

Evolution of DRGs (2017 Update)

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Editor's Note: This update replaces the 2010 Practice Brief "The Evolution of DRGs."

In the early 1970s Yale University developed diagnosis related groups (DRGs) to describe all types of patient care in an acute care hospital. The Yale system encompassed the Medicare population as well as newborn, pediatric, and general adult populations. The second version and each subsequent version of DRGs have been updated by 3M Health Information Systems, which holds a contract with the Centers for Medicare and Medicaid Services.

Over time DRG technology has evolved to include changes in healthcare delivery, advances in medicine, and the October 2015 implementation of the new ICD-10-CM/PCS coding system. The current DRGs serve hospital needs for data management and reimbursement as well as comparability, benchmarking, and other types of research. This Practice Brief provides an overview of the DRG system and its evolution from a grouping system for utilization review purposes to a tool for reimbursement that also encompasses severity and risk measurement.

The DRG System

The DRG method assigns a numeric value to an acute care inpatient hospital episode of care, which serves as a relative weighting factor intended to represent the resource intensity of hospital care of the clinical group that is classified to that specific DRG. As a reimbursement system, the DRG assignment determines the payment level the hospital will receive.

Four guidelines were established as guiding principles for the DRG system's formation:

- The patient characteristics used in the DRG definition should be limited to information routinely collected on the hospital billing form.
- There should be a manageable number of DRGs that encompass all patients seen on an inpatient basis.
- Each DRG should contain patients with a similar pattern of resource intensity. Each DRG should contain patients who are similar from a clinical perspective (i.e., each class should be clinically coherent).¹

Grouping patients in this manner allows hospitals to evaluate and manage costs by DRG or groups of DRGs. Hospitals can also benchmark by groups for quality and resource measurement. The DRG system allows only one DRG assignment per patient stay, so payment includes all services that occur between hospital admission and discharge.

DRGs are hierarchical. Major diagnostic categories (MDCs) represent the body systems. Originally there were 23 MDCs. The version for fiscal year 2010, version 27.0, contained 25 MDCs and there have not been any additional MDCs added since.

There were also 13 DRGs in which cases were directly assigned on the basis of ICD-9-CM procedure codes. These are called Pre-MDC DRGs, and they are not assigned to MDCs.² This has been expanded with the implementation of ICD-10 to include three additional Pre-MDC DRGs related to Bone Marrow Transplants. The next level in the hierarchy divides each MDC into surgical and medical sections. The third level then assigns surgical patients into a DRG based on the procedure performed and medical patients into a DRG based on the principal diagnosis (and any secondary diagnoses that qualify as comorbid conditions or complications) for which the patient was admitted.

The following elements comprise the components of each DRG version:

- Number and title
- Geometric mean length of stay
- Arithmetic mean length of stay
- Relative weight
- ICD-10-CM and ICD-10-PCS code ranges that drive the DRG assignment

The code range may consist of the principal diagnosis, secondary diagnoses, operating room procedures, or a diagnosis-procedure combination.³

Computer programs called groupers or pricers assign hospital cases into DRGs. There are a series of steps in calculating the total DRG payment. Fiscal intermediaries use grouper (pricer) software to calculate the DRG assignment. Although hospitals assign DRGs to cases for internal use, the DRG used for payment is calculated as part of the claims processing provided by the fiscal intermediary or Medicare Administrative Contractor (MAC).⁴

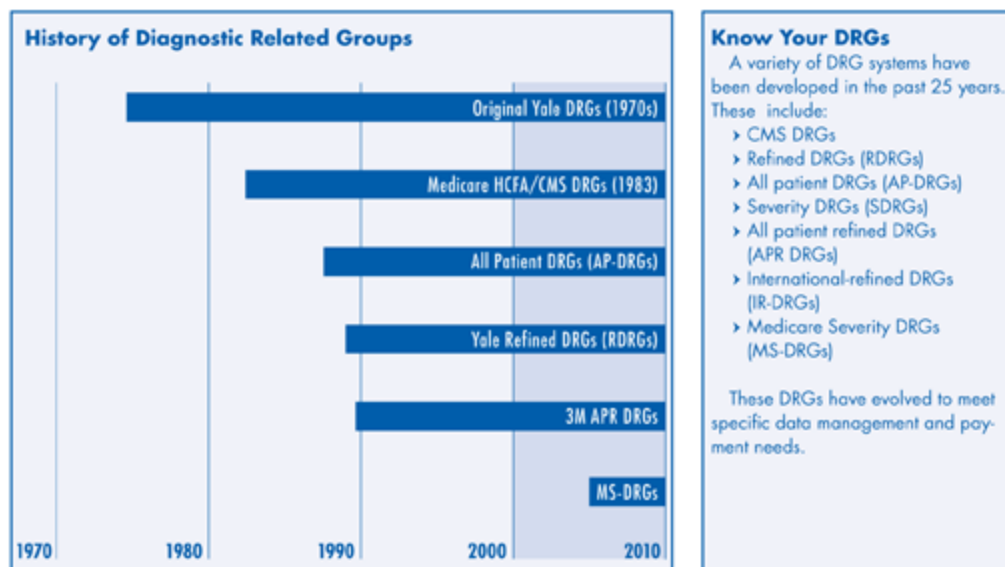
How DRGs have Evolved Over Time

The Health Care Financing Administration (HCFA), now the Centers for Medicare and Medicaid Services (CMS), implemented DRGs in 1983 for the Inpatient Prospective Payment System (IPPS). 3M developed an all patient DRG (AP-DRG) system in 1987 as the basis for New York's hospital reimbursement program for non-Medicare discharges. This system was adopted by a number of state Medicaid agencies as well as commercial payers.

A project at Yale in 1989 resulted in the development of the refined DRG (RDRG) system, which looks at severity of illness in the Medicare population. Severity DRGs (SDRGs) came about in 1993 after HCFA re-evaluated the use of complications and comorbidities within the Medicare DRGs. HCFA published this system in 1994; however, there was never an implementation date requirement for this particular system.

3M developed all patient refined DRGs (APR DRGs) in 1990 to address both severity of illness and risk of mortality over all patient populations. In July 2005 the state of Maryland implemented new payment regulations required by its Health Service Cost Review Commission, which uses the APR DRG method for rate setting.⁵

DRG Development Timeline



The Need for a Measurement System

The traditional CMS DRGs focused on resource intensity only. The US healthcare industry needed a tool that would look beyond these factors and allow agencies such as state data commissions to evaluate differences in hospital mortality rates. This tool would support quality of care projects and facilitate the implementation and use of critical pathways. The healthcare

industry's need led to the development of a new method and refinement to evaluate acute care in hospitals and consider the factors that affect the cost of delivering inpatient health services.

Case mix complexity refers to an interrelated but distinct set of patient attributes that include:

- Severity of illness
- Risk of mortality
- Prognosis
- Treatment difficulty
- Need for intervention
- Resource intensity

The APR DRG system is comprised of a clinical model and four severity of illness and risk of mortality subclasses for each base APR DRG. These subclasses are broken down into four levels (1–4): minor, moderate, major, and extreme. APR DRGs are used by hospitals for internal quality improvement and by many states for public reporting.

Severity of illness describes the extent of the physiologic decompensation or organ system loss of function. The risk of mortality indicates the patient's likelihood of dying. The systems are differentiated by trajectory of development, clinical logic, severity classification structure, and level of complexity.

There are other severity adjusted systems. The all-payer severity-adjusted DRG system (APS-DRG), developed by HSS Inc. and now owned by Ingenix, was built on the previous refined DRG systems.⁶ The APS-DRG version 25 had 378 base disease categories called consolidated DRGs (CDRGs). The APS-DRG group number was represented by the CDRG category (XXX) plus the one-digit severity class (Y). The APS-DRG system measured resource intensity in terms of length of stay, high charges, or cost.

A new DRG system, called Medicare Severity DRGs (MS-DRGs), was adopted for use with Medicare's Inpatient Prospective Payment System. It became effective with discharges occurring on or after October 1, 2007. The MS-DRG structure was also adopted for use with the Long-Term Care Hospital Prospective Payment System (referred to as MS-LTC-DRGs).

Instead of a two-tiered structure (with CC and without CC), MS-DRGs introduced a three-tiered structure: major complication/comorbidity (MCC), complication/comorbidity (CC), and no complication/comorbidity (non-CC). MCCs reflect secondary diagnoses of the highest level of severity. CCs reflect secondary diagnoses of the next lower level of severity. Secondary diagnoses which are not MCCs or CCs (the non-CCs) are diagnoses that do not significantly affect severity of illness or resource use. The MS-DRGs provide better recognition of severity of illness than the traditional CMS DRG system.

CMS replaced 538 DRGs with 745 new MS-DRGs.⁷ Every DRG number had a new meaning with the introduction of MS-DRGs. For example, DRG 127 was no longer the DRG for principal diagnosis congestive heart failure. In place of DRG 127 were three new DRGs: MS-DRGs 291, 292, and 293, depending upon the secondary diagnoses reported along with the principal diagnosis of CHF. Throughout the past 10 years, the MS-DRG system has seen minor changes each fiscal year. As noted in the table to the left, the FY 2017 version of MS-DRGs, version 34, consists of 757 total MS-DRGs.

The full version of the MS-DRGs can be located at the [CMS.gov](https://cms.gov) website. As Margaret M. Foley, PhD, RHIA, CCS, said in a *Journal of AHIMA* article on DRG grouping, "the greater specificity provided by ICD-10 codes is one of the most salient features of the new code set. In the future, it is anticipated that the DRG grouper logic will be refined after CMS has analyzed claims data including the more specific ICD-10 codes."⁸

MS-DRG Version 34.0 Subdivisions		
Base MS-DRGs	Split Type	Total MS-DRGs
154	3-way	462
44	2-way MCC/CC and no CC	88
65	2-way MCC and CC/no CC	130

77	No split	77
340 Total Base	[blank]	757 Total MS-DRGs

Notes

- [1] Centers for Medicare and Medicaid Services. “[Design and Development of the Diagnosis Related Group \(DRG\)](#).”
- [2] Casto, Anne and Elizabeth Layman. *Principles of Healthcare Reimbursement*. Chicago, IL: AHIMA Press, 2006, p. 91.
- [3] Ibid, p. 93.
- [4] Centers for Medicare and Medicaid Services. “[Acute Inpatient PPS](#).”
- [5] Health Services Cost Review Commission. “[The Transition to APR-DRGs and Related Methodological Changes](#).” June 1, 2005.
- [6] Ingenix. “[Definitions Manual for All-Payer Severity-Adjusted DRG \(APR-DRGs®\) Assignment for Public Use Version 25](#).” June 26, 2009.
- [7] “Medicare Program; Changes to the Hospital Inpatient Prospective Payment Systems and Fiscal Year 2008 Rates; Final Rule.” *Federal Register* 72, no. 162 (2007): 47,129–48,175.
- [8] Foley, Margaret M. “[DRG Grouping and ICD-10-CM/PCS](#).” *Journal of AHIMA* 86, no. 7 (July 2015): 56-59.

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