendance compliance for short-course tuberculosis chemotherapy at clinics in Estcourt and surroundings. *S Afr Med J* 1986;70:265-266.
349. Collie A, Küstner HGV. The Tuberculosis Control Programme, 1985-1986. *S Afr Med J* 1989;76:675-680.
350. Westaway MS. Managing tuberculosis at the clinic level. [correspondence]. *S Afr Med J* 1990;77:539-540.
351. Bell J, Yach D. Tuberculosis patient compliance in the western Cape, 1984. *S Afr Med J* 1988;73:31-33.
352. Westaway MS, Conradie PW, Remmers L. Supervised out-patient treatment of tuberculosis: evaluation of a South African rural programme. *Tubercle* 1991;72:140-144.
353. Edginton ME, Price M. A record review of patients notified with TB to an urban local authority. Conference paper at the Annual Conference of the Epidemiological Society of Southern Africa, Johannesburg 1991.
354. Wilkinson D. High-compliance tuberculosis treatment programme in a rural community. *Lancet* 1994;343:647-648.
355. Dick J, Schoeman JH, Mohammed A, Lombard C. Tuberculosis in the community: 1. Evaluation of a volunteer health worker programme to enhance adherence to anti-tuberculosis treatment. *Tuber Lung Dis* 1996;77:274-279.
356. Tuberculosis Control in South Africa: Joint Programme Review, June 1996. WHO, Geneva. WHO/TB/96.208.
357. Millard FJC. Assessment of resources for tuberculosis control on Sekukhuneland, Northern Province. *S Afr J Epidemiol Infect* 1997;12(3):75-78.
358. Wilkinson D, de Cock KM. Tuberculosis control in South Africa - time for a new paradigm? [editorial] *S Afr Med J* 1996;86:33-35.
359. TB talk. National Tuberculosis Control Programme, Department of Health. August 1997 and September/October 1997.
360. Notifiable Medical Conditions. Epidemiological Comments, Department of Health 1996/7;23:24-25.
361. World Health Organisation, United Nations Children's Fund. Primary Health Care. Report of the International Conference on Primary Health Care. Alma Ata, USSR, 6-12 September 1978. Geneva: World Health Organisation, 1978.
362. Newell K. The way ahead for district health systems. *World Health Forum*, 1989;10:80-87.

363. World Health Organisation. The Challenge of Implementation. District Health Systems for Primary Health Care. World Health Organisation, Division of Strengthening Health Services, 1988.
364. Kasongo Project Team. Primary care for less than a dollar a year. World Health Forum. 1984;5:211-215.
365. Amonoo-Lartson R, Ebrahim GJ, Lovel HJ, Ranken JP. District Health Care: Challenges for Planning, Organisation and Evaluation in Developing Countries. Basingstoke and London: MacMillan Education Ltd, 1984.
366. World Health Organisation. Integration of Health Care Delivery. WHO Technical Report Series No. 861, Geneva, 1996.
367. Tarimo E. Towards a health district: Organising and managing district health systems based on primary health care. World Health Organisation, Geneva. 1991.
368. Daniel TM. Selective Primary Health Care: Strategies for Control of Disease in the Developing World.II Tuberculosis. Rev Infect Dis 1982;4(6):1254-1265.
369. Leowski J. Tuberculosis control at the Primary Health Care level. Bull Int Union Tuberc 1986;61:29-31.
370. Chaulet P. Integrating tuberculosis control activities into the primary health care system at district level Bull Intern Union Tuberc Lung Dis 1987;64:33-34.
371. Zidouni N. Involvement of a properly structured network of primary health care in the management of tuberculous patients during a community survey in 45 districts in Algeria. Bull Intern Union Tuberc 1989;64:36-38.
372. Gokce C, Gokce O, Erdogmus Z, Arisoy E, Arisoy S, Koldas O et al Problems in running a tuberculosis dispensary in a developing country: Turkey Tubercle 1991;72:268-276.
373. Huwaha FN. The integration of tuberculosis control into primary health care in Uganda during this era of the human immune deficiency virus epidemic CHASA J Comprehen Health 1995;6(1):46-48.
374. Tuberculosis Control as an Integral Part of Primary Health Care. WHO. Geneva;1988.
375. Zwarenstein M, Barron P, Tollman S, Crisp N, Frankish J, Toms I, Solarsh G. Primary Health Care depends on the district system. [editorial] S Afr Med J 1993;83:558.
376. Department of Health. Health Policy Co-ordinating Unit. A policy for the development of a district health system in South Africa. 1994.

377. Pick WM. Alternative approaches to the delivery of health care in South Africa. *S Afr J Sci* 1996;92:17-23.
378. Gilson L, Balfour T, Goosen V. Towards Well-Functioning Health Districts in South Africa: A Vision and Indicators for Assessing Progress. Technical Report No. TK27. 1997. The Centre for Health Policy, Department of Community Health, University of the Witwatersrand.
379. Harrison D. A Pocket Guide to District Health Care in South Africa. 1997. Health Systems Trust.
380. World Health Organisation. The Health Centre in District Health Systems. Division of Strengthening Health Services, World Health Organisation, Geneva. 1994.
381. Yach D, Tollman SM. Public Health Initiatives in South Africa in the 1940s and 1950s: Lessons for a Post-Apartheid era. *Am J Public Health* 1993;83:1043-1050.
382. Tollman SM, Rispel L. Organisation, Planning and Management. In: South African Health Review. Health Systems Trust and Henry J Kaiser Family Foundation. Durban and California, 1995;75-88.
383. Tollman S, Mkhabela S, Pienaar J. Developing District Health Systems in the rural Transvaal: Issues based on the Tintswalo/Bushbuckridge experience. *S Afr Med J* 1993;83:565-568.
384. Tyrell B, Jergens P. African Heritage. Johannesburg: MacMillan South Africa Pty Ltd, 1983.
385. Pugh AO. The District Health System. Paper presented at the District Health Systems Workshop, 30th September and 1st October 1992.
386. Project for Statistics on living standards and development. South Africa's rich and poor: baseline household statistics. SALDRU, School of Economics, University of Cape Town. August 1994.
387. Coleman P, Dolan C, Russo R. The Village Development Programme Income and Expenditure: an analysis. Unpublished report 1993; Wits Rural Facility, University of the Witwatersrand. Klaserie.
388. Hirschowitz R, Orkin M. A National Household Survey of Health Inequalities in South Africa. Prepared by The Community Agency for Social Enquiry (CASE). The Henry J Kaiser Family Foundation, October 1995.
389. Department of Health. Notifiable medical conditions: number of reported cases of selected conditions, January to December 1992. *Epidemiological Comments*. 1993;20(6):103.

390. Department of Health. The trend of Tuberculosis through the eyes of cohorts . Epidemiological Comments. 1992;19(11):184-197.
391. Chum HJ. Ten years of the National Tuberculosis/Leprosy Programme in Tanzania. Bull Int Union Tuberc Lung Dis 1989; 64: 34-36.
392. Holmes CB, Hausler H, Nunn P. A review of differences in the epidemiology of tuberculosis. Int J Tuberc Lung Dis 1998;2(2):96-104.
393. Department of Health. National antenatal surveillance. Epidemiological Comments 1995;22(5):90-96.
394. Wilkinson D. Tuberculosis: Hlabisa Health Ward. Department of Health, Epidemiological Comments. 1993;20:73-75.
395. Xie HJ, Enarson DA, Chao CW, Allen FA, Grzybowski S. Deaths in tuberculosis patients in British Columbia, 1980-1984. Tuber Lung Dis 1992;73:77-82.
396. Weyer K, Groeneveld PJ, Zwarenstein M, Lombard CJ. Tuberculosis drug resistance in the Western Cape. S Afr Med J 1995;85(6):499-504.
397. Jolly R, King M. The organisation of health services. In King M, editor. Medical Care in Developing Countries. Lusaka, Addis Ababa, London: Oxford University Press, 1966:2.1-2.15.
398. Okot-Nwang M, Wabire-Mangen F, Kagezi VBA. Increasing prevalence of tuberculosis among Mulaga Hospital admissions, Kampala, Uganda (1985-1989). Tuber Lung Dis 1993; 74: 121-125.
399. Aisu T, Nochur SV. Monitoring of Tuberculosis Therapy Compliance. Abstracts for the Annual Meeting of the American Society of Microbiology, 16-20 May, 1993, Atlanta, Georgia.
400. Sumartojo E. Comparison of Measures of Adherence to TB treatment. Unpublished manuscript. Division of Tuberculosis Elimination, National Center for HIV, STD and TB Prevention. Centers for Disease Control and Prevention. Atlanta, Georgia. 1996.
401. Moorman J, Edginton ME. Cause of death of patients on treatment for tuberculosis: a study at Tintswalo Hospital. Submitted to Int J Tuberc Lung Dis, June 1998.
402. Khan ME, Anker M, Patel BC, Barge S, Sadhwani H, Kohle R. The use of focus groups in social and behavioural research: some methodological issues. World Health Stat Q 1991;44:145-149.
403. Kitzinger J Introducing focus groups. Br Med J 1995;311:299-302.

404. Centre for Disease Control and Prevention. Improving Tuberculosis Treatment and Control: an Agenda for Behavioral, Social and Health Services Research. Proceedings :Tuberculosis and Behavior. National; Workshop on Research for the 21st Century. Atlanta; CDC. 1995.
405. Sutter EE, Ballard RC. Community participation in the control of trachoma in Gazankulu. Soc Sci Med 1983;17(22):1813-1817.
406. Dujardin B, Kegels G, Buve A, Mercenier P. Tuberculosis control: did the programme fail or did we fail the programme? [editorial] Tropical Med and Int Health 1997;2(8):715-718.
407. Herzberg F, Mausner, Snyderman BB. The Motivation to Work. New York: John Wiley & Sons, 1959.
408. Beattie A, Rispel L, Broomberg J, Price M, Cabral J. The Quality of Primary Care in South Africa: the results of a facility-based assessment. Centre for Health Policy Paper no.44, Department of Community Health, University of the Witwatersrand. September 1995.
409. Maslow AD. A Theory of Human Motivation. Pschycological Review 1943;July:370-396.
410. Improving the performance of health centres in district health systems. Report of a WHO Study Group. WHO Technical Report Series 869. Geneva 1997.

## APPENDIX A: TABLES

## A1 TREATMENT OUTCOMES AND SEX - NEW SMEAR POSITIVE PATIENTS (1992-94)

| SEX    | COMPLETED | INTERRUPTED | DIED    | TOTAL      |
|--------|-----------|-------------|---------|------------|
| Female | 42 (66%)  | 16 (25%)    | 6 (9%)  | 64 (31%)   |
| Male   | 97 (68%)  | 36 (25%)    | 10 (7%) | 143 (69%)  |
| Total  | 139 (67%) | 52 (25%)    | 16 (8%) | 207 (100%) |

## A2 TREATMENT OUTCOMES AND AGE GROUPS - NEW SMEAR POSITIVE CASES (1992-94)

| AGE GROUP<br>in yrs | COMPLETED | INTERRUPTED | DIED    | TOTAL        |
|---------------------|-----------|-------------|---------|--------------|
| 0-14                | 3 (60%)   | 1 (20%)     | 1 (20%) | 5 (2%)       |
| 15-29               | 40 (66%)  | 17 (28%)    | 4 (7%)  | 61 (29%)     |
| 30-59               | 75 (70%)  | 25 (23%)    | 7 (7%)  | 107 (52%)    |
| 60 +                | 21 (62%)  | 9 (26%)     | 4 (12%) | 34 (16%)     |
| Total               | 164 (79%) | 65 (31%)    | 19 (9%) | 207 * (100%) |

\* excludes 3 transferred cases

**A3 TREATMENT OUTCOMES AND DISTANCE FROM TINTSWALO HOSPITAL, NEW SMEAR POSITIVE PATIENTS (1992-94)**

| DISTANCE<br>in kms | COMPLETED | INTERRUPTED | DIED    | TOTAL       |
|--------------------|-----------|-------------|---------|-------------|
| 0-9                | 49 (65%)  | 21 (28%)    | 5 (7%)  | 75<br>36%   |
| 10-25              | 62 (76%)  | 15 (18%)    | 5 (6%)  | 82<br>40%   |
| 26-49              | 19 (61%)  | 7 (23%)     | 5 (16%) | 31<br>15%   |
| 50 +               | 8 (44%)   | 9 (50%)     | 1 (6%)  | 18<br>9%    |
| TOTAL              | 138 (67%) | 52 (25%)    | 16 (8%) | 206<br>100% |

**A4 DISTANCE FROM TINTSWALO HOSPITAL AND AGE GROUPS (1994-96)**

| AGEGROUP<br>(years) | DISTANCE CATEGORIES (kms) |                 |                 |                | TOTAL      |
|---------------------|---------------------------|-----------------|-----------------|----------------|------------|
|                     | 0 -9                      | 10-25           | 26-49           | 50+            |            |
| 0-14                | 17 (37%)<br>12%           | 9 (20%)<br>8%   | 19 (41%)<br>15% | 1 (2%)<br>4%   | 46<br>11%  |
| 15-29               | 27 (30%)<br>19%           | 26 (29%)<br>22% | 32 (36%)<br>25% | 4 (4%)<br>15%  | 89<br>21%  |
| 30-59               | 84 (37%)<br>58%           | 68 (30%)<br>58% | 61 (27%)<br>48% | 17 (7%)<br>63% | 230<br>56% |
| 60+                 | 16 (33%)<br>11%           | 14 (29%)<br>12% | 14 (29%)<br>11% | 5 (10%)<br>19% | 49<br>12%  |
| Total               | 144 (35%)                 | 117 (28%)       | 126 (30%)       | 27 (7%)        | 414        |

A5 DISTANCE FROM TINTSWALO HOSPITAL  
AND SEX (1994-96)

| DISTANCE<br>(kms) | FEMALE            | MALE              | TOTAL         |
|-------------------|-------------------|-------------------|---------------|
| 0-9               | 38 (26%)<br>31%   | 106 (74%)<br>36%  | 144 (100%)    |
| 10-25             | 34 (29%)<br>28%   | 83 (71%)<br>28%   | 117 (100%)    |
| 26-49             | 45 (36%)<br>37%   | 81 (64%)<br>28%   | 126 (100%)    |
| 50+               | 5 (19%)<br>4%     | 22 (81%)<br>8%    | 27<br>(100%)  |
| TOTAL             | 122 (29%)<br>100% | 292 (71%)<br>100% | 414<br>(100%) |

A6 DISTANCE FROM TINTSWALO AND  
PATIENT CATEGORY (1994-96)

| DISTANCE<br>(kms) | NEW<br>PATIENTS   | RE-<br>TREATMENT<br>PATIENTS | TOTAL         |
|-------------------|-------------------|------------------------------|---------------|
| 0-9               | 129 (90%)<br>37%  | 15 (10%)<br>24%              | 144<br>(100%) |
| 10-25             | 92 (79%)<br>26%   | 25 (21%)<br>40%              | 117<br>(100%) |
| 26-49             | 104 (83%)<br>30%  | 22 (17%)<br>35%              | 126<br>(100%) |
| 50+               | 26 (96%)<br>7%    | 1 (4%)<br>2%                 | 27<br>(100%)  |
| TOTAL             | 351 (85%)<br>100% | 63 (15%)<br>101%             | 414           |

## A7 AGES AND TREATMENT GROUPS

| Age Group | TREATMENT GROUP   |                   |                   |                   | TOTAL        |
|-----------|-------------------|-------------------|-------------------|-------------------|--------------|
|           | Treatment Clinic  | Control Clinic    | Hospital          | Outside District  |              |
| 0-14      | 16 (35 %)<br>12 % | 12 (26 %)<br>16 % | 10 (22 %)<br>8 %  | 8 (17 %)<br>9 %   | 46 (11 %)    |
| 15-29     | 22 (26 %)<br>17 % | 19 (21 %)<br>25 % | 26 (29 %)<br>22 % | 22 (25 %)<br>25 % | 89 (21 %)    |
| 30-59     | 79 (34 %)<br>60 % | 36 (16 %)<br>48 % | 70 (30 %)<br>58 % | 45 (20 %)<br>52 % | 230 (56 %)   |
| 60+       | 15 (31 %)<br>11 % | 8 (16 %)<br>11 %  | 14 (29 %)<br>12 % | 12 (24 %)<br>14 % | 49 (12 %)    |
| TOTAL     | 132<br>32 %       | 75<br>18 %        | 120<br>29 %       | 87<br>21 %        | 414<br>100 % |

## A8 SEX AND TREATMENT GROUPS

| Sex    | TREATMENT GROUP     |                    |                     |                    | TOTAL                |
|--------|---------------------|--------------------|---------------------|--------------------|----------------------|
|        | Treatment Clinic    | Control Clinic     | Hospital            | Outside District   |                      |
| FEMALE | 37 (30 %)<br>28 %   | 21 (17 %)<br>28 %  | 34 (28 %)<br>28 %   | 30 (25 %)<br>34 %  | 122 (100 %)<br>29 %  |
| MALE   | 95 (33 %)<br>72 %   | 54 (18 %)<br>72 %  | 86 (29 %)<br>72 %   | 57 (20 %)<br>66 %  | 292 (100 %)<br>71 %  |
| TOTAL  | 132 (32 %)<br>100 % | 75 (18 %)<br>100 % | 120 (29 %)<br>100 % | 87 (21 %)<br>100 % | 414 (100 %)<br>100 % |

## A9 AGES AND TREATMENT SUPPORTERS

| AGEGROUPS<br>(years) | SUPPORTED |     | NOT SUPPORTED |     | TOTAL |     |
|----------------------|-----------|-----|---------------|-----|-------|-----|
|                      | n         | %   | n             | %   | n     | %   |
| 0-14                 | 41        | 13  | 4             | 6   | 45    | 12  |
| 15-59                | 238       | 75  | 58            | 81  | 296   | 76  |
| 60+                  | 37        | 12  | 10            | 14  | 47    | 12  |
| Total                | 316       | 100 | 72            | 101 | 388 * | 100 |

\* excludes patients transferred out, and those who died before supporters could be organised

## A10 SEX AND TREATMENT SUPPORTERS

| SEX    | SUPPORTED |     | NOT SUPPORTED |     | TOTAL |     |
|--------|-----------|-----|---------------|-----|-------|-----|
|        | n         | %   | n             | %   | n     | %   |
| Female | 95        | 30  | 20            | 28  | 115   | 30  |
| Male   | 221       | 70  | 52            | 72  | 273   | 70  |
| Total  | 316       | 100 | 72            | 100 | 388 * | 100 |

\* excludes patients transferred out, and those who died before supporters could be organised

## A11 NEW AND RETREATMENT PATIENTS AND SUPPORTERS

|              | NEW PATIENTS     | RETREATMENT<br>PATIENTS | TOTAL         |
|--------------|------------------|-------------------------|---------------|
| NO SUPPORTER | 62 (81%)<br>23%  | 15 (19%)<br>26%         | 77<br>23%     |
| SUPPORTED    | 213 (84%)<br>77% | 42 (16%)<br>74%         | 255<br>77%    |
|              | 275 (83%)        | 57 (17%)                | 332 *<br>100% |

\* pulmonary disease patients

## A12 TREATMENT GROUPS AND SUPPORTER CATEGORIES

| Supported    | Treatment Clinic |            | Control Clinic |            | Hospital  |           | Outside District |            | Total      | %          |
|--------------|------------------|------------|----------------|------------|-----------|-----------|------------------|------------|------------|------------|
|              | n                | %          | n              | %          | n         | %         | n                | %          |            |            |
| SHOP         | 43               | 35         | 28             | 43         | 41        | 45        | 11               | 30         | 123        | 39         |
| FAMILY       | 36               | 29         | 20             | 31         | 33        | 36        | 16               | 43         | 105        | 33         |
| CLINIC       | 24               | 19         | 6              | 9          | 1         | 1         | 6                | 16         | 37         | 12         |
| NEIGHB       | 12               | 10         | 4              | 6          | 6         | 7         | 4                | 11         | 26         | 8          |
| TEACHER      | 4                | 3          | 2              | 3          | 2         | 2         |                  |            | 8          | 3          |
| WORK         | 2                | 2          | 3              | 5          | 1         | 1         |                  |            | 6          | 2          |
| CHURCH       | 1                | 1          | 1              | 2          | 4         | 4         |                  |            | 6          | 2          |
| CHW          | 1                | 1          | -              | -          | -         | -         |                  |            | 1          |            |
| INDUNA       | 1                | 1          | 1              | 2          | 1         | 1         |                  |            | 3          | 1          |
| HOSP         | -                | -          | -              | -          | 2         | 2         |                  |            | 2          | 1          |
| <b>TOTAL</b> | <b>124</b>       | <b>100</b> | <b>65</b>      | <b>100</b> | <b>91</b> | <b>99</b> | <b>37</b>        | <b>100</b> | <b>317</b> | <b>101</b> |

A13 TREATMENT OUTCOMES OF NEW SMEAR POSITIVE PATIENTS FOR  
1992-94, CATEGORISED ACCORDING TO INTERVENTION STUDY GROUPS

| PLACE FOR TREATMENT                           | COMPLETED        | INTERRUPTED     | DIED           | TOTAL                                   |
|-----------------------------------------------|------------------|-----------------|----------------|-----------------------------------------|
| INTERVENTION CLINICS IN DISTRICT              | 45 (74%)         | 11 (18%)        | 5 (8%)         | 61 (100%)<br>(38% of in-district pats.) |
| CONTROL CLINICS IN DISTRICT                   | 34 (67%)         | 12 (24%)        | 5 (10%)        | 51 (100%)<br>(32% of in-district pats.) |
| TINTSWALO HOSPITAL DISTRICT PATIENTS          | 33 (69%)         | 14 (29%)        | 1 (2%)         | 48 (100%)<br>(30% of in-district pats.) |
| TOTAL IN DISTRICT                             | <u>112 (70%)</u> | <u>37 (23%)</u> | <u>11 (7%)</u> | <u>160 (100%)</u><br>(78% of all pats.) |
| TINTSWALO HOSPITAL OUTSIDE DISTRICT 10-25 kms | 11 (85%)         | 2 (15%)         | 0 (0%)         | 13 (100%)                               |
| TINTSWALO HOSPITAL OUTSIDE DISTRICT 26-49 kms | 7 (47%)          | 4 (27%)         | 4 (27%)        | 15 (100%)                               |
| TINTSWALO HOSPITAL OUTSIDE DISTRICT 50+ kms   | 8 (44%)          | 9 (50%)         | 1 (6%)         | 18 (100%)                               |
| TOTAL OUTSIDE DISTRICT                        | <u>26 (57%)</u>  | <u>15 (33%)</u> | <u>5 (11%)</u> | <u>46 (100%)</u><br>(22% of all pats.)  |
| GRAND TOTAL                                   | 138 (67%)        | 52 (25%)        | 16 (8%)        | 206 *<br>(100%)                         |

\* excludes 3 transfers and 1 patient with missing data

## A14 TREATMENT OUTCOMES AND SEX - ALL PATIENTS (1994-96)

| SEX    | CURED AND COMPLETED | INTERRUPTED | FAILED  | DIED    | TOTAL |
|--------|---------------------|-------------|---------|---------|-------|
| FEMALE | 94 (79%)            | 15 (13%)    | 2 (2%)  | 8 (7%)  | 119   |
| MALE   | 208 (73%)           | 47 (17%)    | 14 (5%) | 15 (5%) | 284   |
| TOTAL  | 302 (75%)           | 62 (15%)    | 16 (4%) | 23 (6%) | 403 * |

## A15 TREATMENT OUTCOMES AND SEX - NEW SMEAR POSITIVE PATIENTS (1994-96)

| SEX    | CURED AND COMPLETED | INTERRUPTED | FAILED | DIED   | TOTAL           |
|--------|---------------------|-------------|--------|--------|-----------------|
| FEMALE | 39 (85%)            | 4 (9%)      | 2 (4%) | 1 (2%) | 46<br>(26%)     |
| MALE   | 96 (72%)            | 22 (17%)    | 7 (5%) | 8 (6%) | 133<br>(74%)    |
| TOTAL  | 135 (75%)           | 26 (15%)    | 9 (5%) | 9 (5%) | 179 *<br>(100%) |

\* excludes 4 new smear positive patients transferred out

A16 OUTCOMES AND AGE GROUPS - NEW SMEAR POSITIVE PATIENTS  
(1994-96)

| AGE GROUP<br>in years | CURED AND<br>COMPLETED | INTERRUPTED | DIED    | FAILED  | TOTAL         |
|-----------------------|------------------------|-------------|---------|---------|---------------|
| 0-14                  | 3 (75%)                | 1 (25%)     | 0       | 0       | 4<br>(2%)     |
| 15-29                 | 41 (91%)               | 4 (9%)      | 0       | 1 (2%)  | 45<br>(25%)   |
| 30-59                 | 79 (70%)               | 20 (18%)    | 8 (7%)  | 6 (5%)  | 113<br>(63%)  |
| 60+                   | 12 (71%)               | 2 (12%)     | 1 (18%) | 2 (12%) | 17<br>(10%)   |
| TOTAL                 | 135 (75%)              | 26 (15%)    | 9 (10%) | 9 (5%)  | 179<br>(100%) |

A17 TREATMENT OUTCOMES AND HOSPITAL ADMISSIONS (1994-96)

| HOSPITAL<br>ADMISSION | COMPLETED<br>& CURED | INTERRUPTED | DIED   | FAILED  | TOTAL           |
|-----------------------|----------------------|-------------|--------|---------|-----------------|
| NO                    | 35 (73%)             | 10 (21%)    | 1 (2%) | 2 (4%)  | 48<br>(13%)     |
| YES                   | 267 (79%)            | 49 (15%)    | 7 (2%) | 13 (4%) | 336<br>(88%)    |
| TOTAL                 | 302 (79%)            | 59 (15%)    | 8 (2%) | 15 (4%) | 384 *<br>(100%) |

\* excludes 11 transferred and 19 for whom admission information not available (of these, 15 died, 1 failed, 3 interrupted)

A18 TREATMENT OUTCOMES AND DURATION OF STAY IN HOSPITAL,  
ONE WEEK AND MORE (1994-96)

| DAYS IN HOSPITAL | COMPLETED & CURED | INTERRUPTED | DIED   | FAILED  | TOTAL      |
|------------------|-------------------|-------------|--------|---------|------------|
| 1-6              | 17 (71%)          | 5 (21%)     | 1 (4%) | 1 (4%)  | 24 (7%)    |
| 7+               | 250 (80%)         | 44 (14%)    | 6 (2%) | 12 (4%) | 312 (93%)  |
| TOTAL            | 267(79%)          | 49 (15%)    | 7 (2%) | 13 (4%) | 336 (100%) |

A19 TREATMENT OUTCOMES AND DURATION OF STAY IN HOSPITAL,  
ONE MONTH AND MORE (1994-96)

| DAYS IN HOSPITAL | COMPLETED & CURED | INTERRUPTED | DIED   | FAILED  | TOTAL      |
|------------------|-------------------|-------------|--------|---------|------------|
| 1-27             | 157 (77%)         | 34 (17%)    | 6 (3%) | 7 (3%)  | 204 (63%)  |
| 28+              | 110 (83%)         | 15 (11%)    | 2 (2%) | 5 (4%)  | 132 (37%)  |
| TOTAL            | 267 (79%)         | 49 (15%)    | 8 (2%) | 12 (4%) | 336 (100%) |

A20 TREATMENT OUTCOMES AND TREATMENT SUPPORT,  
NEW SMEAR POSITIVE CASES (1994-96)

| SUPPORT | COMPLETED | INTERRUPTED | DIED   | FAILED | TOTAL        |
|---------|-----------|-------------|--------|--------|--------------|
| YES     | 120 (84%) | 15 (10%)    | 1 (1%) | 7 (5%) | 143 (84%)    |
| NO      | 15 (54%)  | 11 (39%)    | 0      | 2 (7%) | 28 (16%)     |
| TOTAL   | 135 (79%) | 26 (15%)    | 1 (1%) | 9 (5%) | 171 * (100%) |

\* excludes 5 transfers and 8 deaths

TABLE 21: COMPARISON OF PATIENTS WHO HAD 3, 2, 1 AND NO INTERVIEWS

| VARIABLE                   |                 | All 3 inter-views<br>n=185 |    | Two inter-views<br>n=103 |    | One inter-view<br>n=17 |    | No inter-view<br>n=22 |    |
|----------------------------|-----------------|----------------------------|----|--------------------------|----|------------------------|----|-----------------------|----|
| AGE<br>(years)             | <15             | n                          | %  | n                        | %  | n                      | %  | n                     | %  |
|                            |                 | 19                         | 10 | 15                       | 15 | 1                      | 6  | 3                     | 14 |
|                            | 15-59           | 146                        | 79 | 76                       | 74 | 12                     | 71 | 18                    | 82 |
|                            | 60+             | 20                         | 11 | 12                       | 12 | 4                      | 24 | 1                     | 5  |
| SEX                        | Male            | 129                        | 70 | 77                       | 75 | 12                     | 71 | 17                    | 77 |
|                            | Female          | 56                         | 30 | 26                       | 25 | 5                      | 29 | 5                     | 23 |
| DISTANCE<br>(kms)          | 0-9             | 92                         | 50 | 52                       | 51 | 10                     | 59 | 12                    | 55 |
|                            | 10-25           | 70                         | 38 | 37                       | 36 | 5                      | 29 | 6                     | 27 |
|                            | 26-49           | 23                         | 12 | 14                       | 14 | 2                      | 12 | 4                     | 18 |
| TREAT-<br>MENT<br>OUTCOMES | Care/<br>Compl. | 163                        | 88 | 84                       | 82 | 3                      | 18 | 3                     | 14 |
|                            | Interr          | 9                          | 5  | 10                       | 10 | 6                      | 35 | 10                    | 46 |
|                            | Transf          | 2                          | 1  | 2                        | 2  | 3                      | 18 | 1                     | 5  |
|                            | Died            | 0                          | 0  | 5                        | 5  | 5                      | 29 | 8                     | 36 |
|                            | Failed          | 11                         | 6  | 2                        | 2  | 0                      | 0  | 0                     | 0  |

## A22 SEX AND EDUCATIONAL STATUS

| SEX    | HIGHEST EDUCATION ACHIEVED |                    |                   |                      |
|--------|----------------------------|--------------------|-------------------|----------------------|
|        | Informal                   | Primary            | Secondary         | Total                |
| FEMALE | 37 (43%)<br>(28%)          | 24 (28%)<br>(29%)  | 25 (29%)<br>(29%) | 86 (100%)<br>(28%)   |
| MALE   | 96 (44%)<br>(72%)          | 59 (27%)<br>(71%)  | 62 (29%)<br>(71%) | 217 (100%)<br>(72%)  |
| TOTAL  | 133<br>(44%)               | 83 (100%)<br>(27%) | 87<br>(29%)       | 303 (100%)<br>(100%) |

# A23 PERCENTAGE AGREEMENT FOR SAMPLE OF FIRST AND REPEAT INTERVIEWS

| VARIABLE                             | % AGREE-<br>MENT |
|--------------------------------------|------------------|
| <b>INTERVIEW 1:</b>                  |                  |
| Address                              | 88               |
| Treatment place                      | 100              |
| Facility first attended              | 75               |
| Attended: clinic                     | 75               |
| trad healer                          | 100              |
| faith healer                         | 100              |
| hospital                             | 100              |
| Treatment: frequency                 | 75               |
| duration                             | 100              |
| Problems anticipated                 | 88               |
| Belief in cause<br>(open question)   | 38*              |
| Belief: spread                       | 88               |
| inadequate treatment                 | 75               |
| mines                                | 88               |
| poor nutrition                       | 63*              |
| alcohol                              | 100              |
| smoking                              | 100              |
| food quality                         | 75               |
| Previous TB                          | 88               |
| Family TB now/previous               | 100/88           |
| Type of work                         | 57*              |
| Education                            | 67*              |
| Post-school education                | 83               |
| Household size                       | 50*              |
| No. under 15 yrs                     | 33*              |
| No. under 5 yrs                      | 17*              |
| No earning                           | 83               |
| Old age pensioners                   | 67*              |
| Disability pensioners                | 100              |
| No. sick                             | 83               |
| <b>INTERVIEW 2</b>                   |                  |
| Supporter presence / who             | 100/73           |
| Transport to hospital clinic         | 55*              |
| Satisfaction with<br>hospital/clinic | 100              |

| VARIABLE                     | % AGREE-<br>MENT |
|------------------------------|------------------|
| <b>INTERVIEW 2 contd.</b>    |                  |
| Time to reach supporter      | 27               |
| Post-hospital consult:       |                  |
| trad healer                  | 73               |
| faith healer                 | 100              |
| another hospital             | 100              |
| another clinic               | 91               |
| private dr.                  | 100              |
| <b>INTERVIEW 3</b>           |                  |
| Attending supporter          | 67*              |
| Problems attending supporter | 100              |
| Cost                         | 100              |
| <b>CLINIC PATIENTS</b>       |                  |
| Place attended               | 100              |
| Time to reach                | 0*               |
| Transport                    | 50*              |
| Cost                         | 0*               |
| Waiting time                 | 0*               |
| Staff care                   | 100              |
| Preference                   | 100              |
| <b>HOSPITAL PATIENTS</b>     |                  |
| Transport                    | 90               |
| Cost                         | 67*              |
| Waiting time                 | 0*               |
| Staff care                   | 100              |
| Problems                     | 44*              |
| Preference                   | 67*              |
| <b>GENERAL</b>               | 92               |
| Difficult treatment          | 93               |
| Side effects                 | 54*              |
| Staff kind                   | 69*              |
| Trad healer role             | 93               |

\* < 70% agreement

TABLE 24 SUMMARY OF BIVARIATE ANALYSIS OF TREATMENT OUTCOMES  
AND VARIABLES n=296

| VARIABLE                  | OUTCOME           |                           | p     | OUTCOME             | p     |
|---------------------------|-------------------|---------------------------|-------|---------------------|-------|
|                           | Cured /<br>Compl. | Interrup /<br>Failed/Died |       | Interrup/<br>Failed |       |
| <b>Education: n=296</b>   |                   |                           |       |                     |       |
| Informal                  | 111               | 21                        | 0.89  | 14                  | 0.36  |
| Formal                    | 137               | 27                        |       | 24                  |       |
| Informal & primary        | 177               | 35                        | 0.82  | 25                  | 0.48  |
| Secondary                 | 71                | 13                        |       | 13                  |       |
| Below std 9 & 10          | 32                | 4                         | 0.37  | 4                   | 0.68  |
| Std 9 or 10               | 216               | 44                        |       | 34                  |       |
| <b>Age (years): n=319</b> |                   |                           |       |                     |       |
| 0-5                       | 16                | 4                         | 0.93  | 4                   | 0.39  |
| 6+                        | 237               | 62                        |       | 44                  |       |
| 0-15                      | 33                | 5                         | 0.22  | 5                   | 0.61  |
| 16+                       | 220               | 61                        |       | 43                  |       |
| 0-29                      | 89                | 11                        | 0.004 | 11                  | 0.09  |
| 30+                       | 164               | 55                        |       | 37                  |       |
| 0-59                      | 226               | 56                        | 0.31  | 41                  | 0.43  |
| 60+                       | 27                | 10                        |       | 7                   |       |
| 15-29                     | 56                | 6                         | 0.009 | 6                   | 0.6   |
| 30+                       | 164               | 55                        |       | 37                  |       |
| 15-59                     | 193               | 51                        | 0.40  | 36                  | 0.47  |
| 60+                       | 27                | 10                        |       | 7                   |       |
| <b>Sex: n=319</b>         |                   |                           |       |                     |       |
| Female                    | 78                | 13                        | 0.074 | 6                   | 0.009 |
| Male                      | 175               | 53                        |       | 42                  |       |
| <b>Work: n=319</b>        |                   |                           |       |                     |       |
| Unemployed                | 90                | 24                        | 0.90  | 14                  | 0.39  |
| Employed                  | 163               | 42                        |       | 34                  |       |
| Manual                    | 120               | 29                        | 0.55  | 22                  | 0.29  |
| Other employed            | 43                | 13                        |       | 12                  |       |
| Skilled/semi-skilled      | 43                | 13                        | 0.55  | 12                  | 0.29  |
| Manual                    | 120               | 29                        |       | 22                  |       |

| VARIABLE                                                    | OUTCOME        |                        | p      | OUTCOME          | p     |
|-------------------------------------------------------------|----------------|------------------------|--------|------------------|-------|
|                                                             | Cured / Compl. | Interrup / Failed/Died |        | Interrup/ Failed |       |
| <b>Time to reach supporter:</b><br>n=319                    |                |                        |        |                  |       |
| 0 (same home)                                               | 81             | 9                      | 0.003  | 9                | 0.06  |
| Rest (>0 mins)                                              | 172            | 57                     |        | 57               |       |
| <b>Stated problems with treatment access:</b> n=282         |                |                        |        |                  |       |
| Yes                                                         | 28             | 12                     | 0.0006 | 10               | 0.005 |
| No                                                          | 217            | 25                     |        | 22               |       |
| <b>How patients reached treatment source:</b>               |                |                        |        |                  |       |
| <b>Those nearest hospital (hospital treatment):</b> n=101   |                |                        | 0.35   |                  |       |
| Walk                                                        | 27             | 7                      |        |                  |       |
| Other                                                       | 58             | 9                      |        |                  |       |
| <b>Those on hospital treatment (Control treatment)</b> n=64 |                |                        | 0.20   |                  |       |
| Walk                                                        | 1              | 1                      |        |                  |       |
| Other                                                       | 56             | 6                      |        |                  |       |
| <b>Those on clinic treatment:</b> n=117                     |                |                        |        |                  |       |
| Walk                                                        | 57             | 7                      |        |                  |       |
| Other                                                       | 46             | 7                      |        |                  |       |
| <b>CLINIC PATIENTS:</b> n=74                                |                |                        |        |                  |       |
| <b>Time to reach clinic:</b>                                |                |                        |        |                  |       |
| < 30 mins                                                   | 50             | 6                      |        |                  |       |
| 30+ mins                                                    | 15             | 3                      |        |                  |       |
| <b>Cost to reach:</b>                                       |                |                        |        |                  |       |
| 0 - R3                                                      | 61             | 8                      |        |                  |       |
| > R3                                                        | 4              | 1                      |        |                  |       |
| 0                                                           | 37             | 2                      |        |                  |       |
| >0 (R1+)                                                    | 28             | 7                      |        |                  |       |
| <b>How reached:</b>                                         |                |                        |        |                  |       |
| Walk                                                        | 37             | 2                      |        |                  |       |
| Other                                                       | 28             | 7                      |        |                  |       |
| <b>Waiting time:</b>                                        |                |                        |        |                  |       |
| <30 mins                                                    | 51             | 14                     |        |                  |       |
| 30+ mins                                                    | 8              | 1                      |        |                  |       |
| <b>Problems experienced</b>                                 |                |                        |        |                  |       |
| Yes                                                         | 6              | 59                     |        |                  |       |
| No                                                          | 2              | 7                      |        |                  |       |

| VARIABLE                           | OUTCOME           |                           | p    | OUTCOME             | p |
|------------------------------------|-------------------|---------------------------|------|---------------------|---|
|                                    | Cured /<br>Compl. | Interrup /<br>Failed/Died |      | Interrup/<br>Failed |   |
| <b>HOSPITAL PATIENTS:</b><br>n=112 |                   |                           |      |                     |   |
| <b>Time to reach:</b>              |                   |                           |      |                     |   |
| <30 mins                           | 58                | 5                         | 0.32 |                     |   |
| 30+ mins                           | 43                | 6                         |      |                     |   |
| <b>Cost to reach:</b>              |                   |                           |      |                     |   |
| 0 - R3                             | 72                | 7                         | 0.41 |                     |   |
| >R3                                | 29                | 4                         |      |                     |   |
| 0                                  | 29                | 4                         | 0.41 |                     |   |
| >0 (R1+)                           | 72                | 7                         |      |                     |   |
| <b>How reached: n=113</b>          |                   |                           |      |                     |   |
| Walk                               | 30                | 4                         | 0.54 |                     |   |
| Other                              | 72                | 7                         |      |                     |   |
| <b>Waiting time:</b>               |                   |                           |      |                     |   |
| <30 mins                           | 18                | 1                         | 0.40 |                     |   |
| 30+ mins                           | 83                | 10                        |      |                     |   |
| <b>Problems experienced:</b>       |                   |                           |      |                     |   |
| Yes                                | 28                | 2                         | 0.39 |                     |   |
| No                                 | 74                | 9                         |      |                     |   |

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURGDivision of the Deputy Registrar (Research)COMMITTEE FOR RESEARCH ON HUMAN SUBJECTS (MEDICAL)

Ref: R14/49 (Registry)

CLEARANCE CERTIFICATEPROTOCOL NUMBER M940103PROJECTRecord review of TB patients  
admitted to Tintswalo HospitalINVESTIGATORS

Dr M E Edginton

DEPARTMENT

Community Health

DATE CONSIDERED

940128

DECISION OF THE COMMITTEE

Approved unconditionally

DATE 940204

CHAIRMAN .....

(Professor P E Cleaton-Jones)

\* Guidelines for written "informed consent" attached where  
applicable.

## =====

To be completed in duplicate and ONE COPY returned to the Secretary at Room  
10001, 10th Floor, Senate House, University.I/We fully understand the conditions under which I am/we are authorized to  
carry out the abovementioned research and I/we guarantee to ensure  
compliance with these conditions. Should any departure be contemplated  
from the research procedure as approved I/we undertake to resubmit the  
protocol to the Committee.

DATE.....

SIGNATURE.....

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

B2

Division of the Deputy Registrar (Research)

COMMITTEE FOR RESEARCH ON HUMAN SUBJECTS (MEDICAL)

Ref: R14/49 Edginton

CLEARANCE CERTIFICATE

PROTOCOL NUMBER M 940806

PROJECT

Study to evaluate a strip test to detect the drug INH and its metabolites in urine of patients taking INH orally

INVESTIGATORS

Dr M E Edginton

DEPARTMENT

Community Health, Medical School

DATE CONSIDERED

940826

DECISION OF THE COMMITTEE \*

Approved unconditionally

DATE

940830

CHAIRMAN ..... *P E Cleaton-Jones* ..... (Professor P E Cleaton-Jones)

\* Guidelines for written "informed consent" attached where applicable.

c c Supervisor: Dr M E Edginton  
Dept of Community Health, Medical School

Works2\other\heclear\ 940806

=====

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and ONE COPY returned to the Secretary at Room 10001, 10th Floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

DATE..... *1/9/94* ..... SIGNATURE ..... *[Signature]* .....

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURGDivision of the Deputy Registrar (Research)COMMITTEE FOR RESEARCH ON HUMAN SUBJECTS (MEDICAL)

Ref: R14/49 (Registry)

CLEARANCE CERTIFICATEPROTOCOL NUMBER M940203

PROJECT                      Tuberculosis in the Eastern  
Transvaal: a study in management

INVESTIGATORS              Dr M E Edginton

DEPARTMENT                Community Health

DATE CONSIDERED            940225

DECISION OF THE COMMITTEE

Approved with the attached condition

DATE 940302

CHAIRMAN ..... *P E Cleaton-Jones* .....  
(Professor P E Cleaton-Jones)

\* Guidelines for written "informed consent" attached where applicable.

=====

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and ONE COPY returned to the Secretary at Room 10001, 10th Floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

DATE ..... *8/3/94* ..... SIGNATURE ..... *[Signature]* .....

## QUESTIONNAIRE FOR DATA ENTRY INTO EPIINFO

name \_\_\_\_\_ tb reg no. ## / ###  
 age in years ## sex <A> address \_\_\_\_\_ nearest clinic \_\_\_\_\_  
 date treatment started <dd/mm/yy> treatment regime #  
 source of patient <A> if H state which \_\_\_\_\_ patient category <A>  
 diagnostic criteria <A> internat code ###  
 sputum exam. pretreatmnt 8 weeks 6 months  
                   result date result date result date  
 smear <A> <dd/mm/yy> <A> <dd/mm/yy> <A> <dd/mm/yy>  
 culture <A> <dd/mm/yy> <A> <dd/mm/yy> <A> <dd/mm/yy>  
 resistance <A> <A> <A>  
 date of discharge from hospital <dd/mm/yy>  
 post-discharge treatment place \_\_\_\_\_  
 if supervised, who supervises \_\_\_\_\_, who organised \_\_\_\_\_  
 how did patient reach clinic \_\_\_\_\_  
**FOR CLINIC TREATMENT PATIENTS** date first seen at clinic <dd/mm/yy>  
     subsequent clinic visits no. days supervsd trtmnt during mnth  
         scheduled actual  
         <dd/mm/yy> <dd/mm/yy> ##  
         <dd/mm/yy> <dd/mm/yy> ##  
         <dd/mm/yy> <dd/mm/yy> ##  
         <dd/mm/yy> <dd/mm/yy> ##  
         <dd/mm/yy> <dd/mm/yy> ##  
         <dd/mm/yy> <dd/mm/yy> ##  
     any hospital visits <dd/mm/yy> why \_\_\_\_\_  
         <dd/mm/yy> \_\_\_\_\_  
         <dd/mm/yy> \_\_\_\_\_  
         <dd/mm/yy> \_\_\_\_\_  
     final hospital visit for discharge <dd/mm/yy>  
**FOR HOSPITAL TREATMENT PATIENTS** dates of attendance  
     scheduled actual days of supervision  
     <dd/mm/yy> <dd/mm/yy> ##  
     <dd/mm/yy> <dd/mm/yy> ##  
     <dd/mm/yy> <dd/mm/yy> ##  
     <dd/mm/yy> <dd/mm/yy> ##  
     <dd/mm/yy> <dd/mm/yy> ##  
     <dd/mm/yy> <dd/mm/yy> ##  
     <dd/mm/yy> <dd/mm/yy> ##  
     readmission for tb admission date <dd/mm/yy> discharge date <dd/mm/yy>  
     outcome <A> T RF # date <dd/mm/yy> HIV <A>  
     interview 1 <dd/mm/yy>  
         2 scheduled <dd/mm/yy>  
         actual <dd/mm/yy>  
         3 scheduled <dd/mm/yy>  
         actual <dd/mm/yy>

remarks \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## REPORT OF PATIENT ATTENDANCES AND SPUTA RESULTS

DATE: \_\_\_\_\_

PATIENT'S NAME: \_\_\_\_\_

TB NUMBER: 9\_\_/\_

CLINIC (name) OR HOSPITAL PATIENT: \_\_\_\_\_

DATE TREATMENT STARTED: \_\_\_\_\_

DATE DISCHARGED FROM HOSPITAL: \_\_\_\_\_

PATIENT TAKEN TO CLINIC BY: \_\_\_\_\_

DATE FIRST SEEN AT CLINIC: \_\_\_\_\_

SUPPORTER: \_\_\_\_\_

SUPPORTER ORGANISED BY: \_\_\_\_\_

## ATTENDANCES:

| SCHEDULED | ACTUAL | DOCTOR (D)<br>PILLS (P) | CLINIC (C)<br>HOSPITAL (H) | DAYS OF<br>SUPPORT |
|-----------|--------|-------------------------|----------------------------|--------------------|
| _____     | _____  | _____                   | _____                      | _____              |
| _____     | _____  | _____                   | _____                      | _____              |
| _____     | _____  | _____                   | _____                      | _____              |
| _____     | _____  | _____                   | _____                      | _____              |
| _____     | _____  | _____                   | _____                      | _____              |
| _____     | _____  | _____                   | _____                      | _____              |
| _____     | _____  | _____                   | _____                      | _____              |

## SPUTUM TESTING:

| INITIAL DATE    | RESULT | 2 MONTHS DATE | RESULTS |
|-----------------|--------|---------------|---------|
| _____           | _____  | _____         | _____   |
| _____           | _____  | _____         | _____   |
| 5-6 MONTHS DATE | RESULT |               |         |
| _____           | _____  |               |         |
| _____           | _____  |               |         |

FINAL DISCHARGE: \_\_\_\_\_

[illegible]

TINTSWALO TUBERCULOSIS PROGRAMME  
DATA SHEET FOR INTERRUPTER CASE CONTROL STUDY

INTERUPPTER OR CONTROL

BASIC INFORMATION FROM RECORDS: (MEE to enter from records)

TB NUMBER...../9..      NAME.....

AGE..... GENDER M/F      HIV P/N      SOURCE..... CATEGORY.....

TB CODE..... SMEAR P/N      CULTURE P/N

ADDRESS (name of village).....

FIRST ADMISSION/READMISSION F/R

If READMISSION, for first admission:

TB NO...../9..      DATE.....      OUTCOME.....

FAMILY SIZE ..... POSITION OF THIS PATIENT IN FAMILY .....

Days in hospital TB ward .....

TB TREATMENT PLACE (clinic name/Tintswalo) .....

Supporter Category .....

Supporter attendance per month .....

Outcome:

Cure S

Compleat.C1(monthly) C2(monthlyx1st 2m) C3(2-3monthly) C4

Interrupter I1 (incompl.1st 2m.) I2(complet.1st 2 m.only)

I3(never seen postdisc)

RHT from hospital..... RHT

Failed to return after passout FR

Other.....

ACCESS - INFORMATION ON TREATMENT PLACE: (MEE to ask CS/SN/HEDs)

What is the best way to get from patient's home to the treatment

place .....

If best way is by taxi/bus,

How much does it cost to get from patient's home to that place

R.....

How long does it usually take .....

Are taxis/buses regular Y/N

If best way is walking,

How long does it take to walk (one way home to treatment place)

.....

INFORMATION FROM REPORT OF CONNIE/SELLITA/PHILLIP/SOLLY:

ANY PROBLEMS IDENTIFIED BY STAFF AS:

|                                                  |     |
|--------------------------------------------------|-----|
| DISTANCE TO TREATMENT PLACE                      | Y/N |
| NO MONEY                                         | Y/N |
| ATTITUDE/BEHAVIOUR OF STAFF AT TR. PLACE (fr.pt) | Y/N |
| ALCOHOL                                          | Y/N |
| PATIENT AWAY AT WORK                             | Y/N |
| PATIENT CANNOT BE TRACED                         | Y/N |
| Other (say what) .....                           |     |

.....

.....

INFORMATION FROM PATIENT INTERVIEW

First place attended for treatment before T C/TH/FH/AnotherH/GP/Other

Belief re TB (open) .....

Family TB NOW/PREVIOUS

Work type .....

Education (highest level) .....

Household size .....

Under 15.....Under 5 ..... OAPen ..... Disab.Pen .....

Household income R.....

Knowledge re treatment G/B

Treatment Place same as records Y/N

Supporter same as records Y/N

Clinic access by Walk/Taxi/Bus/Other.....

Clinic transport cost R .....

Clinic wait time .....minutes

Clinic staff problem Y/N

Other clinic problems Y/N what.....

Hospital access by Walk/Taxi/Bus/Other.....

cost R.....

wait time .....minutes

staff problem Y/N

other problems Y/N what.....

General statements (ring only if problem)

Pills difficult to take

Pills make sick

Nurses not good

Traditional healer essential

## TINTSWALO DISTRICT TUBERCULOSIS PROGRAMME

Interview for all patients who live in the Tintswalo district before their discharge from hospital

Card No. 

|   |
|---|
| 1 |
|---|

 1

Name of Patient: \_\_\_\_\_

TB Registration No. \_\_\_\_\_ 

|   |  |  |  |  |
|---|--|--|--|--|
| 9 |  |  |  |  |
|---|--|--|--|--|

 2

Date of Admission 

|  |  |  |  |   |  |
|--|--|--|--|---|--|
|  |  |  |  | 9 |  |
|--|--|--|--|---|--|

 7

Date of interview 

|  |  |  |  |   |  |
|--|--|--|--|---|--|
|  |  |  |  | 9 |  |
|--|--|--|--|---|--|

 13

Date of discharge 

|  |  |  |  |   |  |
|--|--|--|--|---|--|
|  |  |  |  | 9 |  |
|--|--|--|--|---|--|

 19

Place of Interview: \_\_\_\_\_

Address: Name of village/town \_\_\_\_\_

Exact address with landmarks: \_\_\_\_\_

Place for follow up treatment \_\_\_\_\_

Interviewer: Check records and/or ask ward sister where this patient is to receive follow-up treatment and write it here.

## TUBERCULOSIS ACTION

A1 Please tell me about places you went to when you got sick with TB, before you came to hospital. Have you been to a:

clinic 

|     |    |
|-----|----|
| Yes | No |
|-----|----|

|  |
|--|
|  |
|--|

 30

say where \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 31

traditional healer 

|     |    |
|-----|----|
| Yes | No |
|-----|----|

|  |
|--|
|  |
|--|

 32

faith healer 

|     |    |
|-----|----|
| Yes | No |
|-----|----|

|  |
|--|
|  |
|--|

 33

hospital other than this one 

|     |    |
|-----|----|
| Yes | No |
|-----|----|

|  |
|--|
|  |
|--|

 34

say which \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 35

private doctor 

|     |    |
|-----|----|
| Yes | No |
|-----|----|

|  |
|--|
|  |
|--|

 36

other place/person 

|     |    |
|-----|----|
| Yes | No |
|-----|----|

|  |
|--|
|  |
|--|

 37

say where/who \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 38

- A2 Where did you go first when you got sick with this TB?

|                    |                |                   |                    |
|--------------------|----------------|-------------------|--------------------|
| Tintswalo hospital | Other hospital | Clinic            | Traditional healer |
| Faith healer       | Private doctor | Other - say where |                    |

☐ 39

## TUBERCULOSIS KNOWLEDGE

- K1 Please tell me about the treatment you must take for your TB:

For how long must you take the treatment?

How often should you take the treatment?

☐ 40

- K2 Where will you go regularly to fetch your TB treatment after you are discharged from hospital?

☐ 41

- K3 Do you think you will have any problems in getting to the place where you will get your treatment?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 42

- K4 If yes, please explain \_\_\_\_\_

☐ 43

- K5 Are there questions you would like to ask about your TB treatment

☐ 44

(Interviewer: if you cannot answer the questions, ask someone qualified to do so)

## TUBERCULOSIS CAUSE

- C1 Why do you believe you got TB?

☐ ☐ 45

C2 Do you think people get tuberculosis from:-

|    |                                             |     |    |            |
|----|---------------------------------------------|-----|----|------------|
| 1  | Bewitchment<br>Neglect of ancestors         | Yes | No | Don't know |
| 2  | Disobeying rules when family<br>member dies | Yes | No | Don't know |
| 3  | Sexually transmitted disease                | Yes | No | Don't know |
| 4  | Spread from people with TB<br>Germs         | Yes | No | Don't know |
| 5  | TB inadequately treated in the<br>past      | Yes | No | Don't know |
| 6  | Work in mines or dusty<br>conditions        | Yes | No | Don't know |
| 7  | Poor nutrition or diet                      | Yes | No | Don't know |
| 8  | Alcohol                                     | Yes | No | Don't know |
| 9  | Smoking cigarettes                          | Yes | No | Don't know |
| 10 | Food or water contamination                 | Yes | No | Don't know |
| 11 | Other                                       | Yes | No | Don't know |

47

48

49

50

51

52

53

54

55

56

57

## PREVIOUS TUBERCULOSIS

P1 Have you ever had TB before this time?

☐ 58

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If yes,  
P2 What year was this 19\_\_\_\_\_

  59

P3 Where did you have treatment

 61

P4 For how long were you treated (in months)\_\_\_\_\_

  62

## FAMILY TB

F1 Is anyone in your family on treatment for TB  
now

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 64F2 Has anyone in your family been on treatment in  
the past

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 65

## WORK OUTSIDE THE HOME

W1 When did you last work for money? (write month and year) \_\_\_\_\_

|  |  |   |  |
|--|--|---|--|
|  |  | 9 |  |
|--|--|---|--|

 66

W2 For how many years have you worked for money in your life?

(Interviewer: write down all the different jobs and add up the total time worked)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Total Time \_\_\_\_\_

|  |  |
|--|--|
|  |  |
|--|--|

 70

W3 What is the main kind of work you have done? (Interviewer ask for the job the person has had for the longest) \_\_\_\_\_

|  |  |
|--|--|
|  |  |
|--|--|

 72

\_\_\_\_\_  
 \_\_\_\_\_

Card No. 

|   |
|---|
| 2 |
|---|

 1

TB Registration No. 

|   |  |  |  |  |
|---|--|--|--|--|
| 9 |  |  |  |  |
|---|--|--|--|--|

 2

## EDUCATION

E1 What is the highest school standard that you passed eg Nil, SubA, SubB, Std1 - 10 \_\_\_\_\_

|  |  |
|--|--|
|  |  |
|--|--|

 7

E2 Did you have any education or training after you left school

|     |    |
|-----|----|
| Yes | No |
|-----|----|

|  |
|--|
|  |
|--|

 9

E3 If yes, what was this \_\_\_\_\_

|  |  |
|--|--|
|  |  |
|--|--|

 10

## HOUSEHOLD INFORMATION

Tell me about the people in your household. (Tick appropriate squares)

|    | First name | Relationship to you | Year of birth | Age | Earning money | Old Age pension | Disability Pension | Sick now for 2 wks or more |
|----|------------|---------------------|---------------|-----|---------------|-----------------|--------------------|----------------------------|
| 1  |            | yourself            |               |     |               |                 |                    | Yes                        |
| 2  |            |                     |               |     |               |                 |                    |                            |
| 3  |            |                     |               |     |               |                 |                    |                            |
| 4  |            |                     |               |     |               |                 |                    |                            |
| 5  |            |                     |               |     |               |                 |                    |                            |
| 6  |            |                     |               |     |               |                 |                    |                            |
| 7  |            |                     |               |     |               |                 |                    |                            |
| 8  |            |                     |               |     |               |                 |                    |                            |
| 9  |            |                     |               |     |               |                 |                    |                            |
| 10 |            |                     |               |     |               |                 |                    |                            |
| 11 |            |                     |               |     |               |                 |                    |                            |
| 12 |            |                     |               |     |               |                 |                    |                            |
| 13 |            |                     |               |     |               |                 |                    |                            |
| 14 |            |                     |               |     |               |                 |                    |                            |
| 15 |            |                     |               |     |               |                 |                    |                            |
| 16 |            |                     |               |     |               |                 |                    |                            |
| 17 |            |                     |               |     |               |                 |                    |                            |
| 18 |            |                     |               |     |               |                 |                    |                            |

|                           |                          |    |
|---------------------------|--------------------------|----|
| Subject's age             | <input type="checkbox"/> | 12 |
| Total No.                 | <input type="checkbox"/> | 14 |
| Under 15 years            | <input type="checkbox"/> | 16 |
| Under 5 years             | <input type="checkbox"/> | 17 |
| Earning                   | <input type="checkbox"/> | 18 |
| Old age pension           | <input type="checkbox"/> | 19 |
| Disability pension        | <input type="checkbox"/> | 20 |
| Sick (other than patient) | <input type="checkbox"/> | 21 |

How much money comes into your household each month (in Rands) \_\_\_\_\_

|                          |                          |                          |                          |    |
|--------------------------|--------------------------|--------------------------|--------------------------|----|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 22 |
|--------------------------|--------------------------|--------------------------|--------------------------|----|

Thank you for answering my questions.

## TINTSWALO DISTRICT TUBERCULOSIS PROGRAMME

## PATIENT INTERVIEW AT 8 WEEKS AFTER TREATMENT ONSET

Card No 

|   |
|---|
| 3 |
|---|

 1

Name of Patient: \_\_\_\_\_

TB Registration No. \_\_\_\_\_ 

|   |  |  |  |  |
|---|--|--|--|--|
| 9 |  |  |  |  |
|---|--|--|--|--|

 2Date of interview: \_\_\_\_\_ 

|  |  |  |  |   |  |
|--|--|--|--|---|--|
|  |  |  |  | 9 |  |
|--|--|--|--|---|--|

 7Place of interview: \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 13If patient is under 15 years of age, name of mother  
or person interviewed on behalf of child: \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 14Are you currently taking treatment for TB? \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 15

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If no:  
Please explain why not \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 16If yes:  
How often do you take your pills? \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 17Does someone supervise your treatment i.e. give you  
your pills? \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 18

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If yes:  
Who is your supervisor? \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 19

Name: \_\_\_\_\_

Position or relationship: \_\_\_\_\_

How long does it take you to go to your supervisor  
(in minutes) \_\_\_\_\_Please explain \_\_\_\_\_ 

|  |  |
|--|--|
|  |  |
|--|--|

 20When you go for a check up and to get more pills do  
you go to the \_\_\_\_\_ 

|          |        |
|----------|--------|
| Hospital | Clinic |
|----------|--------|

|  |
|--|
|  |
|--|

 22How do you get to the clinic or hospital? \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 23

Do you have any problems getting to the clinic/hospital to fetch your pills?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 24

If yes, please tell me about these problems.

☐ 25

What do you feel the pills do for you?

☐ 26

Why do you feel this?

☐ 27

For how many months must you take the pills? \_\_\_\_\_  
(from start to finish)

☐ ☐ 28

Are you satisfied with the service you are getting at the clinic/hospital?

☐ 30

(Interviewer delete whichever is not applicable)

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If no, please tell me about the problems.

☐ 31

Have you been to see any of the following since you were discharged from hospital?

Traditional healer

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 32

Faith healer

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 33

Another Hospital

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 34

Another clinic

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 35

A private doctor

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 36

Any other healer or service  
say which: \_\_\_\_\_

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 37

Do you have any questions about your sickness or things you would like to discuss?

☐ 38

(Interviewer if you cannot answer the questions, ask someone who can to see this patient.)

Thank you for answering these questions.

INTERVIEW SCHEDULE FOR TB PATIENTS WHO HAVE COMPLETED  
THEIR TREATMENT

Interview to take place at Tintswalo hospital at the  
time of final discharge

Interviewer: Introduce yourself, and explain that the  
patient has the right to refuse to answer questions,  
and that answers will be kept confidential.

Name of patient: \_\_\_\_\_ Card No. 

|   |
|---|
| 4 |
|---|

 1

TB registration number 

|   |  |  |  |  |
|---|--|--|--|--|
| 9 |  |  |  |  |
|---|--|--|--|--|

 2

Date of interview 

|  |  |  |  |   |  |
|--|--|--|--|---|--|
|  |  |  |  | 9 |  |
|--|--|--|--|---|--|

 7

Place of interview \_\_\_\_\_ 

|  |
|--|
|  |
|--|

 13

Patient's address: (name of village or place)

\_\_\_\_\_ 

|  |  |
|--|--|
|  |  |
|--|--|

 14

Which is your nearest clinic (ask patient this)?

\_\_\_\_\_ 

|  |  |
|--|--|
|  |  |
|--|--|

 16

**SUPPORTER FOR TREATMENT**

Have you been going daily to a supporter to get your  
treatment?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

|  |
|--|
|  |
|--|

 18

If yes, who was that supporter?  
[shop/ induna/ family member/ clinic nurse]

Say exactly who it was? \_\_\_\_\_

|  |  |
|--|--|
|  |  |
|--|--|

 19

Did you have any problems getting  
to your supporter every day?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

|  |
|--|
|  |
|--|

 21

If yes, please tell me about your problems.

|  |
|--|
|  |
|--|

 22

Did it cost you money to go to  
your supporter every day?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If yes, how much did it cost? (Rands and cents) \_\_\_\_\_

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

 23

WHERE HAVE YOU BEEN ATTENDING EVERY MONTH TO SEE A  
DOCTOR OR NURSE TO FETCH MORE PILLS?

|  |
|--|
|  |
|--|

 26

## IF YOU HAD TREATMENT AT A CLINIC:

Which clinic did you go to? \_\_\_\_\_

  27How long did it take you to get there? \_\_\_\_\_  
(In minutes)   29

How did you get there? \_\_\_\_\_

 32

How much money did you have to pay to get there?

(in Rands and Cents) \_\_\_\_\_

    33How long did you have to wait at the clinic before  
you were seen by the nurse (in minutes)? \_\_\_\_\_  37

Did the clinic staff look after you well?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

If no, please explain \_\_\_\_\_

 39Please explain any problems you had in getting your  
treatment at the clinic?

\_\_\_\_\_

\_\_\_\_\_

 40Would you have preferred to go to hospital for your  
treatment rather than to the clinic

|     |    |
|-----|----|
| Yes | No |
|-----|----|

 41

Whether person said yes or no, ask:-

Please explain why you have said this

\_\_\_\_\_

\_\_\_\_\_

 42

## IF YOU HAD TREATMENT AT TINTSWALO HOSPITAL:

How long did it take you to get there? (in minutes) \_\_\_\_\_

   43

How did you get there? \_\_\_\_\_

 46How much money did you have to pay to get there?  
(in Rands and Cents) \_\_\_\_\_    47How long did you spend at the hospital  
(from the time you got to the ward until  
you left to go home)? (in minutes) \_\_\_\_\_   51

Did the hospital staff look after you well?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

 54

If no, please explain \_\_\_\_\_

 55Please explain any problems you had in getting your  
treatment at the hospital?

If yes, explain the problems \_\_\_\_\_

 56Would you have preferred to go to your nearest  
clinic for your treatment rather than to the hospital?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

 57

Please explain why you have said this (whether yes or no)

 58

## GENERAL COMMENTS:

If one of your friends or a neighbour got TB, and he asked you about TB, what would you tell that person about the treatment for TB?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Would you tell him that TB pills are difficult to take?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 59

Would you tell him that the pills sometimes make you feel sick?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 60

Would you say the nurses at the clinic or hospital were good/kind/helpful?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 61

Would you tell him he should go to a traditional healer?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 62

Would you tell them anything else about TB or TB treatment?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

☐ 63

Do you feel that your TB is now cured?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 64

If no, please explain why not \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

☐ 65

Have you got a job earning money since you were treated for TB?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 66

Interviewer:

Note yes or no here if this person came from Mozambique, and if possible about how long ago (in years). Do not ask the person directly.

|     |    |
|-----|----|
| Yes | No |
|-----|----|

☐ 67

☐ 68

How many years ago did he/she come \_\_\_\_\_?

☐ ☐ 69

Thank the patient for answering your questions.

## REPORT ON PATIENT NOT FOUND WHEN LOOKED FOR AT HOME

FIRST VISIT/SECOND VISIT/THIRD VISIT (ring the one that applies)  
Do not make more than 3 visits to try to find a patient

Name of patient..... TB no ...../9..

Did you find patient's home? Yes/No

Who was at the home? .....

If someone at patient's home, did they  
know the patient ? Yes/No

If they know patient, where did they  
say he/she was ? .....

.....

Does he ever come home? Yes/No

If yes, when will he next come home? .....

Is he/she well? Yes/No

Is he/she taking TB treatment? Yes/No

If yes, where does he get the pills? .....

If no-one was found at patient's home

Did neighbours or people nearby know  
the patient? Yes/No

If yes, did they know where he/she is? Yes/No

If yes, where did they say patient is .....

If patient is said to be somewhere else in the Tintswalo or the old Mhala district (even if outside our study area), look for the patient there and interview. If he is said to be beyond the Tintswalo or old Mhala area, don't look further.

**Author** Edginton M E

**Name of thesis** Tuberculosis In The Tintswalo District Of The Northern Province Edginton M E 1998

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