Closer Look at All-Patient Refined DRGs

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Are you fluent in DRG? This article takes a look at the evolution of the three distinct DRG systems and spotlights the most recent iteration, All-Patient Refined DRGs. It also sheds light on how this system, when codes are properly applied, can help an organization study morbidity and mortality trends—an important step to identifying problems and improving the quality of care.

DRGs 101

Diagnosis Related Groups (DRGs) are a patient classification system that provides a means of relating the type of patients a hospital treats (i.e., its case mix) to the resource demands and associated costs experienced by the hospital.[1, 2] Since the implementation of the Medicare Prospective Payment System (PPS), DRG development has focused primarily on the payment applications of DRGs.[3]

A hospital with a more complex case mix from a DRG perspective means that its patients require more hospital resources, but not necessarily that its patients have a greater severity of illness, a greater risk of mortality, or poor prognoses. As the industry has evolved, there has been increased demand for a patient classification system that can be used for applications beyond resource use, cost, and payment. In particular, a patient classification system is needed to:

- compare hospitals across a wide range of resource and outcome measures
- evaluate differences in inpatient mortality rates
- implement and support critical pathways
- facilitate continuous quality improvement projects
- support internal management and planning systems

As a result of these diverse applications, three distinct DRG systems have evolved:

- Medicare DRGs
- All-Patient DRGs (AP-DRGs)
- All-Patient Refined DRGs (APR-DRGs)

Medicare DRGs

The initial development of DRGs was intended as a method of describing all the types of patients seen in an acute care hospital. Thus, DRGs encompassed both the elderly patient population as well as the newborn, pediatric, and adult populations. However, with the implementation of the Medicare prospective payment system in 1983, the focus of all DRG modifications instituted by Centers for Medicare and Medicaid Services (CMS, formerly the Health Care Financing Administration) has been on problems relating primarily to payment for the elderly population.[4]

All-Patient DRGs

In 1987, the state of New York passed legislation instituting a DRG-based prospective payment system for all non-Medicare patients. The legislation included a requirement that the New York State Department of Health (NYDH) evaluate the applicability of the Medicare DRGs to a non-Medicare population. The evaluation concluded that the Medicare DRGs were not adequate for a non-Medicare population. NYDH entered into an agreement with 3M Health Information Systems (3M HIS) to research and develop an enhanced DRG system referred to as the All-Patient DRGs (AP-DRGs).

During the mid-1980s, extensive research had been performed independently by the National Association of Children's Hospitals and Related Institutions (NACHRI) on alternative approaches to improving the DRG categories for neonates and other pediatric patients.5 NACHRI's system was called the Pediatric Modified Diagnosis Related Groups or PM-DRGs. As part of the New York DRG evaluation effort, NYDH and 3M HIS examined the NACHRI neonatal definitions and adopted a modified version of them.

In addition to the changes for the neonatal AP-DRGs, a major diagnostic category (MDC) was created for HIV infection patients. The initial release of the AP-DRGs in 1988 consisted of the addition of the HIV MDC and the restructuring of the neonatal MDC.

Subsequent updates have brought additional enhancements to AP-DRGs. For example, a limited revaluation of the complication and comorbidity (CC) list was performed. CCs having a greater impact on hospital resource use than other CCs were designated as major CCs. In total, 60 major CC AP-DRGs were created.

The AP-DRGs introduced many other changes, including an MDC for patients with multiple traumas and DRGs for patients with transplants, long-term mechanical ventilation, cystic fibrosis, nutritional disorders, high-risk obstetric problems, acute leukemia, hemophilia, and sickle cell anemia.6

Some of the DRG modifications originally developed in the AP-DRGs have subsequently been adopted in Medicare DRGs. However, the Medicare adaptation of portions of the AP-DRGs have not included all the detail of the AP-DRGs.

The AP-DRGs are primarily used for payment by Medicaid agencies and Blue Cross plans.

All-Patient Refined DRGs

The All-Patient Refined DRGs (APR-DRGs) further refine the basic AP-DRG structure by adding four subgroups.7 All age, CC, and major CC distinctions in the AP-DRGs were eliminated and replaced by two sets of four subgroups. One set of subgroups addresses patient differences relating to severity of illness, and the second set addresses risk of mortality.

In APR-DRGs, severity of illness is defined as the extent of organ system loss of function or physiologic decompensation, while risk of mortality is the likelihood of dying. Thus, in the APR-DRG system, a patient is assigned three distinct descriptors:

- the base APR-DRG (e.g., APR-DRG 194—Congestive Heart Failure)
- the severity of illness subgroup
- the risk of mortality subgroup

The four severity of illness subgroups and the four risk of mortality subgroups represent minor, moderate, major, or extreme severity of illness or risk of mortality. The assignment of a patient to one of these four subgroups takes into consideration not only the specific secondary diagnoses, but also the interaction between secondary diagnoses, age, principal diagnosis, and the presence of certain non-OR procedures.

The determination of the severity of illness and risk of mortality is disease specific. Thus, in APR-DRGs the severity or risk of mortality level of a secondary diagnosis is assigned separately for each base APR-DRG.

In APR-DRGs, high severity of illness and risk of mortality are primarily determined by the interaction of multiple diseases. Patients with diseases involving multiple organ systems are assigned to higher severity or risk of mortality subclasses because these patients are more difficult to treat and have poorer outcomes.

The combination of the base APR-DRG and the final patient severity of illness and risk of mortality subgroup constitute the complete APR-DRG description of the patient. For applications such as evaluating resource use or establishing patient care guidelines, the base APR-DRGs, in conjunction with the severity of illness subgroup, are used. For evaluating patient mortality, the base APR-DRG in conjunction with the risk of mortality subgroup is used.

The subdivision of the 355 base APR-DRGs into four severity subgroups, combined with the two error APR-DRGs, results in 1,422 APR-DRGs. Because APR-DRGs were a joint development of 3M HIS and NACHRI, the APR-DRGs encompass all

the DRG modifications developed for the original PM-DRGs, plus all subsequent NACHRI research, as well as all relevant updates to the Medicare DRGs and AP-DRGs.7

The APR-DRGs are revised every two to three years. Between revisions, the APR-DRGs are updated for changes in ICD-9-CM codes. The primary application of APR-DRGs has been in internal hospital management systems and for the public dissemination of comparative data on hospital performance. In addition, payment applications of APR-DRGs are in the evaluation and development stage.8

The Agency for Healthcare Research and Quality (AHRQ) has recently released an extensive set of quality indicators.9 The mortality portions of the AHRQ quality indicators use APR-DRGs to risk adjust the quality indicators.

Comparison of the DRG Systems

"Comparing the DRG Systems" compares the major features of the three DRG systems, which differ substantially. The Medicare DRGs have not reevaluated the CC list, while to varying degrees, the AP-DRGs and APR-DRGs have reevaluated the CC list.

APR-DRGs are the only DRG system that incorporate the impact of multiple CCs. The CC subgroup structure in the APR-DRGs is uniform across DRGs, with all base DRGs having four subgroups. Death is used as a variable in the Medicare DRGs and AP-DRGs, but not in APR-DRGs. The use of death to define DRGs makes the system meaningless for mortality analysis. APR-DRGs are the only DRG system with a separate risk of mortality component. All three DRG systems only require standard UB-92 data.

"One Patient, Four Claims" contains four cases that have been assigned to the Medicare DRGs, AP-DRGs, and APR-DRGs. The patient in these cases is a 47-year-old male with (Case 1) a long history of diverticulosis who is admitted for diverticulitis of the colon (562.11) with an ulcer of the anus and rectum (569.41). He was taken to the operating room where multiple affected areas of the large intestine were excised (45.71). In all three DRG systems, the patient is assigned to the corresponding DRG for major small and large bowel procedures. In the Medicare DRGs and AP-DRGs, the patient is assigned to DRG 149, which is without a complication or comorbidity. In APR-DRGs, the patient is assigned to base DRG 221 with a severity of illness subclass of 1.

Case 2 is the same patient with the additional secondary diagnosis of unspecified intestinal obstruction (560.9).
In the Medicare DRGs and AP-DRGs, the patient is assigned to DRG 148, which is with a complication or comorbidity. In APR-DRGs, the severity of illness subclass increases to 2.

Case 3 is the same patient with the additional secondary diagnosis of acute myocarditis (422.99) and atrioventricular block, complete (426.0). In the CMS DRGs, the patient remains in DRG 148. In AP-DRGs, the patient is assigned to DRG 585, which is with a major complication or comorbidity. In APR-DRGs the severity of illness subclass increases to 3.

Case 4 is the same patient with the additional diagnosis of acute renal failure, unspecified (584.9). In CMS DRGs the patient remains in DRG 148 and in AP-DRGs remains in DRG 585. In APR-DRGs the severity of illness subclass increases to 4. The payment weights for the three systems vary substantially for the four example cases. In particular, for case 4, the payment weight for the APR-DRGs is more than double the payment weight for the Medicare DRGs.

Applications of DRGs Beyond Payment

While the primary application of DRGs has been for payment, a relatively recent application of DRGs is for the dissemination of provider "report cards." Many states have established health data agencies that are responsible for the public dissemination of information on provider performance.

The provider report cards usually include comparative information on length of stay (LOS), charges, mortality, and sometimes complication rates. APR-DRGs are widely used in the development of provider report cards and used in more than 20 states for disseminating comparative provider profiles.10 The rationale for provider report cards is that information about the cost and quality of different providers should be available to patients in order for them to make informed and effective healthcare choices. In order for comparisons to be meaningful, they need to be adjusted for differences in severity of illness and risk of mortality.

Provider report cards place increased demands on the quality of medical records data and information systems within hospitals. In particular, the presence of specific combinations of secondary diagnoses is a key factor in a patient being assigned to the higher APR-DRG severity of illness or risk of mortality subclasses. The Medicare DRGs are not as sensitive to the completeness and accuracy of the diagnostic information as the severity of illness and risk of mortality adjustments in APR-DRGs.

Hospitals also need to be proactive in the evaluation of their own data. It is essential that individual hospitals not be surprised when the results of a provider report card are published. Hospitals need to anticipate their performance on the report cards using their own internal information systems. This permits the hospital to have a well-planned response to any negative results and to develop improvement programs to correct any identified problem areas. In general, hospitals are becoming more sophisticated in using APR-DRGs for internal management.

DRGs are the most widely used and best-understood method of measuring a hospital's case mix. As evidenced by the development of APR-DRGs, the DRG methodology continues to evolve. Through APR-DRGs, hospitals, consumers, payers, and regulators can gain an understanding of the patients being treated, the costs incurred, and within reasonable limits, the outcomes expected. APR-DRGs also offer the opportunity for improvement in efficiency and identification of areas with potential quality problems.

The introduction of the original DRGs as a payment method resulted in dramatic changes in how hospitals are managed. As the APR-DRG methodology continues to evolve, the role and importance of APR-DRGs in hospital management will continue to expand.

Notes

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Comparing the DRG Systems

System Characteristics	Medicare DRGs Version 18.0	AP-DRGs Version 18.0	APR-DRGs Version 15.0
Number of DRGs	499	653	1422
Multiple Trauma MDC	Limited	Complete	Complete
HIV Infection MDC	Limited	Complete	Complete
Newborn Birthweight Used	No	Yes	Yes

NACHRI Pediatric Changes	No	Limited	Complete
Major (Extreme) CCs	No	Yes	Yes
Death Used In Definition	Yes	Yes	No
LOS used in Definition	No	Newborn Only	No
CC List Reevaluated	No	Limited	Complete
Multiple CCs Recognized	No	No	Yes
Number of CC Subgroups	2	3	4
CC Subgroup Structure	Variable	Variable	Uniform
Risk of Mortality subgroup	No	No	Yes
Data Requirement	UB-92	UB-92	UB-92
Developers	CMS	NYDH and 3M HIS	3M HIS and NACHRI
Updates	Annual	Every 1-2 years	Every 2-3 years
Definitions Manual	Yes	Yes	Yes

One Patient, Four Claims

This table shows the claims of the same patient with additional diagnoses each time. With each claim, the DRG and severity of illness subclasses change.

	Pdx: 562.11 Diverticulitis of colon Proc: 45.71 Multiple segmental resection of large intestine				
	Case 1	**Case 2**	**Case 3**	**Case 4**	**Description**
Secondary Diagnoses	569.41	569.41 560.9	569.41 560.9 422.99 426.0	569.41 560.9 422.99 426.0 584.9	Ulcer of anus and rectum Unspecified intestinal obstruction Acute myocarditis Atrioventricular block, complete Acute renal failure, unspecified
Medicare DRG AP-DRG APR-DRG	149 wo CC 149 wo CC 221 Subclass 1	148 w CC 148 w CC 221 Subclass 2	148 w CC 585 w Maj CC 221 Subclass 3	148 w CC 585 w Maj CC 221 Subclass 4	Major small and large bowel procedures
Medicare DRG AP-DRG APR-DRG	1.3737 1.3995 1.4309	2.8155 2.1364 1.8794	2.8155 4.4026 2.9492	2.8155 4.4026 5.9107	Payment weights

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