## Studies completed:

### Timing and its significance in the diagnosis and treatment of tuberculosis in disease endemic countries: the interplay of health seeking and health systems

### Background:

The impact of the DOTS strategy is limited by poor case detection in many settings, attributable both to the low sensitivity of smear microscopy and to multiple behavioral and health system factors. These obstacles lead to diagnostic delay and in some cases high rates of drop out from the diagnostic process, inevitably with the result of greater morbidity, higher cost, and ongoing transmission of infection as patients go undetected and untreated. This study was done in two parts.

### Part I

### Aim:

To quantify the delay in diagnosis and treatment of TB in all disease categories, at the levels of patient, health provider, laboratory and treatment stages.

### Methods:

A cross sectional study was planned to quantify delay and drop-out in the TB diagnostic process, to identify factors associated with delay, and to evaluate its economic and health impact in four disease endemic countries (India, Peru, Thailand and Zambia). This study was conducted in Tiruvallur district, Chennai Corporation and Kancheepuram district. In order to collect qualitative data, we conducted 9 focus group discussions. The participants were LTs, STLS, Health Visitors, Lab Assistants, Village Health Nurses, Treatment Organisers and Health Inspectors. Based on the findings, a pre-coded structured interview schedule was developed. This was used to collect data from TB patients and chest symptomatics.

### Results:

A total of 408 newly diagnosed adult TB patients were interviewed: 240 (59%) pulmonary smear-positive, 108 (26%) pulmonary smear-negative and 60 (15%) extra-pulmonary. Various delays (patient's delay, provider delay and total delay) and the mean, median cost of diagnosis for pulmonary and extrapulmonary cases were evaluated.

### Part II

### Aim:

To determine the frequency and timing of diagnostic drop-outs among pulmonary TB suspects.

### Methods:

Subjects (≥15 years) presenting to government health centres with ≥3 weeks cough or haemoptysis were enrolled in a prospective observational study. All symptomatics who had been ordered smear microscopy were followed-up, for the presence and dates of i) serial laboratory sample registration, ii) patient notification and iii) treatment initiation. Interviews were undertaken for the following subjects who did not (a) deliver 3 sputum specimens, (b) collect results and (c) come for treatment initiation, within 2 weeks of request (drop-outs).

## Results:

Out of the total of 1000 subjects recruited, 872 (87%) completed the diagnostic process. Among the 128 drop-outs, 92 (72%) drop-outs were tracked and interviewed, the main reasons for dropping out were analysed.

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**Studies in progress:**

**Drug resistance surveillance in Model DOTS Project (MDP) area**

## Background:

Drug resistance surveillance is considered as a useful tool to assess the effective functioning of tuberculosis control programmes. Drug resistance levels and its trends serve as an epidemiological indicator to assess the extent of resistant bacterial transmission in the community. The drug resistance levels among patients treated under TB control programmes are not available in many settings.

## Aim:

To study the drug susceptibility pattern among patients admitted to treatment in the project area.

## Methods:

The project area in Tiruvallur district has 17 peripheral health institutions where TB patients are diagnosed and started on treatment. Two additional sputum samples were collected from all types of patients started on treatment in these centers, preferably within a week and tested for culture and drug susceptibility to anti-TB drugs.

## Results:

The collection of sputum samples was started in August 1999. Bacteriological results are available for 4647 patients. Of these, culture results were positive for 2547 patients and drug susceptibility pattern available for 2536 patients. Category wise distribution of the culture results and susceptibility pattern are given in Table IV.

Of the 2052 patients admitted to CAT I and III and for whom sensitivity results were available, 1740 (84.8%) were sensitive to all drugs, 98 (4.8%) resistant to streptomycin alone, 208 (10.1%) to isoniazid and only 27 (1.3%) had resistance to isoniazid and rifampicin (multi-drug resistant tuberculosis, MDR-TB). Among 484 CAT II patients, 279 (57.6%) were sensitive to all drugs, 184 (38.0%) had resistance to isoniazid and 57 (11.8%) had MDR-TB (Fig. 2).

## Conclusion:

MDR-TB was observed in less than 2% in newly diagnosed patients

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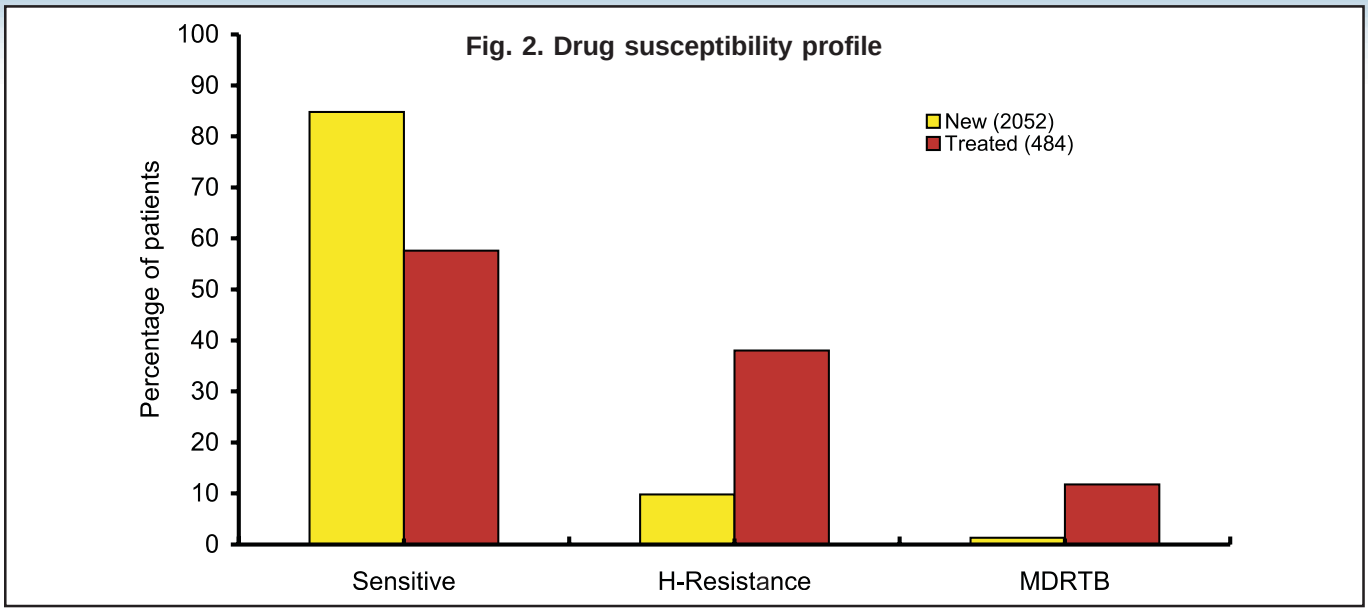
**Table IV : Distribution of patients by category and bacteriological results**

| Category | Total patients admitted | Bact. Results available | S+C+ | S-C- | S+C- | S-C- | Total S+ | Total C+ |
|---|---|---|---|---|---|---|---|---|
| I | 2589 | 2350 | 1473 | 381 | 88 | 408 | 1561 | 1854 |
| II | 768 | 673 | 414 | 75 | 40 | 144 | 454 | 489 |
| III | 1822 | 1624 | 78 | 126 | 33 | 1387 | 111 | 204 |

S+C+ smear positive culture positive
S-C+ smear negative culture positive
S+C- smear positive culture negative
S-C- smear negative culture negative




**Risk of tuberculosis infection and disease in different economic strata**

**Background:**

Most researchers agree on the general association between TB and socio-economic conditions, but no direct cause and effect relationship has been demonstrated.

**Aim:**

To estimate TB infection and disease rates in the community and relate these to the economic status of the population.

**Methods:**

The study is being carried out in the same population where the disease survey is undertaken. All households in a village included for the survey will be visited and the head of the family/ informant identified. After explaining the purpose of the survey and obtaining consent a semi-structured interview schedule will be used to elicit the socio-economic status of the household.

**Results:**

The data collection was started in February 2004. Of the 11,926 households attempted, 11,374 (95%) were covered for the survey.

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**Assessment of Quality of life of TB patients treated under DOTS programme**

**Background:**

The impact of a chronic disease like TB on individuals is often affecting not only physical health, but also social, economic and psychological well being. The economic costs incurred by TB patients are well studied. However very little information is available on patients' perceptions regarding health status and quality of life after completion of treatment.

**Aim:**

To assess perceptions of 'cured' or 'treatment completed' TB patients about their physical, mental and social well being.

## Methods:

This study is being carried out in one TB unit (TU) of Tiruvallur district of Tamil Nadu, south India, with a population of 580,000. TB patients treated from July to December 2002 and January to June 2003 under the government health facilities of DOTS programme were visited at their residence after one year from the completion of treatment. Using a semi–structured (modified SF36) interview schedule to elicit data on physical and social functioning, role limitations due to physical or emotional problems, mental health, energy and vitality, pain and general health perceptions were collected.

So far, 567 patients were interviewed and data entry is in progress.

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### Management of MDR-TB patients from the field

## Background:

Emergence of MDR-TB is a potential threat to the success of TB control. Patients diagnosed to have MDR-TB in the study area were managed by TRC under programme conditions.

## Methods:

In the study area two additional sputum samples were collected for culture and sensitivity testing for *M. tuberculosis* from patients

1. Registered for treatment, within one week of admission
2. During follow up, if reported as positive by smear
3. Cured patients, at 12, 18 and 24 months from start of treatment to find the rate of relapse under RNTCP
4. All Cat II failure patients identified in the study area

Patients identified to have drug resistance to both isoniazid and rifampicin (MDR-TB), with or without resistance to other drugs, were treated with one of the following regimens.

| **Drug regimens** | **No. Pts.** |
|---|---|
| $S_3$,$Ofl_7$,$Eth_7$,$Emb_7$,$Z_7$ | 31 |
| $K_3$,$Ofl_7$,$Eth_7$,$Emb_7$,$Z_7$ | 20 |
| Individually tailored | 19 |
| **Total** | **70** |

## Results:

So far 75 patients have been identified with multiple drug resistance. Five of them were not MDR-TB but had resistance to more than one drug. Of the remaining 70 MDR-TB patients, 48 were from study area and 22 referred by a Non-Governmental organization (NGO), Advocacy for control of tuberculosis (ACT) working in Chennai Corporation. Duration of treatment is a minimum period of 18 months and/or culture negativity for 12 months, whichever is later. Most of the patients are still on treatment.

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### HIV seroprevalence in tuberculosis patients

## Background:

The HIV seroprevalence among TB patients varies widely between different states in India and even between different districts in the same state.

The seroprevalence varies between 0.6% in certain areas to almost 24% in some regions. This wide variation is a reflection of the background seroprevalence among the high-risk groups and the general population. The TRC had undertaken 2 surveys previously. The findings of these surveys and other such studies show a trend towards increasing HIV prevalence among the new TB patients.

**Aims:**

1. To determine the HIV seroprevalence among persons with TB by age, sex, area of residence and site of disease.
2. To monitor trends of HIV infection among TB cases in 4 selected centres.
3. To study the feasibility of testing all TB patients for HIV, through Voluntary Counseling and Testing Centre (VCTC).

**Methods:**

All new TB patients are referred to the VCTC if willing and offered HIV testing after pretest counseling. Patients who are not willing are tested in an anonymous unlinked manner in order to get unbiased prevalence. Since, blood collection is not part of the routine for TB patients on treatment, the addition of this procedure will be explained to the patient.

- Purpose of the study, informed consent
- Referral to VCTC by TB Medical Officer, pretest counseling
- Retesting of all blood samples by ELISA at TRC (for confirmation of results)
- Results will be divulged after post test counseling
- Two sputum samples (bacteriology)

The study sites will include the 4 centres:

| | |
|---|---|
| One rural | – Pennathur Sanatorium |
| One semi-urban | – Kancheepuram District Tuberculosis Centre (DTC) |
| One urban | – Vellore DTC |
| One Metropolitan | – Otteri TB Hospital, Chennai |

These sites are the same as in the 2 surveys conducted by TRC earlier.

**Outcome measures:**

Prevalence of HIV among TB patients at these 4 centers in Tamil Nadu will be available.

Trend analysis can be done as this will be the third time point where the prevalence survey is being done in the same centres.

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