Perspectives on the International Classification of Diseases, 11th Revision, developments in allergy clinical practice in the United States

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Perspectives

Why Should We Start Discussions Regarding ICD-11 in the United States?

ICD

The International Classification of Diseases (ICD) has been in use as a recognized global classification system since 1900, when the first version was launched. Its development and continuing evolution reflect the uniting efforts of many experts and contributors. The ICD is revised periodically, and respective updates are gradually adopted and implemented in participating countries. Currently, the International Classification of Diseases, Tenth Revision (ICD-10) is in use in more than 100 countries worldwide, translated in 43 different languages, and used as a common language for reporting and monitoring diseases to achieve the standard of being a universal classification.

Historic Background of the ICD in the United States

Together with several other countries, the United States has adopted the ICD system of classifying medical diagnosis and procedures as the basis of the coding system. The ICD system is used worldwide as a public health tool to monitor mortality and morbidity, as well as other important epidemiologic variables. Different from much of the rest of the world, the United States also uses the ICD system to determine health care payment and reimbursement of practitioners and health care services in hospitals. Since the 1960s, some countries have created national modifications of the ICD for their own use, and these contain more specific information or details that can be found in the World Health Organization (WHO) ICD (eg, Australia has the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification, Canada has the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Canada, and the United States has the International Classification of Diseases, Tenth Revision, Clinical Modification [ICD-10-CM]). All updates to the main ICD are performed through the WHO. The International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) has been used in the United States since 1977. In 1990, the WHO released the 10th revision of the ICD, and the United States started the development of national adaptation in 1998, creating the ICD-10-CM. American health care practitioners and payers were initially scheduled to adopt the ICD-10-CM in 2008, but the Centers for Medicare & Medicaid Services (CMS) pushed back the deadline. The reason given was that the conversion required health care practitioners and payers to
adapt their information system to accommodate an increase in new diagnostic codes. The ICD-10-CM was finally launched in 1st October 2015 (Fig 1) and now is mandated for all medical reporting. The CMS also announced a 1-year grace period, allowing for payment even if codes were not correct as long as they were in the same family. In contrast to the 14,000 ICD-9-CM codes, it covers more than 70,000 codes to reach more specificity.

In development since 2007, ICD-11 is intended not only to rectify deficiencies in ICD-10 and to incorporate changes demanded by scientific advances but also to take advantage of the possibility of electronic data handling since the publication of ICD-10 a quarter of a century ago. The final version of ICD-11 is intended to be presented to the World Health Assembly in 2018. Once the ICD-11 is approved and available, all the countries currently using national modifications specific for their country will be advised to move to the ICD-11.

To create a more appropriate classification for allergic and hypersensitivity conditions in ICD-11, a structured and detailed action plan (Fig 2) has been built by providing scientific evidence...
Allergic and Hypersensitivity Conditions

Table 1
Differences in the Classification of the Main Allergic and Hypersensitivity Conditions in the ICD-10-CM and ICD-11

<table>
<thead>
<tr>
<th>Main hypersensitivity disorders (according to the EAACI-WAO Revised Nomenclature)</th>
<th>ICD-10-CM Corresponding chapter(s)</th>
<th>ICD-11 Beta draft allergic and hypersensitivity conditions section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>Chapter 10: Diseases of the Respiratory System</td>
<td>Allergic or Hypersensitivity Disorders Involving the Respiratory Tract</td>
</tr>
<tr>
<td>Rhinitis</td>
<td>Chapter 10: Diseases of the Respiratory System</td>
<td>Allergic or Hypersensitivity Disorders Involving the Respiratory Tract</td>
</tr>
<tr>
<td>Conjunctivitis</td>
<td>Chapter 7: Diseases of the Eye and Adnexa</td>
<td>Allergic or Hypersensitivity Disorders Involving the Eye</td>
</tr>
<tr>
<td>Skin diseases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermatitis</td>
<td>Chapter 12: Diseases of the Skin and Subcutaneous Tissue</td>
<td>Allergic or Hypersensitivity Disorders Involving Skin and Mucous Membranes</td>
</tr>
<tr>
<td>Urticaria</td>
<td>Chapter 12: Diseases of the Skin and Subcutaneous Tissue</td>
<td></td>
</tr>
<tr>
<td>Angioedema</td>
<td>Chapter 3: Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism</td>
<td></td>
</tr>
<tr>
<td>Food hypersensitivity</td>
<td>Chapter 19: Injury, Poisoning, and Certain Other Consequences of External Causes</td>
<td>Food Hypersensitivity section in the Complex Allergic or Hypersensitivity Conditions</td>
</tr>
<tr>
<td>Drug hypersensitivity</td>
<td>Chapter 19: Injury, Poisoning, and Certain Other Consequences of External Causes</td>
<td>Drug Hypersensitivity section in the Complex Allergic or Hypersensitivity Conditions</td>
</tr>
<tr>
<td>Venom hypersensitivity</td>
<td>Chapter 20: External Causes of Morbidity and Mortality</td>
<td>Allergic or Hypersensitivity Reactions to Arthropods section in the Complex Allergic or Hypersensitivity Conditions</td>
</tr>
<tr>
<td>Anaphylaxis</td>
<td>Chapter 19: Injury, Poisoning, and Certain Other Consequences of External Causes</td>
<td>Anaphylaxis section subheadings:</td>
</tr>
<tr>
<td></td>
<td>T78.0 Anaphylactic reaction due to food</td>
<td>Drug-induced anaphylaxis</td>
</tr>
<tr>
<td></td>
<td>T78.1 Other adverse food reactions, not elsewhere classified</td>
<td>Anaphylaxis due to insect venoms</td>
</tr>
<tr>
<td></td>
<td>T78.2 Anaphylactic shock, unspecified</td>
<td>Anaphylaxis provoked by physical factors</td>
</tr>
<tr>
<td></td>
<td>T78.3 Urticaria</td>
<td>Anaphylaxis due to inhaled allergens</td>
</tr>
<tr>
<td></td>
<td>T78.4 Other and unspecified allergy</td>
<td>Anaphylaxis due to contact with allergens</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anaphylaxis secondary to mast cell disorders</td>
</tr>
</tbody>
</table>

Abbreviations: EAACI, European Academy of Allergy and Clinical Immunology; ICD-10-CM, International Classification of Diseases, Clinical Modification; ICD-11, International Classification of Diseases, 11th Revision; WAO, World Allergy Organization.

For the need for changes. The Allergy in ICD-11 Initiative has been moving efforts during the last 4 years toward this end and has received unwavering support from an international collaboration of allergy academies, composed of the American Academy of Allergy Asthma and Immunology, the European Academy of Allergy and Clinical Immunology, the World Allergy Organization, the American College of Allergy Asthma and Immunology, the Asia Pacific Association of Allergy, Asthma and Clinical Immunology, and the Latin American Society of Allergy, Asthma and Immunology. The continuing close collaboration between our group and the WHO has the backing of the Joint Allergy Academies and has as a major achievement of this process the construction of an Allergic and Hypersensitivity Conditions chapter. Although the ICD-11 is still quite some time away from being officially ready for use, from the WHO perspective, the ICD-11 is the top priority. Considering the new classification model addressed to the allergic and hypersensitivity conditions, to follow the WHO ICD revision agenda and support our US colleagues, we believe it is the appropriate time to start the discussions regarding the possible influence and outcomes of ICD-11 transition on clinical practice taking the US perspective, whenever it will occur.

**Effect of the New Allergic and Hypersensitivity Conditions Section in the ICD-11**

**Clinical Practice of the US Allergists: Diagnosis and Management of Allergic Patients**

Allergies, including allergic asthma and allergic rhinitis, affect an estimated 40 million to 50 million people in the United States. Some allergies may interfere with day-to-day activities or lessen the quality of life. In fact, allergies and hypersensitivity disorders are multifaceted conditions that can manifest at any age and any health care professional may be faced with them. Even though many efforts have been made by US allergy specialty societies to update allergies into the ICD-10-CM, we still face some misclassification, such as for anaphylaxis, because its
Table 2
Asthma Classification from the ICD-10-CM and ICD-11 Perspectives

<table>
<thead>
<tr>
<th>ICD-10-CM Corresponding chapter(s)</th>
<th>ICD-11 Beta draft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>Asthma</td>
</tr>
<tr>
<td>Allergic (predominantly) asthma</td>
<td>Allergic asthma</td>
</tr>
<tr>
<td>Allergic bronchitis not otherwise specific</td>
<td>Allergic asthma with exacerbation</td>
</tr>
<tr>
<td>Allergic rhinitis with asthma</td>
<td>Allergic asthma with status asthmaticus</td>
</tr>
<tr>
<td>Atopic asthma</td>
<td>Allergic asthma, uncomplicated</td>
</tr>
<tr>
<td>Extrinsic allergic asthma</td>
<td>Nonallergic asthma</td>
</tr>
<tr>
<td>Hay fever with asthma</td>
<td>Nonallergic asthma with exacerbation</td>
</tr>
<tr>
<td>Idiosyncratic asthma</td>
<td>Nonallergic asthma with status asthmaticus</td>
</tr>
<tr>
<td>Intrinsic nonallergic asthma</td>
<td>Nonallergic asthma, uncomplicated</td>
</tr>
<tr>
<td>Nonallergic asthma</td>
<td>Other specified forms of asthma or bronchospasm</td>
</tr>
</tbody>
</table>

| J45.2 Mild intermittent asthma     | Asthma with exacerbation |
| J45.20 Mild intermittent asthma, uncomplicated (including mild intermittent asthma not otherwise specified) | Controlled |
| J45.3 Mild persistent asthma       | Asthmatic pulmonary eosinophilia |
| J45.30 Mild persistent asthma, uncomplicated (including mild persistent asthma not otherwise specified) | Controlled |
| J45.31 Mild persistent asthma with (acute) exacerbation | Controlled |
| J45.4 Moderate persistent asthma   | Unspecified asthma |
| J45.40 Moderate persistent asthma, uncomplicated (including moderate persistent asthma not otherwise specified) | Partial remission |
| J45.41 Moderate persistent asthma with (acute) exacerbation | Complete remission |
| J45.42 Moderate persistent asthma with status asthmaticus | Complete remission |
| J45.5 Severe persistent asthma     | Unspecified asthma, uncomplicated |
| J45.50 Severe persistent asthma, uncomplicated (including severe persistent asthma not otherwise specified) | Complete remission |
| J45.41 Severe persistent asthma with (acute) exacerbation | Complete remission |
| J45.42 Severe persistent asthma with status asthmaticus | Complete remission |
| J45.9 Other and unspecified asthma | Unspecified asthma with exacerbation |
| J45.9 Other and unspecified asthma | Unspecified asthma with status asthmaticus |
| J45.9 Unspecified asthma           | Unspecified asthma, uncomplicated |
| J45.9 Other asthma                 | Unspecified asthma, uncomplicated |


frame has inherited a structure from previous versions of ICD in which topographic distribution frequently takes precedence (Table 1). By consolidating all allergic conditions into one ICD-11 single section, as opposed to spreading them out over many ICD-10 (and ICD-10-CM) chapters (Table 1) and by allowing all the relevant codes to be used to represent specific conditions, our aim was to facilitate the use of such classification and codes by clinicians, epidemiologists, and statisticians, as well as all data custodians and other relevant personnel. In other words, aligning the clinical diagnosis to ICD classification and codes provides a realistic recognition of allergic conditions and allows a better management of allergic patients.

As an example, conceptually, asthma is a clinical syndrome characterized by recurrent attacks of breathlessness and wheezing or cough, which varies in severity and frequency from person to person. In an individual, these events may occur from hour to hour and day to day. Although covering a heterogeneous group of phenotypes and endotypes, it is often the result of inflammation of the air passages in the lungs and affects the sensitivity of the nerve endings in the airways so they become easily irritated. In ICD-10-CM, asthma (J45) includes allergic (predominantly) asthma, allergic rhinitis with asthma, hay fever with asthma, and nonallergic asthma. The severity classification of asthma is prioritized (Table 2). Different from the previous ICD editions, the ICD-11 revision allows a multihierarchical structure in which underlying mechanisms can be considered. Unifying allergic and hypersensitivity conditions under a specific section in the building block of the Allergic or Hypersensitivity Conditions involving the Respiratory Tract section has allowed for allergic asthma and nonallergic asthma to be highlighted as main stem terms of the asthma subsection. The rationale for this semantic move was related to clinical practice. In general, the severity classification is used to support the management of patients with asthma by adapting drugs and drug doses. In order to reach an appropriate management, physicians reclassify the asthma control in the follow-up. However, considering mechanisms in the stem terms it is possible to reach higher specification in diagnosis and facilitate the possible treatment and management procedures more appropriately. Having a specific code for allergic asthma enables specific diagnostic procedures and treatment, such as immunotherapy (eg, the allergen immunotherapy or the anti-IgE omalizumab), can be covered by third-party payers, which will then benefit patients, physicians, and public
health. On the other hand, neither severity nor temporal charac-
terization will be lost because these additional classifications will
to be able to be combined to the stem terms, what is called post-
coordination from the WHO ICD perspective. The supplementary
specification (severity, temporal nature, origin, and response to
treatment) will be scattered into the ICD-11 Extension Codes
chapter (Table 2). Finer distinctions in the medical data offer a more
precise evaluation and management of patients.

Clinical Vignette: Application of ICD-10-CM and ICD-11

A nonatopic, 60-year-old man, with no known drug allergies, investigated a possible abdominal tumor. After 5 minutes of the infusion of a low-osmolar intravenous contrast media for an abdominal computed tomography, he began with shortness of
breath, generalized flushing with pruritus, bronchospasms, chest
pain, and nausea. The serum tryptase level at 25 minutes was 8.5
μg/L. (basal tryptase level, 9 μg/L). After treatment and recovery, he
underwent allergologic workup. Investigation results were nega-
tive for latex allergy but positive for contrast media. Final diagnosis
would be anaphylaxis grade III for acute phase, drug-induced
anaphylaxis for clinical diagnosis, and contrast media for origin.
From the ICD-10-CM perspective, it would be classified as anaphy-
lactic shock (prioritizing just severe cases) (T78.2), anaphylactic reaction due to adverse effect of correct drug or medicament properly administered (nonbillable) (T88.6), and radiographic dye allergy status (Z91.041). Although the corresponding ICD-11 codes are not completely defined, applying the ICD-11 logic, the case would be classified as anaphylaxis heading + grading scale, drug-induced anaphylaxis (4E41), and iodinated contrast medium (XJ47.4H).

Looking to the Future

Although aware that the ICD-10-CM has only been recently
launched in the United States, starting the discussion and designing
actions together with both American allergy specialty societies to
try to avoid the same problems faced in 2008 is necessary. Efforts to
support the ICD-10 (and adaptations) transition to ICD-11 aim to
ensure the global acceptance of the ICD-11 new framework
model worldwide. As a first technical attempt with this aim, we found that
overall 87% of ICD-10-CM terms could be captured in the ICD-11
beta draft framework, underlying stability and meaningful location
in the new framework. Most of the terms that did not reach correspondence in the ICD-11 framework were attributable to
takes in the classification as expected in the revision processes,
with the assurance of having 100% concordance eventually.

Overall, the WHO indicates that the ICD is currently responsible for allocating approximately 70% of the world’s health expendi-
tures, meaning US$2.3 trillion in 2013 and US$2.6 trillion in 2014
according to the National Center for Health Statistics. Therefore,
every modification into the ICD framework may have a potential
effect on health finance and economy. Greater specificity regarding
clinical conditions and services delivered will provide payers, pol-
licymakers, and practitioners with better information to make
major refinements to US payment and reimbursement systems,
including the design and implementation of pay-for-performance programs.

Many quality measures, such as those from US HealthGrades and the Agency for Healthcare Research and Quality, rely on the
WHO ICD codes. Increasing the specification of conditions will help
clarify the connection between a practitioner’s performance and
the patient’s condition. Accurate and updated diagnostic and pro-
cedure codes will improve data on the outcomes, efficacy, and costs of
new medical technology and facilitate fair reimbursement pol-
icies for the use of this system. It will help payers and practitioners
more easily identify patients in need of disease management and
more effectively tailor disease management programs.

From the public health perspective, by allowing all the relevant
diagnostic terms for allergic and hypersensitivity conditions to be
included in the ICD-11, the WHO has recognized their importance
not only to clinicians but also to epidemiologists, statisticians,
health care planners, and other stakeholders. Importantly, the new
classification will enable the collection of more accurate epidemi-
ologic data to support quality management of patients with
allergies and better facilitate health care planning and decision
making and public health measures to prevent and reduce the
morbidity and mortality attributable to allergic diseases. The
improved logic and standardized definitions through the ICD-11
will also facilitate international comparisons of quality care and the
sharing of best practice globally.

Different from the previous versions of the ICD (and adapta-
tions), the ICD-11 logic will enable more flexibility in the classifi-
cation process. It will prioritize postcoordination, allowing the
incorporation of more detailed classifications to the stem term. The
additional classifications, such as topography, severity, and chro-
nologic scale, are now available in the Extension Codes chapter (eg,
severe persistent asthma [J44.5] of ICD-10-CM = asthma [DA62] +
severe [XA03] + persistent [XAS0.6]). Although seemingly more
complex, the rationale of this new logic is increasing classification
and coding accuracy and giving flexibility for the classification
procedure by making it easier and faster by focusing first on the
disease itself and then on its additional characteristics. The ICD-11
aims to support the end users to follow the evolution of the patient;
the stable disorder represented by the stem code will be preserved
(eg, asthma [DA62]), and the additional classification can be
changed according to the clinical follow-up. A period of adaptation
to the new codes and new philosophy of the ICD-11 is expected as in
all ICD transitions. However, to smooth the possible difficulties and
doubts, the core Allergy in ICD-11 operational team (L.K.T., M.C., P.D.)
in collaboration with national allergy academies and the WHO in-
tends to implement educational tools to prepare the allergy com-
community before the ICD-11 is released. Educational and research
efforts will also help to address the current morbidity and mortality
underrecognition of allergic and hypersensitivity conditions by
patients, caregivers, and health care professionals.

We strongly believe that the outcomes of all past and future
actions will positively affect epidemiologic data, improve the
quality of care provided by health care professionals in clinical
practice, and support recognition of the allergy specialty
worldwide.

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