

# Medicare's Use of Risk Adjustment

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**OVERVIEW** – Medicare accounts for expected differences in resource needs of patients or health plan enrollees by risk-adjusting the payments it makes to health care facilities, such as hospitals, skilled nursing facilities, and home health agencies, and the premiums it pays to health plans. Risk adjustment is intended to ensure that payments or premiums are adequate for patients or plan enrollees who require more resources than average in order to protect beneficiary access as well as the financial condition of the provider or plan. At the same time, risk adjustment lowers payments or premiums for beneficiaries who are expected to use fewer resources to reduce incentives for providers or plans to favor these beneficiaries. This paper describes the origins and importance of risk adjustment, summarizes current risk adjustment by Medicare, and discusses issues and problems with risk adjustment methods.

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## Medicare's Use of Risk Adjustment

Risk adjustment has a long history in the insurance industry, predating the development of health insurance, and it is a fundamental component of actuarial science. For more than a century, insurance companies have defined categories of individuals who face similar risks for some insurable loss. With life insurance, for example, these categories are based on risk factors, such as age and gender, and more recently measures of health status, such as presence of certain chronic diseases, or behavior, such as cigarette smoking. Actuarial life tables quantify the relationship between these risk factors and the probability of dying (the insurable loss) during a particular time period, such as the next 12 months. This relationship is then used to determine the risk-adjusted life insurance premium for each category of individuals.

Why do insurers risk-adjust their premiums? The simple answer is to avoid adverse selection.<sup>1</sup> An insurer that offers the same premium to everyone in a market who wants the insurance, termed a community-rated premium, would be more likely to attract individuals who expect to need the coverage. This is because the premium would reflect the average risk of the population in that market and thus would be relatively inexpensive for someone at high risk. As more high-risk individuals purchase that insurance, the community-rated premium would rise to reflect the higher average risk of the insured population. Higher premiums would, in turn, create a disincentive for low-risk individuals to purchase policies. With fewer low-risk individuals in the pool, this adverse selection could cause premiums to spiral even higher, a possibility that concerns insurers enough for them to employ risk adjustment.<sup>2</sup>

Medicare began to risk-adjust hospital payments with the implementation of the prospective payment system (PPS) for inpatient hospital services in 1983. Previously, Medicare hospital reimbursement was based on each facility's actual charges for providing services to a Medicare beneficiary. The payments automatically accounted for the fact that some patients needed more expensive and extensive care than others. As hospital charges went up, so did Medicare's payments. This charge-payment dynamic was the impetus behind Medicare's PPS. The PPS was designed to break the direct link between the hospital's charges and the payment amount so that hospitals would have financial incentives to control the costs of providing care. In the PPS, a predetermined payment for all the services provided during a hospital admission financially rewarded hospitals for providing care for at a lower cost than the payment amount and penalized inefficient hospitals. A flat payment per admission would have provided incentives for hospitals to select the least intensive patients, stint on care, or both. Therefore, the predetermined payment was varied based on the

likelihood, or risk, that the cost of caring for the patient would be higher or lower than the cost of caring for the average patient. This risk adjustment, sometimes called case mix adjustment when applied to provider payments, is patterned after insurance industry practice.

## RISK ADJUSTMENT AND THE MEDICARE PROGRAM

Risk adjustment aligns Medicare payments to providers or premiums paid to health plans with the expected costs of providing contracted services. Without it, patients or plan enrollees expected to incur higher-than-average costs might have difficulty gaining access to services or they might receive inadequate or poor quality care. Risk-adjusted payments help ensure that providers or plans are not inappropriately advantaged or penalized if they treat or enroll a costlier mix of patients.

Risk adjustment became necessary in the traditional Medicare program when it began paying certain types of providers predetermined amounts for bundles of services delivered during a specified period (Table 1).<sup>3</sup> Beginning with inpatient hospital services, Medicare has over time changed its facility payment systems so they are no longer based on facility-specific costs or charges for individual services. Medicare implemented prospective,

**TABLE 1**  
**Medicare Payment Bundles, by Type of Provider**

PROVIDER TYPE	Payment Bundle — All Services Provided During:	Services Excluded from Payment Bundle
<b>Acute Care Hospital</b>	Inpatient admission plus certain diagnostic and radio- logic procedures performed three days prior to admission	Physician professional services
<b>Skilled Nursing Facility</b>	Day of care	Physician professional services and certain high cost outpatient procedures
<b>Home Health Agency</b>	60-day episode	Physician professional services
<b>Inpatient Rehabilitation Facility</b>	Inpatient admission	Physician professional services
<b>Long-Term Care Hospital</b>	Inpatient admission	Physician professional services
<b>Inpatient Psychiatric Hospital</b>	Day of care	Physician professional services

Source: Medicare Payment Advisory Commission, *Payment Basics*, [www.medpac.gov/documents.cfm](http://www.medpac.gov/documents.cfm).

bundled payment approaches to encourage providers to become more efficient in delivering care by allowing them to keep any difference between the payment and the cost of care. Each payment is adjusted to reflect the expected costs of care, based on characteristics of the patient and the treatment that have been demonstrated to affect the risk that costs will be higher or lower than costs associated with the average patient. This rewards providers for delivering only necessary services and penalizes them when costs are above the payment. Rather than paying for each service provided during a hospital stay or a day of care in a skilled nursing facility (SNF), for example, Medicare pays a single rate, based on historical, average costs, for a hospital admission or a day of care in a SNF. When payments were made for each individual service (as is done for physician payment), there was no need for risk adjustment because the cost of providing a service was not likely to vary across patients. Costs of providing a bundle of services such as during a hospital admission or a day of care in a SNF do vary, however, based on patient needs.

Risk adjustment is also an essential component of Medicare's managed care option [Medicare Advantage (Part C)] in which private, Medicare-participating plans enroll Medicare beneficiaries and provide Medicare-covered benefits in exchange for a monthly premium. In this case, risk adjustment raises or lowers the premium Medicare pays the plan based on patient characteristics that have been shown to affect the risk that the enrollee will have higher or lower than average health care needs. Without risk adjustment, premiums would not accurately reflect the expected costs of a plan's enrollees. This could have several consequences. Some plans would be overpaid while others would be underpaid. This could result in access problems for beneficiaries with less favorable risk profiles, particularly if plans try to discourage enrollment of potentially more costly patients, for example, by having fewer specialists available to treat particular high-cost conditions. Plans with fewer high-cost enrollees would have a competitive advantage over other plans. In addition, overpaying plans may prevent them from becoming as efficient as they could in providing health care. Further, inaccurate accounting for risk could cause Medicare to pay more or less than intended in its managed care program.<sup>4</sup>

## Provider Payments

To account for differences in risk across patients, the patient classification system associated with a particular type of provider creates categories of patients, called case mix groups, that are expected to have similar costs for the payment bundle. The average cost of patients in each group is compared with the average cost across all groups for that type of provider. This ratio, or relative weight, is used to adjust the average (or "standard") provider payment so that the payment is higher for treating a patient in a costlier group and lower for treating a patient in a less expensive group.

Each type of provider has a different patient classification system to reflect the risk factors that affect costs and resource use. Although acute care,

long-term care, and psychiatric hospitals all categorize patients based on their diagnosis-related group (DRG), the relative weights associated with the DRGs differ in each type of hospital to reflect their varying treatments and cost structures (Table 2).

The patient classification systems require patient-level information, such as diagnosis, functional status, or expected or actual treatment. Diagnostic information is reported using the more than 15,000 codes included in the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM). Treatment information is reported using either ICD-9-CM procedure codes or the Current Procedural Terminology (CPT) coding system developed by the American Medical Association to describe treatments typically provided by physicians.

Patient functional status, which is required by the patient classification systems for SNFs, home health agencies, and rehabilitation hospitals, is obtained from patient assessment tools. These patient assessment tools are administered at admission or other times during a patient's treatment, and they measure factors such as the ability to perform activities of daily living. Each type of provider uses a different assessment tool and administers the assessment at different times during the patient stay.

The relative weight for each case mix group compares the cost or resource use of that category relative to all categories for the type of provider

**TABLE 2**  
**Data Used in Medicare's Patient Classification Systems, by Type of Provider**

PROVIDER TYPE	Patient Classification System	Patient Data Elements
Acute Care Hospital	Diagnosis-related groups	Diagnoses, surgical procedure, age, discharge status (alive? yes/no)
Skilled Nursing Facility	Resource utilization groups	Presence of certain acute medical conditions, need of certain services, expected or actual use of therapy, functional status
Home Health Agency	Home health resource groups	Clinical conditions, expected need of therapy, functional status
Inpatient Rehabilitation Facility	Inpatient rehabilitation facility case-mix groups	Diagnosis requiring rehabilitation, functional and cognitive status, age, comorbidities
Long-Term Care Hospital	Long-term care hospital diagnosis-related groups	Diagnoses, surgical procedures, age, discharge status (alive? yes/no)
Inpatient Psychiatric Hospital	Psychiatric diagnosis-related groups	Diagnoses, certain treatments, age, day of stay

Source: Medicare Payment Advisory Commission, *Payment Basics*, [www.medpac.gov/documents.cfm](http://www.medpac.gov/documents.cfm).

**TABLE 3**  
**Medicare Patient Classification Systems,**  
**Base Payment Amounts, and Range of Relative Weights,**  
**by Type of Provider, 2007**

PROVIDER TYPE	Patient Classification System	Base Payment Amount (\$)	Range of Relative Weights
Acute Care Hospital	Diagnosis-related groups	\$5,305* per admission	0.1000 – 19.2551
Skilled Nursing Facility†	Resource utilization groups	<b>NURSING</b>	
		\$142 per day	0.50 – 1.93
		<b>THERAPY</b>	
	\$107 per day	0.43 – 2.25	
Home Health Agency	Home health resource groups	\$2,339 per 60 day episode	0.5265 – 2.8113
Inpatient Rehabilitation Facility	Inpatient rehabilitation facility case mix groups	\$12,981 per admission	0.2201 – 4.1542
Long-Term Care Hospital	Long-term care hospital diagnosis-related groups	\$38,086 per admission	0.4175 – 3.8893
Inpatient Psychiatric Hospital	Psychiatric diagnosis-related groups	\$595 per day	0.88 – 1.22

\* This includes the operating and capital (depreciation and interest on buildings and major equipment) cost amounts.

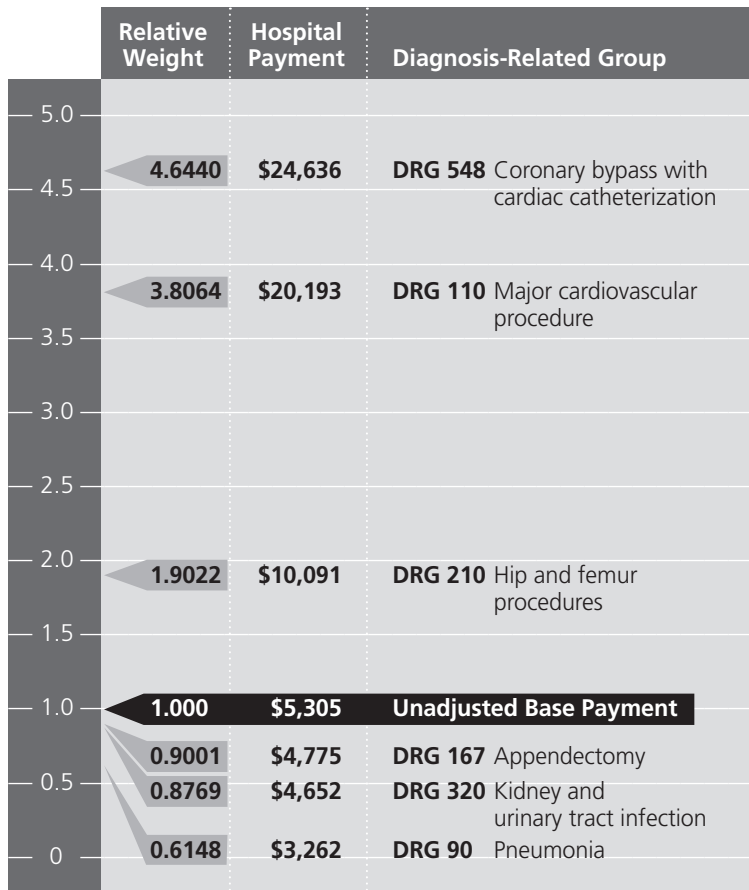
† The base payment amount for SNFs differs for urban and rural facilities, but the relative weights are the same. The rural nursing base payment is \$136 per day and the rural therapy base payment is \$123 per day.

Source: Federal Register, 71, no. 146, July 31, 2006, pp. 43158–43198; Federal Register, 71, no. 149, August 3, 2006, pp. 44082–44180; and Federal Register, 71, no. 160, August 18, 2006, pp. 47870–48434.

(Table 3). Using the inpatient hospital system as an example (Figure 1, next page), Medicare’s 2007 unadjusted hospital rate for the average admission was approximately \$5,305.<sup>5</sup> This base amount reflects historical average hospital costs, updated to account for inflation. The relative weight for DRG 90 (simple pneumonia) is 0.6148 because patients in this category require fewer resources, on average, than the average acute care hospital patient. Applying the relative weight results in a risk-adjusted payment of over \$3,200 for this DRG. Similarly, the relative weight for DRG 320 (kidney and urinary tract infection) is 0.8769. By contrast, the relative weight for DRG 548 (coronary bypass with cardiac catheterization) is 4.644, resulting in a risk adjusted payment of almost \$25,000.



**FIGURE 1**  
**Medicare Acute Care Hospital Payment,**  
**Selected Diagnosis-Related Groups, 2007**



*Note: Payment does not account for other adjustments in the payment system.  
Source: Federal Register, 71, no. 196, October 11, 2006, pp. 60013–60025.*

## Plan Payments

In Medicare managed care [Medicare Advantage (Part C)] and the prescription drug benefit (Part D) per capita premiums paid to health plans are risk-adjusted. The same process is involved in producing a risk-adjusted premium for a health plan as in producing a risk-adjusted payment for a provider; beneficiaries are assigned to the appropriate group, a relative weight is determined for each group, and an average premium is adjusted by the relative weight. The bundle of services encompassed under a premium, however, is broader than the bundle of services delivered by an individual provider. Premiums to health plans are intended to cover the services provided during a period of time by all providers involved in delivering medical services. As a result, risk-adjusting premiums may be more challenging.

The monthly premiums to health plans for beneficiaries enrolled in Medicare Part C have always been risk-adjusted, but initially the adjustment



accounted only for demographic differences across enrollees. The first classification system Medicare used, starting in January 1985, was based on the enrollee's age, sex, and other demographic characteristics as well as institutional status and Medicaid eligibility. It did not consider health status or clinical conditions.<sup>6</sup> This method was widely viewed as inadequate.<sup>7</sup>

This system was replaced beginning in January 2000 with the principal inpatient diagnostic cost groups (PIP-DCGs).<sup>8</sup> PIP-DCGs use the principal diagnoses from any hospital stays in the previous year to predict costs in the upcoming year. In 2004, Medicare began using a risk adjuster that considered the disease burden of enrollees. The system was further refined by including diagnostic information from multiple sites of care, including outpatient and physician office settings. This revised classification system, known as the hierarchical condition categories (HCCs), was fully implemented by January 2007.<sup>9</sup> For premiums paid to Part D prescription drug plans, Medicare's risk adjustment is based on an adaptation of the HCCs, known as the Centers for Medicare & Medicaid Services' Prescription Drug Hierarchical Condition Categories, which relies on the same data elements as HCCs to predict relative differences in pharmaceutical expenditures.

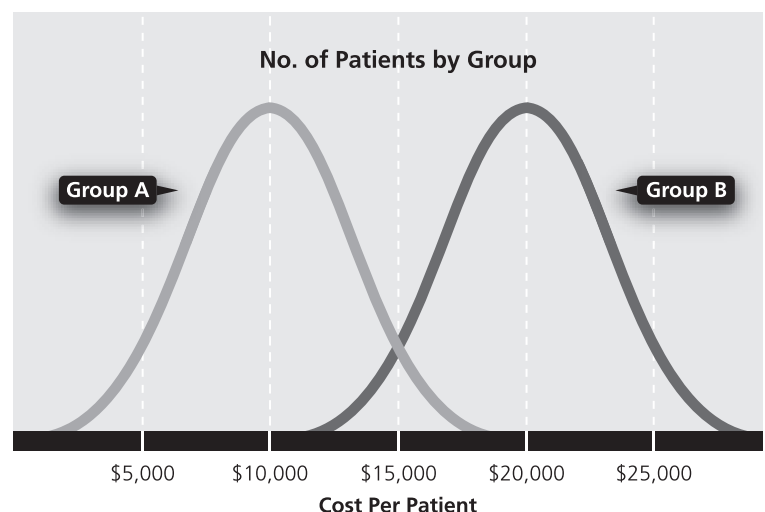
## ISSUES IN MEDICARE RISK ADJUSTMENT

Risk adjustment methods require ongoing changes because of advances in medical technology and treatment patterns as well as provider responses to financial incentives. Without ongoing adjustments, payment accuracy can suffer. This section discusses several important issues that need to be considered to maintain and improve Medicare's payment systems. In some instances, these issues may be better addressed through changes to other components of the payment system rather than the risk adjustment methods.

### Variability Within Groups

All of the patient classification systems used for risk adjustment group patients into categories based on their clinical characteristics and the similarity of their costs. But the costs of patients within each risk category are not identical. That is, there will always be cost variability within each case mix group (Figure 2). The variation in costs across patients within a group can be due to imprecise patient classification. Failure to distinguish adequately among patients with different resource needs can be particularly problematic if some providers are able to select low-risk patients or avoid high-cost patients, or if some providers systematically treat a disproportionate number of high-cost patients.

**FIGURE 2**  
Variation in Costs for Patients in  
Two Hypothetical Case Mix Groups



In general, more patient categories are needed to improve the precision of the patient classification system when there is substantial variation across patients and thus an increased chance of large losses or gains for individual providers due to their mix of patients. Medicare currently uses almost 600 DRGs for payment of acute care hospital services because of the wide range of conditions and types of patients treated. It will substantially increase the number of DRGs with the refinements scheduled for implementation in 2008. In contrast, payments to psychiatric hospitals are based on 15 DRGs, with payments also varying by day of stay. There is not as much variability in the costs of treatment across psychiatric conditions, so additional categories do little to improve payment accuracy.

Differences in patient severity within the same DRG can result in some patients being more profitable to treat than others, which was the reason for the upcoming increase in the number of DRGs.<sup>10</sup> This was demonstrated in a Medicare Payment Assessment Commission (MedPAC) analysis of Medicare patients hospitalized for certain heart conditions. MedPAC grouped patients within a DRG based on their severity of illness and then compared the Medicare payment amount with patient costs, which varied based on patient severity. On average, Medicare payments for patients with coronary bypass with catheterization (DRG 109) were about 10 percent above hospital costs. For the least severe patients within this DRG, payments were 47 percent above costs, and, for the most severe patients, payments were 20 percent below costs. Thus, hospitals would be disproportionately rewarded for treating the less severe patients within this particular DRG. Similarly, hospitals with a disproportionate share of the most severe patients would be financially disadvantaged.

This within-DRG cost variability has contributed to the growth in specialty hospitals.<sup>11</sup> Specialty hospitals are small, often physician-owned facilities that focus on a narrow range of DRGs, such as cardiac care, orthopedics, or surgery, that tend to be more profitable than others. Further, specialty hospitals appear to be effective in selecting lower cost patients within the DRGs they treat.<sup>12</sup> This “cream skimming” allows them to profit from treating selected Medicare patients, without necessarily providing care more efficiently than community hospitals. There are concerns that community hospitals will have increasing difficulty covering their costs because they will be left to treat a disproportionate share of less profitable patients. The refinements to the DRGs and other payment system modifications are intended to ameliorate this inequity.<sup>13</sup>

Efforts to minimize cost variation within case mix categories to recognize differences in the resource needs of the patients may involve trade-offs between the precision of the risk adjustment and the number of case mix groups. A patient classification system with more categories may have less cost variability within each group. Generally, adding patient groups to improve the patient classification system is desirable as long as the additional groups improve payment accuracy by accounting for a significant proportion of the variance in cost differences among groups and reduce

the amount of variability within groups. At some point, however, there are diminishing returns to adding more groups to the classification system and implementation concerns might outweigh improved precision. The concerns center on data issues, because refining patient groups generally requires obtaining more patient-level data. Providers or plans may object to additional reporting requirements because of increased administrative burden. The reporting tools to obtain additional data may not be adequately tested, widely available, or sufficiently objective. Finally, additional program oversight might be needed to ensure that the new data requirements are correctly implemented.

### Changes in Medical Practice over Time

Medical practice and the costs of health care change over time, which affects both the factors that identify patients with similar risks and the costs of care. As a result, the patient classification system and the relative weights attached to each patient group need to be adjusted. For example, as the detection and treatment of certain cancers improves, the characteristics of patients admitted to a hospital for cancer care will likely change, as will the costs of providing care. Accurate risk adjustment requires refinement of the patient categories and recalculation of the relative weights to reflect new technologies and treatment patterns that affect who gets health care services and the type of services available.

**The patient classification system and relative weights used in risk adjustment methods must be updated periodically as medical practice changes.**

Medicare annually reviews the hospital inpatient DRGs and updates, or recalibrates, the relative weights; if needed, Medicare may also modify DRG definitions or change the DRGs to improve the homogeneity within the groups. Recalibration involves comparing hospital cost data for each DRG with total average costs to recalculate the relative costs across all groups. If there are indications that patients within a given DRG are no longer similar with respect to their costs, Medicare might segment the DRG, change the risk factors associated with the DRG or create a new DRG to better account for differences in patients. Providers and other interested parties submit information to the Medicare program if they believe that the practice of medicine has changed enough so that current patient categories do not distinguish adequately among patients according to their cost.

Sometimes other approaches to accounting for changes in medical practice may be needed because data are not available or adequate to modify the risk adjustment system. There may be few cases and little cost data with which to establish a case mix group. The patients initially receiving a new procedure or method of delivering care may differ from the types of patients who would receive the procedure or method once it is more established. Such issues may be more effectively addressed through other payment adjustments such as outlier payments, risk corridors to limit gains or losses on particular types of patients, or partial capitation payments until the data for refining the risk adjustment system are available.

## Scope of PPS Bundles

Medicare's PPS bundles range from units as narrow as a day of care in a psychiatric hospital to units as broad as 60 days of home health care. Under all of Medicare's prospective payment approaches, providers have incentives to shift services outside of the bundle to lower their costs of delivering care to increase their profitability. Such shifting would result in Medicare paying more than intended for the bundle of services actually provided. Further, this practice could raise Medicare spending if it resulted in services that will be paid for by Medicare in another setting. To account for any change in the services provided within the payment bundle delivered by a provider, Medicare makes adjustments in the PPS.

Before the implementation of Medicare's PPS for inpatient hospital services, policymakers were concerned that pre-surgical testing and other services that had been performed during the hospital stay would be moved out of the hospital and performed before a scheduled hospital admission in an ambulatory setting. Although shifting these services outside the inpatient admission might reflect more efficient delivery of care, it would result in Medicare paying twice for the same service—once through the payment to the ambulatory provider and again implicitly through the hospital payment. To account for this, Medicare defined the payment bundle for inpatient care to include all services provided during the hospital admission as well as any tests performed within the three-day window prior to admission. In this way, the Medicare program financially protected itself from changes to the set of services provided at the beginning of a hospital stay.

Over time, hospital inpatient length of stay has declined markedly. This was an expected response to the PPS, as hospitals became more efficient in scheduling services within the hospital stay. In contrast, admissions to post-acute care settings (for example, SNF, home health agencies, and rehabilitation hospitals) rose, suggesting that recovery and rehabilitation services that had been part of the hospital bundle were being shifted to other settings. To help ensure that it is not paying more than intended to the hospital and again for the same service in the post-acute site, Medicare reduces the hospital payment when patients in particular DRGs are transferred to a post-acute site before they have stayed at least the average time for the group.

## Gaming

Providers have incentives to ensure that patients are categorized in the highest paying category possible, so any changes to the risk factors that are used to assign patients to case mix groups need to ensure that the factors are not likely to be gamed. Gaming, also known as upcoding, would result in a patient being assigned to a higher paying group even though the resource needs of the patient are not similar to the average needs of patients in that group. Any modification to a payment system or its risk adjustment method being considered needs to account for documentation and coding changes that could provide opportunities to shift patients to higher paying groups without commensurate increases in resource requirements. Particular care needs to be taken to ensure that risk factors are objective and verifiable.

When the acute care hospital PPS was implemented, the number of complicating conditions or comorbidities (CC) assigned to patients increased markedly because the presence of a CC often resulted in the patient's classification into a higher paying DRG. The patients and the costs of caring for them had not changed, but the documentation and coding of these risk factors had changed. As a result, payments to hospitals increased more than warranted. A similar issue was identified in the home health PPS.<sup>14</sup> Even though a higher proportion of patients were categorized in the more intensive case mix groups, the average resource use of home health patients had not increased. This indicates that either the documentation and coding of patient characteristics that are used to assign them to case mix groups changed or that home health agencies reduced the services provided to their patients.

The incentives in the PPSs are to record or document risk factors in the most financially advantageous way possible. Although reporting false information about a patient would be fraud, there are often variations in assessments and judgment that can affect the classification.

For example, the patient classification system used in the SNF setting relies in part on an assessment of the patient's ability to perform activities of daily living. The provider has to rate the patient's ability to transfer from the chair to bed. Does the patient require moderate help or extensive help? The answer to this question alone may not affect the patient's case mix group determination, but several of these types of judgments could.<sup>15</sup>

Some patient classification systems rely on service use as a risk factor, even though it is a direct measure of costs. For example, SNF patients who were assessed as needing between 325 and 499 minutes of therapy were categorized into the high rehabilitation group. This reliance on expected service use resulted in a change in patient assessments. Between 1999 and 2001, SNFs reduced the minutes of therapy provided to these patients from an average of 325 minutes to 255 minutes, resulting in lower costs of providing care for the same Medicare payments.<sup>16</sup> This may reflect an improvement in the efficiency of providing care—if the patient outcomes remained the same—but it could also reflect inappropriate reductions in services to achieve higher profits.

## **FUTURE DIRECTIONS FOR RISK ADJUSTMENT: PERFORMANCE AND OUTCOME COMPARISONS**

In addition to serving as a fundamental component of Medicare payment systems, risk adjustment is also needed as Medicare, other payers, and researchers compare the costs or outcomes of providers and treatments.<sup>17</sup> These types of comparisons are likely to become more important as payers continue to focus on steady increases in health care spending without commensurate increases in patient outcomes. (See next page for an illustration.) All else

**Changes to risk assessment methods may introduce opportunities to shift patients into higher paying groups without commensurate increases in resource requirements.**

Continued on p. 15 ►



## Risk Adjustment in Performance and Outcome Comparisons : An Illustration

To illustrate the importance of risk adjustment in comparing performance and outcomes, examine the hypothetical experience of two hospitals, Mercy Hospital and Community Hospital, that treat two types of patients. Patients in group A have had no prior heart attack. Patients in group B have had one or more heart attacks. The mortality rate is 9 percent for group A and 16 percent for group B across all hospitals. Mercy Hospital appears to have better outcomes because its actual (that is, unadjusted) mortality rate is 12 percent, compared with 13 percent for Community Hospital. This, however, is an artifact of the mix of patients in the two hospitals. Mercy Hospital has a higher proportion of patients in group A—the less severe cases—than Community Hospital. Mercy Hospital has worse outcomes for both patient groups, but because only 20 percent of its patients are in group B—the more severe patients—its overall mortality rate appears lower.

### Actual Mortality Rates, by Group and Hospital

		Mercy Hospital	Community Hospital	Overall
Group A	No. of Cases	80	20	100
	Deaths	8	1	9
	<b>Mortality Rate</b>	<b>10%</b>	<b>5%</b>	<b>9%</b>
Group B	No. of Cases	20	80	100
	Deaths	4	12	16
	<b>Mortality Rate</b>	<b>20%</b>	<b>15%</b>	<b>16%</b>
Total by Hospital	No. of Cases	100	100	—
	Deaths	12	13	25
	<b>Mortality Rate</b>	<b>12%</b>	<b>13%</b>	—

*Without considering the mix of patients, Mercy Hospital has a lower mortality rate than Community Hospital.*

A comparison of risk-adjusted, or expected, mortality provides a more accurate picture of outcomes in the two hospitals. The expected mortality rate reflects what the mortality rate would be if the hospital had the same percentage of deaths for each group as the overall average. The expected mortality for Mercy Hospital, given its mix of patients, is 10.4 percent. The risk-adjusted mortality is lower than its actual mortality rate of 12 percent. By comparison, Community Hospital's expected, or risk-adjusted, mortality rate is higher than its actual mortality rate. Given its mix of patients, the expected mortality rate in Community Hospital is 14.6 percent, but its actual mortality rate is 13 percent, or 11 percent lower.

### Expected Mortality Rates, by Hospital

	Expected Mortality Rate by Group		Overall Expected Mortality Rate
	GROUP A	GROUP B	
Mercy Hospital	80 x 9% = 7.2%	20 x 16% = 3.2%	7.2% + 3.2% = <b>10.4%</b>
Community Hospital	20 x 9% = 1.8%	80 x 16% = 12.8%	1.8% + 12.8% = <b>14.6%</b>

*Expected mortality rates are calculated by applying the overall mortality rate by group to the number of cases for each group, and then summing across all groups.*

### Difference Between Actual and Expected Mortality Rates

	Mercy Hospital	Community Hospital
Actual	12.0%	13.0%
Expected	10.4%	14.6%
Percentage Difference	<b>+15.4%</b>	<b>-11.0%</b>

*After considering the mix of patients, Community Hospital has a lower mortality rate than Mercy Hospital.*

Continued from p. 13

being equal, riskier patients—either people with more health problems or more severe health issues—are probably more costly to treat than others. Similarly, the treatment outcomes for patients who have fewer health issues or less severe ones are likely to be better. As a result, assessments of the best treatment approach must account for the starting point of the patient. Failure to adjust properly for differences in clinical risk can lead to erroneous conclusions when making comparisons.

In the mid 1980s, Medicare began publishing risk-adjusted mortality rates for all U.S. hospitals treating Medicare beneficiaries. Claims data were used to perform the risk adjustment. However, the uproar caused by the release of these data, including concerns about the adequacy of the risk adjustment methodology for reporting all-cause mortality, brought that effort to an end by 1993. Currently, a number of states (for example, New York, California, Vermont, and Oregon) produce reports that compare provider performance based on risk-adjusted mortality rates. Generally, these reports focus on mortality rates for a specific medical condition, such as coronary artery bypass graft surgery, to narrow the risk differences across patients.

Increasingly, Medicare and other payers are investigating differences in the quality of care provided and the outcomes of health care treatment to use in adjusting payments to reward better performance or greater improvements in performance. These new uses of risk adjustment may require more sophisticated methods than those currently in use.

## CONCLUSION

Adequate risk adjustment is critical to Medicare's efforts to pay providers and health plans appropriately and to provide incentives for them to deliver care efficiently. In its prospective payment systems and managed care program, Medicare needs to ensure adequate compensation to providers or plans to maintain access to care for beneficiaries who are likely to incur higher than average costs. Payments and premiums also need to be calibrated correctly for low-cost beneficiaries to ensure that the financial benefit of caring for them is not greater than the benefit of caring for others. Although the concept of aligning payments with expected costs is straightforward, the actual process is complex and requires continual improvements. As providers and payers gain more experience with risk-adjusted payments and as practice patterns and treatment protocols change, risk adjustment methodologies need to be updated to continue to be effective.

The importance of risk adjustment in the health care environment is expanding beyond provider and plan payments. With more attention focused on health care spending and differences in spending across geographic areas and types of providers, efforts to identify best practices or alternative treatment options will intensify. One of the methods for doing this



involves comparing resource use and outcomes, but these comparisons are valid and useful only when they adequately account for differences in the risk of patients or populations involved. Current methods may be adequate for adjusting payments or premiums, particularly in conjunction with other payment policies. When decisions about selecting the most appropriate treatment option are based on comparisons of patient outcomes, the consequences of differences in patients that affect the comparisons may be even more important.

## ENDNOTES

1. For an excellent discussion of how medical underwriting is used in the nongroup health insurance market for risk adjustment, see Mark Merlis, "Fundamentals of Underwriting in the Nongroup Health Insurance Market: Access to Coverage and Options for Reform," National Health Policy Forum, Background Paper, April 13, 2005; available at [www.nhpf.org/pdfs\\_bp/BP\\_Underwriting\\_04-13-05.pdf](http://www.nhpf.org/pdfs_bp/BP_Underwriting_04-13-05.pdf).
2. See, for example, Roger Feldman and Bryan E. Dowd, "Simulation of a Health Insurance Market with Adverse Selection," *Operations Research*, 30, no. 6 (1982): pp. 1027–1042; Roger Feldman and Bryan E. Dowd, "Must Adverse Selection Cause Premium Spirals?" *Journal of Health Economics*, 10, no. 3 (October, 1991): pp. 349–358; and Roger Feldman and Bryan E. Dowd, "Risk Segmentation: Goal or Problem?" *Journal of Health Economics*, 19, no. 4 (2000): pp. 499–512.
3. There are various other adjustments made in the payment system to account for regional variation in costs and other factors. See Medicare Payment Advisory Commission (MedPAC), "Medicare Payment Basics" series on home health agency payment system, hospital acute inpatient payment system, long-term care hospital payment system, Medicare Advantage program payment system, psychiatric hospital payment system, rehabilitation facility payment system, and skilled nursing facility payment system, September 29, 2006.
4. MedPAC, *Report to the Congress: Issues in a Modernized Medicare Program*, June 2005, p. 43; available at [www.medpac.gov/documents/June05\\_Entire\\_report.pdf](http://www.medpac.gov/documents/June05_Entire_report.pdf).
5. This includes the base or standardized amount (\$4,878 in 2007) for operating costs, plus an additional standardized amount (\$427 in 2007) for capital costs such as depreciation and interest on buildings and major equipment.
6. See, for example, Henry J. Aaron and Robert D. Reischauer, "The Medicare Reform Debate: What Is the Next Step?" *Health Affairs*, 14, no. 4 (Winter 1995): pp. 8–30; Joseph P. Newhouse, Melinda Beeuwkes Buntin, and John D. Chapman, "Risk Adjustment and Medicare: Taking a Closer Look," *Health Affairs*, 16, no. 5 (September/October 1997): pp. 26–43; and MedPAC, "Medicare Advantage Payment Areas and Risk Adjustment," chapter 2 in *Report to Congress: Issues in a Modernized Medicare Program*.
7. Newhouse, Beeuwkes Buntin, and Chapman, "Risk Adjustment and Medicare"; and Gregory C. Pope *et al.*, "Risk Adjustment of Medicare Capitation Payments Using the CMS-HCC Model," *Health Care Financing Review*, 25, no. 4 (Summer 2004): pp. 119–141.
8. As part of the Balanced Budget Act of 1997, Congress required Medicare to implement a risk adjustment methodology that included beneficiary health status.
9. Pope *et al.*, "Risk Adjustment of Medicare Capitation Payments"; and MedPAC, *Report to the Congress: Issues in a Modernized Medicare Program*.
10. Kevin J. Hayes, Julian Pettengill, and Jeffrey Stensland, "Getting the Price Right: Medicare Payment Rates for Cardiovascular Services," *Health Affairs*, 26, no. 1, (January/February 2007): pp. 124–136.

Endnotes / continued ►

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11. Laura A. Dummit, "Specialty Hospitals: Can General Hospitals Compete?" National Health Policy Forum, Issue Brief No. 804, July 13, 2005; available at [www.nhpf.org/pdfs\\_ib/IB804\\_SpHospitals\\_07-13-05.pdf](http://www.nhpf.org/pdfs_ib/IB804_SpHospitals_07-13-05.pdf).
12. MedPAC, *Report to the Congress: Physician-Owned Specialty Hospitals*, March 2005; available at [www.medpac.gov/documents/Mar05\\_SpecHospitals.pdf](http://www.medpac.gov/documents/Mar05_SpecHospitals.pdf).
13. Federal Register, 72, no. 85, May 3, 2007, pp. 24680–25135.
14. Centers for Medicare & Medicaid Services (CMS), "CMS Proposes Payment Changes for Medicare Home Health Services," press release, April 27, 2007; available at [www.cms.hhs.gov/apps/media/press/release.asp?Counter=2133](http://www.cms.hhs.gov/apps/media/press/release.asp?Counter=2133).
15. General Accounting Office (GAO), "Skilled Nursing Facilities: Providers have Responded to Medicare Payment System by Changing Practices," GAO-02-841, August 2002, p. 8; available at [www.gao.gov/new.items/d02841.pdf](http://www.gao.gov/new.items/d02841.pdf).
16. GAO, "Skilled Nursing Facilities: Providers have Responded to Medicare Payment System by Changing Practices."
17. Lisa I. Iezzoni, Ed., *Risk Adjustment for Measuring Health Outcomes*, ed. 3, (Chicago: Health Administration Press, 2003).



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