

## Can ICD-11 Replace ICD-10-CM for Morbidity Coding in the U.S.?

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### Introduction

The International Classification of Diseases (ICD) has been in use for collection of global health trends and statistics for over a century. <sup>1</sup> Its latest version, ICD-11, was adopted in May 2019 and will be implemented in member countries of the World Health Organization (WHO) from January 2022. <sup>2</sup> Due to specific requirements in some countries, over two dozen national extensions of ICD have been developed for past versions of ICD. In the U.S., the first version of the national extension known as Clinical Modification (CM) was ICD-9-CM released in 1979. According to the official documentation of ICD-9-CM, “the term “clinical” is used to emphasize the modification's intent: to serve as a useful tool in the area of classification of morbidity data for indexing of medical records, medical care review, and ambulatory and other medical care programs, as well as for basic health statistics. To describe the clinical picture of the patient, the codes must be more precise than those needed only for statistical groupings and trend analysis.” <sup>3</sup> The same practice of modifying the international ICD core for clinical purpose continued in ICD-10-CM, which replaced ICD-9-CM in 2015.

The main advantage of developing a U.S. national extension is the ability to add necessary detail under the framework of the international core to serve clinical and administrative (e.g., reimbursement) needs. Another advantage is that updates to the national extension can happen more frequently, as ICD-10-CM is updated yearly compared to the three-year cycle for ICD-10. However, there are potential drawbacks. Firstly, significant effort is involved in maintaining an extension. Secondly, there is usually a delay between the release of the international version and the national extension. Moreover, there can be incongruence between the national extension and the international core. In principle, everything in the Clinical Modification should be totally compatible with the parent system. However, some significant differences can be observed between ICD-10-CM and ICD-10. For example, the ICD-10 category *E14 Unspecified diabetes mellitus* is not present in ICD-10-CM, because diabetes mellitus of unspecified type is coded under *E11 Type 2 diabetes mellitus* by default. Another example is the addition to ICD-10-CM of a new category *K68 Disorders of retroperitoneum* that is not present in ICD-10.

ICD-11 has some new features not available in previous versions. Apart from the introduction of the foundation component, the most noticeable novel feature in ICD-11 is postcoordination. <sup>4</sup> Postcoordination is the combination of codes to represent new meaning - a powerful and efficient way to expand the coverage, expressivity and granularity of a terminology. Towards this end, ICD-11 offers 14,500 extension codes for postcoordination. This new capability, together with the considerable increase in the number of codes - 4,015 (37.9%) more codes than ICD-10, may lead one to question whether it is still necessary to develop a Clinical Modification for ICD-11. The recommendations from the National Committee on Vital and Health Statistics (NCVHS) to the Secretary of the Department of Health and Human Services include research to determine whether ICD-11 can fully support morbidity classification in the U.S. without development of a U.S. clinical modification. <sup>5</sup>

In a previous study, we examined a limited sample of ICD-10-CM codes to see how well they could be represented in ICD-11. <sup>4</sup> The objective of the present investigation is to do a comprehensive assessment of the feasibility of replacing ICD-10-CM with ICD-11 for morbidity coding, without creating a CM extension.

### Methods

We used two sources of data to identify the most commonly used ICD-10-CM codes. First source was a full year of Medicare claims data in 2017. Since the Medicare population did not cover obstetric and pediatric codes, we supplemented it with data from three hospitals in Nebraska. In both sources, we identified the most commonly used ICD-10-CM codes that accounted for at least 60% of usage in each chapter. For each ICD-10-CM code, we identified the best matching ICD-11 code by using WHO's online ICD-11 browser. <sup>6</sup> If the ICD-10-CM code's meaning was not fully represented by the ICD-11 code, we would attempt postcoordination, as guided by the browser, to achieve full representation. Each ICD-11 recoding was done independently by two terminologists who are very knowledgeable in ICD-10-CM and ICD-11. All discrepancies were recorded and discussed until consensus was reached. Failure analysis was then performed for all codes that only achieved partial representation to determine the reason for failure and the type of missing information. Further review was carried out on the accompanying coding guidance - inclusion terms, exclusion terms and index entries - for potential conflicts between

the ICD-10-CM and ICD-11 codes e.g., the ICD-10-CM code had an inclusion which was an exclusion of the matching ICD-11 code.

## Results

Based on both data sources, we identified altogether 962 unique ICD-10-CM codes required to cover 60% of patients, of which 943 codes were still active in 2021. Overall, of the 943 codes, 221 (23.4%) could be fully represented without postcoordination and 81 codes (8.6%) could be fully represented with postcoordination (Table). Concerning coding variability, agreement on the ICD-11 main codes was observed in 716 (75.9%) cases before discussion. Among these 716 cases, postcoordination was used by both terminologists in 253 cases, and they used the same postcoordination codes in 199 cases (78.7% agreement). Failure analysis showed that many of the partially represented codes were missing information related to episode of care, laterality, mode of drug exposure and trimester of pregnancy. With the addition of only nine extension codes in ICD-11 (three episodes of care, three trimesters of pregnancy and three modes of exposure), the proportion of codes that could be fully-postcoordinated will increase to 35.2%. Coding guidance review showed potential conflicts in 10% of the codes. For example, the ICD-10-CM code *A41.9 Sepsis, unspecified organism* was recoded as the ICD-11 code *IG40 Sepsis without septic shock*. “Septicemia” was an inclusion for *A41.9* but an exclusion for *IG40*. In ICD-11, “septicemia” pointed to *MA15 Microbiological findings in blood, blood-forming organs, or the immune system*. Therefore, the ICD-11 code *A41.9* was correct in the broader context of sepsis. However, in the special case of septicemia one should use *MA15*.

Table. Recoding commonly used ICD-10-CM codes in ICD-11

|  | ICD-11 | %      | ICD-11 (with minor enhancements) | %      |
|--|--------|--------|----------------------------------|--------|
| Full representation without postcoordination | 221    | 23.4%  | 221                              | 23.4%  |
| Full representation with postcoordination    | 81     | 8.6%   | 332                              | 35.2%  |
| Partial representation only                  | 641    | 68.0%  | 390                              | 41.4%  |
| Total  | 943    | 100.0% | 943                              | 100.0% |

## Discussion

Without postcoordination, only 23.4% of ICD-10-CM codes are fully represented in ICD-11. However, this can be increased to 58.6% with postcoordination and some minor enhancements. Considering that only 24.3% of ICD-9-CM codes have exact matches to ICD-10-CM codes (based on the 2016 General Equivalence Maps), migrating from ICD-10-CM to ICD-11 appears to be less disruptive than the ICD-9-CM to ICD-10-CM transition. However, postcoordination increases coding complexity and will impact tooling, coder education and coding variability. Replacing ICD-10-CM directly with ICD-11 will avoid the cost of maintaining a national extension and the potential divergence of meaning from the international core. Before embarking on the development of ICD-11-CM, serious consideration should be given to using ICD-11 for morbidity coding.

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