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STATISTICS OF HEALTH SERVICES AND OF THEIR ACTIVITIES

**Thirteenth Report of the WHO Expert Committee
on Health Statistics**

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Geneva, 12-18 November 1968

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STATISTICS OF HEALTH SERVICES AND OF THEIR ACTIVITIES

Thirteenth Report of the WHO Expert Committee on Health Statistics

The WHO Expert Committee on Health Statistics met in Geneva from 12 to 18 November 1968. Dr P. Dorolle, Deputy Director-General, opened the meeting on behalf of the Director-General.

The Committee was concerned primarily with the types of statistics required for the efficient planning, administration, and evaluation of health services in all countries of the world.

1. INTRODUCTION

Previous reports of WHO expert committees on health statistics have dealt with many of the problems of hospital statistics¹ and morbidity statistics in general,² but none has considered in any detail the statistics required for the organization and administration of health services. In the background document prepared for the technical discussions on the collection and use of health statistics in national and local health services, held at the Nineteenth World Health Assembly in 1966, it was pointed out that most countries regard information on the working of their health services as an essential and important part of health statistics. Basically, they want data on the number, size, and distribution of establishments and the personnel employed in them, and details of the levels of training of the personnel. Information is required on the activities and the cost of the health service. Nevertheless, despite the general desire for information, this particular aspect of health statistics services is usually the least well developed. In many countries of the world mortality statistics have been developed to a very high standard and have a considerable degree of uniformity. Morbidity statistics, particularly those relating to hospital in-patient treatment, are being introduced to an ever-widening degree, but few countries, if any, have sufficient data to describe their health services. A country's need for such statistics depends

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1963, No. 261.

² *Wld Hlth Org. techn. Rep. Ser.*, 1968, No. 389.

on the complexity of its health services, but at all levels there is scope for extension and improvement in this field of health statistics.

A WHO Expert Committee on National Health Planning in Developing Countries, meeting in 1966, recognized¹ that the lack of essential data presented a very serious problem and often made it necessary to collect data simultaneously with the process of planning itself, the plans being modified in the light of the information that emerged. This was obviously an undesirable state of affairs, and the Committee recommended that all countries should collect information on resources available, under the headings of money, manpower, facilities, and organization. All of these, except possibly the last, are concerned with statistical matters.

It has been evident for some years that the existing statistics of health service activities require adjustment of scope and content to make them respond to the requirements of the changed patterns of modern health administration, which have been both cause and effect of changing morbidity patterns. It has been stated that the principal impediment to the reduction of ill-health at the present time is not the lack of medical knowledge about diseases but the problem of applying this knowledge, i.e., bringing it to bear upon the population's health needs in the most effective manner possible within the restraints imposed by economic, political, and other considerations. Health services in the past have often been characterized by lack of over-all planning and co-ordination, with different disciplines and specialties operating largely in isolation from one another. Recently these services have been improving as they evolve towards a structure that has variously been labelled "comprehensive health care", "regional planning", "area-wide planning", etc., all of which are synonymous with the concept of the fully integrated health-care system. This tendency towards unification not only permits the more efficient use of statistics, but also demands the production of statistics so that the services can be efficiently managed.

2. THE NEED FOR HEALTH SERVICE STATISTICS

In the opinion of the Committee, there are five main reasons for requiring health service statistics :

- (1) to assist in the administration and co-ordination of health services in any particular community, region, or country, and for the effective management of curative, preventive, and environmental health services;
- (2) for the short-term and long-term planning of health services, both locally and nationally;

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1967, No. 350.

(3) for assessing whether health services are accomplishing their objective, i.e., their effectiveness, and whether they are doing so in the best possible way, i.e., their efficiency;

(4) for the study in depth of particular problems of health and disease and their effect on the administration of health services, i.e., for research purposes;

(5) to provide background data that may be required from time to time by the administration, by legislative bodies, and by members of the public.

The emphasis given to each of these particular requirements will vary from country to country. In the developing countries, for example, greater stress will be laid upon statistics for planning and the equitable nationwide distribution of services, and the use of statistics for these purposes will take priority over their use for evaluation and for research. Further, the need for statistical information will vary with the organizational level at which it is used and with the scope of the service provided.

The list of reasons for requiring health service statistics that is given above is rather more conceptual than functional, and the Committee therefore decided to attempt to formulate a rather different classification giving greater emphasis to the types of statistics that are likely to be available. There seems to be no generally applicable and entirely satisfactory classification of these statistics, but the following outline was selected as the basis for the Committee's discussions.

Resources and their utilization

Resources

Buildings, equipment, and facilities
Manpower
Finance

Utilization of resources

Two alternative classifications are presented :

(1) *by source and purpose:*

Curative, e.g., hospital in-patient and out-patient data
Preventive, e.g., immunization and screening statistics
Environmental, e.g., water treatment, sewage disposal
Statistics of " supporting services "

- (a) diagnostic, e.g., laboratory
- (b) therapeutic, e.g., pharmaceutical
- (c) ancillary, e.g., ambulances, laundries

(2) *by special groups:*

Statistics for special population groups
Statistics for special disease groups

Background community data

Vital statistics

Morbidity data (including social security data)

Demographic statistics

Special data directed towards evaluation of need, e.g., community survey data, health opinion surveys

The consensus of the meeting was that vital, morbidity, and demographic statistics are not, strictly speaking, statistics of health services, but since they are inevitably used in the evaluation of the effectiveness of health services they should not be omitted from any discussion of health service statistics. They have been treated separately at meetings of other WHO expert committees on health statistics, and consequently no detailed consideration was given to them at the present meeting. Nevertheless, the Committee agreed that health statistics in general are likely to be more efficiently organized if the same department is made responsible for the collection of data on mortality and morbidity and for the collection of data on the resources for health services and the utilization of facilities provided.

3. RESOURCES**3.1 Buildings, equipment, and facilities**

The Committee found considerable difficulty in establishing a classification of the material resources associated with health services that would be acceptable in an international context. The only area in which there was general agreement was that concerned with in-patient facilities. Definitions of hospitals and of some of the material resources available within them, e.g., the hospital bed, are to be found in the Committee's eighth report.¹

For international purposes it has been found impossible to collect comparable data on matters other than the number of beds available in in-patient facilities. In many countries, however, and particularly the developing countries, by far the most important part of the material resources available for health services is centred in the out-patient or non-hospital area, e.g., out-patient clinics, polyclinics, health centres. It is extremely important to organize the collection of data on these health facilities, even if they can be little more than descriptive in nature and are relevant only to the health care system within a particular country. Some countries might find it desirable to institute a register of the total health facilities available, distinguishing between in-patient and out-patient facilities.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1963, No. 261.

The following is a tentative classification of the material resources available :

(1) Resources available to provide in-patient care of all types where a patient occupies a bed. These might be grouped according to the intensity of care into (a) hospitals and (b) other types of establishment that provide minimal nursing or personal care. Frequently, the facilities providing in-patient care also provide out-patient services.

(2) Resources available to provide out-patient care exclusively, e.g., health centres, clinics.

(3) Resources for services not directly related to patients, e.g., laboratory facilities, establishments for the manufacture of drugs, equipment, etc.

(4) The resources of public health services; these lie mainly in the field of prevention and administration, and include such organizations as health departments, local health authorities, hospital councils, etc.

(5) Resources related to the provision of organized personal health services, e.g., organized home nursing care.

The last two items present difficulties because they cannot be described entirely in terms of buildings and equipment. Nevertheless, they warrant inclusion here since they add something to the sum of resources available.

This classification is concerned primarily with institutions or organizations, but statistical data are also required on equipment. Here all that is feasible is to give examples of the type of data that might be collected : the number and type of X-ray machines, the amount of first aid equipment available in industry, the number and design of ambulances, surgical instruments, etc.

3.2 Health manpower

In many countries today the health service "industry" employs a significant proportion of all available labour. An occupational classification of health workers presents formidable problems of comparability between countries and even within countries, but this task should nevertheless command priority at both the national and international level. The first distinction might be between those who provide the major proportion of direct personal services — e.g., doctors (subdivided by specialty), dentists, and nurses — and members of the allied health professions, e.g., pharmacists and laboratory technicians. Most of the types of personnel listed require formal qualification through structured training.

The large number of allied health professions reflects the growing complexity of health service administration.

The basic types of statistical information collected for many of these categories of health personnel could include their number, ratio to population, geographical distribution, level of qualification, and personal characteristics. The methods available for the collection of these data usually rely upon registration or licensure or upon census enumeration. In countries where periodic renewal of a certificate of authority to practise is required, statistical data are usually easy to obtain from questionnaires answered at the time of renewal. Where such renewal does not take place, a periodic census of staff actually in employment may be an acceptable way of obtaining data on manpower, but this method does not take in those personnel who have no appointment at the time of the census. Unless such censuses are conducted in association with a total population census, the method will have to be confined to countries where the government exercises a considerable degree of control over the employment of health personnel, or the census will have to be limited to persons employed in establishments that are included in such lists of health service facilities as are available.

In countries where the renewal of certificates of authority to practise is not required, a register of health personnel will be of value only if considerable effort is expended on keeping it up to date.

New names can be added to the register either on completion of a period of training or on immigration to the country or region under consideration. Both these sources of new personnel are of considerable importance in most countries. Statistical data on personnel under training can usually be provided by the training establishments, e.g., medical schools, schools of nursing, etc. The availability of data on immigration will depend upon the laws dealing with the movement of individuals into or within a particular country. Reasons for removing names from a register include death (data might be provided by the vital statistics office), emigration, retirement, invalidity, misconduct, and change of occupation.

Where a register or census count exists, questionnaire inquiries can be made in order to provide data on specialization, part-time employment, and similar matters, and to permit the calculation of "whole-time equivalents" of staff. This is important when personnel do not work full-time in one post.

In the consideration of manpower statistics, care must also be taken to ensure that a person who works in more than one institution or in more than one area is not counted more than once.

The posts available to personnel are known by various descriptive terms in different countries, and the Committee suggested that information on thus subject should be collected; this would make it possible to determine whether the personnel available fully meet the needs of the

health services. The ease with which these data can be collected will depend upon the organization of health services in the country concerned; usually they will be collected by reference to individual health service facilities.

The WHO Symposium on Methods of Estimating Health Manpower held in Budapest in October 1968 was of considerable interest in this connexion, particularly the contribution on health manpower planning in Europe by J. D. Cottrell. The report of the symposium has not yet been published.

The Committee discussed briefly the use of statistical models in manpower planning, and agreed that there are considerable difficulties in the long-term forecasting of manpower needs. This is partly because of the changing organization of medical work, resulting for example in differences in the role of members of the medical profession and other personnel. In making projections of manpower for health services, it should be remembered that the training of medical personnel is a very lengthy process.

Some consideration was given to productivity data, although these are statistics of utilization rather than of resources. The number of patients' visits per doctor and the number of patients discharged from hospital per staff doctor are examples of productivity measures. These figures can never be more than very rough guides, however, because they do not reveal the quality of service, which is much more difficult to measure.

3.3 Finance

The statistics of the financing of health services is a relatively new and complicated subject. Both resources and expenditure are discussed under this heading, although it is appreciated that expenditure might in some cases be more properly dealt with under the heading of "utilization" of resources.

A basic problem facing health administrators is the allocation of limited financial resources among alternative and competing uses so as to obtain the maximum benefit. In essence, the health administration needs financial data in order (a) to review the effect of continuing policies, (b) to assess the value of new proposals, and (c) to allocate resources among competing activities.

The growing use of scientific planning methods has increased the importance of data both on total capital investment and on operating expenditure, although lack of agreement on methods has made it difficult to use such data, even when they are comparable and plentiful.

None of the accounting systems in international use specifies clearly what is and what is not health expenditure. For example, the system

published by the United Nations¹ defines health expenses as payments in respect of "Medicinal pharmaceutical products, therapeutic equipment, services of physicians, nurses and related practitioners. Fees to private hospitals other than non-profit institutions. Expenditures on private non-profit hospitals. Net payment to private accident and health insurance companies and associations". In the United Nations Yearbook of National Accounts Statistics, health expenses are added to personal care expenses.² The material product system used in eastern Europe, on the other hand, does not distinguish between health and hygiene.³

The problem is not solely one of definition, however, for under both the United Nations and eastern European systems some quite considerable items of expenditure in hospital are omitted from health expenses (i.e., expenditure on food and clothing). Moreover all training is classed as educational expenses, and contributions paid to health insurance schemes are classified under financial services.

WHO is currently engaged in producing a functional classification that concentrates on the purposes for which expenditures are made, and is attempting to facilitate the incorporation of this classification into both the United Nations and eastern European systems of national accounts. The classification is divided into two parts. The first covers expenditure by government agencies, divided into current expenditures on health services, capital investment, and other outlays, such as contributions to health insurance schemes, etc. The second part covers private expenditure by individuals on drugs, hospital fees, etc., but does not include payments to health insurance schemes. An international study of health expenditure by Professor Brian Abel-Smith has been published by WHO⁴ and should be consulted for further detail on this subject. The Committee recommends that WHO continue this important work of developing a financial classification at an international level.

Although international comparability is desirable, and there is much to be said for developing accounting methods that make comparisons possible, precedence must be given to statistics that can be used for local and national purposes. Such statistics will need to be more detailed than would be possible or desirable at international level.

The problem of obtaining data is a complex one, except in countries where every item of health service expenditure is financed from government

¹ United Nations, Statistical Office (1964) *A system of national accounts and supporting tables*, New York (Studies in methods, series F, No. 2, rev. 2).

² United Nations, Statistical Office (1967) *Yearbook of national accounts statistics, 1966*, New York.

³ United Nations, Statistical Commission and Economic Commission for Europe (1965) *Generalized description of the system of balances of the national economy (MPS)* (Document Conf. Eur. Stats/WG.22/4).

⁴ Abel-Smith, B. (1967) *An international study of health expenditure*, Geneva, World Health Organization (*Publ. Hlth Pap.*, No. 32).

funds. In almost all countries, however, some proportion of health expenditure comes out of government funds and some from private sources.

Ordinary budgeting practice requires regular financial data showing operating costs under various expenditure headings, e.g., personnel, drugs, maintenance, etc. These data may well be available in some form as a by-product of the accounting procedures normally followed in administering public services, although they may be insufficient for adequate cost analysis.

When normal budgeting procedure does not produce adequate or sufficient data, it may be necessary to have recourse to other methods of obtaining information. These might include surveys of household expenditure on health matters, or a detailed study of the finances of a sample of health institutions. Data obtained from such studies can be used for comparative purposes, and the Committee suggested the following rough but practical methods of comparison: (a) expenditure as a percentage of gross national product; (b) expenditure as a percentage of national income; and (c) expenditure per head of population.

Expenditure on individual items might be measured in terms of expenditure per head or by means of a unit cost system, e.g., cost of ambulances per kilometre travelled. However, comparisons between, say, indices for different areas of a country can still be difficult to carry out because of differences in the quality of service and in the environment, and usually they only point to the need for further and more detailed study.

The Committee briefly considered problems of assessing the cost to the community of individual diseases and their treatment and noted that, although some work has been done on this subject, such studies are as yet in their infancy. It should be remembered, however, that very often the only way of deciding between different procedures is by conducting costing studies, i.e., converting each procedure into its monetary equivalent.

The Committee paid some attention to systems of health expenditure accounting. The establishment of such accounts for the health sector is possible in all countries and in some is already being done, in varying degrees of detail. An increasing number of countries are drawing up their national accounts in conformity with the basic recommendations of the UN and the regional economic organizations.

4. STATISTICS OF THE ACTIVITIES AND UTILIZATION OF HEALTH SERVICES

4.1 Introduction

The Committee considered the needs and problems in the area of statistics relating to the utilization of services or, more broadly, to the activities under health service programmes.

As in the case of statistics of health resources, there is clearly little in the way of accepted statistical practice regarding methods of collection, definitions, units of measurement, or classifications. However, the urgent need of administrators for data on activities is evident from the large volume of official published statistics of this type.

This is particularly true in the case of in-patient hospital statistics, which have served the dual purpose of giving some indication of morbidity in the population and of describing activities in a major area of health services. It is probably safe to say that, in most developing countries, the first priority in the field of health statistics is given to strengthening the vital statistics system and the second priority to bringing together data on the utilization of hospital services.

It is evident that procedures for collecting data on health service activities vary greatly from country to country. Much depends upon the basic system employed for the provision of health services, e.g., free health services supported by public funds, government-operated compulsory health insurance, and private payment for health services with privately-operated health insurance, or combinations of these.

The Committee was confronted at the outset with the problem of distinguishing between preventive and curative services. Many therapeutic actions are preventive in the sense that they slow down the progress of the disease and prevent worsening of the condition and the onset of disability. In statistical coverage it is impossible to make a completely clear-cut division between these two types of service.

There was agreement that statistics should concentrate on the nature or type of the service provided, without attempting to make an absolute distinction between those that are curative and those that are preventive. Nevertheless, since some specific activities that are clearly preventive pose special statistical problems, it seems desirable to give separate consideration to the needs and sources of statistics for each type of service.

4.2 Curative activities

The growing interest in improving the quality and efficiency of health services has led to an increasing demand from administrators for statistics showing the number and characteristics of services used by various segments of the population. Furthermore, there is a need to know the facts concerning treatment provided in the ordinary course of medical and dental care in order to find out whether the advances brought by research are, in fact, reaching the population.

In regard to curative activities, it seems clear that one basis for classifying the statistics should be the source of the service. The units in which services are counted will differ to some extent according to the source.

The major sources of curative service, with the units usually employed, are the following :

(1) *Hospital in-patient care.* The usual unit is the "episode" of hospitalization, although by record linkage it is possible to conduct analyses based on persons or families. (The household survey method also permits such linkage, but only for relatively short periods of time, such as a year.)

(2) *In-patient care in other establishments.* These establishments include nursing and convalescent homes and rehabilitation centres. The usual unit is again the "episode", although because patients tend to remain in such establishments for longer periods of time, it is common practice to conduct a patient census.

(3) *Out-patient clinics.* The unit is sometimes the visit, but perhaps more frequently it is the specific service rendered; of course, more than one service may be given at a single visit.

(4) *General medical and nursing care by physician or nurse.* In both these cases the unit recorded is usually the visit; whether the service is given in a doctor's surgery or in the patient's home is also specified.

(5) *Dental care.* The unit is usually the visit, but sometimes the specific service (e.g., each tooth extracted or filled).

4.3 Certain preventive activities

Important positive measures are taken to prevent disease in any country, e.g., immunizations. In the last analysis, the efficacy of these measures will be judged in terms of trends in mortality and morbidity. However, the administration needs information from time to time on the numbers of immunizations performed and the levels of protection conferred in order to determine which groups of the population most need to be covered in forthcoming field work, to estimate the probable cost of the effort in money and staff, and so on.

This means that statistics on immunization need to be based on the entire population exposed to risk and must take into account the activity of family doctors, public health clinics, and public health nurses. All data must be assembled in a comparable form, and must be suitable for analysis by age, sex, and such other factors as are relevant to distinguishing high-risk groups for particular diseases. The important index is usually the proportion of the population covered.

From time to time, surveys are also needed to measure levels of protection in different areas of a country. This requires the selection of representative samples of population groups, such as pre-school children,

and the administration of a test, such as the Schick test for immunity to diphtheria, a record being kept of immunological reactions.

There are numerous other kinds of preventive activity that demand special statistical work, such as surveys or specially-designed record-keeping systems. The purposes for which these statistics are needed are similar to those mentioned earlier in connexion with immunization activities. Examples of such statistics are : (a) statistics of antenatal and post-natal attendance by mothers, and of well-baby care; (b) statistics on the coverage of cytological screening campaigns, diabetes screening campaigns, vision screening, etc.; and (c) surveys of the nutritional status of various groups of the population. Some of these examples also illustrate the problem, referred to above, of distinguishing between preventive and curative activities. Diabetes screening, for example, is a step towards early diagnosis, a part of the curative process.

4.4 General discussion of methods

Aside from the special statistical methods that might be required in such activities as immunization surveys, dietary surveys, and so on, and which cannot be discussed here, the methods available for collecting data on the activities and utilization of health services, whether curative or preventive, can be classified as follows :

- (1) Routine reporting by establishments to a government agency, usually on a compulsory basis.
- (2) Routine collection of data as the by-product of the operation of a health-insurance plan.
- (3) Household surveys.
- (4) Other types of survey.

Certain general observations can be made on these methods. First, all reporting units must have a standard procedure for recording the data. This requires the preparation of instructions and training courses for the staff who will do the recording. If the operation is a large one, it may even be necessary to set down instructions for the instructors, so that the training is also standardized. Second, continuing attention should be paid to quality control in the recording of the data and in the preparation of the data for analysis (editing and coding or classification). Thus, the reliability of this work must be continually tested, just as is done in industrial production. Errors detected must be followed up, not simply by correcting them, but by taking steps to prevent such errors from occurring again. Continuous quality control in the production of statistics is one of the most frequently neglected aspects of large-scale statistical activities.

If statistics produced by any of the methods mentioned are analysed at different places, it is obviously also necessary to standardize the methods of analysis, the indices computed, tabular presentation, etc.

4.4.1 *Routine reporting by establishments*

Routine and complete reporting by the establishments providing the services has one outstanding advantage over all other methods. This is the opportunity that it provides for local summarizing and immediate utilization of the results. Several members of the Committee, from countries where complete reporting of health services is compulsory, gave illustrations of such uses. This great advantage must be weighed against the drawback of the large volume of additional paperwork involved. The paperwork can be minimized by stipulating that only summaries of local statistics should be passed on to the next higher level, and only summaries of these summaries to the next level, and so on.

Quality control in such a statistical system is usually more difficult, and the system tends to be less flexible in meeting changing needs for data. Furthermore, it is often difficult to relate data collected in this way to the appropriate denominators, i.e., the specific social and economic groups of the population served. However, this problem can be overcome by the introduction of record-linkage systems, particularly linkage of the records of health services to a population census or population register.

4.4.2 *Data from health-insurance plans*

Where a government-operated health-insurance plan covers all or nearly all of the population and provides as benefits major segments of the range of health services, the operating data from the plan can be an important source of statistics for official health agencies. The advantages are, in particular, the ease and relative inexpensiveness of producing the data, since most of the information is needed in any case for the management of the plan; the relative uniformity in methods of recording and processing the data; and the existence of a body of data on all persons eligible for services (though such data on dependents of wage-earners or on demographic and social characteristics are not always up to date).

The principal disadvantages of a health-insurance plan are its general lack of flexibility and its unresponsiveness to the special needs of public health administrators and planners; its unresponsiveness to occasional changes in its terms that result from new legislation and hamper the interpretation of trends; and the delays in the production of statistics, usually characteristic of such systems, that result from the need for central filing

of claims. These delays make it difficult for local health administrations to use the data for the immediate correction of problems in the delivery of health services.

4.4.3 *The household survey method*

Using modern sampling methods, surveys can be designed to gather data for the whole population on any or all types of health services at the point where the services converge, i.e., the individual citizen or his family. The greatest advantages of the method are flexibility and responsiveness to administrative needs; reduction in paperwork for health personnel; the possibility of relating the volume and characteristics of services to a wide range of social, economic, and demographic characteristics of the people served, since data on these are gathered simultaneously in the interview; and central control, exclusively for statistical purposes, of all instructions, methods of classification, and data-processing procedures. On the other hand, this method has certain important disadvantages, including: the inability to produce data on diagnoses and methods of treatment in the desired detail, because the source of the information, the family, is often uninformed about these details; memory failures on the part of family respondents, resulting in under-reporting, particularly of minor calls on health services; and a lack of fine geographic detail (owing to the fact that such surveys are almost always based on samples), which prevents the production of statistics for local health districts. When household surveys are used, therefore, they should probably be supplemented by other types of reporting.

4.4.4 *Other types of survey*

Several other types of survey are available for gathering data on health service activities. An example is the Hospital Discharge Survey in the USA, in which a national sample of short-term hospitals is drawn and the patients discharged from these hospitals are sampled on a continuing basis. Abstracts of the patients' records, coded and processed centrally, are used to make national estimates of the services provided by these hospitals, broken down according to diagnosis, length of stay, characteristics of the hospitals, etc.

Also of interest in this connexion are surveys, such as those conducted in the United Kingdom and elsewhere, of samples of physicians' practices: data are gathered on diagnoses for which the medical service was rendered, treatment prescribed, and other details.

In addition to the collection of statistics by routine reporting methods, the *ad hoc* survey specially designed to provide information on a specific point has an important part to play.

4.5 Statistics of supporting services

For the purposes of this report, the statistics of supporting services may be classified under three headings :

- (1) Diagnostic services, e.g., laboratory statistics, diagnostic radiology statistics.
- (2) Therapeutic services, e.g., physiotherapy statistics, statistics of drug usage and blood transfusion services.
- (3) Other supporting services, e.g., ambulance statistics.

The services covered by these statistics are all of growing importance. Increasing use of complicated technical, diagnostic, and therapeutic equipment means that considerable statistical information is required if the services are to be properly planned and evaluated. For example, it is reported in some countries that the amount of work undertaken by clinical chemistry laboratories is increasing at the rate of 20 % a year. If such growth is to be contained within the resources available, the services must be used in the most efficient way. Since automated methods are available for performing the various tests, more efficiency might be achieved by centralizing laboratory services. Decisions regarding the best location of centralized laboratories and the tests they should perform need to be based on statistical studies. This is a comparatively sophisticated use of statistics, but the data also have other applications, particularly in the fields of work measurement and quality control; quality control here relates both to the department or laboratory concerned and to the doctor who requests its help. The amount and nature of the statistical information required varies considerably with the level at which it is to be used. For example, the local requirement for ambulance statistics might well involve accurate recording of the time taken for an ambulance to answer a call and the time required for the patient to be transferred to hospital. At a more central level, the statistics required would be simpler, and would possibly relate only to the number of journeys made, or the number of patients carried by the ambulance organization, expressed as a ratio to population or to the number of staff involved.

In all these statistics, with the possible exception of those relating to drug usage, there appears to be a considerable amount of common ground with regard to possible recording methods. These methods are outlined as follows :

- (1) *Individual records.* The amount of work carried out by the organization supplying supplementary services is often so large in terms of patients that it is unlikely that statistics can be collected from individual records in the same way as many mortality and morbidity data. An exception is when they can be obtained as a by-product of other processes,

as in the clinical chemistry laboratory, where automated methods are now increasingly used and small computers are often on-line to the equipment carrying out the tests. Where this is the case, it is relatively easy to provide statistics of the individual tests and relate them to patients. Similarly, in some laboratories carrying out examinations of smears for precancerous lesions of the cervix uteri, the data are stored in a computer to facilitate the recall of patients for further examination. It is relatively easy for the name of the doctor to be included in the computer file, so that the number of tests requested by individual doctors can be analysed and the quality of the smears that arrive at the laboratory can be studied and controlled.

(2) *Number of patients treated.* One measure of the work of the supplementary services is a simple record of the number of patients treated or the number who undergo a particular examination. This is a relatively crude measure, for it does not record the amount of work involved in any particular test. For example, a patient having a simple chest X-ray does not cause the radiology department as much work as a patient undergoing fluoroscopy.

(3) *Number of tests performed.* The number of tests performed or the number of treatments given also yields a rather simple measure of work done and goes rather further than recording the number of patients involved. In laboratory work, a possible measure is the number of specimens received for examination, but again this is too simple to provide a useful basis for statistical comparisons between the work of different laboratories, unless the data are analysed according to the detailed nature of the test performed.

(4) *The unit system of recording.* Many countries still use this system for recording the amount of work done. The "unit" is often a measure of the staff time involved in performing tests and is arrived at after an examination by work study methods. This system has the advantage that it makes some allowance for variations in the complexity of different tests or treatments, but it also has considerable disadvantages. For example, if the unit used for the measurement of laboratory tests does not take into account the availability or non-availability of automated equipment, this method will give misleading results when the work of different laboratories is compared. Although laboratory experts tend to consider the unit system cumbersome, it has been found to have value for statistical purposes.

Since measurement of the work of supporting services is a relative novelty, the Committee was unable to make any specific formal recommendations for the collection and use of data that would be internationally applicable; data collection must obviously depend upon the particular circumstances prevailing in an organization. Nevertheless, it is extremely

important that any presentation of statistics relating to the supplementary services should contain a very clear and concise statement of the particular type of measurement in use, for sometimes statistics showing considerable differences between one area and another have been assumed to be comparable, and only on further investigation was it found that the statistical indices used were completely different.

The Committee gave some attention to the collection and analysis of statistics on the use of pharmaceutical preparations. The systems of recording these data differed from those used for most of the other supporting services, and required more attention to the nature of the drug prescribed, its dosage, etc. This subject has become increasingly important on account of the growing realization of the need to record adverse drug reactions, even though it is impossible to foresee which product will cause these adverse reactions.

The Committee noted a recent WHO report on the international monitoring of adverse reactions to drugs,¹ and briefly discussed various methods of collecting statistics on this subject. These included the statistical analysis of a sample of prescriptions showing both the nature of the drug prescribed and the characteristics of the patients treated.

An important use of pharmaceutical statistics is their application to cost control, and surveys in several countries have shown that considerable sums of money are expended on drugs that are either ineffective or could be replaced by a less expensive and equally effective alternative. It was also suggested that drug usage could be analysed according to the disease for which the drug is prescribed or according to the physician prescribing it.

4.6 Environmental health statistics

Environmental health includes such items as water purification, sewage treatment, the study of atmospheric pollution, the control of the cleanliness and adulteration of food, and the examination of hygienic standards in buildings. The statistics concerning these subjects form an important part of the statistics of health services.

Data may be recorded on the number and size of establishments involved in environmental control, on the personnel available, on the number of visits of inspection paid (e.g., to manufacturing establishments to study occupational hazards), the number and type of tests carried out by public health laboratories, and so on. The data collected by doctors or sanitary engineers are often in the form of registers of work done, and are important as an aid to determining the health of a community and to assessing the amount of work done by statistical means. However, the

¹ *Off. Rec. Wld Hlth Org.*, 1966, **148**, 65.

Committee noted that few satisfactory criteria are available for assessing levels of environmental health, and that standards therefore have to be extremely subjective, except in a few areas, e.g., milk and drinking water. In any local situation, statistical methods are often used to arrive at satisfactory standards for environmental conditions, e.g., the level above which the bacterial content of water becomes unacceptable. In many countries, however, simple recording of the facilities that are available to assist in producing a healthy environment has not been found sufficient. For example, communities provided with latrines have been found on further investigation either not to use them at all or to use them for the wrong purpose, and it is recommended that wherever possible statistics on facilities provided should be accompanied by surveys of the utilization of those facilities. Surveys might also be made of the effect of efforts to change the habits of a population. The effect of the introduction of environmental health control should be investigated by reference to background data. For example, the incidence of water-borne disease could be examined before and after the introduction of water-purification plants.

Possible indices of the amount of work being conducted in the field of environmental control include the expenditure on such facilities per head of population, the proportion of the population to whom a particular facility is available, and the ratio of sanitary engineers to population.

A further use of statistics in environmental health is to evaluate the efficacy of monitoring services, e.g., by reference to the number or proportion of tests that fail to meet acceptable standards in food manufacture. A comparison of the results from different areas or manufacturing organizations provides some indication of the places that need tighter control.

It is also important to use statistics to determine whether personnel are being properly used, and whether their training fits them for the tasks they are called upon to undertake. In one country, for example, it was found that although the sanitarians were extensively trained in food inspection, their work was principally concerned with the study of industrial hazards, in which they had received no training.

5. STATISTICS RELATING TO SPECIAL SERVICES

5.1 Introduction

The Committee reviewed the possibilities in respect of statistics relating to services for special population groups and for special disease groups.

In any country there are groups that are identifiable by living conditions, by extremes of age, by occupation, by a physically handicapping condition, or by ethnic origin. The identification of such a group may lead to the creation of an entirely new service to cope with the unique

health problem it presents. Alternatively, some special population groups entail the development of a new pattern in a basic service that caters for the whole population. The administration of the health services for these groups often calls for special statistical programmes. It is not so easy to determine what disease groups require more comprehensive statistics than those relating merely to morbidity or to epidemiological aspects. The Committee agreed that where a disease group such as cancer leads to the creation of a different registration apparatus yielding scientific information in the form of statistical indices (e.g., survival rates according to different histology, pathology, and treatment), and where the store of data created is employed for purposes other than control and epidemiology, then the statistics properly belong in the field of health services.

5.2 Statistics relating to services for special population groups

5.2.1 Family planning activities of maternal and child health services

Within the context of maternal and child health services, special programmes have been created concerned with family planning, and statistics of a specific type are required to assess their effect. These statistics should analyse each method in relation to its application rate, the duration of application, the effectiveness, the characteristics of the users (socio-economic, reproductive, general health), side-effects and complications, previous methods used if any, and any statements indicating factors that led to the adoption of fertility control measures.

5.2.2 Antenatal services

The lives of the mother and baby are at risk long before confinement and birth. Studies in many countries have shown that the prospects for the survival of the foetus up to the actual birth process and beyond improve according to the amount of expert advice the mother receives and heeds during the antenatal period. At the same time, a proportion of mothers will require some medical attention.

Antenatal treatment figures are most readily compiled in countries where the service is available at hospitals and clinics. Apart from gross totals, the analysis should cover the average number of visits, complications of the pregnancy, and the stage of pregnancy at which the mother came under observation. From the last-mentioned data an index of early observation can be calculated, and this can be used for comparisons between regions and identifiable social groups. The preferable denominator for such indices is usually the total number of births, i.e., live births and stillbirths.

5.2.3 *Confinement and infant health services*

The supervision by the health authorities of all maternity hospital births is of particular importance. A monthly report in some standard form providing figures of beds, admissions, deliveries and abortions, stillbirths, operative deliveries, eclampsia infections, and haemorrhages would provide essential data. These returns would be made up from registers maintained in wards or in maternity hospitals. They would be forwarded to the district office of the health authority, and scrutinized individually so that any immediate action necessary could be taken. Regional summaries could then in turn be forwarded to a national centre, for compilation of national figures. Home confinement supervision sets special problems, but it might be possible to obtain similar data and collate them with the hospital figures.

The effectiveness of any country's maternal and child health services is reflected in its maternal, perinatal, and infant death rates. It is customary for most countries to issue these rates by districts, according to the residence of the mother, so that areas where any of these vital indices are consistently above the national average can be given special attention. It is also important to know the place of death, e.g., home or hospital. In many countries qualitative surveys of the obstetric service provided in hospitals are being carried out in defined areas, while retrospective surveys on infant deaths and prospective surveys on selected samples of births are a common source of information on causative factors.

A supplementary report on anomalies noted while the baby is in hospital or observed by the attending physician during birth is of great value in establishing trends in incidence and in alerting workers to possible causative agents. Lists containing names of the people involved and details of the anomaly should be made out by doctors and midwives and forwarded to a central collection point through regional health offices. Although the difficulties are considerable, there is great value in establishing a regional or national register of congenital anomalies. The burden of congenitally handicapped children on the social and educational services may be considerable, and there is need for data derived from established registration systems.

5.2.4 *Postnatal services for mothers and infants*

Figures for services given during the postnatal period are just as important as figures for antenatal attendances, and may be obtained from the same source. Here again the analysis would be made according to the average numbers of visits and the details of advice and medical attention given to both mother and baby. In most developed countries, routine examination of infants at regular periods enables handicaps and

defects to be identified earlier, and data derived from the records of such examinations can be used in planning treatment and management facilities.

5.2.5 *Special services for children*

Child health services can be divided into those provided for infants and those for the examination of pre-school children and schoolchildren. Once again, the collecting units will tend to differ according to the source of the service. In the case of pre-school children, the service may be provided by voluntary welfare nurses, by public health doctors and nurses, and at clinics, crèches, day nurseries, and kindergartens. The data collected will cover services given and defects found, with details of referral for treatment or correction. Similar detail will often be collected for schoolchildren, with summaries derived from the school records or from the records of visiting school medical officers or nurses. In many countries the standard of child care has risen to the extent that untreated defects are rarely found and routine examinations by physicians or nurses are no longer necessary; defects are detected in consultation between teachers, parents, and medical staff. A statistical summary return can be made out for each school, giving details of the school population by age and sex, and the numbers found with defects (recorded under disease or disability headings).

5.2.6 *Special services for care of the aged*

Care of the older members of society is an important activity of any central health authority. The stress is on the co-ordination of all types of services: housing, domiciliary supporting services, hospital provision, and residential homes for the aged and infirm. The needs of the elderly person with mental disorder are considered to warrant separate attention.

The steady increase in the number of persons surviving to old age poses problems that cannot be solved without up-to-date statistical data. It is essential that government and other agencies concerned should have data that not only show the number of beds available and the services required, but also indicate needs. Details of beds available and beds occupied are normally only accessible where a system of licensing for hospitals and homes exists; such data are then compiled at regional level. With regard to persons in special hospitals and homes, questionnaire methods can extract such health information as reason for admission, degree of mobility, patient/nurse dependency, surveillance requirements, hearing and sight states, mental state, mental ability, response to external stimuli and indication of needs, types of therapy and medicinal requirements, and prospects for return to society.

Without information on the proportions of persons requiring geriatric hospital care as against housing or residential care, governments are at a major disadvantage. The methods they usually employ to obtain these data are age stratification sampling, using social security records if such a system exists, or random selection of households. Uniformity in interviewing subjects and in assessing their needs is of paramount importance.

5.2.7 *Services for the crippled, the blind, the deaf, and other handicapped persons.*

The medical and paramedical aspects of each of these types of disability need to be kept under constant review so that shortcomings in services are revealed and improvements can be effected. Registers of such cases can be established, using information obtained from sources such as hospitals, clinics, voluntary welfare organizations, and even schools. The objective of the statistical coverage is to establish incidence, to determine the needs of the total population and of selected groups for special equipment and prosthetic devices, and to assist research into causes.

5.2.8 *Services for workers in industry*

The health of the worker is a precious resource, and health authorities need to work with labour and management to improve and protect it. The statistical programme will routinely include a system of notification of occupational disease, but will also cover subjects such as medical examinations of workers, especially juveniles and those exposed to specific hazards. Some countries operate a network of industrial health centres and clinics, and derive statistics from the records of medical attention, differentiating between first attendances and re-attendances and between referral and non-referral to a doctor or hospital. The records of these clinics can also be used to compile summaries of services provided, for forwarding to the regional and eventually to the national authorities. To amplify the routine statistics on workers' health, *ad hoc* studies will be required.

5.2.9 *Services for migrant groups*

The problem of the migrant and his or her reaction to an entirely new climate and environment is common to many countries. Population pressures have tended to speed up migration in recent years. Care should be taken to separate data that relate primarily to health from social data, but in some countries immigrant groups are so large as to warrant a separate type of health service. An example is the new services required for Pacific island peoples migrating in large numbers to adjacent developed

countries. Government agencies keep records of immigrants' health standards on first entry, and arrange for routine follow-up to measure changes.

Workers who migrate on a seasonal pattern, such as those who follow the harvesting of crops, present special problems with regard to all types of health and social services. The collection of statistical information on health services needed or received by such groups is particularly difficult, and may require a separate record system, including a health dossier carried by the individual. This dossier can serve both as an individual patient record and as a source of statistical information.

5.2.10 *Services required for indigenous populations*

Some countries have indigenous populations who require a special range of health services to cater for a higher incidence of certain diseases. Records of these services are a valuable source of data that can indicate to health authorities the action they should take to raise the level of health.

5.3 **Statistics for special disease groups**

As mentioned in section 5.1, the Committee experienced some difficulty in deciding what characteristics are common to the statistics of health services directed towards the treatment of special disease groups. These disease groups include tuberculosis, cancer, mental illness, tropical endemic infectious diseases, etc. The recognition that the health services for these diseases require some form of special statistical treatment often results from increased medical or public attention paid to these diseases at one time or another. In general the diseases concerned tend to be of long duration, and statistics are required that enable the patient to be followed throughout the whole duration of his connexion with the health and social services. Record linkage is one technique that will be of assistance in this area, although the extensive range of contacts an individual can have with health and social welfare authorities may mean that such linkage can only be carried out on an *ad hoc* survey basis in a relatively limited geographical area.

The complete registration of all cases of the disease is of primary importance, and is often facilitated by the introduction of systems of compulsory notification.

Health service statistics for special disease groups are more concerned with evaluation of the effect of treatment than with the administration of the service, and indices relating to survival, total periods of hospitalization, and re-admission rates often need to be developed.

6. THE EVALUATION OF THE EFFICIENCY AND EFFECTIVENESS OF HEALTH SERVICES

6.1 Introduction

Most of the types of statistics described in this report as useful for planning and administering the health services are also needed for assessing the effectiveness and efficiency of these services.

Subjective impressions are no longer acceptable as the sole criteria for judging either the effectiveness or efficiency of health services. Statistical appraisal is necessary, and is being demanded more frequently. As the years go by the techniques available will become more sensitive and the data required will become more readily obtainable, so that objective evaluation of health services will be possible on a wider scale.

To avoid waste of resources, health services should fulfil certain criteria. They should (*a*) be vital to the health and well-being of the nation; (*b*) serve the purposes for which they are designed; (*c*) function efficiently and economically; and (*d*) be acceptable to those using them as well as to those providing them. Such criteria involve questions of both effectiveness and efficiency, and it is desirable to clarify the difference between these two terms. The effectiveness of a health service is a measure of the extent to which it is achieving its goals. Although a health service may have stated over-all objectives, it is more likely that most of its goals will relate only to a small part of its activities. For example, one goal of a diphtheria immunization campaign might be to reduce the incidence of diphtheria, although there could also be broader objectives, such as the total protection of the community against the disease. Efficiency, on the other hand, is concerned with achieving these goals with the least expenditure of effort, whether such effort be measured in terms of finance, manpower, or other resources. Efficiency is also concerned with acceptability. For example, motor vehicle accidents could be effectively prevented by banning all motor vehicles from the roads. However, this would be a most inefficient method, because of both the enormous cost of changing the transport system and the unacceptability of the measure to the public.

In evaluating the effectiveness of a health service programme it is essential to have a clear conception of the objectives, and the attainment of these objectives can then be observed by watching changes in the relevant indices. Before any new health programme is commenced, therefore, baseline measurements must be available. At the same time, it is just as essential to question the effectiveness of long-established systems for the delivery of health care, although these are often more difficult to evaluate. The Committee recommended that whenever new health programmes

are instituted, part of the resources should be used, if possible, to set up evaluation studies.

Each health programme needs to be closely observed during its development to ensure that the resources devoted to it are employed in the most efficient way and that it is kept on course towards its objectives. The same can be said about evaluating the efficiency of long-standing health services. To make such evaluation possible, data must be fed back to the administrator concerned so that changes can be made in the light of experience.

The evaluation team may or may not be part of the organization responsible for implementing the programme. Although this necessarily depends on the organizational structure of the institution concerned, the consensus was that there is much to be said for comparative independence of the evaluation team.

The introduction of a team to evaluate a health service programme often meets with resistance from those organizing the programme. This can be overcome partly by ensuring that there are good communications between the evaluating team and the organization responsible for the programme, partly by training all levels of health service personnel in methods of evaluation.

6.2 Indices for evaluation

The Committee considered the types of indices that might be useful in evaluating the effectiveness and efficiency of health service programmes. It was decided, however, that the complexity of modern health services and the vast number of activities they engage in make it impossible to provide any specific guidance on the indices to be used. In any case, indices for evaluation very often become obvious when considered in the context of a particular programme and its objectives. The resources devoted to health services can usually be expressed in numerical terms, such as manpower, medical establishments, etc., and are probably best expressed, whenever relevant, in terms of finance, because this enables factors such as manpower and facilities (e.g., beds) to be put on a comparable basis. The measurement of results, however, is a very much more difficult question.

There are four broad ways in which the results of health service activity might be measured. The first and simplest is very similar to the quality control used in industrial production. For example, the quality of pharmaceutical products can be checked by appropriate sampling techniques. In a similar fashion, the work of a clinical laboratory can be controlled by inserting a test sample into the normal work flow. The efficiency of radiology departments can be checked by the percentage of X-ray films that have to be rejected. The efficiency of ambulance services

can be judged in part by the time taken to get to the site of an accident. For a ward organization a suitable index of efficiency might be the number of reports received of the wrong administration of drugs or, at a slightly more complex level, the secondary infection rate following surgical operations. There should be little problem in setting up measures such as these.

The second category of indices is concerned with the effectiveness of the behaviour of either the health service personnel or the population served. This is rather more complex. At a relatively simple level, the "productivity" of physicians can be checked by observing the number of visits they carry out per unit of time, but quantity of work is not always a good indication of quality; checks on the quality of the work of medical personnel might be concerned with such items as the accuracy level of physicians' diagnoses. Here problems of judgement enter into the picture, and it is likely that such assessments can only be tentative.

The third group of indices is concerned with assessing the results of health service activities, and very often involves the observation of changes in morbidity and mortality. For example, the effectiveness of a diphtheria immunization campaign might be measured not only by the proportion of the population immunized but also by the reduction in the incidence of the disease. Other indices might involve the reduction in the mortality rate or the hospitalization rate. When considering the effectiveness of the treatment of an individual, one might compare his capacity to lead a full and active life before and after treatment. Wherever possible, measurement of this capacity should include not only physical indices, such as improvement in the mobility of a joint, but also psychological and sociological indices.

The fourth group of indices is concerned with assessing the cost of health services in relation to efficiency. This raises very difficult problems, for almost invariably complicated ethical and moral questions have to be decided against a financial background. For example, the cost of keeping a patient with chronic renal disease alive by means of artificial renal dialysis is quite considerable, and it is a matter of judgement whether the resources are best expended in this particular way. Similar judgements may be required in the preventive field, e.g., in an immunization campaign that covers a very large number of people at a relatively low cost per head. Even more complex problems are involved when one considers whether resources should be spent on health services in general or on particular related services such as transport. These studies of cost-benefit analysis are extremely difficult to carry out in a health service context, and much work needs to be done to develop them. There is a serious shortage of the kinds of data needed to show what final outcome, measured in terms of reduced morbidity, disability, or mortality, can be expected to result from particular health service programmes. It is possible, however, that the economic models now being developed to

represent the health service system will in future be extended to include an accurate representation of the sociological benefits derived from this system.

In any study involving evaluation of health services, care must be taken to ensure that the indices selected to measure effectiveness actually do so. For example, a programme directed towards reducing the stay of patients in a mental hospital might result in the patients living under extremely difficult circumstances in an unsuitable domestic environment. The total effect of the programme might therefore be to increase the sum of human misery, and this point will be missed in the evaluation if the domestic circumstances are not noted. Care is also needed to ensure that changes in the indices chosen to measure effectiveness are in fact due to the programme. For example, a reduction in the incidence of tuberculosis following a mass radiography campaign may not be a result of the campaign itself.

A striking example of the evaluation of health service activities is summarized in the table below. It is easy to see from the table that Poly-

MEASUREMENT OF HEALTH SERVICE ACTIVITIES OVER A
ONE-YEAR PERIOD AT TWO POLYCLINICS

Index	Polyclinic A	Polyclinic B
Number of visits to the polyclinic per inhabitant	10	14
Number of visits per doctor per hour in the following specialties :		
therapy	4	8
surgery	8	9
neuropathology	5	6
Index of observance of the district principle	98 %	70 %
Coverage by the follow-up services of the following diseases :		
rheumatism	89 %	49 %
hypertensive disease	95 %	56 %
gastric ulcers, etc.	100 %	72 %
Fulfilment of the plan for prophylactic examinations	100 %	86 %
Divergence between polyclinic and hospital diagnoses	2 %	5 %

clinic B has a higher rate of attendance from the inhabitants of the district it serves; that the doctors there are overworked during their consulting hours; that 30 % of the inhabitants do not see the doctors attached to their district; that coverage by the follow-up services of patients with rheumatism, hypertensive disease and ulcers is very low; that the population is not entirely covered by prophylactic examinations; and that the doctors make many mistakes in diagnosis.

Polyclinic A has considerably better indices. It can be concluded from these figures alone that Polyclinic B does not meet the population's requirements for medical services and that the quality of the services it supplies is low.

More detailed analysis disclosed that Polyclinic B had been set up in a relatively newly developed area, and the doctors there were working at too great a pressure. This evaluation led to a further polyclinic being built in the area, and as a result the indices of performance improved considerably. This example shows very clearly how simple statistics can be used to guide administrators in carrying out their policies.

6.3 International classification of health service activities

The Committee has few international recommendations to make. This is no doubt partly because the subject under examination is relatively new and partly because little attention has been paid as yet to the detailed comparison of health service statistics, which cover extremely diverse activities. The Committee feels strongly the need for further study of this important area of health statistics, and recommends the development of international guidelines that not only suggest greater detail in the types of statistics available, but also indicate preferred methods of collection and useful indices of health service activity. One reason for the failure to achieve international comparability in this field has been the lack of an acceptable international classification of health service activities. Several classifications of surgical operations are in use, but there has been no general treatment of other health service activities. The Committee therefore recommends that urgent attention be given to developing a classification of health service activities and that the possibilities of standardizing nomenclature in this field be examined.

7. ORGANIZATIONAL REQUIREMENTS

Many countries will have one central statistics unit containing all the necessary machinery. This unit will be authorized, in many instances by law, to receive information from such sources as hospitals, clinics, and often private medical practitioners. In very large countries a number

of small statistics units located in states, cities, or regions will perform the same functions locally. Both central and local health statistics units may either be part of the central health authority organization or form an established division of a unit or bureau responsible for the collection and compilation of statistics of all types. Whatever the structure, the basic function of a statistics unit will be to collect data from the sources referred to above. This calls for a very high degree of organizational skill and not infrequently a high degree of diplomacy, particularly when an institution or individual is not legally obliged to supply information.

National committees on vital and health statistics could perform a very useful task in co-ordinating and standardizing the collection of data from various health services. All report forms issued by the central statistics unit should have clear layout and neat design, and it is important to reduce the range of data collected to absolute essentials.

7.1 Organization for the supply of routine hospital and clinic data

Data will be required from different departments of the hospital. There will usually be a medical records department dealing with individual case returns for general and mental disease treatment and with cancer registration returns. At hospitals devoted exclusively to the practice of obstetrics, the data will often be provided in summary form, and matrons and supervisory nursing staff will usually allocate the responsibility for completing returns. Figures concerning finance, staff, beds, and the work of specialist departments may be assembled by the secretarial and accountancy staff. The prerequisite for obtaining a smooth flow of returns from all the various sources is that the officers to whom the task is delegated should view their work in a national perspective. It is difficult for any individual who is given the responsibility for completing returns for a government agency to do so conscientiously, achieving a high level of accuracy and promptness, if he has little awareness of the uses to which national statistical compilations are put. Regular training programmes can do much to break down these barriers, and the exchange of visits between the suppliers of statistical data and the central statistics unit to which the data are forwarded for tabulation and publication is very profitable.

The Committee felt that some form of medical audit should be introduced as widely as possible. The creation of a medical record audit committee, at least in the larger institutions, has great advantages. It leads to more accurate medical statistics by ensuring, for example, that the final diagnosis has been entered on the medical record by the doctor in charge of the patient, that pathology and X-ray reports are present and in conformity with the diagnosis, and that records in all sections and departments of the hospital are adequate, so that all returns and summaries

derived from any part of the hospital present an accurate summary of what has actually taken place. Furthermore, routine inspections of hospital records and other checking procedures to ensure validity should be carried out regularly by officers of the central statistics unit or by officers of the local health authority. In the case of government hospitals, intermittent inspections are very often carried out by officers of the division responsible for the control of the whole hospital service.

7.2 Organization for the supply of routine data from various non-hospital sources

Each agency responsible for obtaining routine data concerning child health services, disease control services, and special services provided in all areas, whether it is subject to some form of government control or not, will require its own organization system for extracting statistics. The emphasis will be on ensuring that a uniform system operates in each particular programme and that the staff of the health services are fully aware of the meaning of each item on the reporting or collection form. This is much easier to achieve if the central statistics unit prints and supplies the registers and day-books that are so commonly employed to produce tally figures under various headings.

When data are collected by survey methods, it is essential for each field office to be manned by a qualified supervisor, so that the need for control from the central office is minimal.

7.3 The training of personnel

It is emphasized that training of personnel at all levels is of paramount importance to ensure competence, but the Committee was unable to establish any clear pattern in the statistical tasks carried out by workers concerned in the operation of health services in all parts of the world. There is extensive variety in the content and responsibility of statistical work in the various health service occupations; for some health workers statistics is a full-time activity, for others it is only a very small side-line.

There is a need to know the job content of persons working in statistics at different levels in very different milieus before there can be any clear appreciation of what training facilities need to be introduced. Some definite progress towards this was made at the WHO Inter-Regional Conference on the Training of Health Statistical Personnel, held in Kampala, Uganda from 1 to 10 April 1968.

The objectives of this conference were :

- (1) to discuss the need for statistical personnel in health services;

- (2) to determine what statistical personnel are needed at different levels of health administration;
- (3) to define the responsibilities of the personnel of each category and the type of statistical work they are expected to perform;
- (4) to examine the difficulties connected with recruitment of personnel and the problem of wastage of personnel trained in statistics;
- (5) to assess the need for training statistical personnel, and to state what kind of training is required for statistical personnel without university qualifications;
- (6) to work out the training curriculum and to decide other matters regarding the form and performance of the training;
- (7) to discuss the organization of training, the level at which the training of a particular category of statistical personnel should be organized, what kind of institution the training courses should be attached to, what authority should be responsible for the training, who the teaching staff should be, and teaching media;
- (8) to indicate the role of WHO in the organization of training and what steps should be undertaken to improve the existing situation.

The Kampala Conference agreed that, besides the university-qualified health statistician with training or good experience in public health organization, epidemiology, and methodology, two other categories of personnel are needed: statistical technicians and statistical clerks. The number of personnel in each of these categories depended on the health statistics system of the country, which itself was a function of health service organization. It was considered extremely important that promotion should be possible within these two categories in recognition of special abilities and length of service.

The Committee recommends that WHO give further attention to specialized training in health service statistics and consider organizing courses in this subject for health administrators and statistical technicians.

An important issue discussed by the Committee was whether medical statisticians from central statistics units should give students in advanced courses at medical schools some instruction on their fundamental duties in supplying adequate medical records and certificates. It was felt that, although this contact is extremely desirable, students would not be entirely receptive to instruction at this stage and that it might be more opportune to introduce the subject during the student's internship at a hospital.

There is a need to establish communication between the supplier and the consumer of data. Effective channels of communication remove misunderstandings and lead personnel at lower levels to carry out their assignments more diligently. At a higher level, the feedback of data (e.g., tabulated regional summaries) leads to greater understanding.

The Committee strongly advocates the preparation of guides setting out the refinements of systems of data collection and defining terms encountered in the furnishing of basic returns.

The Committee's feeling in regard to training could perhaps be summed up by stating that there is a need for a team approach to every area of health statistics. To cultivate this approach is a challenge to be taken up by every health administrator.