

Epidemiological and Health Statistical Services

International co-operation in health statistics has a history as long and as eventful as that of the Sanitary Conventions. As has been mentioned earlier, the first International Statistical Congress was held in Brussels in 1853. William Farr and d'Espine were requested to present proposals for a medical nomenclature and did so at the second international congress held in 1855. A compromise list adopted by the congress served as the basis for the International List of Causes of Death, the preparation of which was entrusted to the International Statistical Institute in 1891. The idea of decennial revisions came from the American Public Health Association at its Ottawa session in 1898 and such revisions were subsequently made in Paris in 1900, 1910 and 1920.

When the League of Nations came into being, it co-operated with the International Statistical Institute in the further development of the International Lists; this led to the fourth (1929) and fifth (1938) revisions.

One of the first actions of the World Health Organization's Interim Commission was to set up an Expert Committee for the Preparation of the Sixth Decennial Revision of the International Lists of Diseases and Causes of Death which took as a basis for its work a classification prepared by the United States Committee on Joint Causes of Death. The International Conference for the Sixth Revision of the International Lists of Diseases and Causes of Death, convened in Paris in April 1948 by the French Government, with the assistance of WHO, resulted in the International Statistical Classification of Diseases, Injuries and Causes of Death, which was formally adopted by the First World Health Assembly in July of that year, together with WHO Regulations No. 1. These Regulations had historical importance, not only because they provided a guide to Member States in compiling mortality and

morbidity statistics by cause, age and sex and for various areas of the national territory, but also because they constituted a new departure in international law by laying obligations on States without signature and ratification of a formal treaty.

An important feature of the Regulations is the requirement that countries should adopt a form of medical certificate of cause of death that will clearly indicate the underlying cause of death; it is also specified that, as far as possible, medical certification of cause of death shall be the responsibility of the attending physician, and that the confidential nature of the certificate shall be protected during administrative procedures.

The recommendations of the Sixth Revision Conference were published by WHO, in English, French and Spanish, in the *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death*. This ensured a greater degree of uniformity in the individual categories than had hitherto been achieved. As the text of previous revisions had been published in French only, many countries had independently made their own translations.

An auxiliary publication issued by WHO in connexion with the Classification was the *Index Alphanumericus*, to assist countries using Latin medical terminology.

In 1951 the WHO Centre for Classification of Diseases was established at the General Register Office, London, to help in dealing with problems arising from the interpretation and application of the Classification. Using the experience gained in dealing with problems of certification and classification, the Centre was in a position to play an important role in the preparation of the Seventh Revision Conference which took place in Paris in 1955. It has also issued a number of publications to guide statisticians in the use of the International Lists.

The revised Classification resulting from this conference was adopted by the Ninth World Health Assembly, together with amendments to WHO Regulations No. 1. These amendments overcame certain difficulties which had arisen in the attempts to apply the previous Classification: they made it easier for the compilation of mortality statistics to be undertaken in suitable registration areas, and further provided for greater freedom in the choice of morbidity tabulation lists.

An important contribution of WHO to the international comparability of statistics were the definitions, made in 1950, of "live birth" and "foetal

death" as these had significance for rates of birth and stillbirth, and infant and general mortality rates. These definitions, as well as the WHO rules for certification of death, were embodied in the United Nations recommendations for the improvement of vital statistics and particularly in their *Principles for a Vital Statistics System*.

As the very nature of vital and health statistics did not permit of a line of demarcation being drawn between them—mortality data belonging to both—apportionment of responsibilities between the United Nations and WHO was made on the basis of expediency and the respective technical qualifications and interests of both organizations, the United Nations dealing with the collection of population and vital data of general and demographic significance, and WHO dealing with those aspects of vital statistics involving medical knowledge (certification of causes) and possessing a health significance (causes of death). This applied not only to the collection and publication of data by both organizations but also to studies by their respective commissions and committees and to teaching in the regional seminars and training courses for statistical personnel which they organized. In practice, collaboration between the services concerned went even further than the formal agreements provided.

The importance of encouraging the improvement of country health statistics led to special attention being given to the work of training, particularly from 1952 onwards. A senior consultant visited a large number of countries and in association with the respective regional offices gave advice on the institution or improvement of local statistical systems. The majority of the regional offices now have an adviser for the purpose of expanding this important work, which is basic to all development and planning in local health and medical organizations. The progress in co-ordinating country work in this field has been especially noteworthy in the Region of the Americas. Several reports on mortality and morbidity data from the countries have been prepared by the Regional Office.

Contributions from practically all national health administrations have made it possible for WHO to publish in its monthly *Epidemiological and Vital Statistics Report* current data on communicable diseases and demographic trends. In addition, and with further contributions from the United Nations and national statistical offices, WHO has issued *Annual Epidemiological and Vital Statistics* containing corrected and more complete data, together with

statistics of causes of death from a number of countries whose figures in this respect are more particularly reliable.

Both these periodicals are a continuation of similar ones issued by the League of Nations. Material for study covering an uninterrupted period of some thirty-five years is therefore available.

It is fully realized, of course, that notifications of communicable diseases for those countries which have an abundance of physicians are more complete than those in which medical men are few, but even there the data clearly show seasonal variations and epidemic outbreaks. On the other hand, the comparatively small coverage of the mortality data published indicates the need to expand vital registration and certification of causes of death throughout the world.

The WHO Expert Committee on Health Statistics and the Conference for the Seventh Revision of the International Lists of Diseases and Causes of Death have recommended improved methods for the compilation of mortality statistics. They have stressed the need for developing methods capable of furnishing health administrations with useful information on the health of their people in those areas where the standard methods of death registration and certification cannot be applied for lack of the necessary physicians and administrative machinery. In consequence WHO, by the use of consultants, statistical training centres, and courses organized jointly with the United Nations, has made efforts to facilitate the use of standard methods of health statistics and at the same time, at regional seminars, has tried to develop, on an experimental basis, the application of substitute methods, making use of lay and semi-skilled medical personnel for the collection of data.

Morbidity statistics, apart from certain hospital statistics based on the International Lists of Diseases and Causes of Death, are still far from reaching the degree of uniformity which mortality statistics have attained.

As early as 1949, the Expert Committee on Health Statistics stressed the need for improving the uniformity of morbidity statistics. In 1950 a special sub-committee proposed uniform rules for compiling hospital statistics. The Committee concluded that the International Statistical Classification would generally serve the need of hospitals better than any other classification. It felt that selected countries should be encouraged to compile hospital morbidity statistics routinely, but that routine compilation of all such statistics in all hospitals and countries was neither necessary nor desirable. It recommended

a form of individual report and principles for collection of data. It called for the study of the problems associated with statistics of mental and tuberculosis hospitals, of obstetrics, operations and anaesthetics, and of multiple admissions.

In 1951 a conference discussed the other forms of morbidity statistics, and emphasized the need for international agreement on the definitions of a series of terms commonly used to describe and measure morbidity. It entrusted the experimental application of these terms to the National Committees on Vital and Health Statistics, set up in a number of countries as the result of the recommendation of the 1948 Revision Conference.

These committees, which were intended to improve national and international co-ordination between services in charge of vital registration and health statistics, have fulfilled their purpose in this respect, as was apparent at the conference of their representatives held in London in 1953. The report of this conference¹ served as a guide for the studies which have been carried out in various countries. Such studies had progressed sufficiently for the WHO Expert Committee on Health Statistics, meeting in 1956, to recommend for international adoption, in compiling morbidity statistics, that units be clearly stated as either persons affected, or illnesses (relevant diagnoses), or spells of illness. The Committee also recommended the experimental use of a series of definitions of measurement of morbidity as a first step towards their international adoption.

The Committee also considered other forms of morbidity statistics, and particularly sickness surveys, which can be of considerable value to health administrations if carried out on a proper sampling basis. The Committee further discussed the merits of analysis of general practitioners' records and social security statistics.

Communicable Diseases

International co-operation in the study of the epidemiology of communicable diseases is more advanced than in that of the epidemiology of other conditions. Early measures to prevent the spread of diseases over national boundaries stimulated research into their epidemiology. The discovery of the causative organisms and much of the manner in which they are spread has led

¹ *Wld Hlth Org. techn. Rep. Ser.* 1954, 85

to the better control of these diseases and even to the eradication of some of them in certain circumstances. Nevertheless, many problems connected with their international epidemiology still await solution.

The international epidemiology of the quarantinable diseases is dealt with in Chapter 18. In recent years, international epidemiological work has extended to many other communicable diseases, including malaria, tuberculosis, trachoma, leprosy, the common infectious diseases of childhood, infectious hepatitis, cerebro-spinal meningitis, and diarrhoeal diseases.

Much work has also been done on the epidemiology of influenza and poliomyelitis. For these two diseases and for salmonella and shigella infections, the work was assisted by the establishment of international centres for the identification of the strains concerned.

Other chapters deal with the epidemiology of several of these conditions.

Epidemiological and Statistical Study of Other Conditions

The modern view that epidemiology is relevant not only to communicable disease but to all factors affecting the health of a community has led, particularly in the last few years, to the Organization's being concerned with studies dealing, *inter alia*, with the epidemiology of mental diseases, nutritional diseases, chronic circulatory conditions, accidents, respiratory conditions and dental diseases. The recommendations of expert committees and other groups on nomenclature, definitions, classifications, survey and sampling methods, have been put to use in these studies. Attention has also been given to the possibility of extending the epidemiological method by the use of radioisotopes. The Organization has moreover attempted to provide material for study by local services and institutions, by publishing the available data in its routine statistical publications, and has encouraged the preparation of studies for publication in the *WHO Bulletin*.

Particularly since 1953, epidemiological research has been made a part of many programmes of WHO advisory services to governments. Even when research is not the declared objective of such a programme, opportunities for collecting epidemiological data are taken wherever possible. The need for such work to be included in all the programmes WHO assists has been evidenced by the number of requests made to the Organization in recent years for informa-

tion on the international aspects of many diseases and other conditions affecting public health. The tendency to look to the Organization as a source of medical "intelligence" has grown during the last ten years. The requirements of local institutions and services, universities and research laboratories for data on which to base programmes for national and regional development have increased, particularly since the passing of the "emergency" phase of the first few years. To meet these requests the Organization, since 1953, has strengthened its epidemiological and health statistical services, which are being developed in the expectation that in due course they will be one of the main international channels for the transmission of epidemiological and statistical information.

An interesting example of such a service is the help which the Organization was asked to give to a group, convened by the United Nations with the participation of some of the specialized agencies, concerned with the description of social development or defect as a guide to the establishment of rational international programmes of assistance. For this purpose the group desired some means of comparing different levels or standards of living that would make it possible to form a better judgement as to what action was required to raise them and to assess how far such action had been successful. Great difficulty was met in attempts to give meaning to such terms as "levels" or "standards" of living. A United Nations committee of experts found it impossible for the time being to prescribe any single index by which a level of living could be defined, but suggested that the best way to approach the problem would be to look for relevant factors that could be clearly defined and could be measured. The relevant factors—health, food, education, conditions of work, employment, etc., were called "components", and the means of measuring the components were called "indicators". WHO was asked to advise on indicators for health and set up a study group, which reported in 1955. This group classified possible health indicators as follows:

1. Health status of the individual or group;
2. Environmental conditions;
3. Health activities.

It considered that inherent difficulties prevented any recommendation for the direct measurement of social well-being *per se*, but it suggested the search for indicators by sample surveys of families. In 1956, the WHO Expert Committee on Health Statistics endorsed a previous opinion that the expectation

of life at birth, at one year, or at any other age, was theoretically the best indicator but that it was available for only a small number of countries. It therefore adopted a suggestion that a proportional mortality ratio (that is, the percentage of total deaths represented by deaths at the age of fifty and over) be experimentally taken as a comprehensive health indicator.

Recently the Organization has often been asked to provide consultants to advise countries on health statistics and epidemiology in connexion with the planning of their health programmes, and the number of persons in national services seeking more advanced training through fellowships has been increasing rapidly. The statisticians recently appointed to many countries, as well as those associated with the WHO regional offices, have done much to foster a wider acceptance of statistical work, and numbers of technical projects assisted by WHO are now benefiting. In 1957 the Organization decided to examine its policies and consider future programmes, and it called upon a group representing several branches of epidemiology to undertake this task.

International Study of Cancer

Cancer research is being conducted on an impressive scale, especially in North America and in parts of Europe. As such local investigation meets most of the immediate needs for laboratory, clinical and field research, international programmes have been restricted to certain specific subjects. International research work on cancer has therefore been mainly concerned in the last ten years in the co-ordination of local statistical studies. The Organization has continued the study, initiated by the League of Nations, on cancer of the uterine cervix. It has followed the lead given by the League in assisting research workers in different countries to agree on such matters as definitions, nomenclatures and classifications: such standardization, and common techniques of diagnosis and treatment, are necessary in the study of, for example, the geographical variations in the types and forms of cancer. In 1951 a WHO Sub-Committee on the Registration of Cases of Cancer discussed the general principles which should govern the statistical classification of neoplasms, and agreed that such classification should distinguish the anatomical site, the histological type, and the degree of malignancy. A modified classification for malignant neoplasms was prepared, and was ultimately

included in the seventh revision of the International Statistical Classification of Diseases, Injuries, and Causes of Death. The help of the National Committees on Vital and Health Statistics and of other agencies has been enlisted in promoting the adoption of the definitions and classifications recommended.

Another development during the ten years which has received much attention from the WHO sub-committees concerned with cancer statistics has been the introduction of cancer registries in countries where the medical and statistical services are sufficiently developed to make them a practical possibility. The assessment of the results of the different treatments of cancer—surgical, radiological, and other—has also received attention. The lack of adequate epidemiological and statistical knowledge of the course of neoplasms under different conditions has made many earlier deductions from clinical records of little value. As early as 1950 the Sub-Committee on the Registration of Cases of Cancer suggested definitions, rules and procedures for compiling statistics on the results of treatment and for computing survival and recovery rates.

Data from the returns received from countries, supplemented by those obtained from certain investigations undertaken by the Organization, have been classified and made available in tables published in the *Annual Epidemiological and Vital Statistics* and in some issues of the monthly *Epidemiological and Vital Statistics Report*. Studies published have included: cancer mortality in Europe during the twentieth century; mortality from malignant neoplasms of the respiratory system; mortality from Hodgkin's disease and leukaemia; and mortality due to cancer of the breast and female genital organs.

In 1955 a group of experts advised the Organization on its work connected with cancer research. The group confirmed the view that it was of prime importance that countries should adopt and apply uniform definitions, nomenclatures and criteria of diagnosis. In this connexion the group also made a proposal, on which action is being taken, for the establishment of international pathological reference centres. Difficulties still arise in the pathological diagnosis of neoplasms and in comparing the diagnoses made in different countries. The group therefore considered that it would be useful if the Organization would make standard pathological specimens available to interested local laboratories and specialized workers. There are differences in type and prevalence of neoplasms in different parts of the world which are not yet understood but which may be related to local epidemiological

circumstances; if such relations could be determined, they might explain some of the causative and correlative factors of cancer and the group considered that every assistance should be given to workers on such problems.

UNESCO undertakes international programmes of research into physical, chemical and biological phenomena of cell growth; to avoid overlapping and to co-ordinate the work of the two organizations, it has been accepted that WHO shall have the primary responsibility in the research related to health and medicine, without prejudice to the right of UNESCO to concern itself with the pure sciences.

Non-governmental organizations, in particular the International Union against Cancer, have co-operated in this branch of the Organization's work. The Union has been attempting to extend the studies, referred to earlier, of geographical variations in types of cancer. WHO has also kept in touch with the work of the International Congress of Radiology on the results of treatments of cancer.

Special Studies

During the ten years of its activities, WHO has collected a great deal of information on those diseases on which it concentrated its efforts, such as tuberculosis, yaws, malaria, bilharziasis, etc., which, as already mentioned, are dealt with in other parts of this book. In addition, from the mass of mortality and morbidity data collected by the Organization, statistics have been compiled and presented in the *Epidemiological and Vital Statistics Report*, to provide a statistical basis for the work of expert committees and study groups of the Organization. Such studies have dealt with both communicable diseases and other conditions.

The general acceptance of the infant mortality rate as a useful indication of health conditions prompted its early examination in international studies. In 1948, such a study showed that there had been a disturbing increase in infant mortality in several countries affected by the Second World War. On the other hand, more surprisingly, many countries which had suffered from the war showed little or no change from the usual rate. Similar studies made in 1950, 1951 and 1952 showed that in most European countries limits of reduction of the more easily preventable infant deaths were being reached,

at rates of thirty deaths or less per thousand live births. Similar conditions during the same period were recorded in Australia, Canada, New Zealand, and the United States of America.

In recent years it has been possible to use available data to issue tables in the monthly and annual publications showing death rates in selected countries, mostly in Europe, from such causes as tuberculosis, cancer, maternal morbidity, certain communicable diseases, arteriosclerosis, and accidents. In 1952, a study was made of the decline of mortality as a factor in the recent growth of various populations in the world.

Finally, it should be noted that the scope of the Organization's work in international epidemiology and health statistics also extends to many of the activities described in other chapters of this volume. These subjects are increasingly recognized as essential components in the planning and execution of international programmes and also in the associated research. Many of these programmes must depend for their full development on suitable technical advice on the principles and techniques of epidemiology and statistics.
