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EXPERT COMMITTEE ON
TUBERCULOSIS

Seventh Report

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WORLD HEALTH ORGANIZATION

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EXPERT COMMITTEE ON TUBERCULOSIS

Geneva, 28 September - 3 October 1959

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EXPERT COMMITTEE ON TUBERCULOSIS

Seventh Report *

The Expert Committee on Tuberculosis met in Geneva from 28 September to 3 October 1959. The last meeting of the Expert Committee on Tuberculosis to cover the whole field of tuberculosis was held in September 1950, the only subsequent meeting, held in November-December 1953, having been devoted entirely to vaccination against tuberculosis.

The meeting was opened by Dr P. M. Kaul, Assistant Director-General, acting for the Director-General of the World Health Organization. After welcoming the members of the Committee, Dr Kaul referred to the developments which have taken place since 1950. He pointed out that these developments made it possible to "visualize a tuberculosis programme in which the control measures are applied on the community-wide scale necessary for a public health programme for control of an infectious disease".

The Committee was asked to review the WHO programme for the control of tuberculosis and to advise on any changes which it might consider suitable.

1. INTRODUCTION

The Committee was aware that many factors contribute to the control of tuberculosis in any country, particularly those associated with the improvement of the general standard of living. However, the Committee was of the opinion that specific control measures have been effective, and are becoming increasingly influential; therefore it confined its considerations and recommendations largely to such specific measures.

* The following is an extract from the resolution adopted by the Executive Board at its twenty-fifth session:

The Executive Board

1. NOTES the seventh report of the Expert Committee on Tuberculosis;
2. THANKS the members of the Committee for their work; and
3. AUTHORIZES publication of the report...

(Resolution EB25.R6, *Off. Rec. Wld Hlth Org.*, 1960, 99, 6)

While in the past the emphasis in tuberculosis control programmes has, in many countries, been placed mainly on the care of individual tuberculous patients in hospitals, sanatoria and clinics, it is now possible to extend such programmes on a community-wide basis.

The programme suggested by WHO underlines the importance of the community or public health approach. Developments in the last ten years have made it possible to extend the control programme to countries which were not previously able to launch an effective attack against tuberculosis. This is true largely because of the introduction of effective anti-tuberculosis drugs.

This emphasis on the public health approach, however, has given rise to many problems which were studied by the Committee and which will be discussed in the body of this report.

The Committee emphasized that, with the encouraging progress made in the control of malaria, tuberculosis is now generally conceded to be the most important specific communicable disease in the world as a whole, and its control should receive priority and emphasis both by WHO and by governments.

2. MEASUREMENT OF THE EXTENT OF THE TUBERCULOSIS PROBLEM

2.1 Mortality and morbidity rates

Data on tuberculosis mortality are still considered to be of value for international comparisons provided they relate to countries having adequate death registration. Morbidity data, on the other hand, are not suitable for comparisons between countries; they may, however, be useful for following the trend of tuberculosis within a country or part of a country.

2.2 Prevalence surveys

In many parts of the world and particularly in those countries where the tuberculosis problem is greatest, no reliable data are available to indicate the extent of the problem; in such countries, therefore, prevalence surveys are required, both for the planning of a control programme and for periodically determining the trend of tuberculosis and the effectiveness of the programme. In such surveys it is considered essential (1) to determine what will be an adequate, randomly-selected sample of the population, (2) to employ standard techniques in examining the persons so selected, and (3) to ensure that so far as possible all the persons selected actually undergo the examinations. The Committee congratulated WHO on having established this procedure of prevalence surveys to permit the

formulation of a control programme adapted to the actual needs of the area concerned and to evaluate periodically the programme established.

For purposes of international comparison, the most reliable index of the extent of the tuberculosis problem obtainable from tuberculosis prevalence surveys is probably the prevalence of persons excreting tubercle bacilli, the next best index being the prevalence of significant shadows in chest X-ray films. The prevalence of reactors to tuberculin is also of great importance. However, in some countries or parts of some countries, the value of the age-specific percentage of reactors to tuberculin is diminished, partly because of a high prevalence of non-specific reactors, and partly because in many of these countries the population has been included in mass BCG-vaccination programmes; nevertheless, in these countries tuberculin testing of young children might still provide a satisfactory index.

The Committee felt that tuberculin testing surveys are of special value in following the trend of tuberculosis in countries with a low prevalence of the disease. Even when BCG vaccination has been used extensively in such countries, it is usually possible to make tuberculin surveys in young children who have not been included as yet in BCG-vaccination programmes.

3. FACTORS INFLUENCING THE EPIDEMIOLOGICAL BEHAVIOUR OF TUBERCULOSIS

3.1 Level of prevalence and incidence

The epidemiology of tuberculosis varies considerably in different countries. It is important for countries to make local epidemiological studies to determine as precisely as possible in which population groups the tuberculosis problem is concentrated and how the disease is being spread in the areas concerned. For example, in some areas household exposure seems to be very important in the spread of the disease while in others it does not seem to be of greater significance than other types of exposure.

3.2 Extra-human sources of infection

The Committee agreed that bovine tuberculosis is probably not of great importance at present because in most parts of the world milk is routinely boiled before consumption, and in the other areas pasteurization of milk and control of bovine tuberculous infection have been put into extensive practice. However, in countries where tuberculosis among cattle is a problem, it is also a menace to man, and in these countries complete control of tuberculosis cannot be achieved unless attention is also paid to the reduction, or preferably eradication, of tuberculosis in cattle. In some areas, studies to determine the possible role of tuberculosis in other animals as a source of infection for man are indicated.

4. METHODS OF EXAMINATION FOR PULMONARY TUBERCULOSIS

4.1 Tuberculin testing

One of the most valuable tools in the tuberculosis control programme is the tuberculin test. In spite of some relatively minor problems which still need to be clarified, the tuberculin test is one of the best understood and most specific diagnostic skin tests, and there is every indication that as progress is made in the control of tuberculosis, the tuberculin test is becoming increasingly valuable. The Committee believed that preference should be given to the intracutaneous tuberculin test (Mantoux), using a properly administered standard dose of a well-standardized product, and making certain that the reaction is properly read.

The Committee discussed the reading of Mantoux tests performed according to these specifications. In the sixth report of the Expert Committee on Tuberculosis,¹ it was recommended in connexion with the selection of individuals for vaccination with BCG that "... a single Mantoux test of 5 TU continue to be used, and that the arbitrary definition of a tuberculin reactor continue to be based on the presence of an induration of 5 mm or more in diameter at the end of three days". Since that time further research has made it increasingly clear that in some areas, particularly in or near the tropics, reactions to the tuberculin test are not infrequently obtained in persons who appear from other evidence not to be infected with *Mycobacterium tuberculosis*. Fortunately, most of these reactions are less than 5 mm in diameter and hence are called "negative", but some do attain larger diameters. In some areas, the number of apparently non-specific reactions exceeding 5 mm in diameter is sufficiently high to result in a significantly exaggerated estimate of the prevalence of tuberculous infection if a diameter of 5 mm or more is used as the criterion. It is rare, however, for a reaction of 10 mm or more to be non-specific.

Thus, it is difficult to designate any one size of induration to a standard tuberculin test which should be universally considered as the criterion of a "tuberculin reactor" as opposed to a "non-reactor".

The Committee recommended that in performing a tuberculin test not only should a standard dose of a standardized tuberculin be injected intracutaneously, but the resulting reaction when read three days later should be recorded and reported in millimetres according to its largest transverse diameter, rather than merely as "positive" or "negative" (or "reactor" or "non-reactor"). Such reporting will permit comparison of the results from one area with those from another, whereas mere record-

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1954, 88, 7

ings of "positive" or "negative" will give figures which cannot be used for comparisons because of the possibility that the criterion varies from one area to another.

Since for practical purposes, however, the local tuberculosis control personnel are forced to decide as reliably as possible who is infected with *Myc. tuberculosis* and who is not, certain more or less arbitrary criteria must be agreed upon as to what minimum reaction size is to be interpreted as indicating tuberculous infection. Actually, such criteria may quite properly vary from one area to another, and may with good reason be set at different diameters, even in the same community, according to the purpose for which the tuberculin test is given. Thus, in an area in which reactions of less than 5 mm in diameter are common—probably indicating the presence of non-specific infections producing reactions to the tuberculin test—the criterion for a "positive" reaction might be set at 10 mm or more for the purpose of determining who should be excluded from BCG vaccination, since it is known that even if a person with a smaller reaction is actually infected, it will do no harm to give him BCG vaccination; the 10-mm minimum would enable the advantage of BCG vaccination to be given to as many individuals as possible. However, if in the same community the point at issue is the diagnosis of suspected tuberculous disease in a given person, rather than the criterion for BCG vaccination, a reaction of only 5 mm might be considered sufficient to require initiation of as careful a clinical and laboratory evaluation as practicable to determine whether or not the individual concerned actually has tuberculous disease.

Nevertheless, the Committee held that in areas where small reactions are infrequent, the criterion for a "tuberculin reactor" recommended in its sixth report¹—namely, a reaction of 5 mm or more in diameter—may still be used to separate the tuberculous infected from the non-infected, regardless of whether the test is administered for the purpose of selecting individuals for BCG vaccination or for some other purpose. However, with regard to areas where small reactions are common, it can only be stated (1) that a reaction of less than 5 mm indicates in all probability that the person is *not* infected with *Myc. tuberculosis*; (2) that a reaction of 10 mm or more indicates in all probability that the person *is* so infected; and (3) that a reaction measuring 5-9 mm indicates that the person may or may not be infected, and if precise determination of infection is important, a careful clinical and laboratory evaluation should be made of the person concerned. (It goes without saying that a person with a reaction of 10 mm or more in diameter should be examined carefully and periodically for the presence or development of tuberculous disease.)

Interesting research is continuing on this problem and there is promise that, through the use of more than one antigen or through some other

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1954, **88**, 7

device, it may be possible in the not-too-distant future to determine more precisely in all instances the actual presence of infection with *Mycobacterium tuberculosis*; once this stage has been reached, the formulation of still more helpful recommendations can be considered.

4.2 X-ray examination

The Committee felt strongly that chest X-ray examination by radiophotography or radiography is an extremely valuable tool in tuberculosis control and that the amount of radiation from properly constructed and properly operated machines used for such purposes is negligible compared with the benefits when chest X-ray examination is indicated. Nevertheless, the Committee advocated that every possible effort should be made to abolish all unnecessary radiation; it believed that fluoroscopy should not be used as a screening procedure, not only because of the greatly increased degree of radiation but also because it does not provide a permanent record for comparison with subsequent X-ray films. Whether or not tuberculin testing should precede X-ray examination of the chest in various population groups to reduce exposure to radiation would depend on local circumstances (i.e., the prevalence of tuberculous infection and disease) and therefore should be determined locally; but the Committee concurred with the general view that the examination of children in countries where the yield of cases is known to be low in this age-group should be confined to those first shown to have been naturally infected. The Committee felt that it was outside its competence to give specifications for X-ray apparatus and the technique to be used to eliminate unnecessary radiation; it hoped that such specifications would be formulated by the International Commission on Radiological Protection.

The Committee was aware that many difficulties are encountered, particularly in the economically under-developed countries, owing to lack of X-ray apparatus which is sufficiently sturdy, sufficiently portable or mobile, and sufficiently simple to operate and maintain. It applauded the efforts of WHO to stimulate manufacturers of X-ray apparatus to produce apparatus more suited to the requirements of such countries than that which is at present available. The Committee also stressed the need for adequate servicing facilities for such X-ray apparatus. It recommended that attached to the national tuberculosis programme there should be a sufficient number of X-ray engineers not only to take care of the supplies for the apparatus and its servicing and maintenance, but also to instruct the technicians in the handling of the apparatus.

The Committee felt that a standardized film and apparatus were desirable for radiophotography, both for use in clinics and for mass examinations. It recommended that the 70-mm mirror-optics camera be used.

The Committee discussed the reading of chest X-ray films, and recommended that all films should be read independently by two qualified persons.

4.3 Bacteriological examination

Examination of sputum for tubercle bacilli by direct microscopy is the most practical method at present in many countries. This method is relatively reliable, but it has the obvious disadvantage of being less sensitive than examination by culture. The present techniques for culture of tubercle bacilli are not sufficiently simple, however, to be suitable for use on a mass scale. Better media are needed, especially for the detection of atypical and attenuated strains, as well as effective methods for eliminating contaminating organisms—a problem of particular importance in tropical countries. It is also important to develop methods by which pathological specimens containing tubercle bacilli can be transported over long distances without loss of cultivability.

The Committee was aware of the increased recognition of atypical "tubercle bacilli", but felt that more research was necessary before the importance of these bacilli to the tuberculosis control programme could be determined.

The Committee noted that WHO is actively engaged in research on these problems and recommended that this research be continued.

4.4 Other methods of examination

The Committee felt that it would be very helpful to have available a practical serological test for determining the presence of active tuberculous disease. Present research along this line was noted with interest.

5. PREVENTIVE MEASURES

5.1 BCG vaccination

The Committee had before it a document entitled *Review of BCG vaccination programmes: preliminary report by the Director-General*.¹ This was discussed and the Committee agreed with the general conclusions that had been reached. These conclusions were restated by the Committee in the following slightly modified form:

Existing knowledge and experience show that BCG vaccination can give a considerable degree of protection against tuberculosis, that the inconveniences and risks associated with the vaccination are insignificant, and that it can be applied on a mass scale at costs and with personnel

¹ *Off. Rec. Wld Hlth Org.*, 1959, 96, 19

which any country can afford and in a way which is acceptable to the population. It is therefore the considered opinion of the Committee that BCG vaccination should have an important place in and form an integral part of the tuberculosis programme in most countries. The exact place for BCG vaccination in this programme will vary in different countries, according to the epidemiological situation and the existing system and facilities for tuberculosis control. When the prevalence of tuberculosis in a country has decreased to a sufficiently low level, coverage of the whole population is not necessary, and BCG vaccination may be confined to selected population groups which are particularly exposed to infection.

5.2 Chemoprophylaxis

The Committee agreed to the following terminology in relation to chemoprophylaxis :

primary chemoprophylaxis—the use of anti-tuberculosis drugs in those not infected, i.e., non-reactors to tuberculin ;

secondary chemoprophylaxis—the use of anti-tuberculosis drugs in those who are infected, as demonstrated by a significant reaction to the tuberculin test, but who have no pathognomonic signs or symptoms of tuberculous disease.

The Committee was not prepared to recommend primary chemoprophylaxis since it felt that for tuberculin-negative persons likely to be exposed to infection, the prophylactic measure of choice is BCG vaccination.

With regard to secondary chemoprophylaxis the Committee endorsed the recommendation made by the WHO Study Group on Chemotherapy and Chemoprophylaxis in Tuberculosis Control.¹ This recommendation stated provisionally that in areas of high tuberculosis prevalence, INH should be administered to cutaneous reactors to tuberculin who have not recently received BCG and who are the associates of infectious cases of tuberculosis.

The Committee further recommended that secondary chemoprophylaxis be given to young children (particularly those under four years of age) who are found to be reactors to the tuberculin test and who have not recently been vaccinated with BCG.

5.3 Other measures

The Committee stressed that traditional preventive measures (e.g., communicable disease isolation techniques) have not lost their importance and should be applied wherever practicable.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1957, 141, 7

6. TREATMENT

6.1 Anti-tuberculosis drugs

The Committee realized that in all parts of the world, the great problem in tuberculosis control is that of extending therapy to all tuberculous patients. With a view to increasing more rapidly the numbers under treatment in all countries, the Committee made recommendations concerning the use of anti-tuberculosis drugs and the application of chemotherapy, not only to patients under care in institutions but also on a domiciliary basis.

The Committee believed that the statement on a minimum programme of chemotherapy formulated by the WHO Study Group on Chemotherapy and Chemoprophylaxis in Tuberculosis Control¹ should be endorsed for the time being. (The pertinent paragraphs of this statement are quoted in the Annex on page 18.)

The Committee noted that drug resistance, especially isoniazid resistance, has not proved to be the public health problem originally feared.

The Committee noted the need for international standards for the definition and determination of drug resistance which will permit comparisons to be made from one area to another, and recommended that the World Health Organization take appropriate steps to establish such standards.

The Committee recommended drug treatment (in the form prescribed by the above-mentioned WHO Study Group, see Annex) of persons found upon chest X-ray examination to have shadows likely to indicate tuberculous disease, even though tubercle bacilli had not been demonstrated in their sputum. The Committee emphasized that this recommendation relates to situations in which it is impracticable to submit such persons to a detailed clinical investigation; it is made in the light of recent research which indicates that persons whose chest X-ray films show shadows indicative of tuberculous disease are much more likely to develop active tuberculosis than those whose chest X-ray films do not show such shadows.

6.2 Institutional and domiciliary treatment

The Committee agreed that in countries with a large tuberculosis problem and with limited resources, it was advisable to use such resources initially to promote the community-wide tuberculosis control programmes through domiciliary use of anti-tuberculosis drugs rather than primarily for hospital construction. However, in areas where tuberculosis beds

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1957, **141**, 4

are readily available it was felt that all measures likely to assist recovery and protect the public should be utilized, such measures including hospitalization of the patient, at least for a preliminary period to allow clinical evaluation; education of the patient concerning his disease; and segregation of the patient from the community pending his being rendered non-infectious through appropriate therapy. The Committee was of the opinion that new hospitals for tuberculous patients should be situated near the centres of population they are to serve and near the medical and surgical facilities of the community.

The Committee noted the results of current research, including a controlled comparison of institutional and domiciliary treatment in pulmonary tuberculosis in India which showed, at the end of a year's treatment, no significant difference between the clinical progress of hospitalized patients and that of patients treated at home.¹ It was felt, however, that further observations were needed before the Committee could make any specific recommendation with regard to whether or not institutional treatment is necessary.

6.3 Collapse and resectional therapy

The Committee noted the marked reduction in the use of collapse therapy and other surgical procedures in the treatment of pulmonary tuberculosis. In the great majority of cases adequate drug therapy eliminates the necessity for surgical intervention but in certain instances surgery may be indicated.

7. CASE-FINDING

7.1 Static clinics and mobile units

In countries with a well-developed tuberculosis control system, static clinics are more important than mobile units and should serve as centres for diagnosis and also for treatment of diagnosed cases. Attached to these clinics should be mobile units to conduct group examinations.

It has been found possible and useful at a certain stage of tuberculosis control to conduct community-wide mass X-ray case-finding programmes using such methods and resources as permit a very high and rapid coverage of the adult population. These programmes should be followed by more selective case-finding programmes in which special attention is given to the examination of groups in which prevalence is known to be high (high-prevalence groups), groups in which there is more than average risk of infection (high-risk groups), and certain professional and other groups

¹ *Bull. Wld Hlth Org.*, 1959, 21, 51

whose members constitute a special danger to others should they develop infectious tuberculosis (danger groups). The Committee agreed that even in these selective programmes it is unnecessary to repeat the examination of a given group annually once the great majority of that group has been covered. Re-examination about every three years would seem sufficient, except for certain special high-risk and danger groups.

In countries where the tuberculosis problem is serious and tuberculosis control is in its early stages, the setting up of static clinics must be considered the first step. These will be needed to examine the large numbers of persons suspected of being tuberculous and their contacts, and to treat those who are tuberculous. As soon as possible, mobile units should be attached to these static clinics for the purpose of carrying out community-wide case-finding programmes in the area which the clinic was designed to serve, starting with the communities where preliminary surveys have shown the highest prevalence of tuberculosis.

8. ORGANIZATION OF A TUBERCULOSIS PROGRAMME

The Committee discussed the organization of national tuberculosis programmes and made the following statements and recommendations :

1. The Committee held that tuberculosis is a community problem and that tuberculosis control must therefore be considered in relation to other problems in the community and must be planned and organized as part of the general public health programme. The Committee wished to add the recommendation that the official health department appoint a qualified director to be in charge of the tuberculosis control programme.

2. The Committee recommended that the aim of tuberculosis control should be the eradication of the disease. It realized, however, that this cannot be achieved in all countries in the near future. It recommended that all countries should take the most energetic measures to eliminate tuberculosis as a public health problem and that governments should accord a high priority to such measures. Where the prevalence of disease is known to be very high, it is recognized that the immediate problem is to establish a service capable of bringing the disease under control.

3. The Committee felt that the elimination of the disease as a public health problem could not be considered to have been achieved in most instances until the prevalence of natural reactors to tuberculin among children in the 14-year age group had become less than 1% (a natural reactor being defined as a person showing a significant reaction to a standard dose of tuberculin).

4. The Committee wished to draw attention to the need for accurate information regarding the extent and nature of the tuberculosis problem.

It stressed the value of adequate local tuberculosis case registers and the importance of forwarding appropriate data to a properly staffed and well-equipped statistical service in the national health organization.

5. The Committee agreed that there should be three stages in starting a national tuberculosis programme :

- (i) a planning stage, including a national prevalence survey ;
- (ii) a pilot stage, including
 - (a) a pilot area project, i.e., a small-scale tuberculosis control programme limited to a selected part of the country, which would serve to adapt the various control measures to the conditions prevailing in the country and to train personnel for the subsequent country-wide programme ;
 - (b) detailed tuberculosis prevalence surveys ;
 - (c) the establishment of a national epidemiological centre for tuberculosis ;
- (iii) an extension stage, during which the control programme would be gradually extended from the pilot area to the whole country.

9. FUNCTIONS OF WHO IN THE WORLD TUBERCULOSIS PROGRAMME

9.1 International assistance to individual countries

The Committee reviewed a number of problems relating to the provision of international assistance to national tuberculosis programmes. The Committee agreed that WHO upon request should give direct technical assistance to the various stages of such programmes.

9.2 Training of personnel

The Committee realized that one of the principal problems in the establishment and operation of an adequate tuberculosis control programme is the training of various types of personnel, and recommended that programmes and facilities for the training of such personnel be developed with the assistance of WHO. The Committee particularly recommended that the national pilot area project should also serve as a centre for the training of most of the personnel needed for the country-wide tuberculosis control programme. The Committee further recommended that arrangements should be made for the training of professional key personnel as close to their home countries as possible and in the form of organized courses. WHO assistance would be necessary in the form of personnel, equipment and fellowships.

Recognizing the need to avoid the waste of highly-trained professional personnel, the Committee recommended that programmes be developed for training technicians to carry on most of the routine work of the tuberculosis control programme under the supervision of professional personnel. This relates particularly to the training of BCG technicians, X-ray technicians, laboratory technicians, home visitors, and technicians to assist in the health education of the public. The Committee believed that there should be continuous evaluation of the work of these technicians to ensure that they are used to their full capacity and yet not in a manner exceeding their proper role.

9.3 Development of standards

9.3.1 *Nomenclature*

It was pointed out that there is a great need for a standard terminology in the field of tuberculosis, as at present the meaning of many terms varies between countries, making comparisons difficult. It was recognized that this problem can be divided into two parts:

- (1) epidemiological terms not covered by the sixth report of the Expert Committee on Health Statistics¹ (these apply to other communicable diseases as well as tuberculosis);
- (2) clinical terminology relating specifically to tuberculosis, such as the terms relating to activity and the various stages of the disease, e.g., "minimal", "moderately advanced", and "far advanced".

The Committee recommended that the World Health Organization take steps to clarify the epidemiological terminology, referred to under (1), since this involves other communicable diseases besides tuberculosis.

With regard to the standardization of clinical terms relating specifically to tuberculosis, the Committee felt that the International Union against Tuberculosis could be helpful in this problem and recommended that the Union be invited by WHO to suggest appropriate clinical terminology in the classification of pulmonary tuberculosis for consideration by the World Health Organization.

9.3.2 *Products*

The Committee noted the parts of the thirteenth report of the Expert Committee on Biological Standardization² which concern the definition of the International Unit of Purified Protein Derivative of Mammalian Tuberculin and the standardization of BCG vaccine. The Committee

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1959, **164**

² *Wld Hlth Org. techn. Rep. Ser.*, 1960, **187**

was also informed of the work being conducted to provide a basis for the establishment of an international reference preparation of BCG vaccine and the formulation of requirements for a satisfactory BCG vaccine. The Committee recognized the importance of both these activities and urged that the collaborative studies aimed at the elaboration of satisfactory laboratory methods for the biological assay of BCG be continued.

9.3.3 *Methods*

The Committee recommended continued efforts to standardize techniques for tuberculin testing, reading of X-rays, sputum examination and other procedures necessary for the tuberculosis control programme; such standardization would permit a more reliable comparison of programmes between various countries.

9.4 **Research**

The Committee reviewed with great interest the numerous research activities being conducted by WHO alone or in co-operation with national agencies. It believed that such research was extremely important, and it congratulated WHO on its present as well as its past activities along these lines. It noted the present trend of decentralization of tuberculosis research to the various regions of WHO and expressed the hope that the research conducted in the regions would be permitted adequate flexibility and freedom and that sufficient funds would be given for this purpose. Even though the Committee was sympathetic to this policy of decentralization it felt strongly that there must be an adequately staffed central co-ordinating tuberculosis research unit in WHO. The Committee expressed the hope that in the future the same high quality of research would characterize this aspect of the programme as in the past. While realizing the importance of fundamental laboratory and clinical research in tuberculosis, the Committee felt that the emphasis in tuberculosis research by WHO at present should be on field or epidemiological research.

9.5 **Dissemination of information**

The Committee considered the current policy of disseminating information concerning the tuberculosis programme of WHO and felt that it would be very valuable to have pertinent information disseminated to individuals interested in tuberculosis throughout the world. The Committee believed that this could be accomplished quite readily if such information were transmitted to the Ministries of Health in the various countries and to the various national tuberculosis associations, where they exist. These agencies in turn could see that this information were further disseminated.

10. VOLUNTARY ORGANIZATIONS

The Committee recognized the valuable contribution to tuberculosis control made by voluntary organizations in many countries and recommended that full use of their services should be encouraged wherever possible as an important means of obtaining the cooperation of the public.

Annex

MINIMUM PROGRAMME OF CHEMOTHERAPY¹

“1. Every known case of pulmonary tuberculosis should receive anti-tuberculous chemotherapy. This can be administered on an ambulatory or a domiciliary basis.

2. Every patient should have a roentgenogram of the chest before therapy is started.

3. Every patient should have an examination of the sputum for tubercle bacilli before chemotherapy is started. Preferably this examination should include a sputum culture; if sputum cultures are manifestly impossible or decidedly impracticable, microscopy of an appropriately stained sputum is acceptable.

4. Antimicrobial therapy should be continued without interruption for 6 months after the sputum has become negative for acid-fast bacilli, but in no case should therapy be given for less than one year.

5. The chest roentgenogram should preferably be repeated at 3, 6 and 12 months. When this is manifestly impossible or decidedly impracticable, every effort should be made to obtain a film one year after the start of therapy and at the completion of chemotherapy.

6. If the patient continues to discharge acid-fast bacilli in the sputum 6 months after the start of chemotherapy, or should his disease at any time show unquestioned deterioration on roentgenography, the case should be reviewed and the question of a change in treatment considered. If possible, drug susceptibility tests and other special investigations should be made at this time. In certain cases, it may be necessary to make a special effort to have the patient transported to a centre where he could receive surgical therapy or various other forms of chemotherapy not now suitable for domiciliary use. If no such changes in management are possible, the question of continuing the previous chemotherapy, especially with INH (isoniazid), for an indefinite period must be considered. The Study Group agreed that a reasonably satisfactory scientific answer is not available concerning the wisdom of such continued INH therapy in the presence of uncorrectable “open” pulmonary tuberculosis. About all that can be said is that from a very limited experience and from certain theoretical considerations it appears that on the whole the practice is

¹ Extract from the report of the WHO Study Group on Chemotherapy and Chemoprophylaxis in Tuberculosis Control (*Wld Hlth Org. techn. Rep. Ser.*, 1957, **141**, 4)

more likely to be beneficial than harmful. Every effort should be made to minimize the spread of infection by an education programme in this group.

7. The preferable regimen would consist of daily administration of both INH and a companion drug. In ambulatory and domiciliary patients it is advisable to use PAS as the companion drug.

8. If a local situation exists in which it is not practicable to use the above drug regimen, the use of INH alone is justifiable. The Study Group agrees that on present knowledge the use of INH alone cannot be recommended with the same assurance as the use of INH-PAS. Nevertheless, if a local situation exists in which the alternatives faced by the public health administrators are the institution of a programme with INH alone or no programme at all—or one drastically smaller in scope—the Study Group agrees that a programme with INH alone would constitute an acceptable practice today and until definite further evidence to the contrary should be forthcoming. Meanwhile, important relevant questions which remain unanswered should be intensively investigated without delay . . .

9. The total daily dosage of INH should be between 5 mg and 10 mg per kilogram of body-weight. Within this range, children tolerate somewhat higher doses than elderly people. Usually a daily dose of 8 mg per kg of body-weight is satisfactory.

10. The total daily dosage of sodium PAS (or its equivalent) should be 10 g.

11. If INH is used alone, the total daily dose may be administered at one time.

12. Every effort should be made to determine the regularity with which the patient takes the drug and to ensure patient, family and community co-operation in such a tuberculosis chemotherapy programme by repeated educational activities with constant emphasis on the importance of continued regular self-administration of the therapy.”
