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ORIGINAL: ENGLISH

WHO/SPC REFRESHER COURSE ON TUBERCULOSIS

Sponsored by the

WORLD HEALTH ORGANIZATION REGIONAL OFFICE FOR THE WESTERN PACIFIC

and the

SOUTH PACIFIC COMMISSION

HONIARA, SOLOMON ISLANDS
18-29 August 1980

FINAL REPORT

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1. INTRODUCTION

The Fourth WHO/SPC Refresher Course on Tuberculosis was held in Honiara, Solomon Islands, from 18 to 29 August 1980. It was conducted in the University of the South Pacific Centre, Honiara, with the support of the Ministry of Health, Government of Solomon Islands.

Local arrangements were made with the help of Dr Michael Chia, WHO Medical Officer assigned to Solomon Islands, and Dr Nathan Kere, Chief Medical Officer (CD), Ministry of Health and Medical Services, Solomon Islands, long before the opening of the course. During the course, most of the administrative services were provided by the staff of the South Pacific Commission (SPC).

Owing to the unexpected delay of the Air Pacific flight from Vila, Vanuatu on 17 August 1980, on which twelve participants, including four members of SPC, were travelling, the opening of the course was delayed until the afternoon of Monday, 18 August 1980.

A list of the participants, observers and staff of the course is appended in Annex 1 of the report.

The course was opened officially in the afternoon of 18 August 1980, by H.E. Dr Gideon Zoloveke, Minister of Health and Welfare. Dr S. Endo spoke on behalf of the Regional Director, WHO Regional Office for the Western Pacific (WPRO) and Dr P. Bennett on behalf of the Secretary General of the South Pacific Commission. Their messages are attached as Annex 2 of this report.

Following the introduction of the participants and a group photograph, an introduction to the course was given.

Dr Nathan Kere was selected as chairman and Dr Philip Kame as Vice-chairman of the course and they presided over the sessions relating to the country reports and their evaluation.

2. OBJECTIVES OF THE COURSE

The objectives of the course were:

(1) to provide the participants with a review of all aspects of anti-tuberculosis work, with special emphasis on prevention, case finding and treatment;

(2) to discuss in depth with the participants practical and realistic methods of control of the disease which are applicable to prevailing local conditions and are acceptable to the people and the country; and

(3) to allow participants, including the resource personnel, to discuss special problems encountered in the field and to exchange opinions and experience in the field of operations of their programme, in particular the managerial, control and evaluation aspects.

3. CONTENT OF THE COURSE

The curriculum and timetable of the course are presented in Annex 3. An introduction to the course was given by Dr Tao which is included in the summary of discussion.

3.1 Country reports

After the introduction to the course, each participant was requested to present a report on the general conditions and activities in the field of tuberculosis control in his or her country or area in accordance with a pre-distributed questionnaire prepared by the WHO Regional Office.

A new feature in this course was the summary of the country reports. Following the presentation, individual participants made their comments on their reports. The discussions together with the summary reports are attached to this report as Annex 4.

3.2 Presentations and discussions

The following subjects were introduced by resource persons and discussed by all participants in detail:

Epidemiology of tuberculosis

Pathogenesis of tuberculosis

Tuberculin testing and BCG vaccination

Diagnosis of tuberculosis and case-finding

Treatment of tuberculosis, chemotherapy and case-management

Planning, organization, management, training and evaluation of national tuberculosis programmes

International cooperation in tuberculosis control

An outline for the presentation of each subject was distributed prior to the session so that participants might have a chance to read it beforehand and raise questions or remarks during the discussion.

3.3 Demonstration

Following the discussion on the subject of tuberculin testing and BCG vaccination, a demonstration was made of the international standard techniques of tuberculin testing and BCG vaccination with a UNICEF-supplied BCG vaccination kit.

On the subject of "Diagnosis of tuberculosis by microscopic examination", a filmstrip prepared by the WHO Regional Office for the Americas (film strip no. 71, PAHO Scientific Publication No. 277, 1977) was shown to the participants. The filmstrip was prepared with the assistance of Dr Louis Herresa Malmsten of Chile, Disease Control Division, PAHO. Copies of the filmstrip, in English, French or Spanish were offered to the participants upon request.

3.4 Field visit

The entire group made a field visit to Solomon Islands Plantation Limited (SIPL) Clinic and Binu Clinic on Guadalcanal on Tuesday, 26 August 1980. SIPL is a joint venture between the Government of Solomon Islands, the local residents and the Commonwealth Development Corporation covering a population of 4-5000. There are three satellite clinics in addition to the main one. Four nurses and three nursing aides are employed by the company. Binu Clinic is one of the rural clinics 40 kilometres away from Honiara covering an approximate population of 9000 in an area of about 5000 square miles. The number of tuberculosis cases on 31 December 1979 was 25. The clinic was staffed by four nurses and one midwife. Both clinics had difficulty in following up patients due to frequent migration of population in the case of the SIPL clinic and the widely scattered population in the case of Binu clinic.

A discussion session was held following the visit. A Solomon Islands participant said that the two clinics visited were the best staffed among the 140 clinics in Solomon Islands. Most of the others had poorer communication. Following up of patients was therefore even more difficult. Improvement of health education at the clinics, preparation and distribution of a manual on tuberculosis control for general health workers, improvement of the treatment card, and appointment of supervisory staff at an intermediate level were discussed.

The suggestions made by the group were well accepted by the Solomon Islands participants and observers. One Solomon Islands participant said that registered nurses could be trained as supervisors and that a new category of health workers should probably not be created for this purpose.

4. SUMMARY OF DISCUSSIONS

4.1 Introduction to the course[1/]

Attention was drawn to four dramatic advances that had been made in the field of tuberculosis in the past 35 years:

(1) introduction of specific and effective drugs for tuberculosis;

[1/] Presented by Dr Tao.

(2) worldwide application of BCG vaccination;

(3) cooperative, controlled operational studies conducted on various aspects of tuberculosis; and

(4) trial on the organization of national tuberculosis programme in developing countries.

These advances have enabled many governments, especially those of developing countries, to take up tuberculosis control as one of their priority health services. As a government service, no discrimination is allowed among citizens of different race, sex, class or residence. In view of the gap existing between the needs of the population for services and the present stringent resources in most countries, the principle of cost/benefit becomes the main guideline in the planning and implementation of health services.

Leadership is essential for the success of any planned activity, so is the execution of national tuberculosis programmes. The competent manager must have a thorough understanding of the disease, technical expertise, the ability to organize, and devotion to the task. He or she must be mature and able to work with others and coordinate between different agencies or workers concerned with the programme.

The functions of a clinical practitioner and a disease control officer were compared. While the objective of a clinician is to relieve suffering, that of a disease control officer is to reduce or to solve a disease problem in a community. The primary interest of a clinician is in the individual patient while that of a disease control officer is in the protection of the healthy population from infection. The relation in clinical practice is between the patient and the physician while in disease control it is between the government workers and the community. Initial action in clinical practice is always taken by the patient and the site of such an action is usually in the physician's office while the case-finding and treatment services in disease control are often initiated or promoted by health workers and their action usually takes place in the field close to the patient's home. The decision in taking medicine in clinical practice is in the patient's hands, while in disease control the responsibility of achieving successful treatment, once an infectious case is discovered, must be the health officer's. In the selection of methods, both for diagnosis and for treatment, practitioners tend to use sophisticated ones in order to achieve perfection, while for disease control certain requirements must be met by these methods to qualify for mass use. In disease control, because of the large number of patients involved, records must be standardized, accurately filed out and carefully filled for future review and analysis while in clinical practice such a record may not be so important. As regards remuneration of workers, the practitioners usually earn much more than the government officers, who have to rely on a fixed income, and, in developing countries, the salary scale is invariably low. Thus, disease control officers must be determined to accept the challenge and accept a great deal of self-sacrifice.

The participants were then urged to continue their task in tuberculosis control for at least another decade or two.

4.2 Epidemiology and statistics of tuberculosis[1/]

The use and application of epidemiologic principles and methods were discussed.

Epidemiology is an essential part of a successful tuberculosis control programme. Epidemiological methods should be applied for the planning, maintaining and evaluation of a control programme. Knowledge of the epidemiology of the disease in general, in particular in the country or community concerned, and recognition of the distribution of the disease in the community among various sub-groups of the population, and of changes occurring over time, permit an understanding of the events which are involved in the spread of the disease in the community. Application of this knowledge enables available resources to be used in a more efficient manner to combat and prevent the disease.

The commonly used methods for the measurement of morbidity and mortality were described and the importance of correct usage of the terms emphasized. Measurement of the number of existing cases of the disease in the community according to such characteristics as age, sex, ethnic group, together with the distribution of these characteristics in the total population, should be used to estimate the prevalence of the disease. There is no single measurement by which the effectiveness of a control programme can be evaluated. The rate of development of the disease over specified time periods, the incidence rate, is probably the best single indicator of the overall state of tuberculosis control. However, this cannot be accurately assessed without performing specific surveys for the purpose.

The use of tuberculosis registries in estimating prevalence and incidence were discussed and the fact that the statistics derived from those represented only the disease which was recognized and recorded was emphasized.

Alternative methods of monitoring achievements include estimation of the annual risk of infection. For example, determining the frequency of positive tuberculin tests in children who have not previously received BCG vaccination and thereby estimating the rate of conversion within a period of time in this group provides an index of infection rate.

The use of sputum surveys in the community for determining the prevalence of active tuberculosis as well as for case finding was mentioned as an important tool in tuberculosis control.

Other indicators of the state of tuberculosis control were discussed. Mortality statistics, while useful when the frequency of the disease is very high, are no longer the case in the South Pacific region, and are therefore of limited importance. The frequency of extrapulmonary tuberculosis relative to that of pulmonary disease provides some indication of the extent of the tuberculosis problem as this falls rapidly when control is attained. Another indicator of the problem is the high

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[1/] Presented by Dr P.H. Bennett and Dr J. Leowski.

frequency of the disease in the population aged under 15 years of age as this shows the extent of the disease in young people in the community. A further index of an improvement in tuberculosis control is a fall in the age-specific prevalence and incidence of the disease associated with an increased average age of presentation of the cases. This shift occurs because of the characteristic distribution of the age-specific incidence (and mortality) of tuberculosis, which is such that the frequency in children and young adults falls earlier than that in the older age groups, e.g. 45 years and over, after an effective control programme is instituted.

The concept of the immune status of the individual and its significance in the population as a whole were discussed. The principles of herd immunity and of the measurement and derivation of vaccine effectiveness were presented.

The steps in achieving and monitoring an effective control programme were reviewed. These include:

(a) inputs (manpower, financial resources, facilities, supplies, etc.);

(b) process (case-finding, treatment, prevention activities);

(c) performance (coverage, continuity, content, quality of services);

(d) operational outputs (number of cases detected, placed on treatment, compliance, remissions, etc.); and

(e) impact (problem reduction).

The effective programme will be one in which each of these steps is monitored over time. The indicators of impact are the ones which will be the last to change, but since changes in these are the purpose of the programme they must be measured. Nevertheless, programme success, i.e. change in impact, will not likely be achieved unless all steps are monitored and corrective actions taken if the standards of performance fall short of expectations.

4.3 Pathogenesis of tuberculosis[1/]

The disease

(1) Primary lung infection follows inhalation of the pathogen; usually heals causing minimal signs, symptoms and pathology.

(2) However, primary infection induces a state of cell-mediated hypersensitivity, which in the victim determines the body's response to, among other factors, a repeat assault by the pathogen.

(3) This state of hypersensitivity may be detected by the intracutaneous injection of tuberculin, a produce of the mycobacterial cell; it is also induced by BCG vaccination.

1/Presented by Dr Peter Cavanagh.

(4) Cell-mediated hypersensitivity often, but not always, parallels cell-mediated immunity. This is the justification for the present use of BCG vaccination.

The organism

Mycobacterium tuberculosis is a Gram positive aerobic organism. Its reservoir, or source, is an infective case of tuberculosis in another (human) patient.

(1) Its cell wall contains a high proportion of wax-like substances which account for the organism's resistance to acids and alkalis and also determine its distinctive staining reaction (acid-fastness). These properties are important in the laboratory diagnosis of the disease.

(2) Certain products of liquid-culture of the organism are known as tuberculin or as purified - protein - derivative. These are used in the tuberculin test to determine the patient's previous experience of the organism.

The vaccine

Despite several attempts to produce a safe, effective vaccine using M. tuberculosis or its products, the bovine tubercle bacillus, attenuated in virulence after years of growth on inhibitory media by Calmette and Guerin and first described in 1905 (Bacille-Calmette-Guerin: BCG) remains the component of choice.

This presentation stimulated a wide range of comments, questions and anecdotes.

A participant mentioned that a former physician at the Central Hospital had suggested that the rate of tuberculosis infection was lower among families living in above-ground houses than in houses with dirt floors; there was interest in the availability of a standard tuberculin (RT 23) and some participants expressed their dissatisfaction with the tuberculin available to them in their particular environment. Questions of drugs served to remind participants that a minority of patients, with very large bacterial populations in lung lesions, would require longer treatment to achieve sputum negativity. Normal infants may exhibit tuberculin conversion as early as six weeks after birth. It is unlikely that repeat BCG vaccinations would stimulate an anergic patient towards tuberculin - reactivity. Some participants remained sceptical of the value of washing and disinfection of hospital wards and out-patient departments which are used for the treatment and examination of tuberculosis patients. The possibility of the infection of cattle with strains of M. tuberculosis from human sources was mentioned. Finally two participants from widely dissimilar island cultures expressed their doubt as to the wisdom of paying "risk-money" to nursing and case-finding staff working with tuberculosis patients.

4.4 Tuberculin testing and BCG vaccination

4.4.1 Tuberculin testing[1/]

Tuberculin testing is used mainly in epidemiological studies, BCG assessment and clinical diagnosis.

It was first explained how to decide on the criterion of a positive reaction by showing the histogram of distribution of the size of tuberculin reactions for the general population, which shows bimodal distribution, as in the case of the Republic of Korea. The normal curve on the right hand of the histogram represents those presumably infected while the one the left hand (with the peak at 0 mm) those presumably uninfected. Thus, the most reasonable point to divide these two groups must be at the intersection (antimode) of the two normal curves, usually at 10 mm as in the case of the Republic of Korea; hence the positive reaction is 10 mm and above. However, in most of the tropical countries this bimodal curve becomes greatly distorted due to overlapping of low-grade skin sensitivities, which probably arise from atypical mycobacterial infection, thus making it difficult to identify the optimum dividing point.

Once the criterion of a positive reaction is set, it is possible to obtain the prevalence of infection at different ages by applying the tuberculin test to a population. If tuberculin testing is repeated for children of a certain cohort, after a certain interval of time, the annual incidence, or risk of infection can be obtained.

The use of tuberculin testing in BCG assessment was explained, and later illustrated, during the lectures on BCG vaccination with examples of vaccine and programme assessments collected from various countries. Emphasis was placed on how to express post-vaccination tuberculin allergy; not to speak of "positive conversion" but to express it in terms of the mean size and its standard deviation for the whole group vaccinated and tested later at 9-12 weeks.

The limited clinical value of tuberculin testing was demonstrated by examples of studies conducted by the WHO team in Papua New Guinea and Solomon Islands. With 1 TU of PPD RT 23 with Tween 80, 10-15% of bacteriologically confirmed cases were shown to have a reaction smaller than 10 mm (false negative reactions). When 5TU is applied, all the cases show a size larger than 10 mm, but this would inevitably shift the existing low-grade sensitivities as elicited in the general population with 1 TU, to above 10 mm (false positive reactions), thus limiting the value of tuberculin testing as a diagnostic tool.

Most of the discussions by participants centred on how to apply the tuberculin testing more reasonably to the clinical diagnosis of individual cases.

1/ Presented by Dr H.T. Lin, Dr S. Endo and Dr J.C. Tao.

In connexion with the remarks on the characteristics of tuberculosis in the South Pacific region, a report was presented on the epidemiological profiles of tuberculosis in the same region, i.e. Tonga, Solomon Islands and Papua New Guinea, as contrasted with Singapore and Malaysia. This is summarized as follows:

> Distribution of tuberculosis by sex (male:female) in the South Pacific countries is 1:1, as compared with 2:1 or 3:2 in countries along the fringe of the Asian continent. A much higher proportion of the young age group is affected; one quarter to one third of the patients are below 15 years of age. There is also an extraordinarily high proportion of extrapulmonary tuberculosis, also varying between one quarter to one third of the cases notified.

4.4.2 BCG vaccination

The results of eight previously conducted controlled trials on the efficacy of BCG vaccination and the results of the trial conducted in South India, which was recently publicized and showed nil protection against pulmonary tuberculosis, were discussed.

The studies on the North American Indians and in Great Britain show 80% protection.

The main reasons for the difference in protection between the studies conducted in South India, on North American Indians and in Great Britain are believed to be:

(1) possible protection caused by atypical mycobacterial infection, which is prevalent in South India;

(2) low virulence of M. tuberculosis isolated from its patients found in South India;

(3) low incidence of tuberculosis among the recently infected persons in South India.

Furthermore, the study carried out in South India does not provide any information on the protection against infantile tuberculosis, thus, the results from this study should not be extrapolated to other areas. The recommendations made by the ninth report of the WHO Expert Committee on Tuberculosis[1/] regarding BCG vaccination remain valid.

The importance of care of vaccine was discussed, such as storage, cold chain, protection against sunlight, duration of vaccine validity after reconstitution, technique of reconstitution (wrapping ampoule with vinyl paper when opened), and shaking of ampoule before syringe is refilled. A comment was made on the lower heat stability of the vaccines other than the

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[1/] WHO Technical Report Series, No. 552, 1974.

Japanese vaccine (cold chain should still be maintained during transportation of vaccine). Many participants expressed their desire to have vaccine ampoules with a small dose, i.e each ampoule containing 5-10 doses.

As BCG gives additional protection against tuberculosis to that given by atypical mycobacteria infection, BCG vaccination is recommended, even if atypical mycobacterial infection is prevalent, particularly in the countries where tuberculosis is common.

Evidence of the effectiveness of BCG vaccinations has been demonstrated in Samoa and Tonga. After BCG campaigns covering both countries were conducted, tuberculosis meningitis virtually disappeared.

4.4.3 BCG vaccination policy

Concerning BCG vaccination policies, part of the ninth report of the WHO Expert Committee on Tuberculosis, was quoted as follows:

"When BCG vaccination is initiated in a country, or if the coverage obtained in an existing programme is inadequate, an intensive mass campaign is indicated, with the object of covering the eligible population (usually all persons up to 15 or 20 years of age) in a short time. Experience indicates that a coverage of 70-90% is a feasible target. Thereafter, a programme integrated with the general health services is more likely to achieve and maintain a high coverage. The Committee felt that the same staff should undertake preventive measures against several diseases, practising simultaneous immunization whenever justified and expedient.

"The Committee emphasized that where infant tuberculosis is a problem, the widest possible coverage with BCG vaccination should be ensured as early in life as feasible.

"Young adults are often particularly exposed to primary infection with tuberculosis. Even more important, young adults are more likely to develop the disease soon after infection than are children of school age. In contrast to infants and young children, they develop the infectious type of tuberculosis. Hence, the maintenance of immunity, by vaccination at the school-leaving age, can be expected to yield benefits not only in terms of disease prevention but also in breaking the chain of transmission.

"Where the risk of infection is very high, vaccination at the usual school entrance age may be justified as under these circumstances most infection will take place during the first few years in school. At the other extreme, if the risk of infection in a country is known to be declining rapidly, vaccination at the school entrance age may also be the best policy, as a large proportion of the total infection during the lifetime of each cohort will take place before the school-leaving age is reached.

"Vaccination at school age (as referred to above) should be undertaken irrespective of vaccination at birth, since the immunological response of infants is poor and it has never been demonstrated that the reduced dose of BCG usually given to the newborn will induce a lasting significant level of protection. Apart from the revaccination of schoolchildren who were vaccinated at birth, revaccination is indicated in groups of persons known to have been vaccinated inadequately, e.g. with a product that was later demonstrated to have been of a low potency.

"Tuberculin testing before vaccination always reduces coverage and more than doubles the cost. In situations where cost is of little importance, the prevalence of infection is generally low. The Committee therefore favoured direct BCG vaccination under almost all circumstances, especially at revaccination. In deciding on the age-limit for direct vaccination, the age-specific prevalence of infection, as determined by surveillance, should be taken into account."

4.4.4 Coverage and quality control of the BCG vaccination programme

The present vaccination service should be continued in the South Pacific area in view of a generally high incidence of disease following infection.

The planning and implementation of a BCG vaccination programme must take into consideration the size of the uninfected population, the prevalence of tuberculosis infection in the locality, the risk of developing tuberculosis in different age groups following infection, the period of observation, the coverage and the quality of the vaccine at the time of administration.

To ensure the effectiveness of a BCG vaccination programme, the latter two factors must be carefully watched and followed. Attempts should always be made to cover as high a proportion of the uninfected population as possible, a minimum coverage of 75% should be achieved. In order to reach a high coverage, introduction of direct BCG vaccination to a selected age group and the introdction of simultaneous BCG vaccination with other vaccines may be considered. In order to maintain the potency of the vaccine from the receipt of th a p p t' he time of injection, the vaccine must be carefully protected from heat and light. In spite of the known heat stability of the Japanese freeze-dried BCG vaccine, unnecessary exposure of the vaccine must be kept to an absolute minimum.

In many countries, a high proportion of the population, usually under the age of 15 or 20, has been vaccinated by specialized BCG workers in a mass campaign.

Newborn infants are thereafter BCG vaccinated as part of a polyvalent vaccination programme through the general health services. In countries with an expanded programme on immunization, tuberculosis officers will still have to take up the following responsibilities:

(a) training and retraining of BCG vaccinators;

(b) examination of the coverage;

(c) check the viability of the vaccine used at the end point;

(d) carrying out post-vaccination tuberculin testing of children vaccinated 9-12 weeks before; and

(e) investigating causes of deficiencies if present and making corrections.

As time goes on and the annual incidence of infection drops, the attention of the vaccination service could gradually be shifted to an older age group. When the prevalence of infection is less than 1% at the age of 14, the mass BCG vaccination service could be discontinued.

4.5. Diagnosis of tuberculosis and case-finding[1/]

4.5.1 Clinical presentation of tuberculosis and its value in tuberculosis control

It is important to obtain as much information as possible from the patient at the clinical interview, not only to support his management, but also the wider fields of public health and epidemiological data.

To this end, staff who are in contact with patients at field level must be trained to take complete histories and record this information. This requires that the staff in the field should be familiar with the clinical presentations of patients with active tuberculosis, know how to elicit this information and at the same time gain the full confidence of the patient, encourage him to follow the advice given, keep appointments and take all medicines. This requires that staff members should also be aware of the nature of tuberculosis, the tests used in establishing a diagnosis, the mode of spreading it and general hygiene required to minimize dissemination.

The person who conducts this first interview has a huge responsibility for it can mould the entire attitude of patients towards their cooperation.

Details of the various types of clinical presentation as well as aspects which could be of value for accumulating data for epidemiological studies were discussed.

Discussion

Different views were expressed about the risk of cross infection from tuberculosis patients who are nursed in wards with other general medical patients. The need for good ventilation and daylight was expressed, and also the need for protection of hospital staff.

[1/] Presented by Dr R. Marshman, Dr P. Cavanagh and Mr A.Y. Eng.

There was considerable difference in opinion regarding the period of time necessary between the patient commencing chemotherapy treatment and being regarded as safe from risk of spreading infection. There was a discussion on the means of persuading patients to continue their treatment and surveillance, which was a frequent problem.

4.5.2 X-ray examination

Although an X-ray examination is probably the only way to detect early, non-symptomatic tuberculous lesions in the lungs, for a reliable diagnosis there must be other evidence, viz. bacterial confirmation. The appearance of tuberculosis in an X-ray can imitate almost any other disease or be associated with other disease. Sometimes active disease cannot be detected, even by several X-rays, and those reporting on X-rays should always bear this in mind. The cost of setting up and maintaining an X-ray service is very high, both in money and trained staff. In the tropical region, maintenance of equipment can be a major problem. Unless there are adequate funds and trained personnel, other less costly measures should be used, both in the area of case-finding and/or clinical management of patients. If X-ray facilities are available, they should be used, especially for clinical management.

If X-ray services are being considered for tuberculosis case finding, they should be confined to those groups of people who are known to yield a higher rate of active tuberculosis such as sick, out- or in-patients, or who run the risk of developing tuberculosis such as the staff of tuberculosis wards or clinics, or those who, if they develop tuberculosis, present a risk to their immediate contacts, such as teachers or nurses in children's wards.

X-ray screening of unselected persons is costly and complicated, and very frequently not very rewarding because of poor attendance or low yields of active cases. Until a complete tuberculosis control programme is very well advanced, and there is an abundance of funds and trained manpower, it should not be considered.

4.5.3 Laboratory diagnosis of tuberculosis[1/]

4.5.3.1 Microscopy

Use clean, new slides; nitric acid, 95% alcohol (discard). For Ziehl-Neelsen staining, use distilled water; heat until steam arises, do not boil; replenish stain and heat at least 10 minutes.

Decolourize (mineral acids + 95% alcohol) until no pink colour appears in the wash.

[1/] Presented by Dr P. Cavanagh and Mr A.Y. Eng.

Sputum: Select proper specimens. Spread 2 x 1 cm

Scan whole slide (sputum, not saliva)

Use an oil immersion objective on the microscope

For 0.01 ml of sputum spread over 2 x 1 cm

there are .. 10^4 fields in the area covered by sputum as .02 mm^2 = one field

(i.e.: 100 fields: only 1% of slide is examined)

10×10^5 smallest number of bacilli/ml which will provide consistent (1:10) positive slide report

Wipe lens after each slide and discard slide

Standard (WHO)

\+ 6 - 25 / 200 - 300 fields

\++ 26 - 99 / 200 - 300 fields

\+++ 1 or more bacilli in each field

\++++ numerous bacilli in each field

The standard of case-finding in areas possessing limited resources depends largely on the technical performance of smear microscopy.

Unskilled workers can be trained, but there is a need for continual supervision and for the corrective re-training of the workers.

Fluorescence microscopy

Fluorescence microscopy using Auramine and Rodamine is an effective method for detection of tubercle bacilli by which up to 200 slides per day can be examined. It is particularly useful in specialized centres and can be used effectively for the examination of fluids obtained by gastric lavage, urine and pus. However, it requires a special microscope.

4.5.3.2 Culture

Culture provides a sensitive method for identification of mycobacteria and particularly useful for examination of sputum, tissue obtained by biopsy and pus.

Lowenstein - Jeusen or Ogawa media are used.

4.5.4 Case-finding

From the discussion, agreement was reached that case-finding is not a control measure by itself, but is conducted for the purpose of identifying those requiring treatment. As such, case-finding should be planned and conducted according to the availability of the treatment component. Where resources for tuberculosis control are limited, highest priority should be given to the discovery and treatment of infectious cases.

Bacteriological procedures have been unanimously considered as the priority procedure in case-finding, with special emphasis on direct microscopy as an efficient, specific, cheap and simple means of achieving a high level of coverage in the detection of infectious cases, which are the most dangerous to the community.

Culture should be done, if available, for symptomatics and for persons with abnormal chest X-ray shadows whose direct smear examinations have been repeatedly negative.

Fluorescence microscopy is recommended only when the laboratory service has too many specimens to examine, and possesses the required trained personnel and facilities to utilize this quicker but less accurate method of smear examination. Other laboratory diagnostic procedures like tracheal or gastric lavage, guinea-pig inoculation and blood sedimentation rate are not suitable for mass use.

The speaker suggested that, if X-ray services are available, they should be made as static units and used rationally for the following purposes:

- screening sputum negative symptomatics, where acid fast bacilli may be too few in number to be detected by direct microscopy;
- confirmation of sputum positive cases; and
- follow-up examination of patients on treatment.

The films should be read by two independent readers in order to reduce the margin of error in radiographic assessment.

Participants were also warned about the great number of undiagnosed cases in their communities. The prevalence surveys conducted in the Malaysian Peninsular, Singapore, China (Province of Taiwan), Republic of Korea and Japan, showed that the number of undiagnosed cases ranged from 40 to 88%.

The importance was stressed of accelerating case-finding activities in order to discover the majority of the existing infectious cases; and the following actions were suggested:

- decentralization of health service so as to be as near as possible to the patient's home;

- public must be informed of such services available to them and invited to utilize them; and

- promoting health education to build up the confidence of the public, i.e. using successfully treated patients as the best advertisers for the programme.

4.6. Treatment chemotherapy

4.6.1 Recent development of chemotherapy[1/]

A brief historical outline of the introduction of effective chemotherapy was presented including the chain of development through trials of treatment leading up to our present knowledge and application of the present regimens used. Some current trials give indications that it may be possible within the foreseeable future to have shorter courses of intermittent chemotherapy which are effective, using drugs that are bactericidal and also include those patients who show bacterial resistance, as well as patients with sensitive bacilli.

The search continues for improved combinations of existing drugs, to decrease the period over which treatment has to be maintained to obtain acceptable results and to diminish the number of defaulters from treatment and those that develop reactivation of their disease.

The present concept of distribution of bacilli in lesions, their rates of multiplication and the action of individual drugs used in chemotherapy relating to these groups were discussed. The effective "hierarchy" of drugs, rated on their effectiveness, acceptability and safety, was given, and the costs indicated. Some details of the side effects and toxicity of the newer drugs were discussed.

It was pointed out that the results following the recommended three-drug regimen of carefully conducted trials lasting 18 and 24 months contrasted with the WHO recommended duration of 12 months under field conditions.

Several participants offered the opinion that fully supervised short-term regimens were worth considering. This emphasizes the disparity of resources available among nations of the Pacific community.

The susceptibility of different races to the toxic effects of thioacetazme was discussed.

It was emphasized that patients who default during treatment and who had not converted should repeat the whole of the initial phase of therapy if they return to the clinic register. Participants asked for the definition of "relapse" and "reinfection". There was much interest in the

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[1/] Presented by Dr R.S.A. Marshman, Dr H.T. Lin, Dr J.C. Tao and Dr^Leowski.

drug treatment of extrapulmonary tuberculosis; this reflected the clinical responsibilities of a high proportion of the participants, who requested an additional session on this subject. (The five-drug regimen for the treatment of tuberculosis meningitis, which originated in Hong Kong, was discussed with great interest).

Finally, several countries can support the use of expensive drugs in attempts to convert persistent or reactivated sputum-positive patients but it was emphasized that the addition of rifampicin to the existing regimen should always be accompanied by the substitution of another, previously unused, drug.

4.6.2 Hospital versus domiciliary treatment

If institutional care is not available, the tuberculosis programme should not be impeded by monetary cost and manpower required to provide beds specifically for use for treating tuberculosis patients. Domiciliary treatment can be just as effective as institutional treatment if adequate supervision of the patient is provided.

However, if institutional beds are available, these should be used to advantage. Categories of patients who could be considered for admission to hospital were presented and it was pointed out that the length of necessary inpatient treatment should usually be measured in weeks rather than months. These categories vary from the very sick or frail, the medically complicated or those reluctant to comply with treatment, to those with geographical situations which make communication and supervision impossible. Generally, initial assessment and commencement of treatment was regarded as an acceptable indication for admission.

Where domiciliary treatment is being used, it is necessary to have a well organized and trained staff to carry out the responsibility of supervising these patients. These staff should be selected, bearing in mind all the problems of prolonged, necessary treatment for a successful result, and so trained that they carry out this work with enthusiasm, pleasantly, persuasively and reliably.

Fully supervised chemotherapy is the most reliable method.

4.6.3 Standard drug regimens

Standard drug regimens suitable for use in national tuberculosis programmes, as recommended by the World Health Organization, at present remain the following:

(1) SH twice weekly for the full 12-month period

(2) SPH daily for 3 months followed by SH twice weekly for 9 months

(3) SPH daily for 3 months, followed by PH daily for 9 months

(4) STH daily for 2-3 months, followed by TH daily or by SH twice weekly for the rest of the year.[1/]

These regimens, as reported from several different countries during the period 1964-1973, ensured a 95% success in the treatment of pulmonary bacteriological tuberculosis. Toxicity of these drugs at the standard dose is relatively low and well accepted by the majority of patients of many countries. Above all, these drugs, except PAS, are still supplied by UNICEF to many developing countries which receive assistance for their primary health care projects. The participants were therefore urged by Dr Tao to continue the use of these regimens until the price of rifampicin and other second-line drugs is radically reduced.

In the present economic situation of their countries, most participants expressed their agreement that these standard drug regimens should be continued in their national tuberculosis programme. The participants from New Caledonia and French Polynesia, however, felt that the economic position of their countries was such that the use of other drugs as part of the national tuberculosis programme could be adequately justified.

4.6.4 Case-holding and case-management

In disease control, the system-patient relationship has replaced the traditional doctor-patient relationship. It is the responsibility of the health workers, representing the whole system, to give treatment to the patients. Inasmuch as the drugs are ingested by the patients, the action of drugs on the organisms should be the same regardless of who gives the treatment.

The reason for the more unsatisfactory treatment results in the field programmes (efficiency) than in the controlled trials (efficacy) is largely operational, namely, irregularity of treatment. One of the solutions to overcome such a weakness in domiciliary treatment programmes is the application of supervised medication, under which not only each treatment is given under supervision, but defaulters can be identified and traced immediately. In order to obtain the highest possible efficiency of the treatment programme, the whole process of delivery of treatment must be reviewed and streamlined. This process is called case-management in its broad sense. It consists of case-holding and case-management in its narrow sense.

Case-holding is further divided into under-holding (premature loss of patients) and over-holding (longstanding patients). Both should be minimized by strengthening capability in case-holding and case-management. The purpose of case-management is to ensure regular treatment, including drug collection and drug intake by patients, and regular follow-up sputum examination for each individual patient. This can be improved by

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[1/] S = Streptomycin; P = Paraaminosalycylic acid; T = Thioacetazone; H = Isoniazid.

intensified motivation of patients, initially and repeatedly during the whole treatment period, and prompt defaulter action whenever the patient fails to come for treatment. Motivation of workers, through repeated training and supervision, is a prerequisite for improvement of the whole process in the delivery of treatment.

Data from two countries in the Western Pacific Region were quoted to show the efficiency level of case-holding and case-management. The treatment results are at the level of 70% of sputum conversion in these two countries as revealed by cohort study.

Prospective cohort analysis was introduced, which may be of help in securing high efficiency in case-holding and case-management.

The importance of efficient case-holding and case-management to the successful treatment programmes was emphasized as well as defaulter action to be taken as promptly as possible as soon as the patients fail to report.

4.6.5 Recording and reporting of case-finding and treatment services

The following necessary items were recommended:

For each subject one record/register

- serial number
- date
- name of the patient
- sex and age (date of birth)
- name and place of the health institution

For specific records/registers

(a) Laboratory investigation

- name of specimen collection centre
- type of specimen
- date of specimen collection
- purpose of collection - for diagnosis
  - for follow-up
- date of examination
- result
- remarks

(b) Symptomatics

- address
- results of microscopy: 1st
  2nd
  3rd
- remarks: (e.g. type of symptoms and duration, previous visits to health institutions)

(c) Case registration

- address
- bacteriological status
- presence of BCG scar
- history of previous treatment
- diagnosis
- date of treatment started
- treatment regimen - change of regimen
- follow-up examination due - done
- date completed treatment
- remarks

(d) Treatment card

- as under (c) plus provisions for supervised intermittent regimen and/or monthly supply of drugs

- provisions for defaulter tracing

Report on treatment of tuberculosis
(annual, monthly)

Specification	Pulmonary tuberculosis				Extra-pulmonary tuberculosis	Total
	Smear positive	Culture positive	Sputum negative	Sub-total		
Total number at end of last year (month)						
Total registered during the reporting period of which:						
- newly discovered						
- relapses						
- other						
Total number discharged during the reporting period of which:						
- completed treatment						
- died						
- lost						
- other						
Total number at end of year (month)						

Report on newly registered tuberculosis patients
(annual, monthly)

Age group	Number of newly registered tuberculosis					Rates per 1000 (10 000 or 100 000)					
	Smear positive	Culture positive	Bacteria negative	Bacteria not done	Total	Population	Smear positive	Culture positive	Bacteria negative	Bacteria not done	Total
0 - 4											
5 - 9											
10 - 14											
15 - 19											
20 - 24											
25 - 34											
35 - 44											
45 - 54											
55 - 64											
65 - 74											
75 and over											
Total											
Age grouping											
0 - 14											
15 - 24											
25 - 44											
45 - 64											
65 and over											

Notification of Newly Detected Tuberculosis
(Case Registration Form)

(Health Institution) _____ Registry number: _____

Date: _____

Name: _____ Sex: _____ Age: _____

Address: _____ Date of birth: _____

Diagnosis: Pulmonary _____ BCG Scar Yes ___ No ___

Extrapulmonary _____

Bacteriological status:

	Positive	negative	not done
Sputum microscopy	_____	_____	_____
Culture	_____	_____	_____

Previous history of tuberculosis:

Date of treatment started: _____ Treatment regimen:

Change of treatment (date): _____ Treatment regimen:

Date treatment completed: _____

Other items: Place of employment
Occupation
Method of detection, place of detection
Type of symptoms and their duration
Number of visits to health institution before diagnosis
Follow-up examinations: Due: _____ Done: _____

Follow-up Examination

(Health institution): _____ Reg. No. _____

Name: _____ Sex: ____ Age: _____

Address: _____

Date treatment started: _____

Treatment regimen: _____

Follow-up examination:	First	Second	Third	Fourth
Date due:	_____	_____	_____	_____
Date done:	_____	_____	_____	_____
Sputum microscopy results:	_____	_____	_____	_____

Culture (if done): _____

Change of treatment regimen (if any): _____ Date: _____

New regimen: _____

Reason for change _____

Regularity of treatment (every 3 months): Yes ____ No ____

Defaulter action - taken
result

Date treatment completed and discharged: _____

Remarks:

4.7 National tuberculosis programme[1/]

4.7.1 Planning

Steps to be followed in programme planning were summarized as follows:

(1) Collection and analysis of data relevant to the problem: geographical, demographic, organizational, administrative information, vital statistics, health problems, health facilities, existing tuberculosis services and their achievements, epidemiological information on tuberculosis, etc. if available.

(2) Setting the objectives and targets of activities based on a hypothesis.

(3) Designing the strategies: such as, direct BCG vaccination for infants of a specified age, sputum positive cases detected among persons with respiratory symptoms, domiciliary chemotherapy with a standard regimen provided free to all diagnosed infectious cases of tuberculosis.

(4) Determination of policy: epidemiological, administrative, operational, sociological, technical and economical requirements.

(5) Test run:

(a) further collection of required information, e.g. population census, respiratory symptom inquiry, tuberculin survey, BCG scar survey, tuberculosis prevalence survey;

(b) testing the practicability and acceptability of the recommended diagnostic, therapeutic and preventive measures to the local population;

(c) estimation of work load, required personnel, equipment, supplies and budget;

(d) determination of recording and reporting system: information to be recorded and reported, record/report forms, and routing of reports;

(e) identifying potential obstacles; and

(f) training of personnel.

(6) Preparation of a work manual, which should contain the policy, description of the working system, methods and techniques to be used, procedures for each activity, list of equipment and supplies, record/report forms.

(7) Preparation of programme proposal: specifying objectives, methods to be applied, plans of action with time schedule, incorporating supervisory, monitory and assessment activities.

[1/] Presented by Dr J.C. Tao.

4.7.2 Organization

In view of the wide distribution of the disease, the tuberculosis services must be decentralized to all parts of the country. With such a concept, there is no alternative but to accept an integrated approach to the problem, i.e. the tuberculosis control service must be developed as an integral part of the general health service and the key personnel for tuberculosis activities must be found from among the existing staff of the national health service at different levels. During the test run phase in the planning stage, such an approach needs to be tried out and its applicability and acceptability confirmed.

An integrated approach does not rule out the need for a technical unit in the Department of Health at the national level. Such a unit is vital for the successful implementation of an effective national tuberculosis programme. The unit has the responsibility for planning and managing the programme.

The field arms of the programme are the skeletal staff of the peripheral health agencies in the local areas. These workers, adequately trained, are often part-time existing staff of a health post, health station, MCH clinic, or a general dispensary. They are responsible for the following functions:

(a) delivering services properly to the needy population according to the instruction manual;

(b) recording accurately the activities performed;

(c) submitting reports regularly without delay;

(d) requesting, receiving and maintaining supplies in good quality; and

(e) keeping accounts of supplies and reporting regularly to the supervisor.

Such a system permits the programme activities to be available to the population throughout the country. Its implementation, however, requires strong motivation, coordination and cooperation, together with the hard work of all people concerned, i.e. the population, the patients, government officers, especially those of the other health services, and the tuberculosis workers.

4.7.3 Training

Adequate training and retraining of all categories of personnel involved in the operation of the national tuberculosis service are crucial to the success of the programme.

The training of auxiliary workers at the peripheral level should include not only a detailed explanation of their responsibilities, but also a complete description of each activity, i.e. what is to be done, how and when, who is to do it, etc. The training should be conducted on an

in-service basis and allow for a great deal of practice. In view of the expected turnover of workers, such training of new recruits should be repeated periodically at the local level. Soon after completion of the training, field visits should be made by the instructor to ensure that techniques performed by the trainees are properly carried out. Even for experienced workers, such supervisory visits should be undertaken periodically as a form of on-the-job training and retraining.

For key medical and nursing staff, education and training should be community- and programme-oriented and practical, including field exercises. As their responsibilities will cover the planning, implementation and evaluation of the programme, their training should be multidisciplinary and include social sciences, economics and management technology.

Members of the supervisory team are the activity managers responsible for implementation of the programme. In addition to the expertise of their own discipline, they should also be trained more in the organizational, analytical, educational and management technology aspects.

After the key personnel have been trained and posted, the line of authority, responsibility and relationship with others should be clearly defined.

4.7.4 Programme management

Programme management essentially consists of the following activities:

(1) Supervision and assessment of field activities

(a) compiling of reports received for evaluation of the activities;

(b) target-setting after studying the reported workload and taking into consideration the local working conditions; and

(c) technical supervision through periodical visits to the work site and study of the reports, e.g. BCG scar survey, handling of BCG vaccine, technique of vaccination, checking of sputum slides and treatment cards.

(2) Logistics

(a) requesting and distributing in time the required amount of supplies to ensure the smooth running of the service;

(b) after studying the achievements and progress of the programme, estimating and requesting in advance the amount of supplies required for the next three or six months;

(c) maintaining and reporting the accounts of supplies each month; and

(d) maintenance of stock of supplies in proper condition and smooth distribution with respect to service agencies.

(3) Planning the progress of the programme

(a) assessment of overall achievements;
(b) adjustment of the programme if necessary;
(c) target resetting after adjustment; and
(d) estimation of required supplies accordingly.

(4) Training of personnel

(a) training of new recruits; and

(b) refresher training to maintain the work quality and morale of field workers.

4.7.5 Evaluation

The purposes of evaluation of a programme are:

(1) to measure the degree of accomplishment of the set objectives of the project or the programme; and

(2) to translate the information obtained into modification of the programme activities in order to expedite the accomplishment.

A tuberculosis programme, if fully implemented as planned, has the potentiality for neutralizing almost all the infectious sources in the community and strengthening the resistance of the uninfected. An effective national tuberculosis programme is able to accentuate the decline in the incidence of the disease within a reasonably short period of time.

Evaluation should be conducted at three different levels at different stages of development of the programme:

(1) Organizational and administrative evaluation

Organizational and administrative reorientation is fundamental to the successful implementation of the programme. In the initial stage, the programme can best be evaluated in terms of the progress made in overcoming these difficulties. Progress made in such administrative steps as training of personnel, obtaining administrative sanction for starting the programme and following up the actual implementation of the sanction should be evaluated.

(2) System evaluation, or evaluation of means

Technical evaluation usually concentrates on the following specific measures:

(a) discovery of infectious cases - number of new cases found during the year in relation to the estimated total in the country;

(b) regularity of chemotherapy - number of newly diagnosed cases during the past one year who have completed the prescribed 12-month course of chemotherapy in relation to number of discovered cases;

(c) bacteriological conversion of sputum - number of cases converted by 6 months and 12 months of chemotherapy in relation to the cohort of cases admitted for treatment one year earlier; and

(d) BCG vaccination of the specified age group - number of children of a specified age vaccinated during a year in relation to the eligible population of the particular year.

The reasons for failure to achieve the expected coverage mentioned above should be investigated after the information is available, and the appropriate programme modification should then be considered and introduced. The unit cost of each activity should be calculated periodically and efforts to reduce it should always be kept in mind. Apart from the quantitative evaluation, mainly concerning coverage of various control measures, the qualitative aspects of the activities should also be reviewed periodically. Based on these findings, improvements can also be introduced when found necessary.

(3) Evaluation of the epidemiological impact of the programme or goal evaluation

The primary objective of a national tuberculosis programme is to alleviate the tuberculosis problem of the country in terms of rates of transmission, morbidity and mortality. Such changes usually take a long period to show and they may not reflect absolutely the results of the programme activities. This means evaluation of the epidemiological impact which is most important to the manager of the programme. Among the three indices commonly used, the mortality rate and the annual notification of cases in many countries often provide misleading and incomplete information. Instead, the annual infection rate at a specified age among the unvaccinated offers a much faster and more accurate measurement of the epidemiological picture of the country.

In conclusion, it was said that evaluation is a continuous process. It results in the formulation of proposals for programme modification, thus maximizing the efficiency and effectiveness of the programme.

Although some participants felt that the presentation was a little theoretical, most of them considered the procedures described above would be quite useful in the implementation of the tuberculosis programmes in the future.

4.8 International cooperation in tuberculosis control[1/]

It was stated that international activities in the field of tuberculosis prior to the end of the Second World War were based on missionary assistance to tuberculosis patients and the international tuberculosis conferences. Neither kind of activity led to any impact, the former being described as patchy and the latter spasmodic.

After the war, the first international effort to be directed against tuberculosis was the International Tuberculosis Campaign organized in 1945 by the four National Tuberculosis Associations of the Scandinavian countries.

Mass BCG vaccination activities were carried out in eastern European, eastern Mediterranean and north African regions under the leadership of several BCG teams composed of doctors, nurses and clerks from these four countries. All the equipment, supplies and transport together with operational expenses required for the service were contributed by these associations as well. Hundreds of thousands of children in the countries covered were BCG-vaccinated after tuberculin testing.

This humanitarian effort was viewed as an emergency measure to stop the rampant transmission infection, which had caused a tremendous amount of suffering and numerous deaths during the war. Soon after the establishment of the World Health Organization in 1948, this service was taken over from the International Tuberculosis Campaign and further extended to the Asian, South American and African regions. In the same year, the WHO Tuberculosis Research Office, which has made tremendous contributions in the field of tuberculin testing and BCG vaccination, was organized.

Tuberculosis is a most damaging disease and tuberculosis control, as a result of a number of spectacular innovations during the post-war years, has become a distinct reality, even in countries with stringent resources. Many governments have assumed responsibility for this task as their top priority problem. As an organization of government health services, it is natural that the World Health Organization should view tuberculosis control as one of its major functions.

The efforts made by WHO during the last three decades can be summarized as follows:

(1) Training; and
(2) Research

International Union Against Tuberculosis (IUAT) activities are complementary to the activities of WHO. Under its six scientific committees, considerable research activities have been conducted in recent years on chemotherapy and on the chemoprophylaxis of high-risk groups. There is also a surveillance unit stationed in Holland, which is

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[1/] Presented by J.C. Tao.

responsible for collecting epidemiological information on tuberculosis in various countries. Through periodical international and regional tuberculosis conferences sponsored by IUAT, recent developments in the area of tuberculosis have been exchanged and disseminated. Through its mutual assistance programme, special support has also been extended to certain national tuberculosis activities in some developing countries.

There is no question that these international aid agencies must coordinate their activities more closely and that cooperation between agencies must be further intensified in order to achieve the goal more efficiently at a faster pace.

5. EVALUATION OF THE COURSE

As usual, an evaluation of the course was conducted at the end of the course through a questionnaire form distributed to all participants. Nineteen evaluation forms were collected from all the participants. The answers were tabulated and are shown in Annex 5. Some questions however, were left without answers, so the total number of answers given to specific questions may differ.

The attainment of the objectives of the course was confirmed by all participants except two as regards objectives (a) and (b), and one as regards objective (c).

Thirteen participants considered that the lectures, discussions, demonstrations and field trip were well-balanced, while five gave negative answers. Those five however, differed in their opinion: two of them considered that time for discussions was too short, two were not satisfied with the demonstrations, and one was not satisfied with the field trip.

Lectures were considered "essential" by nine participants, and as "useful" by ten. Discussions were ranked "essential" by twelve, "useful" by six and "not so useful" by one. Demonstrations: "essential" by six and "useful" by thirteen, while the field trip was ranked as "essential" by one, "useful" by seventeen, and "not so useful" by one.

The question on how the main subjects were presented and discussed was answered as follows:

Subject	Evaluation of presentation						
	Clear		Time			Useful	
	Yes	No	Too long	Adequate	Too short	Yes	No
Epidemiology	17	1	1	15	2	18	-
Pathogenesis	15	3	1	12	4	16	2
TB testing BCG	15	3	3	13	1	18	-
Case-finding	17	1	2	14	1	16	1
Chemotherapy	18	-	-	14	4	18	-
N T P	17	1	1	14	2	18	-

The questions of whether some subjects should be extended or reduced in future courses, and whether the documents provided during the present course were adequate or not were answered as follows:

Subject	Time allotment		Documents considered	
	Number in favour of extension	Number in favour of reduction	Adequate	Inadequate
Epidemiology	10	1	17	1
Pathogenesis	8	3	12	6
TB testing and BCG	-	5	16	1
Case-finding	5	5	15	2
Chemotherapy	9	1	15	2
N T P	9	2	13	4

Two participants complained of insufficient personal contact with the resource personnel, while sixteen were satisfied in this respect.

Two participants considered that they were not given enough free time for work on their own, while fifteen were satisfied.

Three participants had language difficulties while fifteen no difficulties at all.

The length of the course was considered appropriate by eleven participants, too short by one (who suggested a course of three weeks), and too long by six (all suggested one week duration).

The question whether the course should be repeated in future received positive response from all eighteen participants who answered the question. A majority of participants (twelve) suggested a 5-year interval, four were in favour of 2-3 years interval, and one was in favour of an annual course.

The stipend was considered as appropriate by eleven participants, and as too low by five.

The social and cultural facilities offered by the organizers of the course were considered as satisfactory by thirteen participants, while five were not satisfied.

The reception on arrival was satisfactory for fifteen participants, and not satisfactory for two.

Accommodation was considered as good by eight, as satisfactory by seven, and as unsatisfactory by two participants.

Sixteen participants offered other comments, the majority of which were explanations of the answers given or specific suggestions on how to improve the organization of future courses.

On the whole, the content as well as the conduct of the course was considered by nearly all participants as a very useful exercise in improving their national tuberculosis control programme, and as a very good refresher of their theoretical and practical knowledge on the subject.

The participants were later informed that they would be contacted again 12 months after completion of this course. They would be requested to furnish the sponsoring agencies with detailed information concerning their activities, and to state whether they were able to apply what they had learnt in this course to their field work. They were also informed that they were welcome to write to the resource personnel individually and among themselves, about any technical problems they might encounter.

6. CLOSING CEREMONY

A brief closing ceremony was held on Friday, 29 August 1980, in the presence of the Under Secretary For Health, Dr Hutchison, under the chairmanship of Dr Nathan Kere, the participants' representative. Dr R. Marshman and Dr J.C. Tao expressed their satisfaction with the progress made at the course and thanked the participants for their interest and cooperation.

The co-Directors of the course, Dr S. Endo and Dr Peter Bennett, on behalf of their respective agencies, thanked the host Government for the splendid support given to the course. They also expressed their appreciation to the secretariat of both sponsoring agencies for the administrative and technical assistance and the interpretation.

Dr Philip Kame, on behalf of the participants, thanked the sponsoring agencies for the continued support given to this course. He also expressed his gratitude to the resource personnel for the new information they had gained. He promised they would endeavour to implement their services on their return in accordance with the principles introduced by the consultants and that there would be closer communication and exchange of experiences among the participants in the future.

Finally, the Under Secretary For Health, Dr Hutchison, after expressing his satisfaction with the course and his hope to see the favourable outcome of the course reflected in the future tuberculosis control services in Solomon Islands, officially closed the course.

6. ACKNOWLEDGEMENTS

The writers of this report wish to express their gratitude for the considerable assistance they received from many persons before and during the conduct of the course.

The Minister of Health, the Permanent Secretary and the Deputy Secretary of the Ministry of Health and Medical Services, took a great interest in the preparation and conduct of the course. The Minister personally opened the course and gave a great deal of encouragement and support to the group. Dr Hutchison, the Under Secretary, led the closing session and his collaboration with the organizers did much to ensure the successful conduct of this course.

The writers are indebted to Dr Nathan Kere, Chief Medical Officer, Communicable Diseases, Ministry of Health and Medical Services, one of the Solomon Islands participants, who did so much, both during the preparatory and the operational phases of the course, in liaison with the Government and the sponsoring agencies concerning so many administrative and social affairs. A heavy burden of responsibility fell upon Miss Nicole Ries and Mr Gary Monson, both of SPC, which they discharged with ability and constant courtesy. Miss Teressa Markowitch, Miss Martine Schleigh and Mr Hubert Toubeau performed splendidly in interpretation.

Tribute must be paid to the participants, whose interest and cooperation were outstanding. It was a great pleasure and opportunity to have met them and it is hoped that future collaboration with them will continue.

ANNEX 1

LIST OF PARTICIPANTS

Country	Name	
Cook Islands	Dr Tamarua Teariki	Director of Public Health Ministry of Health Rarotonga Cook Islands
Fiji	Mr Mohd. Azeem	Health Inspector P.O. Box 129 Nadi Fiji
	Dr Sainivalati Vaitogave	Sub-Divisional Medical Officer Vunidawa Sub-Division Hospital P.O. Vunidawa Naitasiri Fiji
French Polynesia	Dr René Chasin	Institut "Louis Malardè" BP 30 Papeete French Polynesia
Kiribati	Dr Alolae Cati	Principal Medical Officer Ministry of Health Tarawa Kiribati
Malaysia Sabah	Dr R.L. Campos	Deputy Director Medical Services (Health) P.O. Box 123 Sabah Malaysia
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Annex 1

Country	Name	
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	Mr Maxwell Mirintoro	Health Extension Officer TB/Leprosy TB/Leprosy Control Section P.O. Box 2084 Konedobu Papua New Guinea
	Mr Douglas Tauwaigu	Health Extension Officer TB/Leprosy TB/Leprosy Control Section P.O. Box 2084 Konedobu Papua New Guinea
Solomon Islands	Dr Martin Baker	Principal Medical Officer Auki Malaita Solomon Islands
	Dr Nathan Kere	Acting Chief Medical Officer (CD) Ministry of Health and Medical Services Honiara Solomon Islands
	Dr Pimbo Ogatuti	Consultant Paediatrician Central Hospital Honiara Solomon Islands
	Dr Eritara Tekieru	Senior Medical Officer Gizo Hospital Gizo Western Province Solomon Islands
Tonga	Dr Malakai Ake	Medical Officer Ministry of Health Nuku'alofa Tonga

Annex 1

Country	Name	
Vanuatu	Dr Giles Guidon	District Medical Officer Hospital Louis Rouzand Tanna Vanuatu
	Dr J. Makau Kalsakau	Medical Superintendent Vila Base Hospital Port Vila Vanuatu
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OBSERVERS

Solomon Islands	Mr Paul Benham	Senior Pharmacist Honiara Solomon Islands
	Dr T. Bresford West	Senior Medical Officer Honiara Municipal Authority Honiara Solomon Islands
	Dr G. Corble	Senior Medical Officer Makira/Ulawa Province Solomon Islands
	Ms Jessy Garoni	Assistant Nursing Officer Honiara Solomon Islands
	Dr R. Gude	Principal Medical Officer Western Province Solomon Islands
	Ms Gweneth Harold	Assistant Nursing Officer Honiara Solomon Islands

Annex 1

Country	Name	
	Dr I. MacGregor	Senior Medical Officer Guadalcanal Province Honiara Solomon Islands
	Mr Michael Parker	Senior Laboratory Officer Honiara Solomon Islands
	Dr A. Roberts	Consultant Physician Honiara Solomon Islands
	Dr T. Spare	Senior Medical Officer Central Islands Province Solomon Islands
	Dr Mark Wright	Senior Medical Officer Ysabel Province Solomon Islands

CONSULTANTS

WHO	Dr J.C. Tao	Formerly Regional Adviser on Chronic Diseases WHO Regional Office for the Western Pacific Honolulu Hawaii
SPC	Dr Ray Marshman	Formerly Director Tuberculosis Control Victoria Australia
SPC	Dr Peter Cavanagh	Fairfield Hospital Yarra Bend Road Fairfield Victoria Australia

Annex 1

SECRETARIAT

Country	Name	
WHO Regional Office for the Western Pacific P.O. Box 2932 Manila Philippines		
	Dr Shoichi Endo	Regional Adviser in Chronic Diseases
	Dr H.T. Lin	Team Leader, Regional Tuberculosis Control Team
	Dr J. Leowski	Medical Officer, Regional Tuberculosis Control Team
	Mr A.Y. Eng	Technical Officer, Regional Tuberculosis Control Team
	Dr Qian Yuan Fu	WHO Medical Officer Apia Western Samoa
	Mrs Carolyn Bird	Technical Secretary Honiara Solomon Islands
SPC BP D5 Noumea New Caledonia		
	Dr Peter Bennett	Epidemiologist
	Dr Ropati Uili	Assistant Epidemiologist
	Ms Nicole Ries	Administrative Officer
	Miss Teresa Markowitch	Interpreter
	Miss Martine Schleich	Interpreter
	Mr Hubert Toubeau	Interpreter
	Mr Gary Monson	Maintenance Technician

ANNEX 2

OPENING REMARKS BY DR HIROSHI NAKAJIMA, REGIONAL DIRECTOR, WHO REGIONAL OFFICE FOR WESTERN PACIFIC

Colleagues and Friends,

First of all, allow me to welcome you all to Honiara and to express to you my sincere thanks for participating in the WHO/SPC refresher training course on tuberculosis, at which we shall be discussing both the technical and managerial aspects of the problems facing us in the Pacific area. I wish to thank the Government of Solomon Islands for acting as hosts to this course and for providing the necessary facilities, as well as the South Pacific Commission, which is collaborating with us in holding the course.

My sincere thanks are also extended to Dr Ray Marshman and Dr Peter Cavanagh, South Pacific Commission consultants, and to Dr J.C. Tao, WHO consultant, for their valuable participation in the course.

The first course was held in Noumea, New Caledonia, in 1964. Subsequently courses were held every five years. This course should have been held last year, but for administrative reasons, it was decided to hold it this year.

The principle of tuberculosis control methods has been well established, and most of the countries and areas in the Pacific have a developed national tuberculosis control programme integrated into the general health services, which are adopting the control methods recommended by WHO. Although in recent years, the incidence of tuberculosis has decreased in many countries and areas, the rate of annual decline has been far less than what might have been expected if currently available control measures had been properly applied on a national scale. Although control methods have been standardized, there are many practical problems to be resolved in their application. Control methods need to be applicable to the prevailing local conditions and acceptable to the people so that the majority of the population can be covered by the programme. In this respect, each control method must be carefully reviewed and appropriate ways found for application of the methods.

Tuberculosis is a chronic disease and calls for long-term regular treatment. It can also develop from people who have already been infected, even if the infection rate becomes very low in the community. Thus tuberculosis problems will continue to be felt until all those who have been infected die off in the community. The tuberculosis programme thus needs a long-term plan and must be integrated into the general health services.

In order to achieve maximum impact of the programme, the services provided must be of high quality and there must be a wide coverage of the population.

Annex 2

In this respect, the training of health workers, supervision of activities, and monitoring and evaluation of the programme are of the utmost importance, particularly if the programme is integrated into the general health services.

In this course, the management aspects of the programme, such as planning, organization, training, implementation and evaluation, will be discussed in addition to the technical problems of tuberculosis control.

Non-specific factors such as the improvement of living conditions and nutrition will also undoubtedly alleviate the tuberculosis problems in a community. However, the benefit accruing from alleviation of tuberculosis problems as a result of the control programme will far exceed the costs of the programme provided the latter is properly implemented.

I hope therefore that discussions during the course will be fully utilized to improve the effectiveness of your tuberculosis programmes, and that the decline in the incidence of this disease will be accelerated. The WHO Regional Office will do its best to collaborate with your Government in the implementation of its programme.

I wish you a successful meeting and an enjoyable stay in Honiara.

Annex 2

MESSAGE FROM THE SECRETARY GENERAL, SOUTH PACIFIC COMMISSION
by
Mr M. Young Vivian

I regret that I am unable to be with you today in the Solomon Islands on the occasion of the opening of the Fourth Joint World Health Organization - South Pacific Commission Refresher Course on Tuberculosis. Consequently, I have asked Dr Bennett, who with Dr Endo, the World Health Organization Regional Adviser on Chronic Diseases, is serving as Co-Director of this course to present my message and welcoming remarks to you.

The first refresher course on tuberculosis designed especially for medical officers in the South Pacific territories was organized by the World Health Organization in Suva in 1959. This course was clearly successful, and led to the demand for similar courses in the future.

In 1964 the World Health Organization and the South Pacific Commission joined forces, and the first joint WHO/SPC Refresher Course on Tuberculosis was held at the Commission's Headquarters in Noumea, New Caledonia. This decision resulted in a regional meeting in which the French speaking countries and territories were also able to participate. The second joint meeting also took place in Noumea in 1969, and then, the third was held in Papeete, French Polynesia in 1974.

Thus there is a long history of collaboration between the Commission and the World Health Organization in tuberculosis teaching activities in the South Pacific Region.

As the participants and observers are aware, there is a strong bond of friendship among all the peoples in the South Pacific community. Most of our islands are small, and our populations are all modest in size by world standards. Yet, in spite of being spread over a vast area, we have so much in common, and we recognize that our well-being and happiness in the future depends on being able to combat our problems, largely through the mechanism of regional cooperation. Only by sharing experiences, learning from the success of others, and devising our own ways address those difficulties which are the result of our special geographical circumstances, will we continue to reap the benefits of the Pacific way of life which is so dear to us.

As with many of our problems, difficulties in achieving the highest standards of health for our people are often the result of the difficulties in providing goods and services and distributing them effectively to where and to those who need them. I am well aware that tuberculosis is still an important health problem in many of our countries in the Region, but yet considerable strides have been made in reducing the frequency of this disease in the past 20 years. Some of the credit for this improvement must

Annex 2

be the result of the joint activities of the Commission and the World Health Organization in sponsoring these meetings, which serve to inform our medical officers of the latest developments in diagnosis and therapy and promote the use of the most acceptable methods of treatment and prevention to the benefit of the people and the countries of the Region.

The methods and technologies which are best suited for this goal are not necessarily those which are best suited to the purpose in other parts of the world. In many countries in the Region medical personnel achieve strong support for health programmes, working with their governments, provided that they receive appropriate information and advice, which takes into account the unusual circumstances which they encounter in delivering medical care to their people. The medical officers should also be aware of preventive measures which can be taken and learn the role which health education can play in preventing illness. If this is done then I feel that they will do their work well, and all the Pacific countries will benefit from your discussions and deliberations during the next two weeks.

As Secretary-General of the South Pacific Commission, I would like to convey our thanks and appreciation to the Government of the Solomon Islands who generously offered to host the course and who have undertaken responsibility for the local arrangements. I feel confident that these arrangements will well serve the needs of the meeting. I am especially pleased that the Government has taken the opportunity to invite so many of the medical officers and other staff concerned with tuberculosis control in the Solomon Islands so that they too may benefit from the discussions, lectures and demonstrations which take place in Honiara.

I understand that both the World Health Organization consultant, Dr Tao and the SPC consultants, Dr Marshman and Dr Cavanagh are each well known for their work in tuberculosis. I believe their contributions to the meeting will be of considerable importance to combating the disease in the Pacific Region in the forthcoming years. Other members of the World Health Organization Regional Tuberculosis Team will also serve to deliver their knowledge and experience in this field.

I extend a warm welcome to them, and to all the participants and observers in the course. The work that will be done in Honiara during the course, and that which will be carried out by all of you when you return home will help to solve one of the most important health problems in the Region. As you all know, the cause of tuberculosis is known, there are effective drugs to cure the disease, and diagnosis and case finding are possible in all our countries. Let us then resolve to use the available tools to the best advantage to rid the Pacific Region of the disease. May God bless you and speed your efforts.

Annex 2

MESSAGE OF H.E. DR GIDEON ZOLOVEKE
THE MINISTER OF HEALTH AND WELFARE, HONIARA, SOLOMON ISLANDS

Ladies and Gentlemen, it gives me the greatest pleasure to be asked to open this conference on a subject which has been one of concern for thousands of years and which we in the Solomons must increase our efforts and our determination to eradicate from our midst. 'If tuberculosis is a preventable disease, why don't we prevent it' a king of Britain said many years ago.

Unfortunatey, the solution is not so simple but I am more than glad to say that all over the world this disease is now not only being prevented but it is actively being attacked.

During the last 30 years new drugs and new methods of detection have been introduced which have dramatically reduced the mortality from this disease.

I fully well remember that when I started my career any person diagnosed as suffering from tuberculosis meningitis died - there was no cure. Now this has dramatically changed and it is the exception for a person suffering from tuberculosis meningitis to die. With the advent of new drugs to treat the disease so also came the wide spread use of BCG vaccine to prevent the disease and with the aid of these two weapons the whole picture of tuberculosis is changing rapidly but not as quickly as I would like to see it in the Solomon Islands.

Most of you will have heard that I am a devotee of health education. I am absolutely convinced that it is through health education, close contact tracing and personal supervision of cases not necessarily in hospital, that the fight against tuberculosis will be carried on victoriously.

We in the Solomon Islands are determined that we shall eliminate tuberculosis from our midst and it is from advice and experience gained at such a conference as this that we shall be able to go forward and achieve our aim.

Ladies and Gentlemen, I have much pleasure in declaring this conference open and to wish you well in your deliberations.

ANNEX 3

CURRICULUM AND TIMETABLE

Daily hours:

8.30 - 11.30
1.30 - 4.00

Monday, 18 August 1980

1.30 p.m.	1. Opening Ceremony	
	1.1 Opening Address	Dr S. Endo Dr P. Bennett
	1.2 Welcome speech and opening of the course	Minister of Health
	1.3 Introduction of participants Group photograph Coffee break	
2.30 p.m.	2. Introduction to the course	Dr J.C. Tao
	3. Election of officers	
	4. Country reports	Participants

Tuesday, 19 August 1980

	4. Country reports continued	Participants

Wednesday, 20 August 1980

	5. Epidemiology	
	5.1 Principles of epidemiology	Dr P. Bennett
	5.2 Epidemiology and statistics of tuberculosis	Dr J. Leowski
	6. Pathogenesis of tuberculosis	Dr P. Cavanagh

Annex 3

Thursday, 21 August 1980

7.	Tuberculin testing and BCG vaccination	
7.1	Tuberculin testing	Dr H.T. Lin
7.2	BCG vaccination	Dr S. Endo
7.3	Coverage and quality control of BCG vaccination programme	Dr J.C. Tao
7.4	Demonstration	Mrs Jennifer Kauli

Friday, 22 August 1980

8.	Diagnosis of tuberculosis and case-finding	
8.1	Clinical presentations of tuberculosis and their value in tuberculosis control	Dr R. Marshman
8.2	Laboratory diagnosis	Dr Cavanagh
8.3	X-ray examination	Dr Marshman
8.4	Case-finding programme	Mr A.Y. Eng
8.5	Demonstration - sputum collection and microscopic	Mr M. Parker
	examination	Mr A.Y. Eng

Monday, 25 August 1980

9.	Treatment of tuberculosis	
9.1	Chemotherapy of tuberculosis	Dr Marshman
9.2	Standard drug regimens in national tuberculosis programme ..	Dr Tao
9.3	Institutional vs. domiciliary treatment	Dr Marshman
9.4	Case-holding and case-management .	Dr H.T. Lin
9.5	Recordings, reporting and monitoring system	Dr J. Leowski

Annex 3

Tuesday, 26 August 1980

10.	Field visit	Dr N. Kere Dr I. MacGregor
10.1	Discussion of field visit	Participants
10.2	Recording, reporting and monitoring system	Dr J. Leowski

Wednesday, 27 August 1980

11.	National tuberculosis programme (NTP) ..	Dr J.C. Tao
11.1	Planning	
11.2	Organization	
11.3	Management	
11.4	Training and supervision	
11.5	Evaluation	

Thursday, 28 August 1980

12.	Review, discussions and future plans on NTPs of participating countries or territories	Participants and resource personnel

Friday, 29 August 1980

13.	International cooperation in tuberculosis control	Dr J.C. Tao
14.	Evaluation and closing	

ANNEX 4

SUMMARY OF COUNTRY INFORMATION ON TUBERCULOSIS

Out of 12 participating countries or territories, with 6 800 000 population, 11 questionnaires were analysed (9 from South Pacific countries and 2 from Malaysia - Sabah and Sarawak). The questionnaire form is shown at the end of this Annex.

A. General information

1. Tuberculosis among leading causes of death:

1st in 1 country
2nd in 1 country
4th in 2 countries
5th in 2 countries
10th in 1 country

No data available for 1 country, and in three other countries tuberculosis was not present among 5 or 7 listed causes of death.

2/3. Due to lack of data on age structure of population the number of preschool children and figures on school enrolment could not be qualitatively assessed.

4. Budget

Only data on total health budget were presented in all the questionnaires. Figures for communicable disease control and tuberculosis control were given by 6 and 2 countries respectively.

An attempt was made to present the budget in per capita figures. These figures, however, have to be considered, only as a very rough estimate.

The total health budget in three countries is below US$10 per capita per annum; in four countries it is in the range of 15-25 US$, in one around US$55 and in three others in the range of US$200-250.

For communicable disease control is concerned, out of six countries reporting, the budget is below US$1 per capita per year in one country, around US$2-5 in three countries, and around US$7 in two countries.

Figures for tuberculosis control were presented in two questionnaires: - they were 0.20 and 0.30 US$ per capita per year.

Annex 4

B. National Tuberculosis Programme

Four countries reported that their tuberculosis control programme has been operating for more than 30 years, another five between 15 and 20 years, and two for less than 10 years.

More or less specialized units are responsible for the programme at control level in five countries, while in another six countries the Division of Public Health is the responsible central agency.

At intermediate and peripheral levels, the tuberculosis services are integrated within the general health service in all the countries.

Personnel responsible for tuberculosis control at central level seem to be rather scarce; with two exceptions the number of doctors at that level was one (four countries) or two (four countries), or none (one country).

C. Epidemiological information on tuberculosis

The tuberculosis mortality rate, as reported, seems to be rather low: in two countries in the range of 2 per 100 000 population, in five countries in the range of 5-7 per 100 000; in one around 11 and in another around 24 per 100 000 (for two countries no data available). Five countries, however, reported deaths from tuberculosis meningitis.

Data on the prevalence of tuberculosis infection were given by one country only. Three other countries reported some data on tuberculosis infection based on very small numbers of children tested some years ago in routine prevaccination tuberculin tests.

Data on the prevalence of pulmonary tuberculosis were also given by one country only. Two other countries reported some data based on MMR screening of selected small areas.

D. Programme performance

(1) BCG vaccination

In all the countries the initial vaccination covers infants; in two countries school entrants are revaccinated, in three countries school leavers, and in five countries both school entrants and school leavers are revaccinated.

In all countries except one, BCG vaccinators were trained in the BCG vaccination technique.

In nine countries direct BCG vaccination is practiced, while in two the tuberculin testing is applied routinely before BCG vaccination.

Annex 4

All the countries use freeze-dried vaccine, nine of Japanese origin and two French.

In six countries BCG vaccination is given simultaneously with other types of immunization.

Four countries only consider their cold chain as well maintained, the other seven do not.

Nine countries out of eleven presented their BCG performance figures; as far as initial vaccination of infants is concerned, three countries estimate that the coverage exceeds 90%, in five countries it is in the range of 60-75%, and in one country 30%. The coverage of school entrants and school leavers was given by five countries only, of which only one estimate it as being very low (around 10%), all the others reported figures of 80-99%.

(2) Case-finding

In all the countries the case-finding policy is based on examination of symptomatics at clinics or health centres; three countries, however, use also mass X-ray screening in addition.

In all the countries, the majority of tuberculosis patients are discovered in hospitals or hospital clinics, and only three countries reported that health centres also play some role.

In nine countries out of eleven, X-ray and sputum examinations are routinely given to symptomatic patients. Two countries reported that this is not a routine.

The use of mass miniature radiograph is reported by six countries; the use of microscopic examination of sputum as a means of case-finding - in all except one. In only five of the countries is the sputum examined in health centres and hospital laboratories, while in another five in hospital laboratories only.

In six countries specimens are sent for examination, in four countries slides only, while in one country both.

The slide-check system is in operation in five countries only.

All the countries reported having culture facilities; seven of them, however, have one such laboratory only.

The accomplishment figures for case-finding by sputum examination were reported by five countries only, and those reported were not complete, so no conclusions can be drawn from the available data.

Annex 4

(3) Case-registration

In six countries the case-registry is maintained at a central level only; in one at intermediate level only, and in four countries at both levels.

In eight countries the peripheral units notify the registry of newly discovered cases individually as soon as a case is discovered, while in another three countries - collectively once a month.

Nine out of eleven countries report that their peripheral units also notify the registry of events such as death, loss or completed treatment.

In all the countries except one, private physicians are required to notify the health authorities when a diagnosis of tuberculosis is made.

Four countries consider their case-registry as well maintained, while seven as not well maintained.

The registration statistics for 1979, however, were reported by seven countries only, of which six gave total or incomplete figures, and no conclusions can be drawn.

(4) Treatment

A total of 171 hospitals with 10 200 beds exists in all the countries, of which about 1000 beds are considered as tuberculosis beds.

In five countries only, the tuberculosis patients are admitted to the general medical wards, but in all the countries it is routine to keep the patients in the hospital for initial treatment, the duration of hospitalization being six weeks to three months.

As far as standard drug regimens are concerned, three countries report the use of rifampicin, while all other use streptomycin, INH and thioacetazone or PAS: usually three drugs for the initial phase and two drugs for the continuation phase. In six countries, a twice weekly supervised regimen is in use; thioacetazone is in use also in six countries.

Oral drugs are normally dispensed to patients on domiciliary treatment once a month in ten countries, and fortnightly in one country. Only four countries reported that their patients could come to the health units for daily injection of streptomycin.

As far as defaultor action is concerned only one country considers it very well done, six countries consider it fairly well, while other four not very well.

Annex 4

The regularity of treatment is considered very good by six countries (80-90%), fairly good by two (60-80%), not good by one (30%), while two countries did not reply to the question.

In four countries there has been an attempt to assess the sputum conversion rate, and the figures given by these countries range from 80-100%.

The bacteriological follow-up examination of patients on treatment is claimed to be routinely done by all countries except one, at three monthly intervals, and the percentage of patients followed-up gradually is claimed to be in the range of 65-100% in eight countries; one country only gave the figure of 10-15%.

On the basis of the questionnaires for country information on tuberculosis, a critical review of the existing situation was presented for discussion. The emphasis was put on how to improve the tuberculosis services within the existing primary health care institutions. It was agreed that patients with respiratory symptoms of two weeks or more duration should be selected by each health institution and offered the possibility of sputum examination by direct smear. If found positive those patients should be put on treatment using standard drug regimen, and if possible under full supervision.

Simple notices for evaluation of case-finding and treatment activities as well as of BCG vaccination were discussed. The importance of achieving the highest possible coverage of eligible population groups was stressed.

Annex 4

QUESTIONNAIRES FOR COUNTRY INFORMATION
FOURTH WHO/SPC REFRESHER COURSE ON TUBERCULOSIS

COUNTRY (Area): _____

A. GENERAL INFORMATION

1. Leading causes of death: (Year 19__)

(a) _____ (f) _____
(b) _____ (g) _____
(c) _____ (h) _____
(d) _____ (i) _____
(e) _____ (j) _____

2. Number of preschool children _____ (Year 19__)

3. Total school enrolment: (Year 19__)

Primary school _____
Secondary school _____

4. Budget: (Year 19__)

Total national (or central) budget _____

Total health budget _____

Budget for communicable diseases control _____

Budget for tuberculosis control (if applicable) _____

B. NATIONAL TUBERCULOSIS PROGRAMME (NTP)

1. How long has the country-wide (or area-wide) tuberculosis control programme been operating?
For ___ years (since 19__)

2. What unit is responsible for NTP at national level (or the central level) of the health administration? _____

3. What units are operating at intermediate level?

_____

4. What units are operating at peripheral level where the tuberculosis service is available to individual persons (or patients)?

_____

5. How many persons are responsible for NTP at national (or central) and intermediate levels?

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Category of personnel	National (or central)	Intermediate*
Doctor (full-time)		
Doctor (part-time)		
Nurse (full-time)		
Nurse (part-time)		
Paramedical staff**		
Auxiliary staff***		

*You may indicate the average number of each category of personnel multiplied by the number of intermediate units available.

**e.g. health extension officer in Papua New Guinea.

***e.g. hospital orderlies, nurse aides or clerks.

6. How many peripheral health units do you have in the whole country (or area)?

Health centres _____
Health subcentres _____
Aid posts _____
Others (specify _____) _____

7. How many of the above peripheral units are providing a tuberculosis service?

_____ health centres
_____ health subcentres
_____ aid posts
_____ others (specify _____)

Note: If you have health units equivalent to the above but with different names, you may change the above names.

C. EPIDEMIOLOGICAL INFORMATION ON TUBERCULOSIS

1. Number of tuberculosis deaths (Year 19__). It is suggested that small countries give a five-year total of tuberculosis deaths to make the data more representative.

Total tuberculosis deaths _____
Pulmonary tuberculosis deaths _____
Extrapulmonary tuberculosis deaths _____
(Deaths from tuberculous meningitis _____)
Tuberculosis mortality rate ____ per 100 000 population/year.

Annex 4

2. Prevalence of tuberculosis infection:

Age group	Number tuberculin tested and read	Number positive	Per cent positive
0			
1 - 4			
5 - 9			
10 - 14			
15 - 19			
20 - 24			
25 - 29			
30 - 34			
35 - 44			
45 - 64			
65 & over			

(1) Indicate type of above data:

Special sampling survey /___/

Routine prevaccination survey /___/

Others: specify: _____ /___/

Also indicate the type of tuberculin test used:

Type of tuberculin used: PPD /___/

OT /___/

Dosage ____ TU

Criteria of a positive reaction _____

(2) If there is more information available concerning the prevalence of infection, indicate it on additional paper.

(NOTE: You may readjust the age groups above if you have different age classification.)

Annex 4

3. Prevalence of pulmonary tuberculosis:

If a special survey was done in the past, indicate its results by age group below:

Age Group	Number examined*	Number X-ray suspects	Number sputum positive
0 - 9			
10 - 19			
20 - 44			
45 & over			
Total			

*Indicate the type of examination employed in this survey: (Year 19__)

X-ray examination /___/

Sputum examination /___/

Both /___/

Was it a sampling survey or simply the results of a routine mass examination?

Sampling survey /___/

Mass examination /___/

If there is more information available concerning the prevalence of tuberculosis, please show it on additional paper.

D. PROGRAMME PERFORMANCE

1. BCG vaccination

1.1 Vaccination scheme:

Initial vaccination*:

Infants (including newborns) /___/

Preschool children /___/

School entrants /___/

Revaccination:

School entrants /___/

School leavers /___/

*Tick only one which is given the highest priority.

Annex 4

1.2 Who gives BCG vaccination?

For infants: Hospital or clinic nurses /___/
Health centre (or sub-centre) nurses or nurse aides /___/
Orderlies /___/

1.3 Were BCG vaccinators trained in BCG vaccination techniques?

Yes /___/ No /___/

If yes, were all of them /___/ or only part of them /___/ trained?

1.4 Who is responsible for training of BCG vaccinators? (Indicate the title of such persons below)

_____

1.5 Is tuberculin test applied routinely before BCG vaccination?

Yes /___/ No /___/

If yes, at what age is this done?
_____ years and above.

1.6 What kind of BCG vaccine is used?

Liquid vaccine /___/

Freeze-dried vaccine /___/

Give the source of vaccine, i.e. Japanese, British, French, Australian, etc.

_____

1.7 What is the dosage of BCG vaccine given?

New borns _____ ml
Infants _____ ml
Preschool children _____ ml
School children _____ ml

1.8 Is BCG vaccination given simultaneously with other types of immunization, such as DPT (or triple vaccine), polio, etc.?

Yes /___/ No /___/

If yes, routinely /___/ or exceptionally /___/

1.9 Do you think that the cold chain for BCG vaccine is usually well maintained?

Yes /___/ No /___/

If no, at what point is it likely to be broken?

_____

Annex 4

1.10 Please give the performance figures for 1979 below:

Age Group	Number eligible	Number vaccinated	Coverage (%)
Newborns			
Infants			
Preschool ages			
School entrants			
School leavers			
Total			

2. Case-finding

2.1 What is your case-finding policy?

Mainly mass X-ray screening /___/

Mainly examination of symptomatic at clinics or health centre /___/

2.2 Where are most of the tuberculosis patients discovered?

Hospitals or hospital clinics /___/

Health centres or subcentres /___/

Orhers: Specify _____

2.3 In the hospitals or clinics, are X-ray and sputum examinations routinely given to symptomatic patients?

X-ray: Yes /___/ No /___/

Sputum examination Yes /___/ No /___/

If yes, is it a fixed unit /___/ or a mobile unit?

2.5 Do you use microscopic examination of sputum as a means of case-finding?

Yes /___/ No /___/

If yes, where is the sputum examined?

Hospital laboratories /___/

Health centres /___/

Both /___/

Annex 4

2.6 If sputum is examined at the health centres, how many such centres perform microscopic examination? _____

2.7 Do the peripheral units (health centres or subcentres) send sputum specimens or make smears and send the slides to the laboratories (or centres) for staining and examination there?

Send sputum specimens /___/

Send slides /___/

2.8 Is there a slide-check system, in which the results of sputum examinations are checked by the central laboratory?

Yes /___/ No /___/

2.9 How many hospital laboratories have culture facilities?
_____ laboratories

2.10 Give the accomplishment figures in 1979 for case-finding by sputum examination below:

Specification	Number examined	Number positive
Microscopy		
Number of specimens	_____	_____
Number of persons	_____	_____
Culture		
Number of cultures	_____	_____
Number of persons	_____	_____

(Do not include those for follow-up examination.)

As a result, how many sputum positive cases (either microscopy, culture or both) were newly discovered in 1979?

_____ cases

3. Case-registration

3.1 Where do you maintain the case-registry?

Non-existent /___/

At central level /___/

At intermediate level /___/

At both central and intermediate level /___/

Annex 4

3.2 How often do the peripheral units notify the registry of newly discovered cases (and/or suspect cases) for registration?

Individually as soon as a case is discovered /___/

Collectively once a month /___/

Other intervals: specify _____ /___/

3.3 Do the peripheral units also notify the registry of the events such as death, loss or completed treatment?

Yes /___/ No /___/

If no, when are the cases removed from the registry?
Specify _____

3.4 Are the private physicians, if any, required to notify the health authorities when the diagnosis is made?

Yes /___/ No /___/

If yes, do they notify all, part or none of the cases they discovered?

All /___/ Part /___/ None /___/

3.5 Do you think that your case-registry is well maintained and kept up-to-date so that it can tell you how many cases were registered last month, how many were taken off the registry last month and how many remained in the registry at the end of last month?

Yes /___/ No /___/

If no, what are the reasons?

_____

Annex 4

3.6 Give the registration statistics for 1979 below:

Specification	Pulmonary tuberculosis		Extra-pulmonary tuberculosis
	Sp. positive	Sp. negative	
Total number at end of 1978 (A)			
Total registered in 1979 (B)			
Newly discovered			
Readmitted			
Others			
Total number discharged in 1979 (C)			
Completed treatment			
Died			
Lost			
Others			
Total number at end of 1979 (D)			

(A) + (B) - (C) = (D)

4. Treatment

4.1 How many hospitals and hospital beds do you have in the whole country (or area)?

_____ hospitals
_____ hospital beds

4.2 Are tuberculosis patients normally admitted to the general medical wards?

Yes /___/ No /___/

If no, how many of the total hospital beds are designated tuberculosis beds?

_____ beds

4.3 Is it almost a routine to keep the patients in the hospital for initial treatment?

Yes /___/ No /___/

If yes, how many weeks (or months) in the hospital on an average?

_____ weeks
_____ months

Annex 4

4.4 What are the standard drug regiments?
Initial phase:

_____

_____

Continuation phase:

_____

_____

Note: Give the dosage of individual drugs, frequency of application and duration of treatment above. If there are alternative drug regimens, also describe them. There is not enough space, please use separate paper.

4.5 How often are oral drugs normally dispensed to patients on domiciliary treatment?

Once a week /___/

Fortnightly /___/

Once a month /___/

Longer: Specify _____ months

4.6 If initial phase of treatment starts on ambulatory basis, can most of the patients come to the health units for daily streptomycin injection?

Yes /___/ No /___/

If no, how do you solve this problem?

_____

4.7 Do the peripheral health workers take defaulter action well?

Very well /___/

Fairly well /___/

Not very well /___/

Not at all /___/

4.8 What percentage of patients on domiciliary treatment do you estimate receive treatment regularly*?

_____ per cent

(*Received at least 80% of the prescribed medicine for a year.)

Annex 4

4.9 Has any attempt been made to assess the sputum conversion rate of cases after one year's treatment?

Yes /___/ No /___/

If yes, what percentage of cases have converted sputum?

_____ per cent

4.10 Are bacteriological follow-up examinations of patients on treatment routinely done?

yes /___/ No /___/

If yes, how often:

every 3 months /___/

every 6 months /___/

after completion of treatment only /___/

If yes, what percentage of the patients received bacteriological follow-up regularly according to the above requirement?

_____ per cent

Reported by _____ Date: _____

ANNEX 5

EVALUATION OF THE FOURTH WHO/SPC
REFRESHER COURSE ON TUBERCULOSIS

1. The objectives of the course are:

   (a) to provide the participants with a review of all aspects of anti-tuberculosis work with special emphasis on prevention, case-finding and treatment.

   (b) to discuss in depth with the participants practical and realistic methods of control of the disease, which are applicable to prevailing local conditions and are acceptable to the people and the country; and

   (c) to allow participants, including the resource personnel, to discuss special problems encountered in the field and to exchange opinions and experience in the field of operations of their programme.

   Do you think that the objectives have been attained?

Objective (a)	Yes 17	No 2
Objective (b)	Yes 17	No 2
Objective (c)	Yes 18	No 1

   If "No" please comment.

2. Do you think that the lectures, discussions, demonstration and field trip of the course were well-balanced?

   Yes 13 No 5

   If not, please indicate which should have received more emphasis and in what proportion.

3. To what extent do you think that the following are useful?

	Essential	Useful	Not so useful
Lectures	9	10	-
Discussions	12	6	1
Demonstrations	6	13	-
Field trip	1	17	1

   If you answer "not so useful" on any of the above, please comment overleaf, suggesting possible improvements.

Annex 5

4. Do you think that any of the following subjects were presented and discussed?

Subject	Clear		Time			Useful	
	Yes	No	Too long	Adequate	Too short	Yes	No
Epidemiology	17	1	1	15	2	18	-
Pathogenesis	15	3	1	12	4	16	2
Tuberculin testing and BCG vaccination	15	3	3	13	1	18	-
Case-finding and diagnosis	17	1	2	14	1	16	1
Chemotherapy and case-holding and management	18	-	-	14	4	18	-
National tuberculosis programme	17	1	1	14	2	18	-

5. Which of the subject should be extended or reduced in future courses?

	To be extended	To be reduced
Tuberculosis		
Epidemiology	10	1
Pathogenesis	8	3
Tuberculin testing and BCG vaccination	-	5
Case-finding and diagnosis	5	5
Chemotherapy, case holding and management	9	1
National tuberculosis programme	9	2

Annex 5

6. Where the documents provided adequate?

Subject	Adequate	Inadequate
Epidemiology	17	1
Pathogenesis	12	6
Tuberculin testing and BCG vaccination	16	1
Case-finding and diagnosis	15	2
Chemotherapy, case holding and management	15	2
National tuberculosis programme	13	4

7. Did you have sufficient personal contact with the resource personnel of the course?

Yes - 16 No - 2

8. Were you given enough free time for work on your own, e.g. for reading of documents?

Yes - 15 No - 2

9. Did you have any language difficulties?

Yes - 3 No - 15

If so, describe.

10. Was the length of the course?

Too short - 1 Appropriate - 11 Too long - 6

If too short or too long, how long do you think the course should be

3 weeks

11. Should the course be repeated in future?

Yes - 18 No -

If yes, at what inverval? 12 - 5 Yrs
4 - 2-3 Yrs
1 - 1 Yr

Annex 5

12. Was the stipend: Appropriate - 11 Too low - 5

13. Were the social and cultural facilities offered by the organizers of the course satisfactory?

Yes - 13 No - 5

If your answer is "no", please comment overleaf.

14. Was the reception on your arrival satisfactory?

Yes - 15 No - 2

If not, what was it?

15. Was the accommodation:

Good - 8 Satisfactory - 7 Unsatisfactory - 2

If "Unsatisfactory", please comment overleaf.

16. Have you any other comments on the content or conduct of the course that might help us to improve future courses of this kind?

Date _____ _____