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Implementation of the Polish version of the 11th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-11): importance for oncology

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ABSTRACT

Member States of the World Health Organization (WHO), after several years of joint review, approved and implemented the update of the International Statistical Classification of Diseases and Related Health Problems (ICD) in May 2019. Usually, the abbreviated name ICD-11 (International Classification of Diseases, 11th Revision) is used. The new version was created in fully digital form with a search easy-to-use search engine available to every user. Many changes were introduced, and the most important is the redesign of the coding system to adapt it for digital use. ICD-11 codes are divided into main and supplementary codes. Main codes are at least 4 characters long, and 2 levels of extensions, up to 7 characters, are possible. In Poland, the entire process of implementing the ICD-11 is carried out as part of a project coordinated by the Medical Center for Postgraduate Education in cooperation with the Department of Healthcare of the Ministry of Health and the e-Health Center The implementation of the new version and the official introduction of ICD-11 in Poland must be preceded primarily by the amendment of legal acts (laws and regulations) and orders of the President of the National Health Fund, such as those regarding the reimbursement for refunded services and the keeping of medical records.

An important element is the change in the cluster codes in oncology. Selected oncology groups were based on analyses of international reports on morbidity, mortality, cancer registries, and clinical reports. Cluster 02, which deals with cancer, contains 8 subsections detailing disease states associated with abnormal or uncontrolled cell proliferation. This article summarizes and discusses the most important changes in ICD-11, along with providing an introduction to the classification rules in the coding system and individual subsections on cancer.

Keywords: ICD-11, classification, WHO

Introduction

The International Classification of Diseases (ICD), which was introduced in the mid-nineteenth century as a shortlist for compiling statistical data about causes of death has become, over the years, the dominant classification of diseases, syndromes, and health conditions in people around the world [1]. One of the aims of

the classification is to collect health data for the assessment of comparable health status at the international level. In addition, 70% of global health spending uses ICD codes for reimbursement and resource allocation. Some 110 countries, representing approximately 60% of the world's population, use ICD death data to organize, fund and monitor the use of health resources.

Despite the dynamic development of all areas of medicine for nearly 100 years, between the initial versions of the International Statistical List and the 10th ICD revision (ICD-10) in 1990, there was virtually no evolution in the structure of the classification, which was a table of terms with associated code values [2]. The basis for the introduction of the ICD-11 was the need to improve the quality of coding and access to its resources, lower costs of its use and update its structure so that it reflects the current state of medicine, which was associated with a properly designed (logical and clear) user interface and better mapping of causes of morbidity and death. Before undertaking work on the new version of the ICD, the WHO reviewed all existing classifications (including categorization and codes) to make the new version reflect medical progress. A team of experts on WHO Classification and Terminology was aware of ICD shortcomings in the era of the IT revolution and the dynamic development of medicine. In 2005, work began on revising the ICD to take advantage of the huge advances made in the early 21st century in computer science, ontology, and medicine. The ICD-11 version was developed by many teams of clinical specialists and experts in particular fields. The teams were divided into 19 thematic advisory groups, the so-called TAGs. Important for this project was the creation of a special "Informatics TAG", which significantly contributed to the development of the new ICD-11 architecture and was elevated to the rank of priority equal to clinical domains. In information systems, a TAG is a keyword or term assigned to information (such as a web bookmark, multimedia, database record, or computer file). This type of metadata helps describe the item and makes it discoverable by browsing or searching. TAGs are usually chosen informally and personally by the creator of the item or by its user, depending on the system although they can also be selected from a controlled vocabulary [3].

World Health Organization member states, after several years of joint review, approved and implemented in May 2019 the International Classification of Diseases ICD-11, which is already in force in 35 countries. It is currently available in English, French, Spanish, Arabic, and Chinese, with translation into further 20 languages in preparation [4].

Since January 1st, 2022, the 11th version of the classification has been officially used in Poland for national and international registration and reporting of the causes of diseases and deaths, reimbursement for health services, statistical analysis, and clinical trials. Poland, like other countries, has at least a 5-year transition period for the implementation and dissemination of the ICD-11. During the transition period, WHO Member States may compile and submit statistical data to the WHO using the previous revision (ICD-10) [5].

Classification structure developed for ICD-11

For the first time, the ICD has been made available not in print but in a digital form (https://icd.who.int/en) and consists of grouping information according to logical rules. The terminology allows healthcare professionals to report information at any level of detail (e.g., body parts, exam results, or other elements that characterize the disease). Only items defined in terminology can be reported. In contrast, the classification contains residual classes ("other specified" and "unspecified"), which ensure that all cases can be classified. In modern classification terminology, a disease can be defined by, for example, establishing a correlation between its components. Terminologies retain information without emphasizing any aspect of the recorded information. Classifications, on the other hand, allow for the identification of "relevant parts" of content (e.g., for public health purposes). An international agreement on these material parts ensures that the aggregated information is comparable in the international context [6].

The ICD-11 architecture includes 3 layers, which are:
— semantic network of biomedical concepts (so-called base);
— traditional table of hierarchical codes that derive from this network (linearization);
— formal ontology that places the meaning of terms in a semantic web. Additionally, each entry in the Semantic Web is associated with an information model with required and optional content (content model) [3].

The new classification allows the encoding of approximately 17 000 unique categories (codes) of diseases and causes of death, while in the previous version of the ICD-10, there were 14 000. There are 80 000 units/ /elements of the classification; each element has its own number and is grouped into categories. There are over 120 000 concepts and terms and 40 000 synonyms for units/elements and categories with the same number. It should be emphasized that the intelligent coding algorithm currently interprets over 1.6 million terms (including their combinations).

The ICD-11 contains 26 main clusters, including 5 new ones:
— R.03 Diseases of the blood and organs of the human hematopoietic system;

— R.04 Disturbances in the functioning of the immune system;
— R.07 Disturbance of sleep and awakening;
— R.17 Factors determining sexual health;
— R.27 Traditional medicine [7].

In addition to the code classification in the 26 main clusters, there are 2 additional sections (V and X). Section V on the assessment of human functioning enables calculation of the disability score according to the WHO Disability Assessment Schedule (WHODAS 2.0) scale, which allows healthcare professionals to combine the ICD and International Classification of Functioning, Disability and Health (ICF) codes. On the other hand, in section X, the supplementary codes contain additional information (e.g., histological type, active substances, pathogens, medical supplies used, or antibiotic resistance) [8].

The ICD-11 system can be used to code diagnoses in electronic medical records and link them to death records or other data in digital collections. Special tools, such as the ICD-11 Coding Tool, make it easy to find specific ICD-11 codes for any diagnosis from several places that define the unit or category of that classification [9].

Eleventh revision of the International Statistical Classification of Diseases and Related Health Problems codes are divided into main and supplementary codes. Main codes consist of a minimum of 4 characters and have 2 levels of extensions up to 7 characters (including a period, the second character is always a capital letter; no O or L to avoid confusion). All codes in one cluster will always start with the same character. The range of codes is from 1A00.00 to ZZ9Z.ZZ. The letter X describes the extension codes, i.e., additional important information about the disease [8].

A new coding feature introduced in the ICD-11 is post-coordination, which supports combining two or more codes into a cluster describing a clinical concept. Post-coordination enables reporting of coded data with a higher level of detail than in the previous ICD version. One can combine codes consisting, for example, of main codes and supplementary codes in so-called collections/sets of codes. Main codes are combined with a slash "/" and supplementary codes with an "&". The rules for code combinations and the acceptable method of linking main codes and supplementary codes were defined (pathomorphological codes are combined only with codes of neoplastic diseases) [10].

It is possible to combine codes into clusters, e.g.:
— MAINCODE1/MAINCODE2;
— MAINCODE1/MAINCODE2/MAINCODE3;
— E1/MAINCODE2&SUPPLEMENTARYCODE1;
— MAINCODE1 & SUPPLEMENTARYCODE1/ /MAINCODE2/SUPPLEMENTARYCODE2.

The following examples show how clinical situations can be described more accurately by combining main codes with a slash "/" and supplementary codes with an "&" character:
1. Personal history of invasive breast cancer in a patient with contralateral breast cancer
   Cluster: QC40.3/2C61
   Code descriptions:
   QC40.3 Personal history of malignant breast neoplasm (main code)
   2C61 Invasive breast cancer (main code)
2. Personal history of invasive left breast cancer in a patient with right breast cancer
   Cluster: QC40.3&XK8G/2C61&XK8K
   Code descriptions:
   QC40.3 Personal history of malignant breast neoplasm (main code)
   Lateralization: XK8G left side (supplementary code)
   2C61 Invasive ductal carcinoma of the breast (main code)
   Lateralization: XK8K right side (supplementary code)
3. Acute left-sided pyelonephritis caused by *E. coli*
   Cluster: GB51&XK8G&XN6P4
   GB51 Acute pyelonephritis (main code)
   Lateralization: XK8G left side (supplementary code)
   Infectious agent: XN6P4 *Escherichia coli* (supplementary code) [4].

Application of linking the ICD-11, ICF, and ICHI classifications

Historically, the ICD has used certain concepts of disability as common disease entities or disorders (e.g., blindness, deafness, learning disabilities, or paraplegia) and certain concepts of disability for other purposes (e.g., "disability as a consequence of injury", and "limitation of activities due to disability") [6].

The ICD-11, which is based on ontology and the incorporation of its sister classifications, ICF and ICHI (International Classification of Health Interventions), into the same ontological infrastructure enabled full integration of terminology and classifications on a common platform. In this way, it is possible to use the clinical documentation (encoding all the necessary details) for other uses. The ICD-11 ensures consistency with earlier versions of the ICD. Analyses of historical data based on older versions of the ICD can be linked to data analyses based on the ICD-11 [9].

In general, the link between the ICD and ICF classifications found in the ICD-11 can help in the following cases:
— assessments in general medical practice (e.g., in the assessment of working capacity);

— evaluation of social benefits (e.g., invalidity pension);
— payment or reimbursement of benefits — refund;
— needs for assessment (e.g., in the field of rehabilitation, occupational adaptation assistance, long-term care);
— evaluation of intervention results [9].

ICD-11 in the field of cancer — general issues

Rapid progress in oncology has clearly shown that the categorization of malignant and benign tumors based solely on location provides limited information for prevention, treatment, and prognosis. The previous ICD-10 classification system contained a limited number of categories based on pathology (e.g., some cancers of the lymphatic system, melanoma). In the ICD-11, major tumor locations have pathomorphological subcategories first. The selected groups were based on analyzes of international reports on morbidity and mortality, cancer registries, and clinical reports. The redesigned sections have been checked for missing details in relation to ICD use cases. Maintaining the main anatomical axes allows for consistency with previous classifications. However, the structure has been adjusted to anatomical subcategories in several places according to the TNM classification [9].

For tumors of the central nervous system, the distinction between benign and malignant in terms of histological characteristics and clinical course creates a certain uncertainty zone. Therefore, it was decided to move all tumors of the central nervous system beyond the basic framework and group them together.

Progress in the field of molecular biomarkers is dynamic, but it is different in particular groups of cancers. For some cancers, markers with recognized diagnostic and prognostic value have been used for years, but there are areas without biomarkers. Therefore, except for hematopoietic and lymphatic malignancies, molecular markers have not been included in the ICD-11. However, they may be included in Cluster X "Extension Codes" and may be added in the future to more fully describe individual tumor entities as science advances and knowledge of biomarkers deepens [9].

Cancers in the ICD-11 are included in Cluster 02, in which the individual disease entities are cataloged considering the following elements:
— 1st level — type of cancer;
— 2nd level — wide range of sites or systems from which the tumor originates;
— 3rd level — detailed tumor location;
— 4th level — morphological character (histological type) of the tumor.

The exception to the above hierarchy are 3 groups of neoplastic diseases which are:
1. neoplasms of the brain and central nervous system, which include a wide range of sites in the first tier and the combined nature of malignancy and the morphological (histological) type of the tumor in the second tier;
2. neoplasms of hematopoietic or lymphoid tissues, which in the first tier contain a wide range of morphological (histological) types and in the second tier a detailed morphological (histological) type;
3. malignant mesenchymal neoplasms, which in the first tier contain a detailed morphological (histological) type, and in the second tier, its location [9].

Detailed categories for the description of neoplastic diseases

Cluster 02, which deals with cancer, contains 8 subsections detailing disease states associated with abnormal or uncontrolled cell proliferation that is not coordinated with the body's need for normal tissue growth, replacement, or repair. The subsections have been grouped as follows:
— neoplasms of the brain or central nervous system (codes 2A00 to 2A0Z);
— neoplasms of hematopoietic or lymphoid tissues (codes 2A20 to 2B3Z);
— malignant neoplasms, except primary neoplasms of lymphoid, hematopoietic, central nervous systems, or related tissues (codes 2B50 to 2E2Z), including:
  • malignant neoplasms, identified or presumed primary, in specific locations, except for lymphatic, hematopoietic, central nervous systems, or related tissues,
  • malignant neoplasms with ill-defined or unspecified primary foci,
  • malignant tumor metastasis,
— neoplasms *in situ*, except lymphoid, hematopoietic, central nervous systems, or related tissues (codes 2E60 to 2E6Z);
— benign neoplasms other than lymphoid, hematopoietic, central nervous systems, or related tissues (codes 2E80 to 2F5Z);
— neoplasms of uncertain behavior except for lymphoid, hematopoietic, central nervous systems, or related tissues (codes 2F70 to 2F7Z);
— neoplasms of unknown behavior except for lymphoid, hematopoietic, central nervous systems, or related tissues (codes 2F90 to 2F9Z);
— inherited tumor predisposing syndromes (2C65 to LD2F.15) [9].

Implementation of the Polish language version

In Poland, the entire implementation process is carried out as part of the project entitled "Improving the quality of medical information by increasing the competence, knowledge, and skills of employees of healthcare entities in the correct use of the ICD-11 classification" led by the Medical Center for Postgraduate Education in cooperation with the Department of Healthcare at the Ministry of Health and the e-Health Center. The project is financed by the European Social Fund under the Operational Programme Knowledge Education Development 2014–2020.

The stages of the ICD-11 implementation project in Poland, in line with the assumptions, include the development of the Polish version of the ICD-11, then verification of the Polish ICD-11 translation by Postgraduate Medical Education Center (CMKP) subject matter experts and external experts, and in the next stage, assessment and acceptance by national consultants and the development of a set of WHO instruments supporting future users of the classification.

The last stage of the project is the development of programs and the organization of training and workshops for future users of the ICD-11. Improving practical skills in the use of the current classification by healthcare professionals, lecturers at medical universities, death cause coders in the Central Statistical Office and persons conducting epidemiological analyses. According to the project schedule, the expected completion date is 2023.

As stated by the Communication of the Ministry of Health, the final decision on the date of official ICD-11 entry into force will be made after the introduction of legal changes with due consideration for the adequate time needed to prepare for ICD-11 implementation [11].

In the Polish legal system, the rules for reimbursement between service providers and the payer, the subject of the procedure for concluding a contract for the provision of healthcare services and the detailed terms and conditions of contracts for the provision of healthcare services — such as hospital treatment — highly specialized services are regulated in the Order of the President of the National Health Fund [12].

The implementation of the new version of the ICD-11 in Poland must be preceded primarily by the amendment of legal acts (acts and regulations) and orders of the President of the National Health Fund, regarding the reimbursement for guaranteed services and keeping medical records. Numerous changes are necessary in the healthcare system (legal and in the field of IT). A very important aspect is the adaptation of the IT systems of both service providers as well as the reporting and reimbursement system of health services of the public payer (KRUS, ZUS, GUS) [13]. The integration of the application with the medical systems of service providers Hospital Information System (HIS) should also be considered, which can be a big call but may also generate additional costs on the part of service providers.

Conclusions

There is no doubt that the introduction of the new version of the ICD should improve the precision of coding medical conditions and causes of death. The ICD-11 has been designed to reflect the state of modern medicine and to implement changes related to its dynamic development. By cataloging known conditions, the ICD-11 can be used for health insurance purposes, for classification and statistical analysis of diseases, and as a global health tracking tool that can be used across countries and languages. The introduction of the ICD-11 should improve the quality of coding by reflecting modern practice and thus generate correct data for the needs of healthcare systems and their regulators.

Article Information and Declarations

Author contributions
All authors contributed equally to the article.

Conflict of interest
The authors declare no conflict of interest.

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