

REVIEW

Global classification and coding of hypersensitivity diseases – An EAACI – WAO survey, strategic paper and review

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Abstract

Hypersensitivity diseases are not adequately coded in the International Coding of Diseases (ICD)-10 resulting in misclassification, leading to low visibility of these conditions and general accuracy of official statistics. To call attention to the inadequacy of the ICD-10 in relation to allergic and hypersensitivity diseases and to contribute to improvements to be made in the forthcoming revision of ICD, a web-based global survey of healthcare professionals' attitudes toward allergic disorders classification was proposed to the members of European Academy of Allergy and Clinical Immunology (EAACI) (individuals) and World Allergy Organization (WAO) (representative responding on behalf of the national society), launched via internet and circulated for 6 week. As a result, we had 612 members of 144 countries from all six World Health Organization (WHO) global regions who answered the survey. ICD-10 is the most used classification worldwide, but it was not considered appropriate in clinical practice by the majority of participants. The majority indicated the EAACI–WAO classification as being easier and more accurate in the daily practice. They saw the need for a diagnostic system useful for nonallergists and endorsed the possibility of a global, cross-culturally applicable classification system of allergic disorders. This first and most broadly international survey ever conducted of health professionals' attitudes toward allergic disorders classification supports the need to update the current classifications of allergic diseases and can be useful to the WHO in improving the clinical utility of the classification and its global acceptability for the revised ICD-11.

The current scope of the problem

Coding the multifacets of allergies is needed

Hypersensitivity diseases cover several clinical presentations, including asthma, rhinitis, anaphylaxis, drug, food, and insect hypersensitivity, eczema, urticaria and angioedema. The impact of hypersensitivity diseases, both mild and severe, is

well known worldwide, affecting the quality of life of patients and their carers and elevating the world's health expenditures. Current medical needs in allergy are substantial (1). Believing that without a common understanding and a strict use of terms to define allergic diseases, neither science nor patient care could be optimal, the European Academy of Allergy and Clinical Immunology (EAACI) and the World

Allergy Organization (WAO) joined forces to propose a revision of the nomenclature for allergy for global use a few years ago (2). The EAACI–WAO revised nomenclature of allergy has been proposed by allergy experts with experience in health policy, statistics, and epidemiology, considering taxonomy/ontology of allergic disorders, underlining mechanisms, and taking in account the feasibility of use by both clinicians and researchers, but did not attempt at that time to liaise with the World Health Organization (WHO) International Coding of Diseases (ICD).

Models of health and disease are constructed around medical coding languages, and this has created a need for mechanisms to collect, analyze, interpret clinical data, and build up registries. A standard registry of morbidity and mortality data provides health information that is used for statistics and epidemiology, healthcare management, allocation of resources, monitoring and evaluation of research, prevention and treatment. This need has given rise to a process of coding, whereby words describing medical concepts are translated into codes for later analysis. Important gaps exist in the information available to policymakers when attempting to determine the disease burden from allergic disorders. Although the most important clinical utility of coded information is to support appropriate computerized decision support around ordering investigations, medicines management and bundling of care, and related performance management, coding systems currently used, such as the WHO's ICD, have been criticized as being unduly restrictive and possibly inadequate for the detailed coding of some diseases, including allergic diseases.

The current ICD version is not optimal

The ICD is a global health information system developed by the WHO to monitor disease morbidity and mortality worldwide (3). This codification system is in use in more than 100 countries, available in 43 different languages, and responsible for allocating about 70% of the world's health expenditures. This system is designed to promote international comparability in the collection, processing, classification, and presentation of disease statistics. The ICD is revised periodically and is currently in its tenth revision (ICD-10). Work on ICD-10 began in 1983, and the new revision was endorsed by the World Health Assembly in May 1990, that is to say far before our revision of the allergic diseases nomenclature (2).

Hypersensitivity diseases are not adequately coded in the ICD-10, resulting in misclassification, as recently published for anaphylaxis deaths (4) and highlighted in the EAACI guidelines on food allergy and anaphylaxis (5–7). WHO rules highlight some diseases and conditions as underlying causes of death in detriment of others. This is an important example of the gaps and trade-offs of the ICD-10 for our specialty, recently leading us to construct an alternative model to search for anaphylaxis deaths rates because this condition is not considered by WHO as an underlying cause of death in the death certificates making it impossible to obtain reliable easily accessible data (4). Moreover, there is a large variability of ICD-10 codes used to report allergic diseases and several entities scattered across the ICD structure, mainly

classified by site or systems. For example, asthma is classified under pulmonary disease and atopic dermatitis under skin diseases. There is also missing classification codes for important hypersensitivity diseases such as 'food allergy'.

For the first time, WHO opens the discussion of the ongoing 11th revision of the ICD for the public opinion, inviting experts and stakeholders to make comments and proposals. Understanding that coding definitions should be standardized with a view of enabling trend analyses and international comparisons, the ongoing WHO ICD-11 revision is a unique opportunity to improve the hypersensitivity diseases coding system so as to facilitate epidemiological studies, as well as the evaluation of the true size of the allergy epidemic and its consequences. When the beta phase of ICD-11 discussion was made available online in May 2012, the linearization was pre-established according to ICD-10, meaning that hypersensitivity diseases are not considered a parental category and are incompletely classified by etiology or by symptom based on the ICD-11 Topic Advisory Groups (TAGs).

Taken all the above into consideration, EAACI formally inserted a proposal regarding the hypersensitivity classification implementation in the online discussion of the beta phase at the same time that we proposed a Task Force on global classification of hypersensitivity diseases with the objective of facilitating the assessment and raising the profile of allergic diseases worldwide, by including terms in the ICD and/or having a global classification of hypersensitivity diseases endorsed by WHO.

Implementation gaps and possible strategy

European Academy of Allergy and Clinical Immunology has developed a thorough strategy (i) to understand why allergic diseases nomenclature (3) was not included into the ICD-11 beta form, (ii) to better appraise the process of ICD review and (iii) to possibly meet the influential groups for discussion and possible changes. In order to achieve such goals, we firstly analyzed the example of psychiatrists, looked to other forms of systematizing the nomenclature and groups in charge of rare diseases and secondly developed a survey among EAACI members together with the WAO. We are aware that the update of the classification of hypersensitivity diseases and/or a separate new chapter joining these disorders should not be at the cost of an increase workload.

The Diagnostic and Statistical Manual of Mental Disorders

The need for a classification of mental disorders has been clear throughout the history of medicine, but until recently there was little agreement on which disorders should be included and the optimal method for their organization. The many different classification systems that were developed over the past two centuries have differed in their relative emphasis on phenomenology, etiology, and course as defining features (8).

The American Psychiatric Association Committee on Nomenclature and Statistics developed a variant of the ICD-6 (published in 1952) as the first edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-I)*.

DSM-III was developed in coordination with ICD-9 (published in 1975) with the additional goal of providing a medical nomenclature useful for clinicians and researchers. Because of dissatisfaction across all of medicine with the lack of specificity in ICD-9, developers of DSM-IV and ICD-10 worked closely to coordinate their efforts, resulting in increased congruence between the two systems. ICD-10 was published in 1992. In 2011, aware of the revision of ICD, the World Psychiatric Association in collaboration with the Department of Mental Health and Substance Abuse of WHO published the results of a survey of 4887 psychiatrists in 44 countries regarding their use of diagnostic classification systems in clinical practice, and the desirable characteristics of a classification of mental disorders (9). DSM-V was published in 2013. This version was coordinated by a task force and 13 diagnostic working groups and includes in each category of disorders a numeric code taken from the ICD coding system.

The example of the mental health diseases DSM is an appropriate case study because, in collaboration with WHO, a classification has been updated to fit the need of a specialty and the aims of WHO.

The Systematized Nomenclature of Medicine–Clinical Terms

The Systematized Nomenclature of Medicine–Clinical Terms (SNOMED-CT) is a systematically organized computer processable collection of medical terms, providing codes, terms, synonyms, and definitions used in clinical documentation and reporting created in 1999 (10). In July 2003, the National Library of Medicine, on behalf of the U.S. Department of Health and Human Services, entered into an agreement with the College of American Pathologists to make SNOMED-CT available to U.S. users at no cost through the National Library of Medicine's Unified Medical Language Systems. In April 2007, SNOMED-CT intellectual property rights were transferred from the College of American Pathologists to the International Health Terminology Standards Development Organisation (IHTSDO) in order to promote international adoption and use of SNOMED-CT. The countries compounding this organization are Australia, Canada, Czech Republic, Denmark, Estonia, Hong Kong, Iceland, Israel, Lithuania, Malaysia, Malta, Netherlands, New Zealand, Poland, Singapore, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom, United States, and Uruguay. Currently, SNOMED-CT contains more than 311 000 active concepts able to cross-map to other international standards and classifications, providing the core general terminology for the electronic health record, but is available in only few languages.

The SNOMED-CT is a terminology system that enables information input into electronic health record system during the course of patient care focusing in the description and definition information for primary data purpose, while the ICD is a classification system that facilitates information retrieval, or output, for secondary data purposes, aggregating and categorizing clinical information (11). SNOMED-CT is still not globally used, but it may be an important tool to improving reliable data and a way to update hypersensitivity classification and coding. Indeed recently, the IHTSDO together with

WHO announced that a Technology Preview of SNOMED-CT to ICD-10 cross-map is available. The priority list of concepts from SNOMED-CT domains has been assembled based on frequency of SNOMED-CT concept use in clinical data repositories in IHTSDO member countries. Although it has been demonstrated remaining gaps for the classification of allergic diseases (12), we certainly need to include it in our strategy.

ICD revision by TAGs

Twelve content-specific TAGs (e.g., ear Nose and Throat, Mental Health, External Causes and Injuries, Internal Medicine, Rare Diseases) are formed by more than 136 scientists from 36 countries, and all WHO regions are contributing to planning and coordinating advisory body for specific issues which are the key topics in the update and revision process. Each TAG is responsible for advising WHO on particular topic revision steps and establishes workgroups and partners to involve for the development of various drafts of topic segments in line with the overall production timeline of ICD-11 and for the development of protocols for and in implementing field trials. Taking the opportunity of the EAACI food allergy and anaphylaxis guideline process, we started in April 2013 to aim at changing the codification of anaphylaxis as an 'orphan' main clinical presentation of severe hypersensitivity diseases, by contacting the TAG of Rare Diseases of WHO. A positive answer came in June 2013. Introducing allergic diseases in general in ICD is more challenging, and a survey was first design among EAACI and WAO members.

EAACI–WAO survey on the global classification and coding of hypersensitivity diseases

To evaluate the adequacy of the ICD-10 in relation to allergy and hypersensitivity diseases and to contribute to the forthcoming revision, we developed a web-based survey, in English (Appendix S1), launched via Internet and circulated it for 6 weeks (August to October 2013). It had an anonymous and voluntary nature. We sent out an introduction letter containing a link (Internet address) to the online questionnaire that was unique to each participating member of EAACI (individuals) and WAO (representatives responding on behalf of the national society). When the respondent clicked on the link, he or she was directed to a page that explained the purpose of the survey. The survey was e-mailed from the EAACI and WAO headquarters, and every EAACI and WAO member, regardless their specialty, affiliation, or nationality, received the questionnaire. A reminder was sent out after 4 weeks. A total of 7937 e-mails were sent, 227 (2.9%) of these were bounced by the server, and 3016 (38%) receivers opened the message.

Data are presented here for the 612 members from EAACI and/or WAO (Fig. 1) of 144 countries that answered the survey (Fig. 2). The countries were aggregated according to the six WHO global regions – primarily sub-Saharan Africa (AFRO), the Americas (AMRO), Eastern Mediterranean/North Africa (EMRO), Europe (EURO), South-East Asia

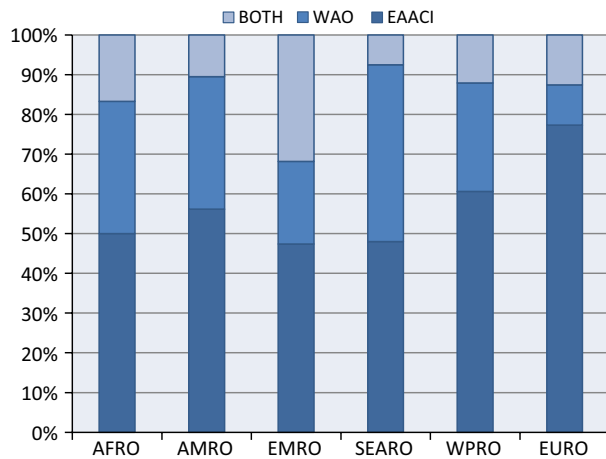


Figure 1 Percentage of representatives of societies (European Academy of Allergy and Clinical Immunology/World Allergy Organization) who implemented the survey according to WHO global region.

(SEARO), and Western Pacific (WPRO) – and across the global sample. A list of participating countries, number of participants from each allergy society, mean age of respondents, sex ratio, percent of professionals who spend more than 20 h/week looking after patients suffering from allergic diseases, percentage of professionals utilizing ICD or EAACI–WAO classification and data regarding ‘which classification better represents the speciality’ are provided in Table 1.

As shown in Figs 2 and 3, all WHO global regions were represented, and members from both EAACI and WAO implemented the survey. Response rates were lowest for AFRO (1.9%) and highest for EURO (66.3%).

Ninety-eight percent of the participating professionals reported that they were seeing allergic patients regularly. Of those, 17% reported that they spent between 1 and 9 h during a typical week with these patients, 25% for between 10 and 19 h, 24% for between 20 and 30 h, and 32% for more than 30 h. Regarding the number of patients with allergic diseases seen on average every month, 14% reported <19 cases, 18% between 20 and 40 patients, and 68% more than 40 patients per month. Fifty percent of the responders declared as having more than 20 years of professional experience, 23% reported 10–20 years, and 27% <10 years of experience.

As shown in Fig. 3, overall, 42% of the global sample reported that ICD-10 is the classification system they use most in their daily clinical work, and 10% uses ICD-9 mainly in United States of America. Table 1 shows the main classification systems in use according to the WHO global regions. Although ICD-10 showed to be the most used worldwide, 51% of users considered it not appropriate for clinical practice. In contrast, the EAACI–WAO classification was considered appropriate for clinical practice by 86.3% of professionals (Fig. 4).

The most important purpose of a classification is to have a ‘basis for generating national health statistics’, followed by to ‘inform treatment and management decisions’ (Fig. 5). To all participants, we asked: ‘Please indicate in which of the

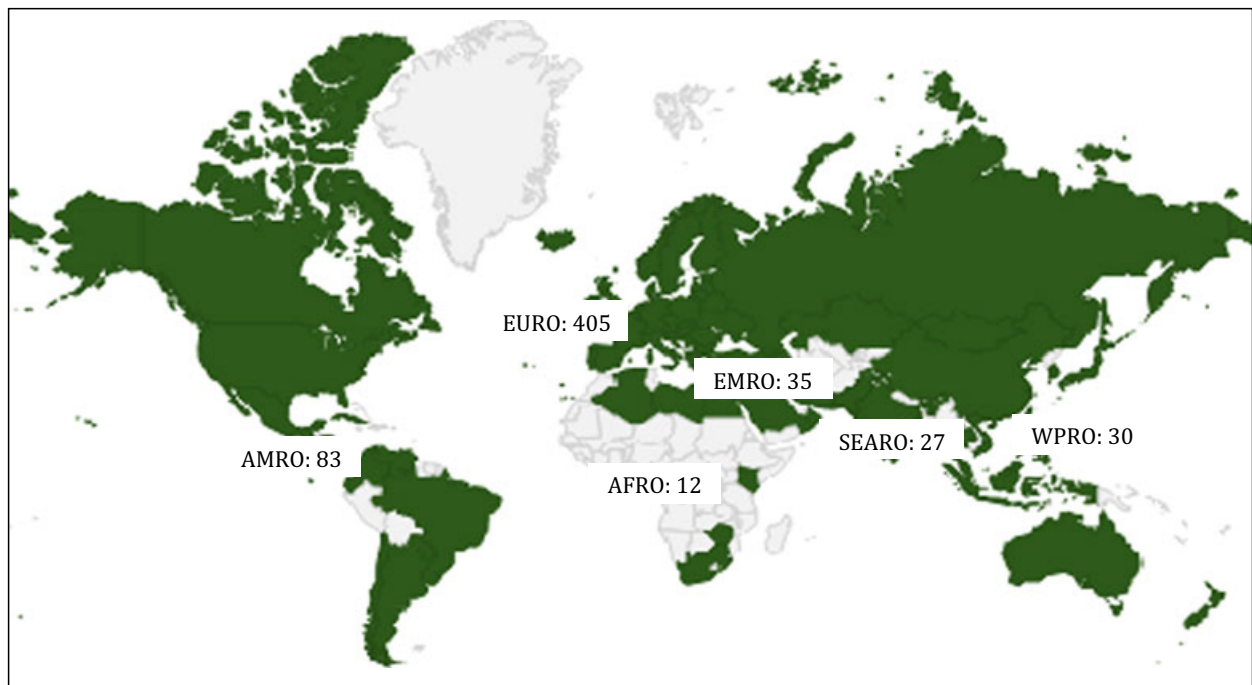


Figure 2 Countries and WHO regions represented by the global survey of healthcare professionals’ attitudes toward allergic

disorders classification. Twenty participants were not classified, as data of origin country was not provided.

Table 1 Participating member societies, response rates, demographic characteristics, and classification in use

WHO Global Region	Country (N responses)	Total Number of responses	Responding as (N members)	Mean age (years)	Ratio women/men	Percentage spending more than 20 h/week with allergic diseases	Percentage of often/always use of ICD-10	Percentage of often/always use of EAACI-WAO classification	Indicate which classification represents better the speciality (%)									
AFRO	Algeria (2)	12	Individual EAACI member (6) WAO member society (4) Both (2)	53.7	0.34	75.0	58.3	41.6	ICD (41.7) EAACI/WAO classification (50) No experience (8.3)									
	Democratic Republic of the Congo (1)																	
	Kenya (1)																	
	South Africa (7)																	
	Zimbabwe (1)																	
	AMRO									Argentina (7)	83	Individual EAACI member (49) WAO member society (29) Both (5)	49.4	0.38	95.1	62.6	33.7	ICD (12) EAACI/WAO classification (42.1) No experience (45.8)
										Brazil (16)								
										Canada (4)								
										Chile (2)								
										Colombia (5)								
										Cuba (1)								
										Ecuador (2)								
El Salvador (1)																		
Mexico (8)																		
Panama (2)																		
EMRO	Paraguay (1)	35	Individual EAACI member (16) WAO member society (20) Both (12)	52.3	0.29	54.3	20.0	40.0	ICD (14.3) EAACI/WAO classification (60.0) No experience (25.7)									
	Peru (1)																	
	United States of America (29)																	
	Uruguay (1)																	
	Venezuela (2)																	
	Egypt (8)																	
	Iran (6)																	
	Iraq (3)																	
	Jordan (3)																	
	Kuwait (2)																	
	Lebanon (2)																	
	Libya (1)																	
	Oman (2)																	
	Pakistan (2)																	
	Saudi Arabia (3)																	
Syrian Arab Republic (2)																		

Table 1 (Continued)

WHO Global Region	Country (N responses)	Total Number of responses	Responding as (N members)	Mean age (years)	Ratio women/men	Percentage spending more than 20 h/week with allergic diseases	Percentage of often/always use of ICD-10	Percentage often/always use of EAACI- WAO classification	Indicate which classification represents better the specialty (%)
EURO	Albania (6)	405	Individual EAACI member (313)	51	0.47	51.8	53.4	42.5	ICD (21.5)
	Armenia (1)		WAO member society (41)						EAACI/WAO classification (65.7)
	Austria (3)		Both (51)						No experience (12.8)
	Azerbaijan (1)								
	Belarus (1)								
	Belgium (7)								
	Bulgaria (12)								
	Croatia (5)								
	Czech Republic (6)								
	Denmark (8)								
	Estonia (2)								
	Finland (5)								
	France (11)								
	Georgia (6)								
	Germany (11)								
	Greece (22)								
	Hungary (4)								
	Iceland (1)								
	Ireland (5)								
	Israel (4)								
	Italy (43)								
	Kazakhstan (1)								
	Kyrgyzstan (1)								
	Latvia (2)								
	Lithuania (6)								
	Luxembourg (2)								
	Netherlands (7)								
	Norway (5)								
	Poland (17)								
	Portugal (19)								
	Republic of Moldova (1)								
	Romania (32)								
	Russian Federation (19)								
	Serbia (5)								
	Slovakia (3)								
	Slovenia (3)								
	Spain (31)								

Table 1 (Continued)

WHO Global Region	Country (N responses)	Total Number of responses	Responding as (N members)	Mean age (years)	Ratio women/men	Percentage spending more than 20 h/week with allergic diseases	Percentage of often/always use of ICD-10	Percentage of often/always use of EAACI-WAO classification	Indicate which classification represents better the speciality (%)
	Sweden (13)								
	Switzerland (5)								
	Yugoslav Republic of Macedonia (5)								
	Turkey (20)								
	Ukraine (8)								
	United Kingdom (33)								
SEARO	India (15)	27	Individual EAACI member (13) WAO member society (12) Both (2)	48.1	0.08	33.4	18.5	25.9	ICD (18.5) EAACI/WAO classification (48.1) No experience (33.4)
	Indonesia (4)								
	Sri Lanka (1)								
	Thailand (7)								
WPRO	Australia (1)	30	Individual EAACI member (20) WAO member society (6) Both (4)	49.5	0.43	43.4	56.7	16.7	ICD (33.3) EAACI/WAO classification (43.4) No experience (23.3)
	China (3)								
	Japan (8)								
	Malaysia (3)								
	Mongolia (1)								
	New Zealand (2)								
	Philippines (5)								
	Democratic People's Republic of Korea (6)								
	Viet Nam (1)								

AFRO, primarily sub-Saharan Africa; AMRO, Americas; EAACI, European Academy of Allergy and Clinical Immunology; EMRO, Eastern Mediterranean/North Africa; EURO, Europe; ICD, International Coding of Diseases; SEARO, South-East Asia; WAO, World Allergy Organization; WPRO, Western Pacific; WHO, World Health Organization.

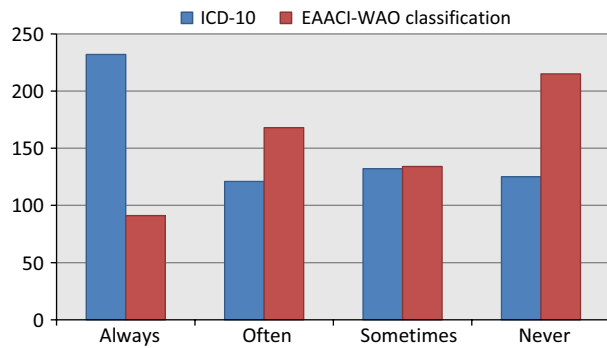


Figure 3 Members using ICD-10 and/or European Academy of Allergy and Clinical Immunology–World Allergy Organization classification.

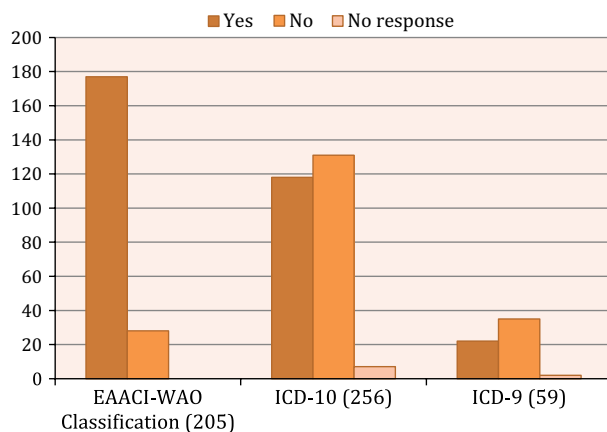


Figure 4 Classification in use worldwide and opinion of appropriateness (Yes/No) of the classification for the clinical practice. Eighty-eight members were not using any classification and were not included in the analysis.

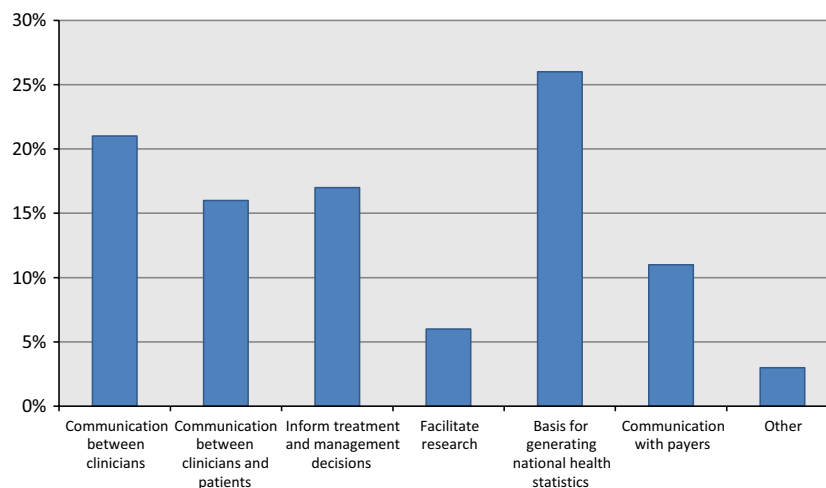


Figure 5 The most important purpose of a diagnostic classification system. Only one answer per participant.

following classification systems you feel your specialty is better represented?’ The classification system elected as being better representative of the specialty was the EAACI–WAO classification (Fig. 6).

Most of the professionals (248) reported the EAACI–WAO classification as easy and extremely easy to use in clinical practice when compared with ICD-10 (121) (Fig. 7). Regarding the rate of accuracy quality classification diagnostic criteria, 274 pointed the EAACI–WAO classification with good or extremely good accuracy, while 99 subjects considered ICD-10 in the same categories (Fig. 8).

Of 590 professionals who replied the question of how many diagnostic categories should a classification system contain to be most useful for health professionals treating allergic diseases, 52% were in favor of 1–30 categories, followed by 36% for 31–100 categories, 7% reported that a classification system with 101–200 would be appropriate, and 4% preferred more than 200 categories.

Sixty-three percent of 216 participants who indicated the ‘dimensional component, where some disorders are rated on scale’, as the best method of diagnostic system justified the decision for the need ‘of a more detailed and personalized diagnosis’. On the other hand, 82% of 193 were favorable to ‘rate as present or absent’ because it is ‘more simple in clinical setting’.

Of all 598 responders, 79% indicated that the functional status should be part of the diagnostic criteria when necessary to infer presence of disorders, 16% consider functional status should not be part of diagnostic criteria, and 5% think that disorders should not be diagnosed if there is no functional impairment.

Overall, 89% of participants completely or mostly agreed with the statement that ‘A diagnostic classification system should serve as a useful reference not only for allergists but also for other health professionals (e.g., primary care practitioners, psychologists, social workers, nurses)’, and 76% completely or mostly agreed that ‘A diagnostic system should

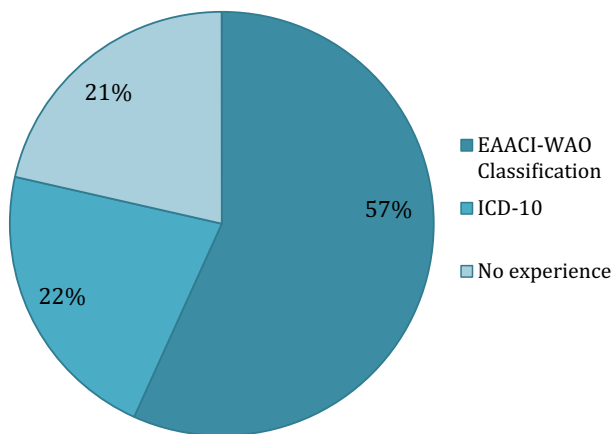


Figure 6 Percentage indication in which classification the specialty is better represented.

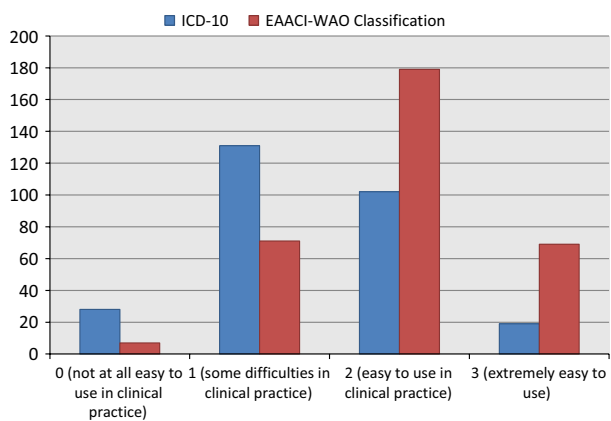


Figure 7 Number of global ICD-10 and European Academy of Allergy and Clinical Immunology–World Allergy Organization classification users reporting how easy it is to use in clinical practice.

be understandable to service users, lawyers, administrators, and other relevant people in addition to health professionals’ (Fig. 9).

The proportion of professionals by WHO region who mostly or completely agreed with the statement ‘The diagnostic system I use is difficult to apply across cultures, or when the patient/service user is of a different cultural or ethnic background from my own’ is shown in Fig. 10. Over 36% of participants from WPRO, EMRO, AFRO and SEARO regions mostly or completely agreed with this statement.

A clear need to include a revised version of the EAACI–WAO classification to ICD-11

The EAACI–WAO Global Survey is the first and most broadly international survey ever conducted of health professionals’ attitudes toward allergic disorders classification. Based on the proportion of time spent by participating

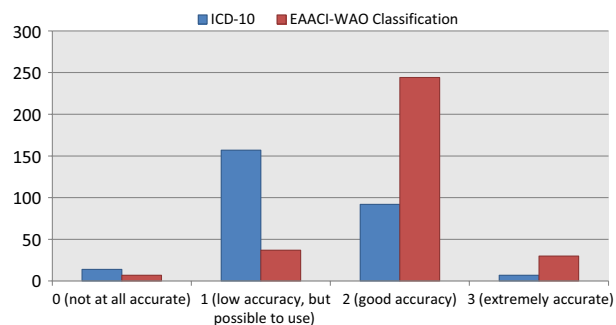


Figure 8 Number of global ICD-10 and European Academy of Allergy and Clinical Immunology–World Allergy Organization classification reports regarding the rate of accuracy quality classification diagnostic criteria.

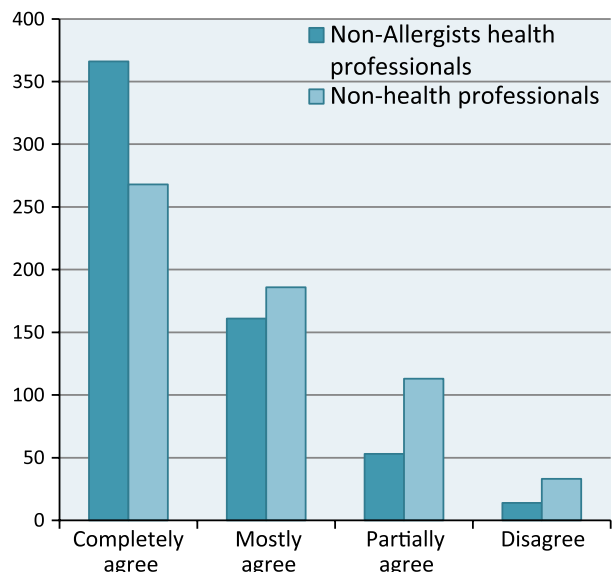


Figure 9 Agreement of the use of a diagnostic classification system by non-allergists and non-health professionals.

professionals in seeing patients, the survey was successful in reaching practicing allergists. This study demonstrates that electronic communications (crowd sourcing) make it feasible to implement projects of this nature via the Internet in all but a few parts of the world, suggesting that this mechanism can be used to facilitate a far more distributed and participatory process for the current ICD revision than was possible with previous versions. The survey covered all WHO regions with the participation of members of both EAACI and WAO societies. The responders were mainly clinicians with more than 10 years of professional experience responsible for seeing more 50 allergic patients per month, spending more than 20 h/week with patients suffering from allergic diseases.

The study was not specifically set up to compare and contrast the ICD and the EAACI–WAO classification, given that

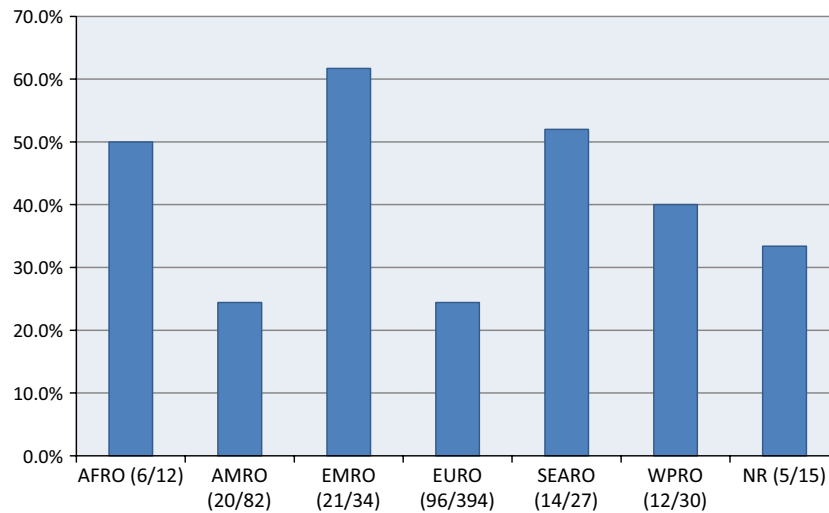


Figure 10 Percentage of responses distributed by WHO global regions indicating they mostly or completely agreed with the statement 'The diagnostic system I use is difficult to apply across

cultures, or when the patient/service user is of a different cultural or ethnic background from my own'. NR, no response regarding the origin country.

it was framed as an effort to evaluate the adequacy of ICD-10 to classify allergic diseases and try to assist WHO in the ongoing revision of the ICD-10. The results of the survey demonstrated that the ICD-10 is the most used classification worldwide, but it was not considered appropriate in clinical practice by the majority of participants, who were asked to justify. Some comments regarding the ICD-10 are striking: 'unclear', 'obsolete', 'insufficient and inadequate for allergic conditions', 'not enough accurate', 'missing hypersensitivity diseases', 'does not reflect reality', 'allergic diseases are not unified', and 'This classification doesn't reflect all variety forms of allergic diseases' among others. The information on accuracy and ease of use is of direct relevance to the ICD revision, as it points directly to categories where there are perceived problems in the definition and diagnostic guidance. From a public health perspective, this has particularly important implications for very commonly used categories (13, 14). Fifty-seven percent of professionals scored the ICD-10 as difficult to use in their daily clinical practice. On the other hand, 24% of the EAACI-WAO classification users reported the same score for this categorization. The large majority of responders (88%) considered the EAACI-WAO classification as having good accuracy in contrast to 38% for the ICD-10. We therefore demonstrated that ICD-10 is not easy and accurate for the majority of responders and therefore does not code appropriately the wide spectrum of allergic diseases. Participants emphasized the strong need for a simpler and more clinically useful classification in particular for generating national health statistics and for facilitating communication among clinicians. They indicated that they would prefer a dimensional classification for a more detailed and personalized diagnosis, with up to 100 categories. Results of the survey reflect the multidisciplinary orientation and complex organizational realities of current allergist practices. A vast majority of participants saw the need for a diagnostic system

useful for nonallergists health professionals and for non-health professionals.

The most important purpose of a diagnostic classification system indicated in the survey was 'basis for generating national health statistics'; however, we understand that 'communication with payers' is also important as ICD is the basis for reimbursement in many countries as this classification system is considered for health insurances.

Although the large majority of participants worldwide appeared to endorse the possibility of a global, cross-culturally applicable classification system of allergic disorders, results of this survey point to several areas of caution. A higher number of members from AMRO and EURO disagreed with the cross-cultural statement. It may be important for the ICD revision process to carefully appraise this issue.

Some limitations are well known in survey-based studies. Although straightforward, the online form and English language used in the questionnaire may appear difficult to some doctors. English is the official language in scientific field, but it is not the maternal language of the majority of participating countries. Even with important representation of professionals, the study may have been hampered by the short time frame of the survey, which was established to follow the ICD-11 discussion timeline.

We are fully aware that hypersensitivity disorders cross over many chapters/areas within the ICD and to form a new chapter with reporting WHO guidelines will require major changes in the ICD structure, but the current survey provides both a baseline and a set of specific targets for improvement related to the definition and description of specific allergic disorder categories, as well as more general guidance on a series of important issues. The example of chapter T78 made of many relevant hypersensitivity disorders, not elsewhere classified is striking (Fig. 11): to start with, it could well be reorganized to cover hypersensitivity/allergic diseases.

T78	Adverse effects, not elsewhere classified <i>Note:</i> This category is to be used as the primary code to identify the effects, not elsewhere classifiable, of unknown, undetermined or ill-defined causes. For multiple coding purposes this category may be used as an additional code to identify the effects of conditions classified elsewhere. <i>Excludes:</i> complications of surgical and medical care NEC (T80-T88)	
T78.0 T78.1	Anaphylactic shock due to adverse food reaction Other adverse food reactions, not elsewhere classified <i>Excludes:</i> bacterial foodborne intoxications (A05) dermatitis due to food (L27.2) · in contact with the skin (L23.6, L24.6, L25.4)	
T78.2	Anaphylactic shock, unspecified Allergic shock Anaphylactic reaction Anaphylaxis <i>Excludes:</i> anaphylactic shock due to: · adverse effect of correct medicinal substance properly administered (T88.6) · adverse food reaction (T78.0) · serum (T80.5)	} } } NOS }
T78.3	Angioneurotic oedema Giant urticaria Quincke's oedema <i>Excludes:</i> urticaria (L50) · serum (T80.6)	
T78.4	Allergy, unspecified Allergic reaction NOS Hypersensitivity NOS Idiosyncrasy NOS <i>Excludes:</i> allergic reaction NOS to correct medicinal substance properly administered (T88.7) specified types of allergic reaction such as: · allergic gastroenteritis and colitis (K52.2) · dermatitis (L23-L25, L27) · hay fever (J30.1)	
T78.8 T78.9	Other adverse effects, not elsewhere classified Adverse effect, unspecified <i>Excludes:</i> adverse effect of surgical and medical care NOS (T88.9)	

NEC: not elsewhere classified; NOS: not otherwise specified

Figure 11 Example of the misclassification of hypersensitivity diseases/anaphylaxis according to ICD-10 (the chapter T78 is made of

many relevant hypersensitivity disorders, not elsewhere classified and could well be reorganized to cover hypersensitivity/allergic diseases).

The results of this survey show the need to update the current classifications of allergic diseases and can be useful to the WHO in improving the clinical utility of the classification and its global acceptability.

Based on these results, we have contacted several TAGs and been in touch with the ICD revision steering group to convince WHO to have a chapter dedicated to allergic diseases, bringing to light our speciality.

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Author contributions

Pascal Demoly and Luciana Kase Tanno contributed equally for the construction of the paper (designed the study,

analyzed and interpreted the data, and wrote the manuscript). Nikolaos G. Papadopoulos, Ruby Pawankar, Cezmi A. Akdis, Susanne Lau, Moises A Calderon, Alexandra F Santos, Mario Sanchez-Borges, and Lany J Rosenwasser helped in the interpretation of the data and with the revision of the manuscript.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Supporting Information

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Global Survey of Health Care Professionals' attitudes toward allergological disorders classification.

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