Some Considerations in the Revision

of the

International Statistical Classification

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This paper was prepared for the use of the Subcommittee on International List Revision of which Dr. Harold F. Dorn was chairman. The group was appointed in May 1959 under the U.S. National Committee on Vital and Health Statistics for the overall review of revision proposals in the United States, in preparation for the eighth revision of the International Statistical Classification of Diseases, Injuries, and Causes of Death.

THE International List of Causes of Death was designed primarily for classifying, coding, and tabulating causes of death. The sixth revision differed significantly from previous revisions in that it provided a single classification of diagnoses intended for both morbidity and mortality statistics. In part at least to emphasize this intention, the title was changed to the International Statistical Classification of Diseases, Injuries, and Causes of Death.

This professed intention, however, has yet to be accepted fully by those responsible for subsequent revisions of this classification. Reflecting the fact that the classification still is used more widely for classifying and coding mortality statistics than for any other purpose, plans for its revision and use have been and still are dominated by the special problems of mortality statistics. Despite this, the International Statistical Classification has been increasingly used for the classification and coding of a wide variety of morbidity statistics. In addition, adaptations of the list designed for the indexing of hospital records have been published recently in English and Spanish.

The time has arrived for squarely facing the question, can the International Statistical Classification be successfully used for these three purposes, that is, for mortality statistics, for morbidity statistics, and for indexing hospital records? The answer to this question will largely determine the type of changes proposed for the eighth revision. At first thought this question might appear unnecessary since article 13 of the WHO Regulations Regarding Nomenclature with Respect to Diseases and Causes of Death provides that, "Each Member, when preparing statistics of *Morbidity*, shall code the causes of illness in accordance with the International Statistical Classification of Diseases, Injuries, and Causes of Death. . . ." However, the implications of this so far have been largely ignored during the revision of the classification.

If the main purpose of the classification is to be the traditional one of tabulating mortality statistics, changes can be made which will in-

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crease its usefulness for this specific end. On the other hand, if the decision is that an effort should be made to prepare a revision that will be satisfactory for all three purposes, this objective must be kept clearly in mind when proposed changes are considered. I believe that a single classification of diseases can satisfactorily serve the multiple purposes of indexing hospital records and coding and tabulating morbidity and mortality statistics provided the requirements for the three purposes and the basic principles of the construction of codes are kept clearly in mind.

I shall use the term "diagnosis" in the usual sense of medical practice, that is, a word implying a unique combination of symptoms and signs of departure from health. Examples are terms such as measles, pneumonia, and so forth. Numerous problems of definition will arise when an attempt is made to prepare a classified list of diagnoses for coding, but these are not insoluble and a discussion of them at this point is not essential for my immediate objective.

Principles of Classification

The preparation of a single disease code that can be used for multiple purposes will be greatly simplified if two essential steps are kept separate. These are (*a*) the construction of a classified list of diagnoses, and (*b*) the development of principles and procedures for using this classification for indexing records and coding and tabulating morbidity and mortality statistics.

These steps have not been kept separate in the past with the result that the International Statistical Classification has become increasingly complex and inflexible. Even though age is almost invariably coded separately, the identification of some diagnoses in the classification is based on age. For other diagnoses, the classification attempts to distinguish between those of occupational and nonoccupational origin. Some rubrics, for example, influenza and pneumonia, are combinations of separate diagnoses. Instructions for coding and tabulation have been incorporated into the classification. This failure to observe the fundamental principles of classification and coding has made the International Statistical Classification increasingly complicated and inflexible, difficult to use for more than one purpose, and has not satisfactorily solved the main problem for which it was designed, the coding and tabulation of mortality statistics.

Requirements for Hospital Record Index

In general, a list to be used for indexing hospital records should be based on a single axis of classification and should include single diagnostic terms. The number of separate terms desired is greater than the number usually required for coding morbidity and mortality records for statistical purposes, but this need not create any appreciable difficulty if the basic list is designed so that additional terms can be added. Composite diagnostic terms formed by joining two or more diagnoses ordinarily are not used for indexing hospital records.

Requirements for Coding Morbidity Records

Morbidity statistics arise from a diversity of sources and are used for a multiplicity of purposes. Interest often centers on the frequency of specific diseases and whether these are the primary cause of illness, a complication, sequela, or a concurrent condition. For some purposes, the end result or sequela of a disease or injury, for example paralysis or the loss of a limb, rather than the initial disease may be of primary concern, in contrast to the long-established principle of selecting the underlying cause for mortality statistics. For many studies, a tabulation showing all co-existing diseases or injuries is desired. In brief, the diversity of purposes for which morbidity statistics are used requires that the basic disease classification be based on individual diagnostic terms and that it be free from specific instructions concerning how coding and tabulation shall be done.

Requirements for Coding Mortality Records

Traditionally, mortality statistics have been based on a count of deaths with one cause assigned to each death. This system appeared to be satisfactory so long as death records usually contained only one diagnosis. Physicians were instructed to enter the underlying cause

of death on the death certificate. Whenever two or more causes were entered, the choice of the single diagnosis selected for coding was based on the underlying cause principle. As a result, this principle has been interpreted as implying that only one cause of death should be coded. This, of course, is an incorrect interpretation since the underlying cause principle is a way of ranking diseases in order of importance and places no limitation on the number of diagnoses that may be coded.

In many countries the belief is widely accepted that a single diagnosis, no matter how selected, no longer adequately represents the circumstances surrounding death. The leading causes of death in these countries are chronic or degenerative diseases whose etiology, although unknown, is believed to be due to multiple factors. A large proportion of persons have more than one active disease at the time of death. Two or more causes were reported for 58 percent of the deaths occurring in the United States during 1955.

The selection of a single cause requires the adoption of elaborate rules for selecting the underlying cause and these must be applied even when there is no medical basis for so doing. The 1962 Instruction Manual of the National Vital Statistics Division of the U.S. Public Health Service devotes 62 pages to rules for choosing the underlying cause of death. In addition, the coding supervisors must have a long list of decisions for specific instances.

As a result, the frequency with which a disease is shown in published mortality statistics is determined, to an increasingly greater extent, by the rules for selecting the underlying cause of death. In 1958 a sample of death records was coded twice, once in accordance with the coding rules for the sixth revision and once in accordance with the coding rules for the seventh revision. Both revisions had identical rubrics for bronchitis (500–502), other chronic interstitial pneumonia (525), bronchiectasis (526), and emphysema and other diseases of the lung and pleural cavity (527). The ratio of the number of deaths assigned to each cause by following the coding rules of the seventh revision to the corresponding number assigned by following the coding rules of the sixth revision was as follows:

Bronchitis (500–502)	106.7
Other chronic interstitial pneumonia (525)	99.4
Bronchiectasis (526)	114.7
Other diseases of lung and pleural cavity (527)	85.1

It is obvious that marked changes in the reported death rate from a disease may be brought about by changes in coding rules unknown to most users of mortality statistics.

Some persons believe that the cause of death can be adequately represented only by a composite diagnosis or disease complex formed by combining two or more diagnoses. For example, a death record showing acute myocardial infarction, hypertension, and nephrosclerosis would be assigned a code representing a combination of these three diagnoses. It has been proposed that composite diagnoses of this kind be assigned code numbers and be included in the eighth revision of the International Statistical Classification. A proposed revision of the Section on Cardiovascular Diseases incorporating this suggestion has been distributed by the World Health Organization.

Objectives of the Classification

If the International Statistical Classification is to be used for the three major purposes described above it must:

1. Be easily adaptable for indexing hospital records by single diagnostic terms.
2. Be readily usable for the tabulation of morbidity and mortality statistics by single diagnoses selected by a variety of principles.
3. Facilitate the tabulation of morbidity and mortality statistics by multiple causes. Two multiple-cause tabulations have been proposed: (*a*) the number of deaths classified by diagnostic complexes, or composite diagnoses, that is, combinations of two or more diagnostic terms, and (*b*) the frequency with which each diagnosis is reported as a primary or underlying cause and as a contributory cause.

Ways to Accomplish Objectives

The proposed revision of the Cardiovascular Diseases Section of the International Statistical Classification incorporates composite diagnoses into the list of diagnoses by assigning separate code numbers to combinations of two or more

diagnoses. Separate code numbers also are included for the separate terms that comprise the composite diagnoses. I believe that this proposed method is unsatisfactory and should be rejected as a basis for revision of the International Statistical Classification for the following reasons:

1. It cannot be generally applied without increasing the number of separate code numbers to an extent that would make the use of the classification impracticable. Approximately 100 additional code numbers are proposed for composite diagnoses in the Cardiovascular Diseases Section and 65 numbers for combinations of diabetes with cardiovascular diseases. It is also suggested that 20 diseases of the respiratory system or affecting the pulmonary vasculature be subdivided to show the presence or absence of cor pulmonale.
2. It is a clumsy and awkward way of accomplishing its objective.
3. It is inflexible and assumes that desired combinations of diagnoses can be foreseen 12 years in the future.
4. It makes no provision for meeting requests for other composite diagnoses that may be made at any time in the future.
5. It introduces what is essentially a tabulation and coding instruction into the structure of the diagnostic classification.
6. It ignores the existence of electrical data-processing equipment.
7. It places primary emphasis on the use of the International Statistical Classification for coding and tabulating mortality statistics and largely ignores its other possible uses.
8. It recognizes only one of the changes that should be made in the processing of mortality statistics.

I believe that the separate countries should be free to experiment with the use of composite diagnoses. The concept has not yet been widely discussed and very little experience by which its usefulness can be judged is available. It is premature to make the use of composite diagnoses mandatory.

I propose the following general principles as a basis for preparing the eighth revision of the International Statistical Classification and for improving existing procedures for tabulating mortality statistics. These arise from the belief that this classification can be successfully used for processing morbidity as well as mortality statistics and, with minor modification, for indexing hospital records and, further, that it is desirable for the classification to be used for a diversity of purposes.

1. The International Statistical Classification should be a classified list of single diagnostic terms, as used in medical practice. This does not preclude the assignment of one code number to two or more diagnostic terms which do not have separate code numbers. Instructions for assigning a priority order to diagnoses when two or more are reported, coding rules, and tabulation suggestions should be deleted from the classification.
2. Methods for coding, tabulating, and presenting morbidity and mortality statistics should be considered as a separate problem from the revision of the classified list of diagnoses although naturally related to it.

The acceptance of these two principles will make possible the use of the International Statistical Classification for morbidity statistics and for indexing hospital records. The following comments refer specifically to the use of the classification for processing mortality statistics.

3. The necessity for coding more than one diagnosis when two or more diagnoses are entered on the death certificate should be explicitly recognized. The interpretation of the underlying cause principle as implying that one diagnosis, in general, can adequately represent the conditions causing death should be abandoned.

Considerable flexibility must be exercised in the carrying out of this principle. The proportion of death certificates with two or more codeable diagnoses varies from country to country. Wide variation also exists in the possibility of using more complete diagnostic information. I doubt that any single set of proposals will be generally applicable. Many countries will continue to have difficulty in producing tabulations showing the number of deaths classified by age, sex, and one cause of death. Others may be prepared to code multiple causes for a few diseases but not for all. Some may do it an-

nually; others only occasionally. Hence, the following comments refer specifically to countries such as the United States.

In the United States, the selection of a single cause for each death should be abandoned as soon as possible. The medical information entered on death certificates can be adequately summarized only by coding multiple causes of death whenever these are entered on death certificates.

Prompt Identification of Food Poison

Use of gel diffusion to identify the specific staphylococcal toxin responsible for the majority of food poisoning outbreaks in the United States was announced in November 1963 by the U.S. Food and Drug Administration, simultaneously with similar reports by the Public Health Service. The gel double diffusion test, the goal of 15 years' research, employs a serologic method. Minute quantities of Enterotoxin A can be detected through the use of the antibody produced in rabbits by injection of the enterotoxin. (Similar results with Enterotoxin B were reported in the December 1963 issue of *Public Health Reports* by Dr. Herbert E. Hall and associates, Sanitary Engineering Center, Public Health Service.)

In the past, it has been necessary to isolate the bacteria from suspected foods and demonstrate toxicity by feeding monkeys or injecting cats. These tests were time consuming and not always reliable because animals vary in susceptibility to toxins.

In the FDA test, the suspected food sample is placed in an electric blender and thoroughly homogenized. A special glass column containing certain chemicals is used to separate the toxin from the food substances. The toxin is removed from the chemicals and concentrated.

Samples of the toxin and an antitoxin are applied to a gel medium into which they diffuse. When they meet a line is formed; characteristics of this line matched against a known reference line permit a positive identification.