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WORLD HEALTH ORGANIZATION

TECHNICAL REPORT SERIES

No. 164

EXPERT COMMITTEE ON HEALTH STATISTICS

Sixth Report

including

Third Report of the

SUB-COMMITTEE ON CANCER STATISTICS

	Page
1. Terms and measurements in the field of morbidity statistics	1
2. Long-range programme in vital and health statistics	12
3. Statistics in WHO field and research projects: review of the role of statistical methodology.	18
4. Third report of the Sub-committee on Cancer Statistics . . .	19
5. Health indicators for measurement of levels of living	19
6. International programme of social statistics	20
7. Resolution on health and vital statistics of the Eleventh World Health Assembly	21
Annex 1. Subjects envisaged for studies and publications on methods and procedures in health statistics	23
Annex 2. Sub-Committee on Cancer Statistics: third report . .	25

WORLD HEALTH ORGANIZATION

PALAIS DES NATIONS

GENEVA

1959

EXPERT COMMITTEE ON HEALTH STATISTICS

Geneva, 29 September - 4 October 1958

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This report was originally issued as mimeographed document WHO/HS/100.

PRINTED IN SWITZERLAND

EXPERT COMMITTEE ON HEALTH STATISTICS

Sixth Report

The Expert Committee on Health Statistics met in Geneva from 29 September to 4 October 1958.

Dr P. Dorolle, Deputy Director-General of the World Health Organization, opened the meeting on behalf of the Director-General.

The Committee elected Dr W. P. D. Logan *Chairman*, and he was requested also to act as *Rapporteur*. Dr Forrest E. Linder was elected *Vice-Chairman*.

The provisional agenda was adopted with slight modifications.

1. TERMS AND MEASUREMENTS IN THE FIELD OF MORBIDITY STATISTICS

1.1 Special problems in measuring morbidity

The measurement of morbidity presents a variety of problems not encountered in the field of mortality statistics, problems that arise out of the special characteristics of *illness* in contrast with *death*. Death is a unique event, whereas illness may occur many times, either from the same or from different causes. Death occurs at a point in time, whereas illness may have a duration ranging from less than a day up to many years. Illness may vary greatly in its severity, leading to different reactions on the part of the patient, to different degrees of disturbance of his ordinary activities, and to various kinds of medical treatment: for example, some illnesses may cause no disability whatever, others may lead to some minor restriction of ordinary activities, and others may lead to absence from work or to confinement to bed or to admission to hospital. In the measurement of morbidity, these special aspects of illness have to be taken into account.

* The Executive Board, at its twenty-third session, adopted the following resolution:
The Executive Board

1. NOTES the sixth report of the Expert Committee on Health Statistics, including the third report of the Sub-Committee on Cancer Statistics adopted by the Expert Committee on Health Statistics;
2. REQUESTS the Director-General to take into consideration the recommendations of the Expert Committee;
3. THANKS the members of the Committee for their work; and
4. AUTHORIZES publication of the report of the Expert Committee on Health Statistics together with the report of its Sub-Committee on Cancer Statistics.

(Resolution EB23.R19, *Off. Rec. Wld Hlth Org.*, 1959, 91, 14)

1.2 International comparability of morbidity measurement

At the Conference on Morbidity Statistics held in 1951 in conjunction with the Expert Committee on Health Statistics,¹ it was recommended that attention should be given by national committees on vital and health statistics, or their equivalents, to definitions of terms in current use in morbidity statistics and to the methods of measurement of morbidity. Two annexes to the Committee's report set out a series of terms and measurements requiring definition for morbidity statistics purposes. It was further recommended that certain countries should make preliminary reports on these matters and submit them to the World Health Organization. The fifth report of the Expert Committee on Health Statistics² again took up this subject, noting that a certain degree of international comparability as regards the basic concepts relating to the measurement of morbidity appeared to have developed, but that committee was unable to give the subject sufficient consideration, and suggested that after adequate preparation it should be discussed further by a subsequent expert committee.

1.3 General considerations

As a general approach to the question of morbidity statistics terms and measurements, the Committee decided first to attempt to define the basic concepts associated with measurement of morbidity, and then to discuss the applicability of these concepts to several special fields of morbidity, modifying the basic terminology as necessary for these special fields, and introducing such definitions as seemed to be needed. The special fields of morbidity statistics into which the Committee looked were:

- (1) general surveys of sickness (household interview surveys);
- (2) hospital in-patient morbidity statistics;
- (3) notifications of disease;
- (4) industrial sick-absence statistics;
- (5) social security morbidity statistics.

In each of these fields the Committee noted that numerous working definitions are already in use and that these definitions are often different from one country to another. Many of them are determined by national or local administrative, legal or medical requirements, and the Committee did not attempt to review these. It confined its attention solely to terms directly relevant to the morbidity measurements it was itself recommending.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1952, 53, 5

² *Wld Hlth Org. techn. Rep. Ser.*, 1957, 133, 5

1.4 Basic concepts in the measurement of morbidity in general

Morbidity can be measured in terms of three units: (1) *persons* who are ill; (2) the *illnesses* (periods or spells of illness) that these persons experience; and (3) the *duration* (days, weeks, etc.) of these illnesses. The Committee considered that in this connexion no difference in meaning ought to be attached to terms such as "sickness", "illness", "morbid condition". It was further considered that in relation to morbidity statistics in general, these synonymous terms (sickness, illness, morbid condition) can be defined as any departure, subjective or objective, from a state of physiological well-being, whether due to disease, injury, or impairment. The Committee noted that diseases, injuries and impairments can each be of varying degrees of severity and in some circumstances it would be desirable to exclude the most trivial diseases, injuries, and impairments from the statistics.

For special morbidity statistics, the meaning of "period (spell) of illness" will be determined by circumstances. For example, hospital in-patient morbidity statistics will relate to periods of illness in hospital; industrial sick-absence statistics will relate to periods of absence from work on account of sickness. The distinction has been drawn between an experience of ill-health related to a single specific diagnosis or cause, and one related to two or more concurrent or overlapping diagnoses. The latter type of experience may be counted as a single "spell" or "period" for such purposes as, for example, health insurance or absenteeism. While the distinction is obviously a valid one, it is considered that the question of which concept is being used will ordinarily be made clear in the context of each particular study.

The Committee considered that for many morbidity statistics purposes, morbidity could best be measured in terms of: (1) periods (spells) of illness, or alternatively, of persons with illness, *commencing* during a defined period; (2) illness *current*, or persons ill, during a defined period; (3) illness *current*, or persons ill at a particular point of time within the period, or at an average point of time within the period; and (4) the duration of these illnesses. Accordingly, the Committee discussed the following general measurements of morbidity.

1.4.1 *Frequency of illnesses commencing during a defined period*¹

This measurement can be used either for periods (spells) of illness

¹ During its discussion the Committee thought that in languages in which the concepts are rendered by different words or circumlocutions these should be followed in the text by the internationally accepted term or by its derivative best adapted to the language concerned: e.g., "fréquence des cas nouveaux (*incidence*)"; "fréquence globale à un moment donné (*point prevalence*)".

This might facilitate a correct understanding of the text and contribute to the general adoption of the internationally accepted term, even in languages in which the term already exists but possesses other meanings.

commencing within a defined period or for persons becoming ill during the period. It excludes illnesses which had started before the beginning of the period and which continued into it.

The Expert Committee on Health Statistics

RECOMMENDS that:

(1) the term "incidence" be used to describe the measurement of frequency of illnesses commencing during a defined period and that this term be used with no other connotation;

(2) in utilizing the term "incidence", it be made clear whether the term is used in respect of illnesses or in respect of persons ill;

(3) when incidence is expressed as a rate, the denominator be the average number of persons exposed to risk during the defined period or the estimated number of persons at the mid-point of that period.

1.4.2 *Frequency of illnesses in existence at any time during a defined period*¹

This measurement applies to illnesses that are current at any time during a defined period (e.g., a week, a month, or a year), whether they started before or during the period. Alternatively, the measurement may be applied to persons who are ill at any time during the period, whether they became ill before or during the period.

The Expert Committee on Health Statistics

RECOMMENDS that:

(1) the term "period prevalence" (or, more specifically, annual, monthly, weekly, prevalence) be used to describe the measurement of frequency of illnesses in existence at any time during a defined period (i.e., a year, a month, a week, etc.) and that this term be used with no other connotation;

(2) in utilizing the term "period prevalence", it be made clear whether the term is used in respect of illnesses or in respect of persons ill;

(3) when period prevalence is expressed as a rate, the denominator be the average number of persons exposed to risk during the defined period or the estimated number of persons at the mid-point of that period.

1.4.3 *Frequency of illnesses in existence at a particular point in time*¹

This measurement relates to illnesses that are current at a given time (e.g., the first day, the last day, a daily average within a defined period), regardless of when the illness commenced. Alternatively, the measurement

¹ See footnote, page 5.

may relate to persons ill at a given time, regardless of when they became ill.

The Expert Committee on Health Statistics

RECOMMENDS that:

- (1) the term "point prevalence" (or, more specifically, the "prevalence" at a stated point in time) be used to describe the measurement of frequency of illnesses in existence at a particular point in time and that this term be used with no other connotation;
- (2) in utilizing the term "point prevalence", it be made clear whether the term is used in respect of illnesses or in respect of persons ill;
- (3) when point prevalence is expressed as a rate, the denominator be the number, actual or estimated, of persons at risk at the given time.

1.4.4 *Measurements of duration*

The measurements of duration that are available for morbidity statistics purposes are numerous. They can be expressed in two ways:

- (1) measurements of average duration;
- (2) frequency distributions of duration.

These two forms of statistical measurement can be computed for:

- (a) the population at risk, yielding an average duration of illness and a frequency distribution of durations of illness in the population at risk during a defined period (e.g., days of illness per person of the population);
- (b) ill persons, yielding an average total duration of illness and a frequency distribution of durations of illness amongst persons who were ill during a defined period (e.g., total days of illness per person ill);
- (c) periods (spells) of illness, yielding an average duration of periods of illness and a frequency distribution of durations of periods of illness during a defined period (e.g., total days of illness per period of illness).

Particular forms of measurement of duration will be required for particular purposes, but the majority of these measurements will correspond with one or other of the three types listed above. In measuring duration, the date of onset and the date of recovery from illness should be defined on the basis of uniformly applied criteria; these criteria will depend upon the type of morbidity statistics under consideration.

1.5 Application of basic measurements to several special fields of morbidity statistics

1.5.1 *General surveys of sickness (household interview surveys)*

The definition of "sickness" adopted in such surveys is usually a wide one, based upon subjective rather than objective criteria, and including

departures from health resulting either from disease, injury, or impairment. As an example of the broad type of definition appropriate to surveys of sickness, the Committee noted the following definition used in the current US National Health Survey:

“Morbidity is basically a departure from a state of physical or mental well-being, resulting from disease or injury, of which the affected individual is aware. It includes not only active or progressive disease but also impairments, that is, chronic or permanent defects that are static in nature, resulting from disease, injury, or congenital malformation. The existence of morbidity in an individual caused by a particular disease, injury, or impairment is called a ‘morbidity condition’ or simply a ‘condition’.”¹

The illness reported in surveys of sickness can be classified in various ways, for example:

- (1) (a) New illness—illness commencing during a defined period.
(b) Continued illness—illness that commenced before the defined period and continued into it.
- (2) Acute and chronic disease. This distinction is in practice based on a variety of criteria, such as medical indications, severity, duration, etc. It is considered that the sense in which the terms are used will be made clear in the context of each particular study.
- (3) (a) Non-disabling (or non-incapacitating) illness—illness causing no disability (incapacity) throughout that portion of its duration which fell within the defined period.
(b) Disabling (or incapacitating) illness—illness causing any degree of interference with the ability of the patient to continue his ordinary activities. It can be further sub-divided, for example, as follows (the categories not being mutually exclusive):
 - (i) minor restriction of activities;
 - (ii) absence from work or from school;
 - (iii) confinement to bed;
 - (iv) admission to hospital.
- (4) Recourse to medical advice and/or treatment.

The basic measurements presented in section 1.4 are directly applicable to the results of sickness surveys in so far as they relate to general morbidity, namely,

- (1) incidence rate of illnesses or of ill persons;

¹ United States Department of Health, Education, and Welfare, Public Health Service (1958) *Health Service statistics from the US National Health Survey. Series A-3*, Washington, D.C.

- (2) period prevalence rate of illnesses or of ill persons;
- (3) point prevalence rate of illnesses or of ill persons (this may be either a directly calculated rate for a specified day, or an indirectly calculated rate referring to a daily average within the defined period);
- (4) average duration and frequency distribution of durations relating to periods of illness or to ill persons during the defined period.

1.5.2 *Hospital in-patient morbidity statistics*

The Committee reviewed a series of terms commonly used in connexion with hospital in-patient morbidity statistics—for example, admission, first admission, re-admission, discharge, in-patient, patient-day, duration of stay—and considered that there seemed to be a high measure of agreement on the definition of these terms. Many other terms in common use for hospital statistics purposes are either required mainly for hospital service statistics, with which the Committee was not, on the present occasion, concerned, or are determined by local administrative requirements.

The Committee considered that the general definitions of measurements of morbidity recommended in section 1.4 were applicable to hospital in-patient morbidity statistics, but with a number of changes in terminology, namely:

- (1) “Admission rate” corresponds to “incidence rate”. If possible, the admission rate should be sub-divided into “first admissions” and “re-admissions”. For practical convenience, discharges rather than admissions will often be used as the statistical unit for tabulation and, in most circumstances, the admission rate and the discharge rate will be largely interchangeable.

- (2) The term corresponding to “point prevalence rate” in section 1.4.3 will be “average daily bed occupancy”, or “average daily census”, or “number of patients in hospital on . . . (a specified day)”.

- (3) Amongst measurements of duration, those that are frequently used in this field are the average duration of stay and the frequency distribution of durations of stay, usually tabulated in relation to individual periods of hospitalization, though sometimes tabulated in relation to the total hospitalization time of *persons* during a defined period.

1.5.3 *Notifications of disease*

The Committee emphasized the desirability of distinguishing in tabulations between “provisional notifications” and “corrected notifications”. In publishing statistics of notifiable diseases, some indication should be given, when possible, of the estimated degree of error to which these statistics are subject as a result of incompleteness of notification. In respect of certain notifiable diseases, such as tuberculosis, distinction should be

made, if possible, between "new cases" and "newly detected pre-existing cases".

In relation to the basic measurements given in section 1.4, the Committee noted that:

- (1) notification rates correspond with incidence rates of illness or of persons, these being usually identical;
- (2) a point prevalence rate can be calculated in certain circumstances, for instance when information or estimates on duration are available.

1.5.4 *Industrial sick absence statistics*

The Committee noted that in the *draft* report of the International Conference of Sick Absence Statistics (Leiden, 10-12 October 1957) organized by the Permanent Committee and International Association of Occupational Health, a detailed account has been given of methods of measuring industrial sick absence. The Committee further noted that the measurements proposed in that report correspond closely, in concept and in terminology, to the basic measurements of incidence, prevalence and duration recommended in section 1.4 above.

1.5.5 *Social security morbidity statistics*

The Committee did not discuss in detail the terms and measurements used for morbidity statistics derived from the various forms of social security systems (sick funds, sickness insurance plans, etc.). The International Labour Organisation has already carried out considerable work in this field, and future developments should be looked at closely in collaboration with this Organization. However, the Committee considered the applicability to this field of the general concepts of morbidity measurement set out in section 1.4 above. It believed that a measurement such as "new claims to sickness benefit" during a defined period was the equivalent of "incidence", and that a measurement such as "number of persons in receipt of benefit" on a given day was the equivalent of "point prevalence". Measurements relating to numbers of days in respect of which sick benefit was paid within a defined period were represented within the "duration" measurements given in section 1.4.4. The Committee therefore concluded that the basic concepts of measurement of morbidity presented in section 1.4 were relevant to social security morbidity statistics, though the terminology conventionally employed in that field appeared to be different.

1.6 Further recommendations

I. The Expert Committee on Health Statistics,

Recognizing that the morbidity concepts and terminology presented in this report represent only a first step towards the achievement of

standard definitions in the various fields of morbidity statistics, and that further progress will depend in part upon experimental use and evaluation of the usefulness and adequacy of the proposed terms,

RECOMMENDS that:

(1) the World Health Organization draw to the attention of national health statistics administrations the concepts, definitions, and terminology proposed in the sixth report of the Expert Committee on Health Statistics;

(2) these concepts, definitions, and terms be adopted, in so far as possible, for use in the national or international presentation of morbidity statistics, and that countries report to the World Health Organization, after trial, on the acceptability of these terms as standard definitions;

(3) to facilitate understanding and comparability of morbidity statistics, countries take special note of the recommendation of the Expert Committee in its fifth report that published morbidity statistics should be accompanied by technical notes clearly defining the scope and methods used in collecting and analysing the data.

II. The Expert Committee on Health Statistics,

Considering that the World Health Organization, in co-operation with other appropriate international agencies, can add greatly to the value, nationally and internationally, of the results obtained from health surveys by the establishment of a systematic exchange of national experience and by the achievement of some degree of international comparability,

RECOMMENDS that:

(1) countries consider the usefulness of survey methods as a source of the morbidity statistics needed for public health planning and administration;

(2) the World Health Organization establish an expert sub-committee or group for the continuing study of such surveys;

(3) this sub-committee or group consider the standardization of morbidity survey methodology, carrying forward the initial steps taken by the Expert Committee in 1958, and also the general objectives and purposes of such surveys and such technical questions as those of statistical design, questionnaire content, analysis and presentation of results;

(4) in view of the growing importance of sickness surveys, and the emphasis given in previous reports of expert committees to the necessity for improvement of morbidity statistics, the work programme and reports of the expert sub-committee or group on health surveys should be under the guidance of the Expert Committee on Health Statistics.

2. LONG-RANGE PROGRAMME IN VITAL AND HEALTH STATISTICS

2.1 Preparation of Eighth Revision of the International Classification of Diseases

The Conference for the Seventh Revision of the International Lists of Diseases and Causes of Death recognized that certain sections of the International Classification of Diseases were not entirely satisfactory. However, owing to the limited scope of the Seventh Revision, the modifications introduced were mainly of an editorial nature, improving on the notes and explanations given in the Classification. Changes of substance were postponed until the Eighth Revision, and it was strongly recommended that work be started early on the national and international level in laying the groundwork for that revision.

The Committee noted that studies were already being undertaken in various countries in preparation for the Eighth Revision, and stressed the importance of international co-ordination of such studies, so that different national viewpoints and approaches could be reconciled before they became too deeply entrenched in any particular country.

The Committee considered the preparatory work in relation to the three sections of the Classification which appear most in need of a critical appraisal and early attention, namely: causes of stillbirth; mental, psycho-neurotic, and personality disorders; cardiovascular diseases.

2.1.1 *Causes of stillbirth*

In order to obtain a sound basis for the revision of the classification of causes of stillbirth, a series of studies have been suggested to countries, such as studies of various principles of certification and selection of causes for tabulation; comparison and integration of the reported causes of foetal death and of causes of death during the neonatal period; studies on the tabulation of causes of foetal death by length of gestation, as recommended in the second report of the Expert Committee on Health Statistics.

As part of the preparatory work on causes of stillbirth, the Committee felt that it would also be useful to obtain information on the present application of the WHO definitions of "live birth" and of "foetal death" and on the difficulties encountered.

The Expert Committee on Health Statistics,

Considering the importance of national experience in classifying causes of stillbirth and the need for international co-ordination of various efforts in this field,

RECOMMENDS that:

(1) the World Health Organization again call attention to international recommendations that have been made in respect of the classification of causes of stillbirth;

(2) the World Health Organization collect and disseminate information on studies being conducted in various countries, whether at the national or local level (e.g., hospital studies on perinatal mortality);

(3) the World Health Organization provide, not later than in 1961, for a combined session of clinicians familiar with the principles of classification for statistical purposes and of health statisticians to review the results of studies and formulate proposals for the revision of the classification of causes of stillbirth.

2.1.2 *Mental, psychoneurotic, and personality disorders*

Except for routine mortality statistics, the classification of mental disorders in the International Classification has not been used to any great extent. As far as is known, only three countries (New Zealand, the United Kingdom, and Canada) are applying the International Statistical Classification of Diseases in compiling statistics of patients in mental institutions.

Recognizing the difficulties in arriving at a generally acceptable classification of mental disorders, the Committee noted with satisfaction the active interest being taken by WHO in the establishment of a classification suited to the nature of these disorders and adjusted to the statistical needs.

The Expert Committee on Health Statistics

RECOMMENDS that:

(1) the World Health Organization keep in close touch with and co-ordinate national efforts aimed at the revision of the section of the International Classification dealing with mental disorders;

(2) the World Health Organization provide in due course for one or more combined sessions of psychiatrists familiar with the principles of classification for statistical purposes and of statisticians working in the mental health field to review developments and to suggest further action in respect of the revision.

2.1.3 *Cardiovascular diseases*

The section of the International Classification dealing with cardiovascular diseases has proved unsatisfactory, and the Committee considered that a series of basic studies from both the clinical and statistical viewpoints would be necessary in order to revise it. It noted the investigations planned or already started in certain countries, such as studies on medical certifica-

tion of cause of death, the bases of the cardiovascular diagnoses entered on certificates, and ways to improve the classification of these diseases. It also noted that a WHO Expert Committee on Cardiovascular Diseases and Hypertension would shortly be giving attention to the question of establishing uniform criteria for the clinical diagnosis and classification of cardiovascular diseases in a manner that will be applicable to epidemiological and other statistical studies.

The Expert Committee on Health Statistics,

Recognizing the deficiencies in the present classification of the cardiovascular diseases, and the need for early co-ordination of various national and international efforts before divergent ideas as to the revision of the classification of cardiovascular diseases become firmly fixed,

RECOMMENDS that:

(1) a group consisting of specialists in cardiovascular diseases familiar with the principles of classification for statistical purposes and of health statisticians be established soon to consider the revision of the classification of cardiovascular diseases in the light of current medical concepts and statistical requirements, and to formulate proposals for revision;

(2) in view of the complexity of the problem, such a group meet several times before 1963 to attend to the various stages of the preparatory work.

2.2 Regional seminars and meetings

The Committee was informed about the series of regional seminars and conferences already convened or scheduled to be convened by WHO for the coming years until 1960. This series of meetings started with a Seminar on Vital and Health Statistics, convened jointly with the Commission for Technical Co-operation in Africa South of the Sahara (CCTA), which was held in Brazzaville in November 1956; this was followed by the Inter-American Seminar for the Classification of Diseases, held in Caracas in August 1957. A Seminar on Certification and Classification for countries in the South-East Asia Region was to be held in New Delhi in October 1958, and seminars are planned for countries in the Eastern Mediterranean Region and in the Western Pacific Region.

These regional seminars or meetings are conducted in collaboration with the Statistical Office of the United Nations. They are adapted to the stage of development in vital and health statistics of the countries in the particular region, the general purpose being to strengthen health statistical services through methods best suited for application in the countries concerned.

The Committee stressed the great importance of regional meetings of health statisticians. These meetings serve a number of useful purposes, such as: a stock-taking of the health statistical situation in the countries concerned; an analysis of progress achieved in these countries; and a discussion of difficulties met in implementing national and international recommendations.

In addition to these uses, the regional meetings fulfil the important objective of creating a wider appreciation of the value of health statistics in countries in the region, particularly in the country where the meeting is held. In this respect, the Committee also pointed out the desirability that some future Expert Committees on Health Statistics should meet in areas with variously developed vital and health statistics services, to permit responsible health statisticians to take advantage of technical discussions with the members of the Expert Committee.

In the opinion of the Committee, international effort had been applied much more vigorously to systematic programmes of regional conferences and meetings of working groups concerned with developing types of statistics other than health statistics. The Committee noted that the agendas of the large number of regional statistical conferences convened yearly by the United Nations and regional organizations, such as the Inter-American Statistical Institute, do not cover health statistics, but leave responsibility in this field to WHO.

The Committee felt that such responsibility should be more adequately assumed and implemented than has been done so far, and that WHO should expand its programme, including the convening of meetings of health statisticians together with health administrators. The Committee noted the meeting of this kind convened by the WHO Regional Office for Europe to deal with hospital statistics and their application in health administration.

Meetings of health statisticians would be useful for areas at any stage of development. A number of other health statistics subjects could profitably be dealt with, such as the following:

- (1) health statistical systems in the various countries;
- (2) education and training of health personnel in health statistics;
- (3) the International Classification of Diseases and its application to various fields of health statistics;
- (4) methodology and results of health surveys.

The comprehensiveness of such a programme of regional meetings and the need for co-ordination between such meetings and for evaluating their results would be an additional justification for the suggestion made in the fifth report of the Expert Committee on Health Statistics that regional

advisers in statistics should attend the meetings of future expert committees.¹

The Expert Committee on Health Statistics,

Considering that a planned and balanced programme of international and regional conferences and meetings of technical working groups is essential for the continuing improvement of health statistics in Member States in all stages of development,

RECOMMENDS that:

(1) the World Health Organization assume the responsibility for preparing and implementing, in co-operation with other agencies as appropriate, an adequate long-range programme of such conferences and meetings of technical working groups;

(2) the agendas of these conferences and meetings provide opportunity for discussions among health statisticians, and between statisticians and other health personnel, on technical questions dealing with the international comparability of health statistics, methods of improving national health statistics, and the practical uses and applications of health statistics for public health administration and medical research.

2.3 Activities of national committees on vital and health statistics²

The Expert Committee took note of the activities of national committees on vital and health statistics since its previous session. It recognized the importance of the work being carried out by national committees in a large number of countries, the stimulus that these committees gave to the development of health statistics, both in their own national sphere and internationally, and the important amount of information that was being exchanged between national committees on vital and health statistics through the Liaison Centre in the WHO Secretariat. As a further step in exchanging information between national committees on vital and health statistics, the Committee urged that from time to time the WHO Secretariat should issue collated reports of work carried out by national committees, summarizing the position that had been reached internationally in various health statistics fields. The Committee expressed concern at the fact that some national committees had not reported on their work during a number of years, that only 35 countries had so far established a national committee on vital and health statistics, and that the increase in this number over the last two years had been only two, while the World Health Organization now comprises eighty-eight Member and Associate Member States. The

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1957, 133, 22

² or equivalent bodies

Committee emphasized the advantages of the existence of a national committee to undertake the function of making an appraisal of the health statistics programme of the country in order to bring to the attention of national authorities concerned the existence of gaps and suggestions for improvements. The support of national committees is often an important element in securing resources for implementing health statistics programmes.

The Expert Committee stressed that national committees on vital and health statistics should be urged to keep the World Health Organization regularly, and at least annually, informed of their activities.

National committees should be requested to submit to WHO a statement of how far they had succeeded, and what difficulties they had encountered, in implementing the recommendations of the First World Health Assembly and the Sixth Revision Conference concerning the national and international functions of national committees on vital and health statistics.

The Committee also discussed the usefulness of convening international conferences of national committees on vital and health statistics. It was generally felt that such meetings should preferably be on a regional rather than on a world basis.

2.4 WHO publications on health statistics methods

The Committee noted that progress was being made in the preparation of the series of WHO manuals on health statistics methods, recommended in the third report of the Expert Committee on Health Statistics,¹ and that the preparation of some of these handbooks is already well advanced.

The Committee reviewed the envisaged programme, shown in Annex 1 (page 23), and expressed its satisfaction that the particular needs of less developed countries were being taken into consideration.

The Committee expressed the view that these publications should be prepared under the responsibility of the WHO Secretariat with the assistance of appropriate members of the expert advisory panels. Although the basic draft might have to be prepared by an individual specialist, there ought to be collective revision and sponsorship in order to ensure that the publications represent an international viewpoint and not merely the experience of one person or country. While the Committee expressed its strong interest in this programme and its desire to advise on and to assist the programme in every possible way, it did not consider formal Expert Committee approval to be necessary before publication of the manuals.

The Committee noted that some of the proposed publications would deal with matters of common interest to the United Nations Statistical Office and WHO and expressed its opinion that those publications should be produced in close collaboration with the United Nations Statistical Office.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1952, 53, 41

The Expert Committee on Health Statistics,

Having noted the envisaged WHO programme on publications on health statistics methods and having discussed the possibilities for preparing handbooks dealing with various subjects, and being convinced of the practical value of these publications,

RECOMMENDS that:

- (1) publications on health statistics methods be a responsibility of the WHO Secretariat;
- (2) the preparation of these publications be proceeded with as speedily as possible.

3. STATISTICS IN WHO FIELD AND RESEARCH PROJECTS : REVIEW OF THE ROLE OF STATISTICAL METHODOLOGY

The Committee noted with satisfaction that the statistical services of WHO had in recent years been able to provide, on an increasing scale, advice on methodology and technical help with regard to statistical problems to other units in the Organization, to field projects, and to individual countries. The Committee further noted that, in addition to health statistics routinely collected by the Organization from national health and statistical services in accordance with the WHO Constitution, the various technical units of WHO were themselves accumulating from WHO-sponsored projects a considerable amount of statistical material of potential value to Member States if it were statistically analysed. The Committee expressed the view that the Organization should apply sound statistical methodology, whenever its action involved the collection, compilation, and analysis of statistical data and their evaluation, calling upon the advice of its own statistical specialists for this purpose. If, however, the present facilities for rendering advice within WHO should not be adequate to cope with increasing demands, the Committee urges that the Organization take steps to strengthen its statistical advisory services both at Headquarters and in the regions. It further urges that procedures be developed whereby units of the Organization consult its specialists at an early stage in the planning of a project. In addition, the Committee urges that the possibility of subjecting to statistical analysis the data which have been accumulated within the technical sections of WHO be explored, with a view to making resulting information useful to a wider range of health workers through suitable publications.

4. THIRD REPORT OF THE SUB-COMMITTEE ON CANCER STATISTICS

The Expert Committee on Health Statistics considered the third report of the Sub-Committee on Cancer Statistics (see Annex 2, page 25).

The Committee noted the views and recommendations of the Sub-Committee and adopted the report.

In respect of epidemiology of cancer, the Committee underlined the statistical competence needed for epidemiological studies on cancer. Statistical advice and assistance must be available at all stages of the study, from its planning to the evaluation and publication of its results.

5. HEALTH INDICATORS FOR MEASUREMENT OF LEVELS OF LIVING

The Committee reviewed the development of the problem since the publication in 1954 of the *Report on International Definition and Measurement of Standards and Levels of Living*.¹ It noted the contribution made by the WHO Study Group on Measurement of Levels of Health² and reviewed previous contributions of the Expert Committee on Health Statistics.³

The Committee was informed of the United Nations *ad hoc* Inter-Agency Meeting on International Social Programmes in August 1958. This meeting had agreed that the United Nations would prepare a plan for a progress report and circulate it to the specialized agencies, inviting their contributions. The Committee was also informed that this report would be ready by the summer of 1959 and that the WHO contribution would be expected by the beginning of 1959.

The Committee was of the opinion that in the selection of health indicators a distinction has to be made according to whether they are intended (1) to serve as tools to health administrators in gauging the needs of health services and their achievements; (2) to be taken into consideration as elements in the measurement of levels of living; or (3) to be used as one of the bases for framing social policy. In this respect, the Committee noted that there was a connexion between health indicators appropriate for measurement of levels of living and those needed for social policy which are expected to be used in the health section of the "Compendium of Social Statistics" planned to be published by the United Nations in 1963.

¹ United Nations document E/CN.3/179-E/CN.5/299

² *Wld Hlth Org. techn. Rep. Ser.*, 1957, 137

³ *Wld Hlth Org. techn. Rep. Ser.*, 1957, 133, 17

In reviewing the problem of selecting health indicators as an element in measuring the levels of living, and in reviewing the tests of such indicators drawn up at previous meetings of the Expert Committee on Health Statistics and put forward by the WHO Study Group on the Measurement of Levels of Health, the Committee agreed that no single health indicator existed which could be considered objective, sensitive, and meaningful, and which was at the same time available in all types of communities. A choice had to be made between a series of indicators variously corresponding to the mutually exclusive criteria of meaningfulness on the one hand and availability on the other.

The Committee was therefore of the opinion that for international comparisons recourse must be had simultaneously to several health indicators of varying degrees of meaningfulness and availability.

The Committee recommended that the Director-General draw up a list of selected indicators and transmit it to the United Nations, after consultation as appropriate with members of the Expert Advisory Panels on Health Statistics and Public Health Administration.

The Committee was of the opinion that apart from contributions which might be made as regards the health component of a statistical measure of levels of living or social conditions there is need to continue research for those precise indicators required by health administrators. The Committee suggested that an approach to the development of such indicators might be made in the first instance within WHO as part of its role in statistical methodology referred to in section 3 (page 18).

6. INTERNATIONAL PROGRAMME OF SOCIAL STATISTICS

The Committee took note of that part of the "Draft International Programme on Social Statistics"¹ which concerns health statistics and which contains suggestions for tables on health conditions intended for inclusion in the "Compendium of Social Statistics" to be published in 1963.

The Committee was glad to learn that WHO would be responsible for the selection, collection, and interpretation of the health items in the compendium.

There would be a need for special care in presenting an interpretation of the data to be published, owing to the fact that the compendium was not intended primarily for health workers and that therefore many of its readers might have difficulty in interpreting the health data properly.

¹ United Nations document E/CN.3/239

7. RESOLUTION ON HEALTH AND VITAL STATISTICS OF THE ELEVENTH WORLD HEALTH ASSEMBLY¹

The Committee noted with the greatest interest the following resolution adopted by the Eleventh World Health Assembly:

“The Eleventh World Health Assembly,

Recognizing the importance of the scientific quantitative measurement of the health status of populations to the continued progress of public health programmes throughout the world, and

Noting that, in accordance with resolution WHA10.17, the Director-General has submitted a progress report to the Executive Board which deals especially with the past and present work of WHO in vital and health statistics, and that he is to submit a final report to the Executive Board,

REQUESTS the Director General:

- (1) to continue this study in the field of health and vital statistics, with appropriate expert consultation, with a view to making a final report at an early session of the Executive Board, and
- (2) to include in this report recommendations on a forward-looking and balanced WHO programme for the development and strengthening of systematic procedures for the securing of adequate vital and health statistics, such recommendations to include specific proposals
 - (a) on how WHO can appraise and assist in the development of administrative and technical procedures best adapted to various social and organizational frameworks;
 - (b) on how WHO can evaluate and disseminate information on the systems in effect in different countries, and
 - (c) on how WHO can further the development and adoption of international standards in health statistics.”

The Committee expressed the hope that the report referred to in the above resolution would go beyond a description of the programme presently being carried out, which is inevitably and appropriately governed by administrative and budgetary expediency, in order to present a clear-cut exposition of the scope and nature of the Organization's responsibilities in the field of health statistics. Such a report could constitute the blueprint of a long-term programme of action which would keep pace with the rapid expansion of public health programmes throughout the world.

¹ Resolution WHA11.41, *Off. Rec. Wld Hlth Org.*, 1958, 87, 35

The Committee indicated its desire to assist the Director-General in any manner possible in attaining this objective, in realization of the great importance of this step in further strengthening the statistical services of the Organization.

The Committee felt that members of the Expert Advisory Panel on Health Statistics would welcome an opportunity of giving the Director-General the expert assistance mentioned in the Assembly resolution.

Annex 1**SUBJECTS ENVISAGED FOR STUDIES AND PUBLICATIONS
ON METHODS AND PROCEDURES IN HEALTH STATISTICS****(Principles for a Health Statistics System)****I. General**

1. Evolution of health statistics; their role and use in modern public health services
2. Indices of health
3. Health services facilities and personnel
4. Statistics of health activities

II. Statistical methods suitable for less developed areas

1. Organization of vital and health statistical services in a less developed country: first steps towards health information
2. Partial and graded vital and health registration in countries of uneven development
3. Organization and health significance of pilot registration areas (including cancer registration)
4. Registration of deaths and causes of death by laymen (village chiefs, civil registrars, etc.)
5. The demography survey (as a stopgap to vital registration)
6. Statistics of the small tropical hospital: simplified procedures and list of diseases
7. Statistics of medical outposts and dispensaries (manned by semi-medical personnel): simplified procedures and list of diseases and symptoms
8. Statistics of mobile health units

III. Morbidity statistics

1. Terms and definitions in morbidity statistics
2. Reporting of communicable diseases
3. Hospital patient statistics
4. Morbidity (field) surveys
5. Measurement of morbidity

IV. Mortality statistics

1. Medical certification of cause of death (revised edition)
2. Principles and rules for classification of causes of death
3. Computation and tabulation of data (cause-of-death statistics)
4. Presentation and evaluation of cause-of-death statistics

V. Special statistics

1. Malaria statistics
 2. Maternal and child health statistics
 3. Statistics of diarrhoeal diseases
 4. Cancer statistics of cancer registers
 5. Perinatal mortality and its causes
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Annex 2**SUB-COMMITTEE ON CANCER STATISTICS****Third Report**

	Page
1. Methods for measuring incidence and prevalence of cancer	28
2. Cancer registration	33
3. Epidemiology of cancer, including geographic pathological aspects	37
4. Statistics on results of treatment of cancer	40
5. Statistical classification, nomenclature and clinical staging of cancer	41
6. Accuracy of cancer diagnoses on death certificates	43

SUB-COMMITTEE ON CANCER STATISTICS

*Geneva, 9-14 December 1957**Members :*

- Dr J. Clemmesen, Director, The Danish Cancer Registry, Copenhagen, Denmark
- Dr P. F. Denoix, Directeur de l'Institut Gustave Roussy, Villejuif (Seine), France
- Dr H. F. Dorn, Chief, Biometrics Branch, Division of Research Services, National Institutes of Health, Bethesda, Md., USA
- Dr W. P. D. Logan, Chief Statistician (Medical), General Register Office, London, England (*Chairman and Rapporteur*)

Secretariat :

- Dr Y. Biraud, Director, Division of Epidemiological and Health Statistical Services, WHO
- Dr Marie Cakrtova, Chief, International Classification of Diseases and Causes of Death Section, WHO (*Secretary*)
- Mr J. Nielsen, International Classification of Diseases and Causes of Death Section, WHO
- Dr P. Stocks, Senior Fellow of the British Empire Cancer Campaign, London, England (*Consultant*)

This report was originally issued as mimeographed document WHO/HS/CANC/35.

SUB-COMMITTEE ON CANCER STATISTICS**Third Report**

The Sub-Committee on Cancer Statistics of the Expert Committee on Health Statistics met in Geneva from 9 to 14 December 1957.

The meeting was opened by Dr W. Aeg. Timmerman, Assistant Director-General, Department of Central Technical Services, representing the Director-General of WHO.

The Sub-Committee elected Dr W. P. D. Logan as Chairman, and requested him to act also as Rapporteur.

The Sub-Committee adopted the following agenda:

1. Methods for measuring incidence and prevalence of cancer
2. Cancer registration
3. Epidemiology of cancer, including geographic pathological aspects
4. Statistics on results of treatment of cancer
5. Statistical classification, nomenclature and clinical staging of cancer
6. Accuracy of cancer diagnoses on death certificates
7. Other business.

This agenda is based on the views expressed in the fifth report of the Expert Committee on Health Statistics,¹ which had noted the previous work presented in the two reports of the Sub-Committee on the Registration of Cases of Cancer² and had recognized the useful recommendations made on various methodological aspects of cancer statistics. The report had reviewed the developments which had taken place since the Sub-Committee last met, including: the setting up of cancer registers in various countries; the growth of international co-operation, under the aegis of the International Union against Cancer (UICC), in the field of histological classification of neoplasms, leading to the compilation of a statistical code of human tumours; the progress in the clinical-stage classification of malignant neoplasms and the trials now being undertaken in various countries with the stage classification proposed by the UICC for malignant tumours of the breast and the larynx; the development and application of various techniques for ascertaining the incidence and prevalence of cancer in the population; the expansion of statistical studies of the etiology of cancer

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1957, **133**, 15

² *Wld Hlth Org. techn. Rep. Ser.*, 1950, **25**, 17; 1952, **53**, 43

by relating morbidity and mortality statistics to ethnic, climatic, nutritional and other environmental factors; and the changes introduced in the International Statistical Classification at the Seventh Revision (1955).

The report further stated that the Expert Committee considered it timely for the Sub-Committee on Cancer Statistics to review and evaluate these recent developments and to consider what international action might be indicated.

In its discussions, the Sub-Committee was also guided by the resolution¹ of the Tenth World Health Assembly concerning the epidemiology of cancer, which requests the Director-General:

- (1) to continue the collection and publication of international statistics, mainly of mortality, but also of morbidity so far as practicable;
- (2) to continue work on formulating international definitions of nomenclature and statistical classification, including cancer staging;
- (3) to provide an advisory centre on the objectives and methods of cancer registration;
- (4) to consider the desirability and urgency of both co-ordinating and expanding work on cancer epidemiology and statistics in order to contribute more effectively to national needs through improved international liaison; and
- (5) to include in the epidemiological work on cancer due reference to occupational and other environmental conditions likely to have an influence on the frequency of the various forms of the disease and therefore an etiological significance."

1. METHODS FOR MEASURING INCIDENCE AND PREVALENCE OF CANCER

1.1 Definitions

The Sub-Committee agreed on the following definitions of incidence and prevalence in relation to cancer morbidity:

Incidence relates to the number of new cases occurring during a stated period of time in a given population.

Prevalence relates to the number of cases current in a given population, either at a given point of time—e.g., on a given day ("point prevalence")—or during a stated period ("period prevalence").

¹ Resolution WHA10.18, *Off. Rec. Wld Hlth Org.*, 1957, 79, 27.

Unit to be counted. This can be either "persons" diagnosed as having cancer, no regard being paid to whether they have more than one primary cancer, or it can be "cases" of cancer in which each primary site is counted separately. In publications, it should be indicated to which of these two units the data relate.

1.2 Proportionate distribution

Occasionally, and particularly when no population denominator is available—e.g., with hospital cases or in communities for which basic demographic data are lacking—a study is often made of the proportionate distribution of different forms of cancer in relation either to the total number of cancer cases or to the total number of all diseases diagnosed. Proportionate distributions are often a useful supplement to rates based on populations, but when used by themselves in the absence of population rates they are apt to be misleading; they should be interpreted with caution and with an awareness of their limitations, particularly when they relate to specialized institutions.

1.3 Purposes of incidence and prevalence statistics

1.3.1 Medical care

Data on the incidence and prevalence of cancer are needed for the organization of medical care activities, such as provision of diagnostic and therapeutic facilities, planning and development of hospitals, distribution of medical services, and estimation of costs.

1.3.2 Cancer control

Incidence statistics by sex and age provide information concerning the cancer problem in the population, point to the age-groups where detection programmes are likely to be most effective, and allow evaluation of the results obtained in cancer control.

1.3.3 Epidemiological research

Studies of incidence trends in time or of differences in incidences rates by race, area—which may be parts of a country or different countries—occupation, socio-economic groups, habits and ways of life, may supply valuable leads to more intensive studies concerning the etiology of cancer.

1.4 Methods of obtaining incidence and prevalence statistics

1.4.1 Mortality statistics

Mortality statistics are not a reliable measure of the incidence or prevalence of cancer, owing to differential survival rates for the various types of cancer. Only with certain types of cancer having a high fatality rate,

such as cancer of the lung or stomach, do mortality data give a close indication of the extent of the problem, and then only to the degree of accuracy of diagnoses entered on the death certificates. Mortality statistics are, however, a useful source of information, especially if tabulated according to age, sex, race and other demographic characteristics, and they have been extensively used as such in describing the cancer situation in the community. They have the advantage of being routinely available in places with established vital statistics systems.

1.4.2 *Compulsory notification on the lines of communicable disease reporting*

A major disadvantage of this method is that the minimum amount of useful information required about each cancer case is considerably more than that normally obtained in communicable disease notification. Data on the age and sex of the patient and primary site of the cancer are essential; it is also highly desirable to have information on the histological type of the cancer, the method of diagnosis, and whether the case is a new one, a relapse, or a recurrence. An advantage of compulsory notification, however, is that it provides information which, owing to its confidential character, might not be otherwise obtainable.

1.4.3 *Cancer registers*

For small countries, national cancer registration (see also section 2, page 33) is an effective method of obtaining incidence statistics, but in large countries it is doubtful whether the amount of work required would justify nation-wide registration solely for the purpose of obtaining incidence and prevalence statistics.

1.4.4 *Ad hoc cancer surveys*

Within a defined area of known population, information is obtained from doctors in hospitals and in private practice about all cases of cancer diagnosed, treated, or observed during a given period. An example is the investigation of the distribution of cancer in ten metropolitan areas of the United States of America. The same areas were surveyed twice, the first survey including cases of cancer diagnosed, treated, or observed during 1937-1939. The second survey referred to the years 1947-1949.¹ Another application of the survey technique in the United States of America is the study on cancer morbidity in Iowa State.² As an example in Europe, reference may be made to the study on the appearance of new cases of cancer in 1951 and 1952 conducted in the Department of Loir-et-Cher, France.³

¹ Dorn, H. F. & Cutler, S. J. (1955) *Morbidity from cancer in the United States. Part I*, Washington, D. C., US Public Health Service (Public Health Monograph No. 29)

² Haenszel, W., Marcus, S. C. & Zimmerer, E. G. (1956) *Cancer morbidity in urban and rural Iowa*, Washington, D. C., US Public Health Service (Public Health Monograph No. 37)

³ France, Institut national d'Hygiène, Section du Cancer (195-) *Essai d'étude de la fréquence d'apparition des nouveaux cas de cancer*

1.4.5 *Cancer statistics obtained as a by-product of general morbidity surveys and other morbidity sources*

Under this heading are included statistics derived from household morbidity surveys, hospital morbidity studies, social security data, life insurance experiences, records of absenteeism, and general practitioners' clinical records. In general, the amount of information about cancer normally obtained from these sources will be found to be inadequate. In household surveys the informant either does not know that he has cancer or, if he knows, cannot give the precise medical information needed for the study of cancer, i.e., primary site, histological type, method of diagnosis. Hospital morbidity statistics, apart from their selective character, have the disadvantage of being given in terms of discharges rather than persons, and a particular individual with cancer may be represented several times in the study, with consequent inflation of the rate. Social security statistics, being mainly geared to the administration of social security benefits, also yield insufficient morbidity data, as a rule. Experience in England has shown that general practitioners' records are a source of reliable diagnoses, but a limitation is that additional information beyond the diagnosis is not routinely available. On the whole it can be said that any investigation or method of recording which is not specifically adapted to cancer does not supply the needed information. However, each of these sources, although insufficient in itself, can provide the basic framework for an *ad hoc* cancer survey.

1.5 **Starting point of the disease in time**

In the majority of cancer morbidity studies, particularly those based on cancer registers, a case of cancer is defined as such from the date of the first diagnosis or of commencement of treatment or of registration. When the statistics are supplemented from the death registers, these additional cases are usually added to the statistics of the year in which death occurred. This procedure is not wholly satisfactory from the point of view of producing statistics on incidence, particularly by age, and the suggestion has been made that the date of onset of first symptoms is a closer approximation to the date of actual onset of the disease. On the other hand, it was pointed out that the information available on onset of symptoms is subject to wide variations and its interpretation in relation to onset or death is by no means clear-cut. The Sub-Committee, while accepting the statement of onset of symptoms as an important item to be included in the records (for tabulation of the interval between onset of symptoms and diagnosis), nevertheless felt that it may not be desirable to adopt it as the actual date to which incidence statistics should be related. However, it was agreed that this matter required further study.

The Sub-Committee accordingly recommends that countries where information on date of onset of first symptoms is included in registration records should carry out studies on an experimental basis to determine whether, for incidence statistics, adopting onset of symptoms as the starting-point of the disease would offer any advantage.

1.6 Incidence and prevalence in less-developed areas

There are indications that light may be thrown on the etiology of malignant neoplasms by relating the unusual incidence of certain types to dietary and other habits and to various environmental conditions prevailing in areas where the population still lives in primitive circumstances and is still, for instance, living off the produce of its own soil.

Incidence of malignant neoplasms of various types cannot be ascertained from hospital records alone, as these are selective and do not, as a rule, correspond to defined populations. On the other hand, systems of vital registration and ascertainment of cause of death do not exist in primitive communities. In a few selected areas, however, where the population is living under primitive circumstances but within reach of a hospital, it is feasible to establish joint schemes of cancer diagnosis and of demonstration of vital and health statistics procedures, consisting of administrative arrangements for registration of the population and of vital events. Such schemes would necessarily include provisions for strengthening the medical staff of the local hospital both on the clinical side and in respect of pathology and laboratory methods, the aim being not only to raise the diagnostic standards in the hospital but also to provide qualified personnel for ascertaining the cause of all deaths in the area selected.

Such a scheme might be expected to supply, within a few years, sufficient knowledge of demographic trends and of the morbidity and mortality in the area to be of value to the health administration. It would also provide reliable incidence rates of various types of cancer, together with precise data on local conditions and ways of life, which might be of significance in the etiology of cancers.

A different approach is called for in sparsely populated areas with primitive conditions of life where medical services are given not by hospitals but by mobile medical teams. In such circumstances, the attachment of cancerologists to the medical teams which examine at fairly regular intervals the entire population of the villages (chiefly for the diagnosis and control of endemic diseases, such as sleeping sickness and leprosy) may provide, at little expense, valuable information on the prevalence of certain forms of cancer.

2. CANCER REGISTRATION

2.1 Historical note

Tumour registers for collecting information on cancer patients from a particular hospital or group of hospitals were in use for internal purposes as early as the nineteenth century. Cancer registration as discussed in this chapter is a system of maintaining a centralized register, covering patients from a whole country, state or other well-defined larger area.

The prospects of collecting reliable information have greatly improved with the provision of better diagnostic facilities and the standardization of diagnostic procedures, and centralized systems of cancer registration have now been introduced in several countries. The *Danish Cancer Registry* was opened in 1942. The present scheme for the registration of cancer in England and Wales has been in operation since 1945, and in France an "enquête permanente" on cancer was established in 1943 by the Institut national d'Hygiène for the special purpose of undertaking longitudinal studies of cancer patients. In Norway, cancer registration was introduced in 1952, in Finland and Belgium in 1953, and in Iceland and the Netherlands in 1954. In Austria, cancer registration has commenced recently, and plans for establishing cancer registers are being developed in Sweden, in Italy, and in Germany.

Outside Europe, a cancer register was established in New Zealand in 1948. In the USA, several states have introduced cancer registration, e.g., Massachusetts (1927), Connecticut and New York State outside New York City (1940), California (1947), and Pennsylvania (1948). A centre of cancer registration was set up in Israel in 1954.

In England and Wales, in France, and in New Zealand, the registry was created and is financed by the central administration. The Netherlands registry is operated by the National Anti-Cancer Association. In the Scandinavian countries, sponsoring and financing of the registry is a joint effort of the National Anti-Cancer Associations and the health authorities. The registries in the USA are operated by the State health departments.

2.2 The purposes and uses of cancer registration

2.2.1 *Follow-up of patients*

2.2.1.1 *Detailed analysis of treatment results.* A cancer register offers the material for evaluating results of treatment and for comparing the efficacy of different methods of treatment. Detailed studies of this type can be properly made only in individual institutions or groups of institutions co-operating along agreed lines. Central cancer register records, pooling data from various hospitals, clinics and physicians, are less suitable for the

purpose, since the material is very heterogeneous, owing to variations in clinical staging, types of patients, selection and application of treatment, etc.

2.2.1.2 *Survival of patients.* While cancer registers covering larger areas are not suited to the study of detailed aspects of cancer therapy, they provide a basis for computing the survival rates of patients according to broad types of treatment and cancer stage. An example of this kind is the study prepared by the General Register Office of England and Wales,¹ from the material in the National Cancer Register, on five-year survival rates for various cancer sites. A similar study is included in the comprehensive analysis of the data in the Cancer Register in the State of Connecticut, USA, covering the years 1935–1951.² Treatment and survival studies have been carried out in France by the Institut national d'Hygiène.³

2.2.2 *Study of etiological and pathogenetic aspects of cancer*

2.2.2.1 *Incidence studies.* Depending on the completeness of coverage of cases, data in cancer registers can be utilized for studying the incidence of cancer of various sites in a population.

2.2.2.2 *Epidemiological studies.* A cancer register serves as the basis for epidemiological studies in relation to sex, age, race, marital status, occupation, etc., and in relation to a suspected carcinogenic factor.

2.2.2.3 *Genetic studies.* The material of a cancer register may also be helpful in genetic studies on possible relationships between inherited traits and the occurrence of particular types of cancer.

2.2.2.4 *Longitudinal statistical studies.* Patients on the register (whether treated or untreated) form a population which, when followed up, lends itself to longitudinal statistical studies of cancer.

2.2.3 *Statistics relating to medical care and cancer control*

The information contained in a cancer register may also be of value in cancer control and in medical care; in fact, sometimes this is the primary purpose in establishing a register.

2.2.3.1 *Medical care.* A cancer register provides a means of ensuring that the patient returns for treatment or check-up, thus promoting continuity

¹ England and Wales, Registrar General (1957) *The Registrar General's statistical review of England and Wales for the year 1952. Supplement on Cancer*, London, H. M. Stationery Office

² Griswold, M. H., Wilder, C. S., Cutler, S. J. & Pollack, E. S. (1955) *Cancer in Connecticut 1935–1951*, Hartford, Connecticut State Department of Health

³ France, Institut national d'Hygiène (1956) Bilan 1956 de l'Enquête permanente Cancer. II. Modes et résultats de sept ans de traitements des principaux cancers. III. A propos de 7435 cas de tumeurs malignes du col de l'utérus (171). *Bull. Inst. nat. Hyg.*, **11**, 327, 515

of the medical services, and facilitating the work of the institution and of the attending physician. For this purpose, the register is best maintained at the place where such services are given, namely the hospital, the tumour clinic or centre.

2.2.3.2 *Cancer control.* Registers on a more extensive scale, covering larger areas, allow tabulation and analysis of various factors important in cancer control, e.g., the proportion of patients receiving treatment, the stage at which they are diagnosed, the time-lapse between first symptoms and diagnosis, the waiting period before treatment, and the type of treatment given and where.

2.2.4 *Cancer reference file*

A cancer register serves as a reference file, providing series of cases for the purpose of clinical or other research.

2.3 **Patterns of organization of registers**

The registration procedures adopted and the special arrangements for maintaining a register vary according to the specific purposes which the cancer registration system is intended to fulfil. Among the existing cancer registration systems, three different groups can be distinguished:

(1) A register is kept of all hospitalized cases, sometimes supplemented from death registration, without special arrangements for routine follow-up. An example of such a registration system is the *Danish Cancer Registry*, the main purpose of which is to obtain morbidity information and estimates of differences in incidence. It also serves as a reference file for those engaged in clinical and pathological research and as a framework for follow-up studies.

(2) The register is concerned not only with the registration of cases for incidence studies but also with making arrangements for the permanent follow-up of patients. Examples of such a system are the registration schemes in England and Wales, in New Zealand, and in the State of Connecticut, USA.

(3) No attempt is made to use the register for studies of incidence but efforts are concentrated on the permanent follow-up of a limited series of cases. Sometimes registration is made only in specialized cancer centres. An example of this is the "enquête permanente" in France, which is a centralized record of all patients treated in all French cancer hospitals. These patients are followed annually for a period of at least ten years.

2.4 **Special points to note in starting or in maintaining a register**

A cancer registry has no virtue of its own; it can only justify itself if it really accomplishes what it sets out to do and if it can be

seen to produce worth-while information or to provide a worth-while service.

The justification for a local register attached to a single hospital or group of hospitals is evident, as the cancer register meets a definite need on the part of the hospital with regard to its cancer patients. Many hospitals or cancer centres for the diagnosis, treatment and follow-up of cancer cases have established and maintain a cancer register.

The problem is different in the case of a central registry receiving information on cancer cases from a variety of different sources. Although certain registries of this type may still be able to render useful services to the reporting institutions, the main emphasis is in the direction of statistical studies, as mentioned above in section 2.2.2. The functions performed by a central register must justify the labour involved in the continuous transmission of data from reporting institutions and in the maintenance of the central file.

Before deciding to establish a cancer register, the following points should be carefully considered:

(1) *Purpose of the register.* It is important to decide whether the register is intended to be used for the purpose of assisting in the control of medical services or for research studies of cancer.

(2) *Coverage.* The area covered by a register depends on its purpose; it may be an individual hospital or group of hospitals for local registers, or a region, state, or a whole country for regional, state, or national registers. Whether the register should refer to a whole country, or to a selected part of it, depends, among other things, on the organizational pattern of medical services of the country and on the size of the country. Organization of medical services on a centralized pattern facilitates the establishment and operation of a national system in small as well as large countries. In very large countries, national coverage may be less economical and less profitable, and the required information may be obtained more conveniently from coverage of a smaller area.

(3) *Sources of the data.* The data used in compiling a cancer register are derived from reports received by hospitals and tumour clinics, either as a result of compulsory notification (e.g., in Norway) or on a voluntary basis. Supplementary data may often be obtained from death certificates giving cancer as a cause of death. The additional cases discovered in this way include patients in whom the diagnosis of cancer was not made until the time of death as well those who were diagnosed as cancer cases but escaped registration during their lifetime.

(4) *Sites to be covered.* The usual practice is to include all types of malignant neoplasms. In some instances, neoplasms are recorded irrespective of malignancy, e.g., papilloma of the bladder and intracranial tumours. Where this is done, definitely malignant forms should be distinguished from others.

(5) *Items of information to be collected.* Inclusion of too many items may jeopardize the success of the register. Data often recorded include: personal information about the patient, such as age, sex, race, marital status, occupation, area of residence; and information on the cancer, such as date of onset of first symptoms, the clinical stage at time of first diagnosis, histopathological diagnosis, type of treatment given, findings at follow-up, and the end results of therapy. Depending on the special purpose for which a particular register is intended, other information may be entered, such as occurrence of cancer in a twin or other close relative.

(6) *Person in charge of cancer register.* Supervision and operation of a cancer register require familiarity with both the medical and statistical aspects of cancer, and the ability to ensure the continuous co-operation of reporting institutions.

(7) *Utilization of the material.* Analysis of the data accumulated in a cancer register is needed to enable the efficiency of the register to be assessed and as a guide to its further operation. Publication of studies based on the material in the cancer register helps to maintain the interest of those supplying the information. Experience has shown that demonstration of the usefulness of data provided is the best way of keeping alive the interest and willingness of co-operating agencies.

(8) *Role of cancer register in general cancer research.* A cancer register should not be maintained solely as a statistical project, isolated from other cancer research. An efficient cancer registry will operate in close association with work on the biological, clinical, laboratory or pathological aspects of cancer research, and will stimulate or take part in field studies on cancer epidemiology.

2.5 Cancer registers in less-developed territories

There is little justification for the establishment of a comprehensive central cancer register in the less-developed territories where cancer is not, at the present time, a serious problem, and where the statistical and medical resources of the country are insufficient to maintain such a register.

3. EPIDEMIOLOGY OF CANCER, INCLUDING GEOGRAPHIC PATHOLOGICAL ASPECTS

3.1 Value of statistical methods in the study of the etiology of cancer

Statistical methods are used in cancer studies for two main purposes: firstly as an auxiliary to experimental and clinical cancer research, and secondly as the foundation of epidemiological studies. Statistical evidence derived from such studies of human cancer has a scientific validity in itself,

irrespective of evidence derived from other kinds of investigation. Only evidence on the incidence of malignant neoplasms in human beings will decide the extent to which the numerous carcinogenic factors now known are significant with regard to man. The strength of such evidence depends upon the degree of accuracy of the data, successful elimination of disturbing factors which could produce bias, reliability of the statistical methods used, and consistency between results of different studies. Provided that proper attention has been given to these conditions, the finding, in a group of people, of correlations between the incidence of a particular form of cancer and certain characteristics of their history and environment marks an advance in knowledge which should not be ignored in searching for the etiology of that form of cancer.

3.2 Epidemiological studies of cancer

The epidemiological method is used to study the occurrence of cases of cancer, not as individual clinical cases but as groups of cases occurring in a given population.

The items of information usually studied in epidemiological research on cancer are:

- (a) trends in time, e.g., the notable increase that has taken place in recent years in the mortality from cancer of the lung;
- (b) racial and ethnic groups;
- (c) sex differences, e.g., in cancer of the breast, cancer of the lung;
- (d) age differences, e.g., the characteristic age distribution of different forms of cancer;
- (e) genital-hormonal activity, e.g., cancer of the breast and uterus;
- (f) area of residence, e.g., differences in incidence between one part of a country and another, or between one country and another;
- (g) soil and water;
- (h) occupational factors;
- (i) food and dietary habits;
- (j) atmospheric pollution;
- (k) ionizing radiations;
- (l) habits, e.g., alcohol and tobacco smoking;
- (m) socio-economic status and ways of life.

Sources of data for epidemiological studies are:

- (1) mortality statistics;
- (2) morbidity statistics, i.e., the various forms of incidence statistics mentioned in section 1.4;

(3) field studies designed to obtain information not normally available from routine mortality and morbidity sources.

Field studies may be studies of particular forms of cancer, combined with investigation of the factors possibly responsible (e.g., recent research into the causation of cancer of the lung), or they may be studies on the distribution of the different forms of cancer in areas having special environmental or other features which may be related to the incidence of certain types of cancer in the area.

The technique employed in field studies may be either prospective or retrospective. In prospective studies, a defined population group is selected and is followed forward in time to determine the incidence of a particular form of cancer in the group in comparison with the general population or a control group. In the retrospective method, a group of persons diagnosed as suffering from the form of cancer under investigation is studied backwards in time to ascertain whether they have any characteristic which distinguishes them from persons not suffering from the condition under investigation. In both forms of study, the selection of a suitable control group requires much attention with regard to possible sources of bias. For example, in studies of a particular form of cancer among patients in a hospital, the control could be a random sample of the non-hospital population, or patients in the same hospital suffering from other forms of cancer, or other patients in the hospital. Caution should be exercised in the latter two cases, as they may not necessarily be free of bias.

3.3 Recommendations

3.3.1 Mortality

The Sub-Committee recommends that WHO continue publication of its reports on cancer mortality, publishing rates by sex and age and considering, as regards rates for all ages, whether some form of standardization could be applied. It further recommends that WHO note any major apparent differences in the mortality from various forms of cancer among different countries and bring them to the attention of the countries concerned. As far as its resources allow, WHO should investigate these differences.

3.3.2 Morbidity

The Sub-Committee recommends that WHO publish an article on the subject of the epidemiology of cancer and cancer registration systems.

3.3.3 Field studies

The Sub-Committee recommends that WHO, in so far as its resources permit and, where appropriate, in conjunction with national or other international agencies, facilitate or advise on field studies which are likely to be of international interest or which may not be otherwise practicable.

Examples of topics for study, in relation to cancer, are:

- (a) air pollution and tobacco smoking;
- (b) ionizing radiation;
- (c) occupational factors;
- (d) food and diet;
- (e) habits and ways of life;
- (f) soil;
- (g) incidence and distribution of forms of cancer which present large geographical and international differences.

In selecting particular forms of cancer for research, priorities should be accorded on the basis either of the numerical importance of a particular form of cancer (e.g., cancer of the stomach), or of evidence of a recent increase in incidence (e.g., cancer of the lung, cancer of the bladder, leukaemia), or because of indications that exogenic factors are in operation which could be identified and brought under control.

4. STATISTICS ON RESULTS OF TREATMENT OF CANCER

The Sub-Committee reviewed the relevant remarks in the two reports of the Sub-Committee on the Registration of Cases of Cancer.¹ The first report recommended definitions and rules to be used in the preparation of therapeutic statistics and set out a number of rates for measuring results of treatment. The present Sub-Committee notes that these rates are being used in the presentation of statistics by a number of organizations. It does not wish to propose any changes at the present time, but recommends that WHO should again draw the attention of countries to these proposed rates, as possibly they may not be as well known as they should be.

In the tabulation of results of treatment, the Sub-Committee felt that it would be advisable always to distinguish cases which had received treatment before from cases untreated previously.

The Sub-Committee discussed the annual reports on the results of radiotherapy in cancer of the uterine cervix, which had been initiated and for many years edited by the late Professor J. Heyman (Sweden), and originally issued by the League of Nations Health Organization. It noted that a Summarized Report on results obtained in 1949 and previous years (collated in 1956) had recently been issued.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1950, 25, 23; 1952, 53, 48

5. STATISTICAL CLASSIFICATION, NOMENCLATURE AND CLINICAL STAGING OF CANCER

5.1 International Statistical Classification

At the Seventh Revision of the International Statistical Classification, which took place in 1955 and became effective on 1 January 1958, the only change of importance made in the section on neoplasms was the introduction of a series of fourth-digit anatomical sub-divisions of several of the categories relating to malignant tumours. These changes were closely in accordance with the fourth-digit anatomical sub-division recommended in the second report of the Sub-Committee on the Registration of Cases of Cancer and endorsed in the third report of the Expert Committee on Health Statistics.¹ Certain difficulties remain in the use of the neoplasms section, such as:

(a) the provisions for the assignment of multiple sites are not uniform for all categories;

(b) for certain types of tumour there is doubt as to whether assignment should be on the basis of anatomical site or histological nature of the tumour;

(c) the lists of histological varieties in the International Classification² to be classified either as malignant or benign when not specified as such are not wholly satisfactory;

(d) the inclusion of secondary tumours (i.e., categories 156, 165 and 198) in the main body of malignant tumour categories intended, for the most part, for primary sites has caused some inconvenience.

It was felt that these difficulties, though important, should be left for ultimate solution till the Eighth Revision of the Classification. The Sub-Committee recommends, however, that in the meantime a preliminary study of these problems be undertaken, due regard being given to current developments in the histological classification of tumours (see section 5.2).

5.2 Statistical code for human tumours

The Sub-Committee noted that WHO had circulated a statistical code for human tumours³ prepared under the auspices of the International Union against Cancer. This code was originally developed in the United States because of an interest in classifying tumours for statistical purposes, not only by anatomical site but also by histology. An earlier edition of this code

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1952, 53, 33, 49

² World Health Organization (1957) *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death*, Geneva, Vol. 1, pp. 75-78

³ Documents WHO/HS/CANC/24.1 and 24.2

had been published by the American Cancer Society¹ and had also been included in the Standard Nomenclature of the American Medical Association.² Responsibility for further work on the code had subsequently been taken over by the International Union against Cancer which, after approval of the final draft by the Symposium on Nomenclature of Human Tumours during the Sixth International Cancer Congress in São Paulo, Brazil, 1954, referred the document to WHO for distribution, trial, and comment. Some thousand copies of the code had been distributed by WHO in the latter half of 1956.

The Sub-Committee noted these developments and agreed that it would be too early to express an opinion upon the value of the code until several years' experience in its use had been obtained.

5.3 Nomenclature of human tumours

A "Histological nomenclature of human tumours" has been prepared in English, Latin, French and Spanish by the Committee on Nomenclature of Tumors of the International Union against Cancer.³ This nomenclature of tumours is accompanied by a list of references to histological pictures of each type of tumour given in widely used text-books. It is intended for use in pathology, and not for statistical purposes, and in its draft form is to be distributed to pathologists and institutions interested in cancer, for comments, criticisms, and suggestions.

5.4 Report of WHO Study Group on Histological Definition of Cancer Types

On the basis of a recommendation made by a consultant group on the WHO cancer programme⁴ that work should be done on unifying definitions of histological types, the Executive Board of WHO proposed, in January 1956,⁵ that the Organization should establish registry centres for pathological tissues. As a result of this, a number of recommendations had been made by a study group on histological definition of cancer types which met in Oslo in June 1957.⁶ The Sub-Committee noted the report of this study group and stressed that there should be close co-operation between WHO and the International Union against Cancer in order to avoid duplication in a field in which both organizations had an interest and had a contribution to make.

¹ American Cancer Society, Statistics Committee, Subcommittee on Tumor Nomenclature and Coding (1951) *Manual of tumor nomenclature and coding* (corrected edition, 1953)

² Plunkett, R. J. & Hayden, A. C., eds (1952) *Standard nomenclature of diseases and operations*, 4th ed., New York, Philadelphia & Toronto, Blakiston

³ International Union against Cancer, Committee on Nomenclature of Tumors (1958), *Acta Un. int. Cancr.*, 14, No. 3

⁴ Document MH/CT/47.55

⁵ Resolution EB17.R40, *Off. Rec. Wld Hlth Org.*, 1956, 68, 14

⁶ Document WHO/HDCT/12

5.5 Clinical staging of cancer

The importance of classifying neoplasms by their clinical stage for the compilation of comparable therapeutic statistics and the need for international definitions in this field had been expressed in the second report of the Sub-Committee on the Registration of Cases of Cancer.¹ The present Sub-Committee reviewed the progress in clinical-stage classification of malignant tumours and the trials being undertaken in various countries. It noted the efforts of the International Union against Cancer which, through its Committee on Clinical Stage Classification and Applied Statistics, had produced draft recommendations in regard to the clinical staging of cancer of the breast and of cancer of the larynx, and was now making preparations for developing similar recommendations in regard to certain deeper sites of cancer.

6. ACCURACY OF CANCER DIAGNOSES ON DEATH CERTIFICATES

The first report of the Sub-Committee on the Registration of Cases of Cancer² drew attention to the importance of initiating studies to determine to what extent the diagnoses of malignant tumours upon death certificates could be accepted as reliable. The present Sub-Committee learnt that a number of studies in this connexion had now taken place, and recommends that such studies be continued, particularly where the mortality figures published by WHO reveal substantial differences between countries. Four broad types of method have been used to study the accuracy of diagnoses:

- (1) utilization of ancillary information provided routinely on death certificates as to whether the death had been certified following biopsy, operation, or post-mortem examination;
- (2) inquiries to certifying physicians regarding the clinical, laboratory, or other investigations upon which their diagnoses had been based;
- (3) comparison between the diagnosis reported on the death certificate and the clinical data in cancer registration or hospital records in respect of the same patient;
- (4) matching of diagnoses arrived at without post-mortem examination with those arrived at following post-mortem examination.

With reference to (4), the Sub-Committee emphasized, however, that cases selected for post-mortem examination are often atypical or of special diagnostic difficulty, and that unless unselected series are studied conclusions are liable to be biased.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1952, **53**, 47

² *Wld Hlth Org. techn. Rep. Ser.*, 1950, **25**, 21

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