

# **ICD-9 to ICD-10: Evolution, Revolution, and Current Debates in the United States**

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## **Abstract**

The International Statistical Classification of Diseases and Related Health Problems (ICD) has undergone a long evolution from its initial inception in the late 18th century. Today, ICD is the internationally recognized classification that helps clinicians, policy makers, and patients to navigate, understand, and compare healthcare systems and services. Currently in the United States, hot debates surround the transition from the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) to the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). This article presents an analysis of the views of the proponents and opponents of the upcoming change. We also briefly present and analyze the quality of the most frequently cited scientific evidence that underpins the recent debates focusing on two major issues: ICD-10-CM implementation costs and revenue gains and the projected clinical data quality improvement. We conclude with policy and research suggestions for healthcare stakeholders.

## **Background**

The International Statistical Classification of Diseases and Related Health Problems (ICD) has a long history of development and refinement that can be traced back to the French physician J. Bertillon, who introduced the Bertillon Classification of Causes of Death in 1893.<sup>1</sup> In 1946, the United Nations delegated the responsibility for the ICD to the World Health Organization (WHO), which conducts and issues periodical revisions of the ICD.

The International Classification of Diseases, Ninth Revision (ICD-9) was designed in the late 1970s and was adopted by many countries around the world during the 1980s. Although this version was more detailed and interprofessional than the previous versions of the ICD, it did not meet the clinical needs of providers and payers in the United States. To make the application of ICD-9 appropriate to the American healthcare settings, the National Center for Health Statistics (NCHS) and the Council on Clinical Classifications jointly created the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). Since late 1970s, ICD-9-CM has been the required standard for billing and clinical purposes by the most payers (such as the Centers for Medicare and Medicaid Services [CMS]) in the United States.<sup>2,3</sup>

During the creation of ICD-9, WHO leaders realized that even bigger classification changes would need to be implemented in the near future. To address this issue, development of the 10th revision of ICD was initiated even before the ninth version was completed.<sup>4,5</sup> The WHO Collaborating Centers for the Classification of Diseases experimented with different models and structures for ICD-10. Multiple international users' and developers' appeals and requests postponed the publication of ICD-10 from 1985 to 1989. During this extended time, the WHO implemented changes and further developed ICD-10. As a

result of this work, ICD-10, published in 1990, included significantly more codes and categories: while ICD-9 had only about 17,000 codes, ICD-10 included more than 155,000 codes tracking a significant number of new diagnoses. ICD-10 was swiftly adopted and implemented by many international healthcare users.

In the United States, the National Center for Health Statistics (NCHS) is charged with developing and updating the ICD.<sup>6</sup> After the WHO authorization in the middle of 1990s, the NCHS went through a long, multistep process of adapting ICD-10 to American healthcare needs and settings. First, the NCHS released the revised version of ICD-10 for the public comments in 1998. Then, in summer 2003, ICD-10 was field tested by the American Hospital Association and the American Health Information Management Association (AHIMA).<sup>7, 8</sup> Finally, public suggestions and the field-test results were implemented to create an updated version, known as the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). According to the NCHS, the current “clinical modification represents a significant improvement over ICD-9-CM and ICD-10.”<sup>9</sup> The specific improvements include the creation of the diagnosis/symptom combinations that reduce the number of codes required to describe a certain medical condition, additional information relevant to the description of managed care and ambulatory encounters, and greater specificity in codes. The NCHS conducts an annual update of ICD-10-CM, and the last update was released in December 2012.<sup>10</sup>

After long discussions and debates, the US Department of Health and Human Services (HHS) published a final rule requiring the use of ICD-10-CM to replace ICD-9-CM in the Health Insurance Portability and Accountability Act (HIPAA) electronic transaction standards.<sup>11</sup> Initially, the transfer to ICD-10-CM was scheduled to happen in 2011,<sup>12</sup> but it was postponed by CMS to October 1, 2013.<sup>13</sup> Most recently, HHS proposed that this date be set back one year from the postponed date, to October 1, 2014.<sup>14</sup> Debates about adoption continue. The following sections provide an analysis of the views of the proponents and opponents of the upcoming change.

It is important to note that in the United States, ICD-10 consists of two parts: ICD-10-CM for diagnosis coding and the International Classification of Diseases, Tenth Revision, Procedure Coding System (ICD-10-PCS) for inpatient procedure coding. According to the HHS requirements, ICD-10-CM will become a standard for all US healthcare settings, whereas ICD-10-PCS will be required in inpatient settings only. This article mainly focuses on ICD-10-CM to enable a broader overview of the recent debates.

## **ICD-10-CM: Implementation Costs and Revenue Gains**

It is challenging to estimate the possible costs of the transition to ICD-10-CM. These costs will probably vary widely for different organizations, settings, and providers. However, several rough estimates were recently made. For example, according to general estimates by CMS in 2009,<sup>15</sup> the costs of the ICD-10-CM implementation will be about 0.03 percent of revenue for inpatient and outpatient healthcare settings. Other anecdotal estimates suggest that these costs will be much higher, according to some reports up to approximately \$5 million for a large institution (400 or more beds), up to \$1.5 million for a medium-size institution (100 to 400 beds) and up to \$250,000 for a small institution (100 beds or fewer).<sup>16</sup> Moreover, revenue loss is expected during the transition to the new classification system because of the increased claim denial rates, delays in submission of bills, and increases in claim error rates ranging from 6 to 10 percent.<sup>17, 18</sup>

According to HHS, the implementation and error costs should subside within a few years.<sup>19</sup> Two years after the implementation, providers' revenues are expected to increase because of more accurate payments and fewer rejected and improper claims.<sup>20</sup> Moreover, the improved disease management that is expected with the help of ICD-10-CM should lead to higher-quality care and improved outcomes.<sup>21</sup> This trend is especially relevant in light of the possible transition to new, outcome-oriented models of payment such as those used by accountable care organizations and patient-centered medical homes.

In sum, the claims of both the opponents and proponents are based on estimations and predictions, while there is scarce empirical evidence to support either argument. To make financial estimation even

more complicated, the US healthcare reimbursement and payment systems are unique, and it is hard to compare them to healthcare systems that have adopted and successfully transitioned to ICD-10 in other countries.

In addition, most of the estimates were made before the creation of requirements for meaningful use that provide financial incentives for healthcare providers to adopt electronic health records (EHRs) and penalize the lack of adoption through an upcoming adjustment of payments by CMS and other payers.<sup>22</sup> These recent changes are directly related to the possible costs and revenues estimated for the transition to ICD-10-CM. For example, it is estimated that most healthcare providers will have functional EHR systems in place by 2015,<sup>23</sup> and the costs of transitioning these systems to the new classification might be lower or higher than those expected without EHRs. The suggested revenue estimates might still be relevant but are less straightforward with the widespread adoption of EHRs. For example, it will be challenging to estimate whether the adoption of EHRs or the transition to ICD-10-CM is responsible for increased revenues due to more accurate payments. To conclude, it is difficult to approximate the effect of the ICD-10-CM transition on revenues and costs due to the lack of empirical evidence and scarcity of updated high-quality estimates.

## **Clinical Data Quality Improvement**

Supporters of ICD-10-CM praise its ability to provide a more detailed description of clinical situations and its greater specificity in describing healthcare problems. Similarly to the international version, the overall number of codes and diagnoses has increased significantly from ICD-9-CM (about 17,000 codes) to ICD-10-CM (more than 155,000 codes).<sup>24, 25</sup> For example, ICD-10-CM includes previously unavailable codes for distinguishing between different types of diabetes and requires providers to document additional important information, such as any underlying condition that caused the diabetes or whether drugs induced the diabetes.<sup>26, 27</sup> It also enables a more detailed description of the location on the patient's body, for example left or right limb. This improved level of detail should decrease medical fraud and abuse, for instance by reducing the ability to repeatedly report the same procedure on the same side of the body.<sup>28</sup> ICD-10-CM also improves the information coverage for other healthcare disciplines, which should lead to better understanding of healthcare outcomes and processes through improved coding.<sup>29</sup> For example, ICD-10-CM codes are focused on human responses to disease, which are more appropriate for nurses, while the previous versions leaned toward disease- or organ-level, physician-oriented content.<sup>30</sup>

On the other hand, opponents of ICD-10-CM suggest that the claims about its advantages over ICD-9-CM are exaggerated. First, although the number of ICD-10-CM codes and diagnoses increased, the two systems are still very similar.<sup>31</sup> Indeed, the major increase in ICD-10-CM codes might be attributed to the increased levels of detail about traumatic injuries (about 60 percent of all the codes), while ICD-9-CM devoted only a small percentage (about 15 percent) of codes to these types of injuries. Also, the overall proportion of disease codes decreased from 65 percent (or roughly 8,500 codes) in ICD-9-CM to about 30 percent (about 20,000 codes) in ICD-10-CM.<sup>32</sup>

While in the long run ICD-10-CM is expected to decrease medical fraud and abuse, there are concerns that in the transition period, healthcare providers will intentionally or mistakenly misreport codes. This might happen because only a limited number (around 5 percent) of the existing ICD-9-CM codes have a one-to-one match with the ICD-10-CM codes.<sup>33</sup> To avoid severe problems and enable easy mapping between the classifications, CMS has developed special cross-mapping pathways called General Equivalence Mappings (GEMs).<sup>34</sup> However, most ICD-9-CM codes are still matched with multiple terms in ICD-10-CM, and there is still room for double billing during the period when the two systems will be activated simultaneously.<sup>35</sup>

In addition, the opponents of ICD-10-CM claim that throughout the years, the classification has become obsolete and no longer fits the clinical needs of modern healthcare providers; indeed, the classification was designed in the 1980s and therefore lacks codes for more recent medical information. For example, when bilateral prophylactic mastectomy is performed because of the presence of the BRCA2 gene (a genomic variant that significantly increases the risk of breast cancer), there is no option for coding this genomic variant as an indication for surgery.<sup>36</sup> Genomics and family history are actually

being incorporated into the newest revision (ICD-11), which is expected to be published in 2016. Also, ICD-11 will be somewhat broader in its clinical definitions but will include a straightforward linkage to the Systematized Nomenclature of Medicine–Clinical Terms (SNOMED CT), a systematically organized, computer-processable collection of medical terms that is required under the current regulations for the second stage of meaningful use.<sup>37, 38</sup>

Several scientific studies have compared currently existing classifications. One example often cited when comparing the last two ICD versions is a Canadian study conducted in 2008 by Quan et al.<sup>39</sup> The study aimed to assess the validity of administrative and clinical data coded with ICD-10 and to determine whether it offers significant improvements compared to ICD-9-CM. The researchers extracted medical chart data on 32 medical conditions from four teaching hospitals in Canada. The original data were coded using the recently adopted ICD-10 standard, and the researchers hired four coding experts to code the charts with ICD-9-CM. These codes were compared, and the study concluded that the “dually coded database demonstrated that ICD-9-CM and ICD-10 administrative data . . . had similar validity in recording clinical condition information.”<sup>40</sup>

However, several methodological concerns might limit the generalizability of the findings of the study by Quan et al.<sup>41</sup> First, at the time of the study data collection, ICD-10 had only recently been implemented (it had been used for only nine months prior to the study), and it is possible that the coders were not experienced with the new classification. The data were then recoded into ICD-9-CM by experienced experts hired by the study team. Therefore, it is possible that the lack of difference between the two classifications stems from comparing expert coders (using ICD-9-CM) and novice coders (using ICD-10). Moreover, the comparisons were made using data from teaching hospitals in one province in Canada and did not analyze ICD-10-CM. All of these factors weaken the generalizability of the study findings to US settings.

Only one study comparing the most updated versions of ICD-9-CM and ICD-10-CM was identified.<sup>42</sup> The researchers used expert coders to code 50 clinical notes sampled from four academic medical centers. Similar to the findings of the previous study, this study concluded that the “practical ability of ICD-10-CM to capture content typically contained in clinical records is not measurably better or worse than that of ICD-9-CM.”<sup>43</sup> However, the small sample size (50 clinical notes) limits the generalizability of this study’s findings.

To conclude, researchers did not identify significant improvements or deficits between the recent versions (9th and 10th) of the ICD. However, the existing evidence is limited in its generalizability and validity.

## Conclusion

Disease classifications have undergone a long evolution from their inception in the late 19th century. Nowadays, ICDs are internationally recognized classifications that help clinicians, policy makers, and patients to navigate, understand, and compare healthcare systems and services. In the United States, ardent debates arose recently around the requirement to transition from ICD-9-CM to ICD-10-CM. Three general sectors are involved in the ICD discussions in the United States: *healthcare providers* (mostly interested in postponing the implementation of ICD-10-CM because of the financial uncertainties and questionable quality gains), *vendors* (which will probably gain monetary profits from the implementation of the new classification), and the *government* (which holds a neutral position and has twice postponed the requirement for the transition to ICD-10-CM for billing purposes).

The first common category of arguments relates to the financial side of the classification change: it is challenging to estimate the possible costs and revenue generated from the transition to ICD-10-CM. The evidence that exists about the estimated costs and revenues also seems to be either anecdotal or somewhat outdated, especially in the light of the recent legislative changes related to meaningful use of EHRs. In order to make strong and valid financial predictions, high-quality evidence with a national scope is desperately needed. This evidence might be obtained by a governmental agency, such as CMS or HHS, or with their funding, as was provided previously.

The second category of arguments relates to the ability of the suggested ICD-10-CM transition to generate higher-quality clinical data that will drive better healthcare management and improve outcomes. Although this argument sounds reasonable, evidence about the actual improvement of healthcare data that is likely to occur with the transition to ICD-10-CM is scarce. Several recent studies comparing the classifications did not identify significant improvements. However, these studies are not without methodological concerns that limit the generalizability of their findings. Therefore, more generalizable research that thoroughly compares and examines the quality improvements between ICD-9-CM and ICD-10-CM is needed. Also, CMS and the NCHS might consider allocating additional resources to facilitate more robust research comparing the quality improvements between the classifications.

ICD-11 is expected to be released by 2016, and at least another year will probably be needed to create an appropriate clinical modification for use in the United States. Until then, it is likely that the switch to ICD-10-CM will continue to be required, but more robust research evidence is needed to facilitate and substantiate the recent debates.

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