

New Directions In Medicaid Payment For Hospital Care

Major changes in how Medicaid calculates payment lie ahead.

by **Kevin Quinn**

ABSTRACT: Medicaid now pays for 20 percent of all inpatient stays and plays an especially important role in funding obstetric, pediatric, and mental health care. In coming years, policy decisions on inpatient payment may be the most consequential since diagnosis-related groups (DRGs) were introduced two decades ago. This study describes Medicaid's growing role in purchasing inpatient care, reports Medicaid-specific results from an evaluation of three DRG algorithms, provides a case study of a new payment method designed in Mississippi, and summarizes recent developments in paying for quality. [*Health Affairs* 27, no. 1 (2008): 269–280; 10.1377/hlthaff.27.1.269]

APPROXIMATELY 7.6 MILLION HOSPITAL INPATIENTS a year have their care paid for by Medicaid. Hospitals now count on Medicaid for 17 percent of total revenue—almost twice as much as they did two decades ago.¹ Nevertheless, few studies have examined Medicaid payment policy for hospital care, especially in comparison with the attention paid to Medicare. Such a discussion is timely, as Medicaid policy decisions in the coming years may be the most consequential since diagnosis-related groups (DRGs) were introduced two decades ago.

This paper describes Medicaid's role in purchasing inpatient care, reports results from an evaluation of three alternative DRG algorithms, provides a case study of a new method designed by Mississippi Medicaid, and summarizes recent developments in paying for quality of care.

Medicaid's Role In The Hospital Care Market

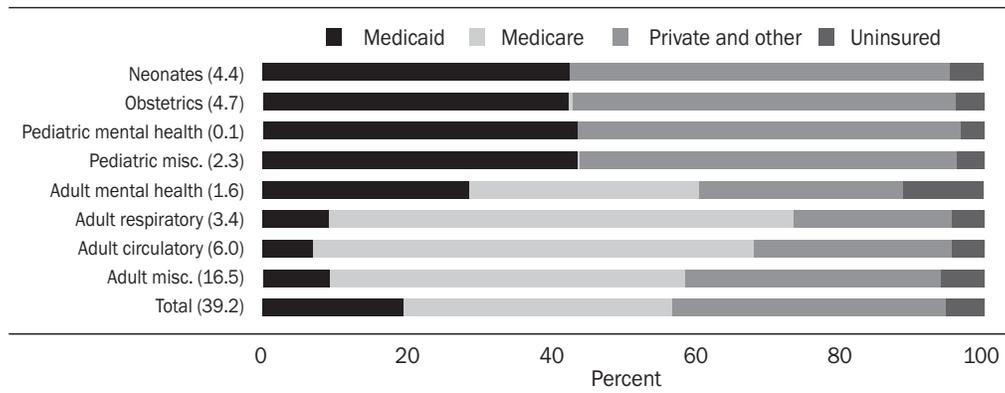
Analysis of the Nationwide Inpatient Sample (NIS) shows that Medicaid was the expected primary payer for 20 percent of the nation's 39.2 million hospital stays in 2005.² In Exhibit 1, these stays are organized by Medicaid Care Category, which is based on age and principal diagnosis. The categorization is intended to reflect both the policy portfolios of a typical Medicaid agency and the internal organization of a typical hospital.

In obstetrics, neonatal care, and pediatrics, Medicaid pays for 42–44 percent of all stays. In mental health, Medicaid pays for 44 percent of the pediatric stays and

Kevin Quinn (kevin.quinn@acs-inc.com) is director, Payment Method Development, at ACS Government Healthcare Solutions in Helena, Montana.

EXHIBIT 1

U.S. Hospital Stays, By Expected Primary Payer And Medicaid Care Category, 2005



SOURCE: Author's analysis of data from the Nationwide Inpatient Sample.

NOTES: Numbers in parentheses are total stays (millions). Pediatric patients are under age eighteen. Obstetric patients may be of any age.

29 percent of the adult stays. In states where there is no dominant private insurer, Medicaid therefore may be the single largest payer for these important categories of care. In the categories for adult circulatory, respiratory, and miscellaneous care, however, Medicaid has modest shares of 7–9 percent.

Medicaid's inpatient population stands in sharp contrast to that of Medicare. In 2005, 70 percent of Medicaid's 7.6 million stays were in obstetrics, pediatrics, or mental health. By contrast, 96 percent of Medicare's 14.6 million stays were in an adult circulatory, respiratory, or miscellaneous category.

Medicaid programs pay for hospital care either directly on a fee-for-service (FFS) basis or indirectly through managed care. The above results combine the two funding streams, but the NIS includes no data on payments. The Centers for Medicare and Medicaid Services (CMS) reports that Medicaid FFS payments for inpatient hospital care totaled \$42 billion in federal fiscal year 2005, second only to nursing facility payments.³ Payments by Medicaid managed care plans were probably another \$10–\$20 billion, although specific figures are not available.⁴

Medicaid funds are famously scarce, and Medicaid typically pays less than hospital cost.⁵ If hospitals have empty beds, as they often do, then they have incentives to accept Medicaid patients so long as payments cover variable costs, even if they do not cover total costs. For categories of care where Medicaid has a modest market share, a strategy of covering only variable costs often makes sense. For categories where Medicaid may be the dominant payer, however, it may be necessary to boost rates to ensure access.⁶ The case study provides an example of this.

■ **Medicaid payment methods.** The payment method is a payer's most potent influence not only on the cost of care but also on how that care is delivered. Although these methods are labyrinthine in their detail, they pivot on the unit of payment. Whatever the unit of payment may be, a hospital is rewarded for increasing

the number of units while decreasing its own cost per unit. In 1983, Medicare revolutionized hospital payment by redefining the unit of payment to be an inpatient stay, with higher payment for sicker patients. Sickness was measured by DRG, which depends chiefly on diagnoses and major procedures. DRG-based payment probably has come closer than any other payment method to striking the elusive balance between access and efficiency.⁷ Because payment does not depend on cost, each hospital has sharp incentives to improve efficiency. Because payment is higher for sicker patients, hospitals have incentives to treat the full range of patients.

Federal law gives Medicaid programs wide latitude in choosing payment methods, but states rarely have the funding and expertise to develop sophisticated new methods themselves.⁸ They often look to Medicare as a model. Two-thirds of the states used DRG-based methods in their FFS programs (Exhibit 2). (Some Medicaid managed care plans also use DRGs, but information about prevalence is anecdotal.) Although “DRG” is a very familiar term in health care, there are at least a half-dozen DRG algorithms, with major differences among them. The most popular algorithm, called CMS-DRGs, was used by Medicare from 1983 to 2007. It is also used by almost half of the states, which often adapt it for use in a Medicaid population. Montana Medicaid, for example, carves out payment for sick newborns and splits the mental health CMS-DRGs into pediatric and adult groups.

For the first two decades of CMS-DRGs, the federal government was willing to refine the algorithm to accommodate the needs of non-Medicare populations. In 2004, however, the CMS said plainly, “We advise those non-Medicare systems that need a more up-to-date system to choose from other systems that are cur-

EXHIBIT 2
Medicaid Fee-For-Service Hospital Payment Methods, By State, 2004

Payment per stay: CMS-DRGs	CO, IA, IL, KS, KY, MI, MN, MT ^a , NC, ND, NE, NH, NJ, NM, OH, OR, PA, SC, SD, TX, UT, WI, WV
Payment per stay: AP-DRGs or CHAMPUS-DRGs	DC, GA, IN, NY, VA, WA
Payment per stay: Other	DE, MA, WY
Payment per diem	AK, AZ, CA, FL, HI, LA, MO, MS ^b , NV, OK ^b , TN, VT ^c
Cost reimbursement	AL, AR, CT, ID, ME, RI
Other	MD ^d

SOURCES: 3M Health Information Services; ACS Government Healthcare Solutions; and Kaiser Commission on Medicaid and the Uninsured.

NOTES: This exhibit shows only the principal payment method in each state. States typically also have carve-outs and other exceptions to the principal method. DRGs are diagnosis-related groups. CMS-DRGs are Centers for Medicare and Medicaid Services DRGs. AP-DRGs are All Patient DRGs. APR-DRGs are All Patient Refined DRGs, CHAMPUS-DRGs are DRGs developed by the Civilian Health and Medical Program of the Uniformed Services.

^aMT, MS, and PA plan to move to APR-DRGs in 2008.

^bOK moved to CMS-DRGs in 2005.

^cVT plans to move to CMS-DRGs in 2008.

^dMD uses APR-DRGs to set case-mix-adjusted hospital-specific rates within an all-payer system.

rently in use in this country, or to develop their own modifications.... Our mission in maintaining the Medicare DRGs is to serve the Medicare population.”⁹

Moreover, in 2007 Medicare itself implemented a new algorithm called Medicare Severity DRGs (MS-DRGs).¹⁰ States with CMS-DRGs now must defend their use of an algorithm that the federal government says is inappropriate for Medicaid and, in any case, will no longer be updated by the CMS. Many states likely will consider changing payment methods in coming years.

■ **Choice of a DRG algorithm.** All available DRG algorithms do many things well.¹¹ In particular, their statistical power in explaining differences in resource use compares favorably with risk-adjustment algorithms in other areas of health care, such as capitation.¹² In choosing among the options, Medicaid payers likely will seek an algorithm that improves upon CMS-DRGs on two key criteria.

First, the algorithm should better measure the impact of complications and comorbidities (CC) on the resources a patient uses. Medicare’s interest in a wholly new algorithm, in fact, was prompted by evidence that CMS-DRGs systematically underpay hospitals for the sickest patients.¹³ CMS-DRGs use a single list of CC diagnoses, and the list had not been seriously revisited since 1983.¹⁴ A patient with gastrointestinal (GI) bleeding and uncontrolled diabetes would be assigned to the same “with CC” DRG as a patient with a GI bleed, defective coagulation, shock, septicemia, and hepatic coma.¹⁵ Under MS-DRGs, the CC list has been reanalyzed and divided into a “CC” list and a “major CC” list. For the Medicare population, MS-DRGs represent a major improvement in payment accuracy.¹⁶ For the Medicaid population, however, the CMS has made it clear that MS-DRGs are not appropriate.¹⁷ The second criterion, then, is that the algorithm must be suitable for Medicaid, especially in obstetrics, neonatology, and pediatrics.

Exhibit 3 compares CMS-DRGs with three algorithms that meet both criteria and are marketed for use by Medicaid payers: All Patient DRGs (AP-DRGs), All Patient Refined DRGs (APR-DRGs), and All Payer Severity-adjusted DRGs (APS-DRGs). All three were designed and calibrated for use in an all-patient population. Unlike CMS-DRGs and MS-DRGs, they also use birthweight to group neonatal stays; birthweight is a powerful predictor of hospital resource use.¹⁸

AP-DRGs and APS-DRGs, which were both developed before MS-DRGs, similarly use a CC list and a major CC list to group patients by level of severity. The APR-DRG algorithm, by contrast, does not use standard lists. Instead, severity depends on the interaction among multiple CCs for each base DRG.

Evaluation Of Alternatives

Although previous studies have compared DRG algorithms, this is the first study focused on Medicaid.¹⁹ Inpatient claim data sets were provided by the Mississippi, Montana, and Rhode Island Medicaid programs (Exhibit 4). The study evaluated CMS-DRGs, AP-DRGs, and APR-DRGs; these algorithms were chosen because each is used for payment by at least one state. Although APS-DRGs were

EXHIBIT 3
Comparison Of Diagnosis-Related Group (DRG) Algorithms For Medicaid Purposes

Characteristic	CMS-DRGs (V.23)	AP-DRGs (V.23)	APS-DRGs (V.23)	APR-DRGs (V.24)
Developer, ownership	3M HIS for Medicare; public domain	3M HIS for New York State; proprietary	Ingenix Inc.; proprietary	3M HIS and NACHRI; proprietary
Population	Medicare	All patients	All patients	All patients
Total DRGs	526	676	1,136	1,258
Complications and comorbidities (CC)	Most conditions split into "DRG with CC" or "DRG without CC"; single CC list; additional CCs do not affect DRG assignment	Most conditions split into "DRG with CC," "DRG with major CC," or "DRG without CC"; CC list and major CC list; additional CCs do not affect DRG assignment	380 base DRGs, almost all split into "DRG with CC," "DRG with major CC," or "DRG without CC"; CC list and major CC list; additional CCs do not affect DRG assignment	316 base DRGs, each with four levels of severity; no single CC list; additional CCs usually increase level of severity
Neonates	7 DRGs; birthweight not used in grouping	34 DRGs; birthweight used in grouping	21 DRGs; birthweight used in grouping	112 DRGs; birthweight used in grouping
Mental health	13 DRGs	18 DRGs	27 DRGs	72 DRGs
Principal uses—payment	Medicare until 2007, about 23 states, many private payers	5 states	None	Maryland; planned for Mississippi, Montana, Pennsylvania
Principal uses—analysis	Wide use by hospitals and consultants	Very limited	NIS; West Virginia; hospitals; consultants	NIS; hospital "report cards" such as <i>U.S. News and World Report</i> , Florida Compare Care; hospitals; consultants
Applicability to quality measurement	Limited case-mix adjustment	More extensive case-mix adjustment	More extensive case-mix adjustment	Most extensive case-mix adjustment; adjustment for risk of mortality
Main advantages for Medicaid	Thoroughly understood; very familiar to hospitals	Similar structure to CMS-DRGs but more applicable to Medicaid; used by 5 states	Similar structure to CMS-DRGs but more applicable to Medicaid; clearer structure than CMS-DRGs or AP-DRGs	Most extensive case-mix adjustment; best statistical performance in Medicaid evaluation; clearer structure than CMS-DRGs or AP-DRGs
Main drawbacks for Medicaid	Not intended for Medicaid population; worst statistical performance in Medicaid evaluation	Statistical performance in Medicaid evaluation not as good as APR-DRGs	Not as well known to hospitals or Medicaid plans (statistical performance not evaluated for Medicaid)	Complexity of grouping algorithm

SOURCES: ACS Government Healthcare Solutions, 3M Health Information Systems, and Ingenix Inc.

NOTES: CMS-DRGs are Centers for Medicare and Medicaid Services DRGs. AP-DRGs are All-Patient DRGs. APS-DRGs are All Payer Severity-adjusted DRGs. APR-DRGs are All Patient Refined DRGs. HIS is Hospital Inpatient Sample. NACHRI is National Association of Children's Hospitals and Related Institutions. NIS is Nationwide Inpatient Sample. All four algorithms ignore the impact of a CC if the CC is closely related to the principal diagnosis.

not included, a future evaluation using Medicaid data would be appropriate.

In a well-performing algorithm, each DRG contains stays that are similar both clinically and in hospital resource use. Resource use is measured in relative terms—for example, whether a particular type of stay uses twice as many resources as the average stay. Alternative measures of relative resource use include

EXHIBIT 4
Comparison Of Three States, By Medicaid Care Category

	Mississippi	Montana	Rhode Island
Total Medicaid enrollees (2005)	593,000	84,000	169,000
FFS inpatient hospital benefit	All enrollees	All enrollees	Disabled enrollees and managed care enrollees needing neonatal intensive care
Current FFS payment method	Per diem based on hospital-specific cost	Per stay based on CMS-DRGs	Cost reimbursement with negotiated caps
Data period	January–June 2006	July 2005–June 2006	July 2004–June 2005
Average length-of-stay (days)	4.6	3.5	9.2
Total stays	54,056	17,300	9,858
Neonates	24%	26%	10%
Obstetrics	27	29	4
Pediatric mental health	5	3	3
Pediatric miscellaneous	17	13	5
Adult mental health	5	4	19
Adult respiratory	3	3	9
Adult circulatory	5	3	12
Adult miscellaneous	15	18	37
Total payments (millions)	\$238.4	\$76.4	\$138.5
Neonates	19%	20%	14%
Obstetrics	17	16	2
Pediatric mental health	9	5	8
Pediatric miscellaneous	18	19	4
Adult mental health	9	2	16
Adult respiratory	4	4	8
Adult circulatory	5	5	11
Adult miscellaneous	18	28	36

SOURCES: Author's analysis of Medicaid inpatient claims data from each state. Enrollment data are from E.R. Ellis et al., *Medicaid Enrollment in the Fifty States: June 2005 Data Update*, December 2006, <http://www.kff.org/medicaid/upload/7606.pdf> (accessed 11 October 2007).

NOTES: FFS is fee-for-service. CMS-DRGs are Centers for Medicare and Medicaid Services diagnosis-related groups.

length-of-stay, charges, and cost.²⁰ Each measure has flaws: Length-of-stay takes no account of differences in daily resource use, charges are increasingly subject to strategic pricing behavior, and costs are defined using accounting conventions that might not reflect clinical reality.²¹ The following discussion of Exhibit 5 therefore refers only to results that were robust across all three measures. For economy of presentation, the exhibit shows results in terms of cost only.²²

The study followed standard practice in analyzing the reduction in variance (R^2) from applying each DRG algorithm to each data set. Before grouping, each data set displayed large variation (coefficient of variation in cost exceeding 220 percent), reflecting the wide range of conditions, comorbidities, treatments, and unit costs seen in the modern U.S. hospital. No definitive decision rules exist on what R^2 values are adequate. One benchmark is that CMS-DRGs show an R^2 of about 0.40 when applied to the Medicare population.²³ For this study, R^2 values above 0.50 were seen as exceptional, values around 0.40 as good, values of 0.10–0.40 as in the middle, and values less than 0.10 as disappointing.

EXHIBIT 5
Statistical Performance (R²) Of Diagnosis-Related Group (DRG) Grouper Algorithms In Three States

Medicaid care category	Mississippi			Rhode Island			Montana		
	CMS-DRG	AP-DRG	APR-DRG	CMS-DRG	AP-DRG	APR-DRG	CMS-DRG	AP-DRG	APR-DRG
Neonate	0.43	0.56	0.68	0.39	0.54	0.74	0.60	0.75	0.84
Obstetrics	0.20	0.22	0.35	0.12	0.19	0.45	0.20	0.21	0.45
Pediatric MH	0.15	0.14	0.23	0.07	0.07	0.18	0.11	0.11	0.21
Pediatric misc.	0.33	0.35	0.54	0.61	0.60	0.66	0.55	0.60	0.80
Adult MH	0.09	0.10	0.16	0.15	0.12	0.23	0.06	0.07	0.24
Adult respiratory	0.51	0.54	0.58	0.34	0.36	0.51	0.58	0.72	0.79
Adult circulatory	0.71	0.70	0.77	0.28	0.30	0.41	0.72	0.83	0.78
Adult misc.	0.45	0.50	0.59	0.37	0.38	0.58	0.44	0.46	0.79
Overall	0.38	0.48	0.66	0.33	0.40	0.56	0.46	0.55	0.69

SOURCE: Author’s analysis of Medicaid inpatient claims from each state.

NOTES: The R² is the reduction in variance in cost of inpatient stays due to the application of a grouping algorithm. Higher values indicate better performance. To calculate the R² by Medicaid Care Category (MCC), each MCC in each state was considered as a stand-alone data set. Data are untrimmed. CMS-DRG is Centers for Medicare and Medicaid Services DRG. AP-DRG is All Patient DRG. APR-DRG is All Patient Refined DRG. MH is mental health.

The most significant finding in Exhibit 5, true across all three states, was that APR-DRGs explained more variation in resource use than AP-DRGs and much more variation than CMS-DRGs.

Although the overall R² is an important summary measure, an algorithm also must be appropriate for major categories of patients. If hospitals can predict that certain cases will be underpaid, then access problems may arise for enrollees. Neonatal care and mental health are two examples where Medicaid’s size as a purchaser amplifies the need to calibrate payment carefully. R² results were therefore calculated for each Medicaid Care Category as a stand-alone data set. Four findings were notable for consistency across the states.

■ **Neonates.** First, APR-DRGs had much explanatory power in grouping neonates (babies under twenty-nine days old). Although expected, this finding is significant because it applies to one-quarter of Medicaid stays and because these stays can display sharp variation in cost. Whereas CMS-DRGs overpay for normal newborns and underpay for sick neonates, AP-DRGs and, especially, APR-DRGs brought payment-to-cost ratios much closer to equilibrium.

■ **Mental health.** Second, statistical performance was weakest in the mental health categories, although APR-DRGs had higher R² values than the other algorithms. This result was also expected, since similar prior analyses have been bedeviled by two data issues.²⁴ First, *International Classification of Diseases*, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis data do not reflect clinically important information about cognitive deficits, aggressive tendencies, and problems with the activities of daily living (ADLs). Also, nursing care and other routine costs make up more than 90 percent of the cost of mental health care, and cost-reporting con-

ventions require hospitals to report the same routine cost per day for all patients. Although these issues do not make DRGs inappropriate for mental health payment, they do mean that the topic requires additional analysis.

■ **Adults.** Third, APR-DRGs explained more variation in resource use than CMS-DRGs did, even for Medicare's core business—that is, adults with circulatory, respiratory, and miscellaneous conditions. This finding reinforces results from the Medicare population.²⁵ It appears to reflect more accurate capture of the interaction of illnesses in the most complex cases.

■ **AP-DRGs.** Fourth, AP-DRGs showed R^2 results between those of CMS-DRGs and APR-DRGs. This finding indicates that AP-DRGs remain a defensible method of setting Medicaid payment rates, even if they do not explain as much variation as APR-DRGs do.

Design Of A New Payment Method

A recent initiative by the Mississippi Division of Medicaid can serve as a case study for DRG-based payment. The previous method, dating from 1981, was to pay each hospital an interim per diem rate based on hospital-specific costs. The rate was subject to a cap based on costs of similar-size hospitals. Interim payments were then adjusted after settlement of cost reports, which took several years.

For Medicaid, this had major drawbacks: incentives that penalized hospitals for reducing cost, flat rates that took no account of how sick each patient was, sharp differences in payment among hospitals for similar services, lack of purchasing clarity, lack of control over spending, and the administrative burden of finalizing payment several years after discharge. Hospitals shared some of these concerns.

Following an assessment similar to that described above, Mississippi decided to design a new method based on APR-DRGs. An important decision was to apply the new method to all acute care hospitals, general and specialty, to create a level playing field. Medicare, by contrast, pays for two-thirds of its acute mental health stays on a per diem basis and one-third by DRG.²⁶

■ **Base payment calculation.** As with DRG-based methods in general, the base payment for each stay will be calculated as the relative weight for each DRG multiplied by a single base price. Although states that use CMS-DRGs often must calculate their own Medicaid-based weights, Mississippi can use national APR-DRG weights. The national weights were highly correlated with cost-based weights from Mississippi Medicaid data (for example, Pearson correlation coefficient = 0.96 for the fifteen most common DRGs and 0.89 for the fifty most common DRGs).

In calculating the budget-neutral base price, Mississippi built in a documentation and coding adjustment of -2.5 percent. A small but compelling literature shows that increased use of diagnosis and procedure coding in payment calculations prompts hospitals to code diagnoses and procedures more completely.²⁷ Absent a documentation and coding adjustment, payments would rise because of an

increase in measured case-mix attributable only to changes in coding practices.

■ **Payments for mental health stays.** Analysis of mental health issues generated the most important adaptations. First, a simulation using 54,000 stays showed that payments for mental health stays would decrease substantially under DRGs. Mindful of its size as a payer and the discretion that hospitals have to open and close psychiatric units, Mississippi put in place “policy adjusters” to explicitly boost payment-to-cost ratios for mental health.

Second, and in response to hospitals’ concerns, an analysis of Mississippi data showed that pediatric mental health patients consistently had longer lengths-of-stay and higher costs than adults in the same base APR-DRG. (Comparisons of severity were confounded by coding differences between general and specialty hospitals.) Separate pediatric and adult policy adjusters were created to bring payment-to-cost ratios closer to equilibrium. Thus, rates for adult and pediatric mental health stays will be 51 percent and 89 percent higher, respectively, than they would have been using national relative weights without adjustment.

Third, there was concern about payment for patients who require long lengths-of-stay because of unresolved homicidal, suicidal, or psychotic tendencies. In the simulation, a cost outlier payment pool, which DRG payers usually use to protect hospitals against exceptionally expensive cases, was drained by neonatal and pediatric transplant stays. For mental health stays only, the new method therefore will pay an additional \$375 a day once a stay exceeds nineteen days.

■ **Hospitals’ responses.** During eleven training sessions for 750 hospital staffers across Mississippi, no concerns were voiced about the appropriateness of payment by APR-DRG. Hospitals’ main requests were for smooth implementation and sufficient lead time. Implementation is expected in 2008.

■ **Top APR-DRGs.** Exhibit 6 shows summary statistics for the leading APR-DRGs by total payments. These fifteen groups accounted for 47 percent of stays and 28 percent of payments in the simulation. The coefficient of variation (CV) in cost (a measure of homogeneity of resource use within each group) was usually under 75 percent, which compares favorably with the CVs for the leading CMS-DRGs applied to the Medicare population.²⁸

Paying For Quality

■ **Paying for hospital-related complications.** Many researchers have noted that payment methods traditionally have been, at best, neutral on encouraging high-quality care. Patients in U.S. hospitals, for example, suffer from an estimated 1.7 million hospital-acquired infections and 99,000 related deaths a year.²⁹ Hospitals paid per diem or at a percentage of charges or costs will be rewarded for these complications if they result in more care being provided. Under CMS-DRGs, an infection or other complication can push an inpatient stay into a higher-paying group. Because MS-DRGs, AP-DRGs, APR-DRGs, and APS-DRGs take more than one complication into account, they actually create more opportunities for hospitals to receive higher

EXHIBIT 6
Top 15 APR-DRGs By Total Payments, Simulation Based On Mississippi Medicaid
Data For January–June 2006

APR-DRG	Description	Total payments (\$ millions)	Stays	ALOS (days)	Average charge (\$)	DRG base payment (\$)	CV cost (%)
540-1	Cesarean delivery	9.6	2,812	3.1	11,265	3,333	39
560-1	Vaginal delivery	8.4	4,533	2.2	6,010	1,801	40
640-1	Neo bwt >2,499 grams, normal newborn	6.8	11,071	2.7	2,116	592	114
560-2	Vaginal delivery	4.9	2,361	2.5	6,435	2,019	65
758-1	Childhood behavioral disorder	4.3	508	13.1	17,042	7,308	62
758-2	Childhood behavioral disorder	4.1	408	15.2	18,468	8,708	73
753-2	Bipolar disorders	4.0	500	10.8	15,669	8,318	65
540-2	Cesarean delivery	3.9	964	3.9	14,384	3,909	50
750-2	Schizophrenia	3.8	443	9.9	14,438	10,388	90
751-2	Major depressive disorder	3.6	557	9.9	14,951	7,043	75
591-4	Neo bwt 500–749 grams without major procedure	2.9	27	49.2	210,207	106,819	81
593-3	Neo bwt 750–999 grams without major procedure	2.7	40	60.6	141,697	70,125	44
139-2	Other pneumonia	2.6	643	3.8	10,165	3,976	84
753-1	Bipolar disorders	2.5	431	10.1	13,639	5,730	57
588-4	Neo bwt <1,500 grams with major procedure	2.1	13	125.6	423,640	134,181	52
	Subtotal, top 15	66.2	25,311	3.9	7,089		80

SOURCE: Mississippi Division of Medicaid; author's analysis of inpatient claims.

NOTES: Diagnosis-related group (DRG) base payment equals the relative weight times the DRG base price. For mental health (MH) DRGs, the DRG base payment also includes the pediatric MH policy adjuster of 1.89 and the adult MH policy adjuster of 1.51 (adult rates in parentheses). Total payments include DRG base payments plus DRG outlier payments. ALOS is average length-of-stay. CV is coefficient of variation (standard deviation expressed as a percentage of the mean); CV for the subtotal is the weighted average of the CVs for the top fifteen All Patient Refined (APR) DRGs. Neo bwt is neonatal birthweight.

payment for complications that might have been prevented.

These perverse incentives can be reversed, in part, by a single byte of data recently added to each diagnosis field on the standard hospital claim form. Effective 1 October 2007, hospitals nationwide must tell Medicare whether each complicating diagnosis was present on admission (POA) or developed during the stay. Starting 1 October 2008, Medicare will no longer consider certain diagnoses as complications if they were not POA. The proposed list includes catheter-associated urinary tract infections, pressure ulcers, and postoperative infections of the mediastinum. To avoid absorbing these costs, some hospitals have stepped up efforts to minimize complications.³⁰ Medicaid programs, regardless of which DRG algorithm they use, can follow Medicare in requiring the POA indicator and then disregarding potentially preventable complications in assigning a DRG.

■ **Pay-for-quality incentives.** To date, pay-for-quality incentives have been nota-

bly absent in Medicaid payment for inpatient care. Although Medicaid programs have offered such incentives to managed care plans for years, the first notable FFS incentive for hospital care was initiated by Pennsylvania in 2006.³¹ Arkansas followed suit in 2007, and other states are now considering initiatives. Medicare, which has steadily widened its footprint in quality reporting and pay-for-quality experiments, is the obvious model. However, its measures focus on heart failure, heart attack, and pneumonia—conditions that are much less prevalent in the Medicaid population. Medicaid programs must find a balance between targeting initiatives to the Medicaid population and minimizing the additional reporting burden on hospitals. Pennsylvania chose measures targeted to a Medicaid population (such as asthma readmission rates), while Arkansas lent its weight to the Medicare measures.

■ **Likely impact of using ICD-10 data.** Nationwide implementation of the ICD-10 diagnosis and procedure scheme will affect quality, by enabling computerized collection of clinical data that will be far more detailed than the current ICD-9-CM data. The switch to ICD-10, delayed for years, will occur in 2010 at the earliest. When it does, it also will require major changes to claims submission and processing systems at every U.S. hospital and Medicaid program.

With major changes looming in grouping by DRG, paying for quality, and coding diagnoses and procedures, payment for inpatient stays may well return to the forefront of Medicaid policy discussion. For policymakers and hospitals, the challenge, as always, will be to move forward in a way that improves beneficiaries' access to high-quality care.

.....
An earlier version of this paper was presented at the National Medicaid Management Information Systems conference in San Diego, California, 14 August 2007. Research for this paper was funded by ACS Government Healthcare Solutions and the Medicaid programs in Mississippi, Montana, and Rhode Island. Statements in the paper are those of the author and should not be attributed to ACS or the Medicaid programs. Neither the author nor ACS has any financial interest in the DRG algorithms discussed here. The author is very grateful to Roxanne Andrews, Darrell Bullocks, Richard Burford, Robert F. Coulam, Connie Courts, Deb Florio, Richard Jacobsen, Margaret King, Renee Leary, David Maatallah, Kurt Price, and Brett Williams for advice and assistance.

NOTES

- Centers for Medicare and Medicaid Services, "National Health Expenditures by Type of Service and Source of Funds, CY 1960–2005," http://www.cms.hhs.gov/NationalHealthExpendData/02_NationalHealthAccountsHistorical.asp#TopOfPage (accessed 20 February 2007).
- Agency for Healthcare Research and Quality, "Welcome to HCUPnet," <http://hcupnet.ahrq.gov> (accessed 5 September 2007).
- Author's calculations from CMS-64 report data. The figure excludes supplementary payments to disproportionate-share hospitals and payments to inpatient mental health facilities.
- The CMS-64 report shows total payments to comprehensive and inpatient-only managed care plans as \$46.4 billion for federal fiscal year 2005. From these payments the plans must pay for administrative costs as well as inpatient and outpatient care, physician services, and other covered services. The range of \$10–\$20 billion reflects several estimation procedures, including extrapolation from individual state experience and comparisons to spending by states that do not have managed care.
- A. Dobson, J. DaVanzo, and N. Sen, "The Cost-Shift Payment 'Hydraulic': Foundation, History, and Implications," *Health Affairs* 25, no. 1 (2006): 22–33.
- K. Quinn and M. Kitchener, "Medicaid's Role in the Many Markets for Health Care," *Health Care Financing*

- Review 28, no. 4 (2007): 69–82.
7. R.F. Coulam and G.L. Gaumer, “Medicare’s Prospective Payment System: A Critical Appraisal,” *Health Care Financing Review Annual Supplement 12* (1991): 45–77.
 8. K. Quinn, “How Much Is Enough? An Evidence-Based Framework for Setting Medicaid Payment Rates,” *Inquiry 44*, no. 3 (2007): 247–256.
 9. CMS, “Medicare Program: Changes to the Hospital Inpatient Prospective Payment Systems and Fiscal Year 2005 Rates,” Final Rule, *Federal Register 69*, no. 154 (2004): 48939.
 10. CMS, “Changes to the Hospital Inpatient Prospective Payment Systems and Fiscal Year 2008 Rates,” Final Rule, *Federal Register 72*, no. 162 (2007): 47130–48175.
 11. B.O. Wynn et al., *Evaluation of Severity-Adjusted DRG Systems*, Interim Report to the CMS (Santa Monica, Calif.: RAND, 2007).
 12. M. Schwartz and A.S. Ash, “Evaluating Risk-Adjustment Models Empirically,” in *Risk Adjustment for Measuring Health Care Outcomes*, 3d ed., ed. L.I. Iezzoni (Chicago: Health Administration Press, 2003), 231–274.
 13. P.B. Ginsburg, “Recalibrating Medicare Payments for Inpatient Care,” *New England Journal of Medicine 355*, no. 20 (2006): 2061–2064.
 14. CMS, “Changes to the Hospital Inpatient Prospective Payment Systems,” 47153.
 15. The example reflects 2006 data grouped using V.23 CMS-DRGs.
 16. B.O. Wynn and M. Scott, *Evaluation of Severity-Adjusted DRG Systems: Addendum to the Interim Report*, Report to the CMS (Santa Monica, Calif.: RAND, 2007).
 17. CMS, “Changes to the Hospital Inpatient Prospective Payment Systems,” 47152.
 18. J.H. Muldoon, “Structure and Performance of Different DRG Classification Systems for Neonatal Medicine,” *Pediatrics 103*, no. 1, Supp. E (1999): 302–318.
 19. Previous evaluations include *ibid.*; R.F. Averill et al., “The Evolution of Case Mix Measurement Using Diagnosis-Related Groups,” in *Physician Profiling and Risk Adjustment*, 2d ed., ed. N. Goldfield (Gaithersburg, Md.: Aspen, 1999), 391–454; and Wynn et al., *Evaluation of Severity-Adjusted DRG Systems*.
 20. For in-state hospitals, cost was estimated by multiplying claim charges by each hospital’s most recent Medicaid inpatient cost-to-charge ratio. For out-of-state hospitals, the study used the Medicare inpatient cost-to-charge ratio for the hospital’s home state.
 21. K. Dalton, *A Study of Charge Compression in Calculating DRG Relative Weights*, Report to the CMS (Research Triangle Park, N.C.: RTI International, 2007).
 22. Other results, including payment-to-cost ratios for neonatal care, are available from the author.
 23. Wynn et al., *Evaluation of Severity-Adjusted DRG Systems*.
 24. P.G. Cotterill and F.G. Thomas, “Prospective Payment for Medicare Inpatient Psychiatric Care: Assessing the Alternatives,” *Health Care Financing Review 26*, no. 1 (2004): 85–101.
 25. K.J. Hayes, J. Pettengill, and J. Stensland, “Getting the Price Right: Medicare Payment for Cardiovascular Services,” *Health Affairs 26*, no. 1 (2007): 124–136; and Medicare Payment Advisory Commission, *Report to the Congress: Physician-Owned Specialty Hospitals* (Washington: MedPAC, 2005).
 26. T.G. Thompson, *Prospective Payment System for Inpatient Services in Psychiatric Hospitals and Exempt Units*, Report to Congress (Washington: U.S. Department of Health and Human Services, 2002), 12.
 27. For a summary, see CMS, “Changes to the Hospital Inpatient Prospective Payment Systems,” 47175–47186.
 28. Ingenix Inc., *The Ingenix Response to the CMS Request for Alternatives to Consolidated Severity-Adjusted DRGs* (Rock Hill, Conn.: Ingenix, 2006), Appendix II.
 29. R.M. Klevens et al., “Estimating Health Care–Associated Infections and Deaths in U.S. Hospitals, 2002,” *Public Health Reports 122*, no. 2 (2007): 160–166.
 30. L. Landro, “Hospitals Combat Dangerous Bedsores,” *Wall Street Journal*, 5 September 2007.
 31. K. Kuhmerker and T. Hartman, *Pay-for-Performance in State Medicaid Programs* (New York: Commonwealth Fund, 2007).