International Refined DRGs Globalize Coding

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by Robert L. Mullin, MD

For accurate profiling and utilization assessment, a single patient classification system compatible with a wide variety of coding systems and clinical practices is needed. It also provides a reliable basis for healthcare funding and budgeting. However, many of the patient classification systems available for international use have been basically US- or other country-specific systems without substantial modifications to account for international differences in coding systems, data collection, and clinical practice patterns outside the US.

To address this problem, the International Refined Diagnosis Related Groups (IR-DRGs) have been developed. This article will explain IR-DRGs and how they're being used.

Coding Worldwide

IR-DRGs assign patients to the same DRG regardless of the coding system used. This allows a country to use IR-DRGs with its own diagnosis and procedure codes. Furthermore, IR-DRGs use severity adjustment, which can simplify adaptation of the system for country-specific requirements.

Many of the early groupers adapted for international use were "mapped" versions (see "IR-DRG Groupers Developed," below). Mapped groupers are limited by the ability to find suitable matches in the two coding systems. Often, several specific codes in one system map to a single nonspecific code in the other system, and this may lead to erroneous DRG assignments. To correct this problem, "native" groupers were developed. Native groupers assign the native (country-specific) codes to the appropriate DRGs and are much more clinically and statistically accurate. Native groupers also eliminate arguments over mapping tables.

IR-DRG Objectives

In developing IR-DRGs, the objectives were to create a classification system that:

- can be used for management, budgeting, payment, profiling, and research with a baseline classification structure that can be adapted to country-specific needs
- has an easily understood structure and clinical logic
- has groups that are not dependent on specific codes in specific coding systems
- is comparable across different coding systems
- assigns all patients to the same DRG regardless of the coding system or any particular version of the system

IR-DRG Development

IR-DRGs incorporate the basic structure of the All Patient Diagnosis Related Groups (AP-DRGs) and the All Patient Refined Diagnosis Related Groups (APR-DRGs). The concepts of the AP-DRGs and the APR-DRGs, with refinements of the base DRGs to reflect international coding systems, clinical practices, and numerous refinements of the contents, form the basis of the IR-DRGs.

Two databases—US and European—were used to develop the IR-DRGs. The US database used for the initial construction of the IR-DRGs was the Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Sample (NIS) Release 5 1996. It contains about 6,900,000 patient records from 1996 with individual patient attributes, including charges. It approximates a 20 percent sample of US acute care hospitals based on a stratified probability sample of hospitals.

All records are coded with ICD-9-CM diagnosis and procedure codes. The European database contained 121,826 cases from Italy, 46,283 cases from Spain, and 32,214 cases from Belgium. All these records were coded with ICD-9-CM diagnosis and procedure codes.

The base APR-DRGs were used as the first step in the development of the IR-DRGs. To be compatible with ICD-10 and with the many non-ICD-9-CM procedure coding systems, some base DRGs were combined, eliminated, created, or modified.

The effect of secondary diagnoses on average charges and length of stay (LOS) of each base DRG was established and each secondary diagnosis was assigned one of three severity levels. Each base DRG was then split into these three subclasses based on the highest severity level of any secondary diagnosis.

The average number of secondary diagnoses in the databases was 2.7069 for the HCUP (US) database and 1.8150 for the European database. Therefore, using the interaction of multiple secondary diagnoses to establish a severity level would actually measure the relative quality of data collection and not the use of resources.

A complications or comorbidities (CC) exclusion list was developed using the previously established principles. For each principal diagnosis, a list of CCs that were either symptoms of the principal diagnosis, commonly associated with the principal diagnosis, or the principal diagnosis itself, was developed. The CCs on each list were excluded as CCs when present with the specific principal diagnosis.

The resulting grouper was used to group the HCUP Release 6 1997 database and the same international database. The results were analyzed and several base DRGs were combined because they were clinically similar and the charges and LOS were nearly equal. A surgical hierarchy was established to conform to the charge and LOS results.

The databases were regrouped and the monotonic progression (meaning each succeeding level has a greater value) of the charges (and LOS) of the three levels was analyzed (see "Sample Monotonic Progression," below). Ten base DRGs were found to either have very similar charges at all levels or have very few cases at the lower two levels. These DRGs were not split (see "10 Base DRGs Not Split, "below).

ICD-10 Version

The appropriate ICD-10 diagnosis codes were assigned to each base DRG so that an individual patient would group to the same DRG whether coded with ICD-9-CM or ICD-10. Secondary ICD-10 codes were assigned a severity level (1 to 3) in the same manner as the secondary ICD-9-CM codes.

A CC exclusion list was developed for the ICD-10 codes using the same established principles used with the ICD-9-CM codes. All versions of ICD-9-CM diagnosis procedure codes through October 1, 2002, are included in the DRG definitions and all versions of the official World Health Organization ICD-10 diagnosis codes through January 1, 2003, are included in the DRG definitions.

Country-specific Versions

Appropriate DRG assignments have been made as required for an individual country's procedure codes so that whether coded with ICD-9-CM procedure codes or the country-specific procedure codes, a patient will group to the same DRG.

System Specifications

A more logical and intuitive DRG numbering system consisting of five digits was developed. The first two digits identify the Major Diagnostic Category (MDC):

- 00 indicates pre-MDC
- 01–25 indicate MDC
- 88 indicates unrelated operating room (OR) procedure
- 99 indicates error DRGs

The second two identify the base DRG:

- 01–29 indicate surgical DRGs
- 30–59 indicate medical DRGs
- 60–86 indicate OB and neonate DRGs
- 87–89 indicate unrelated OR DRGs
- 98–99 indicate error DRGs

The last digit identifies the severity level:

- 0 indicates no split
- 1 indicates no CC
- 2 indicates CC
- 3 indicates major CC

The surgical DRGs are numbered in their hierarchical order.

The IR-DRG grouper has 321 base DRGs, which break down into 306 base DRGs with three subclasses, 10 base DRGs with no subclasses, three non-related OR base DRGs with three subclasses, and two error DRGs for a total of 939 DRGs.

More Databases Grouped

The IR-DRGs produce monotonic progressions of charges and LOS at each level for all base DRGs in the 1997, 1998, and 1999 HCUP databases. Recently, several large European, Asian, and Mexican databases have been grouped and also produce monotonic progressions of LOS for all base DRGs.

The IR-DRGs provide a classification system that is compatible with all versions of ICD-9, ICD-9-CM, and ICD-10 diagnosis coding systems, and ICD-9-CM procedure coding systems. The IR-DRGs have been adapted for country-specific procedure coding systems and for country-specific modifications of ICD-10, ICD-9-CM, and ICD-9 diagnosis coding systems. The IR-DRG system is a “native” grouper and does not require code system mapping. The IR-DRGs and the APR-DRGs are the only patient classification systems that are uniformly adjusted for severity.

IR-DRG Groupers Developed

Diagnosis Codes	Procedure Codes	Country
ICD-9-CM	ICD-9-CM	Bulgaria, Italy, Spain, Portugal, Ireland, Singapore, Malaysia, and Japan
ICD-10	ICD-9-CM	Mexico and Switzerland
ICD-10	CPT	South Africa
ICD-10	Czech Procedure Codes	Czech Republic
ICD-10	OPS v2.0 and v2.1	Germany and Switzerland
ICD-10	Swedish-Nordic Procedure Codes	Sweden
ICD-9	CCP	Province of Quebec
ICD-10	ICPM	The Netherlands

Sample Monotonic Progression

DRG	Description	Average Charge 1	Average Charge 2	Average Charge 3
0501	Cardiac defibrillator and heart support	49603	55674	84796
0502	Cardiac valve with catheterization	47908	61800	93179

0503	Cardiac valve without catheterization	40404	49500	76715
0504	Coronary bypass with catheterization	40019	46054	67890
0505	Coronary bypass without catheterization	38476	51657	93859

10 Base DRGs not Split

DRG	Description
04310	Respiratory failure
05070	Permanent cardiac pacemaker implant with AMI, heart failure, or shock
15720	Neonate, birth weight >2499g with respiratory distress syndrome
21300	Injuries to unspecified or multiple sites
22510	Extensive burns with skin graft
22530	Extensive burns without skin graft
24010	HIV with procedure with multiple major HIV-related infections
24020	HIV with procedure with major HIV-related diagnosis
24320	HIV with multiple major HIV-related infections
24350	HIV without other HIV-related diagnosis

Robert Mullin *(robertmd@aol.com) is senior healthcare research consultant for 3M Health Information Systems.*

Article citation:
Mullin, Robert L. "International Refined DRGs Globalize Coding." *Journal of AHIMA* 74, no.7 (July/August 2003): 70,72,74.