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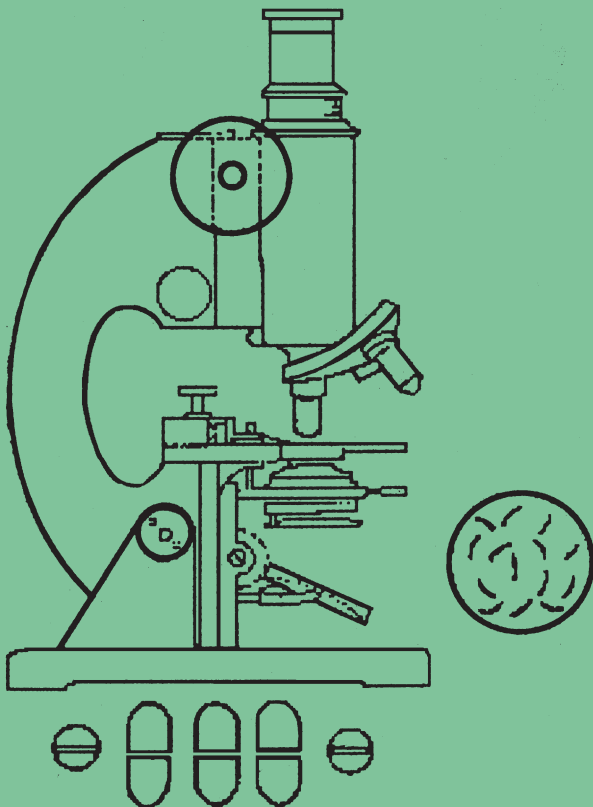
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We wish our readers A Very Happy New Year. The Revised National Tuberculosis Control Programme (RNICP) continues to deal with efficient case finding, case holding and effective treatment with special emphasis on Directly Observed Treatment Short-course (DOTS). Regarding case finding, although the emphasis of RNICP is to identify sputum positives and cure them, X-ray still continues to play its role in diagnosing patients with sputum negative - X-ray positive pulmonary tuberculosis. X-ray right from its invention in 1892 has remained quite popular with physicians and patients. In this bulletin "Role of MMR X-ray Units & its present Status" has been thoroughly presented by the author with the list of advantages for using MMR in place of conventional X-ray.

The National Tuberculosis Institute continues to monitor the performance of tuberculosis control programme in whole of the country. Emphasis on the importance of recording, reporting and supervision has been thoroughly covered in another article on related topic wherein monitoring and supervision have been shown as inbuilt component of recording and reporting system.

In view of expansion of RNICP the role of "Senior Treatment Supervisors" has become crucial in successful implementation of the programme. An article in this issue highlights multiple roles of senior treatment supervisors as a field worker, an educator, a trainer and a supervisor besides contributing in planning and organising the effective treatment strategies.

The other contributions in this issue are from the field workers in form of their experience with the tuberculosis patients. This issue also includes progress reports on current research activities viz., ARI in different parts of

India, Surveillance of drug resistance in the districts of Mayurbhanj, Hoogli and Nagaon and initiatives and progress on HIN projects.

To ensure active participation from our esteemed readers we are privileged to invite our readers to kindly contribute by sharing their valuable experiences, views and impressions about RNICP for its effective implementation in every part of our country.

Editor

हम अपने पाठकों को नववर्ष की शुभकामनाएं देते हैं। संशोधित राष्ट्रीय क्षयरोग नियंत्रण कार्यक्रम (आर.एन.टी.सी.पी.) प्रभावशाली रूप से क्षयरोगियों का पता लगाने, उनको संभालने व प्रत्यक्ष अवलोकित लघु कोर्स उपचार (डॉट्स) के माध्यम से उपचार करने में प्रयासरत है। केसों का पता लगाने के संदर्भ में हालांकि आर.एन.टी.सी.पी. का प्रमुख ध्यानकेन्द्र स्युटम पॉजीटिव केसों को पहचानने तथा उनका उपचार करने पर है, फिर भी स्युटम नेगिटिव फुफ्फुसीय क्षयरोग वाले रोगियों की जाँच में क्ष०-किरण की महत्वपूर्ण भूमिका है। सन् 1892 में अपने आविष्कार के समय से ही क्ष०-किरण चिकित्सकों व रोगियों के मध्य लोकप्रिय रही हैं। इस पुस्तिका में "एम.एम.आर. क्ष०-किरण की भूमिका तथा इसकी वर्तमान स्थिति" को लेखक ने विस्तारपूर्वक प्रस्तुत किया है तथा परम्परागत किरणों की अपेक्षा एम.एम.आर. के प्रयोग के लाभों की सूची भी प्रस्तुत की है।

राष्ट्रीय क्षयरोग संस्थान देशभर में क्षयरोग नियंत्रण कार्यक्रम के प्रदर्शन का अनुश्रवण करता है। रिकार्डिंग, रिपोर्टिंग तथा पर्यवेक्षण को एक अन्य संबंधित लेख में शामिल किया गया है जिसमें अनुश्रवण तथा पर्यवेक्षण को रिकार्डिंग तथा रिपोर्टिंग का आंतरिक अवयव प्रदर्शित किया गया है।

आर.एन.टी.सी.पी. के विस्तार को देखते हुए कार्यक्रम के सफल कार्यान्वयन में वरिष्ठ क्षयरोग पर्यवेक्षकों की भूमिका बहुत महत्वपूर्ण हो गई है। इस प्रकाशन के एक लेख में वरिष्ठ उपचार पर्यवेक्षकों के प्रभावशाली उपचार रणनीतियों की योजनाओं के आयोजन में योगदान के अतिरिक्त उनकी एक क्षेत्रीयकर्मी, शिक्षक, प्रशिक्षक तथा पर्यवेक्षक की विभिन्न भूमिकाओं को उजागर किया गया है।

इस प्रकाशन में अन्य योगदान उन क्षेत्र कर्मियों का है जिन्होंने क्षयरोगियों के साथ अपने अनुभव व्यक्त किए हैं। यह प्रकाशन वर्तमान अनुसन्धान गतिविधियों पर भी विकास रिपोर्ट दर्शाता है, जैसे कि - भारत के विभिन्न भागों में ए.आर.आई., मयूरभंज, हुगली तथा नागौन जिलों में दवा प्रतिरोधकता का अवलोकन और एच.आई.एन. परियोजनाओं पर उपक्रमण व विकास।

हमारे सम्मानित पाठकों की सक्रिय भागीदारी सुनिश्चित करने के लिए हम उनके अनुभव, विचार तथा देश के हर भाग में आर.एन.टी.सी.पी. के प्रभावशाली कार्यान्वयन के बारे में सुझाव आमंत्रित करते हैं।

डा. प्रहलाद कुमार
निदेशक

GENERAL INFORMATION ON MMR X-RAY UNITS & ITS PRESENT STATUS

S Ravindra*

Introduction:-

The Directorate General of Health Services, Government of India, New Delhi with assistance from UNICEF/WHO/SIDA between 1960-1990 had supplied over 500 Mass Miniature Radiography (MMR) X-ray units to STCs/DTCs/XCs of the country for implementation of the National Tuberculosis Control program

At the present cost of Rs.30 Lac per unit the investment made on the MMR units in the country works out to an amount of over Rs.150 Crores. To make things more complicated M/s Oldelft have phased out the 70-mm cameras and its accessories and have now stopped manufacturing them. M/s Oldelft have now merged with M/s Nucletron B.V. of Holland. This compelled the Government to keep the units supplied hitherto in working condition for as long as possible. Although the initial cost involved for supply of the MMR units was high compared to conventional X-ray unit, it was cost effective over large X-ray units in the long run. The advantages are obvious, especially in case of mobile X-ray units operating in the field.

This article is intended to give general information regarding the invention of MMR, its working principles and its advantages over the conventional X-rays. The information provided in the article would also be useful to the district and state level programme managers to know the current status of MMR X-ray units in the country. It will also give information about the facility provided by the Government of India for the maintenance, repair of these units and also regarding the training provided for operation of these units.

Historical aspects:

The introduction of radiography as a diagnostic tool was an important landmark in our knowledge of tuberculosis.

With the conventional X-ray machine normally the radiographs taken are based on the principle of

shadowgraphy. Obviously, the film either as large as the part being X-rayed, or larger had to be used. Hence, cost of the film increased as the area to be X-rayed increased. To take radiograph of every suspected case of TB, using large film was very expensive. There was a strong need to reduce the cost incurred without compromising on the quality of X-rays thus making the technique cost effective. The only way to reduce the cost was by reducing the size of the film. This was possible by adopting the principle of photography i.e " Formation of a real, inverted image smaller than the object". If the image formed on fluorescent screen could be photographed, the size of the film could be reduced. Efforts in this direction were in progress from early 19th century that ultimately resulted in the invention of the MMR.

Earlier Attempts:

Earlier attempts were made with the camera of the type normally used in photography where the size of the film required was 35-mm wide roll films. The disadvantage was that the film had to be projected by a slide projector and in such case due to high degree of magnification details were lost. The result was that a considerable number of patients had to be re-X-rayed on large films for proper diagnosis. Then an attempt was made with 4"X5" and even with 70-mm films using lens cameras. In lens camera the disadvantage was; the light ray passing through the focussing lens, absorbed a great percentage of the limited light available from the fluorescent screen. This meant either a very high exposure time or a high powered X-ray unit with risk of higher radiation to the patients. Standard exposures were of 40 Milli Ampere Seconds (mAs) at 80 Kilo Voltage Peak (KVP) for an average patient with chest thickness of 20 cms.

Then came the Odelca camera using mirror optics, i.e. using concave mirror instead of lens and this was a great step forward. First the exposure came down to 20 mAs and then further reduced to 8 to 12 mAs at 80 KVP. This was possible as the mirror used to focus the image absorbed far less fluorescent light compared to the lens. Therefore low power X-ray

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machines could be used. An added advantage was that more details were available on the film.

A comparison of the working principles of the MMR X-ray unit vis-a-vis is highlighted below.

MMR X-ray unit:

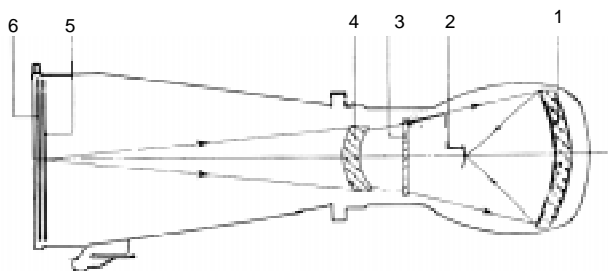


Fig 1. Odelca Camera

1. Concave mirror
2. Sensitive film
3. Conical lenses
4. Meniscus lens
5. Fluorescent Screen
6. Anti diffusion Grid

The Odelca camera consists of a light tight hood that incorporates in the first place an optical system (fig.1). The most important part of the optical system is the large concave mirror (1) a meniscus lens (4) and a conical lens (3). In the focus of the system we find the film (2) with its sensitive coating facing the mirror. This system designed by Prof. Bouwers was named the "concentric mirror system".

The great advantage of this system is that each ray of the light that passes through the centre of curvature is seen as an optical axis of the system. In principle this means that there is an equal image quality in all parts of the image, an outstanding high luminosity and better image sharpness is obtained which results in radiation reduction to a large extent.

X-rays generated by the tube penetrate the patient, corrected by the grid (6) an image appears on the fluorescent screen (5) this then passes through the lens (1) & (4) as a light image; this is later converged by the mirror onto the film (2) whose emulsion (sensitive) side is facing the mirror. The MMR films are very fast and sensitive to light, which explains why good pictures are obtained with less radiation technique compared to conventional radiographs. Good quality chest X-ray of a normal adult can be obtained with factors as low as 8 to 12 mAs and 80 KV in an MMR unit.

Conventional X-ray unit:

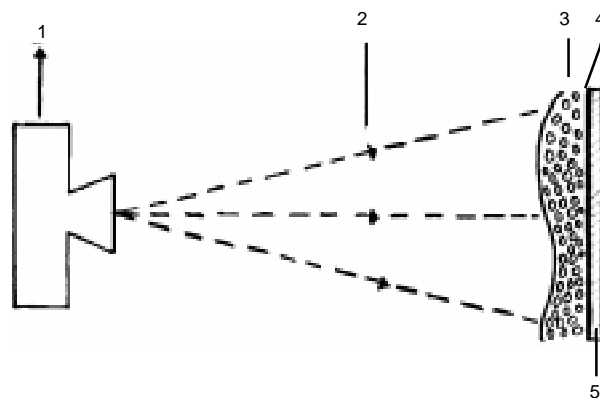


Fig. 2. Conventional X-ray

1. X-Ray Tube
2. X-Ray Beam
3. Object
4. Intensifying Screen
5. X-Ray Film

In a conventional X-ray unit by means of the X-ray generated through the tube penetrate via the patient and an image is formed on the intensifying screens, which is fixed in the X-ray cassette. The film which has sensitive emulsion coated on both sides is sandwiched between these screens. Because of the absence of the grid here that filters unwanted scatter X-rays the film receives them rays, this affects the quality, contrast and sharpness of the image formed on the film. X-ray chest of normal adult can be obtained with factors of 16 to 30 mAs and 70 to 80 KV.

Advantages of MMR over conventional X-ray:

There are operational and technical advantages for the use of MMR.

Operational:

Maintenance/Service cost of Odelca camera is minimal. The service life of Odelca camera is about 20 years and more. Cost of an MMR chest is approximately 1/10th of a large X-ray. MMR is best suited for mass surveys. Mobile version is available for rough terrain with an independent power source.

Technical:

Radiation exposure for patient and operator is comparatively less as highlighted in the working principle. Because of the presence of the grid that prevents the scatter radiation reaching the film and the inclusion of an optical system, high quality X-rays are produced in MMR. Simplified procedure for taking large number of Chest X-rays. Storage and retrieval of processed films is easy and requires less space.

Retakes are few because of safety precautions adopted. Simple and fast method adopted for processing MMR films.

Training and servicing of MMR units:

As Operation of MMR X-ray unit was different compared to conventional X-ray units, NTI took up the responsibility of imparting training in the operational and maintenance aspects to the staff involved in National TB Control Program, and till date NTI has trained over 880 X-ray Technicians/Radiographers.

NTI has played a pivotal role in keeping these MMR units in running condition for so long in the country. This is by lending technical advice guidance to needy STCs/DTCs/XCs about servicing and maintenance aspects. At times servicing of MMR units have also been taken up in places where the servicing company could not succeed in repairing. NTI is also the only Institute in the country that caters to the service requirement of the Roll Film Cassette (RFC); an important accessory of the MMR X-ray unit. It is to be noted here that both the manufacturers and the authorized Service Company do not take up servicing of the RFCs. In the year 1999 NTI has received additional spares from WHO for this purpose. Over 600 RFCs have been serviced till date at NTI.

District Tuberculosis Officers (DTOs) are requested to make use of this opportunity and write to The Director, National Tuberculosis Institute, No.8, Bellary Road, Bangalore-560 003 for further details.

CURRENT STATUS OF MMR X-RAY UNITS IN THE COUNTRY

Under instructions from the DGHS in the year 2000 NTI sent over 586 Report on Condition of X-ray Unit (RCXU) forms to STCs/DTCs/XCs centers for assessing the condition of their MMR X-ray units supplied by DGHS. In response, till date NTI has received over 400 RCXU reports. Preliminary assessments of the reports show about 50 percent of the MMR units are having problems that need servicing. This is because after the supply of these units periodic servicing/maintenance was not undertaken by any agency. Servicing of the MMR units would enhance their life substantially. Efforts are underway to procure spares from DGHS/WHO for this purpose. Centers will be informed regarding receipt of the spares and servicing of MMR units will be undertaken by NTI after prioritizing based on the RCXU reports received. Though the company has now stopped the manufacturing of the odelca camera and accessories, M/s Nucletron have assured the supply of spares if ordered in bulk.

Summary of RCXU reports received from DTCs/STCs/XCs as on 14-1-2003

Sl. No	Name of the state	Rcxu Sent	Report Received	MMR unit available			RFC Available		Dark room Accessories	
				Functional	Non Functional	Not Available	Functional	Non Functional	Available	Not Available
01	AP	24	18	07	11	00	28	14	14	04
02	J & K	14	11	05	05	01	08	04	05	06
03	Assam	27	16	06	07	03	10	05	07	09
04	Bihar	55	36	13	11	12	37	10	16	20
05	HP	12	12	09	01	02	10	10	10	02
06	Haryana	20	13	07	05	01	13	00	10	03
07	Karnataka	28	26	14	06	06	35	10	20	06
08	Tripura	03	01	01	00	00	01	01	00	01
09	Nagaland	08	07	00	02	05	02	01	02	05
10	Meghalaya	07	06	01	02	03	02	06	03	03
11	Mizoram	03	03	01	02	00	01	11	03	00
12	Sikkim	04	03	00	00	03	00	00	01	02
13	Manipur	08	05	00	01	04	00	00	00	05
14	Kerala	19	09	02	04	03	04	03	03	06

Sl. No	Name of the state	Rcxu Sent	Report Received	MMR unit available			RFC Available		Dark room Accessories	
				Functional	Non Functional	Not Available	Functional	Non Functional	Available	Not Available
15	Punjab	17	10	05	04	01	13	04	08	02
16	Rajasthan	34	20	13	04	03	27	08	16	04
17	UP	77	52	30	17	05	71	23	42	10
18	ARP	12	06	01	01	04	01	00	01	05
19	Gujarat	20	18	15	03	00	24	11	15	03
20	WB	22	08	04	02	02	05	03	04	04
21	MP	45	41	36	05	00	68	24	33	08
22	Orissa	31	15	09	04	02	18	20	09	06
23	Maharastra	32	27	20	06	01	41	14	20	07
24	TN	35	23	17	04	02	34	07	15	08
25	Goa	02	02	02	00	00	01	00	02	00
26	Uts	27	19	08	05	06	12	05	09	10
	Total	586	407	226	112	69	466	194	268	139

Information regarding MMR units of various sanatoria of different states have not been included.

The preliminary analysis of the RCXUs received at NTI so far reveals that around 60% of the MMR X-ray units in the country require servicing and replacement of few spares. NTI is now embarking on an action plan in consultation with DGHS to service them by changing necessary parts. Aged and non-functional Odelca cameras will be serviced thoroughly by replacing spares, this

will enhance camera life by about 25 years. Efforts to service and revive non-functional X-ray units will also be taken up. Redistribution of Roll Film Cassettes (RFCs) to needy centers from those centers having extra RFCs will be taken up. Centers where MMR units are lying idle because of breakdown in RFCs may send the same to NTI for servicing.

ROLE OF SENIOR TREATMENT SUPERVISORS IN REVISED NATIONAL TUBERCULOSIS CONTROL PROGRAMME

VN Saroja *

The Revised National Tuberculosis Control Programme (RNTCP) aims to reduce the transmission of tuberculosis as well as mortality and morbidity from the disease, until it is no longer a major public health problem.

The outcome of any programme is dependent on the role of the key persons involved and their performance. At times, when the programme is more field operation oriented, it is an extremely difficult task for the programme administrators to plan and demarcate individual job responsibilities.

As Ben Boyal rightly put it ; "Most plans are just inaccurate predictions" . Hence the necessity or the urge of the key personnel in making the programme a success plays a crucial role as against so called "prescribed methodology". This may demand the key personnel to don "new avathar" as per the demands of the ground situation.

The Senior Treatment Supervisor (STS) has to assume different roles at different junctures in the RNTCP. He has to play the role of a field worker, treatment organizer, trainer, colleague, subordinate, teacher, health educator, advisor, well wisher, supervisor, etc. While discharging these roles, the STS has to act with simplicity and responsibility. By virtue of his position, he has various roles to play at the Tuberculosis Unit (TU), Microscopic Centres (MC) and Treatment Centres. The expected duties of STS while playing different roles are as follows:

1. As a field worker

- Ensure effective case detection and organize Directly Observed Treatment (DOT) in the TU and MCs after cross verifying the addresses of the patients.
- Maintain Tuberculosis (TB) Register incorporating the required information in respect of all cases diagnosed in the sub-district.
- Prepare quarterly report on case detection,

sputum conversion, treatment outcome & programme management and send them to District Tuberculosis Officer (DTO) after review and approval by the Medical Officer of Treatment Unit (MO-TU).

2. As an educator

- Make certain that the patients are advised properly regarding regularity in treatment completion in the prescribed period, so that they get cured and further spread of infection is prevented. STS for this purpose has to motivate patients appropriately, by understanding their attitude, knowledge and circumstances of the patient. STS's ability to create awareness among the patients for continuation of treatment amounts to proper motivation.

3. As a Trainer

- Train the staff of health facilities under his jurisdiction to carry out TB control related activities like DOT, retrieval action through home visit, etc.
- Provide continuous training to health staff viz., Health Visitors, Staff Nurses, Health Assistants and Multi-purpose Health Supervisors, in carrying out various activities such as:
 - i. Make sure the initial home visits to the patients prior to starting treatment and follow-up visits for retrieval of defaulters.
 - ii. Discussions with new patients to find out the most convenient location for DOT and continuously educate them regarding the importance of completing the prescribed treatment period.
 - iii. Ensuring DOT in the intensive phase and providing drugs in the continuation phase with first dose of the week under direct

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observation while the other two doses are self-administered.

- iv. Maintenance of treatment cards and see that the follow-up examinations are carried out as per the guidelines.
- v. Ascertain that the contacts are suitably examined.

4. As a Captain of the Treatment Section

- Maintain a map of the area detailing all the government health facilities as well as Non-governmental organizations (NGOs) which specifically carry out TB activities. The facilities and staff available in these organizations should be listed. The willingness of the identified NGOs to support the TB control programme should be solicited.

5. As a Supervisor

- Supervision of the Primary Health Centres, Community Health Centres and hospitals in his area, at least once in a month on a systematic basis.
- Ensure that the patients presenting with productive cough of 3 weeks or more duration undergo 3 sputum smear examinations.
- Make certain that the patients are correctly classified and prescribed treatment. The treatment outcome must be indicated on completion of treatment.
- Make sure that the follow up sputum examinations are carried out as prescribed.
- Check the patients randomly and ensure that treatment is carried out accurately as per the guidelines.
- Interviewing the patients at random to ascertain proper entries in the treatment forms which forms an important part of the supervision.
- If supervision is done without the Senior TB Laboratory Supervisor (STLS) :
Collect information on all parameters of laboratory performance, cross check to see that all sputum smear positive cases are put on treatment, necessary steps taken to trace initial defaulters and bring them back for treatment and inform the MO and STLS about any discrepancies observed in

functioning of the laboratory.

- During these supervisory visits, it is important to find out the facts to ascertain why certain laid down procedures are not being followed besides taking possible corrective actions instead of just finding faults.

The supervision should be aimed at helping the workers to carry out their duties in an organized manner and help the patients to complete the treatment successfully. This will be possible if STS acts as a friend, philosopher, guide and teacher by inquiring about the difficulties faced by the workers.

6. As a planner

- Prepare monthly tour programme in advance and see that all the field units are covered at least once in a month & approval obtained from the MO-TC.
- Maintain a diary, record the details of field visits and give feedback to the MO-TC on the observations made.

7. As an organizer

- Maintain regular supply of drugs and other logistics and ensure their uninterrupted availability at all the designated centres in the sub-district.
- Retrieve un-consumed medicine boxes of patients who have defaulted.
- Arrange and facilitate the referring of patients to the District TB Centre or other designated health facilities for drug toxicity and other complications.

On the whole, the STS is expected to be a person with positive attitude which in turn is beneficial to the RNTCP. He fosters teamwork to solve the problems, improves the quality of work, encourages better relationship with other staff and patients, etc.

To conclude, the STS has various roles to play for the success of RNCTP and should have the skills like problem-solving, decision-making, creativity, critical thinking, effective communication, interpersonal relationship, empathy, self awareness, etc. He is an important link between the health system & the patients besides acting as a co-ordinator between the district level health systems, Primary Health Institutions and the sub-district.

Bibliography

1. Central TB Division, New Delhi: Operational Guidelines for tuberculosis control; Ministry of Health & Family Welfare, Directorate General of Health Services, New Delhi 1999, page 10-11.
2. Central TB Division, New Delhi: Operational Guidelines for Senior Treatment Supervisors, Part-I, Ensuring proper treatment; Ministry of Health & Family Welfare, Directorate General of Health Services, New Delhi 2002, page 27.

MONITORING OF TUBERCULOSIS CONTROL PROGRAMME - RECORDING, REPORTING AND SUPERVISION

KP Unnikrishnan¹ & PS Jagannatha²

Summary:

The national TB control programme has put in place a recording and reporting system to systematically evaluate the patient's progress and treatment outcome, as well as overall programme performance. The system includes a laboratory register that contain a log of all chest symptomatics and patients who had a smear test done; treatment cards that detail the intake of medication and results of follow up sputum examination; and the TB register which lists patients starting on treatment and monitors their individual and collective progress towards cure. A health worker is responsible for supervising each administrative area or institution in the district and uses the district/sub district TB register to monitor the progress and treatment outcome of all patients in that district. This provides the district or local health chief with rapid feed back on programme performance in the district and allow for monitoring of the epidemic overall. Recording and reporting system allows for targeted, individualized follow up to help patients who may not be making satisfactory progress and rapid management assessment of the overall performance of each institution, district, state and national. There is a strong system of accountability and checks and balances that make false reporting of data difficult.

A good record/report demonstrates that services were provided to the patient and establish that services provided were necessary. Reporting is auditing of our own records. This helps the programme managers to evaluate the strengths and weaknesses of the system of TB case management.

1. Introduction

1.1 The basic objective of the recording and reporting system is to provide a 'Management information system' for better management of Tuberculosis Programme at national, state, district and subdistrict levels. The regular flow of information generated at various management levels assists the programme managers in

assessing their performance against the expectations. The areas of non-performance and bottlenecks in programme delivery could be identified and evaluated for immediate remedial action.

- 1.2 An efficient monitoring system should have a standardised set of performance indicators¹. The indicators compiled on the basis of reports emanating from the field are compared with the expected values for assessing the performance. Once the monitoring indicators are standardised, the essential data required for compiling the indicators have to be identified. The proper implementation of the programme would also need documentation of several other details, especially of the patients. This calls for designing of appropriate forms or records at the most basic level. These records could be either patient oriented or management oriented. Standardised definitions of cases, disease classification, treatment regimen, treatment outcome etc. are very vital in designing basic records for the information system. A consensus on frequency of reporting and analysis is also vital for an efficient monitoring system. A three monthly quarterly reporting system has been adopted for the TB control programme in India.
- 1.3 A brief analysis of the programme performance in Karnataka during 2001 has been given towards the end of the paper.

2. TB Control Programme

2.1 The National Tuberculosis Programme (NTP) has been implemented in all parts of India since 1962. The National Tuberculosis Institute (NTI), Bangalore which was set up in 1960, played a major role in its formulation. Sustained research efforts of NTI, Bangalore and Tuberculosis Research Centre (TRC), Chennai helped in several operational improvements in implementation of NTP^{2,3,4,5,6,7}. These institutions have also largely shouldered the burden of the heavy training

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requirements under the programme. 'Recording and reporting' was given vital importance since beginning which was basically a district based action plan under a District Tuberculosis Officer (DTO). The strengths and weaknesses of the programme were jointly evaluated by the Government of India (GOI) and the World Health Organization⁸ (WHO) in 1992. The review among other things concluded that despite the existence of a national programme, the accuracy of diagnosis of TB patients was still poor and that most of the diagnosed patients did not complete treatment. Based on the recommendations of the review team, the Revised National TB Control Programme (RNTCP) was initiated in 1993. The major thrust of the revised strategy was on Direct Observation of Treatment (DOT). Accountability by way of proper documentation and reporting of treatment services provided to each and every patient is another main stay of the RNTCP strategy. After the pilot phase from 1993 to 1998, wide scale implementation of RNTCP with World Bank assistance began in late 1998.

3. Monitoring

3.1 Up to 1977, NTP was monitored by two designated Regional Centres i.e., southern and northern. In 1977, the entire monitoring responsibility was handed over to NTI, Bangalore. The responsibility of monitoring the RNTCP is vested with the Central TB Division, Directorate General of Health Services (Dte.GHS), Ministry of Health & Family Welfare, GOI. The technical responsibilities for research and training are shared by NTI, TRC and other central institutions under the overall guidance of GOI and WHO.

4. Tools of Monitoring

4.1 Using appropriate indicators is one way of measuring the achievement of patient oriented activities as well as programme management. The TB control programme has identified several indicators, the most important of which are as under:

A. Patient oriented

- a. Case detection rate.
- b. Proportion of chest symptomatics among all OPD adult patients attending the health institutions covered under RNTCP.
- c. Proportion of new smear positive cases detected out of patients subjected to sputum

smear examination.

- d. Ratio of smear positive to smear negative cases.
- e. Reported notification rate of new smear positive cases per lakh population per year.
- f. Sputum conversion rate at the end of intensive phase for smear positive cases (new relapses and failures).
- g. Treatment outcome for new smear positive cases, relapses and other re-treatment cases:
 - i) Cure rate
 - ii) Completion rate
 - iii) Default rate
 - iv) Failure rate
 - v) Death rate
 - vi) Transfer rate

B. Programme management oriented

- a. Proportion of districts covered under the programme.
- b. Proportion of supervisory visits at various levels.
- c. Number of quarterly reports on case finding, sputum conversion, treatment outcome and programme management and logistics properly completed and received.
- d. Proportion of drugs and other supplies consumed.
- e. Proportion of slides accurately read as smear positive or smear negative.
- f. Information on key personnel and equipment in position.

5. Basic records under TB Control Programme

5.1 For the compilation of the indicators enumerated above, the TB Control Programme has specified the following basic records:

A. TB Treatment Card: This is the very basic and most important document specified for patient documentation. This is prepared immediately after a patient is diagnosed and decided to be initiated on treatment. This card is maintained at the health unit separately for each patient where he/she receives treatment. It contains patient information about identification particulars, name of contact person, type of disease, name of the treatment centre, the category of treatment, administration of drugs, details of sputum examination and the treatment outcome. The health worker uses the treatment card for recording the progress of treatment and for follow up. The information contained in the

treatment card not only helps in management of the case but also is used in completing the TB register.

- B. **TB Identity Card:** This is issued to the patient after he / she is initiated on treatment. This contains patient information as in the TB treatment card. The card also contains columns for dates for follow-up appointments and health education messages.
- C. **TB Register:** This register is maintained at the Tuberculosis Unit (TU) level under RNTCP and at district level under NTP. The Senior Treatment Supervisor (STS) in RNTCP is mainly responsible for the maintenance and timely updation of this register. The TB register is updated periodically on the basis of information contained in the treatment cards. The patients are registered and assigned a TB number, starting with number one at the beginning of each calendar year. Each patient in the TU/ district, therefore, is assigned a unique TB number for purposes of identification. In addition to the TB number, the TB register contains the patient details viz., date of registration, name (in full), address and gender, name of treatment centre, date of starting treatment, treatment regimen, disease classification, type of patient, details of sputum examination and treatment outcome. Information in the TB register helps in monitoring programme activities as well as in preparing the quarterly reports of the TU/district.
- D. **TB Laboratory Register:** This is the record maintained by the Laboratory Technician (LT) in the Microscopy Centre (MC) responsible for sputum smear examinations of TB suspects and follow-up sputum smear examination. For each chest symptomatics examined for sputum smear microscopy the register would contain a row of information viz., laboratory serial number, date of examination, name, age, gender, name of the health unit which requested the examination, address for new patients, reason for examination (diagnosis/followup) and sputum smear examination results. The register will, therefore, have data on the number of suspect cases examined, number of smear positive cases detected and the number and results of smear examination at follow-up stages. The contents of the laboratory register are also a major input for the updation of TB register as well as for quarterly report preparation.
- E. **TB laboratory Form - request for sputum**

examination: This is the form sent with the patient (or sputum sample / smear) requesting for sputum examination. The bottom portion is filled by the LT after sputum examination. It contains patient information and also provides data on the number of days taken to collect three specimens for diagnosis and for giving the results by LT.

- F. **TB Culture/Sensitivity Request/Report:** This is the request form for culture / sensitivity tests which are usually done at a central or reference laboratory. The results of the culture / sensitivity tests are also entered in this report along with the laboratory serial number.
- G. **TB Referral / Transfer Form:** This form is used while transferring a patient from one health unit to a health center in another TB unit or district. Apart from containing all patient information in the TB treatment card, it also contains name of the referring unit and the unit to which the patient has been transferred and a section to be sent back to the referring unit after he / she is registered in the new TU / district TB register. The transfer form also has a section for reporting the treatment outcome of the patient to the health unit from which he/she was originally transferred.

6. Reporting System, Analysis and Feed-Back

6.1 Reporting System:

A quarterly reporting system has been adopted for the NTP/RNTCP in India. The purpose of the quarterly reports is to monitor the programme activities and to evaluate the programme.

The following are the components of the quarterly report :

- A. **Quarterly Report on New and Retreatment Cases of Tuberculosis :** This report complies with the epidemiological and administrative requirement for the notification of new and relapse cases diagnosed.
- a) The report includes the total number of pulmonary smear positive cases (divided into new and relapses), pulmonary smear negative and extra pulmonary cases, which were diagnosed and registered during the quarter. Failures, chronic and return after interruption cases are not included in this report since they are not notifiable cases.

- b) The new pulmonary smear positive cases are classified by age & sex whereas all other types of patients are classified only by sex.

- B. Quarterly Report of Sputum Conversion of New cases, Relapses and Failures :** In order to anticipate the outcome of treatment (which would otherwise not available for another 12-15 months) it is essential to monitor the sputum smear conversion rates achieved at the end of 2 or 3 months of treatment. The RNTCP districts with high conversion rates of >85% become eligible for selection as 'sites' for field visit for trainees from implementing districts.
- C. Quarterly Report on the Results of Treatment of Tuberculosis patients registered 12-15 months earlier :** Cohort analysis is the key management tool for evaluation of the effectiveness of TB control activities in any given area. A cohort consists of patients who were diagnosed, registered and planned to have the same treatment with in a defined period.

Evaluation of outcome of treatment is based on the analysis of two groups of patients

- 1) New smear +ve pulmonary cases
- 2) Retreatment smear +ve cases

- D. Quarterly report on programme management and logistics :** This report facilitates the monitoring of the logistics of drug supply and other material inputs at the peripheral and higher levels. The report also provides a consolidated picture of the case detection and treatment activities under RNTCP for that level.

6.2 Analysis and Feed Back

- A. National TB programme :** Under the NTP, the Peripheral Health Institutions (PHI) as well as Microscopy / X-ray Centres (MCs / XCs) are required to send monthly reports to the District TB Centre (DTC). The DTC consolidates the monthly reports and transmit the same to the Director of Health Services (DHS) in the state. However, the most significant is the quarterly report, which every DTC has to submit to the Directorate General of Health Services, New Delhi; NTI, Bangalore as well as to the respective state DHS. The NTI analyses the quarterly reports for various indicators of performance described earlier. The reports are also subjected to detailed scrutiny for consistency and reliability. The details of analysis are brought out

in a report form and are submitted to the national health authorities. Feedbacks on the state level performance along with a comparison of performance of individual districts are forwarded to the State TB Officer (STO) / DHS. Inconsistencies observed in the quarterly reports as well as the performance are also conveyed to the individual DTOs for bringing in improvements in the implementation as well as reporting of the programme.

- B. Revised national TB control programme:** Central TB Division, Dte.GHS, GOI, is directly monitoring the performance of RNTCP. A TU for every five lakhs population and MC for every one lakh population are additional institutionalities provided in RNTCP. The records at TU level are periodically updated by the Senior Treatment Supervisor and hence the flow of information from the peripheral level to the TUs has been integrated as a part of the regular administrative/ supervisory mechanism. There is a monthly flow of information on programme management and logistics from the PHIs to the TUs. For this purpose microscopy centres are also treated as PHI's. The information essential pertains to the consumption of drugs, laboratory consumables and other supplies, staff position and training, microscopy activities, etc. These reports are consolidated once in a quarter at TU level for all the PHIs and at DTC level for all the TUs. The information contained in the TB register and TB laboratory registers are used for compiling quarterly reports at TU level for patient oriented activities. The quarterly reports from DTC are furnished to the State TB Officer, Central TB Division, Dte.GHS as well as to NTI. The STO consolidates the quarterly reports received from the DTCs at his level and adds information on the activities at the state level before the same are reported to the Central TB Division, Dte.GHS, New Delhi. The reports received in the Central TB Division are scrutinized thoroughly for consistency of the reported figures. Feedback on the initial scrutiny is conveyed immediately to the concerned DTOs and clarifications are sought. The reports are analysed for indicators of performance. These are later consolidated for knowing the position at state as well as national levels.

7. Monitoring and Supervision

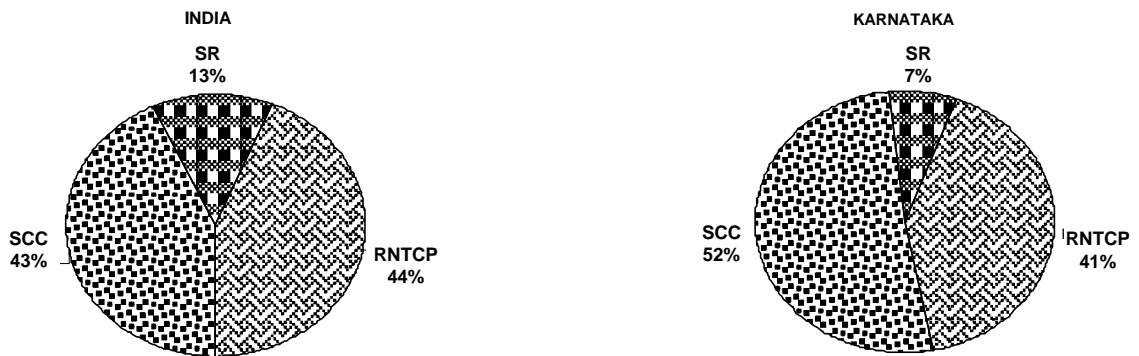
- 7.1 Monitoring and supervision are inbuilt in the recording and reporting system especially in RNTCP. The record keeping has been so

designed, that a supervisor at any level can check and verify the status of a particular patient at any point of time. Intensive supervision is the backbone of the revised DOTS strategy. The programme provides an efficient default retrieval system, thereby reducing the chances of the case to be transformed into a Multi-drug Resistant (MDR) one. Frequent review meetings conducted by the officers at district, state and national levels also provide the forum for introspection and for corrective and remedial actions.

8. Performance of TB control programme in India & Karnataka

8.1 India has 35 states/union territories and nearly 600 districts with a population of 1027 millions in 2001. By the end of December 2001, 44% of total population has been covered under RNTCP. The states of Rajasthan, Kerala, Delhi, Himachal Pradesh, Tamilnadu, Manipur, Sikkim and UT of Chandigarh have achieved 100% RNTCP implementation by March 2002. For efficient implementation of the programme, a few high populated districts having substantial urban population have been divided into rural, urban and municipal corporation areas. There were 262 RNTCP districts in all as of September 2002⁹.

Fig1 : Population Coverage



CC : Conventional Chemotherapy,
 SCC: Short Course Chemotherapy

8.2 Karnataka with 27 revenue districts has a population of 527 lakhs as per the 2001 census. There are 28 DTCs in the state. As on 3rd quarter 2002, 11 districts have been brought under RNTCP implementation⁷ and the remaining 17 districts are implementing NTP. The districts of Bellary, Bijapur, Chitradurga, Mandya, Raichur,

Davangare, Bagalkot, Koppal, Bangalore (Urban), Bangalore (Rural) and Bangalore Mahanagara Palike (BMP) have been covered under RNTCP. This account for a population of 218 lakhs and is about 41% of the population (Fig.1).

Table 1 : Performance of TB Control Programme during the year 2001

	Population Covered in lakhs by 31.12.2001	Total case treated	Annual total case detection rate	New S+ve* cases	Annual new s+ve* detection rate	Ratio of S+ve* to S-ve* patients	2/3 months conversion rate of new s+ve*patients	Success rate of new S+ve* patients
All India								
NTP ¹¹	5770	666853	129	199550	38	2.00	74%	62%
RNTCP ¹⁰	4503	471658	121	185178	47	1.25	88%	84%
Karnataka								
NTP ¹¹	328	39652	134	13875	47	1.63	66%	65%
RNTCP ¹⁰	199	20959	113	9646	52	0.7	86%	84%

* S+ve = Smear positive, * S-ve = Smear negative

8.3 Some of the salient performance indicators for the districts under NTP and RNTCP for the year 2001 are given in the Table-1. All India estimates have also been given for comparison. The annualized new smear positive case detection rate in Karnataka for the year was higher than the national rates for both NTP and RNTCP. The ratios of number of smear positive to smear negative patients were also more favourable in Karnataka for both the programmes compared to all India. However the annualized total case detection rate for RNTCP in the state is fairly lower (113) than the national rate (121)¹⁰.

8.4 A high conversion rate is usually followed by high cure rate. This gives an indication about the efficacy of the treatment regimen and the degree of supervision during the intensive phase of the treatment. Table 1 shows that smear positive patients converted to smear negative at the end of 3 months were 74% & 88% in All India NTP & RNTCP areas. In Karnataka, however these rates were 66% and 86 % in NTP & RNTCP areas respectively.

Monitoring problems and suggestions:

8.5 For the effective functioning of a monitoring system, it is very essential that the basic records and documents are maintained as per the standards specified. Timely consolidation of figures at different levels should be ensured for smooth flow of information to the higher level. The acid test for judging the efficiency of a monitoring system is whether the reports prescribed are received from all the districts in time and are consistent and reliable.

8.6 Smear conversion rate & Treatment Success rate in Karnataka under NTP was very low as compared to the rates in RNTCP areas (Table1). The reporting of treatment outcome from NTP areas is quite unsatisfactory. NTI had advised the NTP districts to discontinue compilation of quarterly reports in DTP/9 formats and instead, furnish the reports in the revised Short Course Chemotherapy (SCC)/Conventional Chemotherapy (CC) formats. This was to facilitate the uninterrupted flow of information on treatment outcomes.

8.7 All the 11 RNTCP districts of Karnataka have been regularly submitting quarterly reports in the prescribed format in time. The Central TB Division, Dte.GHS, has brought out the results of

the analysis for the year 2001. Scrutiny of the reports has brought out certain shortcomings. It was observed that some of the district reports were inconsistent while reporting new cases. Differences have been observed in the number of patients registered and the number of patients put on treatment. Another area of discordance was in the consumption of sputum containers and laboratory consumables. Re-training of field staff maintaining the basic records and intense supervision could only salvage the situation and render the reporting more accurate and reliable.

8.8 Computers have come in a big way in all walks of life. Computers have been provided to all the DTCs covered under RNTCP. Even TUs could also be equipped with computers in the near future. It is, therefore, suggested that the compilation and transmission of data at district level be immediately commenced in electronic media, if not done already. This not only reduces the processing time at state and national levels, but also reduces the transcription errors at these levels.

Reference:

1. Implementing the Revised Recording and Reporting System (Module 7): Central TB division, Directorate General of Health } Services, Min. of Health and Family Welfare, Nirman Bhavan, New Delhi-110011. Annexure IV.
2. Banerji D. & Anderson S: A sociological study of awareness of symptoms among persons with pulmonary tuberculosis ; Bull Wld Hlth Org 1963;29,665.
3. Baily GVJ et al: Potential yield of pulmonary tuberculosis cases by direct microscopy of sputum in a district of south India: Bull Wld Hlth Org 1967,37,875.
4. Tuberculosis in India - A Sample Survey 1955-1958. Special Report Series No.341, Indian Council of Medical Research, New Delhi, p.1, 1959
5. Tuberculosis Chemotherapy Centre, Madras. A concurrent comparison of home and sanatorium treatment of pulmonary tuberculosis patients in south India. Bull Wld Hlth Org 21: 51, 1959.

6. Fox, W. Self-administration of medicaments. A review of published work and a study of the problems. Bull Int Union Tuberc 31:307, 1962.
7. 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 Wld Hlth Org 31: 247, 1964.
8. World Health Organization: Tuberculosis Programme Review - India 1992; WHO, Geneva:1992.
9. RNTCP performance report, India, Third Quarter 2002: Central TB division, Directorate General of Health Services, Min. of Health and Family Welfare, Nirman Bhavan, New Delhi-110 011.
10. TB India 2002- RNTCP Status Report: Central TB division, Directorate General of Health Services, Min. of Health and Family Welfare, Nirman Bhavan, New Delhi-110 011.
11. Report on performance of National TB Programme: National Tuberculosis Institute; 25/4. Jan-Dec-2001.

"NATIONAL SAMPLE SURVEY TO ESTIMATE ANNUAL RISK OF TUBERCULOUS INFECTION IN DIFFERENT PARTS OF INDIA"

Progress Report : July - December 2002

This is in continuation of earlier reports published in previous issues of NTI Bulletin regarding the survey, which is being conducted by the National Tuberculosis Institute as a nodal center. The study has been completed in north, south and west zones. The field work is currently under progress in the east zone and is likely to be completed by January 2003.

During the period; July to December 2002, 19,050 children were investigated. A total of about 1.9 lakh children have been investigated till December 2002.

Data entry of the East zone is under progress. The field work is being supervised by officers and staff of NTI on day to day basis.

Dr VK Chadha
Sr. Epidemiologist
NTI, Bangalore

SURVEILLANCE OF DRUG RESISTANCE IN THE DISTRICTS OF MAYURBHANJ, HOGLI & NAGAON

Progress Report : July - December 2002

The intake of specimens for the study was completed by the end of June '02 in Hoogli and Mayurbhanj and Nagaon districts.

The number of specimens received for the period ending September 2002 is given below:

District	Total Specimens
Hoogli	352
Mayurbhanj	342
Nagaon	354

The bacteriological results were available for all the patients taken into the study by the end of Novem-

ber 2002. A draft report of the results has been sent to Central TB Division, New Delhi.

Dr B Mahadev
Chief Medical Officer
NTI, Bangalore

HEALTH INTERNETWORK INDIA PILOT PROJECT-TUBERCULOSIS

Progress Report : July - December 2002

Essential additional manpower required for the HIN project were appointed. They are:

1. Project Assistant

Interview was conducted on 1st August 02, by the selection committee consisting of Dr Prahlad Kumar, Director, Mr. K.P.Unnikrishnan, Project Co-ordinator and Prof. Neelameghan, External Professional expert, to select a Project Assistant for the HIN Project. Mrs. Lakshmi Ravishankar was selected among the 8 candidates who attended the interview. She reported for duty on 2.9.2002.

2. Technical Consultant

Prof. A. Neelameghan, Emeritus Professor, DRTC was appointed as Technical Consultant for the HIN Project.

3. Medical Consultant

Offer of appointment was sent to Dr. (Mrs) Sujatha Chandrasekar who was selected for the post of Medical Consultant under the HIN Project.

Creation of Union Catalogue of Core Periodicals on TB

Mr. Ranjan Dwivedi had a discussion with Sr. Librarian regarding preparation of core list of Periodicals on Tuberculosis and their Union Catalogue. A list of 73 core periodicals was prepared after scanning 8000 abstracts of Indian articles published over a period of 20 years in Excerpta Medica -15 Chest Diseases and approximately 500 abstracts down loaded from NLM data base.

With the advise Prof. A. Neelameghan, creation of union catalogue of 73 core periodicals on Tuberculosis was initiated. WIN/ISIS, a free legalized UNESCO software was installed to carryout information processing for the HIN project. Using Foxpro software, the data required for core periodicals across the country was downloaded from soft copy of the National Union Catalogue of Scientific periodicals (NUCSSI)* released by INSDOC, New Delhi. Separate databases were created on WIN/ISIS 20

viz., TB PERS (Title History), LIBCOD (Library details) and UNCAT is for (Holding details). Through a unique data structure for each database, a total of 2248 records were generated. After a series of discussion with Prof. A. Neelameghan and NIC, Bangalore, a design was developed for uploading the data of core periodicals on the web. Formats for search strategies and search results were developed. The Union Catalogue was uploaded to the NTI website in October 2002.

Initiation for Intranet

Internet connection was established through cable by M/s. DSL Dishet, Bangalore. Installation of LAN and extending the connection throughout the institute is in the offing. Mrs.Lakshmi Ravishankar, Project Assistant, prepared a prototype of "Intranet home page". for launching of Intranet Dr. Sarala Arunagiri, Sr. Manager, Health Care and Telemedicine of M/s Pico Peta Simputers Pvt. Ltd, Bangalore made a demonstration of SIMPUTERS on 12th July at NTI, Bangalore regarding its feasibility of utilization in the project.

Thesaurus on TB

Initiatives for developing Thesaurus on TB has staologies from MEDLINE and other database has started.

Templates for the Data entry

Sr. Librarian and Project Assistant attended the meeting convened by M/s. Indegene systems Bangalore for discussion on templates for data entry and uploading. Suggestions for changes in the templates were sent. NTI has sent 160 records in October 2002.

HIN Meeting

A HIN awareness meet was conducted on 24th October 2002 to inform the aims, goals and benefits of HIN project to faculty, technical staff of NTI, PG Students on training and Dr. Karen, WHO global training consultant.

HIN National Workshop

A one day National level workshop to "Chalk out the action plan of Resource Institutions (RI) of HIN Project" was organized on 14th November 2002 at NTI, Bangalore. In all, 21 participants from RI, media developers, and DANTB attended. Presentations were made and discussions were held on : Content development (by Mrs. Sudha S Murthy, Sr. Librarian and Mrs. Lakshmi Ravishankar, Project Assistant, HIN); Content uploading (by M/s. Indegene, Bangalore); Resource sharing and the concept of JCCC (by M/s Informatics India, Bangalore); operation of List Serve (by Mr. Jitendra, NTI and Prof. A. Neelameghan, Professional Consultant, HIN); Use of information technology for strengthening training programme (by Dr. Neeraj Raj, Director Med Re Edu Tech, Hyderabad); Capturing of data from different levels of program on PDA by M/s. Analytica India, Bangalore; and Demo on GIS based decision support system for better presentation of RNTCP indicators (by Tushar Kant Ray of DANTB). The workshop was moderated by Mr. Ranjan Dwivedi, programme manager, HIN, WHO, New Delhi. An action plan with time schedules was immediately prepared and sent to all the RI's for follow up action. A detailed report of the workshop was subsequently prepared and sent to all the RI's.

Journal Custom Content for Consortia (JCCC)

A proposal for JCCC was moved by the NTI,

Bangalore with NTI as the consortia leader on 24.12.2002 to the Project Manager, HIN Project, New Delhi for execution under HIN Project. Through this, the contents of the periodicals subscribed by the 4 resource institutions viz., National Tuberculosis Institute, Bangalore, TRC, Chennai, VP Chest Institute and LRS Institute of TB and allied diseases, New Delhi will be available with abstracts as well as full text on Electronic Media on the NTI server for access by all the faculty and staff of these institutions. The benefits derived from this are that the users can access all the periodicals, obtain the full text at any point of time. The cost of this proposal is around Rs. 7.65 lakhs, which will be funded by the HIN for 2 calendar years ie. 2003 and 2004.

Initiation for Digitization

Several discussions were held with the technical consultant, browsed websites of similar digitised project and visit was made to the digital library at IISc, Bangalore to formulate a draft proposal for digitization under the project. Subsequently, a brief draft report was prepared for digitization and action has been initiated to lookout for vendors for outsourcing the digitization work. Request letters to obtain copy right permission for digitization for the NTI papers published in different journals have been sent. During the period under report , permission was received from Indian Pediatrics and Indian Journal of Tuberculosis.

TRAINING & SUPERVISORY ACTIVITIES

During July - December 2002

I National TB Programme (NTP):

a) Regular Training :

Intimation was sent to all the participants regarding cancellation of the 88th Training Course on TB Control Scheduled from 15th July, 2002 as per the oral instructions of DGHS, New Delhi, NTI. As such there has been a revision in the 88th batch regular training programme which has now become "Revised NTI regular Training Programme" with its thrust on RNTCP for the MO's, DTO's, STS & STLS from various states of the country as per the guidelines of RNTCP.

Dr Reuben Granich , Dr Mandal, Medical Officer, WHO-SEARO and CMO, Central TB Division, New Delhi were held discussions on 25th October 2002 regarding revised training programme at NTI along with Dr Karin Bergstrom, I/c Global training programme, WHO.

b) Revised National Tuberculosis Control Programme (RNTCP):

(i) Training :

The Director inaugurated 3 batches of training programme on RNTCP for Lab Technicians from Karnataka. The NTI faculty and concerned staff, as facilitators, took active participation in the following training programme.

Training programme on TB Control and RNTCP of 8 weeks duration from 15th July - 7th September 2002 was conducted for a team of WHO fellows from Nepal viz. one Lab-Technician, two Treatment Organizers and one Computer Assistant . As a part of the training activity, the trainees were taken for field training to TB units of RNTCP areas at of Neelasandra, Hosahalli and Broadway and PHI's of Mangalore.

Dr VS Pappu from Public Health Institute, Bangalore had discussion with the Director on getting

support from NTI for organising training in TB Control during his visit to NTI on 26th August 2002. The latest situation of RNTCP expansion in new districts of Karnataka was discussed among WHO Consultants of Karnataka on 30th December 2002.

(ii) Trainer's Training:

A plan of action for RNTCP modular training for DTO's and Trainer's Training Course was discussed with training committee on 2nd & 3rd December 2002.

(iii) Refinement of curriculum :

The Director conducted a meeting on 2nd September to discuss the feed back from trainees and obtain suggestion from the faculty to further improvement of the training programme. Subsequent meetings were held on 7th and 17th October 2002 to discuss the training curriculum for PG students and training of state TB Programme Managers scheduled from 17th and 21st October 2002 respectively.

(iv) RNTCP appraisal formats:

Comments given for updating the RNTCP appraisal formats and curriculum for refresher training for DTO's trained in RNTCP modular training, by different faculty members were compiled, finalized and submitted to Central TB Division, DGHS through Director. Discussions were held on 19th December 2002 with the officer-in-charge, control and bacteriology sections regarding appraisal of RNTCP districts in Karnataka

Dr Karin Bergstrom, In charge Global Training Programme, WHO had fruitful discussion regarding training curriculum for programme managers and training of trainers on 21st to 25th October 2002 with the faculty of NTI. A meeting was also held with programme co-ordinator, BMP & Joint Director (TB), Karnataka and she visited TB units under BMP .

c) Modular Training on RNTCP:

i) At NTI :

Sl.No.	Period	No. of Participants	Details
1	24 th Jun. - 5 th Jul. 2002	11	Lab Technicians of Karnataka.
2	1 st - 12 th Jul. 2002	8	MOTC's of Karnataka.
3	8 th - 19 th Jul. 2002	16	Lab Technicians of Karnataka.
4	1 st Jul. - 2 nd Aug. 2002	9	A team from Madhya Pradesh who came to attend regular training (88 th batch).
5	22 nd Jul. - 2 nd Aug. 2002	11	LT's of Karnataka.
6	5 th - 16 th Aug. 2002	15	Lab Technicians of Karnataka. As part of the training, the trainees were taken to the TB units of Hanumanthanagar and Hosahalli on 14th August, 2002.
7	19 th Aug.-2 nd Sept.2002	17	DTO's and MO's of different states.
8	19 th Aug. - 22 nd Sept. 2002	22	Sr. Treatment Supervisors (STS)of different states.
9	19 th Aug.-22 nd Sept. 2002	17	Sr. TB Laboratory Supervisors (STLS) of different states.
10	3 rd - 18 th Sept. 2002	15	STLS of Karnataka.
11	9 th - 20 th Sept. 2002	2	Lab. Assistants from British Medical Trust, Nepal an NGO.
12	12 th - 20 th Sept. 2002	23	STS of Karnataka.
13	19 th Sept. - 3 rd Oct.2002	14	STLS of Karnataka.
14	23 rd Sept.- 1 st Oct.2002	18	STS of Karnataka.
15	23 th Sept. 5 th Oct.2002	23	DTO's and MO's of Chattisgarh, Maharashtra and Karnataka.
16	7 th - 18 th Nov.2002	5	WHO Fellowship Training Programme for the participants from Srilanka.
17	7 th - 18 th Dec.2002	2	WHO Fellowship Training on TB Control and Training on Epidemiology.
18	7 th - 21 st Dec.2002	21	DTO's of different states.
19	7 th - 28 th Nov. 2002	8	State Level TB Programme Managers and MO's working in State TB Cell.

Technical report of the Modular training on RNTCP from the DTO's of different states held during December 2002 was prepared.

ii) Outside NTI:

Sl.No.	Period	No. of Participants	Details
1	24 th Jul. - 3 rd Aug.2002	9	Lab Technicians of Karnataka held at Lady Willington State TB Centre, Bangalore.
2	5 th - 16 th Aug.2002	10	Mrs SR Kusuma, Lab Technician participated as facilitator for ten days RNTCP training course of LT's of Karnataka held at Lady Willington State TB training and Demonstration centre, Bangalore.
3	3 rd - 18 th Sept. 2002	9	Mr D Yesupadam, Lab Technician participated as facilitator for RNTCP Modular Training for STLS of Karnataka held at Lady Willington State TB Training & Demonstration Centre, Bangalore.
4	12 th - 21 st Sept. 2002	22	Dr B Mahadev, CMO took part as facilitator for the Trainers Training Programme for the Trainers of RNTCP in Orissa organised by DANTB at Konark, Orissa.
5	7 th - 15 th Nov. 2002	23	Dr Preetish S Vaidyanathan, Sr. Medical Officer participated as facilitator in the Training of Trainers programme under RNTCP sponsored by DANTB at Bhubaneshwar.

d) Supervision / Appraisal / Meetings / Discussions / Lectures

Sl.No.	Period	Place	Purpose
1	24 th Feb - 2 nd Mar 2002	Surat Muncpal Corporation and Surat	Dr. Sophia Vijay, Sr TB Specialist attended as co-ordinator of team 4 of the Internal Evaluation Team for Gujarat, carried out the internal evaluation of two districts viz. Surat Muncpal Corporation and Surat. Final report to be submitted to central TB Division is under preparation.
2	3 rd Jul. 2002	Nirman Bhawan, New Delhi	Dr Prahlad Kumar, Director and Dr VK Chadha, Sr.Epidemiologist attended the Central Steering Committee meeting on operational Research in RNTCP. Dr VK Chadha presented the results of NSS-ARI survey of three zones.
3	13 th Jul. 2002	Badagara, Kozhikode district, Kerala	Dr B Mahadev, CMO participated in the sensitization programme for involving private practitioners in RNTCP.
4	14 th - 20 th Jul. 2002	Nanded & Akola districts of Maharashtra	Dr (Mrs) Sophia Vijay, Sr. TB Specialist as Team leader made appraisal visit of "Year - 4 RNTCP" districts.
5	15 th - 20 th Jul. 2002	Yavatmal & Ghadchiroli districts of Maharashtra	Dr L Suryanarayana, CMO (NFSG) undertook appraisal visit for preparedness of implementation of RNTCP.
6	25 th July 2002	Bangalore Mahanagara Palike (BMP), Bangalore	Dr (Mrs) Sophia Vijay, Sr.TB Specialist attended the meeting of BMP Society for RNTCP chaired by the Commissioner of BMP.
7	25 th July 2002	Ponnani, Kerala	Mr KP Unnikrishnan, Chief Statistical Officer delivered a lecture on operational aspects of RNTCP in a sensitization aspects of RNTCP in a sensitization meeting organized by DTC Malappuram for the benefit of IMA members and private practitioners.

Sl.No.	Period	Place	Purpose
8	26 th July 2002	Karnataka State TB Association, Bangalore	Dr Preetish S Vaidyanathan, SMO attended the meeting of Karnataka State TB Association.
9	31 st July 2002	NTI, Bangalore	Dr Prahlad Kumar, Director had a meeting with Dr HG Narayana Murthy, Joint Director (TB), Karnataka, Dr KN Prasad, WHO Consultant, Karnataka, Incharge Bacteriology and Training Sections. NTI to discuss about NTI support to meet the targets of RNTCP in Karnataka including expansion of DOTS to other districts.
10	22 nd - 27 th Sept 2002	Nizamabad and Warangal districts, Andhra Pradesh	Dr Preetish S Vaidyanathan undertook RNTCP appraisal visit to review the infrastructure and criteria to be fulfilled for starting service delivery under RNTCP.
11	28 th - 31 st Oct.2002	Nagpur district & Amaravathi Municipal Corporation	Dr L Suryanarayana, CMO (NFSG) undertook appraisal visit for assessment of preparedness for RNTCP implementation.
12	22 nd Nov. 2002	NTI, Bangalore	Dr Prahlad Kumar, Director and Dy. Director General (TB) participated in the review meeting of a performance of RNTCP under Bangalore Mahanagara Palike.
13	25 th - 28 th Nov.2002	Gadag district	Dr Preetish S Vaidyanathan, Sr. Medical Officer undertook appraisal visit for assessment of RNTCP implementation.
14	3 rd - 5 th Dec.2002	Mangalore district	Dr L Suryanarayana, CMO (NFSG) undertook appraisal visit.
15	9 th - 11 th Dec.2002	Shimoga district	Dr VH Balasangameswara, CMO (NFSG) and Dr HG Narayanamurthy, Joint Director (TB) Govt. of Karnataka undertook appraisal visit.
16	9 th - 13 th Dec.2002	Gulbarga & Bidar districts	Dr B Mahadev, CMO (NFSG) and Dr Shivalli, Dy. Director (TB), Govt. of Karnataka and Dr Raveendra, WHO Consultant under took appraisal visit.
17	11 th - 13 th Dec.2002	Hassan district	Dr L Suryanarayana, CMO (NFSG) undertook appraisal visit.
18	16 th - 17 th Dec.2002	Tumkur district	Dr VH Balasangameshwara, CMO (NFSG), Dr (Mrs) Sophia Vijay, Dr Shivalli, Dy. Director (TB), Govt. of Karnataka and Dr Raveendra, WHO Consultant undertook appraisal visit.
19	16 th - 18 th Dec.2002	Mysore district	Dr Preetish S Vaidyanathan, Sr. Medical Officer undertook appraisal visit.

II. Orientation Training for undergraduates, medical / paramedical students:

Sl.No.	Date	Category	No. of Participants	Organization	Topic
1	6 th July 2002	B.Sc Nursing students	22	Hillside School of Nursing, Mangalore.	Orientation on TB.
2	15 th July 2002	Post Graduate students	03	JSS Medical College, Mysore.	Briefing on ZN Microscopy, primary isolation, sensitivity and identification and orientation on TB.

Sl.No.	Date	Category	No. of Participants	Organization	Topic
3	17 th July 2002	4 th year B.Sc Nursing Students	16	St. John's College of Nursing, Bangalore.	Briefing on Ziehl Neelsen (ZN) Microscopy, primary isolation, sensitivity and identification and orientation on TB.
4	22 nd July 2002	4 th year B.Sc Nursing Students	14	St. John's College of Nursing, Bangalore.	Briefing on ZN Microscopy, primary isolation, sensitivity and identification and orientation on TB.
5	24 th July 2002	Medical Assistants	47	Command Hospital, Air Force, Bangalore.	Briefing on ZN Microscopy, primary isolation, sensitivity and identification and orientation on TB.
7	6 th Aug. 2002	I, II, III & IV year B. Pharma and I year M. Pharma students	65	Government Pharmacy College, Bangalore.	Orientation on TB, ZN microscopy, isolation, sensitivity and identification tests.
8	6 th Aug. 2002	Microbiology students	32	SVR Science &	Briefing on ZN microscopy, isolation, sensitivity and identification tests orientation on TB.
9	12 th Aug. 2002	4 th year B.Sc. Nursing students	20	St. Martha's Hospital, Bangalore	Briefing on ZN microscopy, isolation, sensitivity and identification tests orientation on TB.
10	16 th Aug. 2002	Microbiology students	30	RSV College of Arts & Science, Bangalore.	Orientation on TB.
11	27 th Aug. 2002	I & IV year B.Sc. Nursing students	60	M.S. Ramaiah Nursing College, Bangalore.	Orientation on TB; ZN Microscopy, isolation, sensitivity and identification tests and role of animal experimentation in TB Control.
12	30 th Aug. 2002	IV year B.Sc. Nursing students	45	KP Ballal Institute, Ullal, Mangalore.	Orientation on TB; ZN Microscopy, isolation, sensitivity and identification tests and role of animal experimentation in TB Control.
13	17 th Sept. 2002	Final year B.Sc. Microbiology students	65	Maharani Laxmi Ammanni College, Malleswaram, Bangalore.	Briefing on ZN microscopy, primary isolation, sensitivity and identification tests.
14	6 th Oct. 2002	Medical Assistants	40	Command Hospital; Air Force, Bangalore.	Orientation on TB and briefing on ZN microscopy, primary isolation, sensitivity and identification tests.
15	7 th Oct. 2002	B.Sc. Nursing students	28	KMJ College of Nursing, Bangalore.	Orientation on TB and briefing on ZN microscopy, primary isolation, sensitivity and identification tests.
16	8 th Oct. 2002	B.Sc. Nursing students	91	Gautham College of Nursing, Bangalore.	Orientation on TB and briefing on ZN microscopy, primary isolation, sensitivity and identification tests.

Sl.No.	Date	Category	No. of Participants	Organization	Topic
17	30 th Oct. 2002	B.Sc. Nursing students	22	St. John's College of Nursing, Bangalore.	Orientation on TB and briefing on ZN microscopy, primary isolation, sensitivity and identification tests.
18	31 st Oct. 2002	B.Sc. Nursing students	40	Gautham College of Nursing, Bangalore.	Orientation on TB and briefing on ZN microscopy, primary isolation, sensitivity and identification tests.
19	6 th Nov. 2002	Medical Assistants	40	Command Hospital Airforce, Bangalore.	Orientation on TB and briefing on ZN microscopy, primary isolation, sensitivity and identification tests.
20	7 th Nov. 2002	B.Sc. Microbiology students	24	Sheshadripuram First Grade College, Bangalore.	Orientation on TB and briefing on ZN microscopy, primary isolation, sensitivity and identification tests.
21	8 th Nov. 2002	B.Sc. Nursing students	22	St. John's College of Nursing, Bangalore.	Orientation on TB and briefing on ZN microscopy, primary isolation, sensitivity and identification tests.
22	10 th Dec. 2002	III Year Medical students	30	St. John's Medical College, Bangalore.	Orientation on TB and briefing on ZN Microscopy, primary isolation sensitivity and identifications tests and importance of animal experimentation in the control of TB.
23	17 th Dec. 2002	III year Medical students	30	St. John's Medical College, Bangalore.	Orientation on TB and briefing on ZN Microscopy, primary isolation sensitivity and identifications tests and importance of animal experimentation in the control of TB.
24	26 th Dec. 2002	III year Microbiology students	40	Sri. Jagadguru Renukacharya College of Arts & Science and Sri. Jagadguru Renukacharya College for women.	Orientation on TB and briefing on ZN Microscopy, primary isolation sensitivity and identifications tests and importance of animal experimentation in the control of TB.

III Workshops:

a) TB & HIV:

Workshops on TB/HIV for DTO's and NGO's of Karnataka was held at NTI from 1st - 6th July 2002 and 29th July - 3rd August 2002 in which 35 and 58 participants took part respectively.

b) One day sensitization workshop:

Sl.No.	Period	No. of Participants	Details
1	12 th Nov. 2002	11	On RNTCP for Medical College Teachers of Karnataka.
2	29 th Nov. 2002	20	On RNTCP for Medical College Teachers of Karnataka.
3	20 th Dec. 2002	20	On involvement of Medical Colleges of Karnataka under RNTCP.

Technical and Administrative reports of the sensitization workshop for the medical college Teachers of Karnataka was prepared and sent to the Director TRC, Chennai with a copy of the Technical report to Central TB Division, DGHS, New Delhi.

IV Special Training :

a) Fellowship Programme in Epidemiology:

Ms. Deepika Nag from WHO, SEARO, New Delhi visited the Institute on 19th August 2002 and had discussion in connection with forthcoming Fellowship Programme in Epidemiology - TB Control to be held at NTI from 7th November 2002.

Technical and Administrative report of the training for programme managers held during the month of November 2002 was prepared.

b) Others:

Sl.No.	Date	Category	No. of Participants	Organization	Topic
1	5 th - 6 th Sept.2002	Professor	1	Adichunchanagiri Institute of Medical Sciences, Karnataka	Sensitization in isolation, identification and sensitivity testing of <i>M. Tuberculosis</i>
2	9 th -20 th Sept.2002	MD Micro Biology students	3	SCB Medical College, Orissa	Briefing on RNTCP Drug regimen and sensitization in isolation and identification and sensitivity testing of <i>M. Tuberculosis</i> .
3	21 st Oct-1 st Nov. 2002	Post Graduate students	25	Medical Colleges of South India	TB Control Programme
4	1 st Aug - 30 th Sept. 2002	M.Sc.Microbiology & Biotechnology	4	Bangalore University	"Standardization of simulated specimens for quality assurance of microscopy under RNTCP" & "Time motion study of the smear reading under RNTCP"

V Participation in conference / Seminars / Meetings / Workshops / Training:

Sl.No.	Period	Details
1	1st - 6th Jul. 2002	Mr V Siddarthan, Sr Investigator and Mr HS Mallikarjunaiah under went training in counseling for HIV/AIDS conducted by Karnataka State AIDS prevention society at NTI, Bangalore.
2	6th Jul. 2002	Dr VK Challu, Veterinarian participated in the World Zoonotic Day held at Yavanika, Bangalore organized by KARUNA (formerly society for prevention of cruelty to Animals) and delivered guest lecture on Zoonotic importance of TB.
3	8th Jul. 2002	Mrs Sudha S Murthy, Sr. Librarian attended a lecture on "Have Libraries really required from Technologies" delivered by Prof. FW Lancaster, School of Library and Information Science, Illinois, USA held at Indian Institute of Science, Bangalore.

Sl.No.	Period	Details
4	10 th Jul. 2002	Dr Prahlad Kumar, Director participated as Chief Guest for the inaugural session of WHO/NICD training course on prevention and control of vector borne diseases with special emphasis on JE and Dengue/DHG at National Institute of Communicable Diseases/Plague Surveillance unit, Bangalore.
5	20 th Jul. 2002	Dr Prahlad Kumar, Director attended the official lunch training convened by Honourable Health Minister, Govt. of Karnataka to meet Sri. SK Naik, Secretary to Govt. of India, Ministry of Health & Family Welfare, New Delhi at "ORCHID" Hotel Oberoi, M.G.Road, Bangalore.
6	23 rd Jul. 2002	Dr B Mahadev, CMO participated in the meeting of the Technical Committee on Binocular Microscope for the World Bank assisted NTP project at DGHS, New Delhi.
7	24 th Jul. - 22 nd Aug. 2002.	Mr PS Jagannatha, Statistical Assistant participated as trainer for imparting training in data entry designing format and validation of data to the Data Entry Operator of DAN TB Project, Bhubaneswar.
8	26 th Jul. 2002	Dr Preetish S. Vaidyanathan, Sr. Medical Officer attended a meeting at Karnataka State TB Association, Bangalore.
9	29 th Jul. 2002	Dr (Mrs) Sophia Vijay, Sr. TB Specialist attended the State level Co-ordination Committee meeting at Karnataka Health System Development Project to review the status of communicable disease in the state held under the Chairmanship of Principal Secretary to Govt. of Karnataka, Health & Family Welfare Department at the office of the Department of Health & Family Welfare, Govt. of Karnataka, multi storied building, Bangalore.
10	8 th - 9 th Aug. 2002	Dr Prahlad Kumar, Director attended a meeting of Publishers, Editors, Content Service Providers at National Informatic Centre, Ministry of Information Technology, New Delhi to discuss the contribution of National TB Institute in the project with specific reference to provide NTI Bulletin for Indian Medical website. He also visited the office of the Dy. Director General (TB) DGHS, New Delhi to pursue the pending issues of NTI.
11	13 th Aug. 2002	Dr VH Balasangameshwara, CMO (NFSG) participated as facilitator in the workshop on involvement of private practitioners in TB control programme held at District TB Centre, Mallapuram, Manjeri, Kerala.
12	22 nd Aug. 2002	Dr (Mrs) Sophia Vijay, Sr. TB Specialist attended the general body meeting of the Karnataka State TB Co-ordination Society under the Chairmanship of the Principal Secretary, Health & Family Welfare Department, Government of Karnataka held at Room No. 253, First Floor, Multistoried Building, Vidhana Veedhi, Bangalore.
13	28 th Aug. 2002	Dr VH Balasangameshwara, CMO (NFSG) attended a meeting on Chemoprophylaxis for prevention of TB in HIV infection held at National AIDS Research Institute, Pune.
14	11 th Sept. 2002	Dr Prahlad Kumar, Director attended a meeting at Hotel Comfort Inn, Bangalore to discuss about the role of Shop Keepers in TB Control.
15	16 th Sept. 2002	Dr Prahlad Kumar, Director made an inaugural address to the participants of WHO/NICD Training Course on Surveillance and Control of Plaque, held at NICD, NTI Campus, Bangalore.
16	17 th Sept. 2002	Mr KP Unnikrishnan, Chief Statistical Officer and Mr R Jitendra, Computer attended the Co-ordination meeting held in the office of Health Commissioner, Bangalore.
17	26 th -29 th Sept. 2002	<p>Participation in the 57th National Conference on TB Chest Diseases held at Panaji, Goa :-</p> <ul style="list-style-type: none"> ● Dr Prahlad Kumar, Director chaired the scientific session and participated in panel discussion on RNTCP. ● Dr Sophia Vijay, Sr. TB Specialist presented a paper on Defaults Among Tuberculosis Patients Treated under DOTS in Bangalore City- A search for solution. ● Dr VK Chadha, Sr. Epidemiologist presented a paper on Annual Risk of Tuberculosis Infection in 3 districts of Maharashtra.

Sl.No.	Period	Details
18	26 th - 29 th Sept. 2002	Dr VH Balasangameshwara, CMO (NFSG) presented a paper on "Initial Drug Resistance among Tuberculosis patients of a DOTS programme in Bangalore city in the 57th National Conference on TB Chest Diseases held at Panaji, Goa.
19	27 th Sept. 2002	Mrs Sudha S Murthy, Sr. Librarian attended a lecture on "Publishing Models and Role of Libraries" delivered by Dr TB Rajasekhar, Associate Chairman, National Centre for Scientific Information, IISc, Bangalore at Institution of Information studies Rajajinagar, Bangalore.
20	22 nd Oct. 2002	Dr Prahlad Kumar, Director attended the inaugural session of the 53 rd TB Seal by his Excellency, Governor of Karnataka, Shri.T.N. Chaturvedi at Rajbhavan, Bangalore organized by Karnataka State TB Association, Bangalore.
21	8 th Oct. 2002	Dr VK Chadha, Sr. Epidemiologist participated in the seminar on DOTS held at Mumbai and delivered a talk on "why DOTS".
22	8 th - 10 th Oct. 2002	Dr Prahlad Kumar, Director as a special invitee participated in the 30 th meeting of scientific Advisory Committee of Tuberculosis Research Centre, Chennai.
23	22 nd Oct. 2002	Dr (Mrs) Chitra Nagaraj, CMO attended a discussion-cum-lecture on personal Hygiene at National Institute of Public Co-operation and Child Development, Yelahanka, Bangalore on 22 nd October 2002 organized for the trainer's of Adolescent under Rural Child Health Programme.
24	23 rd Oct. 2002	Dr B Mahadev, CMO (NFSG) attended a Review meeting of Drug Resistance Surveillance in Ranga Reddy District of Andhra Pradesh held at the office of STC, Hyderabad.
25	29 th -31 st Oct. 2002	Dr Prahlad Kumar, Director and Dr VK Chadha, Sr. Epidemiologist participated in the workshop "To operationalize nodal centres for RNTCP in Medical colleges" held at All India Institute of Medical Sciences, New Delhi. Dr Prahlad Kumar presented the preliminary findings of ARI Survey and Dr VK Chadha delivered a talk on operational Research priorities in RNTCP.
26	8 th Nov. 2002	Dr B Mahadev, CMO (NFSG) attended a Technical committee meeting on procurement of Binocular Microscopes held at DGHS, New Delhi.
27	4 th - 11 th Nov. 2002	Dr VK Chadha, Sr. Epidemiologist participated in the Joint Annual Conference of the Indian Society for Malaria and other communicable diseases and the Indian Association of Epidemiologist held at SCOPE convention center, New Delhi and presented a paper on 'Annual Risk of Tuberculosis Infection in Delhi City'. He was also co-chairperson in the plenary session on RNTCP .
28	14 th Nov. 2002	Dr Prahlad Kumar, Director participated in the meeting with the Dy. Director General (TB) and Section Officer (TB Section) held at DGHS, New Delhi regarding pending issues of NTI.
29	20 th Nov. 2002	Dr Preetish S Vaidyanathan, Sr. Medical Officer participated in a meeting at Karnataka State TB Association which was chaired by the Principal Secretary- Health, Government of Karnataka.
30	21 st Nov. 2002	Dr Prahlad Kumar, Director and Dr VK Chadha, Sr. Epidemiologist participated in the RNTCP/ DANTB Health systems Research Dissemination Seminar held at Vasant Continental Hotel, New Delhi .
31	22 nd Nov. 2002	Dr Prahlad Kumar, Director along with Dy. Director General (TB) participated in the review meeting of on performance of RNTCP under Bangalore Mahanagara Palike held at Silver Jubilee Hall of NTI, Bangalore.
32	24 th - 28 th Nov. 2002	Mr Manjunath and Mrs SR Kusuma, Lab-Technicians participated in the training programme in connection with the proposed collaborative study on Assessment of quality of Smear Microscopy performed by pathology and non pathology Lab-Technician of Orissa held at Cuttack, Orissa.

Sl.No.	Period	Details
33	28 th & 29 th Nov. 2002	Dr VK Challu, Veterinarian participated in the Annual Conference and National Symposium on veterinary public Health held at college of veterinary sciences, GB Pant University of Agriculture and Technology, Pantnagar, Uttaranchal and presented a paper on "Tuberculosis and it Zoonotic importance".
34	5 th Dec. 2002	Dr Prahlad Kumar, Director, Dr VK Chadha, Sr.Epidemiologist, Dr B Mahadev, CMO(NSFG) participated in a meeting of screening and monitoring committee on operations Research held at Central TB Division, Nirman Bhavan, New Delhi .
35	9 th Dec. 2002	Dr Prahlad Kumar, Director participated in a meeting at Central TB Division, Directorate General of Health Services, New Delhi to follow up the pending cases of NTI.
36	19 th Dec. 2002	Dr Sophia Vijay, Sr. TB Specialist participated in a meeting at the office of District TB Control Society, Bangalore Urban.
37	27 th Dec. 2002	Dr Sophia Vijay, Sr. TB Specialist participated in the discussion with the Project Co-ordinator, Bangalore Mahanagara Palike regarding MMR facilities to be provided to all the seven TB Units in Bangalore Mahanagara Palike on weekly.
38	31 st Dec. 2002	Dr Sophia Vijay, Sr. TB Specialist participated in the 13 th meeting of the Karnataka State TB Co-ordination society held at MS Building, Bangalore.

SUPERVISORY VISITS

Visits under NSS-ARI Survey Planning and Supervision

Sl. No.	Place of Visit	Purpose	Name(s) of Officers / Officials	Period
1	Kamrup (Assam)	Planning & Supervision	Joydev gupta Field Investigator	7 th July to 23 rd Nov 2002
		Planning & Supervision	Sanjay Singh Field Investigator	7 th July to 19 th Sep 2002
		Supervision	Dr Preetish S Vaidyanathan, SMO	1 st Aug to 6 th Aug 2002
		Supervision	Mr RK Shrivastav Field Investigator	1 st Aug to 30 th Nov 2002
2	Jalpaiguri	Supervision	Dr.Ramkrishna Goud Contractual M.O	1 st July to 9 th July 2002
		Supervision	Mr Magesh V Field Investigator	1 st July to 31 st Aug 2002
		Supervision	Mrs Umadevi Field Investigator	24 th Jul to 31 st Aug 2002
		Supervision	Mr. Sanjay Singh Field Investigator	30 th Jun to 31 st Jul 2002
		Supervision	Mr.Joydev gupta, Field Investigator	1 st Jul to 6 th Jul 2002
		Supervision	Mr R K Shrivastav, Field Investigator	1 st Jul to 31 st Jul 2002
		Supervision	Dr Preetish S Vaidyanathan, SMO	7 th Aug to 9 th Aug 2002
3	Samastipur	Planning & Supervision	Mr. Laxminarayana Investigator	1 st Sept to 2 nd Nov 2002
		Supervision	Mr Jameel Ahmed Field Investigator	1 st Sept to 31 st Dec 2002

Sl. No.	Place of Visit	Purpose	Name(s) of Officers / Officials	Period
		Field Assistance	Mr Balachander Field Assistant	1 st Sept to 31 st Dec 2002
		Supervision	Dr Ramkrishna goud Contractual M.O	9 th Sep to 19 th Sep 2002
		Supervision	Mr Saravanan, X-ray Technician	25 th Nov to 23 rd Dec 2002
4	Itanagar	Initial Planning	Mr Sangeeth Kumar, Sr Statistical Officer	18 th Nov to 12 th Dec 2002
		Field work	Mr Sanjay Singh, Field Investigators	1 st Dec to 31 st Dec 2002
		Field work	Mr Magesh V, Investigators	18 th Nov to 31 st Dec 2002
		Field work	Mr Laxminarayana, Investigators	1 st Dec to 31 st Dec 2002
		Field work	Mr R K Shrivastav, Field Investigator	29 th Nov to 23 rd Dec 2002
		Field work	Mr Venkatachalappa, Computer	1 st Dec to 31 st Dec 2002

INTERACTIONS WITH TUBERCULOSIS PATIENTS - AN EXPERIENCE

N Nagendra*

Experience: 1

This is regarding a patient discharged from Sanatorium a few months back whom myself and Mr KR Hemanth, Health Visitor, National Tuberculosis Institute interviewed during our field visit in June 2002, during the sanatorium study in Mysore District. The patient named Rangaiah, aged 55 years, stays in a very small room separated from the main house where his wife, son, daughter-in-law and grand-daughter stay.

Mr Rangaiah worked as a Tailor and was taking care of the family members. Two years back he suddenly fell sick with fever and cough and was admitted to sanatorium. He took treatment for 2 months and was discharged. Later he never bothered to continue treatment as he felt that he was cured.

After a lapse of 5 to 6 months he started vomiting blood. He was taken to general hospital, Mysore where the doctor advised him to take treatment from District Tuberculosis Centre (DTC), Mysore, as he was suffering from tuberculosis. He never visited DTC, Mysore for treatment. As he started losing weight, his wife took him to DTC, Mysore. After examination he was diagnosed as sputum positive and put on treatment. The family members revealed that he used to visit DTC for drug collection but never consumed the drugs. He used to keep them in a wooden box. When asked, the reasons given were (i) he was not able to consume the red tablet in empty stomach, (ii) he felt like vomiting and giddiness whenever he saw them and (iii) he was afraid of his family members. The family members informed that he did not smoke or drink but lied.

Last year he was again admitted to sanatorium for 2 months as he was losing weight. After discharge, the doctor advised him to continue

treatment for 8 more months. He never turned up for collecting the drugs at sanatorium. When asked why he was not collecting the drugs, the patient and family members said that they had no money to pay, as they have to pay a sum of Rs.270/- to the society to collect drugs every month. The family members were also not willing to get the drugs as the patient did not consume them. The patient was now not able to walk properly. We motivated him to take the drugs at DTC, Mysore. The patient agreed but insisted us also to visit DTC, Mysore to enable him to get the treatment. We agreed and asked his son, an auto rikshaw driver to bring the patient in his auto next day morning at 10.00 AM to DTC, Mysore. Next day, we waited at DTC Mysore but the patient did not turn up. After waiting for more than one hour we visited the patients' house. The patient was at home. When asked why he did not come we were told that there was no body to bring him to DTC Mysore as his wife and son had gone for work. The patient also said that the family members did not bother about him. They even did not allow him to watch TV and his grand daughter to come near him and he was not provided food properly. After hearing all the stories from the patient we took him to DTC, Mysore. We spoke to the Doctor and informed everything about the patient. The doctor after examination found him to be sputum positive and put him on treatment. The doctor and the treatment organiser motivated the patient to continue treatment. He was asked to come to the centre daily for getting injections and drugs. We also informed him that he would die if he did not take treatment regularly. After administering the injection and tablets consumed under the supervision of the treatment organiser, we took him back to his house. In the evening we again visited his house and motivated the family members to take him to the centre regularly for treatment. They were told that he would be alright in 8 months time and will soon start back to his work. We were happy to know after a week's time from the treatment organiser

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of the centre that the patient is regularly visiting the centre for treatment.

Experience: 2

This is during the fieldwork of the same study at Government Tuberculosis Hospital, old Madras Road Sanatorium, Bangalore. I was supposed to interview the in-patients of the sanatorium. One of them Mr Merek was not in his bed when I visited. The other patients told me that he is in the back corridor of the toilet room. When I went there, I was surprised to see few people smoking. Mr Merek was also there. I

called the ward boy and asked him to check Mr Merek's pocket for more beedies. I was surprised to see Anti-TB drugs, about 15 tablets instead of beedies. When asked why he is keeping tablets, he said without hesitation that he does not feel like consuming them. This was brought to the notice of In-charge nurse. She shouted at him and said that she would report this incident to the superintendent. I motivated the patient as to what happens if he does not take the drugs regularly and told him not to repeat. I also motivated the nurse to supervise the consumption of the tablets rather than giving it to the patient's hand so that the same was not repeated.

क्षयरोगियों के साथ अन्योन्यक्रियाएँ - एक अनुभव

एन. नागेन्द्रा*

अनुभव - 9

यह अनुभव एक ऐसे रोगी के बारे में है जिसे कुछ महीने पहले क्षयरोग आरोग्यशाला से छुट्टी दी गई थी तथा जिसका साक्षात्कार मैंने तथा के आर. हेमंत ने जून 2002 के आरोग्यशाला अध्ययन के दौरान हमारे क्षेत्रीय दौरों में किया था। 55 वर्षीय, रंगैया नामक यह रोगी अपने मुख्य घर, जहाँ कि उसकी पत्नी, पुत्र, पुत्रवधु तथा पोती रहते हैं, से दूर एक छोटे से कमरे में निवास करता है।

श्री रंगैया दर्जी के रूप में कार्य करके अपने परिवार का निर्वाह कर रहा था। दो वर्ष पहले अचानक वह खाँसी व ज्वर से ग्रस्त हुआ तथा उसे आरोग्यशाला में भर्ती कराया गया। दो महीनों के उपचार के बाद उसे छुट्टी दे दी गई। उसके पश्चात उसने उपचार जारी नहीं रखा क्योंकि उसे लगा कि वह ठीक हो चुका था।

पांच-छे महीनों के अंतराल के बाद उसे खून की उल्टियाँ होने लगी। उसे मैसूर के सामान्य अस्पताल ले जाया गया जहाँ कि डॉक्टर ने उसे जिला क्षयरोग केन्द्र, मैसूर से उपचार कराने की सलाह दी क्योंकि उसे क्षयरोग था। वह कभी भी उपचार के लिए जिला क्षयरोग केन्द्र (डी.टी.सी.), मैसूर नहीं गया। जब उसका वजन घटने लगा तो उसकी पत्नी उसे डी.टी.सी. मैसूर ले गई। परीक्षण के बाद जाँच में उसे स्पुटम पोजीटिव पाया गया तथा उपचार के लिए रखा गया। पारिवारिक सूत्रों के अनुसार वह नियमित रूप से दवाई लेने के लिए डी.टी.सी. जाता था परंतु उसने दवाओं का सेवन कभी नहीं किया। वह उन्हे एक लकड़ी के डिब्बे में रखता रहता था। पुछे जाने पर उसने निम्न कारण बताए (१) वह खाली पेट लाल रंग की गोली नहीं ले सकता था, (२) गोलियाँ देखते ही उसे उल्टियाँ व चक्कर आने लगते थे (३) अपने पारिवारिक सदस्यों से उसे डर लगता था। पारिवारिक सदस्यों ने बताया कि वह धूपपान या मद्यपान नहीं करता या परंतु उसे झूठ बोलने की आदत थी।

पिछले वर्ष वजन घटने के कारण उसे दौबारा आरोग्यशाला में दाखिल कराया गया। छुट्टी देने के पश्चात डाक्टर ने उसे आठ महीनों तक उपचार जारी रखने की सलाह दी। परंतु वह दवा लेने कभी आरोग्यशाला नहीं गया। यह पुछे जाने पर कि वह दवा लेने क्यों नहीं जाता या, रोगी तथा उसके पारिवारिक

सदस्यों ने बताया कि उनके पास पैसे नहीं थे क्योंकि दवा लेने के लिए उन्हे सोसायटी को प्रतिमाह 270 रु चुकाने पड़ते थे। पारिवारिक सदस्य दवा लाने के इच्छक भी नहीं थे क्योंकि रोगी उनका सेवन नहीं करता था।

क्योंकि वह रोगी ठीक ढंग से चल भी नहीं सकता था, इसलिए हमने उसे डी.टी.सी. मैसूर से दवा लेने के लिए प्रेरित किया। वह सहमत हो गया परंतु उसने आग्रह किया कि उसके उपचार के लिए हम भी डी.टी.सी. मैसूर जाएँ। हमने उसके पुत्र को, जो कि एक ऑटोरिक्षा चालक था, कहा कि वह अगले दिन सुबह 10 बजे उस रोगी को डी.टी.सी. मैसूर लेकर आए। अगले दिन हमने डी.टी.सी. मैसूर पर रोगी का इंतजार किया परंतु वह नहीं आया। एक घंटे से अधिक इंतजार करने के पश्चात हम उसके घर गए। रोगी घर पर ही था। जब उससे न आने का कारण पूछा गया तो उसने बताया कि उसे डी.टी.सी. मैसूर लाने के लिए कोई नहीं था क्योंकि उसकी पत्नी तथा पुत्र काम पर गए थे। उसने बताया कि पारिवारिक सदस्य उसकी परवाह नहीं करते थे। वे उसे टी.वी. (Television) भी नहीं देखने देते थे। तथा उसकी पोती को उसके पास आने या खाना देने की आना नहीं देते थे। यह सुनने के बाद हम उस रोगी को डी.टी.सी. मैसूर ले गए। हमने डाक्टर को उसके बारे में सब कुछ बताया। जाँच के बाद उसे स्पुटम पोजीटिव पाया गया तथा उपचार के लिए दाखिल कर लिया गया। डाक्टर तथा उपचार संगठक ने उसे नियमित उपचार के लिए प्रेरित किया। उसे प्रतिदिन दवाएँ तथा इंजेक्शन लेने के लिए केन्द्र पर आने के लिए कहा गया। हमने उसे बताया कि यदि उसने नियमित उपचार नहीं कराया तो उसकी मृत्यु हो जाएगी।

उपचार संगठक की देख रेख में टीके (Injection) व दवाएँ दिलाने के बाद हम उसे वापस घर ले आए। शाम को हम फिर उसके घर गए तथा पारिवारिक सदस्यों को प्रेरित किया कि उपचार के लिए नियमित रूप से उसे केन्द्र पर ले जाएँ। उन्हे यह भी बताया कि ८ महीनों में वह स्वस्थ हो जाएगा तथा फिर से अपना काम आरंभ कर सकेगा। एक सप्ताह बाद केन्द्र के उपचार संगठक से यह जानकर हमें प्रसन्नता हुई कि वह रोगी नियमित रूप से उपचार के लिए केन्द्र पर आ रहा है।

यह अनुभव भी राजकीय क्षयरोग अस्पताल, पुराना मद्रास रोड़, आरोग्यशाला, बंगलूर में किए गए अध्ययन के अंतर्गत क्षेत्रीय कार्य के दौरान हुआ। मुझे आरोग्यशाला के कुछ आंतरिक रोगियों का साक्षात्कार करना था। जब मैं वहाँ गया तो श्रीमान मेरिक नामक एक रोगी अपने बिस्तर पर नहीं था। अन्य रोगियों ने मुझे बताया कि वह शौचालय के पिछवाड़े था। जब मैं वहाँ पहुँचा तो कुछ लोगो को धूम्रपान करते हुए देखकर मुझे आश्चर्य हुआ। श्रीमान मेरिक भी वहाँ थे। मैंने रोगीकक्ष-परिचर को बुलाया तथा और बीडियाँ ढूँढने के लिए श्रीमान मेरिक की जेब की

तलाशी लेने को कहा। बीडियों के स्थान पर लगभग 15 क्षयरोग निरोधक गोलियाँ देखकर मैं आश्चर्यचकित रह गया। पूछने पर उसने निःसंकोच बताया कि उसका गोलियाँ लेने को मन नहीं करता। इस बात की सूचना प्रभारी नर्स को दी गई। वह उस पर चिल्लाई तथा कहा कि वह इसकी सूचना अधीक्षक को देगी। मैंने रोगी को बताया कि नियमित दवा न लेने से क्या होता है तथा फिर ऐसा न करने को कहा। मैंने नर्स को भी प्रेरित किया कि रोगी के हाथ में गोलियाँ देने की अपेक्षा अपनी देखरेख में उन्हें सेवन कराए ताकि ऐसी घटना की पुनरावृत्ति न हो।

288. Concomitant Endobronchial Tuberculosis, Myocarditis and Congestive heart Failure. - A Case Report.

Agarwal N, Sharma S.K: Department of Medicine, Lady Harding Medical College, New Delhi, **Ind J Tub 2000, 47/3, 169 - 170.**

Tuberculosis alone is causing or claiming more lives than any other diseases known to mankind. The tuberculosis is mainly a pulmonary disease. But infection of other vital organs with this dreaded organism has increased the magnitude of the disease. Tuberculous involvement of myocardium is rare, seen mostly in association with pericardial disease. Isolated myocardial tuberculosis is an unusual finding. The authors have reported a rare case of myocardial tuberculosis with clinical presentation as Congestive Heart Failure (CHF).

A 28-year-old male with 45 days history of fever, haemoptysis and loss of appetite was brought for consultation. The patient was having dysnoea on exertion and palpitation after one month. He also complained of orthopnoea, facial puffiness and decreased urine output for 4 days prior to admission. On enquiring there was no family history of tuberculosis and the patient had no past history of tuberculosis, rheumatic heart disease, rheumatoid arthritis, alcoholism or drug abuse. On examination the patient was pale and cyanosed. The pulse rate was 120/minute and Blood pressure was as low as 80/60 and neck veins were full. There were bilateral basal coarse crepitations and decreased breath sounds in right infra-axillary region, on auscultation of chest. Cardiovascular examination revealed muffled 1st and 2nd heart sounds, 3rd heart sound and systolic murmurs of mitral and tricuspid regurgitation. On abdominal examination, there was tender hepatomegaly and ascites. Tests for Streptococcal antibody, Rheumatoid factor, antinuclear antibody and Hepatitis B virus antigen, HIV 1 and 2, Coxsackie virus, Cryptococcus and Brucella antigen were all negative. Blood culture was sterile and Widal test was negative. However, when sputum smear was examined it was positive for AFB. Electrocardiogram showed sinus tachycardia, occasional ventricular ectopics and Morris index of 0.08 mm/sec. Chest roentgenogram showed blunting of right costophrenic angle cardiomegaly and pulmonary oedema. Ultra

sonography revealed right pleural effusion, hepatomegaly and ascites. Echocardiography showed dilation of all chambers, regurgitation across mitral and tricuspid valves, ejection, and fraction of 25% to 30% and diffuse hypokinesia. Ascitic and pleural taps showed protein concentration of 1.5 g% and 2 g% respectively. On the basis of the above features, diagnosis of endobronchial and tuberculous myocarditis with congestive heart failure was made. Patient was initially given Dobutamine infusion, Digoxin and ATT with prednisolone. When BP improved, enalapril and furosemide were added. Patient continued to have repeated hospital admissions for CHF over 4 months. ECG did not reveal any arrhythmia during hospital stay. After six months of treatment, CHF disappeared and repeat echocardiography showed normal size chambers and valves without any regurgitation or wall motion abnormality and ejection fraction of 55%.

The authors opine that isolated TB myocarditis is a rare case. The reasons for its rarity are unknown. It has been suggested that constant movement of myocardium is not conducive to the lodgment of tubercle bacilli, but Raviart has proposed that lactic acid produced by muscular activity offers protection to cardiac muscle against the tubercle bacilli. The spread of tubercle to myocardium is either through haematogenous route of direct extension from pericardium or retrograde lymphatic spread from bronchial lymph nodes due to endobronchial TB. The presentations of this case as of congestive heart failure is also rare because myocardial TB itself is asymptomatic, rarely diagnosed during life. Other uncommon manifestations are valve dysfunction, rhythm disturbance and sudden cardiac death.

289. Qualitative and Quantitative Analysis of Antibody Response in Childhood Tuberculosis against Antigens of Mycobacterium tuberculosis.

Uma Devi K.R., Ramalingam B, Raja A; **Ind J Med Microbiology; 2002; 20(3); 145 - 149.**

Tuberculosis in children is a major health problem throughout the world and it is estimated that in 1990, around 4,50,000 deaths occurred in children under the age of 15 years. However, diagnosis of tuberculosis in children is difficult, because the demonstration of Mycobacterium tuberculosis from

the secretions and tissues of patients are negative in majority of those affected. The detection of TB in children is a very laborious process as they are not able to produce good quality sputum, as they tend to swallow most of it. Hence diagnosis in most of the cases is by indirect evidences such as peripheral lymphadenopathy, persistent cough, fever, chest radiography and close household contacts. Positive skin tests like BCG test and Montoux test can hardly be relied upon. Hence a study was undertaken that focussed mainly on analyzing the antibody response to antigens of *Mycobacterium tuberculosis*, in order to identify diagnostically useful antigens. ***H³⁷Rv Culture Filtrate Antigen (CFA)*** was used for quality analysis by both ***Western blot*** and ***Enzyme Linked Immuno Sorbent Assay (ELISA)***.

A total of 87 children below the age of 15 years were selected for the study. Childhood Tuberculosis (CTB) patients included both pulmonary and extra pulmonary cases (N=26). Sera were collected before the start or less than one month of therapy. 61 childhood normal controls (CNHS) included normal school children of less than 15 years of age, Montoux negative, without BCG scar and 25 adult TB patients (both smear and culture positive) were included in the study. Specific IgG, IgA and IgM antibodies were estimated in the sera from 26 CTB group and 61 CNHS group, using the CFA. Western blot analysis gave a comparative account of the antibody profile among CTB, CNHS and adult TB patients. Elisa was used to measure antibody of multiple isotypes. IgG positivity was only 7.6% with CFA in the CTB group while 3.2% among the controls were also positive. However, the results of IgA and IgM isotypes were better. But combining all the 3 isotypes an increased sensitivity of 57.7% with a specificity of 93.5% was obtained. Immunoblot analysis revealed marked difference among antibodies in the region of 16, 19, 38 and 45 KDa between CTB and CNHS.

The authors opine that though sensitivity rate is of limited value, the techniques could well be used to differentiate the CTB patients from CNHS.

290. Comparative study on the use of solid media: Lowenstein - Jensen and Ogawa in the determination of antituberculosis drug susceptibility.

Tonoue S., Mitarai S., Shishido H., Dept. of respiratory diseases, National Tokyo Hospital, 3-1-1 Takeoka, Kiyose, Tokyo; ***Tuberculosis; 2002; 82 (2/3); 63 - 67.***

Mycobacterium tuberculosis infection is re - emerging in most parts of the world and recently the WHO has sent a stern warning to its members on the problems associated with the treatment of tuberculosis. Specifically, WHO warns of the impact of drug - resistant *Mycobacterium tuberculosis* {MDR-TB}. In this situation, even the diagnosis of tuberculosis with smear positive specimens and subsequent directly observed treatment with short course chemotherapy (DOTS) are not enough to control the disease. Thus, drug susceptibility testing for resistant *Mycobacterium tuberculosis* is important in designing subsequent treatment options for such patients. However, there are currently several methods for susceptibility testing i.e. the absolute method, resistant ratio method and proportion method. Using artificial culture media like Middle brook 7H9 for the **BACTEC/MGIT** system and 7H10 for agar plates is increasingly becoming the standard for determining *Mycobacterium tuberculosis* resistance in western countries. However, in Asian and African countries it is the convention egg based media that is more favoured. Hence, the present study was conducted to evaluate the compatibility of *Mycobacterium tuberculosis* resistance results obtained using Lowenstein Jensen media (LJ) and Ogawa media.

A total of 53 *Mycobacterium tuberculosis* strains were selected to evaluate the consistency of susceptibility tests using Ogawa and LJ media, in order to assess the inter- media differences in susceptibility tests for anti-tuberculosis drugs. The strains were tested for resistance against isoniazid, rifampicin, ethambutol, streptomycin and other alternative drugs on LJ and Ogawa media. This gave a consistency ratio of 97.7% for INH between these two media. Similarly, the methods had 100% compatibility with rifampicin, 86.0% with EMB and 88.4 % with streptomycin. When 41 of these strains were tested against ethionamide, enviomycin, para - aminosalicylate, sparfloxacin and levofloxacin, the same number of strains were shown to be resistant or susceptible to LJ and Ogawa media. Similarly, the consistency ratio was 75.6% for kanamycin and 61.00% for capreomycin. However, Ogawa media had a tendency to produce results that indicated more resistant strains. But, the differences were statistically negligible.

The authors opine that Ogawa medium having fewer ingredients than LJ media is more advantageous and it is less laborious and economical to prepare.

291. A preliminary Report on Characterization and Identification of Non-tuberculous Mycobacteria (NTM) on the basis of Biochemical Tests and Protein/Isoenzyme Electrophoretic patterns. Gupta P, Katoch V.M., Gupta U.D., et al., Central JALMA Institute for Leprosy (ICMR), Tajganj, Agra; **Indian Journal of Medical Microbiology**; 2002; 20 (3); 137-140.

Non tuberculous Mycobacteria (NTM), formerly called atypical Mycobacterium is known to cause pulmonary and non-pulmonary infection. Though the incidence of NTM infection is lower compared to that of Mycobacterium tuberculosis infection, there has been a steady rise in the rate in the last 3 decades. The isolation and identification of this Mycobacterium from the clinical specimen often requires several weeks. Hence a more rapid method for identification of Mycobacterium is essential. Protein electrograms/ isoenzyme patterns, lipid patterns and gene probes are alternate methods for identification of Mycobacteria. Study was conducted to assess the usefulness of protein electrophorograms and protein zymodemes in the identification and characterization of NTM.

Twenty-two Mycobacterial isolates (isolated from the environment) were included for the study. Various biochemical tests like nitrate reduction, niacin production, catalase, aryl-sulphatases; tween-80 hydrolysis, pyrazinamidase, urease and pigmentation were done. Cell free extract (CFE) was done according to the procedure described by Katoch et al, and were electrophoresed and stained for proteins and esterases. Most of the isolates identified on the basis of biochemical test exhibited characteristic protein and esterase pattern and were identified as *M. scrofulaceum*, *M. avium* and *M. xenopi*. The authors concluded that even though there is lot of variability in the protein and isoenzymes patterns of NTM, they alone or along with biochemical tests can be useful in characterizing and identifying the different Mycobacterial species/ sub-species/strains. However, these results need to be correlated with modern molecular techniques like species /strain specific probes and rRNA sequencing. Strict conditions for their applications will have to be kept in mind as expression may vary. The authors opine that as several new species of environmental Mycobacteria have been identified in recent years a more in-depth study is required to characterize these isolates.

292. Tuberculosis and Vitamin D Deficiency. Sasidharan PK, Rajeev E, Vijayakumari V; **JAPI**; 2002; Volume 50; April; 554-558.

Vitamins are one of the vital constituents of the dietary constituent that are essential for the normal growth and functioning of any organism. The most abundantly found vitamin is vitamin D, which more or less acts like a hormone, regulates calcium homeostasis. Vitamin deficiency at the same time is quite a hazardous condition wherein the affected organism faces severe problems. The effects of vitamin D deficiency are not confined to bone alone; it is also an important effector of macrophage functions and thus has a crucial role in limiting infections like tuberculosis. Tuberculostatic functions are activated in human macrophages by stimulation with 1,25 dihydroxyvitamin D₃. Macrophage activation is further augmented by TNF- α , which acts synergistically with the 1,25 - dihydroxyvitamin D₃. 1,25 - dihydroxyvitamin D₃ affects monocytes to mature into cells able to respond appropriately to INF - α and incubation of monocytes with Vitamin D metabolites induced anti-tuberculosis activity. It had been shown that 1,25 - dihydroxy D₃ may act synergistically with pyrazinamide to produce enhanced mycobactericidal effect. With these facts known, a study was conducted to find out the normal level of 1,25 - dihydroxy vitamin D₃ in healthy individuals and to look for evidence of vitamin D deficiency in patients with active tuberculosis. Thirtyfive patients with both pulmonary and extra pulmonary tuberculosis from the Calicut Medical College Hospital were selected for the study. 16 healthy individuals (controls) were also selected for the comparison. The clinical characteristics, dietary intake of Vitamin D and biochemical characteristics including serum vitamin D levels were compared.

There was a statistically significant difference ($p < 0.005$) in mean vitamin D levels between controls (19.5ng/ml) and study subjects (10.7ng/ml). 16 patients out of 35 had values well below the lower limit of normal (9ng/ml). No one in the control group had vitamin D level less than 9 ng/ml. However the mean vitamin D level in the control group was less than the mean value quoted in the literature from the west. Sunlight exposure was adequate in those with deficiency but there was reduced dietary intake of vitamin D. The possibility that vitamin D deficiency might render a population more susceptible to

infection by tubercle bacillus, suggest that vitamin D supplementation may have a role in the prevention of tuberculosis. The administration of vitamin D to older adults has the added advantage of preventing osteoporosis. The elderly are at a greater risk of developing vitamin D deficiency due to, (1) decreased ability of the aging skin to produce vitamin D₃, (2) decreased sunlight exposure and (3) decreased dietary intake.

The main drawback of this study was the small number of cases and controls, since the subgroups were small and analysis might have reached incorrect conclusions. There is a disparity between the number of patients and controls; this was due to the high cost of vitamin D assay and the need for duplication of the results in order to avoid procedural errors. The estimation of sun exposure could not be standardized to make absolute conclusions in this regard.

293. Paradoxical Reaction in HIV and Tuberculosis Coinfection- A case report.

Wanchu A, Sud A, Bamkery P et al; **JAPI; 2002;Vol. 50; April; 588-589**

HIV infection has succeeded the title "champion of Death" which was previously the nickname for the deadly diseases like plague, smallpox, TB etc. As more and more people are getting infected with HIV, incidence of secondary infections like TB is also on steady rise. It has been estimated that rate of TB development is **5 - 10% per year** as compared to an estimated lifetime risk of 10% in those without HIV infection. The temporary exacerbation of TB symptoms and lesions after initiation of Anti Tuberculosis Therapy, known as a **paradoxical reaction** has been described as a rare occurrence attributed to causes such as recovery of the patients' delayed hypersensitivity response and an increase in exposure and reaction to Mycobacterial antigens after bactericidal antituberculosis therapy is initiated. A 36-year HIV infected male with low-grade intermittent fever, loss of weight and appetite for three months duration was presented to the authors. Examination revealed mild pallor and a palpable firm spleen 6-cm below the left costal margin. Biochemical investigations for electrolytes, renal and hepatic functions and blood sugars were normal. The chest X - ray was normal, CT scan of chest revealed mediastinal lymphadenopathy with central necrosis. CT scan of abdomen revealed hepatosplenomegaly and enlarged retro-

peritoneal lymph nodes. FNAC showed presence of caseating granulomas and Anti fast bacilli. The patient was immediately put on ATT. After 3 months of ATT, he was also put on Antiretroviral therapy. Total duration of the treatment was for 5 months. Baseline plasma HIV RNA load that was initially 48,500 copies/ml came down to 24,100-copies/ml and CD4 count which was 26/ml rose to 112/ml.

Paradoxical reactions are related more often to concurrent administration of antiretroviral and ATT and occur more often than do paradoxical reactions associated primarily with the administration of ATT. Major features of paradoxical reactions are hectic fevers, lymphadenopathy, worsening of chest radiographic manifestations of TB and worsening of original tuberculous lesions. Investigations into potential causes for paradoxical reactions have included TB treatment failure, anti-tuberculosis drug resistance, non-adherence with TB therapy drugs, fever, development of conditions not related to TB or HIV as possible causes. These were considered unlikely because evaluations for them produced negative results, and TB was cured in patients who remained on unmodified Antituberculosis regimens. The authors are of the opinion that, in an economically developing country like India very few patients can afford to take combination anti-retroviral therapy. However, as their numbers increase the likelihood of such reactions will increase correspondingly and hence much attention has to be paid for such situations.

294. Efficacy of common antiseptics against Multidrug - resistant Mycobacterium tuberculosis.

Rikimaru T, Kondo M, Kajimura K et al; Departments of Internal Medicine, Kurume, Japan; **Int J Tuberc Lung Dis; 2002; 6(9); 763 - 770.**

Mycobacterium tuberculosis is an aerosol-transmitted disease. However, the nosocomial transmission of the organism has also been reported. Various species of Mycobacteria, including Mycobacterium tuberculosis, show higher resistance against various chemical substances, including antiseptics, than other common bacteria. Non-tuberculous Mycobacteria (NTM) are more resistant to common antiseptics than Mycobacteria tuberculosis and are also resistant to anti - Mycobacterial agents. Multi-Drug Resistant (MDR) strains of Mycobacterial tuberculosis (MDR - TB),

which are by definition resistant to both isoniazid (INH) and rifampicin (RMP), are resistant to most anti-Mycobacterial agents; this pattern of drug resistance is similar in NTM. MDR - TB has become a significant clinical problem while limited nosocomial outbreaks of MDR - TB have been reported. It would consequently be of interest to know the activity of various antiseptics against MDR - TB. The study was conducted to examine the sensitivity of MDR - TB to various antiseptics and compared these with that of a standard sensitive strain, H37Rv. The aim of this study was to determine those antiseptics that are useful against MDR - TB.

Thirteen clinical isolates of MDR - TB and a standard strain of Mycobacterium tuberculosis H37Rv was used as a control. Povidone - iodine (PVP - I), cresol, alkyldiamino ethyl glycine hydrochloride (AEG) and glutaraldehyde. After bacilli were exposed to the antiseptic solution with 2% human serum, the disinfectant was inactivated by addition of neutralizer. PVP - I at a final concentration of 0.2% killed all of the strains within 120 seconds. Most stains were killed after exposure to 0.5% cresol at 300 seconds and to 1.0% cresol at 60 seconds; 3.0% cresol killed all bacilli within 120 seconds, while 0.1%, 0.2%, and 0.5% AEG all required 60 minutes to kill 99.9% or more of the bacilli; 2.0% glutaraldehyde required 10 minutes to kill all bacilli.

The authors opine that the bactericidal activities of antiseptics for MDR - TB were similar to those for drug - sensitive Mycobacterium tuberculosis. Even glutaraldehyde is quite effective against MDR - TB as an antiseptic for medical equipment. Cresol in spite of its toxicity is a very strong sterilizing agent.

295. Risk factors associated with default, failure and death among tuberculosis patients treated in a DOTS programme in Tiruvallur District, South India, 2000.

Shantha T, Garg R, Frieden T.R; Tuberculosis Research Center, Mayor V.R. Ramanathan Road (Spurtank Road), Chetput, Chennai - 600 031, India; **Int J Tuberc Lung Dis; 2002; 6(9); 780 - 788.**

World wide it is tuberculosis the second most common cause of death in adults attributable to a single infectious agent. Tuberculosis remains the leading cause of death due to infection in India, which bears nearly 30% of the global tuberculosis burden. By mid 2001, RNTCP has expanded to cover 200 of

the 550 districts in India. DOTS programme's goal is to achieve at least 70%. The study was conducted to identify and analyze the risk factors associated with default, treatment failure and death among tuberculosis patients treated under programme conditions in a rural setting in South India. A total of 209 villages and nine urban clusters were selected for the study.

Six hundred and seventy six patients were selected for the study. Among new smear positive patients (n=295), 74% were cured, 17% defaulted, 5% died and 4% failed treatment. In multivariate analysis (n=676), higher default rates were associated with irregular Treatment (adjusted odd ratio <AOR> 4.3; 95% CI 2.5- 7.4), being male (AOR 3.4; 95% CI 1.5 - 8.2), history of previous treatment (AOR 2.8; 95% CI 1.6 - 4.9), alcoholism (AOR 2.2; 95% CI 1.3 - 3.6). Patients with MDR - TB were more likely to fail treatment (33% Vs 3%; P<0.001). Higher death rates were independently associated with weight less than 35Kg (AOR 3.3; 95% CI 1.5 - 7.0).

The patients described above were treated in the first year of DOTS implementation, during which time the cure rate was 74%. This is significantly lower than the average national cure rate of 81%. The default rate was more than twice the national average. However, in the preceding years cure rate was only 30 - 35%. This provided the opportunity to evaluate and document causes of poor performance and help identify ways to overcome them. The authors feel that the majority of unsuccessful outcomes were due to a failure of the programmes to ensure treatment, rather than a failure of treatment to cure patients. It was found that male patients and those with alcoholism were at increased risk of default, as were patients identified by community survey. Patients with extrapulmonary TB were less likely to default. Better supervision, making DOT more convenient to the patient, counseling home visits and motivation and health education can successfully intervene defaults. The authors also feel that to reduce mortality, the possible role of nutritional interventions should be explored among underweight patient.

296. Factors associated with patient and health system delays in the diagnosis of tuberculosis in South India.

Rajeswari R, Chandrasekaran V, Suhadev M, et al; Tuberculosis Research Center, Mayor V.R.

India bears 30% of the global tuberculosis burden. Of these, smear positive tuberculosis is the most infectious form. It claims around 1 million people as its sufferers. A smear positive tuberculosis patient can infect 10 - 15 more people/ year. Hence early detection of infectious cases, followed by effective treatment is imperative for the successful control of tuberculosis. Delay in diagnosis of tuberculosis causes spread of infection in the community, increases patient expenditure and is associated with a higher risk of mortality. TB diagnosis can be delayed when patients postpone (patient delay), or when health providers take more time than required to diagnose patients seeking care (health system delay). Since its inception, Directly Observed Treatment, short Course (DOTS) strategy, plans to extend its coverage to the entire country by 2005. Baseline information about the magnitude and risk factors for delay in the diagnosis of tuberculosis will be useful in estimating the impact of the DOTS strategy over time, as well as for developing appropriate strategies to reduce diagnostic delays. The above study was therefore conducted to investigate the factors associated with delay in (1) Care - seeking (patient delay), (2) diagnosis by health providers (health system delay).

A total of 531 new smear positive patients were interviewed using a structured questionnaire. Of these, the median patient, health system and total delays were 20, 23 and 60 days respectively. 29% of patients delayed seeking care for more than one month, of whom 40% attributed the delay to their lack of awareness about TB. Men postponed seeking care for longer periods than women ($P = 0.07$). In multivariate analysis, the patient delay was greater if the patient had initially consulted a government provider (adjusted odds ratio [AOR] 2.2; $P < 0.001$), resided at a distance of more than 2 Km from a health facility (AOR 1.6; $P = 0.04$), and was an alcoholic (AOR 1.6, $P = 0.04$). Health system delay was greater than 7 days among 69% of patients. Factors associated with health system delay were: first consultation with a private provider (AOR 4.0, $P < 0.001$), a shorter duration of cough (AOR 2.6, $P = 0.001$), alcoholism ($P = 0.04$) and patients residence greater than 2 Km from a health facility (AOR 1.8, $P = 0.02$). The total delay when government providers were consulted first and a long health system delay when private providers were consulted first. The

authors feel that, the delays in diagnosis of TB observed in study can be reduced greatly by:

- 1) Increasing public awareness about chest symptoms of TB and the availability and location of free diagnostic services.
- 2) Educating government and private physicians about maintaining a high index of suspicion for TB while examining out - patients.
- 3) Developing effective referral links for referral links for smear microscopy between the private and government health systems.

The authors opine that trends in patient and health system delays can be monitored in order to measure the impact of DOTS implementation over time and to identify opportunities to further reduce delays in TB diagnosis.

297. Practice of Directly Observed Treatment (DOT) for Tuberculosis in Southern Thailand: Comparison between different types of DOT observers.

Pungrassami P, Johnsen S.P., Chongsuivatwong V, et al, Zonal Tuberculosis center, 12, Amphur Muang, Yala, Thailand; **Int J Tuberc Lung Dis**; 2002; 6(5); 389 - 395.

Thailand is one of the 22 countries that have 80% of the estimated incident cases of TB in the world and one of 10 countries with the highest prevalence of primary MDR. In 1995, it was found that the cure rate was only 17% - 68%. Hence in 1995, National Tuberculosis Programme (NTP) with DOTS strategy was adopted to increase the cure rate. DOTS strategy was recommended to improve the patients' adherence to TB treatment. In Thailand, there are totally three types of DOT observers. (1) Health personnel (HP - staff members of TB clinics, hospital wards and health centers), (2) Community members (CM - village health volunteers, community leaders and friends) and (3) family members (FM - close and distant relatives). As per the National guidelines, the recommended preferred choice of observer is HP, CM and FM in descending order. However, the choice of DOT observers and places generally depends on negotiation, and the majority of assigned DOT observers are family members. Hence, the study was conducted to compare the practice of actual directly observed treatment (DOT) and the observer sustainability for different types of observer. 411 new

smear positive pulmonary cases (during 1999 - 2000) were selected for the study. The patients and/or their observers were interviewed about the presence of any person with the patient during drug intake and the practice of watching the patients swallowing the medicine. Data were recorded monthly and analyzed by Cox and logistics regression models. For HP, CM and FM observers, the proportions that did not practice actual DOT were respectively 11%, 1% and 2% during the first 9 months of treatment. HP had the lowest risk of not practicing actual DOT (odds ratio HP/FM 0.1, 95%CI 0.1-0.2; CM/FM 0.9, 95% CI 0.5-1.6) but the highest risk for change to self-administration.

It was observed that compliance with the DOT principles were poor. HP observers practiced actual DOTS more often than CM or FM observers. However changing from HP observer to self-administration occurred more frequently than changing from other types of observers to self-administration. The authors feel that using community members is a promising alternative. They opine that to increase the coverage of actual DOT, strategies are needed to maintain health personnel as the DOT observers and to promote actual DOT among family members observers.

298. Cost - effectiveness analysis of the Russian treatment scheme for tuberculosis versus short - course chemotherapy: results from Tomsk, Siberia.

Jacobs B, Clowes C, Wares F, et al; Merlin (Medical Emergency Relief International), Borough, London, UK; **Int J Tuberc Lung Dis**; 2002; 6(5); 396 - 405.

The rate of tuberculosis in Russia has risen from as low as 34 per 100,000 population in 1991 to as high as 76/100,000 by 1998. This increase has been attributed to a growing level of poverty and malnutrition in association with a declining national economy. The Russian TB management system is further characterized by the existence of parallel systems of in - and out - patient care in prisons, the army, some large companies and trade unions and BCG vaccination and contact tracing are conducted by other independent agencies. However, the TB service in Russia is characterized by a vertical, centralized and bureaucratic structure, and it has suffered in common with other health services from declining funding since the 1980s. To assess the cost-effectiveness of individualized Russian treatment and short-course chemotherapy (SCC) regi-

mens for new WHO Category I tuberculosis patients a study was conducted.

Analysis of costs incurred by the provider, the household and society as a whole for both treatment approaches, and a sensitivity analysis for SCC with hospitalization for 2 weeks (patients theoretically at low risk of defaulting). Outcomes were measured as cost per case cured and year of life saved, with cure rates based on a locally conducted trial. The cost per cure using the individualized Russian treatment was US \$2295, vs. US \$ 1901 when using SCC. The costs per year of life saved were respectively US \$ 123 and US \$ 103. The cost per cure was US \$ 1457 for SCC with 2 months hospitalization and US \$556 for SCC with 2 weeks hospitalization, with costs per year of life saved of US \$ 79 and US \$ 30, respectively.

The authors opine that from an economic point of view, SCC in tandem with 2 weeks or 2 months of hospitalization and absence of surgery is clearly the optimal option for treatment in the Tomsk region and probably to the whole of the Russian Federation. This is because both the household and provider costs are substantially lower than with the individualized Russian treatment scheme. The authors also feel that when such an approach is fully implemented, it would require only one sixth of the current budget for TB control.

299. Detection of Mycobacteria in patients with pulmonary tuberculosis undergoing chemotherapy using MGIT and egg-based solid medium culture systems.

N. Hasegawa, T. Miura, A. Ishizaka, et al; Department of Medicine, Keio University Hospital, 35 Shinanomachi, Shinjuku - ku, Tokyo, Japan; **Int J Tuberc Lung Dis**; 2002; 6(5); 447 - 453.

The increase in the incidence of tuberculosis, particularly Multi-Drug Resistant tuberculosis (MDR - TB) has made it an important re-emerging infectious disease. In Japan, an egg - based solid medium, Ogawa Medium that is considered to be equivalent to the world wide used standard egg based Lowenstein - Jensen medium (L - J) medium. There has been felt a need for the rapid diagnosis and identification of the infectious patients for controlling the spread of spread of TB. Numerous investigations have demonstrated that the use of liquid medium resulted in better recovery of Mycobacterium, in terms of recovery rate as well as detection time, than egg - based solid media

or agar-based media. Although earlier liquid medium systems, such as BACTEC 460TB, allowed rapid identification of Mycobacterium in infectious patients, it was not accepted in Japan because of the use of radioactive elements and other problems. Recently, the Mycobacterium Growth Indicator Tube (MGIT) was developed to overcome most of the limitations associated with the BACTEC 460TB system, including the high costs of the equipment, accumulation of radio active wastes and the hazardous procedure of handling needles. Although there are many studies comparing MGIT and solid medium system using specimens obtained during the course of antituberculosis chemotherapy. The main aim of the study was to compare the respective performance of the MGIT System and the egg based Ogawas system. In addition, the utility of the MGIT system in the management of patients with pulmonary tuberculosis on chemotherapy was evaluated.

A single - center prospective case study of 61

hospitalized patients from 1st May to 31st July 1998 on a standard 6 months regimen of anti - tuberculosis chemotherapy including isoniazid, rifampicin, streptomycin or ethambutol and pyrazinamide. Sputum cultures systems were performed bi - weekly up to week 16th of treatment and were further monitored by MGIT alone at the end of chemotherapy and every 6 months after the end of chemotherapy up to 2 years. The detection time by MGIT gradually became longer with the progression of chemotherapy. The recovery rate at weeks 2, 4, 6, 8 and 10 by MGIT were significantly higher ($P < 0.05$) than on the Ogawa slants. According to the authors the data presented in this study strongly suggest that the routine use of less sensitive direct smear method and culture on solid medium might partially account for failure to detect patients who could be spreading the disease. The authors conclude that the MGIT system could detect infectious cases more rapidly than the solid medium. Although its clinical importance was not clear, number of NTM isolates detected by MGIT system than by Ogawa medium were more.

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SELECT BIBLIOGRAPHY OF INDIAN MEDICAL LITERATURE ON TUBERCULOSIS - 24 & 25

TB RESEARCH

1725. Harvesting human genome
Nagpaul DR : **Indian J TB, 2002, 49/4, 187-188**
1726. Genomics and Tuberculosis "New hopes to conquer an ancient disease"
Bose M : **Indian J Chest Dis & All Sci 2002, 44/4, 221-223**
1727. Mycobacterial research in India: successes and challenges
Katoch VM : **Indian J TB, 2002, 49/4, 171-173**

TB PULMONARY

1728. Intercostal lung herniation in cavitary pulmonary tuberculosis
Dixit R & Nawal CL : **JAPI 2002, 50/10, 1339**

TB EXTRA PULMONARY

1729. Acute lung injury in miliary tuberculosis
Bhalla A et al : **Indian J TB 2002, 49/3, 125-128**
1730. Tubercular Mediastinal Lymphadenopathy Presenting as Superior Vena Cava Syndrome
Bandyopadhyay SK et al : **JAPI 2002, 50/9, 1195**
1731. Acute febrile Neutrophilic Dermatitis following tuberculous infection
Singh RK : **JAPI 2002, 50/10, 1322-1323**

TB CHILDREN

1732. Perinatal Tuberculosis
Narang A & Murki S : **J of MGIMS, 2002, 7/1, 12-16**

TB & NUTRITION

1733. Tuberculosis and vitamin D deficiency
Sasidharan PK et al : **JAPI 2002, 50/4, 554-558**

TUBERCULOSIS & POVERTY

1734. Tuberculosis & Poverty
Muniyandi M & Rajeswari R : **ICMR Bulletin 2002, 32/3, 25-30**

TB & HIV

1735. Clinical Profile of Tuberculosis in patients with HIV infection/AIDS
Babu R : **Indian J TB & Chest Dis 2002, 44, 159-163**

EPIDEMIOLOGY

1736. Prevalence of Tuberculosis Infection and the impact of BCG Vaccination on Tuberculin testing among Primary School children in Turkey.
Kosecik et al : **Indian Pediatrics 2002, 39/4, 362-365**

BCG VACCINATION

1737. Prevalence of Tuberculosis Infection and the impact of BCG Vaccination on Tuberculin testing among Primary School children in Turkey.
Kosecik et al : **Indian Pediatrics 2002, 39/4, 362-365**
1738. BCG & Tuberculosis Testing
Sanklecha M : **Ind* Pediatrics 2002, 39/9, 880-881**

BACTERIOLOGY

1739. A preliminary report on characterization and identification of non Tuberculosis Mycobacteria (NTM) on the basis of biochemical tests and protein/isoenzyme electrophoretic patterns.
Gupta P et al : **Indian J Med Microbiology 2002, 20/3, 137-140**

1740. Qualitative and Quantitative analysis of antibody response in childhood Tuberculosis against antigens of Mycobacterium Tuberculosis. Umadevi KR et al : **Indian J Med Microbiology 2002, 20/3, 145-149**

DIAGNOSIS

1741. Extra - Pulmonary Tuberculosis - A Retrospective study
Gopal R et al : **Indian J TB, 2001, 48, 225-226**

QUALITY ASSURANCE

1742. RNTCP: Quality control of sputum microscopy at sub-district level
Sarin R et al : **Indian J TB 2002, 49/3, 143-145**

DOTS

1743. Tuberculosis : Discovery to DOTS
Biswas R : **Indian J Pub Hlth 2002, 46/2, 37-38**
1744. Re-Treatment outcome of smear positive tuberculosis cases under DOTS in Bangalore city
Sophia V et al : **Indian J TB, 2002, 49/4, 195-204**
1745. Directly observed therapy (DOT) is not the entire answer: an operational cohort analysis
Mangura B et al : **Int J TB & Lung Dis 2002, 6/8, 654-661**

1746. Tuberculosis: Discovery to DOTS
Biswas R : **Ind J Pub Hlth, 2002, 46/2, 37-38**

COMPLIANCE

1747. A social study of compliance with DOTS
Sukumaran P et al : **Indian J TB, 2002, 49/4, 205-208**

DRUG RESISTANCE

1748. Drug Resistance in mycobacterium tuberculosis
Narang P : **J of MGIMS, 2002, 7/1, 22-25**
1749. Surveillance of drug resistance in tuberculosis

in two districts of South India
Paramasivan CN et al : **Int J TB & Lung Dis 2002, 6/6, 479-484**

1750. Prevalence of drug resistance among M.tuberculosis isolates in Indore (M.P)
Hemvani N : **Indian J Med Microbiology 2002, 20/4, 228-229**

BACTERIAL RESISTANCE

1751. Detection of rifampicin resistant mutant gene in mycobacterium tuberculosis by line probe assay
Sachan AS et al : **Indian J TB, 2002, 49/4, 209-211**

TB CONTROL

1752. Tuberculosis Control: some reflections
Nagpaul DR : **J of MGIMS, 2002, 7/1, 1-2**

RNTCP

1753. RNTCP: Quality control of sputum microscopy at sub-district level
Sarin R et al : **Indian J TB 2002, 49/3, 143-145**

RADIOLOGY

1754. Dependence on Radiology for diagnosing pulmonary tuberculosis : an urban situation
Dhingra VK et al : **Indian J TB 2002, 49/3, 153-156**
1755. Acute radiological change in adult pulmonary tuberculosis
Behera G et al : **Indian J TB 2002, 49/3, 157-159**
1756. Gall bladder tuberculosis presenting as a multiloculated cystic mass on CT
Gulati MS et al : **Indian J Rad & Imaging 2002, 12/2, 237-238**
1757. CT and MRI in the diagnosis of tuberculosis
Buxi TBS et al : **Ind J Ped 2002, 69/11, 965-972**

STATISTICS

1758. Mixture model for analysis of tuberculin surveys
Savanur SJ et al : **Indian J TB 2002, 49/3, 147-152**

General:

Independence day was celebrated on 15th August 2002 wherein the faculty, staff, trainees (including those from SAARC) participated. Students from Bethesda School, Bangalore who have been using the play ground of NTI gave Guard of Honour to the Director. Director hoisted the flag and this was followed by National Anthem and addressing the gathering by the Director, highlighting the achievements and problems faced by the country. Patriotic songs were sung by the faculty, staff and trainees.

Forty third (43rd) foundation day of National Tuberculosis Institute, Bangalore was celebrated on 16th September 2002. Dr Shivlal, Director, NICD & ADG, DGHS, New Delhi presided over the function.

Dr RL Icchpujani, H.O.D., Zoonosis, NICD, New Delhi was the guest of honour. Director, Chief Guest and Guest of Honour memorized the contributions made by the institute towards the prevention and control of Tuberculosis. The officers, staff and trainees of NTI actively participated in the celebration.

The new renovated Director's office in the first floor of "Avalon" building was inaugurated on 18th September 2002. The faculty and staff of the institute participated in the inaugural function.

Parliament Questions:

Relevant technical replies to Lok Sabha / Rajya Sabha questions were sent to Directorate General of Health Services, New Delhi on 14th, 20th and 29th November, 2002 respectively.

Important Meetings of the Directors Office :

Sl.No.	Date	PARTICULARS
1	18 th Nov. 2002	A meeting with the faculty to discuss the 10th Five Year Plan about fixation of targets, achievements against physical and financial targets, activities under non-plan targets and achievements. Quarterly report on targets and achievements for the current year and targets and achievements (physical & financial) for the IX plan period were compiled and sent to Bureau of planning and Dy. Director General (TB), Dte.GHS, Delhi.
2	4 th Dec. 2002	A meeting with the newly formed administrative committee was held to identify the posts of sensitive nature and policy of rotation of the staff occupying such posts.
3	13 th Dec. 2002	Provision of better facilities for the hostel inmates and related works pertaining to NTI campus were discussed with the member of campus maintenance committee.
4	16 th Dec. 2002	A policy for grant of honorarium to the staff and the resource persons involved in the training courses organised by WHO/NTI was discussed with the members of Training Committee.
5	18 th Dec. 2002	A strategy for the construction of additional quarters was prepared besides discussing the proposed civil and electrical works with the members of planning committee. Director along with the members of the planning committee, NTI visited the office of the superintending engineer, CPWD, Kendriya Sadan, Bangalore on 19 th December 2002 and had discussion regarding construction of additional quarters to NTI staff and officers in NTI campus.
6	27 th Dec. 2002	Formulation of policy for laboratory support to the patients referred by different organizations was discussed with incharge - Bacteriology Section.

Visitors:

Sl.No.	Date	Name & Designation	Organisation
1	11.07.2002	Dr (Mrs) Kamath	Karnatak Aids Prevention Society, Bangalore.
2	03.09.2002	Dr Krishnacharya, Chairman Technical Committee Dr P Chandashekar, Trustee Dr G Visweswaraiiah, Hon. Secretary	Karnataka State TB Association, Bangalore.
3	13.09.2002	Dr Rupen Basu Mullick Professor Dr (Mrs) Basu Mullick H.O.D. Chest Medicine	Calcutta National Medical College & Hospital, Kolkata.
4	15.09.2002	Dr Sagar Galwankar, Project Director	AIDS & Infections Diseases Journal, Mumbai.
5	18.09.2002	Dr R Ramesh, Medical Officer, RNTCP/BMP	MS Ramaiah Medical College, Bangalore.
6	18.09.2002	Mr KG Balachandra Area Manager (Sales)	M/s NBPL Telecommunication Networking & Information Technology, Bangalore.
7	19.09.2002	Dr Fraser Wares WHO Consultant	South East Asian Regional Office (SEARO), New Delhi.
8	25.09.2002	Dr Suvanand Sahu National Programme Officer - TB	Office of the WHO representative to India, Nirman Bhavan, New Delhi.
9	07.10.2002	Dr Krishnabhargava, Former Director	Kidwai Cancer Institute, Bangalore.
10	07.10.2002	Dr Badarinayana, CMO (NFSG)	Nirman Bhavan, New Delhi.
11	07.10.2002	Sri KM Vasudevan, Former CSO	NTI, Bangalore.
12	11.10.2002	Sri VS Mani, General Manager	'Oldelft' International Bio-Medicals, Chennai.
13	21.10.2002	Dr Sheela Rangan, Senior Scientist	The Maharashtra Association of Anthropological Sciences (MAAS) Centre to Health Research & Development (CHRD) unit, Pune.
14	21.10.2002	Dr AK Chakraborty Former Epidemiologist	NTI, Bangalore.
15	24.10.2002	Dr S Vijaya, Assistant Professor	Department of Microbiology and Cell Biology, Indian Institute of Science, Bangalore.
16	13.11.2002	State TB Officer	State TB Centre, Andaman & Nicobar Islands.
17	14.11.2002	Dr VK Arora, Director	Lala Ram Sarup Institute of Tuberculosis & Allied Diseases, New Delhi.
18	15.11.2002	Dr Tushar Kanti Ray, Advisor	DANTB, Orissa.
19	15.11.2002	Dr Rajeswari Ramachandran Deputy Director	Tuberculosis Research Centre, Chennai.
20	19.11.2002	Dr HG Narayana Murthy, Joint Director (TB)	Government of Karnataka, Bangalore.

Sl.No.	Date	Name & Designation	Organisation
21	19.11.2002	Dr B Sarojamma RNTCP Project Co-ordinator	Bangalore Mahanagara Palike, Bangalore.
22	20.11.2002	Dr KN Prasad & Dr HR Ravindra	WHO RNTCP Medical Consultants, Karnataka.
23	22.11.2002	Dr LS Chauhan, Dy Director General (TB)	Central TB Division, DGHS, New Delhi.
24	27.11.2002	Sri Swami Japananda, Chairman	Swamy Vivekananda, Integrated Rural Health Centre, Pavagada.
25	27.11.2002	Dr KG Uma, Director	Centre for Women's Studies, Bangalore University, Bangalore.
26	03.12.2002	Dr S Arunachalam, Distinguished fellow in Information Science	MS Swaminathan Research Foundation, Chennai, Discussions about HIN Project.
27	12.12.2002	A team from M/s. Medispan Diagnostics, Bangalore	Briefing about "Fast plaque TB kit".
28	16.12.2002	The Director Agricultural University, Bangalore	Collaboration between NTI and Agricultural university.
29	16.12.2002	Mr Mohamed Azam	Reliance Infocom, Bangalore. Proposed development of cable network at NTI.
30	19.12.2002	Teachers of Bethesda School, Bangalore	Involvement of schools in IEC relating to TB.
31	24.12.2002	Director, Mahavir Jain Hospital, Bangalore	Technical support to establish DOTS centre at Mahavir Jain Hospital.
32	30.12.2002	Mr Ashok Vaishnavi from Tele Health Project	Discussion regarding "Tele Health TB Control Project".

Professional Updates:

As a part of the professional updating among the faculty and technical staff of NTI, a session on presentation skills was held on 17th September 2002 by Dr VK Chadha, Sr. Epidemiologist, Subsequently, this was followed by series of technical and non-technical presentations by the faculty, technical and non-technical staff. Field Investigator, Health Visitor, Computer, X-ray Technician and two Lab-Technicians made presentations on the sessions held on 4th & 18th October 2002.

Administrative Activities:

Transfer:

Dr (Mrs) Lalitha Suryanarayana, CMO (NFSG) who was on deputation to the Institute from CGHS Chennai has been relieved of her duties from the

afternoon of 26th July, 2002 on transfer to Regional Office of Health & Family Welfare, Kendriya Sadan, Koramangala, Bangalore.

Dr V Seethapathi Rao reported as Additional Director of NTI on 17th October 2002 on transfer from Department of Posts, Vijayawada, Andhra Pradesh.

DPC/Selection Committee/other committee meeting:

Administrative & staff welfare committee meeting was held on 20th August 2002 to discuss the matter pertaining to administration.

A meeting chaired by Dr (Mrs) Sophia Vijay, Sr. TB Specialist was held on 21st August 2002 to review retention in service, Group "C" & Group "D" officials who have attained the age of 50/55 years or 30 years of service.

Recruitment :

Sl. No.	Name of the Official	Designation	Group	Date of Appointment	Details
1	Kum C Veena	Stenographer Gr.III	'C'	19.12.2002	On temporary Basis
2	Sri P Udaya Kumar	Chowkidar	'D'	20.12.2002	On temporary Basis

Retirement:

Smt Kamala Rathnaswamy, Stenographer Gr.II, retired voluntarily from Government service on 7th October 2002.

Termination:

The service of Shri Suhail Pasha, Field Assistant was terminated from services with effect from 17th October 2002.

Hindi / Rajbhasha Implementation Committee:

Correspondence of 13 letters and 3 circulars was done in Hindi. Quarterly meeting of the Rajbhasha Committee was held on 19th August 2002. Celebrations of the Hindi week and Hindi day were discussed and responsibilities entrusted to the committee members - further it was proposed to depute two officials for training in Hindi.

Quarterly meeting of the Rajbhasha Implementation Committee held on 26th December 2002, proposed that (i) a note on the festival and any other religious subject during the respective month by any official of this institute to be initiated and (ii) All new vehicles purchased should have bilingual name of NTI painted on the vehicle.

Celebration of:

1. Hindi Week:

Hindi week was observed from 6th - 13th September 2002 and Hindi day was celebrated on 16th September 2002. Smt. Archana Dutta, Director,

Information & Broadcasting, Kendriya Sadan, Koramangala, Bangalore presided over as the Chief Guest. As part of the observance of the Hindi Week, Anthakshri Competition, Ek Shyam Bachonkeliye (Cultural programme for the children of NTI staff) were conducted. Prizes were distributed to the winner of the events and to the concerned official who wrote Hindi word a day on notice boards of "Avalon and PV Benjamin Block" to promote usage and implementation of official language.

2. Hindi Divas:

Hindi Divas competitions were held under Town Official Language Implementation Committee (TOLIC) during November and December in various Central Government offices of Bangalore. Sri BA Shivashankara, Health Visitor and Sri. Vidyasagar, Chowkidar participated in the written quiz competition and recitation and singing completion respectively. Kum G Sumathi, Statistical Assistant, Smt P Suganthi, Field Investigator, Sri Rajendra Prasad, Bearer and Sri. Vishweswara Sharma participated in the group song competition during the joint Hindi Divas competitions organized by the Town Official Language Implementation Committee.

Vigilance Awareness Week:

Vigilance awareness week was observed at the Institute from 31st October to 6th November 2002. As part of this, vigilance awareness day was observed on 6th November 2002. The staff of NTI and other officers located in the campus (NICD, CPWD and PAO Audit wing) actively participated in the observance. Dr Sophia Vijay, Sr. TB Specialist addressed the gathering on "Vigilance Awareness" and administered oath to the gathering in Hindi, English and local language.

GUIDELINES TO CONTRIBUTORS

The NTI Bulletin (erstwhile 'NTI Newsletter') is introduced and developed by the National Tuberculosis Institute, as a media of exchange for the dissemination of information generated at local, regional and national levels and feedback of information between the Institute and TB programme centres as well as a teaching research and training institutions. The scope of the Bulletin allows publications on Epidemiological, Sociological and operational aspects of TB prevention and Control. Operational aspects include viz., treatment, case holding, case finding, defaulter retrieval and importance of motivation as health education component under Information, Education & Communication. It also publishes program information on RNTCP. This provides a forum for discussing the problems faced by them. This is an unpriced publication distributed as per the mailing list maintained in the NTI library.

Format of Communications

The communications can be sent on any of the following formats viz., editorial, original articles, field research/reports, case reports, practical applications, clinical problems, field experience, success stories, readers' write/readers' forum, view point and also as correspondence.

Submission of Manuscripts

It should be submitted (in MSWord doc format as e-mail attachment) [online](#) and hardcopy by post to the

The Editor,
NTI Bulletin,
National Tuberculosis Institute,
'Avalon', No.8, Bellary Road,
Bangalore - 560 003.

Preparation of Manuscripts

Manuscripts should be presented in as concise a form as possible, typewritten in double space on one side of good paper of A4 size.

Title page should contain the title of the article and a full list of all authors - the first name being that of the primary author. The name of the departments,

institutions and research centres should be given in full. Abbreviations are not to be used.

The next page should contain an abstract of not more than 150 words providing clear information on the central question or hypothesis of the article. A brief note of the major results or conclusions of the study will be appropriate.

The text page is usually divided into:

Introduction:

This must state briefly the current state of the art and indicate the main objective for undertaking the study. Material and methods should be precise and clear. Statistical methods are to be clearly expressed.

The result portion should contain the usual tables and findings of the study. Tables are to be kept to a minimum. Figures or drawings if any should be clear and originals should be sent.

The discussion portion is the area for arguing the points of the articles and the results need not be repeated. The deductions should be logical and relate to other relevant studies. A brief conclusion/summary paragraph is helpful. Due acknowledgement is to be made and proper authority for quoting references and communications are to be included.

References:

All references should be cited in full and numbered in the order in which they appear in the article. Examples:

Article:

Singh V, Mathur US, Bhandari VM, Jain NK. Peak Expiratory and Inspiratory Flow rates: Comparative study of pink city Flow meter with Wright Flow meter. Lung India 1987; 4: 195-7.

(Authors, Title of article, Name of Journal, Year, Volume and inclusive pages)

In press

Sharma OP. Clinical Review. Pulmonary Eosinophilia. Lung India. (In press).

Text book
Cotes JE, Steel J. Work-related Lung Disorders
Oxford. Blackwell Scientific Publications 1987.

Article in text books

Crompton GK, Grant IWB, McHardy GJR.
Bronchial adenoma In: text books J.Macleod: ed.
Davidson's Principles and Practice of Medicine. 14th
edition Edinburgh, Churchill Livingstone 1984; 262-3.

Abbreviations of Journal names are to be found
in Index Medicus. Written personal communications,
unpublished data and work under progress may be
used in the text but not as references.

Material submitted is accepted on the
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Undertaking

We, the undersigned, give an undertaking to the
following effect with regard to our article entitled
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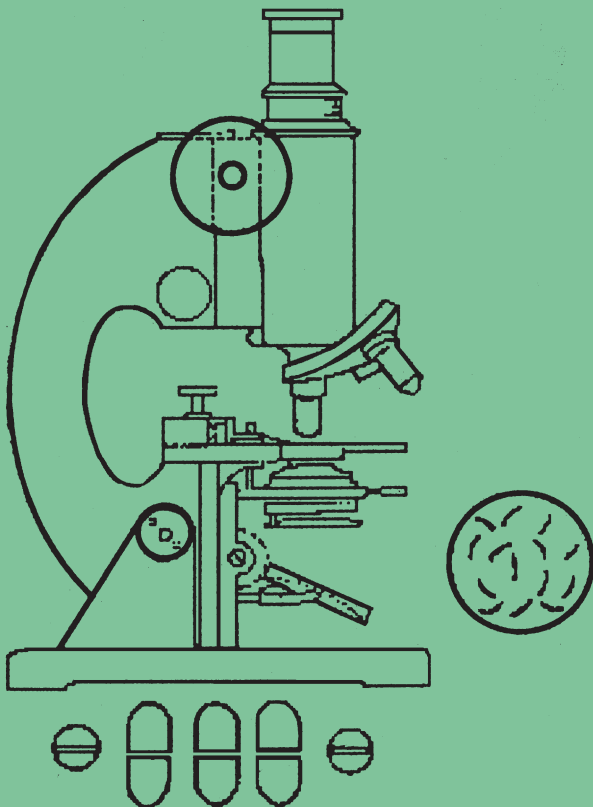
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योगदान के लिए निवेदन

निम्नलिखित विषयों पर लेख आमंत्रित हैं

क्षयरोग के समाजशास्त्रीय, परिचालन, निवारण, नियंत्रण व कार्यक्रम संबंधी पहलू। योजनाकर्मियों के सामने आई समस्याओं व उनके समाधान को पत्रिका में विशेष स्थान दिया जायेगा। क्षयरोगियों द्वारा निरंतर पूछे गए प्रश्न व उनके उत्तर भी भेजे जा सकते हैं।

लेख हिन्दी में भी भेजे जा सकते हैं, जिन्हें पूरे भारत के योजनाकर्मियों के लाभार्थ द्विभाषी में प्रकाशित किया जाएगा।

परिषत्सदस्य, जिसके अंतर्गत संकाय व स्नातकोत्तर छात्र आते हैं, कृपया उपर्युक्त पहलुओं पर लेख भेजकर अपना योगदान दें क्योंकि क्षयरोग नियंत्रण कार्यक्रम में मेडिकल कॉलेजों की भूमिका को बड़ा महत्व दिया जा रहा है।

लेखों या पत्रों की प्रस्तुति हेतु कृपया इस अंक में प्रकाशित अंशदाताओं के लिए दिशानिर्देशों की सहायता लें।

डा. प्रहलाद कुमार
निदेशक

REQUEST FOR CONTRIBUTIONS

Articles are invited on

Sociological, Operational, Prevention, Control and Programme Aspects of Tuberculosis. Problems faced by the programme workers and solved will find a special place in the bulletin. Frequently asked questions by the patients and answers given can also be sent.

The articles can also be submitted in Hindi, which will be published in bilingual for the benefit of programme workers throughout India.

Academic which includes faculty and PG students may please submit contributions on the above mentioned aspects as there is strong emphasis on involvement of medical colleges in the TB control programme.

Guidelines to contributors published in this issue may please be referred for submission of papers.

Dr. Prahlad Kumar
Director

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To Write : English , Hindi, Kannada

Strengths

: Creative ,Innovative and quick learner
Interpersonal Skills
Ability to lead the team
Planning,organising and problem solving