WHO/SPC REFRESHER COURSE ON TUBERCULOSIS AND LEPROSY

Sponsored by the

WORLD HEALTH ORGANIZATION REGIONAL OFFICE FOR THE WESTERN PACIFIC

and the

SOUTH PACIFIC COMMISSION

Papeete, French Polynesia

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REPORT

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I. INTRODUCTION

1. Since 1959, three previous Refresher Courses for Medical Officers in the South Pacific islands have been held; one in Suva, Fiji (WHO, 1959), one in Noumea, New Caledonia (WHO/SPC, 1964), and one in Noumea, New Caledonia (WHO/SPC, 1969). These courses provided important information and results.

2. At the kind invitation of the Government of French Polynesia, the fourth Refresher Course was held in Papeete, co-sponsored by the World Health Organization and the South Pacific Commission. All administrative services were provided by the South Pacific Commission.

3. A list of the participants, consultants and staff of the Course is appended in Annex I of the Report.

4. Dr Guy Loison, Programme Director (Health), South Pacific Commission, and Dr J.C. Tao, Regional Adviser on Chronic Diseases, WHO Regional Office for the Western Pacific, were co-directors of the Course.

5. The consultants on tuberculosis were Dr H. Coudreau, Directeur général, Comité national contre la tuberculose et les maladies respiratoires, Paris (SPC), and Dr Vernon N. Houk, Deputy Chief, Tuberculosis Control Division, Bureau of State Services, Center for Disease Control, Atlanta, USA, (WHO).

6. The consultants on leprosy were Dr J. Languillon, Directeur, Institut de Léprologie appliquée, Dakar, Senegal (SPC), and Dr Luiz Marino-Bechelli, Professor of Dermatology, Universidade de Sao Paulo, Ribeirao Preto SP, Brazil (WHO).

7. The Course was opened officially on the morning of 2 May by Dr J. Laigret, Director of Public Health and Director of the Medical Research Institute "Louis Malardé", representing the Governor. Dr Loison spoke on behalf of the South Pacific Commission and Dr Tao on behalf of the World Health Organization. Mr Maco Tevane, Government Councillor (Health), spoke on behalf of the people of French Polynesia.

8. At the introductory session, it was pointed out that the participants were present at a refresher training programme not as clinicians, but as public health officers and that the main purpose of the Course was to explore the quickest, cheapest and most feasible methods for organizing a tuberculosis and leprosy control programme without sacrifice of quality in the areas represented. It was recognized that each territory and country represented had political, economic and epidemiological problems that might be special to that area, but that there were general principles of management that could be applied to all. At the outset, it was emphasized that all of the participants would be encouraged to express their views and to ask questions freely at any time. The sessions, as each developed, would be very informal. The consultants would make themselves available for individual meetings with participants when requested after the normal session hours.

9. At the final session, the participants expressed their appreciation of the warm hospitality they received from the Government of French Polynesia, in particular the Department of Health and the Division of Endemic Diseases, to the Territorial Assembly which provided the locale and other facilities, and to all who contributed to making the meeting such a successful and enjoyable one.

II. OBJECTIVES OF THE COURSE

10. The main objectives were:

(1) To give the participants an intensive review of all aspects of anti-tuberculosis and leprosy work with special emphasis on prevention, case-finding and chemotherapy.

(2) To introduce to the participants essentially practical, realistic methods of control which are applicable to the working conditions of the participants' respective territories and countries.

11. A subsidiary objective allowed participants, staff and consultants to discuss in an informal way particular problems in tuberculosis and leprosy control, to exchange ideas and views about the work in their respective countries and to make or renew friendships which would be of lasting benefit to all.

III. CONTENT OF THE COURSE

12. All relevant aspects of tuberculosis and leprosy control were covered including:

epidemiology
case-finding and diagnosis
treatment
biological and chemical prophylaxis
rehabilitation
health education
training,

and the planning and organization of a control programme with special reference to the availability of WHO/UNICEF assistance to National Control Programmes.

13. While discussing the epidemiology of tuberculosis, advantage was taken to examine reports on territorial programmes prepared by participants.

14. Practical training was provided in tuberculin reading, BCG vaccination techniques, bacteriological techniques, and the clinical diagnosis of leprosy.

15. Group discussions provided an opportunity to elaborate on subjects discussed at formal sessions, and to fill in gaps left by these sessions.

16. The curriculum is appended as Annex II of this Report.

17. The time-table extended from Monday to Saturday, working hours being 0800 hours to 1130 hours and 1300 hours to 1600 hours, except Saturday (0800-1130 hours), with short breaks during each session.

18. The languages used were English and French with simultaneous interpretation.

19. The usual study format included a formal presentation of the subject under disucssion, a relation of this subject to conditions in the territories, followed by free discussion between participants and consultants. All participants were provided with a portfolio of recent publications from centres in the field of tuberculosis and leprosy, each publication being provided in good time for study, prior to the formal discussion of the subject.

Country Report

20. After the beginning of the course each participant was asked to complete a form which summarised general conditions and activities in tuberculosis control in his territory (see Tables 1 to 5 and Graphes 1 and 2). The substance of these reports, which were necessarily incomplete in many vital aspects, was discussed fully during consideration of the epidemiology of tuberculosis in the South Pacific area.

Demonstration and practical training

21. Field training in tuberculin testing and BCG vaccination was provided at the Fautaua Val School, Papeete.

22. The facilities of the Medical Research Institute "Louis Malardé", Papeete, were used for bacteriological training. A visit was made to the Orofara Leprosy settlement. The field work involved the co-operation of French Polynesia's Medical Services.

23. The co-operation of French Polynesian physicians was given enthusiastically to these procedures, with which the participants became very familiar and in which they became technically expert.

Future co-operation

24. At the completion of the course participants were reminded that it had been designed to improve the performance of control activities in their territory. They were encouraged to write freely to one another and to consultants if the need arose to ask for help in their programme. They were reminded of the wide range of WHO/UNICEF assistance available to developing communities for the facilitation of community health programmes but emphasis was placed upon utilizing one's own resources to the fullest.

IV. SUMMARY OF DISCUSSIONS

T U B E R C U L O S I S

1. General Principles of Tuberculosis Control

(a) Difficulties peculiar to the Pacific Island Territories

25. Most of the Pacific island communities differ from other parts of the world, where, in many countries, no less than 1% of the total population is actively spreading the disease. It seems likely that in the Pacific island territories and countries, the overall prevalence of tuberculous infection and disease is comparatively low.

26. The geographical problems inherent in small but scattered island communities, separated by wide expanses of open ocean, lead to problems in communication and logistics which are potent factors in decreasing efficiency in the administration of a tuberculosis control programme. It was considered, however, that these problems are not insurmontable and, in fact, the insular character and small populations of the different areas may offer some advantage.

(b) Reasons for failure of control

27. Tuberculosis is an infection which may lie dormant and undetected for years, and produces a disease of unusually high chronicity, often unrecognized by the patient.

28. Until comparatively recent years, there were no really effective methods of treatment or prevention, apart from isolation of the recognized case.

29. There has been lack of systematic long-term planning based on epidemiological data, with resultant failure to accord appropriate priorities. Present organisation and administration of programmes implemented have been weak or largely absent and any evaluation or assessment scanty; however gratifying progress has been made since the last course.

(c) Statement of basic principles

30. Both country-wide coverage and permanent organisation of services are essential. The extent of the tuberculosis problem in the community should be measured to identify areas of greatest need.

31. Initially, efforts should be applied to the most urgent problem, i.e. identification and management of patients with symptoms, who are infectious. Any programme contemplated should be within the capability of available resources.

32. As resources expand, and programmes become more sophisticated, services can be extended to the less infectious type of patient.

33. The advantages of integrating tuberculosis services into general health services, while retaining overall control of techniques and evaluation should be recognised.

34. In planning, the importance of complete coverage, economy, efficiency and simplicity of methods applied should be recognised. In addition, there should be good public acceptance of any programme undertaken.

35. To fulfill the above requirements, it is essential to train and utilise para-medical and auxiliary personnel.

2. Country Reports

36. Medical Officer participants presented information on tuberculosis and leprosy as well as on basic vital statistics and the organisation of health services for their territories or countries. In addition, they gave general background information on geographic, socio-economic and demographic structures in each case.

37. It was not possible to make any international comparisons or conclusions on the prevalence of tuberculosis infection and morbidity as data were sparse and not uniform.

38. Almost all territories and countries reported that tuberculosis represented one of their most serious health problems. In addition, they all reported that the greatest tuberculosis problem was to be found in non-indigenous ethnic groups, where these exist.

39. The epidemiology of the disease was shown to vary from place to place. In areas such as Guam and American Samoa the infection rate measured in school children is very low. When extensive BCG vaccine has been applied there are no data present on the current infection rates. However, from previous surveys the new infection rates are generally fairly low and would in most areas be a bit in excess of 1% per year. In Papua New Guinea many of the tribes in more inaccessible areas are completely free of tuberculous infection whereas in the coastal areas tuberculous infection and disease prevalence are high.

40. In a few of the territories basic health infrastructures exist to a relatively high degree, but in most of the territories and countries, well-organised public health activities appear to take second place to clinical treatment facilities because of individual demand. Much could be gained in these areas by greater utilisation of existing medical-care staff.

41. In many areas, laboratory services are limited but in none would it be impossible to train and utilise lay workers in performing such routine tasks as the collection of sputum and the making of sputum smears, their staining and microscopic examination.

42. With the exception of American Samoa, Guam and the Trust Territory of the Pacific Islands, all territories and countries represented have undertaken BCG vaccination programmes of various magnitudes. All are capable of mobilising effective BCG programmes.

43. Territories and countries represented showed wide variation in economic capability and organisation. A few with good natural resources are self-sufficient or nearly so. The majority, however, have limited resources and many of these are under the jurisdiction of more affluent nations to whom requirements must be presented to obtain local finance. This creates problems from time to time.

44. The geographic nature of the territories and countries represented varies from the great land mass of Papua New Guinea to the widely-spaced small atolls of the Trust Territory of the Pacific Islands. Most territories have serious but not insurmountable problems of communications, resulting from geographical factors. Populations are generally related to the amount of land available, but over available land the population density is uneven with high levels in some areas.

3. Epidemiology

45. The magnitude of the tuberculosis problem in a community is directly related to the size of the reservoir of infection, and to existing socio-economic conditions. It is also related to the length of time the tubercle bacillus has been present in the community.

46. Knowledge of basic epidemiological data is especially necessary in planning control programmes, in the deployment of services and in the establishment of priorities.

47. An awareness of the importance of spread of the bacillus through the air by droplet nuclei is fundamental to the understanding of transmission of tuberculosis.

48. Initial natural infection which does not produce clinical evidence of disease confers immunity (in this context a relative term) against subsequent infection, and those without such protection are much more liable to develop clinical disease as a result of exposure to tubercle bacilli. Thus the population most likely to develop tuberculosis, as a result of exposure to an infectious case, is made up of those who have negative tuberculin reaction. In this category children under five years of age and young adults are the most susceptible groups while children between 6 and 12 years of age are much less susceptible.

49. In those who have had prior tuberculous infection there is a risk of active disease developing as the result of "breakdown" or recrudescence of the original infection. The risk is greater in the first 2 years following first infection but persists during the patient's lifetime to a lesser but significant degree.

50. It is also greater for those whose x-rays show "scars" of tuberculous infection than for those who have a positive tuberculin reaction only, except where the "scars" are isolated calcified foci.

51. These risks are frequently reflected in a higher incidence of tuberculosis in those over 50 years of age.

52. In order to undertake planning of a control programme it is important that the extent of the problem be measured and that definition and criteria on which measurements are based be defined. As far as possible these should be uniform so that statistical data can be interpreted by anyone.

53. Tuberculous infection is considered to exist when a positive reaction of 10 mm or more of induration measured accurately, results from the administration of a careful standard tuberculin test (1 T.U. of R.T. 23 with tween 80 in 0.1 ml. of solution injected intradermally in the skin of the forearm). The significance of the actual size of reaction in relation to tuberculous infection within an area may be more accurately determined by ascertaining the percentage of persons in each reaction size. This data should be known for any community and sampling techniques can be used if it is not possible to cover the entire population tested.

54. A case of pulmonary tuberculosis is considered to exist when the patient is shown to excrete tubercle bacilli. In the collection of data it is important to record what method of diagnosis has been used. If based on positive bacteriology it should be recorded whether this was ascertained by microscopic examination of stained sputum smears or by sputum culture. Cases not bacteriologically confirmed should be considered tuberculosis suspects.

55. Once the criteria have been defined the measurement of tuberculosis in a community may be achieved by determining prevalence and incidence.

56. The <u>prevalence of tuberculosis infection</u> in a community is the ratio of the number of persons infected to the total number of persons in the community at any given point in time. The <u>incidence of tuberculous infection</u> is the ratio of the number of people developing tuberculous infection (skin test conversion in non-vaccinated persons) within a given period of time to the total of the population of the community. These are usually expressed as rates per hundred (per year).

57. The <u>prevalence of tuberculosis</u> in a community is the ratio of the number of persons who have bacteriologically confirmed tuberculosis to the total number of persons in the community at any given point in time. The <u>incidence of tuberculosis</u> is the ratio of the number of people developing bacteriologically confirmed tuberculosis within a given period of time to the total population of the community. These are usually expressed at rates per thousand per year.

58. Prevalence demonstrates the extent of the condition at one particular time, while incidence demonstrates the trend occurring within a period of time. To exemplify this difference: the percentage of children found to be tuberculin positive in a group would represent the prevalence of infection in the group at that time; the number of children converting to tuberculin positive in a year would be the incidence of infection in the group in that year.

59. In assessing the tuberculosis problem in a community the most important indices are the prevalence ratio of infection and the prevalence ratio of persons bacteriologically positive in the community. These should be known and tabulated by age group for each area. Only by knowing this can the extent of the problem be measured and an intelligent control programme planned. When known, the prevalence of pulmonary tuberculosis based on all three criteria, namely those positive on smear, those positive on culture and those diagnosed on X-ray alone, should be tabulated.

60. The reported incidence of new cases in a community may depend as much on the extent and kind of case-finding that is done as on the actual prevalence of disease, since the symptoms of disease are often not noted or recognised by the patient. This is an important factor to be considered in analysing data.

4. Bacteriology

61. It was emphasized that the case-finding bacteriological approach should be the sputum smear examination of persons who are symptomatic. This finds the infectious case and is the number one priority. It is the only case-finding programme that can be accomplished on a country-wide basis.

62. In doing sputum smears, it is most important to be certain that the material examined is sputum - from the lung - and not simply spit or saliva. The material examined should be obtained at the time the individual presents himself. The obtaining of the sputum and the preparation and fixing of the smears should be done at the most peripheral level. The facility for staining and reading the smear will depend upon such local factors as training of personnel, number done, transportation and distance.

63. Cultures can be done when providing medical services to an individual but have no place in a country-wide tuberculosis control programme. They cannot be available everywhere, are expensive and do not identify the patients whose treatment is most important, that is, those who are infectious and found by a positive smear.

5. Chemotherapy

64. The aim of chemotherapy for tuberculosis is to heal disease in the individual patient, thus rendering patients non-infectious and preventing dissemination of infection. Sputum conversion as the result of therapy should be rapid as well as lasting, and healing should be firm. Relapse rates should be low and toxic manifestation of therapy, negligible.

65. Initial courses of intensive treatment should be administered to ensure maximum and rapid sputum conversion in order to avoid the emergence of bacteria resistance, to keep complication rates low and to reduce cost.

66. The success of chemotherapy is judged by the number of patients rendered non-infectious and maintained in that state. Success therefore, depends on the result of the initial impact of the drugs on the tubercle becilli and all therapeutic effort must be directed towards ensuring that this is favourable.

67. The selection of patients for treatment is dictated by their potential for dissemination of infection; that is those who are smear positive. In some instances in the practice of individual medicine, those without positive smears but with positive cultures and those with only radiographic evidence of disease are given chemotherapy. Treatment in the last two situations is not part of the overall control programme but is practiced as individual medicine responding to the need of an individual.

68. Isoniazid (INH) Streptomycin (SM), Thiacetazone (TH) and Para-Amino Salicylate (PAS) are the first-line drugs of choice with regard to ease of administration, cost, patient acceptability and absence of toxic effects. Thiacetazone has generally replaced PAS and the combination of INH (300 mgm) and Thiacetazone (150 mgm) is an efficient regimen with a low incidence of toxicity. Ethambutal (15 mgm/kg) substitutes for Thiacetazone when it produces toxicity. Rifampicin under the present circumstances is not considered a first-line drug.

69. Second-line drugs should be regarded as reserve therapy and restricted to clearly defined situations with control by a central authority. Drugs such as Pyrizinamide (PZA), Ethionamide (ETH) and one other drug not previously given may be used. It is of utmost importance to use at least two new drugs and to ensure the ingestion of the drugs into the individual.

70. Drug resistance is not a problem in the Pacific areas nor should it become so if combined drug therapy regimens are undertaken. It is definitely not necessary to carry out drug resistance tests before embarking on a therapeutic programme of combined first-line drugs in this area.

71. The basic principle of therapy is the administration of an initial intensive course of combined chemotherapy to the point of sputum conversion in all newly diagnosed cases of tuberculosis. This initial intensive treatment should be followed by a regimen of 2 drugs for a minimum period of one year. If possible an additional 6 months of Isoniazid is advisable. Drugs should not be continued beyond this time in most patients. With this type of chemotherapy, success is high and failure rates are low.

72. A regimen consisting of one high dose daily is preferable to one consisting of multiple low doses, and the efficacy of the single daily high dose regimen is enhanced by the addition of a once daily dose of streptomycin in the initial period of treatment. The administration of drugs in this way helps greatly to diminish the problems of domiciliary therapy programmes.

73. An initial period of hospital care is not essential, nor always desirable, for every patient. There are substantial advantages to domiciliary chemotherapy provided that this is supervised efficiently and its establishment actively pursued.

74. The efficiency of domiciliary treatment services is increased by reducing the numbers of doses of drugs to be taken daily and by the use of regimens consisting of intermittent treatment, high doses being given 2 or 3 times a week.

6. Supervision of Domiciliary Chemotherapy

75. The success of domiciliary treatment depends on the patient's acceptance of the diagnosis, his confidence in the health service and his understanding that he will require to take drugs consistently for a long period of time. The patient/health service interview immediately after the diagnosis is made is of the utmost importance in establishing adequate relationships right at the beginning.

76. The distribution of medication should be handled by the health aide or field nurse from a Dispensary or Health Centre within the patient's locality. Health staff members who are to distribute drugs should be well indoctrinated in the need for each patient to receive all the medication prescribed, in the importance of detecting lack of co-operation in a patient and in the recognition of toxic or allergic symptoms. Supervision of such health workers must be frequent and continuous.

77. A satisfactory system of assuring uninterrupted treatment when a patient is transferred from hospital to his home or moves from one district to another should be established. The district health officer of the area to which the patient moves must be notified.

78. An individual treatment card is essential for each patient and should contain at least the regimen, the dosage and the date on which treatment was commenced. The filing of cards in calendar order by date, drug refills or treatment due is essential in order to detect defaulters. When defaulters are detected a home visit should be made immediately.

79. No financial requirement should be imposed upon a patient for the cost of treatment of tuberculosis. The patient's unwillingness or inability to pay should not be a barrier to his obtaining treatment.

80. A minimum of three months' supply of drugs should be held in stock but evidence of drug deterioration especially with PAS should be watched for very carefully.

81. Participants described treatment programmes in their territories and countries and it was agreed that

(a) all territories and countries represented can provide combination treatment and do give intensive therapy during initial treatment;

(b) an initial period of hospitalisation is not usually necessary but may be provided for a few weeks if available;

(c) continuing education efforts are required in the organisation and maintenance of domiciliary chemotherapy to improve public understanding of tuberculosis, to provide in-service training for health workers involved and to encourage patients under treatment.

7. Case-finding

82. Case-finding is defined as the extension of the diagnostic function of a clinic beyond its site and should be centered on the self-motivated symptomatic patient. It is the search for the unknown and unrecognised cases of infectious tuberculosis existing in a community.

83. Before embarking on any extensive case-finding programme, adequate facilities for the treatment of cases discovered must exist and adequate planning of the programme must be undertaken.

84. Case-finding should first be concentrated among adults with respiratory symptoms, since it is the patient with cough and positive sputum who is most highly infectious and who should have priority in treatment. The treatment of such patients is liable to be more effective because they are usually more co-operative than those who have no symptoms.

85. The microscopic examination of the sputum of people who have had a cough lasting more than two weeks will identify a large proportion of the most infectious cases. It should have high priority in any programme.

86. Microscopic examination of the sputum of persons with symptoms is especially useful in peripheral areas where X-ray facilities are not available. It will be found that microscopic examination alone will discover most of the infectious cases.

87. Mass mobile radiography activities have no influence on the infection rates in any community. They do not find the acute infectious cases.

88. The use of the mobile photo-fluorographic unit for case-finding is to be discouraged in all South Pacific territories and countries. Whenever and wherever X-ray examination is used, sputum from persons with cough and expectoration should be collected for subsequent bacteriological examination. The unit, if available, should be used for confirmation and follow-up purposes rather than for initial case-finding. When any suspected lesion is seen on X-ray, examination of sputum should always be made if at all possible

89. The cost of finding a case of tuberculosis by photo-fluorography is many times higher than the cost of finding one by sputum microscopy or culture.

90. It was emphasized that case-finding was merely a tool to identify patients who need chemotherapy. No case-finding should be done unless there is an adequate plan to treat all of the infectious cases. It is the chemotherapy actually ingested that will render the infectious patient non-infectious and thus break this chain of transmission.

91. Participants received instruction and advice from the staff of the Medical Research Institute "Louis Malardé" at Papeete in the laboratory techniques of preparation and staining of a direct sputum smear.

8. Prevention

(a) Factors to consider when Planning a Preventive Programme

92. An overall preventive programme can be divided into two major parts:

(i) To prevent the uninfected from becoming infected or developing disease. This can be accomplished by:

a. finding and adequately treating the infectious case;

b. BCG vaccination;

c. primary chemoprophylaxis.

(ii) To prevent those already infected from developing disease. This can be accomplished by:

a. Improving the socio-economic status of those at high risk of developing disease (a political problem but health workers should speak out on this).

b. Secondary chemoprophylaxis.

93. Tuberculosis control programmes in Pacific territories should be designed primarily:

(i) to reduce the infectious pool by treating the persons who are spreading infection;

(ii) to provide a degree of immunity to the susceptible population by BCG vaccination where infection continues to occur.

94. A preventive programme should be one that can achieve a high coverage in the shortest period of time, is acceptable to the people and is economical.

95. In areas where the infectious pool is large, i.e. where the risk of infecting the uninfected is great, or where the susceptible population is considerable, a BCG programme has its greatest value and, indeed, should be regarded as essential.

(b) BCG vaccination

96. It has been adequately demonstrated that BCG vaccination may be up to 80% effective in preventing disease.

97. A freeze-dried, heat-stable vaccine is to be preferred because it can maintain its potency, with a minimum of restrictions, before it is reconstituted.

98. After the vaccine is reconstituted and during the vaccination procedure, strict precautions must be used to protect it against heat and light. This is necessary as even by short exposure to light the organisms are rapidly destroyed, thus diminishing the potency of the vaccine. Under field conditions a small insulated container such as a vacuum thermos bottle which contains ice should be used to store the vaccine. When administering the vaccine no more should be withdrawn into the syringe than can be used immediately. If a waiting period is necessary between injections the syringe containing vaccine should be placed in a light opaque container.

99. With the exception of newborn infants, the dose of BCG to be given is 0.05 mg in 0.1 ml of diluent intracutaneously. For the new born the dose is one half. Injection should always be given at a standard site, in the outer surface of the left upper arm at the site of deltoid muscle insertion. The injection of slightly more than 0.1 ml may produce a slightly larger vaccinal lesion but causes no greater number of complications. Vaccination can be done by lay-workers, properly trained and adequately supervised.

100. Where the percentage of positive tuberculin reactors at specific age in a community is estimated not to exceed 25%, direct vaccination without prior tuberculin testing under the age is recommended, thus eliminating one step in the process. Under these circumstances prior tuberculin testing should be done only when epidemiological information is required. The determination of prevalence and incidence can then be done on a sample basis.

101. It should be noted that the vaccination of a person who already has tuberculous infection causes no serious consequences even if that person has active disease.

102. The goal of any BCG campaign should be the vaccination of at least 80% of the susceptible population in the community. If the prevalence of positive reaction in the six-year-old (at age of school entrance) is less than 2%, the vaccination may be given at the age the individual leavesschool. If it is between 2 and 5%, the primary vaccination may be given at the time of entering school. If it is over 5%, then the BCG should be given at birth or as soon thereafter as is possible. When both smallpox and BCG vaccination are given at the same time, there is no interference with the result of other vaccinations, nor any increase in the number of complications. It is strongly recommended that BCG vaccination be given at a standard site and that smallpox be given on the other arm.

103. The quality of a BCG vaccination programme should be periodically assessed . The quality of the vaccine can be assessed by returning to a central laboratory, if possible, some of the vaccine that is diluted in the field just before it is used. Viability counts from a sampling of this vaccine are desirable. The examination for the presence of a BCG scar will determine the coverage. Also, on a sample basis, a determination of the mean reaction size 3 months after vaccination will be a reliable indication of the potency of the vaccine and the success of vaccination. This is done by plotting, in a histogram, the percentage of individuals in each reaction size.

104. In most Pacific territories and countries it is recognised that it may not be possible to return a sample of diluted BCG to a laboratory for assessment.

105. The complications of BCG vaccination are not serious but the parents should be told what to expect. Nearly all complications will resolve themselves if only patience is utilized. There is generally no need for systematic therapy.

(c) Chemoprophylaxis

106. Although there is ample data to show that chemoprophylaxis can be effective in preventing high risk groups from developing tuberculosis, its use in most of the Pacific island territories and countries should be limited to the non-vaccinated tuberculin positive, close contacts of newly-discovered, proven infectious cases and, then, attention should be directed especially to children under 6 and to adolescents.

107. In communities where almost all tuberculous patients, including those with X-ray evidence of disease but negative sputum, are known and have been or are under adequate treatment and where public services are adequate, chemoprophylaxis may have a potential for reducing tuberculosis to its absolute minimum. Attention should be given to ensuring that those selected for chemoprophylaxis complete 6 months of Isoniazid. It is noted that since these individuals are not sick it is difficult to motivate them to take their medication.

9. The Tuberculin Test

108. The tuberculin test has great value as an epidemiological and case-finding tool in separating those infected from those not infected. It is also useful as a diagnostic tool. A standard tuberculin such as RT.23 PPD should be used. Tine tests, etc. are not acceptable.

109. Epidemiologically, its use in surveys is extremely important in determining the incidence and prevalence of tuberculous infection in a community and thus the type and extent of control measures necessary.

110. In case-finding its use is to select the groups of individuals needing further examination. It is useless to apply further diagnostic measures to individuals with a negative tuberculin test.

111. Where the prevalence of infection is high, the tuberculin test is applied to select those for whom BCG vaccination is indicated. In groups where it is known that the prevalence of infection is low, the value of direct BCG vaccination should be provided without prior testing.

112. In a BCG vaccination programme, the use of the tuberculin test as an assessment tool is important to measure the potency of the vaccine at the time of injection. If the vaccine used was adequately viable, a post-vaccination tuberculin test approximately 3 months after the vaccination should show a good tuberculin allergic response. Thus the post-vaccination tuberculin test is useful in indicating possible technical faults relating to the handling of vaccine and the techniques applied at the time of administration. The construction of a histogram by plotting the percentage of individuals in each reaction size is

essential to determine the allergic response after vaccination in the community. Such a histogram is also useful to estimate the lowest reaction size which may be considered positive in a given locality.

113. In reading the results of the test, careful and accurate measurements of induration size are of great importance. For greatest accuracy it is recommended that a standard tuberculin reader be trained and employed.

114. When reading the result of a tuberculin test the presence or absence of a BCG vaccination scar should be noted together with its character when present.

115. In many tropical and sub-tropical regions, certain mycobacterial infections, usually non-pathogenic, may give rise to a low grade sensitivity to tuberculin. The false positive reactions from infection with these mycobacteriae can produce difficulties in determining the lower level of reaction size above which the test can be called positive. The presence of such non-specific reactions can best be detected by the plotting of a curve of the reaction size following the administration of the test using a higher dosage of tuberculin to those who did not show reaction to the lower dose, in relation to the percentage of individuals in each size (the histogram). A bi-modal distribution due to such non-specific reactions can then be demonstrated.

10. Organization of a Country-wide Tuberculosis Control Programme

116. A tuberculosis control programme must be designed to prevent the spread of infection by finding and treating the infectious cases, and by preventing disease from developing in the uninfected. In most countries of the South Pacific region, the latter is best accomplished by BCG vaccination.

117. The Tuberculosis Control Officer is concerned with the problem of tuberculosis in his community, in contrast with the private physician's concern for the individual. The Tuberculosis Control Officer must organize and maintain a plan of operation which will bring about the control of the disease in the entire area in as short a time as possible.

118. In planning a tuberculosis control programme the relationship between all the factors involved must be considered - the attitudes of the population, the epidemiological impact of the bacillary population on the human population, and the economic impact of the disease. The programme must be planned in relation to the resources of the community, the technical factors involved, the geography of the country, the administrative organization and the demographic data for the country. It must be country-wide in its approach and based on epidemiological data. It should be integrated within the general health programme in order to utilize the services of this staff and to extend services to the peripheral level, but overall technical control and supervision should be provided by a specialist staff. Services should change with new knowledge; one should never follow others blindly but should take a scientific approach and modify the approach accordingly.

119. As much epidemiological and demographic data as possible must be assembled and analysed in order to plan intelligently the most effective strategy and to locate the areas and conditions which require priority. If comprehensive data are not available, then one representative urban area and one representative rural area can be selected as pilot areasboth to obtain data needed and to determine the feasibility of the methods selected. A pilot area project to demonstrate technical procedures, the effect of the methods applied and to train workers which is feasible in larger countries may not be necessary in most of the Pacific Island territories. Instead, pilot projects may be set up to familiarize workers in procedure and technique, to estimate cost and to demonstrate effect before applying the plan to the entire country.

120. Epidemiological and work-load data must be used to demonstrate needs and show effects to the financing governmental administration agency. Unless absolutely necessary, that agency should not be asked for more resources but the available resources should be reallocated for essential work, and those activities that are not essential discontinued.

121. A long-range plan should be devised, with measurable goals to be achieved in a given period - practical goals can be: 80% of susceptible population vaccinated in 2 years; conversion of sputum in 85% of those under treatment within 6 months of starting treatment; reduction of meningitis in children to a predetermined level in 5 years; 80% of persons completing 1 year of treatment, or a 50% reduction in the prevalence of infections at age 6.

122. Case-finding must be determined according to financial resources, existing services being utilized for the management of symptom-motivated patients and of contacts of newly-identified smear-positive cases. Case-finding should be initially designed to discover the most infectious cases, and later, directed towards selected groups according to knowledge of prevalence. Case-finding should only be done when all self-referred patients are actually receiving chemotherapy and additional resources are available.

123. An integrated approach is based upon utilizing an adequate existing health structure. If none exists a mass BCG campaign must be done and repeated in 5 years if no maintenance structure can be arranged. In any event, the programme must be planned and evaluated to ensure at least 80% of coverage that is of good quality coverage.

124. Domiciliary treatment is to be encouraged buthospitalization may be provided, where it is available, for a short period of initial treatment in the highly infectious, for patients with extensive involvement and for those with complications.

125. Domiciliary treatment requires close supervision and should be extended to peripheral areas with the use of the auxiliary workers in the general health service. The peripheral workers should be concerned with the giving quality BCG, and ensuring that all individuals take their medications regularly. Training in these areas is necessary and careful supervision is required. At the district level there should be one person responsible for collection of data, reporting of field activities and supervision of

the auxiliary worker. At the central level, it is necessary to provide for a statistician, a BCG organizer, laboratory services (both as a reference centre and to supervise the field laboratory work) and for a domiciliary treatment organizer. Those responsible for organizing the specific activity are also responsible for ensuring that it is well done in the field.

126. Records used should be as simple and as few as possible, and contain information which is useful. Record forms and procedures as designed by WHO are recommended.

127. It is emphasized that not all procedures are applicable to any one country. But the basic guidelines can easily be followed. The major one is that the services should be uniformly available throughout the entire country. There should be stated objectives that are measurable within a period of time. Organisation of the control activities, an adequate system of logistics, training and supervision of the workers are essential.

128. Health education is important when it is directed at changing the attitudes and behaviour of individuals and the community at large. The health activity itself is the major motivator of the individual. Therefore, the health worker is also a health educator. If available, a trained health educator should be a member of the health team to stimulate the health workers to be health educators at the same time as providing health services. The health educator, if available, should be included in the planning team. The use of pamphlets, posters and written material will fail in its purpose unless there is interaction and warm conversation between the health worker and the patient.

129. Qualified workers actually carrying out the work are essential. Therefore training of these workers is of major importance. But the training should be designed to improve their performance and we can measure whether or not the training achieved its purpose by measuring the workers' performance. A supervisory visit is a very important part of the training programme.

11. Evaluation of Tuberculosis Control Services

130. The purpose of evaluation is not to judge the past but to prepare for a better future under changing conditions. It is to decide what activity needs to be changed, how it needs to be changed and to what extent. In other words the purpose is to profit from the activities of the past and to improve the future.

131. There are four aspects to evaluation

(i) Technical: such as how protective is the BCG vaccination, how accurate are the diagnostic methods, how effective is the treatment.

(ii) Operational: such as what is the proportion of BCG coverage, what is the logistic flow system and the recording system.

(iii) Financial and administrative: such as, what is the cost of each measure, what is the cost/benefit balance of each method (to ensure the highest cost benefit) and what is the efficiency of the staff.

(iv) Epidemiological: such as, how much reduction in the tuberculosis problem has been achieved within a period of time and how much infection is being transmitted over a period of time.

132. The evaluation scheme must be included in the initial plan and a record system is necessary for the systematic collection of data upon which the evaluation can be based. The evaluation indices are to be used to plan programme modification if that is appropriate. Examples would be:

(i) when the prevalence of infection for school entrants is 2%, then the BCG programme can be changed to the school leaving age rather than at birth;

(ii) when a case-finding programme yields less than 3 cases per thousand individuals examined, it should be discontinued. It is emphasized that there is no need of epidemiological evaluation for case-finding alone since it is not a control measure;

(iii) when the treatment programme results in less than 80% cure rate, the methods must be improved or changed. The rate measured by tablet counting and urine tests to determine the drug taking habits are not practical and should not be used.

133. The effectiveness of health education can be measured by the attitude of the population towards tuberculosis. Finally one should evaluate the organization of the tuberculosis control services by periodically measuring the degree of integration with the general health services.

L E P R O S Y

1. The Leprosy Problem in the World

134. The subject was considered taking into account the distribution in continents and countries as published in the Bulletin of the World Health Organization, 1966, 34, 811-826, and 1972, 46, 523-536.

135. Attention was drawn to possible variations in information because of the nature of the basic material provided by the various countries concerned.

136. In all there were 2,831,775 registered patients and 10,786,000 estimated cases in 1964. The estimated number of disabled patients was 3,872,000. The number of treated patients was about 1,928,000. Comparison of data from different countries was made difficult by non-uniform use of epidemiological terminology.

137. The participants of the course then presented reports on the epidemiology and the control of leprosy in their respective countries and territories. Their reports are summarized in Table 6.

138. Humane, social and economic implication of leprosy were also discussed.

2. Bacteriology of Myco.leprae

139. The subject was exhaustively considered. Emphasis was given to the recent progress in research concerning experimental transmission of the disease and the practical application of these studies in therapeutic trials of anti-leprosy drugs.

140. Special emphasis was also given to the practical application and importance of the bacteriological and morphological indices.

141. The differenciation of the Myco.leprae from other mycobacteria by staining methods was considered important for further studies.

142. The recent reports on the transmission of Myco.leprae to armadillos encourage the possibility of overcoming the shortage of lepromin supplies.

3. Some aspects of the immunology of leprosy

143. The host-parasite relationship in leprosy was discussed in detail in terms of humoral and cell-mediated immunity.

144. Cell-mediated immune functions as measured in vivo by skin test, e.g. the lepromin test, and in vitro (one of these is the lymphocyte transformation test) were discussed in some detail.

145. Special emphasis was given to the lepromin test considering its importance in the classification and prognosis of the disease, and in certain epidemiological aspects.

4. Pathology

146. The pathology of leprosy in the skin, nerves and other organs was discussed with regard to the different forms of the disease.

5. Diagnosis of skin lesions

147. Attention was drawn to the elements that may assist in diagnosis. Emphasis was given to thickening of nerves, loss of cutaneous sensation, alopecia, anhydrosis, clinical tests (histamine and pilocarpin tests), bacteriological and histological examinations.

148. The site of early lesions of leprosy was discussed as well as the differential diagnosis of leprosy skin lesions from other diseases.

6. Diagnosis of neural lesions

149. The neurological aspects of leprosy were presented and detailed description was given of the nerves affected and the type of disabilities that follow. Attention was given to the differential diagnosis of pertinent aspects in relation to other neurological conditions.

7. Classification in field projects

150. At the present time there appears to be no single universally accepted system of classification of leprosy.

151. In general for field projects the WHO Expert Committee on Leprosy of 1966 and 1970 proposed that cases should be classified as Lepromatous, Tuberculoid or Indeterminate leprosy. In tuberculoid cases, the presence of reaction should be recorded.

152. For practical purposes, in the majority of field projects, the cases of Borderline leprosy should be included in the lepromatous type.

153. This classification or one based on immunological and histological criteria may be used for research or publications.

8. Disabilities and their classification

154. The disabilities caused by leprosy were considered in detail. The field classification of disabilities as accepted by the WHO Expert Committee of 1970 was suggested.

9. Treatment. Anti-leprosy drugs

155. Several anti-leprosy drugs were studied: Dapsone, Acedapsone, Thiambutazine, Long-acting sulphonamides, Clofazamine and Rifampicin.

156. Oral administration of Dapsone continues to be the treatment of choice of uncomplicated cases of leprosy. Thiambutazine, when used, should not be administered for periods exceeding two years, since its activity diminishes due to probable drug resistance.

157. The merits of Long-acting sulphonamides were discussed. In spite of good reports in many areas of the world, there is still some conflict of opinions as expressed by other workers.

158. Trials of Acedapsone were discussed but further studies are still indicated before this treatment can be recommended.

159. Clofazamine appears to give good results in lepra reaction. It may also be used in cases with sulphone-resistance. The reddish pigmentation that accompanies its use is a drawback.

160. Favorable results have been reported regarding Rifampicin but further long-term observations are required.

161. Reference was made to the possibilities of immunotherapy.

162. The doses of the drugs considered are as follows:

DAPSONE: 6-10 mg per kilogramme of body weight per week, both for adults as well as children.

ACEDAPSONE: 6 years and more: 1.5 ml. (225 mg DDS) every 75 days.
5 years and under: 1.0 ml. (175 mg DDS) every 75 days.

THIAMBUTAZINE: Commencing with one tablet (0.5 g.) daily, increased gradually to 3 tablets (1.5 g.). Doses of 6 tablets (3.0 g.) daily have been used also.

LONG-ACTING SULPHONAMIDES:

Sulfametoxypyridazine: 750 mg. (3 tablets) every other day.

Sulfarthamidine: 1.5 g. (3 tablets) weekly.

CLOFAZAMINE: Doses vary from 300 mg. weekly to 100-300 mg.daily.

RIFAMPICIN: Doses of 600-900 mg. daily have been reported.

163. All treatments should commence with low doses and increased to the maximum gradually, taking into account individual tolerance and side effects.

10. Treatment of reaction and of eyes, nerve, foot and hand lesions

Treatment of reaction

164. Spontaneous regression of lepra-reaction may occur in many cases. Aspirin (2-3 g. daily), anti-malarial (Chloroquin, 150 mg. base three times a day for one week, 150 mg. twice a day for the second week, and 150 mg. once a day for two following weeks), and antimonial drugs (Stibophen I.M. on alternative days; the commencing dose being 1.5 ml. thereafter increasing to a maximum dose of 2.3 ml. every other day. The total dosage in any one course should not exceed 30 ml.) are useful in some cases.

165. In recurrent lepra reaction, however, and in cases with involvement of the nerves and eyes, likely to lead to permanent disabilities, steroids (Prednisolone 20-30 mg. daily) should be used. However, steroids should be discontinued as soon as possible.

166. Reference was made to the efficacy of Thalidomide in the treatment of lepra reaction. However, in view of the well-known teratogenic effects and possible toxic effects, the drug should be used only for investigatory purposes under strict supervision.

167. Clofazamine may also be used in lepra reaction in doses up to 600-900 mg. daily.

168. Reduction in the dose or even the interruption of Dapsone in cases of severe lepra reaction is recommended by many observers, as is change to some other anti-leprosy drug.

Treatment of foot and hand lesions

169. This was considered and pertinent measures are described in the WHO document WHO/LEP/70.3.

170. Surgical methods applicable in such cases have also been described.

11. Bacterial negativity and reactivation (relapse) of lepromatous patients under sulfone treatment

171. The duration of treatment required to obtain bacterial negativity of lepromatous cases and necessary before releasing them from control is very important from the epidemiological and administrative points of view.

172. From available data it appears that a prolonged period of treatment (1-10 years) is required before inactivity is achieved.

173. Reactivation (relapse) may occur in a high proportion of cases under long term observation, especially in those treated irregularly.

174. After inactivity is achieved, it is considered advisable to treat lepromatous patients regularly for at least 10 years if not for life, before releasing them from control.

12. Epidemiology

175. The transmission of leprosy and the importance of exposure, resistance and factors which might contribute to the spread of the disease were discussed.

176. Myco. leprae has not yet been cultivated in vitro but progress in the experimental transmission of leprosy to laboratory animals may further epidemiological studies.

177. The following epidemiological observations are important for the control of the disease:

(a) Leprosy is a contagious disease transmitted from man to man, mainly in the household.

(b) Sources of infection are exclusively human cases discharging bacilli and transmission may occur by direct or indirect contact. Leprosy bacilli are discharged from or may also enter through the nasal, pharyngeal or buccal mucosae.

(c) Lepromatous (L) and Borderline (B) patients are more infectious. Tuberculoid (T) patients in reaction may have a certain degree of infectiousness.

(d) It seems that the closer the contact with infectious cases the greater the risk of transmission of leprosy. The attack rate of 36.2 per cent in continuously exposed children in a sanatorium has been reported.

(e) According to reports, the risk of children living in the household with lepromatous patients acquiring leprosy is 6 to 8 times higher than for non-household contacts. Exposure to Tuberculoid patients in the household is not significantly higher than that in the general population.

(f) There are no laboratory methods to diagnose leprosy in the pre-clinical phase.

(g) The initial Lepromatous cases, unrecognized as such, may play an important role in the spread of the disease, greater than that of the most advanced Lepromatous patients already diagnosed and under treatment.

(h) Exposure to known cases often cannot be established in an appreciable proportion of leprosy infections, even in young children, in part because of the long incubation period.

(i) The great majority of individuals are resistant to leprosy, as shown by epidemiological studies and by the lepromin-reaction. Lepromin negative contacts have a higher incidence rate of leprosy and are prone to develop the Lepromatous form of the disease.

(j) Lepromatous rate is never higher than 10 or 15 per 1000 and the prevalence rate, even in the most endemic areas, only exceptionally reaches 50 per 1000. In small foci these rates may however be higher.

(k) There is a correlation between Lepromatous rates and prevalence rates: the higher the former the higher tends to be the latter.

(l) Spontaneous disappearence of early leprosy lesions occurs in a high percentage of cases, above 70% in some studies.

(m) Leprosy has a long incubation period, estimated as (on average) 3 to 5 years. It may however be shorter or much longer.

(n) The disease may occur at any age. Apparently the difference in prevalence in the different age-groups would depend mainly on an earlier or later exposure to Mycobacterium leprae.

(o) After the age of 10-14 years, leprosy is usually more prevalent in males than in females. However, there is no clear indication that males are more susceptible to leprosy or to Lepromatous form than females.

(p) Leprosy may occur in any race. There is no certain evidence of racial preference.

(q) There is a possibility that a genetic factor plays a role in the determination of resistance or susceptibility to leprosy but this has not yet been proved.

(r) Socio-economic, environmental and predisposing factors may favour the spread of the disease, acting more intensely on susceptible (lepromin-negative) individuals. These factors are linked and may be related to each other.

(s) Apparently, improvement in the standard of living, hygiene and education is important in the control of leprosy.

13. Chemoprophylaxis

178. Reports on various studies on Dapsone and Acedapsone indicate that these drugs may confer some protection in leprosy. However further observation is necessary before these reports can be confirmed and the exact dosage and duration of the administration of the drugs defined.

14. BCG vaccination in the prevention of leprosy

179. Trials of BCG vaccination conducted in Uganda, Papua New Guinea and Burma have been considered. Further data and longer periods of observation are required before a definite conclusion can be drawn on this subject.

15. Leprosy control

180. The objective of a leprosy control programme is to reduce progressively, over a period of many years, the morbidity of the disease to a level at which it is no longer an important public health problem.

181. The achievement of this objective depends on medical, administrative, social and legal measures and health education and training.

182. These measures are given in detail in the WHO Expert Committees (1966 and 1970) reports (T.R.S. 319 and 459).

183. The main points about medical measures that need emphasis are the following:

(a) Leprosy control has been based chiefly on the use of chemotherapy which should reduce the load of infectiousness and incidence in the community.

(b) A system of priorities should be adopted according to the resources available in each country.

(c) Priority should be given to the treatment and follow-up of infectious and indeterminate patients, and mainly of children.

(d) The choice of case-finding methods should be related to the importance of the endemicity of the disease. In areas of known prevalence of 1 per 1000 or more, examination of contacts of infectious cases, survey of school children and selected groups of the population should be undertaken.

(e) Out-patient care is preferable to in-patient and the number of in-patients should be limited to the absolute minimum.

(f) Regularity of treatment is essential and should be ensured through a programme of health education and supervision (75% attendance for treatment is the minimum requirement for regular treatment).

(g) It is important to control the administration of the drug as well as side-effects. Follow-up examinations should preferably be conducted every six months and at least once a year.

(h) The separation of infants from infectious parents is advocated only in special circumstances and for the shortest possible period.

(i) Education is an essential part of rehabilitation and prevention of disabilities in leprosy patients.

16. Health Education

184. No leprosy campaign should be commenced without prior health education. The general principles of health education concerning tuberculosis are equally applicable in leprosy.

185. The objective of health education is to evoke in the public (the patients and their families) a realistic attitude towards leprosy which neither exaggerates nor minimizes the danger of the disease.

186. Health education on leprosy should be conducted in conjunction with that on other diseases. It should take into account the reasons for prejudice against leprosy, if any, beliefs, literacy, traditional attitudes and cultural background.

187. Health education should emphasize that isolation of leprosy patients is no longer necessary.

17. Social Measures

188. Governments should provide social assistance to leprosy patients and their families as is done for other disabled patients.

18. Legal Measures

189. Legal measures applicable to chronic communicable diseases should also be applied to leprosy.

19. Training

190. The principal aspects of training in leprosy were discussed as training is essential for the success of any control programme.

191. Training should be a planned and organized activity, designed to fulfil the objectives related to each type of personnel assigned to leprosy work.

192. Emphasis was given to training of undergraduates and of private practitioners and general health service personnel.

20. Administrative measures

193. One of the main problems in leprosy control is that making the best possible use of available means and resources through administration and operation.

194. For the proper planning of leprosy control programmes it is necessary to know:

(a) The magnitude and characteristics of the leprosy problem and its relative importance. Characteristics of the area of operation;

(b) the efficiency, feasibility and cost of control methods;

(c) the extent and yield of human and material resources.

195. An appraisal of available resources is needed before the formulation of plans.

196. Objectives should be clearly stated and defined in terms of quantity, areas and time; they should be realistic and useful.

197. To accomplish the objectives, quantatively defined in a scheduled time, a number of actions must be performed (detailed schedule or timetable).

198. In organization, the following aspects should be taken into account:

(a) the establishment of staff functions, levels of authority, structure of the leprosy service, budget, mobile or fixed service, co-ordination within the leprosy service and with other services, supervision, evaluation;

(b) co-operation and integration into the general health service. The need for integration was recognised as well as the difficulties involved;

(c) personnel;

(d) supervision.

21. Evaluation

199. The assessment of a leprosy project should be concerned with all the measures applied in the control of the disease.

200. The evaluation of medical measures should be concerned with the operational aspects of the project (operational assessment) and with the trend of the disease under the influence of the control measures, often associated with other factors (epidemiological assessment).

201. For both types of assessment it is indispensable to have the relevant base-line information.

202. Several indicators may be used for operational assessment concerning case-finding, treatment, follow-up examination, out of control cases, disabilities, inactivity.

203. The main indicators for epidemiological assessment are the annual rate of newly registered cases, forms of the disease, prevalence rates and proportion of bacteriologically negative cases among the infectious cases under treatment.

22. Operational research

204. Projects may be improved through operational research, some aspects of which may be applicable to the South Pacific area: sociological research for health education, feasibility of treatment, possible causes of irregularity of treatment, case-finding methods and returns in relation to cost.

23. Collection of data

205. The importance of this was emphasized as well as the need for standard forms and terminology.

24. Prospects of controlling leprosy

206. Each participant reported on the leprosy programme in his country, the existing situation, development of the campaign and possible future trends.

25. Visit to the Medical Research Institut "Louis Malardé"

207. The participants were shown clinical cases of leprosy, as seen in French Polynesia.

208. Clinical examination methods, nose and skin smears, tests for cutaneous sensibility and reactions to histamine and lepromin were demonstrated.

26. Conclusions

209. Leprosy is still an important public health problem in the South Pacific. The exchange of information between the health services of the various countries is advisable.

210. A public health approach is essential in the control of communicable diseases. The same principles are applicable to leprosy as to tuberculosis.

211. Maximum efforts should be made to detect all the infectious cases in the shortest time possible.

212. Full advantage should be taken of existing knowledge, tools and drugs to develop effective leprosy control programmes.

213. Comprehensive health education and training should precede all leprosy programmes.

214. Basic objectives should be clearly defined.

215. Recording systems should be improved and an internationally accepted terminology used as far as possible.

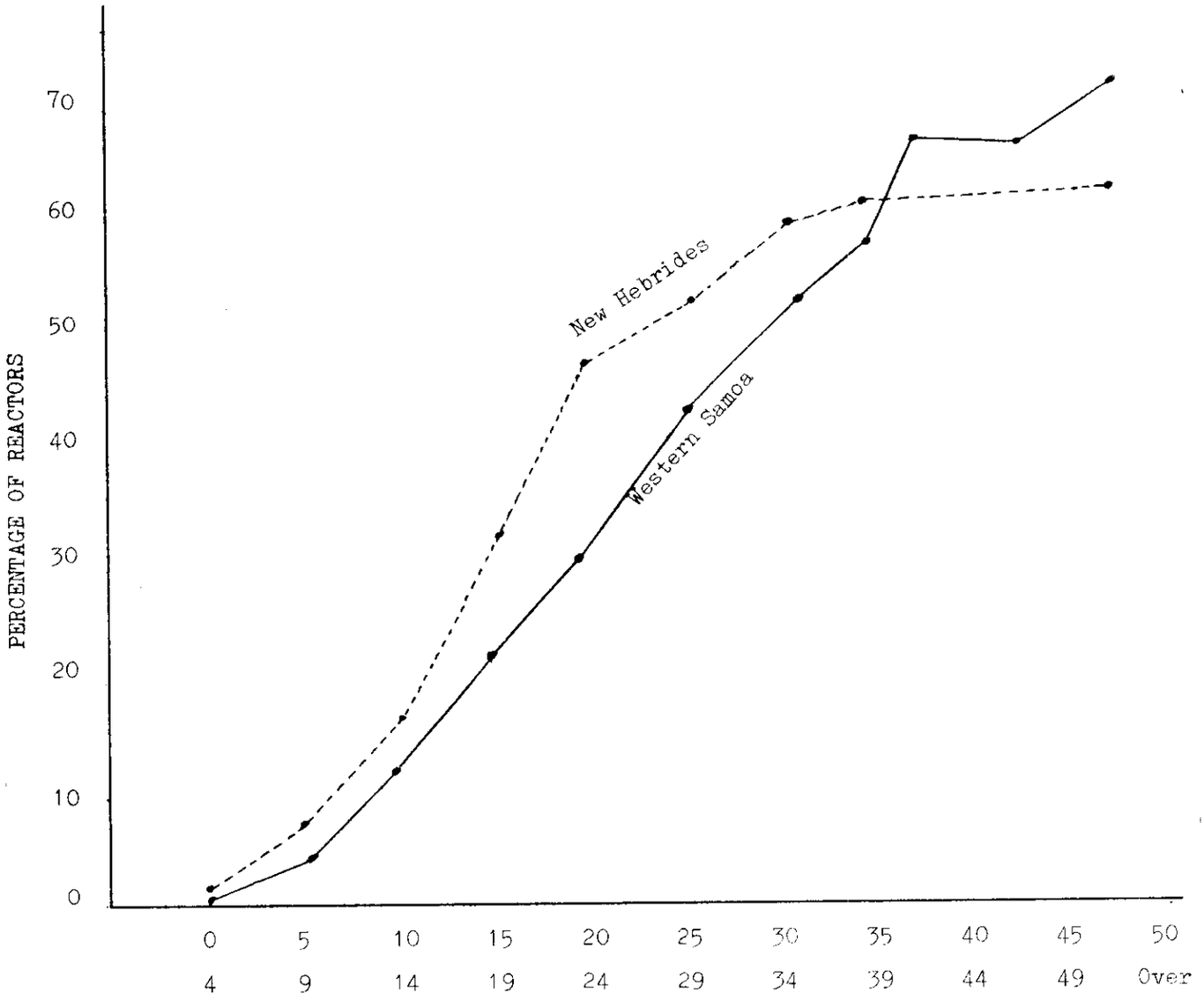
216. Treatment should be made as simple as possible and standardized, and directed especially towards the infectious cases. The regular follow-up of all cases should be an essential part of any control programme.

217. The isolation of patients in colonies should be strongly discouraged and the number of existing in-patients in such institutions should be reduced to the absolute minimum. However, alternative facilities for temporary hospital care for acute conditions are needed.

WHO/SPC REFRESHER COURSE ON TUBERCULOSIS AND LEPROSY
(Papeete, French Polynesia, 2 - 22 May 1974)

TABLE I - PREVALENCE OF TUBERCULIN REACTORS BY AGE IN WESTERN SAMOA AND NEW HEBRIDES, 1967-1968

(PPD RT 23 WITH TWEEN 1.T.U. $\geq$ 10mm)



Age Group	W.Samoa (1967)	New Hebrides (1968)
0-4	1.4	1.8
5-9	4.0	7.6
10-14	12.9	16.5
15-19	22.2	33.5
20-24	30.0	47.2
25-29	43.0	53.2
30-34	51.8	59.4
35-39	62.3	61.3
40-44	66.7	61.5
45-49	65.8	62.0
50 -	70.3	62.5
All ages	23.3	31.2

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TABLE II - NUMBER OF TUBERCULOSIS PATIENTS IN TREATMENT BY COUNTRY OR TERRITORY, 1973

Country or Territory	Estimated Population	Number of Patients in treatment			Ratio per 1000 population
		Hospital	Domiciliary	Total	
A. Samoa	28.834	5	45	50	1.7
B.S.I.P.	169.937	(Not available)			
Cook Islands	21.317	3	35	40	1.9
French Polynesia	119.168	12	250	262	2.2
Gilbert and Ellice Islands	57.960	12	425	437	7.5*
Guam	104.317	12	27	39	0.4
New Hebrides	91.000	(Not available)			
Papua New Guinea	2.579.000	900	2.200	3.100	1.2
Tonga	94.500	20	311	331	3.5
W. Samoa	152.741	17	267	284	1.9

* The high ratio may be attributed to the high proportion of "tuberculous lymphadenitis".

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TABLE III - NOTIFICATION OF TUBERCULOSIS
BY COUNTRY OR TERRITORY, 1973*

Country or Territory	Estimated Population	Number of Tuberculosis Patients Notified**	Ratio per 100.000 Population***
A. Samoa	29,084	26(?)	89.4
B.S.I.P.	169,937	365(?)	214.8
Cook Islands	21,317	19(?)	89.1
French Polynesia	119,168	179(132)	150.2
Gilbert and Ellice Islands	57,960	197(27)	339.9
Guam	104,317	39(8)	37.4
New Hebrides	91,000	203(77)	223.1
Papua New Guinea	2,579,000	2,050(528)	79.5
Tonga	94,500	85(48)	89.9
W. Samoa	152,741	84(28)	55.0

* Include all forms of tuberculosis

** The figures in parenthesis represent the number of bacteriologically confirmed pulmonary tuberculosis cases.

*** The ratios in terms of incidence are not comparable in view of differing situations in the various territories.

WHO/SPC REFRESHER COURSE ON TUBERCULOSIS AND LEPROSY
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TABLE IV - POPULATION, LAND AREA AND POPULATION DENSITY BY COUNTRY OR TERRITORY, 1973

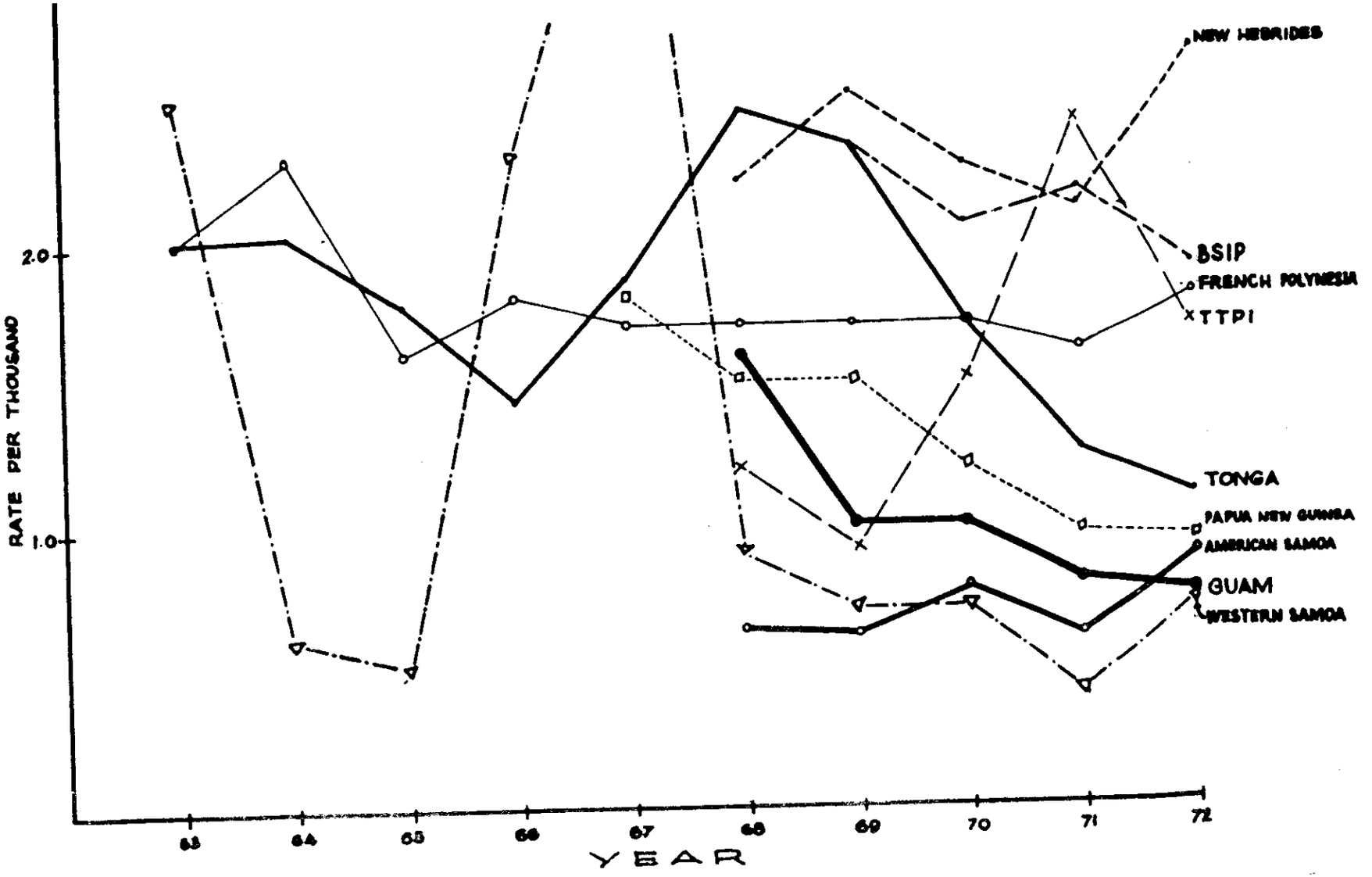
Country or Territory	Estimated Population	Land Area in sq.km	Density in persons per km^2
A. Samoa	28,834	197	146
B.S.I.P.	169,937	29,785	6
Cook Islands	21,317	234	91
Fiji	553,692	18,272	30
French Polynesia	119,168	4,000	30
Gilbert and Ellice Islands	57,960	886	65
Guam	104,317	549	190
New Hebrides	91,000	14,763	6
Papua New Guinea	2,579,000	461,691	6
Tonga	94,500	699	135
Truk	98,000	1,779	55
W. Samoa	152,741	2,842	54

TABLE V - ESTIMATED CRUDE BIRTH, DEATH, AND INFANT MORTALITY RATES BY COUNTRY OF TERRITORY, 1973

Country or Territory	Crude Birth Rate per 1000 pop.	Crude Death Rate per 1000 pop.	Crude Infant Mortality Rate per 1000 L.B.
A. Samoa	34.3	4.8	25.4
B.S.I.P.	40.0	13.0	60.0
Cook Islands	33.2	4.9	34.2
Fiji	30.0	5.0	21.5
French Polynesia	49.1 (1967)	9.9	54.0
Gilbert and Ellice Islands	40.0	15.5	39.0
Guam	31.0	4.1	23.1
New Hebrides	44.6	16.1	75.0
Tonga	27.4	3.1	9.2
W. Samoa	43.4	7.5	40.7

WHO/SPC REFRESHER COURSE ON TUBERCULOSIS AND LEPROSY
(Papeete, French Polynesia, 2 - 22 May 1974)

GRAPH I - NEWLY DISCOVERED TUBERCULOSIS PATIENTS PER THOUSAND POPULATION BY COUNTRY OR TERRITORY AND BY YEAR



WHO/SPC REFRESHER COURSE ON TUBERCULOSIS AND LEPROSY
(Papeete, French Polynesia, 2 - 22 May 1974)

GRAPH II - CUMULATIVE RATE OF BCG VACCINATION PER HUNDRED POPULATION.

POPULATION IN 1971 IS USED AS DENOMINATOR

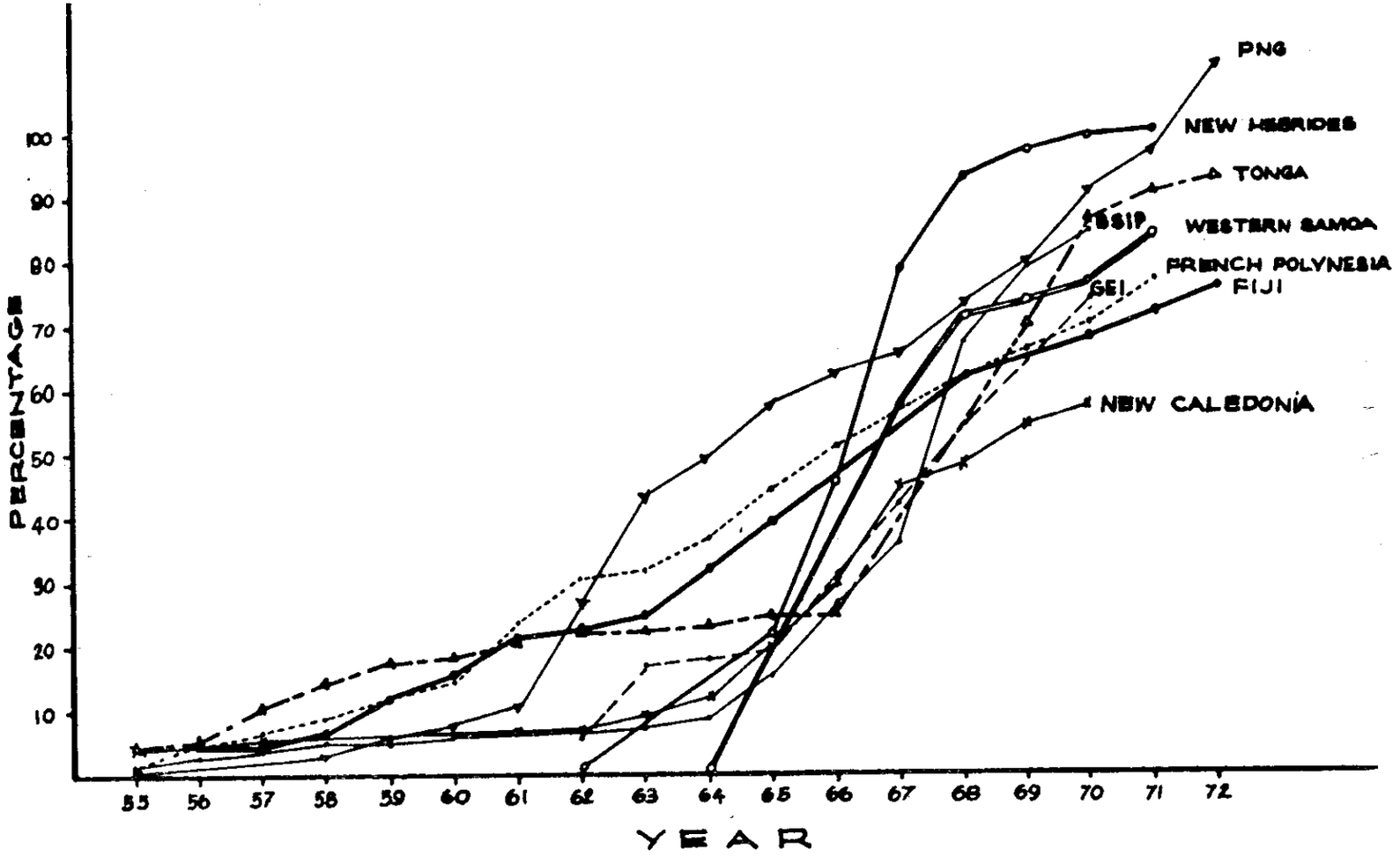


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TABLE VI - SOME INFORMATION ON THE LEPROSY PROBLEM IN THE SOUTH PACIFIC
(DATA RECORDED BY THE PARTICIPANTS)

Countries	Date	LEPROSY CASES									
		No. cases Active Register	%L	%B	%T	%I	%U	No. out of control	Rates 1000	No. of in-patients	No. of Institutions
American Samoa	1973	39	34	28	33	5		0	1.4		0
B.S.I.P.	1973	729	18.5	13	68	0.5		174	4.3	28	1
Cook Islands											
Fiji	1973	213	14	18	58	10		0	0.4	60	1
French Polynesia	1974	273	40	26	29	5			2.3	20	1
Gilbert and Ellice Islands	1973	97	57	11	32			0	1.7	17	
Guam	1974	28	71		25	4		0	0.3		0
New Hebrides	1973	396	18	35	37	9	1	261	4.4	7	1
Papua New Guinea	1974	24,000	28	10	50	12		6,000	10.0	1,100	12
Tonga											
Trust Territory of the Pacific Islands											
Western Samoa	1973	112	40		25		34		0.8	3	1

I : Lepromatous ; B : Borderline; T : Tuberculoid; I : Indeterminate; U : Unknown

ANNEX I

LIST OF PARTICIPANTS, OBSERVERS, CONSULTANTS RESOURCE PERSONS AND SECRETARIAT

I. PARTICIPANTS

Country of origin	Participant	Official designation
AMERICAN SAMOA	Dr Saipele Matagi	Medical Officer-in-Charge Tuberculosis and Leprosy LBJ Tropical Medical Center PAGO PAGO
BRITISH SOLOMON ISLANDS PROTECTORATE	Dr Benjamin Zeva	Medical Cfficer-in-Charge Buala Rural Hospital SANTA YSOBEL, Central District
COOK ISLANDS	Dr Manea T. Tamarua	Medical Officer of Health Ministry of Social Services RAROTONGA
FIJI	Dr Enele R. Karuru	Medical Superintendent (Leprosy) Twomey Memorial Hospital Tamavua SUVA
GILBERT AND ELLICE ISLANDS COLONY	Dr Tawita Tira	Communicable Diseases Control Officer Medical Department Bikenibeu TARAWA
GUAM	Dr Abdiel M. Angeles	Chief, Communicable Disease Control Department of Public Health and Social Services P.O. Box 2816 AGANA
NEW HEBRIDES	Dr Michel Bray	Medical Officer Lenakel Hospital TANNA
FRENCH POLYNESIA	M. Yves Dauphin	Agent de lutte contre la Tuberculose Centre de lutte contre la Tuberculose B.P. 30 PAPEETE, Tahiti

Country of Origin	Participant	Official designation
PAPUA NEW GUINEA	Dr P. Kamo	Medical Officer Department of Public Health P.O. Box 2084 KONEDOBU
TONGA	Dr Taniela Lutui	Acting Medical Officer-in-Charge Communicable Diseases Vaiola Hospital NUKU'ALOFA
TRUST TERRITORY OF THE PACIFIC ISLANDS	Dr Akitekit Ymao	Medical Officer Truk Hospital, Moen Truk District (TTPI) TRUK
WESTERN SAMOA	Dr Vaiouga L. Levi	Medical Officer Chest Clinic and Tuberculosis Ward Health Department P.O. Box 192 APIA

II. OBSERVERS

FRENCH POLYNESIA	Mme M.C. Duprat	Educatrice sanitaire Service de Santé de la Polynésie française PAPEETE, Tahiti.
	Mlle J. Yeung	Assistante Sociale au Centre de Lutte contre la Tuberculose Service des Endémies B.P. 30 PAPEETE, Tahiti.
	M. M. Thibaudet	Agent de lutte au Centre de Lutte contre la Tuberculose Service des Endémies B.P. 30 PAPEETE, Tahiti.

III. CONSULTANTS

Tuberculosis	Dr Vernon N. Houk	Deputy Chief Tuberculosis Control Branch Bureau of State Services Center for Disease Control ATLANTA, Georgia, U.S.A.
	Dr H. Coudreau	Directeur général Comité national contre la Tuberculose et les Maladies respiratoires 66, Boulevard St Michel et 3, rue Auguste Comte 75006 PARIS, France
Leprosy	Dr Luiz Marino-Bechelli	Professor of Dermatology Faculdade de Medicina 14100 RIBEIRAO PRETO (SP) Brazil
	Dr J. Languillon	Directeur Institut de Léprologie appliquée B.P. 11023 CD Annexe DAKAR, Sénégal

IV. RESOURCE PERSONNEL

Tuberculosis	Dr J.A.L. Halet	WHO Medical Officer Leader, Regional Tuberculosis Advisory Team MANILA, Philippines
	Dr Nak-Chin-Chung	WHO Medical Officer Tuberculosis Control Project APIA, Western Samoa
Leprosy	Dr D.A. Russell	Senior Specialist Medical Officer (Leprosy) Department of Public Health P.O. Box 2084 KONEDOBU, Papua New Guinea
	Dr Luis Lopez-Bravo	WHO Medical Officer Leprosy Control Project PORT-VILA, New Hebrides
	Dr M. Merlin	Médecin itinérant du service des Endémies B.P. 30 PAPEETE, Tahiti

V. SECRETARIAT

Dr G. Loison	Programme Director (Health) South Pacific Commission P.O. Box D5 NOUMEA CEDEX, New Caledonia
Dr J.C. Tao	Regional Adviser on Chronic Diseases WHO Regional Office for the Western Pacific P.O. Box 2932 12115 MANILA, Philippines
Dr P. Leproux	Médecin Chef du Centre de Lutte contre la Tuberculose Service des Endémies B.P. 30 PAPEETE, Tahiti
Mlle S. Exbroyat	Conference Officer South Pacific Commission NOUMEA, New Caledonia
Dr C. Zémor	Interpreter 14, rue Pestalozzi 75005 PARIS, France
Mrs A. Robson	Interpreter 8 Adderstone Avenue NORTH SYDNEY, 2060, Australia
Mr G. Azariah	Interpreter South Pacific Commission NOUMEA, New Caledonia
M. P. Blanchet	Translator South Pacific Commission NOUMEA, New Caledonia
Mme H. Claude	Stenographer South Pacific Commission NOUMEA, New Caledonia

ANNEX II

PROGRAMME OF THE COURSE

Thursday, 2 May	
0800 hours	Registration
0900 "	Opening Ceremony
1030 "	Introduction to the Course Dr G. Loison Dr J.C. Tao Dr P. Leproux
1130 "	Lunch
1300 "	Pathogenesis and Transmission of Tuberculosis: Classification of Tuberculosis - Dr Houk
Friday, 3 May	
0800 hours	Epidemiology of Tuberculosis - Dr Houk
1130 "	Lunch
1300 "	Steering Committee
1330 "	Country reports - Participants
Saturday, 4 May	
All day	Excursion trip to Moorea
Monday, 6 May	
0800 hours	Country reports (continued) - Participants
0900 "	Tuberculosis in Pacific Island Countries and Territories - Dr Tao
0920 "	Conclusion : Epidemiology - Dr Houk
1030 "	Identification of sources of infection - Dr Coudreau
1130 "	Lunch
1300 "	Steering Committee
1330 "	Radiological diagnosis of Tuberculosis - Dr Leproux
1400 "	General discussion on tuberculosis case-finding - Dr Coudreau - Dr Leproux

Tuesday, 7 May

0800 hours	Bacteriology on Mycobacterium tuberculosis - Dr Seurat
1030 "	Movie on Laboratory techniques - Dr Houk
1130 "	Lunch
1300 "	Visit to Mamao Hospital Laboratories, Sputum collection - Dr Halet
1315 "	Practical exercise on microscopy of sputum for Tuberculosis - Dr Seurat - Dr Kaeuffer

Wednesday, 8 May

0800 hours	Chemotherapy of tuberculosis - Dr Houk Selection of cases for chemotherapy
1030 "	Selection of drug regimens Problem of drug resistance
1130 "	Lunch
1300 "	Steering Committee
1330 "	Institution versus ambulatory treatment

Thursday, 9 May

0800 hours	Supervision of domicilary chemotherapy service
1030 "	Assessment of regularity of medication and treatment results
1130 "	Lunch
1300 "	General discussion on tuberculosis chemotherapy - Dr Houk
1500 "	Tuberculin testing - Dr Kaeuffer - Dr Houk

Friday, 10 May

0800 hours	Practice on tuberculin reading and BCG vaccination - Dr Leproux - M. Thibaudet
1030 "	Reporting and analysis of tuberculin testing results - Dr Tao
1130 "	Lunch
1300 "	Steering Committee
1330 "	Prevention of tuberculosis - Dr Coudreau
1400 "	BCG vaccination

Saturday, 11 May

0800 hours	BCG vaccination (continued) - Dr Coudreau
1030 "	Chemoprophylaxis - Dr Houk

Monday, 13 May

0800 hours	Principles of tuberculosis control - Dr Tao
1030 "	Planning of national tuberculosis programme
1130 "	Lunch
1300 "	Steering Committee
1330 "	Implementation of national tuberculosis programme - Dr Tao

Tuesday, 14 May

0800 hours	Survey on tuberculosis in French Polynesia - Mme Duprat
0900 "	Health education - Dr Loison
1045 "	Community participation - Dr Coudreau
1130 "	Lunch
1300 "	Evaluation of national tuberculosis programme - Dr Tao

Wednesday, 15 May

0800 hours	Free communication
1030 "	General summing up
1300	Magnitude of the Leprosy Problem in the world - Dr Bechelli
	Leprosy problem and programmes in the South Pacific - Participants
1500 "	Leprosy problem and programmes in the South Pacific - Participants

Thursday, 16 May

0800 hours	Bacteriology of Myco. leprae - Dr Languillon
0900 "	Some aspects of the immunology of leprosy - Dr Bechelli
1015 "	Pathology - Dr Languillon
1100 "	Diagnosis - Dr Bechelli
1130 "	Lunch
1300 "	Diagnosis of skin lesions - Dr Bechelli
1400 "	Diagnosis of neural lesions - Dr Languillon
1515 "	Classification in field projects - Dr Bechelli Dr Russel

Friday, 17 May

0800 hours	Disabilities and their classification	- Dr Languillon
0900 "	Treatment: anti-leprosy drugs	- Dr Languillon
1015 "	Treatment of reaction and of eyes nerve, foot and hand lesions	- Dr Languillon
1130 "	Lunch	
1300 "	Bacterial negativity and reactivation (relapse) of lepromatous patients under sulfone treatment	- Dr Bechelli
1400 "	Epidemiology (continued)	- Dr Bechelli
1515 "	" (continued)	"

Monday, 20 May

0800 hours	Rehabilitation (education, vocational training, prevention of disabilities by simple methods, surgical and orthopaedic rehabilitation)	- Dr Languillon
0900 "	Health education	- Dr Bravo-Lopez
0945 "	Social and legal measures	- Dr Bravo-Lopez
1015 "	Training	- Dr Russell
1130 "	Lunch	
1300 "	Administrative measures (Management) Project formulation Project organization	- Dr Bechelli
1515 "	Evaluation	- Dr Bechelli

Tuesday, 21 May

0800 hours	Pilot (test) areas	- Dr Bechelli
0900 "	Operational research	- Dr Bechelli
1000 "	Collection of data. System of leprosy statistics. Reporting Terminology	- Dr Bechelli
1130 "	Lunch	
1300 "	Prospects of controlling leprosy	- Dr Bechelli - Dr Languillon - Dr Russell - Dr Bravo-Lopez
1500 "	Free communications	
1545 "	Visit to Orofara Leprosarium	

Wednesday, 22 May

0800 hours	Visit to the Medical Research Institute "Louis Malardé" Demonstration of early leprosy patients; lepromin and histamin tests.	
1000 "	Final conclusions	
1130 "	Closing Ceremony	

ANNEX III

EVALUATION

A questionnaire on evaluation was distributed at the end of the Course. All participants completed the questionnaire, with the exception of French Polynesia's participant who had already left Papeete to resume his work on an outer island. (A specimen questionnaire is attached.)

1. Regarding the balance of the theoretical and practical parts on the Course:

   There were 7 positive responses and 4 negatives, one of which was for the leprosy part only.

2. Regarding the usefulness of the lectures, general discussions and demonstrations, the general reactions seemed to be very favourable.

	Essential	Useful	Useless
Lectures	6	4	1
General discussions	6	5	0
Demonstrations	3	8	0

3. Regarding the presentation of various subjects on tuberculosis the majority of the participants appeared to be very satisfied. One, however, thought that the presentation on case-finding was unsatisfactory.

	Well	Average	Unsatisfactory
Pathogenesis and transmission	8	2	0
Epidemiology	8	2	0
Case-finding	9	0	1
Chemotherapy	6	4	0
Prevention	7	3	0
Tuberculosis control	8	2	0

4. The views of the participants regarding the presentation of the various aspects of leprosy were very variable.

	Well	Average	Unsatisfactory
Bacteriology	4	5	2
Immunology	3	7	1
Diagnosis	4	5	2
Treatment	5	5	1
Epidemiology	5	4	2
Prevention	5	4	2
Leprosy control	5	3	3

5. Very few participants completed the section of the questionnaire concerning the need to extend or reduce certain subjects.

	To be extended	To be reduced
Tuberculosis		
Pathogenesis and transmission	2	0
Epidemiology	3	0
Case-finding	1	1
Chemotherapy	2	1
Prevention	1	1
Tuberculosis control	1	0
Leprosy		
Bacteriology	3	2
Immunology	4	2
Diagnosis	5	0
Treatment	3	1
Epidemiology	3	1
Prevention	3	1
Leprosy control	3	1

6. Nine participants considered that they had sufficient contact with resource personnel. Two were not satisfied.

7. Eight participants thought that sufficient free time was given for study; three did not think so.

8. Eight participants had no language difficulty but three had.

9. Five participants considered the length of the Course appropriate; four considered it to be too long, and two, too short.

10. All participants considered that the Course should be repeated. Five suggested an interval of 3 years; three an interval of 5 years; and 2 an interval of 2 years.

11. The stipend paid was considered appropriate by ten and too low by only one.

12. Nine considered the social and cultural activities satisfactory but two did not.

13. All participants considered the arrangements on their arrival to be satisfactory.

14. Five considered the accommodation provided good; four considered it to be satisfactory and two, unsatisfactory.

EVALUATION OF THE WHO/SPC REFRESHER COURSE ON TUBERCULOSIS AND LEPROSY

1. Do you think that the theoretical and practical parts on the Course are well-balanced?

Yes	No
☐	☐

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

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

	Essentiel	Useful	Not so useful
Lectures	☐	☐	☐
General discussions	☐	☐	☐
Demonstrations	☐	☐	☐

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

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

Subject	Well	Average	Unsatisfactory
Tuberculosis			
Pathogenesis and transmission	☐	☐	☐
Epidemiology	☐	☐	☐
Case-finding	☐	☐	☐
Chemotherapy	☐	☐	☐
Prevention	☐	☐	☐
Tuberculosis control	☐	☐	☐

Subject	Well	Useful	Unsatisfactory
Leprosy			
Bacteriology	☐	☐	☐
Immunology	☐	☐	☐
Diagnosis	☐	☐	☐
Treatment	☐	☐	☐
Epidemiology	☐	☐	☐
Prevention	☐	☐	☐
Leprosy control	☐	☐	☐

Were any of these subjects presented in an over-academic or over-simplified way? If so, please state which, commenting overleaf.

4. Which of the different subjects, to your mind, should be extended and which should be reduced in future courses :

	To be extended	To be reduced
Tuberculosis		
Pathogenesis and transmission	☐	☐
Epidemiology	☐	☐
Case-finding	☐	☐
Chemotherapy	☐	☐
Prevention	☐	☐
Tuberculosis control	☐	☐
Leprosy		
Bacteriology	☐	☐
Immunology	☐	☐
Diagnosis	☐	☐
Treatment	☐	☐
Epidemiology	☐	☐
Prevention	☐	☐
Leprosy control	☐	☐

5. Did you have sufficient personal contacts with the resource personnel of the Course?

Yes ☐ No ☐

6. Were you given enough free time for work on your own, such as reading of documents?

Yes ☐ No ☐

7. Did you have any language difficulties?

Yes ☐ No ☐

If so, which?

8. Was the length of the Course:

Too short ☐ Appropriate ☐ Too long ☐

9. Should this Course be repeated in future:

Yes ☐ No ☐

If yes, at what interval?

10. Was the Stipend:

Appropriate ☐ Too low ☐

11. Were the social and cultural facilities offered by the organizers of the Course satisfactory:

Yes ☐ No ☐

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

12. Was the reception on your arrival satisfactory?

Yes ☐ No ☐

If not, what was it?

13. Was the accommodation:

Good	Satisfactory	Unsatisfactory
☐	☐	☐

If "unsatisfactory", please comment overleaf.

14. 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_____

_____
(Signature)