

III. THE EPIDEMIOLOGY AND CONTROL OF LEPROSY  
REPORT OF THE SUBCOMMITTEE ON EPIDEMIOLOGY AND CONTROL\*

A. RECOMMENDATIONS FOR EPIDEMIOLOGICAL  
INVESTIGATIONS

INTRODUCTION

*Incidence.*—The incidence of leprosy should be taken as the number of cases per thousand of the total population. It must be specified upon what information the incidence is based. (a) This information must include the total number of persons residing in the area under consideration. (b) The total number of persons examined must be stated; any discrepancy between the total population and the number examined should be explained. (c) Cases in isolation should be assigned to the areas in which they were living at the time they were isolated. (d) All cases of leprosy diagnosed as such by the examiner, including quiescent and arrested cases, should be recorded.

*Age groups.*—The following age grouping should be used: 0-4, 5-9, 10-14, 15-19, 20-29, 30-39, 40-49, 50-59, and 60 or more years. A "child" is to be taken to mean any person falling within the first three age groups.

*Sex incidence.*—By the sex incidence of leprosy is meant the number of male cases per thousand and the number of female cases per thousand of the male and female sections respectively of the population examined.

*Types of survey.*—It is recognized that there are two main types of survey: (a) extensive or general, and (b) intensive or particular. (a) Extensive or general surveys: Such surveys may be based upon the incidental examination of known cases of

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leprosy by officials and others, or upon the examination of certain groups, as for example school children, prisoners, conscripts, or upon the examination of contacts of known cases. (b) Intensive or particular surveys: An intensive survey depends upon the complete examination of the entire population by a trained personnel. In reports of such surveys it should be stated whether the examinations were conducted in the clinic or in the persons' own homes.

#### MINIMAL EPIDEMIOLOGICAL DATA

The committee recommends that the information for standard epidemiological studies be recorded in two main groups: (1) general; and (2) individual. The latter concerns both (a) all of the individuals in the area surveyed, and (b) the lepers and leper suspects.

##### *General Information*

The following general information regarding the region and the people is required: (a) Climate, meteorology and soils. (b) Geography and topography. (c) Racial groupings. (d) General social and economic conditions. (e) Diet. (f) Housing and sanitation. (g) Hygiene-habits of the community. (h) Clothing. (i) Prevalent occupation (agriculture, fishing, etc.). (j) Prevalent diseases (epidemic or otherwise). (k) Birth rate, death rate, and infant mortality rate when available. (l) Density of population. (m) History of leprosy in the community. (n) Native folk-lore, traditions, customs, and superstitions regarding the disease.

##### *Information concerning Individuals*

*Information regarding all individuals examined.*—The following information is required for every individual in the area surveyed: (a) Serial number of individual. (b) House number. (c) Name. (d) Age. (e) Sex. (f) Race, caste, religion. (g) Relationship to head of family. (h) Physical examinations: malnutrition, skin diseases, other diseases including leprosy, definite or suspect (for lepers and suspected lepers see below). (i) History of contact with lepers, as indicated below.

*Information regarding lepers and suspects.*—The following information is required concerning lepers and suspected lepers: (a) Previous illnesses. (b) History of contact with leprosy: (1) intra-familial and/or household contact (bed contact, room contact, house contact including joint-family system), stating family relationship, (2) extrafamilial (intimate or casual), (3) contact not

known. (c) Contact period: (1) time since first known contact, (2) time since last known contact, (3) duration of contact, (4) contact continuous or intermittent. (d) Particulars about presumed source of infection. (e) Age at onset of first manifestation of leprosy. (f) Course of disease. (g) Present status, description and type of disease, including site of initial lesion. (h) Laboratory findings, examination of smears and if possible of sections, and serological test. (i) Conclusion: (1) leprosy, definite, (2) leprosy, suspected.

#### METHOD OF CONDUCTING AN INTENSIVE SURVEY

It is essential that the area chosen for a survey be sharply delimited, and if possible it should coincide with an administrative area. In brief, there may be said to be two steps in an intensive survey. First, there must be a complete enumeration or census of the chosen area by a sanitary inspector or assistant, preferably someone with sufficient preliminary training in leprosy work to enable him to recognize obvious lesions of the disease. The second step is the careful examination of every individual in the area by a leprologist, and the recording of data on appropriate forms.

*Preliminary examination or survey.*—The enumerator should conduct a house-to-house census of the area, recording his findings in some type of census book or on family cards. The houses are to be given numbers and a map of the area should be drawn, roughly to scale, indicating streets, lanes, houses (with numbers), streams, public latrines, etc. It should be made the practice that the inspector see every individual, and that he do not record data on hearsay evidence.

*Clinical examinations.*—After the preliminary survey has been completed the leprologist proceeds to examine all persons in the area. It is probably best to have some building near the center of the area set aside for use as a clinic, where as many as possible of the population should be examined. In the examination the whole body should be inspected, the clothing having been removed, and when that is not done record should be made of that fact. The examiner's findings in each case are to be recorded in the survey book, and in addition, when leprosy is present or suspected, a separate examination form should be filled in. The preliminary data recorded by the inspector should be checked, and more detailed information obtained. With nonlepers, as well as with those suffering from the disease, an effort should be made to

determine whether or not there has been any previous contact with lepers. When there has been such contact its time and duration, as well as its nature should be ascertained. Such information is to be obtained by questioning and from the records after the completion of the survey. Its collection may present considerable difficulty.

#### DERIVATION OF RATES

Certain leprosy indices which may be valuable can be derived from survey data. These are:

- (1) The case-type rate, which is the number of open cases per 100 cases of leprosy.
- (2) The sex rate, which is the number of male lepers per 100 cases of leprosy.
- (3) The childhood rate, which is the number of child lepers per 100 cases of leprosy.
- (4) The contact rates, which are: (a) the number of lepers with familial (household) contact per 100 cases of leprosy; (b) the number of lepers with extrafamilial contact per 100 cases of leprosy; (c) the number of lepers with contact unknown per 100 cases of leprosy.

Further correlation, such as the ratio between case types and sex, etc., may be derived from these data at the discretion of the investigator.

#### B. GENERAL PRINCIPLES OF LEPROSY CONTROL\*

So long as the mode of transmission of leprosy is not known with absolute certainty, any method of prophylaxis is to some extent empirical. The present conception is that leprosy is an infectious disease spread principally by direct contact, and possibly by indirect contact, e.g., the wearing of infected clothes. As with other infectious diseases, the aim is to discover cases as soon as possible in order to control the spread of infection in the community, and in order to give the patient the benefit of treatment.

#### METHODS OF DISCOVERING CASES

- (1) *Examination and continued observation of regular contacts.*

\* The subcommittee received a proposal that it should "formulate a general scheme of leprosy control which may be modified according to the local conditions in regard to segregation in different countries." After careful consideration it was decided that it is preferable to set forth what are believed to be the more important principles governing the control of leprosy, rather than to formulate a general scheme.

(2) *Periodic examination of children of school age.*—Where this is done as a part of a school medical service, the staff should have adequate training in the diagnosis of early leprosy.

(3) *Dispensary diagnosis.*—In many tropical countries where leprosy is prevalent there is an extensive general dispensary system. The dispensary staff, whether fully qualified or not, if trained in the diagnosis of early leprosy should be able to discover early cases of the disease.

(4) *Notification of cases* by medical men and also by responsible members of the public: for example, practitioners of indigenous medicine, school teachers, headmen. Such notification will be more effective if the general public has been instructed in the early signs of the disease.

#### PREVENTION OF SPREAD

(1) *Isolation of open cases.*—The present view is that the open case constitutes the greatest danger to the public health, and therefore such cases should be prevented from contact with healthy persons, especially children. This has been attempted in the following ways: (a) isolation in institutions, (b) isolation in the patients' own homes, (c) isolation in villages.

(a) *Isolation in institutions:* In a few countries compulsory isolation is being slowly replaced by voluntary isolation. This change is largely due to the fact that the conditions of isolation are now considerably more attractive and encouraging to the patient. In other countries with large leprosy populations compulsory isolation is out of the question because the expense would be out of all proportion to the financial resources. It is recognized, however, that in certain countries compulsory isolation is still practicable and advisable. Where this is the case the general conditions of the patient's life should approximate as nearly as possible those of voluntary isolation, and reasonable periods of leave should be granted. Visitors to settlements should be discouraged from staying with patients, and rest houses away from the patients' quarters might be provided. In any country where segregation in institutions is compulsory, the establishment of multiple regional leprosaria instead of a single central institution is advisable in order that the patients may be as near as possible to their own homes. The establishment of agricultural colonies is also recommended. Whatever the type of institution, every effort should be made to make it, at least in part, self-supporting. In connection with the establishment of such regional lepro-

saria and agricultural colonies, there need not be any danger to the health of the surrounding population if proper precautions are taken. In countries where there is a system of voluntary isolation, it is recommended that the health authorities be empowered to compel the isolation of any case of leprosy which is considered of special menace to the public health.

(b) Isolation in the patients' homes: Isolation of a person with leprosy on his own premises may be designed to separate him from the public and from members of his own household, or from the public only. In neither case do we consider home isolation to be a generally effective method. This applies especially to isolation from the patient's own family. Exceptionally, under favorable circumstances (for example, in the case of a wealthy patient), home isolation may be possible. Home isolation is not recommended as an alternative to institutional isolation.

(c) Village isolation: Village isolation is designed to effect partial isolation of lepers in community units. This method would be applicable only in countries where sufficient funds are not available for a complete system of isolation in settlements. Complete isolation is the most effective method of control, and village isolation should not replace it except where the former system is impossible.

(2) *Nonisolated cases*.—All leprosy patients who are not isolated should be kept under regular, periodic surveillance by the health authorities. The method of carrying this out will vary in different countries. Usually the clinic will be the center for the control of such cases. Therefore the cases registered at the clinic will fall into two categories: (a) those under surveillance and treatment, and (b) those under surveillance only.

(a) Cases under surveillance and treatment: It is assumed that all patients with active lesions will be placed under treatment and so will be seen frequently by a responsible officer.

(b) Cases under surveillance only: Patients who do not require treatment should be examined at regular intervals. The interval will depend on the nature of the case, but the patient should be examined at least every six months, or more often if required. Bacteriological examinations should be made each time the patient is seen. In this connection it is to be understood that every case released from isolation will be placed under surveillance. Surveillance should include regular visits to the patient's house in order that advice regarding sanitation and



hygiene can be given, and in order that the home conditions may be known to the authorities.

#### LEPROSY IN CHILDREN

The importance of leprosy in children cannot be too strongly stressed; therefore every effort should be made to discover early lesions of leprosy in children. To this end every child, in areas where leprosy is endemic, should be examined on admission to school, and should be re-examined every year during school life. In many instances the early lesions in children are of such a nature that the child should be permitted to continue his school studies, provided he is kept under surveillance, but it is recognized that in certain countries the feeling of the public may compel the authorities to exclude such cases from school. Children who are open cases should be isolated. Children with progressive lesions should, where possible, be sent to an institution which has special facilities for treatment of leprosy in children.

#### CONTACTS

Close contacts of every case of leprosy should be examined, and contacts who are children should be re-examined regularly.

The history of leprosy shows that persons working with the disease rarely contract it provided they observe reasonable precautions against infection.

#### PROTECTION OF HEALTHY CHILDREN

Healthy children of leprous parents should be removed from their parents, when the latter are considered a potential source of infection. Children born of leprous parents who are open cases should be removed immediately after birth and brought up under healthful conditions.

#### EDUCATION AND PROPAGANDA

In order that leprosy may be dealt with successfully on a comprehensive scale, and before any large proportion of early cases will come voluntarily for examination, there must be a change in the attitude of the public towards the disease. Greater achievements have been possible as a result of increased interest in the patient's welfare under conditions of isolation; further, the increasing number of discharges has contributed towards this end. There remains, however, a vast field for health education. Any scheme for the control of leprosy will depend for its success on an educated public opinion.

No standard type of procedure to this end can be laid down for universal application, and local customs and conditions must always be taken into consideration. There are, however, certain general principles which may be formulated. These are as follows:

(1) Any propaganda must be in accord with the best informed scientific opinion.

(2) Propaganda should have as its objectives: (a) Dispelling unreasonable fear of leprosy and thus teaching a right perspective regarding it. (b) Emphasizing the necessity of early diagnosis, so that anxiety may be allayed if a case is not considered serious, while if treatment is needed it may be commenced at the earliest possible moment. (c) In this connection adequate training should be made available for medical students and postgraduates, such instruction preferably being given by a leprologist. (d) Courses in the diagnosis of early leprosy should be given to nurses, health visitors and sanitary inspectors. (e) Elementary instruction about leprosy should form a part of the teaching in hygiene given in teachers' training colleges. (f) Special attention should be given to the instruction of households in which there are known cases of leprosy, in methods of personal and general prophylaxis, and particularly regarding the keeping of children from contact with the infected member of the household.

#### VOLUNTARY ORGANIZATIONS

Voluntary organizations have in the past, and can in the future, aid greatly in antileprosy work. It should be emphasized, however, that the control of leprosy is the inescapable responsibility of the governments concerned. The primary function of the voluntary agencies should be to cooperate with governments in demonstrating the value both of approved and of newer methods of prophylaxis, education and therapy. With this principle in mind, but with recognition of the fact that in many countries financial support by government is still far from adequate, the following suggestions are made with regard to activities of voluntary organizations.

(1) *Educational activities.*—At present assistance is needed to provide opportunity for medical, nursing and technical personnel to broaden their knowledge. Much may be accomplished by organization of short courses for intensive instruction. Regional conferences are also helpful to this end. There is a serious lack of educational material, scientifically correct and suitable for the public, such as bulletins, moving picture films, lantern slides and charts.



(2) *Welfare and therapeutics.*—The maintenance of leprosaria should not be continued indefinitely by voluntary agencies, but should increasingly become an obligation of governments, and in new projects governments should themselves undertake financial responsibility, though their management can often best be undertaken by voluntary organizations. There is also considerable scope for such organizations to work out the most suitable types of institutions for the particular countries concerned, and the best methods of their administration. The development of preventoria for children of leprous parents who are open cases may be mentioned in this connection; these should also be generously supported by the government. There will probably always be a need for social work among patients, both in and out of institutions, for which the government will have difficulty in making provision.

(3) *Research.*—Research work in leprosy should be promoted in the laboratory and the field, both by governments and voluntary organizations.

(4) *Rehabilitation.*—Rehabilitation of discharged patients is a sphere in which voluntary organizations can render valuable help with government assistance by providing suitable work for them and by helping to reabsorb them into the community.