

# History of the development of the ICD

## 1. Early history

Sir George Knibbs, the eminent Australian statistician, credited François Bossier de Lacroix (1706-1777), better known as Sauvages, with the first attempt to classify diseases systematically (10). Sauvages' comprehensive treatise was published under the title *Nosologia methodica*. A contemporary of Sauvages was the great methodologist Linnaeus (1707-1778), one of whose treatises was entitled *Genera morborum*. At the beginning of the 19th century, the classification of disease in most general use was one by William Cullen (1710-1790), of Edinburgh, which was published in 1785 under the title *Synopsis nosologiae methodicae*.

For all practical purposes, however, the statistical study of disease began a century earlier with the work of John Graunt on the London Bills of Mortality. The kind of classification envisaged by this pioneer is exemplified by his attempt to estimate the proportion of liveborn children who died before reaching the age of six years, no records of age at death being available. He took all deaths classed as thrush, convulsions, rickets, teeth and worms, abortives, chrysmes, infants, livergrown, and overlaid and added to them half the deaths classed as smallpox, swinepox, measles, and worms without convulsions.

Despite the crudity of this classification his estimate of a 36 % mortality before the age of six years appears from later evidence to have been a good one. While three centuries have contributed something to the scientific accuracy of disease classification, there are many who doubt the usefulness of attempts to compile statistics of disease, or even causes of death, because of the difficulties of classification. To these, one can quote Major Greenwood: "The scientific purist, who will wait for medical statistics until they are nosologically exact, is no wiser than Horace's rustic waiting for the river to flow away" (11).

Fortunately for the progress of preventive medicine, the General Register Office of England and Wales, at its inception in 1837, found in William Farr (1807-1883) - its first medical statistician - a man who not only made the best possible use of the imperfect classifications of disease available at the time, but laboured to secure better classifications and international uniformity in their use.

Farr found the classification of Cullen in use in the public services of his day. It had not been revised to embody the advances of medical science, nor was it deemed by him to be satisfactory for statistical purposes. In the first Annual Report of the Registrar General (12), therefore, he discussed the principles that should govern a statistical classification of disease and urged the adoption of a uniform classification as follows:

The advantages of a uniform statistical nomenclature, however imperfect, are so obvious, that it is surprising no attention has been paid to its enforcement in Bills of Mortality. Each disease has, in many instances, been denoted by three or four terms, and each term has been applied to as many different diseases: vague, inconvenient names have been employed, or complications have been registered instead of primary diseases. The nomenclature is of as much importance in this department of inquiry as weights and measures in the physical sciences, and should be settled without delay.

Both nomenclature and statistical classification received constant study and consideration by Farr in his annual "Letters" to the Registrar General published in the Annual Reports of the Registrar General. The utility of a uniform classification of causes of death was so strongly recognized at the first International Statistical Congress, held in Brussels in 1853, that the Congress requested William Farr and Marc d'Espine, of Geneva, to prepare an internationally applicable, uniform classification of causes of death. At the next Congress, in Paris in 1855, Farr and d'Espine submitted two separate lists which were based on very different principles. Farr's classification was arranged under five groups: epidemic diseases, constitutional (general) diseases, local diseases arranged according to anatomical site, developmental diseases, and diseases that are the direct result of violence. D'Espine classified

diseases according to their nature (gouty, herpetic, haematic, etc.). The Congress adopted a compromise list of 139 rubrics. In 1864, this classification was revised in Paris on the basis of Farr's model and was subsequently further revised in 1874, 1880, and 1886. Although this classification was never universally accepted, the general arrangement proposed by Farr, including the principle of classifying diseases by anatomical site, survived as the basis of the International List of Causes of Death.

## **2. Adoption of the International List of Causes of Death**

The International Statistical Institute, the successor to the International Statistical Congress, at its meeting in Vienna in 1891, charged a committee, chaired by Jacques Bertillon (1851-1922), Chief of Statistical Services of the City of Paris, with the preparation of a classification of causes of death. It is of interest to note that Bertillon was the grandson of Achille Guillard, a noted botanist and statistician, who had introduced the resolution requesting Farr and d'Espine to prepare a uniform classification at the first International Statistical Congress in 1853. The report of this committee was presented by Bertillon at the meeting of the International Statistical Institute in Chicago in 1893 and adopted by it. The classification prepared by Bertillon's committee was based on the classification of causes of death used by the City of Paris, which, since its revision in 1885, represented a synthesis of English, German, and Swiss classifications. The classification was based on the principle, adopted by Farr, of distinguishing between general diseases and those localized to a particular organ or anatomical site. In accordance with the instructions of the Vienna Congress made at the suggestion of L. Guillaume, the Director of the Federal Bureau of Statistics of Switzerland, Bertillon included three classifications: the first, an abridged classification of 44 titles; the second, a classification of 99 titles; and the third, a classification of 161 titles.

The Bertillon Classification of Causes of Death, as it was first called, received general approval and was adopted by several countries, as well as by many cities. The classification was first used in North America by Jesús E. Monjarás for the statistics of San Luis de Potosí, Mexico (13). In 1898, the American Public Health Association, at its meeting in Ottawa, Canada, recommended the adoption of the Bertillon Classification by registrars of Canada, Mexico, and the United States of America. The Association further suggested that the classification should be revised every ten years.

At the meeting of the International Statistical Institute at Christiania in 1899, Bertillon presented a report on the progress of the classification, including the recommendations of the American Public Health Association for decennial revisions. The International Statistical Institute then adopted the following resolution (14):

The International Statistical Institute, convinced of the necessity of using in the different countries comparable nomenclatures:

Learns with pleasure of the adoption by all the statistical offices of North America, by some of those of South America, and by some in Europe, of the system of cause of death nomenclature presented in 1893;

Insists vigorously that this system of nomenclature be adopted in principle and without revision, by all the statistical institutions of Europe;

Approves, at least in its general lines, the system of decennial revision proposed by the American Public Health Association at its Ottawa session (1898):

Urges the statistical offices who have not yet adhered, to do so without delay, and to contribute to the comparability of the cause of death nomenclature.

The French Government therefore convoked in Paris, in August 1900, the first International Conference for the Revision of the Bertillon or International List of Causes of Death. Delegates from 26 countries attended this Conference. A detailed classification of causes of death consisting of 179 groups and an abridged classification of 35 groups were adopted on 21 August 1900. The desirability of decennial revisions was recognized, and the French Government was requested to call the next meeting in 1910. In fact the next conference was held in 1909, and the Government of France called succeeding conferences in 1920, 1929, and 1938.

Bertillon continued to be the guiding force in the promotion of the International List of Causes of Death, and the revisions of 1900, 1910, and 1920 were carried out under his leadership. As Secretary-General of the International Conference, he sent out the provisional revision for 1920 to more than 500 people, asking for comments. His death in 1922 left the International Conference without a guiding hand.

At the 1923 session of the International Statistical Institute, Michel Huber, Bertillon's successor in France, recognized this lack of leadership and introduced a resolution for the International Statistical Institute to renew its stand of 1893 in regard to the International Classification of Causes of Death and to cooperate with other international organizations in preparation for subsequent revisions. The Health Organization of the League of Nations had also taken an active interest in vital statistics and appointed a Commission of Statistical Experts to study the classification of diseases and causes of death, as well as other problems in the field of medical statistics. E. Roesle, Chief of the Medical Statistical Service of the German Health Bureau and a member of the Commission of Expert Statisticians, prepared a monograph that listed the expansion in the rubrics of the 1920 International List of Causes of Death that would be required if the classification was to be used in the tabulation of statistics of morbidity. This careful study was published by the Health Organization of the League of Nations in 1928 (15). In order to coordinate the work of both agencies, an international commission, known as the "Mixed Commission", was created with an equal number of representatives from the International Statistical Institute and the Health Organization of the League of Nations. This Commission drafted the proposals for the Fourth (1929) and the Fifth (1938) revisions of the International List of Causes of Death.

### **3. The Fifth Decennial Revision Conference**

The Fifth International Conference for the Revision of the International List of Causes of Death, like the preceding conferences, was convened by the Government of France and was held in Paris in October 1938. The Conference approved three lists: a detailed list of 200 titles, an intermediate list of 87 titles and an abridged list of 44 titles. Apart from bringing the lists up to date in accordance with the progress of science, particularly in the chapter on infectious and parasitic diseases, and changes in the chapters on puerperal conditions and on accidents, the Conference made as few changes as possible in the contents, number, and even in the numbering of the items. A list of causes of stillbirth was also drawn up and approved by the Conference.

As regards classification of diseases for morbidity statistics, the Conference recognized the growing need for a corresponding list of diseases to meet the statistical requirements of widely differing organizations, such as health insurance organizations, hospitals, military medical services, health administrations, and similar bodies. The following resolution, therefore, was adopted (16):

#### *2. International Lists of Diseases*

In view of the importance of the compilation of international lists of diseases corresponding to the international lists of causes of death:

The Conference recommends that the Joint Committee appointed by the International Institute of Statistics and the Health Organization of the League of Nations undertake, as in 1929, the preparation of international lists of diseases, in conjunction with experts and representatives of the organizations specially concerned.

Pending the compilation of international lists of diseases, the Conference recommends that the various national lists in use should, as far as possible, be brought into line with the detailed International List of Causes of Death (the numbers of the chapters, headings and subheadings in the said List being given in brackets).

The Conference further recommended that the United States Government continue its studies of the statistical treatment of joint causes of death in the following resolution (16):

### 3. *Death Certificate and Selection of Causes of Death where more than One Cause is given (Joint Causes)*

The Conference,

Whereas, in 1929, the United States Government was good enough to undertake the study of the means of unifying the methods of selection of the main cause of death to be tabulated in those cases where two or more causes are mentioned on the death certificate,

And whereas, the numerous surveys completed or in the course of preparation in several countries reveal the importance of this problem, which has not yet been solved,

And whereas, according to these surveys, the international comparability of death rates from the various diseases requires, not only the solution of the problem of the selection of the main tabulated cause of death, but also the solution of a number of other questions;

- (1) Warmly thanks the United States Government for the work it has accomplished or promoted in this connection;
- (2) Requests the United States Government to continue its investigations during the next ten years, in co-operation with other countries and organizations, on a slightly wider basis, and
- (3) Suggests that, for these future investigations, the United States Government should set up a subcommittee comprising representatives of countries and organizations participating in the investigations undertaken in this connection.

### 4. **Previous classifications of diseases for morbidity statistics**

In the discussion so far, classification of disease has been presented almost wholly in relation to cause-of-death statistics. Farr, however, recognized that it was desirable "to extend the same system of nomenclature to diseases which, though not fatal, cause disability in the population, and now figure in the tables of the diseases of armies, navies, hospitals, prisons, lunatic asylums, public institutions of every kind, and sickness societies, as well as in the census of countries like Ireland, where the diseases of all the people are enumerated" (9). In his *Report on nomenclature and statistical classification of diseases*, presented to the Second International Statistical Congress, he therefore included in the general list of diseases most of those diseases that affect health as well as diseases that are fatal. At the Fourth International Statistical Congress, held in London in 1860, Florence Nightingale urged the adoption of Farr's classification of diseases for the tabulation of hospital morbidity in the paper, *Proposals for a uniform plan of hospital statistics*.

At the First International Conference to revise the Bertillon Classification of Causes of Death in Paris in 1900, a parallel classification of diseases for use in statistics of sickness was adopted. A parallel list was also adopted at the second conference in 1909. The extra categories for non-fatal diseases were formed by subdivision of certain rubrics of the cause-of-death classification into two or three disease groups, each of these being designated by a letter. The translation in English of the Second Decennial Revision, published by the United States Department of Commerce and Labor in 1910, was entitled *International Classification of Causes of Sickness and Death*. Later revisions incorporated some of the groups into the detailed International List of Causes of Death. The Fourth International Conference adopted a classification of illness which differed from the detailed International List of Causes of Death only by the addition of further subdivisions of 12 titles. These international classifications of illnesses, however, failed to receive general acceptance, as they provided only a limited expansion of the basic cause-of-death list.

In the absence of a uniform classification of diseases that could be used satisfactorily for statistics of illness, many countries found it necessary to prepare their own lists. A Standard Morbidity Code was prepared by the Dominion Council of Health of Canada and published in 1936. The main subdivisions of this code represented the eighteen chapters of the 1929 Revision of the International List of Causes of Death, and these were subdivided into some 380 specific disease categories. At the Fifth International Conference in 1938, the Canadian delegate introduced a modification of this list for consideration as the basis for an international list of causes of illness. Although no

action was taken on this proposal, the Conference adopted the resolution quoted above.

In 1944, provisional classifications of diseases and injuries were published in both the United Kingdom and the United States of America for use in the tabulation of morbidity statistics. Both classifications were more extensive than the Canadian list, but, like it, followed the general order of diseases in the International List of Causes of Death. The British classification was prepared by the Committee on Hospital Morbidity Statistics of the Medical Research Council, which was created in January 1942. It is entitled *A provisional classification of diseases and injuries for use in compiling morbidity statistics* (17). It was prepared with the purpose of providing a scheme for collecting and recording statistics of patients admitted to hospitals in the United Kingdom, using a standard classification of diseases and injuries, and was used throughout the country by governmental and other agencies.

A few years earlier, in August 1940, the Surgeon-General of the United States Public Health Service and the Director of the United States Bureau of the Census published a list of diseases and injuries for tabulation of morbidity statistics (18). The code was prepared by the Division of Public Health Methods of the Public Health Service in cooperation with a committee of consultants appointed by the Surgeon-General. *The Manual for coding causes of illness according to a diagnosis code for tabulating morbidity statistics*, consisting of the diagnosis code, a tabular list of inclusions, and an alphabetical index, was published in 1944. The code was used in several hospitals, in a large number of voluntary hospital insurance plans and medical care plans, and in special studies by other agencies in the United States.

## **5. United States Committee on Joint Causes of Death**

In compliance with the resolution of the Fifth International Conference, the American Secretary of State in 1945 appointed the United States Committee on Joint Causes of Death under the chairmanship of Lowell J. Reed, Professor of Biostatistics at Johns Hopkins University. Members and consultants of this committee included representatives of the Governments of Canada and the United Kingdom and the Health Section of the League of Nations. The committee recognized the general trend of thought with regard to lists of morbidity and mortality statistics, and decided that, before taking up the matter of joint causes, it would be advantageous to consider classifications from the point of view of morbidity and mortality, since the problem of joint causes pertained to both types of statistics.

The committee also took into account that part of the resolution on International Lists of Diseases of the previous International Conference recommending that the "various national lists in use should, as far as possible, be brought into line with the detailed International List of Causes of Death". It recognized that the classification of sickness and injury is closely linked with the classification of causes of death. The view that such lists are fundamentally different arises from the erroneous belief that the International List is a classification of terminal causes, whereas it is in fact based upon the morbid condition that initiated the train of events ultimately resulting in death. The committee believed that, in order to utilize fully both morbidity and mortality statistics, not only should the classification of diseases for both purposes be comparable, but if possible there should be a single list.

Furthermore, an increasing number of statistical organizations were using medical records involving both sickness and death. Even in organizations that compile only morbidity statistics, fatal as well as non-fatal cases must be coded. A single list, therefore, greatly facilitates their coding operations. It also provides a common base for comparison of morbidity and mortality statistics.

A subcommittee was therefore appointed, which prepared a draft of a Proposed Statistical Classification of Diseases, Injuries and Causes of Death. A final draft was adopted by the committee after it had been modified on the basis of trials undertaken by various agencies in Canada, the United Kingdom and the United States of America.

## 6. Sixth Revision of the International Lists

The International Health Conference held in New York City in June and July 1946 (19) entrusted the Interim Commission of the World Health Organization with the responsibility of:

reviewing the existing machinery and of undertaking such preparatory work as may be necessary in connection with:

- (i) the next decennial revision of 'The International Lists of Causes of Death' (including the lists adopted under the International Agreement of 1934, relating to Statistics of Causes of Death); and
- (ii) the establishment of International Lists of Causes of Morbidity

To meet this responsibility, the Interim Commission appointed the Expert Committee for the Preparation of the Sixth Decennial Revision of the International Lists of Diseases and Causes of Death.

This Committee, taking full account of prevailing opinion concerning morbidity and mortality classification, reviewed and revised the above-mentioned proposed classification which had been prepared by the United States Committee on Joint Causes of Death.

The resulting classification was circulated to national governments preparing morbidity and mortality statistics for comments and suggestions under the title, *International Classification of Diseases, Injuries, and Causes of Death*. The Expert Committee considered the replies and prepared a revised version incorporating such changes as appeared to improve the utility and acceptability of the classification. The Committee also compiled a list of diagnostic terms to appear under each title of the classification. Furthermore, a subcommittee was appointed to prepare a comprehensive alphabetical index of diagnostic statements classified to the appropriate category of the classification.

The Committee also considered the structure and uses of special lists of causes for tabulation and publication of morbidity and mortality statistics and studied other problems related to the international comparability of mortality statistics, such as form of medical certificate and rules for classification.

The International Conference for the Sixth Revision of the International Lists of Diseases and Causes of Death was convened in Paris from 26 to 30 April 1948 by the Government of France under the terms of the agreement signed at the close of the Fifth Revision Conference in 1938. Its secretariat was entrusted jointly to the competent French authorities and to the World Health Organization, which had carried out the preparatory work under the terms of the arrangement concluded by the governments represented at the International Health Conference in 1946 (19).

The Conference adopted the classification prepared by the Expert Committee as the Sixth Revision of the International Lists (20). It also considered other proposals of the Expert Committee concerning the compilation, tabulation and publication of morbidity and mortality statistics. The Conference approved the International Form of Medical Certificate of Cause of Death, accepted the underlying cause of death as the main cause to be tabulated, and endorsed the rules for selecting the underlying cause of death as well as the special lists for tabulation of morbidity and mortality data. It further recommended that the World Health Assembly should adopt regulations under Article 21(b) of the WHO Constitution to guide Member States in compiling morbidity and mortality statistics in accordance with the International Statistical Classification.

In 1948, the First World Health Assembly endorsed the report of the Sixth Revision Conference and adopted World Health Organization Regulations No. 1, prepared on the basis of the recommendations of the Conference. The International Classification, including the Tabular List of Inclusions defining the content of the categories, was incorporated, together with the form of the medical certificate of cause of death, the rules for classification and the

special lists for tabulation, into the *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death* (21). The Manual consisted of two volumes, Volume 2 being an alphabetical index of diagnostic terms coded to the appropriate categories.

The Sixth Decennial Revision Conference marked the beginning of a new era in international vital and health statistics. Apart from approving a comprehensive list for both mortality and morbidity and agreeing on international rules for selecting the underlying cause of death, it recommended the adoption of a comprehensive programme of international cooperation in the field of vital and health statistics. An important item in this programme was the recommendation that governments establish national committees on vital and health statistics to coordinate the statistical activities in the country, and to serve as a link between the national statistical institutions and the World Health Organization. It was further envisaged that such national committees would, either singly or in cooperation with other national committees, study statistical problems of public health importance and make the results of their investigations available to WHO.

## **7. The Seventh and Eighth Revisions**

The International Conference for the Seventh Revision of the International Classification of Diseases was held in Paris under the auspices of WHO in February 1955 (22). In accordance with a recommendation of the WHO Expert Committee on Health Statistics, this revision was limited to essential changes and amendments of errors and inconsistencies (23).

The Eighth Revision Conference convened by WHO met in Geneva, from 6 to 12 July 1965 (24). This revision was more radical than the Seventh but left unchanged the basic structure of the Classification and the general philosophy of classifying diseases, whenever possible, according to their etiology rather than a particular manifestation.

During the years that the Seventh and Eighth Revisions of the ICD were in force, the use of the ICD for indexing hospital medical records increased rapidly and some countries prepared national adaptations which provided the additional detail needed for this application of the ICD.

## **8. The Ninth Revision**

The International Conference for the Ninth Revision of the International Classification of Diseases, convened by WHO, met in Geneva from 30 September to 6 October 1975 (25). In the discussions leading up to the conference, it had originally been intended that there should be little change other than updating of the classification. This was mainly because of the expense of adapting data-processing systems each time the classification was revised. There had been an enormous growth of interest in the ICD and ways had to be found of responding to this, partly by modifying the classification itself and partly by introducing special coding provisions. A number of representations were made by specialist bodies which had become interested in using the ICD for their own statistics. Some subject areas in the classification were regarded as inappropriately arranged and there was considerable pressure for more detail and for adaptation of the classification to make it more relevant for the evaluation of medical care, by classifying conditions to the chapters concerned with the part of the body affected rather than to those dealing with the underlying generalized disease. At the other end of the scale, there were representations from countries and areas where a detailed and sophisticated classification was irrelevant, but which nevertheless needed a classification based on the ICD in order to assess their progress in health care and in the control of disease.

The final proposals presented to and accepted by the Conference retained the basic structure of the ICD, although with much additional detail at the level of the four-digit subcategories, and some optional five-digit subdivisions. For the benefit of users not requiring such detail, care was taken to ensure that the categories at the three-digit level were appropriate.

For the benefit of users wishing to produce statistics and indexes oriented towards medical care, the Ninth Revision included an optional alternative method of classifying diagnostic statements, including information about both an underlying general disease and a manifestation in a particular organ or site. This system became known as the dagger and asterisk system and is retained in the Tenth Revision. A number of other technical innovations were included in the Ninth Revision, aimed at increasing its flexibility for use in a variety of situations.

The Twenty-ninth World Health Assembly, noting the recommendations of the International Conference for the Ninth Revision of the International Classification of Diseases, approved the publication, for trial purposes, of supplementary classifications of Impairments and Handicaps and of Procedures in Medicine as supplements to, but not as integral parts of, the International Classification of Diseases. The Conference also made recommendations on a number of related technical subjects: coding rules for mortality were amended slightly and rules for the selection of a single cause for tabulation of morbidity were introduced for the first time; definitions and recommendations for statistics in the field of perinatal mortality were amended and extended and a certificate of causes of perinatal death was recommended; countries were encouraged to do further work on multiple-condition coding and analysis, but no formal methods were recommended; and a new basic tabulation list was produced.

## **9. Preparations for the Tenth Revision**

Even before the Conference for the Ninth Revision, WHO had been preparing for the Tenth Revision. It had been realized that the great expansion in the use of the ICD necessitated a thorough rethinking of its structure and an effort to devise a stable and flexible classification, which should not require fundamental revision for many years to come. The WHO Collaborating Centres for Classification of Diseases (see Volume 1, pp.7-8) were consequently called upon to experiment with models of alternative structures for ICD-10.

It had also become clear that the established ten-year interval between revisions was too short. Work on the revision process had to start before the current version of the ICD had been in use long enough to be thoroughly evaluated, mainly because the necessity to consult so many countries and organizations made the process a very lengthy one. The Director-General of WHO therefore wrote to the Member States and obtained their agreement to postpone until 1989 the Tenth Revision Conference, which was originally scheduled for 1985 and to delay the introduction of the Tenth Revision which would have been due in 1989. In addition to permitting experimentation with alternative models for the structure of the ICD, this allowed time for the evaluation of ICD-9, for example through meetings organized by some of the WHO Regional Offices and through a survey organized at headquarters.

An extensive programme of work followed which culminated in the Tenth Revision of the ICD and is described in the Report of the International Conference for the Tenth Revision of the International Classification of Diseases, reproduced in Volume 1.



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