Health Policy Review

Necessity and Implications of ICD-10: Facts and Fallacies

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The International Classification of Diseases-10 (ICD-10 is a new system that is expected to be implemented effective on October 1, 2013. This new system is a federally mandated change affecting all payers and providers, and is expected to exceed both the Health Insurance Portability and Accountability Act (HIPAA) and Y2K in terms of costs and risks. However, the Administration is poised to implement these changes at a rapid pace which could be problematic for health care in the United States.

In 2003, HIPAA named ICD-9 as the code set for supporting diagnoses and procedures in electronic administrative transactions. However, on January 16, 2009, the Department of Health and Human Services (HHS) published a regulation requiring the replacement of ICD-9 with ICD-10 as of October 1, 2013. While ICD-9 and 10 have a similar type of hierarchy in their structures, the ICD-10 is more complex and incorporates numerous changes. Overall, ICD-10 contains over 141,000 codes, a whopping 712% increase over the less than 20,000 codes in ICD-9, creating enormous complexities, confusion, and expense. Multiple published statistics illustrate that there are approximately 119 instances where a single ICD-9 code can map to more than 100 distinct ICD-10 codes, whereas there are 255 instances where a single ICD-9 code can map to more than 50 ICD-10 codes. To add to the confusion, there are 3,684 instances in the mapping for diseases where a single ICD-10 code can map to more than one ICD-9 code.

Proponents of the new ICD-10 system argue that the granularity should lead to improvements in the quality of health care, since more precise coding that more accurately reflects actual patient conditions will permit smarter and more effective disease management in pay-for-performance programs. This, in essence, encapsulates the benefits that supporters of this new system believe will be realized, even though many of these experts may not be involved in actual day-to-day medical practices.

Detractors of the system see the same granularity as burdensome. The estimated cost per physician is projected to range from $25,000 to $50,000. Further, they argue that the ICD-10 classification is extremely complicated, and expensive. Concerns exist that it is being implemented without establishing either the necessity or thinking through the unintended consequences. Opponents also argue that beyond financial expense, it is also costly in terms of human toll, hardware and software expenses and has the potential to delay reimbursement. There is also concern that an unintended consequence of granularity would be the potential for enhanced and unnecessary fraud and abuse investigations.

The authors of this article favor postponing the implementation of the ICD-10 until such time as its necessity is proven and implications are understood.

Key words: Diagnostic coding systems, International Statistical Classification of Diseases and Related Health Problems (ICD), ICD-9-CM, ICD-10-CM, regulations, growth, evidence-based literature, reimbursement, claims, Health Insurance Portability and Accountability Act (HIPAA)

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The United States health care industry has been undergoing many changes and is poised to undergo many more radical changes in the coming years (1-10). These changes will happen due to the enormous pace of innovation in health care. There is increasing complexity of health care interventions and systems, pervasive and persistent unexplained variability in clinical practice, and high rates of perceived inappropriate care combined with increased expenditures (11-18). These factors have fueled a steady increase in demand for appropriate application of modalities that have clinical effectiveness, supported by an explosion of evidence-based literature (12,13,18-43).

Among the multitude of coming changes, one significant policy implication that has been overshadowed by the current health care reform discussion is the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10) conversion with its looming implementation deadline of October 1, 2013 (10,44). While conventional wisdom suggests this federally mandated change - which will affect all payers and providers – will exceed both the Health Insurance Portability and Accountability Act (HIPAA) and Y2K in terms of costs and risks, the Obama administration continues to under-acknowledge the both the intended and unintended consequences of this major change in health care. Even so, in 2003, the HIPAA of 1996 (45) named ICD-9 as the code set for reporting diagnoses and procedures in electronic administrative transactions; on January 16, 2009, the Department of Health and Human Services (HHS) published a regulation requiring the replacement of ICD-9 with ICD-10 as of October 1, 2013. Consequently, ICD-10 is set to replace ICD-9 as part of the HIPAA-named code set.

The International Statistical Classification of Diseases and Related Health Problems, known as ICD, provides codes to classify diseases and a wide variety of signs, symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or disease.

The rationale for transformation is that the greatly expanded ICD-10 coding system allows for more precision and specificity about both disease conditions and the health care interventions provided to patients. Experts argue that "granularity", or fineness of detail in definitions, should lead to improvements in the quality of health care, since more precise coding that more accurately reflects actual patient conditions will permit smarter and more effective disease management and pay-for-performance programs (10). Thus, based on these assumptions, it is postulated that ICD-10 coding should also save money by making it easier to weed out provided services that are inappropriate given the diagnosis, as well as identifying fraud. Proponents also add that conversion to ICD-10 will allow the United States to report morbidity and mortality statistics to the World Health Organization (WHO) that are comparable to those of other countries, which have been reporting data based on ICD-10 coding for many years (46-50).

Opponents argue that conversion is not only expensive in terms of the human toll, hardware and software expenses, and delayed reimbursement, but it also will provide additional ammunition for regulators to allow fraud and abuse regulations. However, both proponents and opponents agree that there is no guarantee that the transformation will improve the quality of care or access (10,44,46-54). Clearly the ICD-10 will increase the provider cost of providing health care. As with any unfunded health care mandate, this can lead to problems in quality. The costs for physician practices have been estimated to be steep, averaging over $83,000 for a 3-doctor practice, $285,000 for a 10-doctor practice, and $2.7 million for a 100-doctor practice, based on a study conducted by the Medical Group Management Association (53). Further, hospital expenses have been estimated to range from $15 million to $20 million per hospital. These are the best case scenario estimates, and some expect the cost to be considerably more. It has been speculated that it may be one of the many factors that will drive smaller physician practices, hospitals, health plans, and information technology (IT) vendors to merge with large players rather than make the conversion themselves (10).

Considering the economic turbulence and numerous changes in health care based on the Affordable Care Act (ACA), one might wonder whether this is an appropriate time to make the ICD-10 shift to more codes for individual services, which in turn will increase complexity and expense, and may result in reduced access without improving quality, given that the goal of the ACA is to move from fee-for-service to more "bundled" or global payments, or even to payment for outcomes. Even health plans which have generally benefited from the ACA are complaining that insurers will be squeezed by large ICD-10 implementation costs at the same time as health reform requires them to limit administrative costs under the new medical loss ratio rules (54).

All physicians and other providers in the United States will be affected by proposed implementation of the new ICD-10 system. This manuscript is under-

taken to critically evaluate the background, necessity for change, and effect on medical practices across the United States.

1.0 Background

Coding facilitates billing, and thus medical commerce and medical technology advances. The history of ICD dates back at least to 1763, when French physician Francois Bossier de Lacroix, seeking to aid his fellow physicians in making diagnoses, published a classification system listing 10 major classes of diseases and 2,400 individual diseases (55).

In 1853, the first International Statistical Congress appointed William Farr and Jacob Marc d'Espine to create an internationally acceptable classification of causes of mortality (56). Consequently, the general arrangement proposed by Farr was selected as the basis of the International List of Causes of Death (ILCD).

The first ILCD was developed by a committee chaired by Jacques Bertillon (Chief Statistical Services of the City of Paris) in 1893, and was introduced at the International Statistical Institute (ISI) in Chicago (57). In 1898 it was adopted by Canada, Mexico, and the United States (57). Subsequently, ILCD classifications for mortality reporting were officially published in 1900, 1910, 1920, 1929, and 1938 (56,58). Until 1948 multiple attempts were made to direct parallels of "illness" for morbidity reporting even though these failed to receive general acceptance. During this time many countries developed their own morbidity listings; Canada in 1936 and the United Kingdom and United States in 1944.

The WHO became custodian of ICD in 1948 and in 1949 adopted the ICD, which was expanded to include morbidity coding (56,57). The revisions that followed contained minor changes, until the Sixth Revision of the classification system. With the Sixth Revision, the classification system expanded to 2 volumes. Until then the classification system was contained in one book, which included an alphabetical index as well a tabular list, which was small compared to subsequent and current listings. The Sixth Revision, including morbidity and mortality conditions, and its title was modified to reflect the changes: Manual of International Statistical Classification of Diseases, Injuries, and Causes of Death. Prior to the Sixth Revision, responsibility for ICD revisions fell to the mixed commission, a group composed of representatives from the ISI and the Health Organization of the League of Nations. Since WHO assumed responsibility for preparing and publishing the revisions in 1948, revisions have been performed every 10 years; thus, WHO sponsored the Seventh and Eighth Revisions in 1957 and 1968 respectively.

In 1959, the U.S. Public Health Service published the ICD, Adapted for Indexing of Hospital Records and Operation Classification (ICDA). It was completed in 1962. A revision of this adaptation, considered to be the Seventh Revision of ICD, expanded a number of areas to more completely meet the indexing needs of hospitals. The U.S. Public Health Service later published an Eighth Revision the ICD, adapted for use in the United States, commonly referred to as ICDA-8. This classification fulfilled its purpose to code diagnostic and operative procedural data, except for official morbidity and mortality statistics in the United States. In addition, ICD-6, published in 1949, was the first to contain a section on mental disorders. Consequently, the Seventh and Eighth Revisions included only minor changes.

The ICD-9 Revision provided additional, detailed 4-digit level categories and some optional 5-digit subdivisions. ICD-9 was published in 1977 by the WHO Department of Knowledge Management and Sharing. However, the WHO no longer publishes or distributes the ICD-9 as it is now in the public domain. ICD-9-CM is a classification used in assigning codes to diagnoses associated with an inpatient, outpatient, and physician office utilization in the United States. The ICD-9-CM is based on the ICD-9, but provides for additional morbidity detail and is annually updated on October 1. It was created by the U.S. National Center for Health Statistics (NCHS) and is an extension of the ICD-9 system so that it can be used to capture more morbidity data; a section of procedure codes was also added. It consists of 2 or 3 volumes, with volumes one and 2 containing diagnostic codes and volume 3 containing procedure codes. The NCHS and the Centers for Medicare and Medicaid Services (CMS) are the U.S. governmental agencies responsible for overseeing all changes and modifications to the ICD-9-CM.

Work on ICD-10 began in 1983 and was completed in 1992. The ICD-10 is copyrighted by the WHO and reproduced by permission for U.S. government purposes. ICD-10 was released with introduction of an annual process of review and refinement in 1992. The code set allows more than 155,000 different codes and permits tracking of many new diagnoses and procedures, a significant expansion on the 17,000 codes available in ICD-9 (59). The world adopted ICD-10 quickly. Some countries have even created their own versions of ICD-10, for example, Canada introduced ICD-10-CA in 2000. Approximately 25 countries use ICD-10 for reimburse-

ment and resource allocation in their health systems. A few of them made modifications to ICD to better accommodate this use of ICD-10. The unchanged international version of ICD-10 is used in about 110 countries for cause of death reporting and statistics. Nonetheless, many countries have not adopted for mortality and morbidity coding (60). Thus, proponents of ICD-10 describe that an information paradox exists, in that of 192 registered WHO member states, 83 are not in a position to provide mortality data of any kind (61).

In 2003, HIPAA of 1996 (45) named ICD-9 as the code set for reporting diagnoses and procedures in electronic administrative transactions. On January 16, 2009, HHS published a regulation requiring the replacement of ICD-9 with ICD-10 as of October 1, 2013.

Thus, the United States will begin its official use of ICD-10 on October 1, 2013, utilizing clinical modification of ICD-10-CM for diagnoses coding and the procedure coding system (ICD-10-PCS) for inpatient procedure coding (50,62,63). All HIPAA "covered entities" must make the change; a prerequisite to ICD-10 is the adoption of electronic billing (EDI) version 5010 by January 1, 2012 (64,65).

2.0 Evolution of ICD-10

In 1977, ICD-9-CM, the clinical modification of ICD-9, developed by the NCHS for reporting morbidities, was adopted for use in the United States in 1979. In addition to its use in identifying mortality and morbidity, ICD-9-CM was adopted to classify diseases and health conditions for health care claims for hospitals, physicians, and other health care providers and facilities. It is not only used to report diagnoses to facilitate payment of health services, but also to evaluate utilization patterns, predict health care trends, analyze health care costs, research quality of health care, and plan for future health care requirements.

The ICD-9-CM also includes alternative methods of classifying diagnostic statements in addition to information about manifestation of diseases related to organ or site in classifying the underlying disease, which is known as the dagger and asterisk system and is retained in the 10th revision of ICD. Technical innovations were included in ICD-9-CM to increase the flexibility for worldwide use. The clinical modification added detail at the fourth and fifth digits of divisions. This modification was designed to provide greater flexibility in many situations.

The United States also developed volume 3 of ICD-9-CM in the 1970s to identify inpatient hospital procedures to use with volumes 1 and 2. Volume 3 has been used since 1979 to report procedures performed in the hospital for hospital claims and statistics.

In 1983, the Inpatient Prospective Payment System (IPPS) was adopted, and ICD-9-CM volumes 1, 2, and 3 were used for assigning cases to diagnoses-related groups. As a result of the advances in medicine since ICD-9-CM was implemented, the system has been updated and revised periodically with an establishment of regular updates annually via a coordination and maintenance committee. Responsibility for maintenance of the ICD-9-MC lies with the NCHS and CMS.

In 1988, the U.S. Congress passed the Medicare Catastrophic Coverage Act, which required the use of ICD-9-CM codes for processing Medicare claims. Many commercial and other third party payers followed Medicare's lead and adopted ICD-9-CM as the standard for reporting diagnoses to support medical necessity.

Further, the administrative simplification provisions of HIPAA required HHS to establish national standards for electronic health care transactions, code sets, and national identifiers for providers, health plans, and employers. It also addressed the security and privacy of health data. Industry use of these standards is aimed at greater health care system efficiency and effectiveness through improved use of standard electronic data interchange.

HIPAA has identified 10 standard transactions for electronic data interchange for the transmission of health care data, claims and encounter information, payment and remittance advice, and claims status and inquiry. Code sets are the codes used to identify specific diagnoses and clinical procedures on claims and encounter forms. Such examples of code sets for procedures, diagnoses, and drugs with which providers are familiar include Healthcare Common Procedures Coding System (HCPCS), Current Procedural Terminology (CPT), ICD-9, and National Drug Code (NDC).

Thus, ICD-9-CM today is used not only for disease classification, but it is also the standard for payments justification and supporting medical necessity for a procedure or a service provided to a patient in a health care setting. Consequently, it has become our core classification system to code claims for commercial and government health insurance reimbursement. In 1993, ICD-10 was first used by the WHO. The NCHS first awarded a contract to the Center for Health Policy Studies to evaluate ICD-10 for use for morbidity in the United States. A technical advisory panel developed a prototype of ICD-10-CM in 1994. It was recommended on the basis of

the panel's findings that the NCHS proceed with implementation of ICD-10-CM with revisions. Further work on ICD-10-CM was performed by the NCHS along with a review of proposals from the ICD-9-CM coordination and maintenance committee and input from medical and surgical specialty groups. When ICD-10-CM implementation occurs in 2013, the ICD-9-CM coordination and maintenance committee will be renamed the ICD-10 coordination and maintenance committee.

3.0 Structure of ICD-10

The ICD-10-CM has the same type of hierarchy in its structure as ICD-9-CM. All codes have the same first 3 digits describing common traits, with each character beyond the first 3 providing more specificity. However, ICD-10-CM is alphanumeric with up to 7 digits of specificity. It also has the same organization and use of notes and instructions. When a note appears under a 3-character code, it applies to all codes within that category, and notes under a specific code apply to that single code (66).

However, there are substantial differences between ICD-9 and ICD-10. These are described as improvements in the content and format of the ICD-10-CM, which include (67):

1) The addition of information relevant to ambulatory and managed care encounters.
2) Expanded injury codes in which ICD-10-CM groups injuries by the site of the injury, as opposed to grouping in ICD-9-CM by type of injury or type of wound.
3) Creation of combination diagnoses and symptom codes, which reduces the number of codes needed to fully describe a condition.
4) Greater specificity in code assignment.
5) V and E codes being incorporated into the main classification in ICD-10-CM.
6) ICD-10-CM codes being alphanumeric and including all letters except U.
7) The length of codes in ICD-10-CM being a maximum of 7 characters, as opposed to 5 digits in ICD-9.
8) Some vacant, 3-character codes in ICD-10 to allow for revision and future expansion.

In addition, ICD-10-CM will add many more code choices. The first characters are alphabetic, so instead of 10 choices, there may be up to 26 choices. The specificity of the codes encompasses up to a 7 character extension with dummy place holders to allow room for expansion. The ICD-10 classification system contains 21 chapters and has supplementary classification chapters. In comparison, ICD-9 has only 17 chapters and 2 supplementary chapters for V codes and E codes.

Many of the symbols, terminology, and conversions from ICD-9-CM are carried forward in ICD-10-CM, which will help make the conversion easier.

Overall, ICD-10-CM far exceeds its predecessors in the number of codes available. Table 1 illustrates the comparison of chapter numbers and titles in ICD-9-CM to those in ICD-10-CM. However, diseases of the eye and its adnexa and diseases of the ear and mastoid process will have their own chapters in ICD-10-CM.

ICD-10-CM characteristics are as follows:

- Tabular lists containing cause-of-death titles and codes (Volume 1)
- Inclusion and exclusion terms for cause-of-death titles (Volume 1)
- Alphabetic Index to diseases and nature of injury
- External causes of injury
- Table of drugs and chemicals (Volume 3)
- Description, Guidelines, and Coding Rules (Volume 2)

ICD-10-CM is divided into an alphabetic index, which is an alphabetic list of terms and their corresponding codes, and the tabular list, a numerical list of codes divided by chapter, according to condition or body system.

ICD-10 is similar to ICD-9 as it uses an indented format for ease of reference. The alphabetic index, or Volume 2, is organized in the same manner as ICD-9. Codes are listed by main term, which describes the disease and/or condition. However, similar to ICD-9, there are exceptions to the rule. Cross-references are also found in ICD-10. Notes appear in the alphabetic index to define terms, provide direction, and provide coding instructions.

The structure of the alphabetic index, which is similar to ICD-9, provides separate sections for access terms related to disorders, diseases, poisonings, adverse effects, external causes, and conditions.

The alphabetic index is divided into 3 sections with terms from chapters 1-19 and chapter 21 and the table of neoplasms; terms related to external causes of morbidity and chapter 20 terms; and tables of drugs and chemicals.

The transition from ICD-9 to ICD-10 involved the most significant changes to the ICD since the transition from ICD-5 to ICD-6. Unlike ICD-9 which used numeric

Table 1. *Comparison of chapter numbers and titles in ICD-9-CM to those in ICD-10-CM.*

Chapter	ICD-9-CM	ICD-10-CM
1	Infectious and Parasitic Diseases	Certain Infectious and Parasitic Diseases
2	Neoplasms	Malignant Neoplasms
3	Endocrine, Nutritional and Metabolic Diseases, and Immunity Disorders	Malignant Neoplasms
4	Diseases of the Blood and Blood-Forming Organs	Endocrine, Nutritional and Metabolic Diseases
5	Mental Disorders	Mental and Behavioral Disorders
6	Diseases of the Nervous System and Sense Organs	Diseases of the Nervous System
7	Diseases of the Circulatory System	Diseases of the Eye and Adnexa
8	Diseases of the Respiratory System	Diseases of the Ear and Mastoid Process
9	Diseases of the Digestive System	Diseases of the Circulatory System
10	Diseases of the Genitourinary Systems	Diseases of the Respiratory System
11	Complications of Pregnancy, Childbirth, and the Puerperium	Diseases of the Digestive System
12	Disease of the Skin and Subcutaneous Tissue	Disease of the Skin and Subcutaneous Tissue
13	Diseases of the Musculoskeletal System and Connective Tissue	Diseases of the Musculoskeletal System and Connective Tissue
14	Congenital Anomalies	Diseases of the Genitourinary System
15	Certain Conditions Originating in the Perinatal Period	Pregnancy, Childbirth, and the Puerperium
16	Symptoms, Signs, and Ill-Defined Conditions	Certain Conditions Originating in the Newborn (Perinatal) Period
17	Injury and Poisoning	Congenital Malformations, Deformations, and Chromosomal Abnormalities
18	N/A	Symptoms, Signs, and Abnormal Clinical and Laboratory Findings, Not Elsewhere Classified
19	N/A	Injury, Poisoning, and Certain Other Consequences of External Causes
20	N/A	External Causes of Morbidity
21	N/A	Factors Influencing Health Status and Contact with Health Services
Supplementary classification	Classification of Factors Influencing Health Status and Contact with Health Services (V codes)	N/A
Supplementary classification	Classification of External Cause of Injury and Poisoning (E codes)	N/A

Source: Grider DJ. Format and structure of ICD-10-CM. In: *Preparing for ICD-10-CM: Making the Transition Manageable.* American Medical Association, Chicago, 2010, pp 77-114 (67).

codes (e.g., 001-999), ICD-10 uses an alphanumeric classification system (A000.0-Z99.9). Table 2 illustrates the differences between ICD-9 and ICD-10 (68,69).

ICD-code information is used widely in health care, to generate hospital report cards, and physician performance reports, and for surveillance apart from health care research, mortality, billing and record keeping purposes (70-79). Even though validation studies can be carried out to ensure the validity of coding and administrative data, there are still limitations when using ICD data, which were carried over from ICD-9 to ICD-10 (55,76,80-106). However, this survey can usually not be determined using ICD-coded data alone. Further, detailed instructions on how each condition is defined in ICD-coded administrative data are lacking.

Table 2. *Comparison between the World Health Organization (WHO) ICD-9 and ICD-10 classifications.*

	ICD-9	**ICD-10**
Name of classification	International Classification of Diseases	International Statistical Classification of Diseases and Related Health Problems
No. volumes	(1) Volume 1 – tabular list (2) Volume 2 – alphabetical index	(1) Volume 1 – tabular index (2) Volume 2 – instruction manual (3) Volume 3 – alphabetical index
No. sections vs. chapters	17 sections (001-099)	21 chapters (A00-Z99) Except for U codes U00-U49: reserved for the provisional assignment of new diseases of unknown causes U50-U99: for research purposes
Supplementary classifications	Two supplementary classifications (1) External causes of injury and poisoning (E800-E999) (2) Factors influencing health status and contact with health services (V01-V82)	No supplementary classifications (prior supplementary classifications are now their own chapters) (1) Chapter XX: external causes of morbidity and mortality (V01-Y98) (2) Chapter XXI: factors influencing health status and contact with health services
Categories	909	2036
Subcategories	5161	12,159
Total codes	6882	12,420

ICD = International Classification of Diseases

Source: Jetté N, et al. The development, evolution, and modifications of ICD10: Challenges to the international comparability of morbidity data. *Med Care* 2010; 48:1105-1110 (55).

4.0 Lack of Need for ICD-10 and Its Complex Mechanism

ICD-10 proponents argue that in ICD-9 the number of diagnostic codes based on alphanumeric name badges the diagnoses carry for insurance billing and other purposes will increase from 14,000 to 69,000. In addition, the number of codes for procedures that can be performed on an inpatient basis in hospitals will jump from about 3,800 to 72,000. The shift will affect just about every aspect of clinical and business operations, since the codes document what clinicians do with patients and are embedded in nearly all clinical information and billing operations nationwide. Proponents also agree that in effect, switching to ICD-10 means that every diagnosis and piece of claims activity will operate under a different language than it does now (10). It has been described as the biggest health care information transformation in modern history. The rationale for the transformation is that the greatly expanded ICD-10 coding system will allow for more precision and specificity about both disease conditions and health care interventions provided to patients.

However, opponents argue that the system will only create bureaucracy without improving care and will increase costs to health care providers and ultimately to recipients, resulting in reduced care and access, which in the long term is highly expensive. It has been agreed that ICD-10 implementation requirements are much more extensive than any encountered with HIPAA to date, or even with Y2K (51). The most valuable lesson from both HIPAA and Y2K is that successful ICD-10 implementation will cost more than present estimations potentially by a large amount. While it is guaranteed that the costs will be a part of ICD-10, the benefits are only potential. Understandably physicians, hospitals, health plans, software vendors, government agencies, and nearly all other health care entities bracing for the implementation of the inevitable ICD-10 coding system are not only anxious, but also frustrated. No one understands the specific benefits of this system, whereas everyone understands the disadvantages. As it is compliance issues related to billing and coding are monumental. At present, the biggest coding dilemma may be to decide what level and complexity applies to an office visit. However, ICD-10 introduces a monumental new set of diagnostic and procedural codes.

While there is widespread anxiety across the nation, the anxiety is much more severe for small physi-

cian practices, hospitals, and health plans which may not be ready for ICD-10 by the October 2013 deadline. An additional concern is that some organizations won't be ready for the transaction system conversion on January 1, 2012 (10).

ICD-10, similar to various health care regulations in the past, including implementation of HIPAA and Occupational Safety and Health Administration (OSHA) compliance regulations have created a cottage industry of consultants. However, it appears that the industries capitalizing incorporation of for ICD-10 are already saturated and the practitioners are at their mercy.

While there is no proof or hope of savings and improved efficiency, there are estimations of overriding costs and inconvenience for practitioners. These include overhauling computer software systems, training staff, and making other needed changes. HHS projects a total cost to the U.S. health care system to be in the range of $2.3 billion to $2.7 billion over a period of 15 years. Practitioners do not understand the major advantage of identifying right to left, acute or chronic, etc., based on their expenses. Further, other cost estimates are highly variable, with one consulting firm estimating $3.2 billion to as much as $8.3 billion; another consulting firm estimating $15.2 billion to $34.1 billion (53). America's Health Insurance Plans (AHIP), the Health Plan Trade Group, projects that the cost to health plans alone will be $2 billion to $3 billion (54). Aetna's estimation is approximately $50 million to $70 million a year through 2013 to make the conversion (10). Finally, costs for physician practices will vary from $83,000 for a 3-doctor practice to $2.7 million for a 100-doctor practice (53). Hospitals are estimating the costs to be approximately $15 million to $20 million for each hospital.

However, many question if these costs are appropriate and necessary. The American Medical Association (AMA) (104) advises that each practice should perform an analysis to determine how ICD-10 will affect its business processes. The changes will include super bills and encounter forms; increased documentation; loss of productivity from physicians, clinical staff, coders, billings, front office staff, managers and administrators, and auditors/reviewers; cost of IT system changes; and potential impact on reimbursement. A Research and Development (RAND) study estimated that cost, as well as lost productivity and time to resolve coding issues, could range between $5 million and $25 million nationally for the first year and would decline to $16 million after 6 months. However, the amount of productivity lost in a practice depends on the level of understanding of ICD-10 and training obtained by the physicians and staff. The RAND study also estimated that software costs could range from $500 million up to $1.6 billion nationally, with smaller or solo practices expected to spend $180 million overall. AMA, in a guide to preparing for ICD-10, has presented cost projections (105) for a small surgical practice of 3 physicians to be $44,000, whereas for a typical medium sized practice with 10 physicians the cost will be $93,000.

5.0 ICD-10 Across the World

Several countries have developed their own ICD-10 clinical modifications to address their own specific needs. These modifications have permitted more detailed characterization of a patient's overall state. Even so, a number of problematic differences have arisen across multiple versions starting with an increase in the number of codes, the definition of main condition, etc.

This indicates a lack of uniformity which is the major advantage proclaimed by the supporters.

6.0 ICD-10 Changes for Practice

Conversion of ICD-9-CM codes to ICD-10-CM codes is extremely complicated, even though it is described as simple. As described earlier, ICD-10 vastly increases the number and complexity of disease and procedure codes over ICD-9. Based on the previous standard enacted in 1977, ICD-10 contains over 141,000 codes, a whopping 712% increase over the less than 20,000 codes in ICD-9. Thus, with the dramatic increase in codes from ICD-9 to ICD-10, one would expect that there would be one-to-one relationships between ICD-9 and ICD-10, which would make it fairly straight forward to link across the code sets. However, the relationships is complex. Tables 3 to 8 illustrate the relationship between ICD-9 and ICD-10 codes with multiple ICD-10 codes for each ICD-9 code, leading to significant confusion that changes the meaning of what we have been used to thus far.

Table 3 illustrates the interrelationship of ICD-9 to ICD-10 codes for spondylosis codes which are used to describe facet joint arthropathy. The most commonly used codes in interventional pain management are 721.0 to describe cervical spondylosis without myelopathy, 721.1 describing cervical facet joint arthropathy, 721.2 describing thoracic spondylosis without myelopathy used for thoracic facet joint arthropathy, and 721.3 lumbosacral spondylosis without myelopathy to describe lumbosacral facet arthropathy. However, in ICD-10-CM, these codes are variable, complex, and confusing. For example, 721.0 describing cervical spondylosis without

myelopathy changes to 9 separate ICD-10 codes. The first 3 codes are in a category of M47.21 to M47.23 and include radiculopathy either in the occipito-atlanto-axial region, cervical region, or cervicothoracic region describing them as other spondylosis. In contrast, the next 3 codes, M47.811 to M47.813, describe spondylosis without myelopathy or radiculopathy in the occipito-atlanto-axial region, spondylosis without myelopathy or radiculopathy, cervical region, and spondylosis without myelopathy or radiculopathy, cervicothoracic region. These 3 codes provide the same description as 721.0 with specificity for upper, middle, and lower cervical regions. Further, the remaining 3 codes in a different category from M47.891 to M47.893 describe other spondylosis, occipito-atlanto-axial region, "other" spondylosis, cervical region, and other spondylosis, cervicothoracic

Table 3. *Illustration of the interrelationship of ICD-9 to ICD-10 codes for spondylosis used for facet joint arthropathy.*

ICD-9 CODE	ICD-9 DESCRIPTION	ICD-10-CM	ICD-10 DESCRIPTION
721.0	Cervical spondylosis without myelopathy	M47.21	Other spondylosis with radiculopathy, occipito-atlanto-axial region
		M47.22	Other spondylosis with radiculopathy, cervical region
		M47.23	Other spondylosis with radiculopathy, cervicothoracic region
		M47.811	Spondylosis without myelopathy or radiculopathy, occipito-atlanto-axial region
		M47.812	Spondylosis without myelopathy or radiculopathy, cervical region
		M47.813	Spondylosis without myelopathy or radiculopathy, cervicothoracic region
		M47.891	Other spondylosis, occipital-atlanto-axial region
		M47.892	Other spondylosis, cervical region
		M47.893	Other spondylosis, cervicothoracic region
721.2	Thoracic spondylosis without myelopathy	M47.23	Other spondylosis with radiculopathy, cervicothoracic region
		M47.24	Other spondylosis with radiculopathy, thoracic region
		M47.25	Other spondylosis with radiculopathy, thoracolumbar region
		M47.813	Spondylosis without myelopathy or radiculopathy, cervicothoracic region
		M47.814	Spondylosis without myelopathy or radiculopathy, thoracic region
		M47.815	Spondylosis without myelopathy or radiculopathy, thoracolumbar region
		M47.893	Other spondylosis, cervicothoracic region
		M47.894	Other spondylosis, thoracic region
		M47.895	Other spondylosis, thoracolumbar region
721.3	Lumbosacral spondylosis without myelopathy	M47.25	Other spondylosis with radiculopathy, thoracolumbar region
		M47.26	Other spondylosis with radiculopathy, lumbar region
		M47.27	Other spondylosis with radiculopathy, lumbosacral region
		M47.28	Other spondylosis with radiculopathy, sacral and sacrococcygeal region
		M47.815	Spondylosis without myelopathy or radiculopathy, thoracolumbar region
		M47.816	Spondylosis without myelopathy or radiculopathy, thoracolumbar region
		M47.817	Spondylosis without myelopathy or radiculopathy, lumbar region
		M47.818	Spondylosis without myelopathy or radiculopathy, lumbosacral region
		M47.895	Other spondylosis, thoracolumbar region
		M47.896	Spondylosis without myelopathy or radiculopathy, sacral and sacrococcygeal region
		M47.897	Other spondylosis, lumbosacral region
		M47.898	Other spondylosis, sacral and sacrococcygeal region

Table 3 (cont.). *Illustration of the interrelationship of ICD-9 to ICD-10 codes for spondylosis used for facet joint arthropathy.*

ICD-9 CODE	ICD-9 DESCRIPTION	ICD-10-CM	ICD-10 DESCRIPTION
721.1	Cervical spondylosis with myelopathy	M47.011	Anterior spinal artery compression syndromes, occipito-atlanto-axial region
		M47.012	Anterior spinal artery compression syndromes, cervical region
		M47.013	Anterior spinal artery compression syndromes, cervicothoracic region
		M47.014	Anterior spinal artery compression syndromes, thoracic region
		M47.015	Anterior spinal artery compression syndromes, thoracolumbar region
		M47.016	Anterior spinal artery compression syndromes, lumbar region
		M47.019	Anterior spinal artery compression syndromes, site unspecified
		M47.021	Vertebral artery compression syndromes, occipito-atlanto-axial region
		M47.022	Vertebral artery compression
		M47.029	Vertebral artery compression syndromes, site unspecified
		M47.11	Other spondylosis with myelopathy, occipito-atlanto-axial region
		M47.12	Other spondylosis with myelopathy, cervical region
		M47.13	Other spondylosis with myelopathy, cervicothoracic region
721.41	Spondylosis with myelopathy, thoracic region	M47.14	Other spondylosis with myelopathy, thoracic region
		M47.15	Other spondylosis with myelopathy, thoracolumbar region
721.42	Spondylosis with myelopathy, lumbar region	M47.16	Other spondylosis with myelopathy, lumbar region
		M47.17	Other spondylosis with myelopathy, lumbosacral region
		M47.18	Other spondylosis with myelopathy, sacral and sacrococcygeal region

region. Consequently, IPM specialists are forced into a decision -- either to use the middle set of 3 codes starting with M47.811 to M47.813 or M47.891 to M47.893. There is no guidance provided for such change.

Similar to 721.0, 721.3 is complicated, but 721.2 is somewhat easier. 721.2 thoracic spondylosis without myelopathy also has a total of 9 codes which belong to 3 different categories: M47.23 to M47.25; M47.813 to M47.815; changing to M47.893 to M47.895. The first 3 codes M47.23 to M47.25 describe the cervicothoracic region, thoracic region, and thoracolumbar region with radiculopathy. However, M47.813 to M47.815 describes spondylosis without myelopathy or radiculopathy either in the cervicothoracic region, thoracic region, or thoracolumbar region. Finally, the present codes may be replaced by M47.893 to M47.895, which describe other spondylosis in the cervicothoracic region, thoracic region, and thoracolumbar region. Lumbosacral spondylosis without myelopathy, reported now by 721.3, also follows a similar categorization with multiple codes. 721.3 also follow the same categorization with significant confusion and no clarification.

Similar to the facet joint arthropathy and spondylosis codes, there is a complex relationship for other codes such as 721.1, cervical spondylosis with myelopathy, 721.41 spondylosis with myelopathy in the thoracic region, and 721.42, spondylosis with myelopathy in the lumbar region as illustrated in Table 3. In fact, these codes describe anterior spinal artery compression syndrome and vertebral artery compression syndrome in multiple codes, whereas very few codes describe other spondylosis with myelopathy with codes M47.11 to M47.13. As noted earlier, there are codes corresponding to 721.0 with M47.21 to M47.23 which describe radiculopathy in the same regions. Furthermore, there are multiple other codes with the same descriptions in ankylosing vertebral hyperostosis, kissing spine, traumatic spondylopathy, and other disorders.

As illustrated in Table 4, intervertebral disc displacement codes are simpler compared to the spondylosis codes with creation of multiple codes for different levels of the spine. Consequently, one would have to

Table 4. *Illustration of displacement of intervertebral disc with ICD-9-CM codes .*

ICD-9 CODE	ICD-9 DESCRIPTION	ICD-10-CM	ICD-10 DESCRIPTION
722.0	Displacement of cervical intervertebral disc without myelopathy	M50.20	Other cervical disc displacement, unspecified cervical region
		M50.21	Other cervical disc displacement, occipito-atlanto-axial region
		M50.22	Other cervical disc displacement, mid-cervical region
		M50.23	Other cervical disc displacement, cervicothoracic region
722.10	Displacement of lumbar intervertebral disc without myelopathy	M51.26	Other intervertebral disc displacement, lumbar region
		M51.27	Other intervertebral disc displacement, lumbosacral region
722.11	Displacement of thoracic intervertebral disc without myelopathy	M51.24	Other intervertebral disc displacement, thoracic region
		M51.25	Other intervertebral disc displacement, thoracolumbar region

Table 5. *Illustration of multiple changes in degenerative disc disease in various regions.*

ICD-9 CODE	ICD-9 DESCRIPTION	ICD-10-CM	ICD-10 DESCRIPTION
722.4	Degeneration of cervical intervertebral disc	M50.30	Other cervical disc degeneration, unspecified cervical region
		M50.31	Other cervical disc degeneration, occipito-atlanto-axial region
		M50.32	Other cervical disc degeneration, mid-cervical region
		M50.33	Other cervical disc degeneration, cervicothoracic region
722.51	Degeneration of thoracolumbar intervertebral disc	M51.34	Other intervertebral disc degeneration, thoracic region
		M51.35	Other intervertebral disc degeneration, thoracolumbar region
722.52	Degeneration of lumbar or lumbosacral intervertebral disc	M51.36	Other intervertebral disc degeneration, lumbar region
		M51.37	Other intervertebral disc degeneration, lumbosacral region

learn 2 or 3 different codes based on the level of disc herniation. As illustrated in Table 5, degenerative disc disease in multiple regions also follows the same philosophy with 3 codes in the cervical spine, 2 in the thoracic spine, and 2 in the lumbosacral spine. Unfortunately disc displacement codes do not differentiate variations with disc bulging, disc protrusion, disc extrusion, and disc herniation.

However, simplicity nor specificity would not appear to be part of the future of ICD-10. As illustrated in Table 6, 4 codes of spinal stenosis fall into numerous categories, creating significant confusion. Surprisingly, 724.03, spinal stenosis in the lumbar region, has only one ICD-10 code, which also is a component of 724.02 code groups, removing the existing specificity.

Similar to spondylolysis, disc displacement, and spinal stenosis, radiculitis codes, while appearing to offer more specificity, do not really provide much of an improvement in the coding pattern except for the levels. The major advantage of radiculitis or radiculopathy is 724.4, which describes thoracic or lumbosacral neuritis or radiculitis, which was considered as unspecified as it was utilized for both thoracic and lumbosacral regions. The new classification shows separate codes for the thoracic region, thoracolumbar region, lumbar region, and lumbosacral region. However, confusion will be caused by codes which show separately for radiculopathy, sciatica, and others with intervertebral disc disorders with radiculopathy in a particular region. A person suffering with disc herniation with radiculopathy should be coded with disc herniation, radiculopathy, or a simple code of intervertebral disc disorder with radiculopathy. Also, the question remains if the radiculopathy resolves, then the diagnosis has to be changed. Payers and other specialists may interpret these differently.

As illustrated in Table 8, there are also significant differences with complex regional pain syndrome (CRPS) or reflex sympathetic dystrophy and causalgia. It is rather surprising that even though the name CRPS has been introduced -- and has been recommended to be widely used, the ICD-9 has not changed the description (107-111). Now the new codes describe the right, left, and bilateral extremities, but also provide a code for unspecified upper and lower extremities. No one

Table 6. *Illustration of comparison of codes for spinal stenosis.*

ICD-9 CODE	ICD-9 DESCRIPTION	ICD-10-CM	ICD-10 DESCRIPTION
723.0	Spinal stenosis of cervical region	M48.01	Spinal stenosis, occipito-atlanto-axial region
		M48.02	Spinal stenosis, cervical region
		M48.03	Spinal stenosis, cervicothoracic region
		M99.20	Subluxation stenosis of neural canal of head region
		M99.21	Subluxation stenosis of neural canal of cervical region
		M99.30	Osseous stenosis of neural canal of head region
		M99.31	Osseous stenosis of neural canal of cervical region
		M99.40	Connective tissue stenosis of neural canal of head region
		M99.41	Connective tissue stenosis of neural canal of cervical region
		M99.50	Intervertebral disc stenosis of neural canal of head region
		M99.51	Intervertebral disc stenosis of neural canal of cervical region
		M99.60	Osseous and subluxation stenosis of intervertebral foramina of head region
		M99.61	Osseous and subluxation stenosis of intervertebral foramina of cervical region
		M99.70	Connective tissue and disc stenosis of intervertebral foramina of head region
		M99.71	Connective tissue and disc stenosis of intervertebral foramina of cervical region
724.01	Spinal stenosis of thoracic region	M48.03	Spinal stenosis, cervicothoracic region
		M48.04	Spinal stenosis, thoracic region
		M48.05	Spinal stenosis, thoracolumbar region
		M99.22	Subluxation stenosis of neural canal of thoracic region
		M99.32	Osseous stenosis of neural canal of thoracic region
		M99.42	Connective tissue stenosis of neural canal of thoracic region
		M99.52	Intervertebral disc stenosis of neural canal of thoracic region
		M99.62	Osseous and subluxation stenosis of intervertebral foramina of thoracic region
		M99.63	**Osseous and subluxation stenosis of intervertebral foramina of lumbar region**
		M99.72	Connective tissue and disc stenosis of intervertebral foramina of thoracic region
724.02	Spinal stenosis of lumbar region, without neurogenic claudication	M48.05	**Spinal stenosis, thoracolumbar region**
		M48.06	Spinal stenosis, lumbar region
		M48.07	Spinal stenosis, lumbosacral region
		M99.23	Osseous stenosis of neural canal of lumbar region
		M99.33	Subluxation stenosis of neural canal of lumbar region
		M99.43	Connective tissue stenosis of neural canal of lumbar region
		M99.53	Intervertebral disc stenosis of neural canal of lumbar region
		M99.63	Osseous and subluxation stenosis of intervertebral foramina of lumbar region
		M99.73	Connective tissue and disc stenosis of intervertebral foramina of lumbar region
724.03	Spinal stenosis of lumbar region, with neurogenic claudication	M48.06	Spinal stenosis, lumbar region

Table 6 (cont.). *Illustration of comparison of codes for spinal stenosis.*

ICD-9 CODE	ICD-9 DESCRIPTION	ICD-10-CM	ICD-10 DESCRIPTION
724.09	Spinal stenosis, other region other than cervical	M48.08	Spinal stenosis, sacral and sacrococcygeal region
		M99.24	Subluxation stenosis of neural canal of sacral region
		M99.25	Subluxation stenosis of neural canal of pelvic region
		M99.26	Subluxation stenosis of neural canal of lower extremity
		M99.27	Subluxation stenosis of neural canal of upper extremity
		M99.28	Subluxation stenosis of neural canal of rib cage
		M99.29	Subluxation stenosis of neural canal of abdomen and other regions
		M99.34	Osseous stenosis of neural canal of sacral region
		M99.35	Osseous stenosis of neural canal of pelvic region
		M99.36	Osseous stenosis of neural canal of lower extremity
		M99.37	Osseous stenosis of neural canal of upper extremity
		M99.38	Osseous stenosis of neural canal of rib cage
		M99.39	Osseous stenosis of neural canal of abdomen and other regions
		M99.44	Connective tissue stenosis of neural canal of sacral region
		M99.45	Connective tissue stenosis of neural canal of pelvic region
		M99.46	Connective tissue stenosis of neural canal of lower extremity
		M99.47	Connective tissue stenosis of neural canal of upper extremity
		M99.48	Connective tissue stenosis of neural canal of rib cage
		M99.49	Connective tissue stenosis of neural canal of abdomen and other regions
		M99.54	Intervertebral disc stenosis of neural canal of sacral region
		M99.55	Intervertebral disc stenosis of neural canal of pelvic region
		M99.56	Intervertebral disc stenosis of neural canal of lower extremity
		M99.57	Intervertebral disc stenosis of neural canal of upper extremity
		M99.58	Intervertebral disc stenosis of neural canal of rib cage
		M99.59	Intervertebral disc stenosis of neural canal of abdomen and other regions
		M99.64	Osseous and subluxation stenosis of intervertebral foramina of sacral region
		M99.65	Osseous and subluxation stenosis of intervertebral foramina of pelvic region
		M99.66	Osseous and subluxation stenosis of intervertebral foramina of lower extremity
		M99.67	Osseous and subluxation stenosis of intervertebral foramina of upper extremity
		M99.68	Osseous and subluxation stenosis of intervertebral foramina of rib cage
		M99.69	Osseous and subluxation stenosis of intervertebral foramina of abdomen and other regions
		M99.74	Connective tissue and disc stenosis of intervertebral foramina of sacral region
		M99.75	Connective tissue and disc stenosis of intervertebral foramina of pelvic region
		M99.76	Connective tissue and disc stenosis of intervertebral foramina of lower extremity
		M99.77	Connective tissue and disc stenosis of intervertebral foramina of upper extremity
		M99.78	Connective tissue and disc stenosis of intervertebral foramina of rib cage
		M99.79	Connective tissue and disc stenosis of intervertebral foramina of abdomen and other regions

Table 7. *Illustration of conversions for cervical, thoracic, and lumbar radiculitis.*

ICD-9 CODE	ICD-9 DESCRIPTION	ICD-10-CM	ICD-10 DESCRIPTION
723.4	Brachial neuritis or radiculitis nos.	M50.10	Cervical disc disorder with radiculopathy, unspecified cervical region
		M50.11	Cervical disc disorder with radiculopathy, occipito-atlanto-axial region
		M50.12	Cervical disc disorder with radiculopathy, mid-cervical region
		M50.13	Cervical disc disorder with radiculopathy, cervicothoracic region
		M54.11	Radiculopathy, occipito-atlanto-axial region
		M54.12	Radiculopathy, cervical region
		M54.13	Radiculopathy, cervicothoracic region
724.3	Sciatica	M54.30	Sciatica, unspecified side
		M54.31	Sciatica, right side
		M54.32	Sciatica, left side
		M54.40	Lumbago with sciatica, unspecified side
		M54.41	Lumbago with sciatica, right side
		M54.42	Lumbago with sciatica, left side
724.4	Thoracic or lumbosacral neuritis or radiculitis, unspecified	M51.14	Intervertebral disc disorders with radiculopathy, thoracic region
		M51.15	Intervertebral disc disorders with radiculopathy, thoracolumbar region
		M51.16	Intervertebral disc disorders with radiculopathy, lumbar region
		M51.17	Intervertebral disc disorders with radiculopathy, lumbosacral region
		M54.14	Radiculopathy, thoracic region
		M54.15	Radiculopathy, thoracolumbar region
		M54.16	Radiculopathy, lumbar region
		M54.17	Radiculopathy, lumbosacral region

can be certain about what this essentially means.

In contrast to the above changes, ICD-10 code M96.1, as illustrated in Table 9, describes 4 types of post laminectomy or post surgery syndrome in an unspecified region, cervical region, thoracic region, and lumbar region, substituting for 722.8 to 722.83. This rather simplifies it substantially, but also removes any value for this diagnosis, causing confusion and denials by insurance. Table 9 also illustrates other examples of congenital malformations of the spine and musculoskeletal system.

The United States created ICD-10 Procedure Coding System (ICD-10-PCS) since procedure codes were not developed by the WHO. CMS is responsible for the development and maintenance of the ICD-10-PCS code set (112).

Volume 3 of ICD-9-CM has been used in the United States for the reporting of inpatient procedures since 1979. The structure of volume 3 of ICD-9-CM has not allowed new procedures associated with rapidly changing technology to be effectively incorporated as new codes. As a result, in 1992 CMS funded a project to design a replacement for volume 3 of ICD-9-CM. After a review of the preliminary design, CMS in 1995 awarded 3M Health Information Systems a 3-year contract to complete development of the replacement system. The new system is the ICD-10-PCS.

7.0 Practical Impact

To help facilitate care and commerce, the government has invested in providing mappings between ICD-9 and ICD-10 and vice versa. There are 2 such mappings endorsed by CMS: the general equivalence mappings (GEMs) (for both ICD-9 to ICD-10 and ICD-10 to ICD-9) and the reimbursement maps (for ICD-10 to ICD-9 only). The GEMs established links among codes that are generally equivalent in each code set. The reimbursement maps were created after the GEMs maps and are more

Table 8. *Illustration of conversions of complex regional pain syndrome CRPS I and II.*

ICD-9 CODE	ICD-9 DESCRIPTION	ICD-10-CM	ICD-10 DESCRIPTION
337.20	Reflex sympathetic dystrophy, unspecified	G90.50	Complex regional pain syndrome I, unspecified
		G90.59	Complex regional pain syndrome I of other specified site
337.21	Reflex sympathetic dystrophy of the upper limb	G90.511	Complex regional pain syndrome I of right upper limb
		G90.512	Complex regional pain syndrome I of left upper limb
		G90.513	Complex regional pain syndrome I of upper limb, bilateral
		G90.519	Complex regional pain syndrome I of unspecified upper limb
337.22	Reflex sympathetic dystrophy of the lower limb	G90.521	Complex regional pain syndrome I of right lower limb
		G90.522	Complex regional pain syndrome I of left lower limb
		G90.523	Complex regional pain syndrome I of lower limb, bilateral
		G90.529	Complex regional pain syndrome I of unspecified lower limb
337.29	**Reflex sympathetic dystrophy of other specified site**	G90.59	Complex regional pain syndrome I of other specified site
354.4	**Causalgia of upper limb**	G56.40	Causalgia of unspecified upper limb
		G56.41	Causalgia of right upper limb
		G56.42	Causalgia of left upper limb
355.71	**Causalgia of lower limb**	G57.70	Causalgia of unspecified lower limb
		G57.71	Causalgia of right lower limb
		G57.72	Causalgia of left lower limb
355.9	**Causalgia NOS**	E08.41	Diabetes mellitus due to underlying condition with diabetic mononeuropathy
		E09.41	Drug or chemical induced diabetes mellitus with neurological complications with diabetic mononeuropathy
		E10.41	Type 1 diabetes mellitus with diabetic mononeuropathy
		E11.41	Type 2 diabetes mellitus with diabetic mononeuropathy
		E13.41	Other specified diabetes mellitus with diabetic mononeuropathy
		G58.8	Other specified mononeuropathies
		G58.9	Mononeuropathy, unspecified
		G59	Mononeuropathy in diseases classified elsewhere
337.9	**Unspecified disorder of autonomic nervous system**	G90.2	Horner's syndrome
		G90.8	Other disorders of autonomic nervous system
		G90.9	Disorder of the autonomic nervous system, unspecified
337.00	**Idiopathic peripheral autonomic neuropathy**	G90.09	Other idiopathic peripheral autonomic neuropathy
337.1	**Peripheral autonomic neuropathy in disorders classified elsewhere**	G99.0	Autonomic neuropathy in diseases classified elsewhere
353.6	**Phantom limb (syndrome)**	G54.6	Phantom limb syndrome with pain
		G54.7	Phantom limb syndrome without pain

Table 9. *Illustration of one ICD-10 code can also relate to many ICD-9 codes.*

ICD10	ICD-10 Description	ICD9	ICD-9 Description
M96.1	Postlaminectomy syndrome, not elsewhere classified	722.80	Postlaminectomy syndrome of unspecified region
		722.81	Postlaminectomy syndrome, cervical region
		722.82	Postlaminectomy syndrome, thoracic region
		722.83	Postlaminectomy syndrome, lumbar region
Q7649	Other congenital malformations of spine, not associated with scoliosis	75613	Absence of vertebra congenital
		75614	Hemivertebra
		75615	Fusion of spine (vertebra) congenital
		75619	Other congenital anomalies of spine
Q798	Other congenital malformations of musculoskeletal system	75681	Congenital absence of muscle and tendon
		75682	Accessory muscle
		75689	Other specified congenital anomalies of muscle tendon fascia and connective tissue
		7569	Other and unspecified congenital anomalies of musculoskeletal system

specific, identifying the top candidate mappings from within the GEMs.

Some published statistics (52) may illuminate the challenges inherent in linking across the code sets. In the GEMs maps for procedures from ICD-9 to ICD-10, multiple examples are provided, though these are not specific to interventional pain management.

- There are 255 instances where a single ICD-9 code can map to more than 50 ICD-10 codes.
- There are 119 instances where a single ICD-9 code can map to more than 100 ICD-10 codes.

Some GEMs maps of ICD-9 to ICD-10 are not specific:

- There are 7,239 instances in the mappings for diseases where a single ICD-10 code can map to more than one ICD-9 code.
- There are 7,241 instances in the mappings for procedures where a single ICD-10 code can map to more than one ICD-9 code.

In the reimbursement maps from ICD-10 to ICD-9:

- There are 3,684 instances in the mappings for diseases where a single ICD-10 code can map to more than one ICD-9 code.
- There are 2,135 instances in the mappings for procedures where a single ICD-10 code can map to more than one ICD-9 code.

It is clear that the depth and breadth of ICD-10 is extremely complicated, expensive, and the nature of too many of the relationships makes it challenging for health care providers, more than it does for payers. However, it may also create problems for providers.

Further, different rules exist for different purposes. While CMS has tried to create clarity with GEMs and reimbursement mappings, the results are extremely disappointing. It has been shown that GEMs ICD-10 to ICD-9 mappings have a 5.1% exact match for diseases and only 0.1% exact match for procedures. In contrast, GEMs ICD-9 to ICD-10 mappings have an approximately 20.1% exact match for diseases and 1.2% exact match for procedures. With so few exact matches, it may be impossible for struggling practices to continue.

The troubles do not seem to stop with the different rules and different purposes and multitude of codes. They are also related to adopting software with multiple crosswalk variations. Independent package software vendors will have different offerings and divergent approaches to cross-walking. Some may support sophisticated rules and others won't (52). Either way, if medical systems, claims systems, and financial systems have different tools, things will become extremely difficult, causing hardship. On some occasions, it appears the data may have to be entered into multiple programs. Wollman (52) describes that any busi-

ness rules for mappings would need to be entered and stored in at least 5 systems, plus any analytic systems that source data from the applications. Thus, with crosswalking systems the potential for errors and rework is astronomical, due to the over 250 GEMs mappings, approximately 150,000 reimbursement mappings, and over 160,000 ICD-9/ICD-10 codes used to manage a total of approximately 600,000 records and potentially tens of thousands of overrides in addition to the GEMs and reimbursement maps. Most prudent practices and providers require at least 3 years of historical data for trending and analysis purposes.

On September 30, 2013, all of this history will be encoded in ICD-9 nomenclature. On the following day and going forward, the "new history" will start to be encoded in ICD-10. Consequently, any type of trending will either require a migration of all of the history to ICD-10 or some mechanism for stepping up ICD-9 codes to ICD-10 or stepping back ICD-10 codes to ICD-9 for analysis. However, it may be necessary to use both. Considering other major issues, this may be a minor problem.

8.0 Preparing for the Inevitable

Appropriate preparation about switching to ICD-10 is of paramount importance. Some of the most important concerns are as follows:

1. whether organizations will be able to undertake the huge array of changes to make the conversion possible;
2. whether organizations can do so in time to meet the government-imposed deadline of October 1, 2013, for the transition;
3. where does the money come from and is U.S. health care, which is already broken, ready for more expansions and expenses.

Timing is crucial to manage practices in the United States. Most provider systems, health plans, and software vendors, despite reporting that they are on schedule in their conversions to ICD-10 and the new electronic transaction format, it is evident that some have not even started their preparations. As an example, the American Hospital Association (AHA) survey in October 2010 found that only one-half to two-thirds of hospitals had taken the recommended planning and assessment steps (10). Not surprisingly many providers are not even aware of ICD-10 changes, let alone the implementation date. Very few physicians have completed the impact survey. This is a major issue for smaller practices.

9.0 Master Data Management

Wollman (52) described ICD-10 as a master data challenge, requiring a huge amount of business process adaptation and IT work to be handled in a short period of time with many payers and providers lacking the resources and/or the time to get it all done. Consequently, adapting a master data management (MDM) approach can resolve several challenges implementing these new code sets by establishing a single, centralized, control point of reference for disease/procedure codes, rules, mappings and translations that can be applied uniformly to all applications and processes.

Wollman (52) described that an MDM approach will resolve many of the challenges, both conceptually and practically. The Master Data Management Institute defines MDM as an "authoritative, reliable foundation for data used across many applications and constituencies with the goal to provide a single view of the truth no matter where it lies."

As described by Wollman (52) applied to ICD-10, an MDM approach would provide a central, managed storage and access point for processes and systems that need to consume ICD-9 or ICD-10 codes, mapping, and translations. In this context, a single set of business rules, mappings, and translations can be applied uniformly to all process and supporting applications.

The benefits of MDM have been described as enormous, including applying consistent business rules uniformly to all processes and supporting applications without having to maintain the rules in multiple places including redundant maintenance processes as well as facilitating consistency in approach and rules when major applications are sourced from multiple software vendors and integrated with homegrown applications (52). It is also expected to promote analytic excellence by ensuring consistent results when transactions across multiple systems are aggregated for analysis and also assist in future changes such as ICD-11.

10.0 Conclusion

There are numerous issues related to ICD-10. None of the issues have been addressed appropriately as part of health care reform. Most physicians and hospitals believe that the present system itself is too complicated and we are still in the learning process. Around this time ICD-10 is going to be introduced during an economic downturn, complicated health care regulations and reform, and declining access and quality of care; the introduction of ICD-10 will only exacerbate the problem.

Thus far, there is no scientific evidence for ICD-10 implementation based on the principles of evidence-based medicine as dictated by U.S. authorities and world authorities. The U.S. health care system has been overwhelmed with numerous regulations, none of which are understood well, with most of them evolving, while some of them are vehemently opposed. ICD-10 will be a new blow to the health care system at a time when the Independent Payment Advisory Board (IPAB), Patient-Centered Outcomes Research Institute (PCORI), and other initiatives related to evidence-based medicine, quality, and access are struggling to come out.

The only solution for this misguided venture, which may result in a major disruption of the health care system in the United States, is to postpone implementation of ICD-10 and focus rather on core issues of improving care and access.

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