Modern Classification of Respiratory Diseases: Innovations in the International Classification of Diseases of the 11th Revision

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Abstract. A comprehensive analysis has been performed on the innovations in the classification of respiratory diseases introduced in ICD-11, comparing it with the previous ICD-10 version. This analysis underscores the critical importance of implementing a more detailed and systematic approach to categorizing diseases of the respiratory system. The enhancements found in ICD-11 have been proven to open up new opportunities for the timely and high-quality provision of medical and pharmaceutical care. This is particularly significant for patients suffering from various injuries, including those resulting from traffic accidents, participation in combat operations, and thoracic injuries. The updated classification system in ICD-11 allows for more precise diagnosis and treatment plans, which is essential for improving patient outcomes. By providing a more granular level of detail in disease categorization, healthcare professionals can better understand the nuances of respiratory conditions. This leads to more effective communication among doctors, pharmacists, and patients, thereby improving the legal and professional relationships within the healthcare system. Integrating the ICD-11 classification into educational and training programs is essential for advancing the qualifications of specialists. By incorporating it into curricula and professional development programs, medical practitioners can stay abreast of the latest advancements in disease classification and patient care. This integration is also vital for eliminating medical errors, as a more detailed classification system reduces the likelihood of misdiagnosis and improper treatment. Furthermore, adopting ICD-11 supports the ongoing development of the healthcare sector in Ukraine. It aligns the country's medical practices with international standards, facilitating better collaboration with global health organizations. This alignment is crucial for enhancing the overall quality of healthcare services provided to the population. In conclusion, the transition to ICD-11 represents a significant advancement in the classification of respiratory diseases. Its implementation is imperative for improving medical and pharmaceutical care, enhancing specialist training programs, and strengthening the doctor-pharmacist-patient relationship. Embracing this updated classification system will not only reduce medical errors but also contribute to the further development of Ukraine's healthcare sector.

Keywords: International Classification of Diseases, ICD-10, ICD-11, pulmonology, respiratory diseases, thoracic trauma, international classification, diseases of respiratory organs, health care.

Introduction. In modern conditions, health care institutions, both in Ukraine in general and in the Lviv region, are undergoing reform. The system of legal relations "doctor-patient-pharmacist" needs to be improved regarding timely, high-quality, and qualified diagnosis of the disease and appropriate pharmacotherapy. The reform of the health care sector in Ukraine coincided with the implementation of the International Classification of Diseases 11th Revision (ICD-11) by WHO specialists. ICD-11 contains about 55,000 unique codes for the description of injuries, diseases and causes of death [1-3].

A capable network of health care facilities of the Lviv Hospital District has been officially approved [4]. Of the 65 hospitals of the Lviv region, 37 were included in the network. They are divided into supercluster, cluster, and general health care institutions [5]:

- 9 hospitals – supercluster hospitals;
- 7 cluster hospitals;

- 21 hospitals – general.

It is noted that the state will purchase medical equipment only for hospitals included in the capable network. The state does not have so many financial resources to scatter them on failing hospitals. The patient must receive high-quality medical services using modern equipment and stay in hospitals in safe and comfortable conditions:

- nothing will change for the patient when it comes to planned treatment (asthma, chronic obstructive pulmonary disease, pneumonia, and other respiratory infections);
- the patient has the right to independently choose a doctor and health care institution in which he wants to be treated, not only in the city of Lviv or Lviv region, but also in health care institutions in other regions of Ukraine;
- in case of emergency situations, the route for the patient is drawn up by the health department;
- well-defined hospitals that can provide care for disorders in everyday life, traffic accidents or participation in hostilities (stroke, heart attack, acute surgical pathology, thoracic trauma) [6-10];
- it is important to provide clinical and pharmacotherapeutic assistance to patients as soon as possible.

The Lviv Regional Clinical Hospital, a communal non-commercial enterprise of the Lviv Regional Council, was transferred into state ownership by the decision on the free transfer of an integral property complex. Thanks to this, the university hospital of the Lviv National Medical University named after Danylo Halytsky was created on the basis of the medical institution [11, 12]. The reorganization was carried out on the model of the Dutch Erasmus MC clinic for training students, interns, trainees, providing medical assistance, obtaining additional funding by signing an agreement with the National Health Service of Ukraine [13-15].

At the same time, the Ministry of Health of Ukraine is working on creating a network of university clinics throughout Ukraine.

Of particular importance is the awareness of doctors of health care institutions that are part of the Lviv Hospital District with the issues of using ICD-11 when providing assistance to privileged categories of citizens [16].

Pulmonary diseases, diseases of the respiratory organs - asthma, chronic obstructive pulmonary disease, pneumonia, other respiratory infections, injuries received in everyday life, as a result of traffic accidents, participation in hostilities. They have a significant impact on the life and health of the patient, the length and quality of life, the socio-economic state of society [17].

The growing frequency of diseases of the chest organs, their wide range of clinical manifestations and the complexity of diagnostics and pharmacotherapy pose new tasks and challenges to medical specialists.

To solve these tasks and challenges, WHO specialists are improving the International Classification of Diseases (ICD) system. It plays an important role in the standardization of diagnoses, facilitates the exchange of information between doctors, pharmacists, and scientists of WHO member countries and European Union countries [18-20].

- ✓ The ICD-11 browser provides an opportunity to view the content of disorders;
- ✓ The ICD-11 coding tool codes disorders according to ICD-11;
- ✓ ICD API web services serve to obtain programmatic access to ICD-11;
- ✓ ICD API provides programmatic access to International Classification of Diseases (ICD) codes;
- ✓ Can be used to access up-to-date documentation on API usage, as well as to manage keys required for API usage;
- ✓ A manual for the implementation or transition of ICD-11 has been developed for specialists [19, 20].

With the introduction of ICD-11, there is a significant update of approaches to the description and systematization of diseases of the respiratory system.

In order to optimize the work of doctors and pharmacists in modern conditions, this article aims to consider the key differences between ICD-10 and ICD-11, their impact on the diagnosis,

treatment, pharmacotherapy of pulmonary diseases, as well as the importance of these changes for medical practice.

The purpose of study was to analyze innovations in the classification of respiratory diseases according to the ICD-11 version compared to ICD-10. In particular, the impact of these changes on diagnosis and treatment in pulmonology. The article is aimed at revealing the importance of implementing a more detailed systematization of diseases of the respiratory system. Allows to improve medical and pharmaceutical care. Facilitates communication between specialists. Provides more effective treatment of patients with respiratory diseases.

Materials and methods. The paradigms of organizational-legal and clinical-pharmacological standards became the methodological basis of the study: ICD-11, ICD-10, materials of the WHO and other international medical organizations regarding the classification of diseases of the respiratory system. National and international medical-technological documents on the standardization of medical care, regulatory acts (standards of medical care, clinical protocols, forms of medicinal products, national list of basic medicinal products), as well as instructions for medical use were also used. More than 500 sources of scientific literature on the topic of the work were searched, systematized, and analyzed, in particular [21-35].

More than one hundred and fifty legislative, regulatory, and legal acts, instructional and methodical documents were developed for the research. The methods of documentary, graphic, clinical, pharmacological, pharmaceutical, normative and legal, retrospective, comparative, system analysis are applied.

The study of the article is a fragment of the research works of the department of phthisiology and pulmonology of Danylo Halytsky Lviv National Medical University – Department of phthisiology and pulmonology "Study of clinical, radiological and laboratory features of diagnosis and course of chronic obstructive pulmonary diseases and bronchial asthma in broncho-obstructive syndrome in patients with tuberculosis or pneumonia" and "Study of the features of the clinical course, prevention and treatment of chemoresistant tuberculosis in children and adolescents" (state registration number 0120U002141, implementation period 2020-2024); Lviv Medical Institute LLC on the topic "Improving the system of drug circulation during pharmacotherapy on the basis of evidence-based forensic pharmacy, organization, technology, biopharmacy and pharmaceutical law" (state registration number 0120U105348, implementation period 2021-2026); Private Scientific Institution "Scientific and Research University of Medical and Pharmaceutical Law" on the topic "Multidisciplinary research of post-traumatic stress disorders during war among patients (primarily combatants)" (state registration number 0124U002540, implementation period 2024-2029).

Results and discussion. Every year, about 230 million patients around the world undergo anesthesia for major surgical operations. They lead to 7 million serious perioperative complications, and 1 million of them lead to the death of patients (200,000 deaths in European countries). Proper anesthesiology ensures the quality of intensive care, emergency medical care, includes the postoperative process [36].

Reforms carried out in the field of health care are aimed at providing patients with timely, effective, and safe medical and pharmaceutical care on the basis of medical and pharmaceutical law. Patient safety is ensured by the Medical Guarantee Program-2024. It covers all the main types of medical care: primary, specialized care, emergency, palliative care, and rehabilitation in the field of health care for both adults and children [37].

The reform of health care facilities and the implementation of the Program of Medical Guarantees-2024 are in the system of legal relations "doctor-patient-pharmacist". From January 01, 2025, WHO recommendations on the implementation of ICD-11 in the professional work of doctors [38-42].

- Physician education, training, research, and professional development play a key role in ensuring patient safety.
- Requires improvement and implementation of training measures to ensure patient safety and eliminate medical errors.
- Professional training plays a major role in the safe treatment of patients.

- Patients should strive for a trusting partnership with doctors, nurses, and the administrative apparatus of the medical institution.
- Pharmacies and pharmaceutical companies play an important role in the development, production, supply of affordable, effective, high-quality, and safe drugs, medical equipment, etc.

In the course of the study, a comparative analysis of ICD-10 and ICD-11 classifications was conducted in the context of respiratory diseases. The main attention was paid to the changes in the structure of the codes, the detailing of the categories and the impact of these innovations on the clinical practice of pulmonology [43-55].

Below is Table 1, which shows the correspondence between ICD-10 codes and their updated counterparts in ICD-11. Allows you to see how the new classification improves the diagnosis and treatment of respiratory diseases.

Table 1. Correspondence of respiratory disease codes according to ICD-10 and ICD-11 *(author's text)*.

ICD-10 code	ICD-11 code
J00-J99. Diseases of the respiratory system	12 Diseases of the respiratory system
J00-J06. Acute respiratory diseases of the upper respiratory tract	CA00-CAOZ Upper respiratory tract disorders
J10-J18. Influenza and pneumonia	CA20-CA2Z Certain lower respiratory tract diseases
J20-J22. Other acute respiratory infections of the lower respiratory tract	CA40-CA4Z Pulmonary infections
J30-J39. Other diseases of the upper respiratory tract	CA60-CA8Z Lung diseases caused by external agents
J40-J47. Chronic diseases of the lower respiratory tract	CB00-CB0Z Respiratory diseases primarily affecting the interstitial tissue of the lung
J60-J70. Lung diseases due to external factors	CB20-CB2Z Diseases of the pleura, diaphragm, or mediastinum
J80-J84. Other respiratory diseases that injure the interstitial tissue	CB40 Certain respiratory diseases
J85-J86. Purulent diseases of the lower respiratory tract	CB41 Respiratory failure
J90-J94. Other diseases of the pleura	CB60-CB64 Postprocedural respiratory disorders
J95-J99. Other respiratory diseases	2C22-2B6D Neoplasms of the respiratory system
	LA77-LB00 Respiratory diseases due to developmental disorders
	MD10-MD3Y Symptoms, signs, or clinical findings involving the respiratory system
	BB00-BB0Z Diseases of the pulmonary circulation and right heart
	7A40-7A4Z Sleep-related breathing disorders
	JB64.5 Diseases of respiratory system complicating pregnancy, childbirth, and the puerperium
	CB7Z Diseases of respiratory system, unspecified

Table 1 contains codes of diseases of the organs of the respiratory system according to two international classifications: ICD-10 and ICD-11. It demonstrates the correspondence between codes and disease categories in these classifiers.

1. J00-J99 (ICD-10) corresponds to category 12 (ICD-11) - this is the general category "Diseases

of the respiratory system" in both classifications.

2. J00-J06 in ICD-10 includes acute respiratory diseases of the upper respiratory tract and corresponds to the category CA00-CA0Z in ICD-11 - "Disorders of the upper respiratory tract."
3. J10-J18 in ICD-10 covers influenza and pneumonia, corresponding to category CA20-CA2Z in ICD-11 - "Some diseases of the lower respiratory tract".
4. J20-J22 in ICD-10 describes other acute respiratory infections of the lower respiratory tract and corresponds to CA40-CA4Z in ICD-11 - "Pulmonary infections".
5. J30-J39 in ICD-10 covers other diseases of the upper respiratory tract and corresponds to CA60-CA8Z in ICD-11 – "Diseases of the lungs caused by external agents".
6. J40-J47 in ICD-10 includes chronic diseases of the lower respiratory tract and corresponds to CB00-CB0Z in ICD-11 – "Respiratory diseases affecting mainly the interstitial tissue of the lungs."
7. J60-J70 in ICD-10 refers to lung diseases due to external factors, which corresponds to CB20-CB2Z in ICD-11.
8. J80-J84 in ICD-10 covers other respiratory diseases that injure interstitial tissue and corresponds to CB40 in ICD-11.
9. J85-J86 in ICD-10 includes purulent diseases of the lower respiratory tract and corresponds to CB41 in ICD-11.
10. J90-J94 in ICD-10 describes other diseases of the pleura and corresponds to CB60-CB64 in ICD-11.
11. J95-J99 in ICD-10 covers other respiratory diseases and corresponds to several categories in ICD-11, including 2C22-2B6D (respiratory neoplasms), LA77-LB00 (respiratory diseases associated with developmental disorders) and others codes

Additional codes in ICD-11 include respiratory diseases complicating pregnancy (JB64.5), sleep-related breathing disorders (7A40-7A4Z), and diseases not otherwise specified (CB7Z).

To the description Table. 1, several important details can be added that will help to better understand the structure and differences between the ICD-10 and ICD-11 classifications.

Changing the structure of categories

Compared to ICD-10, the ICD-11 classification is more detailed and specific. It has additional subcategories to distinguish diseases that may have different origins, including environmental factors, infectious diseases, or diseases resulting from medical procedures.

Refined names

In ICD-11, there is greater attention to detail and accuracy of wording. For example, instead of general disease names in ICD-10 such as "Other diseases of the upper respiratory tract", ICD-11 uses specific wording such as "Diseases of the lungs caused by external agents".

New categories

ICD-11 includes several new categories not present in ICD-10, such as:

- LA77-LB00 – respiratory diseases associated with developmental disorders.
- 7A40-7A4Z – breathing disorders associated with sleep.
- JB64.5 – diseases of the respiratory organs that complicate pregnancy, childbirth, or the postpartum period.

Updated approaches to diagnostics

ICD-11 allows to better reflect modern methods of diagnosis and treatment. For example, diseases related to interstitial lung tissue have received more attention as their relationship to environmental and occupational factors has become more apparent.

Expanding categories for medical procedures

ICD-11 added a category of diseases that occur after medical procedures (CB60-CB64), which reflects the growing role of medical interventions and their possible complications on the respiratory system.

Updating the classification based on modern knowledge

ICD-11 reflects new medical knowledge about the pathophysiology of respiratory diseases.

For example, respiratory failure, purulent lung infections, and lung disorders after surgery now have more precise descriptions to ensure better treatment and prevention [56].

Therefore, ICD-11 is a much more flexible and detailed classification that reflects modern approaches to the diagnosis and treatment of respiratory diseases.

Conclusions. An analysis of innovations in the classification of respiratory diseases according to the ICD-11 version compared to ICD-10 was carried out. The impact of these changes on diagnosis, treatment, pharmacotherapy in pulmonology is given. The importance of introducing a more detailed systematization of diseases of the organs of the respiratory system is revealed. It is noted about the prospects of implementation: it allows to improve medical and pharmaceutical care, facilitate communication between specialists, provides more effective treatment of patients with respiratory diseases. It has been proven that the changes in ICD-11 open up new opportunities for timely and high-quality provision of medical and pharmaceutical care to patients suffering from injuries, traffic accidents, participation in combat operations, thoracic injuries. The ICD-11 classification needs to be introduced into the educational and training process, programs to improve the qualifications of specialists, improve the system of legal relations "doctor-pharmacist-patient", eliminate medical errors and further develop the field of health care in Ukraine under the slogan "Lifelong learning in the field of health care".

Conflict of interests. The author confirms that they are the authors of this work and have approved it for publication. The author also certifies that the obtained clinical data and research were conducted in compliance with the requirements of moral and ethical principles based on medical and pharmaceutical law, and in the absence of any commercial or financial relationships that could be interpreted as a potential conflict of interest.

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