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ICD-11 for quality and safety: overview of the who quality and safety topic advisory group

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Abstract

This paper outlines the approach that the WHO's Family of International Classifications (WHO-FIC) network is undertaking to create ICD-11. We also outline the more focused work of the Quality and Safety Topic Advisory Group, whose activities include the following: (i) cataloguing existing ICD-9 and ICD-10 quality and safety indicators; (ii) reviewing ICD morbidity coding rules for main condition, diagnosis timing, numbers of diagnosis fields and diagnosis clustering; (iii) substantial restructuring of the health-care related injury concepts coded in the ICD-10 chapters 19/20, (iv) mapping of ICD-11 quality and safety concepts to the information model of the WHO's International Classification for Patient Safety and the AHRQ Common Formats; (v) the review of vertical chapter content in all chapters of the ICD-11 beta version and (vi) downstream field testing of ICD-11 prior to its official 2015 release. The transition from ICD-10 to ICD-11 promises to produce an enhanced classification that will have better potential to capture important concepts relevant to measuring health system safety and quality—an important use case for the classification.

Keywords: ICD-11, quality, safety, patient safety

Background: the opportunity

For many years, the World Health Organization (WHO) has maintained and refined one of its flagship products—the International Classification of Diseases (ICD) [1]. First launched in 1853 as the International List of Causes of Death (ILCD) by the International Statistical Congress, the international classification system was subsequently adopted by the WHO in 1948 after its 5th revision [2]. Since then, the WHO has undertaken five subsequent revisions that have brought the classification to its 10th revision, ICD-10, that is now used in much of the world [3, 4].

The original ILCD was developed for the sole purpose of classifying causes of death globally [5]. More recently, the ICD has been used for a variety of other purposes, including the reporting of morbidity, measuring patient case mix for hospital payment, billing for physician and laboratory services and studying safety and quality of care. Many of these newer applications are based on country-specific 'clinical modifications' of ICD, which have been developed in Canada (ICD-10-CA), Australia (ICD-10-AM), Germany (ICD-10-GM), Thailand (ICD-10-TM) and other countries [6]. The USA, still using ICD-9-CM, has developed ICD-10-CM for a planned 2014 launch.

Notable initiatives in quality and safety that draw on ICD-coded data include: nationwide hospital outcome reports in the USA produced over many years for Medicare patients [7, 8]; the Hospital Standardized Mortality Ratio [9]; Ambulatory Care Sensitive Condition indicators [10, 11] and a variety of patient safety indicator systems (including those developed by the US Agency for Healthcare Quality (AHRQ) [12] and adapted by the Organization for Economic Cooperation and Development [OECD] for international use in ICD-10 [13]). Many commercial vendors have also developed tools for quality/safety measurement including 3M's Potentially Preventable Complications and Potentially Preventable Readmissions [14], Premier, Inc.'s CareScience Analytics [15] and Truven Health's Risk Adjusted Mortality Index and Risk Adjusted Complications Index (available at http://www.100tophospitals.com/top-cardio-hospitals/, cited 6 December 2012).

These existing tools are currently implemented in one or both of ICD-9-CM or ICD-10 and its various subversions [6], just as the WHO works toward the creation of the 11th revision of ICD, ICD-11, to be released in 2015. This revision process presents both a considerable challenge, and also tremendous opportunity, for the enhancement of ICD to better measure quality and safety.

In ensuing sections, we outline the approach that the WHO's Family of International Classifications (WHO-FIC) network is undertaking to create ICD-11, and the work of an international expert group, the Quality and Safety Topic Advisory Group (QS-TAG), convened by WHO-FIC to inform ICD-11 revision in the domain of quality and safety.

The WHO-FIC strategy for creation of ICD-11

The process of ICD revision has been underway since 2009, and will extend at least through 2015. The WHO-FIC leadership has created a governance structure for the revision process (Fig. 1) that positions a Revision Steering Group (RSG) above several Topic Advisory Groups (TAGs) [16]. Several content-specific, or vertical, TAGs address areas such as Neurology, Mental Health, Ophthalmology, Dermatology and Internal Medicine, while five horizontal TAGs focus on cross-cutting themes—the Mortality TAG, the Morbidity TAG, the Functionality TAG, the Health Informatics and Modelling TAG and the QS-TAG. These latter TAGs are aligned conceptually with 'use cases' for ICD-11. 'Use case' is a term borrowed from the discipline of computer science [17] that alludes to anticipated uses of the classification [18] in domains of morbidity, case-mix costing, and health system quality and safety. The various TAGs have all been meeting periodically since 2009 to produce a beta version of ICD-11 [19] (available online for viewing and comment) through use of a Collaborative Authoring Tool called iCAT [20]. The work of the various TAGs, however, remains far from complete as there is still a need to refine vertical chapter content, finalize alphanumeric coding schemes, develop diagnosis clustering mechanisms, and refine morbidity and mortality coding rules. We now describe the mandate of the QS-TAG in more detail.

Enhancing ICD for quality and safety: the work plan of the QS-TAG

An overriding philosophy for the QS-TAG is that it is best to plan proactively for enhancements of the quality and safety use case, rather than to allow ICD-11 to be developed solely based on clinical considerations without attention to the quality/safety use case. The perils of not taking this approach were apparent in the transition from ICD-9 to ICD-10 [6], where a few existing measurement tools developed for ICD-9 had to be 'translated' into ICD-10 [21–23], in a suboptimal paradigm

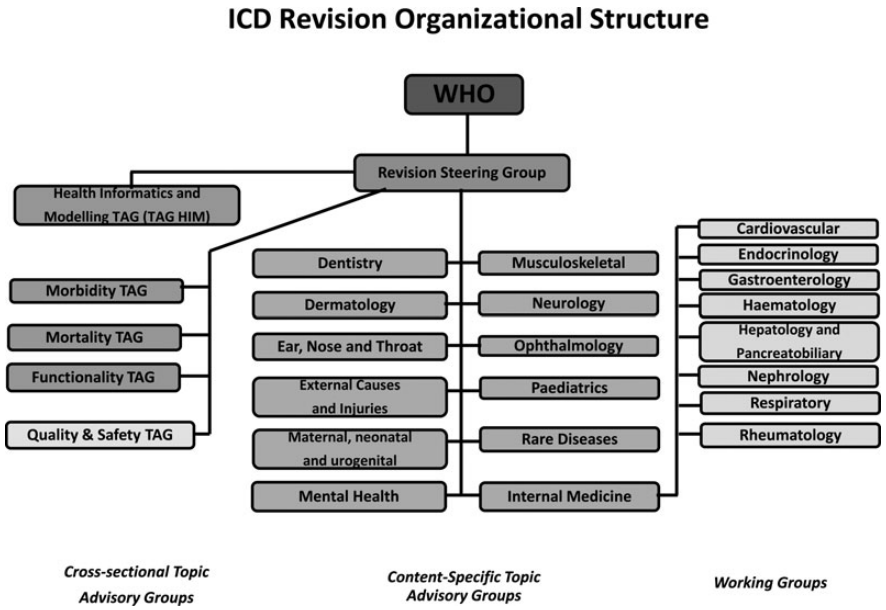

Figure 1 ICD revision organizational structure.

of *post hoc* adaptation. For ICD-11, the WHO-FIC RSG is proactively anticipating all major use cases including that of quality and safety.

In early stages, the QS-TAG undertook stakeholder consultations with the RSG and WHO-FIC network leaders in the domains of mortality coding, morbidity coding, case-mix system development and ontology development. The information derived from these consultations, supplemented by the WHO's past experience in developing ICD-10, produced a QS-TAG work plan (summarized in Box 1) that includes the following: (i) review of existing quality and safety indicators used internationally; (ii) review of a variety of ICD morbidity coding rules (for main condition, diagnosis timing, numbers of diagnosis fields in hospital discharge records and clustering of diagnoses); (iii) substantial restructuring of the health-care related injury content in ICD-10 chapters 19 and 20; (iv) harmonization of ICD-11 with the WHO's International Classification for Patient Safety (ICPS) [24, 25] and the Common Formats developed by the US Agency for Healthcare Research and Quality (AHRQ) [26]; (v) review of content in all other chapters of ICD-11 to ensure appropriate capture of quality and safety concepts and (vi) downstream field testing of ICD-11 prior to its official 2015 release. We now elaborate on each of these.

Box 1. Summary of QS-TAG activities (with general timeline):

1. Cataloguing of existing ICD-9 and ICD-10 quality and safety indicators being used internationally to ensure their ready adaptation to ICD-11 (early 2010–11).
2. Review of ICD morbidity coding rules for main condition, diagnosis timing, numbers of diagnosis fields and diagnosis clustering (early 2010–12).
3. Substantial restructuring of the health-care related injury concepts coded in the ICD-10 chapters 19/20, where injuries and causes of injury are captured (early 2010–12).
4. Mapping of ICD-11 quality and safety concepts to the information model of the WHO's (ICPS [23] and the AHRQ Common Formats [25] (ongoing 2012–13).
5. Review of vertical chapter content in all chapters of ICD-11 to ensure appropriate capture of quality and safety concepts (ongoing 2013).
6. Downstream field testing of ICD-11 prior to its official 2015 release (beginning 2013).

Review of existing quality and safety indicators

The QS-TAG has produced an inventory of existing quality and safety indicator initiatives in the USA, Canada, Australia, Switzerland and the European Union. Examples of notable indicators identified through this scan include the widely used hospital standardized mortality ratio [27], the AHRQ patient safety indicators [12] and the previously mentioned ambulatory care sensitive condition indicator [10, 11]. Related risk-adjustment tools include the Charlson Comorbidity Index and the newer Elixhauser comorbidity coding scheme, both tools that have been translated from ICD-9-CM to ICD-10 in recent years. Going forward, these various tools will require meticulous translation from ICD-10 to ICD-11 if they are to remain seamlessly in use.

Review and modification of morbidity coding rules

Unfortunately, the international standardization of ICD has been compromised by inconsistency among countries in ICD coding rules. One notable issue is the coding rule for main condition (i.e. the principal or primary diagnosis). Some countries use a 'reason for admission' definition while other countries use a 'resource use' definition. The latter leads to assignment of a different diagnosis as the main condition when a patient has been admitted for one condition (e.g. myocardial infarction), but then suffers a significant complication (e.g. stroke) that requires a significantly prolonged hospital stay and use of considerable resources. Other key areas of international inconsistency include: (i) the number of available diagnosis fields in hospital records (ranging from as few as two to as many as an infinite number of fields); (ii) the availability of potentially powerful diagnosis timing indicators in Canada, the USA and Australia, with potential for more widespread implementation in ICD-11 and (iii) exploration of approaches to diagnosis clustering that would permit better coordination and linkage of diagnosis concepts in hospital discharge records [27].

Restructuring and modifying ICD-10 chapters 19 and 20 for health-care related injury

Existing codes in the T80-88 and Y40-84 ranges of ICD-10 [28] permit the capture of healthcare-related injury events such as accidental punctures/lacerations during medical procedures, and harm associated with medications or devices. The existing codes in ICD-10, however, have some redundancies, and some conceptual gaps. Recognizing this, the QS-TAG has undertaken extensive revision of the former chapters 19 and 20 in ICD-10, and proposed an information model for ICD-11 beta [19] that allows the clustered coding of (i) the cause of harm (medications, procedures, devices or other aspects of care); (ii) the mode or mechanism of harm linked to each of the coded causes of harm and (iii) the harm incurred (coded from any of the codes available throughout the classification). The result of this restructuring is a significantly enhanced set of codes that enrich the ICD's ability to capture health-care related injury episodes.

Mapping of quality and safety concepts from ICPS and the AHRQ common formats

The Q&S TAG's work on ICD restructuring was heavily informed by the information models presented in both the WHO's ICPS [24] and the AHRQ Common Formats [26]. These two information models overlap significantly because of their shared purpose of representing key clinical concepts relating to health-care related injuries. Each of the many individual concepts in ICPS and the AHRQ Common Formats is

being manually mapped by QS-TAG members to ensure that there are corresponding ICD-11 codes that represent each concept adequately. Any finding of non-represented concepts in ICD-11 leads to formal TAG recommendations for addition of codes.

Detailed review of chapter content in all chapters of ICD-11

The QS-TAG is now undertaking detailed review of vertical chapter content in ICD-11 beta [19] to ensure that the previously mentioned harmonization to all relevant concepts in ICPS and the AHRQ Common Formats is complete. Our approach includes a focus on both errors of omission (important patient safety concepts not included in ICD-11 that ought to be) and errors of commission (currently included content that ought to be removed or revised). All potential recommendations for changes to the existing ICD-11 content are formally discussed at face-to-face QS-TAG meetings, and then forwarded by the QS-TAG as formal recommendations to the RSG and implicated vertical TAGs (Fig. 1).

Downstream field testing of ICD-11 in advance of the formal release in 2015

The QS-TAG has devised a matrix model for considering potential ICD-11 field trials. The matrix cross tabulates topic areas (e.g. validity of coded concepts, completeness of capture of critical patient safety and quality concepts, reliability and feasibility of various coding rules, opinions of stakeholders on various issues) against the methodologies that would be used for the field trials (i.e. code–recode studies using real medical records, coding studies assessing completeness of capture of key safety/quality concepts, surveys of stakeholders, heuristic evaluations of ICD-11 on various user interfaces, etc.). This framework has already yielded four approved QS-TAG field trial protocols, two of which were completed in the first half of 2013 (an international survey of coding stakeholders, and mapping of existing patient safety indicator listings to ICD-11 in search of errors of omission), and two others that are beginning in Fall 2013 (code–recode testing of the newly proposed ICD-11 coding rules, and attempted coding in ICD-11 of recorded patient safety incidents in a teaching hospital database).

Better information as a foundation for better health

There is tremendous excitement surrounding the opportunities that the ICD revision process brings. The transition from ICD-10 to ICD-11 promises to produce an enhanced classification that will better capture health system safety and quality concepts—an important use case for the classification. It is often argued that we cannot improve phenomena that are not measured [29], and health systems cannot measure safety and quality if they do not have strong classification systems that capture fundamental quality and safety concepts. The WHO has established a robust governance structure for ICD-11 revision, and within this the QS-TAG described here. Ensuing papers from the QS-TAG will inform readers on coding rules, data structure recommendations and the information model used in ICD-11 for capturing healthcare-related harm. Better data and better information provide a crucial foundation for better quality and safety.

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