
Use of Diagnosis-Related Groups by Non-Medicare Payers

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Medicare's prospective payment system (PPS) for hospital cases is based on diagnosis-related groups (DRGs). A wide variety of other third-party payers for hospital care have adapted elements of this system for their own use. The extent of DRG use varies considerably both by type of payer and by geographical area. Users include: 21 State Medicaid programs, 3 workers' compensation systems, the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), more than one-half of the Blue Cross and Blue Shield Association (BCBSA) member plans, several self-insured employers, and a few employer coalitions. We describe how each of these payers use DRGs. No single approach is dominant. Some payers negotiate specific prices for so many combinations of DRG and hospital that the paradigm that payment equals rate times weight does not apply. What has emerged appears to be a very flexible payment system in which the only constant is the use of DRGs as a measure of output.

INTRODUCTION

A variety of Medicaid programs and other third-party payers use DRGs to pay for hospital care. These payment systems are derived from Medicare's PPS, even though they differ from it in various ways. We have studied non-Medicare payers who use DRG systems to learn about the extent to which PPS payment rules, regulatory procedures, and data sources have been

modified to accommodate the needs of other payers. Non-Medicare payers who use DRGs have told us about the issues that they needed to address before using such a system in their environments and about how DRGs relate to their goals, constraints, and opportunities.

Prospective payment for hospitals has become much more common over the last decade. DRGs are just one of the ways that output can be measured within a PPS. Our study shows that different types of payers use DRGs in quite different ways within their PPSs. Government payers, namely Medicaid programs and CHAMPUS, have developed systems like Medicare's in that explicit rules are used to calculate payments. This causes all similar hospitals to be treated similarly. For payers that use a formula, we present detailed information about how the elements in the formula are calculated. Important elements of such systems, such as cost-based rate calculations and outlier payments, could also be used with non-DRG prospective payment systems.

Some private payers negotiate with hospitals about what the payment rate for each DRG will be. These payment systems are, of course, still DRG-based prospective payment systems. Calculation of the amount paid for a case by these private payers requires substantial details which are proprietary and which, we believe, are not of general interest. What appears to us to be of general interest is the extent of negotiation and the negotiating procedures rather than the detail of the individual rates, and, therefore, this is what we present. Many elements of the negotiating strategy could

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also be used with non-DRG prospective payment systems, and the reader may find some of this information useful in other contexts.

METHODOLOGY

The purpose of this study is to provide information that could be used in developing an optional hospital payment system based on Medicare's hospital payment methodology and to evaluate the viability of a PPS-like system for third-party payers. We will describe various existing non-Medicare DRG systems and evaluate aspects of these programs that are relevant to judgments of the viability of DRG systems and to design decisions concerning PPS-like payment systems for non-Medicare populations.

Our approach to this project was to obtain payment system information for each of the following categories of payers: State Medicaid programs, workers' compensation programs, Blue Cross/Blue Shield plans, managed-care organizations, commercial insurers, self-insured employers, and other Federal Government organizations. In several categories, we enlisted the help of agencies that are very familiar with the environment of each payer category and that are well respected by the payer community.

Medicaid

Data on State Medicaid and workers' compensation programs were gathered by the Intergovernmental Health Policy Project (IHPP). The States that use DRGs for their programs were identified through HCFA's State Profile Data System, using data for plans defined as of March 1992. This file identified 21 States that paid for hospital care using DRGs as a unit of payment. During May 1993, current hospital payment regulations and all other available

documentation were requested from each of these 21 States. This documentation was used to determine how each of the payment elements discussed for the Medicare program are designed in each State. Telephone inquiries were made to clarify points of fact, as necessary. To further ensure accuracy, the State summaries were sent to each State for review. We received information on the programs of all 21 States that use DRGs.

Workers' Compensation

Our subcontractor, IHPP, determined that DRGs were currently used by workers' compensation funds in only three States. The details of these uses of DRGs were obtained primarily through abstraction of State regulations but also by using telephone followups, as required.

Blue Cross/Blue Shield Plans

Blue Cross/Blue Shield plans represent a major portion of the market covered by private insurers, accounting for over \$50 billion in health insurance claims in 1989 (Prospective Payment Assessment Commission [ProPAC], March 1992). The BCBSA surveys member plans and affiliates annually. The survey contains a substantial amount of detail about hospital payment systems, including whether DRGs are used. BCBSA agreed to work with us to expand their survey with a special supplement for DRG users which would provide the additional detail required for this study.

BCBSA has 69 member plans, of which 65 sell hospital insurance in the United States. Each plan may sell a variety of insurance products such as a traditional indemnity plan (sometimes known as comprehensive major medical plan) and managed-care products including preferred provider organizations (PPOs),

health maintenance organizations (HMOs), and point-of-service (POS) plans. Many plans also have one or more independent HMOs affiliated with them. There are 160 such affiliated HMOs. BCBSA received responses to its main survey from 55 member plans (80 percent) and an additional 15 affiliated HMOs. We received useful responses to the supplemental survey from 36 plans and 7 affiliated HMOs. Only one plan and one affiliated HMO indicated DRG use in the main survey and did not respond to the supplemental survey. Thus 67 percent (37 of 55) of the responding BCBSA member plans use DRGs for at least one of their insurance products. Although the low overall response rate for HMO affiliates makes inference to the population unreliable, about one-half (8 of 15) of the responding HMO affiliates also use DRGs.

Managed-Care Organizations

Managed-care organizations, such as HMOs, that contract with hospitals represent a very rapidly growing segment of the insurance industry. We received a list from the Group Health Association of America (GHAA) of 64 HMOs that use DRGs. Of the 64 plans using DRGs, 36 used DRGs in 1991 for more than 50 percent of their cases. We eliminated HMOs located in New York and New Jersey because we presumed that they would closely follow the rules of the "all-payer-except-Medicare" systems in these States.¹ We contacted each of the remaining 23 HMOs that used DRGs for more than 50 percent of their cases and asked whether they were affiliated with BCBSA. All but three are affiliated with BCBSA, and thus received

¹New Jersey's all-payer system was no longer in effect as of January 1993 due to a 1992 court decision which held that New Jersey's uncompensated care pool violated the Employee Retirement Income Security Act (ERISA). This decision was overturned in an appeals court decision, but may be taken to a higher court.

our survey from BCBSA. We also received a short list of HMO plans that were believed to use DRGs from the Health Insurance Association of America (HIAA). Two additional HMOs were identified from that list. Because of the industry-wide coverage of GHAA and HIAA, we believe that there are few other HMOs that use DRGs outside of the all-payer States and BCBSA members.

We adapted the supplemental survey instrument which we had developed with BCBSA to a stand-alone instrument suitable for mailing to HMOs. GHAA supplied a letter endorsing our survey. We included the GHAA letter of endorsement with the survey instrument sent to the HMOs. All five HMOs responded to the survey.

Commercial Insurers and Large Employers

We decided to approach commercial indemnity insurers and employers who self-insure through site visits rather than mail surveys. We chose site visits because we felt we could more adequately deal with their concerns over proprietary data and because of the expected complexity of their payment systems. Large commercial insurers offer a variety of managed-care arrangements and indemnity plans. Large employers also often offer more than one health insurance plan to their employees. More importantly, their decisions are likely to be affected by factors specific to their sites of employment and possibly specific to their type of work.

In order to identify commercial insurers and large employers that use DRGs, we conducted numerous informal telephone conversations. We directly contacted each of the five largest commercial insurers. We contacted HIAA, were provided with a short list of probable DRG users, and contacted all of them. One small insurer we

contacted, which does not use DRGs, volunteered to present our project summary at a meeting of actuaries, attended by representatives of most of the major insurers. No one indicated that their company used DRGs outside of States where the DRG methodology is mandated.

To identify individual firms or benefits coalitions, we spoke to the Washington Business Group on Health, the National Business Coalition's Forum on Health, the Employment Benefits Research Institute, the Association of Private Pension and Welfare Plans, the Self-Insured Institute of America, private employment benefits consulting firms, and contacts that these groups referred to us (such as the Society for Professional Benefits Administrators). In turn, most of the above contacts made additional calls on our behalf to identify potential firms or benefits groups.

We conducted formal interviews at two firms, three employer coalitions, one small indemnity insurer in the Midwest, one insurer that is contemplating switching to DRGs, and one benefits advisory firm in the East. We also interviewed two commercial insurers that use DRGs in managed-plan products by telephone.

In preparation for the site visits, we prepared an interview guide to organize note taking, be positive that all topics were covered, and ensure consistency across interview sites. Following each site visit, lasting 1 to 3 hours, interviewees were asked to complete a survey form as background information. Six of those we visited complied; one did not.

Other Federal Payers

We used a combination of telephone interviews and mail survey to determine how DRGs are used within the Department of Defense (DOD) and the Department of

Table 1
Extent of DRG Use, by Payer Type

Payer Type	Use of DRGs (Percentage)
BCBSA Member Plans	37 of 55 plans (67)
Medicaid	21 of 51 programs (41)
CHAMPUS	1 of 1 plan (100)
Workers' Compensation	3 of 51 plans (6)
Health Maintenance Organizations	64 of 546 (12)
Commercial Indemnity Plans	Rarely
Self-Insured Employers	Rarely; Growing?

NOTES: DRGs are diagnosis-related groups. BCBSA is Blue Cross and Blue Shield Association. CHAMPUS is Civilian Health and Medical Program of the Uniformed Services.

SOURCE: Carter, G.M., Jacobson, P.D., Kominski, G.F., and Perry, M.J., RAND, 1994.

Veterans Affairs (DVA). The mail survey was used only for CHAMPUS, the plan which covers the civilian health care received by military dependents and retirees. Other departments use DRGs primarily for internal management purposes.

WHERE DRGS ARE USED

Payer Type

The proportion of organizations using DRGs varies substantially across the different groups of payers that we studied. Table 1 summarizes the extent of DRG use by the various sets of payers. About two-thirds of BCBSA member plans use DRGs to pay inpatient hospital expenses covered by at least one of their hospital insurance products.

A significant number of States use DRGs in their Medicaid program. As of the end of our study in January 1994, 21 States had such programs, with the earliest—in New Jersey—dating back to the early 1980s and preceding Medicare's implementation of DRGs. In addition, North Carolina passed legislation mandating DRG implementation by July 1, 1994.

CHAMPUS provides medical benefits for non-active duty military health care beneficiaries when care is not available from one of the services' medical treatment

Table 2
Location of BCBSA and Medicaid Programs Using DRGs

Census Division	BCBSA Member Plans	Respondents Using DRGs	Number of Medicaid Programs	Programs Using DRGs
Total	65	36	51	21
New England	6	1	6	1
Middle Atlantic	11	8	3	3
South Atlantic	8	2	9	1
South Central	8	6	8	1
East North Central	7	4	5	4
West North Central	8	4	7	5
Mountain	8	6	8	4
Pacific	9	5	5	2

NOTES: BCBSA is Blue Cross and Blue Shield Association. DRGs are diagnosis-related groups.

SOURCE: Carter, G.M., Jacobson, P.D., Kominski, G.F., and Perry, M.J., RAND, 1994.

facilities. Since Federal fiscal year (FY) 1988, CHAMPUS has used a PPS modeled after Medicare's PPS.

Only three States are currently using DRGs for inpatient hospital payments under their workers' compensation programs: New York, Oklahoma, and Washington. New York has a common PPS for Medicaid and workers' compensation; Washington has different PPS for Medicaid and workers' compensation; and Oklahoma does not use DRGs for its Medicaid program. New Jersey included workers' compensation in its all-payer system which ceased to exist in January 1993.

To estimate use of DRGs by health maintenance organizations, we use GHAA data. It identified 64 members that use DRGs. However, many of these HMOs use DRGs to pay for a relatively small portion of their cases. Only 36 HMOs are known to use DRGs for more than one-half of their cases. BCBSA-affiliated HMOs are more likely to use DRGs than other HMOs.

Our methodology does not result in quantitative estimates of the rate of use of DRGs by either commercial insurers or by self-insured employers. However, our extensive attempts to locate firms using DRGs has convinced us that their use in these two sectors is quite rare, with the exception of where DRG use is mandated

by law. As detailed in the Methodology section, we conducted numerous informal telephone interviews to identify entities using DRGs. The entire set of DRG users found as a result of these efforts was one indemnity insurer, two self-insured firms, three employer coalitions, and one benefits advisory firm. This firm had dozens of clients (usually self-insured employers) that used DRGs and had seen a recent rapid increase in the use of DRGs among its clients.

Geographic Distribution

DRGs are used in all regions of the country. However, they are least likely to be used by either Medicaid or BCBSA members in New England and the South Atlantic and by Medicaid only in the South Central (Table 2). DRGs are most likely to be used in the Middle Atlantic States because two of these three States (New York and New Jersey) mandated DRGs as part of an "all-payer-except-Medicare" system². In general, States using DRGs in the Medicaid program are much more likely to have at least one BCBSA member plan that also uses DRGs (81 percent) than States that don't use DRGs for Medicaid

²New Jersey ceased its mandatory all-payer system on Jan. 1, 1993. See footnote 1 for further discussion.

(20 percent).³ The exceptions are concentrated in the South Central Division where BCBSA member plans frequently use DRGs, although Medicaid does not.

Plan Size

Among the States that chose to use PPS for their Medicaid program are 7 of the 10 States with the highest aggregate FY 1991 Medicaid spending levels—New York (first), Ohio (third), Texas (fourth), Pennsylvania (fifth), Illinois (eighth), New Jersey (ninth), and Michigan (tenth), which collectively accounted for about 41.9 percent of Medicaid spending nationally. If the remaining 14 States with PPS Medicaid hospital reimbursement systems are added in, the 21 State total accounts for 53.4 percent of national Medicaid spending and 50.3 percent of inpatient hospital Medicaid spending. Thus, roughly one-half of total Medicaid inpatient hospital expenditures are now made through prospective payment systems. There is little relationship between plan size and whether BCBSA member plans use DRGs.

Medicaid Cost Shifting

The use of DRGs does not appear to be related to the amount of costs that Medicaid does not pay and that hospitals, therefore, must seek from other payers. There is no relationship between the use of DRGs and the extent to which the Medicaid program covers the full cost of care for Medicaid patients. We used analyses from the American Hospital Association, as reported by Congressional Research Service (1993), to estimate the percent of Medicaid hospital expenses that were covered by Medicaid payments in each of FY 1989 and FY 1990. We classified

States by whether they were using DRGs in the year of the data and found no statistically significant difference ($p > .1$ in both cases) between users and non-users of DRGs. In both years, DRG users were only slightly more likely to pay more of costs than the nationwide average than were non-users. In 1989, 11 out of 18 (61 percent) Medicaid programs that used DRGs paid a higher-than-average percentage of Medicaid costs, compared with 19 out of 33 (58 percent) programs that did not use DRGs.⁴ In 1990, 15 out of 19 (79 percent) Medicaid programs that used DRGs paid a higher-than-average percentage of Medicaid costs, compared with 18 of 32 (56 percent) for non-DRG programs.⁵ Means of the percent of Medicaid costs covered by Medicaid for DRG users and non-users were 82.6 and 81.2 in 1989 and 84.5 and 81.0 in 1990, respectively.

SURVEYS

In this section, we report on adaptations of Medicare's PPS for three programs for which population-based data are available—Medicaid, BCBSA plans, and HMOs. The next section will discuss the use of DRGs in the commercial and self-insured sectors where population estimates are not available and in the non-Medicare Federal programs that are one-of-a-kind plans. Our description of payers' DRG systems will be given partly in terms of deviations from Medicare's PPS. In the Technical Note, we describe the major features of Medicare's PPS. Readers unfamiliar with Medicare's PPS may wish to glance at this Technical Note before reading this section.

⁴Results are similar if we use ProPAC's analyses of the FY 1989 AHA data to estimate the percent of Medicaid hospital expenses that are covered by Medicaid payments (Baldwin and Iverson, 1991, Table 3-1): 11 out of 18 for DRG users, and 18 of 33 for non-users.

⁵Fisher's exact test for significance was $p = .14$ in 1990 and $p > .5$ in 1989.

³The chi-square for independence is 18.5 with 1 degree of freedom ($p < .001$).

Table 3
Sample of BCBSA Products that Use DRGs

Product Type	Total	Number of Plan Respondents	Number of Affiliate Respondents
Traditional	32	32	0
PPO	27	26	1
HMO	25	18	7
POS	16	15	1
Total Products	100	91	9
Number of Respondents	43	36	7

NOTES: BCBSA is Blue Cross and Blue Shield Association. DRGs are diagnosis-related groups. PPO is preferred provider organization. HMO is health maintenance organization. POS is point-of-service.

SOURCE: Carter, G.M., Jacobson, P.D., Kominski, G.F., and Perry, M.J., RAND, 1994.

Overview of Plans Using DRGs

Almost all State Medicaid programs using DRGs use a system like Medicare's in which participation in the program is open to all (or almost all) hospitals in the State and the State announces the algorithm it will use to determine how much it will pay for the cases. Exceptions include Michigan and Washington which have selective-contracting waivers from HCFA. Washington State has contracted with 24 hospitals in 6 geographic areas. Hospitals are chosen for the contract based on quality of care, access requirements, and price. The price set for a selective-contracting hospital depends on its own bid price. Hospitals not chosen for the selective contract continue to provide emergency services to Medicaid beneficiaries and are paid for these services on the same basis as hospitals outside the selective-contracting area. These non-contract hospitals in the contract areas are not paid for non-emergency care.

The BCBSA member plans have a variety of arrangements with hospitals. Thirty-six member plans and seven affiliated HMOs responded to our survey. For stylistic simplicity, we will use the term "BCBSA member" to describe this collection of 43 organizations. These BCBSA members used DRGs with 100 separate insurance products (Table 3). Member plans offer

any of four different kinds of products; the HMO affiliates do not offer a traditional indemnity product but may offer any of the other three products. Thirty-two of the 36 respondent plans (89 percent) reported using DRGs for their traditional plan. The other two-thirds of the products are based on hospital networks. In the PPOs,⁶ the BCBSA member contracts with selected providers who furnish services at lower-than-usual fees in return for prompt payment and a certain volume of services. In their HMO product, the BCBSA member arranges for delivery of comprehensive health care services and assumes all risk for the cost of the services. To keep costs down, HMOs also usually hospitalize preferentially in selected hospitals. A POS program provides a higher level of benefits when a patient's care is received from (or at the direction of) his or her designated primary care provider. In all four products, there may be a designated network of hospitals that have agreed to accept the DRG payment as payment in full, and patients may be responsible for extra charges when they use a hospital outside the network. Responsibility for charges beyond the DRG amount when using an out-of-network hospital is less likely to occur when the hospitalization is an emergency (27 out of

⁶The definitions of products used here are adapted from the glossary BCBSA distributed with its annual survey.

Table 4
Method of Ratesetting, by Product Type

Type of Ratesetting	All BCBSA	BCBSA Traditional	BCBSA PPO	BCBSA HMO	BCBSA POS	Medicaid	Other HMO
	Number						
Negotiation	31	8	8	10	5	0	0
Hospital-Specific Cost	15	7	3	3	2	8	2
Peer Group	18	5	4	6	3	6	2
Formula	2	1	0	1	0	3	0
Mixed/Other	23	9	8	4	2	4	1
Total	89	30	23	24	12	21	5
Missing	11	2	4	1	4	0	0
	Percent						
Negotiation	35	27	35	42	42	0	0
Hospital-Specific Cost	17	23	13	12	17	38	40
Peer Group	20	17	17	25	25	29	40
Formula	2	3	0	4	0	14	0
Mixed/Other	26	30	35	17	18	19	20
Total	100	100	100	100	100	100	100

NOTES: BCBSA is Blue Cross and Blue Shield Association. PPO is preferred provider organization. HMO is health maintenance organization. POS is point-of-service.

SOURCE: Carter, G.M., Jacobson, P.D., Kominski, G.F., and Perry, M.J., RAND, 1994.

84 products for which data are available, 32 percent) than when it is not an emergency (55 out of 84, 65 percent).

An even closer relationship between insurance product and hospital occurs when the HMO is owned by a hospital or group of hospitals, or when the hospitals are managed by the HMO. Two of the five HMOs that are non-BCBSA members and answered our survey are such hospital-based HMOs. In both cases, DRGs are used to help manage the HMO hospitals. In one case, the HMO also contracts with externally managed hospitals and uses DRGs for payment of these external hospitals. The other three HMOs are organized similarly to the BCBSA HMOs, in which the HMO contracts with hospitals and uses DRGs to pay the hospitals.

Rate Basis

Table 4 counts plans according to the method used to set rates in the DRG payment formula. Negotiation is the single strategy most commonly used to set rates for BCBSA products, but is never the sole method used by Medicaid agencies. We

categorize a plan as using "hospital-specific cost" when the rate for a hospital is based on an estimate of its own cost. Under the peer group method, the hospital's rate is based on the average cost at a group of similar hospitals (i.e., peer hospitals). Under the formula method, the rate is adjusted based on characteristics of the hospital (e.g., the extent of teaching program). Table 5 presents the basic characteristics of each of the 21 State Medicaid PPS structures, including ratesetting method.

Hospital-Specific Cost

The most common basis for setting Medicaid hospital rates is to use the hospital's own cost. This method is also used by 17 percent of BCBSA products and two of the five non-BCBSA HMOs. Plans using this method estimate a hospital-specific average allowable cost per beneficiary admission, usually excluding costs for which the insurer provides extra payment such as outlier costs, transfer case costs, capital costs, direct medical education costs, et cetera. The payment rate is then based on this average cost divided by the

Table 5
Basic State Medicaid Hospital Prospective Payment System Characteristics

State	Implementation Date	How Hospital Rates are Set	DRG Set Used	Frequency of DRG Update	Weights Used	Frequency of Weight Update
Colorado	December 15, 1989	Hospital cost	Medicare	1 year	South Carolina	1 year
Illinois	September 1, 1991	Medicare formula	Medicare +	1 year	State's own	3 years
Iowa	October 1987	Hospital cost	Medicare		State's own	1 year
Kansas	July 1, 1989	Peer group with hospital-specific education adjustment	Medicare	1 year	State's own	
Michigan	February 1, 1985	Hospital cost	Medicare	2 years	State's own	
Minnesota	August 1985	Hospital cost	Medicare (Condensed to 76 DRGs)		State's own	2 years
Montana	Fall 1987	Peer group	Medicare		State's own	
New Hampshire	January 1, 1989	One rate	Medicare	1 year	HCFA + State's own (Psychiatry)	1 year
New Jersey	1980-82	Hospital characteristics formula	New York State		State's own	1 year
New Mexico	February 1, 1989	Hospital cost	Medicare	3 years	State's own (Amplified)	3 years
New York	January 1988	Mixed	New York State		State's own	
North Dakota	July 1, 1987	Peer group	Medicare	1 year	State's own + Montana	1 year review
Ohio	October 1984	Peer group	Medicare +		State's own	
Oregon	October 1985	Hospital cost	Medicare +	1 year	State's own	1 year
Pennsylvania	July 1984	Hospital cost	Medicare		State's own	
South Carolina	December 1986	Mixed	Medicare	1 year	State's own	
South Dakota	January 1985	Hospital cost	Medicare	1 year	State's own	1 year
Texas	September 1986	Peer group	Medicare	1 year	State's own	1 year
Utah	July 1983	Mixed	Medicare		State's own + HCFA	
Washington	January 1985	Mixed	New York State		State's own + New York State	
Wisconsin	January 1, 1991	Hospital characteristics formula	Medicare +	1 year	State's own	1 year

NOTES: DRG is diagnosis-related group. HCFA is Health Care Financing Administration.

SOURCE: Carter, G.M., Jacobson, P.D., Kominski, G.F., and Perry, M.J., RAND, 1994.

hospital's case-mix index⁷ and updated to reflect budgetary decisions and/or to provide an allowance for inflation. This calculation directly provides the payment rate used by Medicaid programs in Minnesota, Pennsylvania, and New Mexico.

A slight variant of this system is to calculate the cost-based hospital-specific rate and then apply a ceiling to derive the payment rate. For example, South Dakota caps its Medicaid rate at 110 percent of the statewide weighted average rate. As another example, Colorado applies separate ceilings for the payment of routine operating costs, ancillary operating costs, capital costs, graduate medical education, and physician costs.

The last variant of a hospital-specific cost-based rate is found in the Iowa Medicaid program which uses a 50-50 blend of hospital-specific operating costs with the statewide average operating cost.

Peer Groups

About one-fifth of each of BCBSA products and Medicaid programs base payments on peer groups, as do two of the five surveyed HMOs. The BCBSA products that used peer groups typically defined them based on urban or rural location and hospital size. Teaching programs were used by one-half of the products. Case-mix index was used by one product. None of the BCBSA products used either disproportionate share or publicly owned status to define peer groups.

One of the non-BCBSA HMO plans that uses peer groups defines the groups based on hospital size and whether the hospital is a shareholder of the HMO. The other

HMO counted as using peer groups pays all hospitals the same rate.

We counted New Hampshire in the peer group row of Table 4. This is the only State that currently offers a single Medicaid rate to all hospitals. Texas defines its peer groups based on the hospital's case-mix-adjusted cost per case, using \$100 increments. Montana created a peer group of referral hospitals. All other hospitals constitute the other peer group. However, instead of establishing two payment rates, Montana decided (based on a recommendation from Abt Associates) to establish two sets of DRG weights and use a single payment rate.⁸ The other States that use peer groups define them based, at least in part, on hospital size, teaching status, and geographic region.

Formula

Two States—New Jersey and Wisconsin—have chosen to use a formula to adjust Medicaid payment rates based on hospital characteristics. A third State, Illinois, uses Medicare's payment rate which, of course, is basically from a formula. The most interesting formula element is that Wisconsin has chosen to pay hospitals in Milwaukee County at a rate 10 percent higher than otherwise similar hospitals in order to account for adverse selection into the fee-for-service population because of the mandatory HMO preferred enrollment initiative. New Jersey didn't calculate DRG relative weights and apply a DRG rate. Rather, it calculated a DRG-specific "standard patient care cost per case" which it then adjusted, based on hospital characteristics and hospital-specific indirect costs.

⁷The case-mix index is the average DRG weight for cases at the hospital.

⁸A variety of States use hospital characteristics to calculate weights for one or more special-patient populations. This is covered in more detail in our discussion of weight calculations.

Mixed

Most of the methods of calculating payment rates classified as "Mixed/Other" in Table 4 mix elements of the preceding three "pure" strategies. This includes five BCBSA products for which negotiation is combined with hospital-specific rates determined through cost analysis. Our interpretation of these responses is that cost analyses are used as the basis for negotiations with hospitals. This procedure is used by other insurers, employers, and employer agents and will be discussed further in the Case Studies section. If this interpretation is correct, fully 40 percent of all BCBSA product rates are set by negotiation.

Medicaid agencies in Utah, New York, South Carolina, and Washington also use mixed systems. Utah pays hospitals rates which are either hospital-specific or the same for all hospitals, using hospital-specific rates for particular DRGs with highly variable charges and/or high average charges and the single statewide rate for the remaining DRGs.

New York uses a rate which is a formula adjustment of peer group average operating costs to which a hospital-specific component is added. Because New York has an "all-payer-except-Medicare system," the same system is used by BCBSA members and other insurers in the State.⁹ In calculating non-Medicare average cost per admission in each peer group, New York subtracts subacute services furnished in the hospital setting (alternate level of care [ALC] costs), outlier costs, and transfer costs, and then standardizes for utility costs, a hospital-specific wage index, and the case-mix index. The peer group

component of the payment rate is the group average standardized cost per admission times the hospital's wage index, power (utility) index, and indirect medical education cost factor (currently identical to Medicare's formula). To this peer group component is added a hospital-specific rate to cover operating costs associated with malpractice insurance, ambulance services, organ acquisition, schools of radiology, nursing, and/or laboratory technology.

South Carolina uses a hybrid PPS in which all cases are classified by DRG, but some DRGs are paid on a per diem basis and others on a per case basis. DRG categories that are frequent, relatively homogeneous, and considered by clinical experts not to be of a highly specialized nature are paid by DRG and the per diem method is used for the remaining DRGs.

Washington uses two kinds of DRG rates. Hospitals participating through a selective contract are paid a rate based on the price that the hospital bid. Hospitals outside of the contract areas, as well as non-contract hospitals within the contract areas that provide emergency hospitalizations, are paid using a hospital-specific, cost-based rate. The hospital-specific rates are capped, with different ceilings being used for non-teaching hospitals, teaching hospitals, and specialty hospitals.

Updating the Rates

In Table 6, information is presented on how States update inpatient hospital payments under PPS between rate rebasings. Six States indicate that they use the Medicare (i.e., Data Resources, Inc./McGraw-Hill [DRI]) market basket as an inflation adjustment in updating payments, 3 use Medicare update rates for either PPS or Tax Equity and Fiscal Responsibility Act-covered hospitals, while 10 others

⁹Rates actually differ somewhat from one payer to the next. BCBSA members pay a per discharge amount for participation in a Statewide Planning and Research Cooperative System which Medicaid does not pay.

Table 6
State Provisions for Updating Medicaid PPS Rates Between Rebasing Calculations

State	Factors Used to Update Payment
Colorado	Medicare market basket, three geographic caps
Illinois	Medicare updates
Iowa	Inflation update factors (discontinued July 1, 1993)
Kansas	Separate ancillary and accommodation inflation rates
Michigan	Medicare market basket, ceilings/caps are imposed
Minnesota	Minnesota market basket
Montana	Not available
New Hampshire	Inflation adjustment
New Jersey	TEFRA update (inflation) and technology update factors
New Mexico	PPS update factor
New York	DRG creep factor (1 percent case-mix change cap), peer group average charges/costs, trend and roll factors, volume adjustments, cost base enhancements
North Dakota	Not available
Ohio	Index based on weighted average of 17 components indexes including both consumer and producer price indexes and both national and regional indexes
Oregon	Medicare market basket; capped
Pennsylvania	Medicare market basket
South Carolina	Lowest of three inflation options (Medicare market basket, TEFRA update, policy factor)
South Dakota	Inflation factors, capped
Texas	Inflation index (three options), budgetary reduction factor
Utah	Factors for economic trends and conditions
Washington	Caps by peer group, Medicare market basket
Wisconsin	Factor for inflation

NOTES: TEFRA is Tax Equity and Fiscal Responsibility Act. PPS is prospective payment system. DRG is diagnosis-related group.

SOURCE: Carter, G.M., Jacobson, P.D., Kominski, G.F., and Perry, M.J., RAND, 1994.

report the use of other inflation factors. This includes Minnesota where the elements of the DRI market basket are weighted using Minnesota data to produce a Minnesota-specific inflation rate.

Cost Elements Included in Rates

Some plans follow the original Medicare practice of providing payments for some kinds of costs on a non-DRG basis and include different cost elements in their PPS rates. As shown in the first three rows of Table 7, Medicaid plans are much more likely than BCBSA members to provide separate payments for capital costs, teaching costs, and disproportionate share costs. However, most of the BCBSA plans include payments for these items within the DRG rate.

DRG Definitions

Thirteen of the 21 PPS Medicaid State programs have chosen to use the Medicare

DRGs without change.¹⁰ Four additional States expanded the Medicare DRGs slightly to tailor their systems to their population. Wisconsin expanded the DRGs in major diagnostic category (MDC) 15 (neonatal care) and in MDC 19 (psychiatric care). Wisconsin's DRGs in MDC 19 are based in part on the kind of hospital providing the care. Oregon expanded the neonatal care DRGs and provides three rehabilitation DRGs. Illinois added four DRGs for care in neonatal intensive care. Ohio added neonatal DRGs based on both birth weight and level of care. New York has opted to develop its own State-specific DRGs, also known as the 3M All-Patient DRGs.¹¹ These DRGs were adopted by neighboring New Jersey, and, in July 1993, by Washington.

¹⁰In one State (Michigan), DRGs are defined based on a maximum of only two diagnoses and two procedures.

¹¹Developed by 3M Health Information Systems.

Table 7
What is Included in DRG Payment?

Cost Type	BCBSA Products				Medicaid Plans			
	Total	Included	Separate Payment	Not Paid	Total	Included	Separate Payment	Not Paid
				Number				
Capital	95	85	4	6	21	9	12	0
Direct Teaching	91	76	6	9	21	10	11	0
Indirect Teaching	92	81	1	10	21	15	5	1
Disproportionate Share	93	68	0	25	21	7	14	0
Uncompensated Care	92	71	2	19	21	1	5	15
				Percent				
Capital	100	89	4	7	100	43	57	0
Direct Teaching	100	83	7	10	100	48	52	0
Indirect Teaching	100	88	1	11	100	71	24	5
Disproportionate Share	100	73	0	27	100	33	67	0
Uncompensated Care	100	77	2	21	100	5	24	71

NOTE: Data missing for 5 to 9 BCBSA products, depending on item. DRG is diagnosis-related group. BCBSA is Blue Cross and Blue Shield Association. SOURCE: Carter, G.M., Jacobson, P.D., Kominski, G.F., and Perry, M.J., RAND, 1994.

The remaining State, Minnesota, bases its system primarily on Medicare DRGs, but compresses them into 76 diagnostic categories. Typically, these diagnostic categories are groups of DRGs in the same MDC.

The BCBSA members also frequently found the Medicare DRGs to be suitable. Sixty-eight of our respondents used the Medicare DRGs for 71 percent of the sample products.¹² The New York DRGs appear to be used almost exclusively by BCBSA members in New York and New Jersey where their use is or was mandated. A few of the remaining BCBSA members expanded the Medicare DRGs by adding categories for neonates and cardiology.

One BCBSA member plan with four products negotiates different payment categories with different hospitals, using a much smaller number of categories than in the Medicare DRGs. Prices are directly negotiated for each of these categories, rather than using DRG weights. However, a case-mix index based on Medicare DRG weights is calculated within each of these payment categories and used during price negotiations.

¹²Based on the 40 respondents for whom DRG definitions are available.

Of the five HMOs not affiliated with BCBSA, three use the Medicare DRGs, one the New York State DRGs, and one an expanded version of Medicare's DRGs.

DRG Weights

Payments to a hospital are usually proportional to DRG weights. The majority (55 percent) of BCBSA products calculate their own weights, with an additional 21 percent using weights from other BCBSA members or a mixed system. Only 10 percent of the BCBSA members use HCFA Medicare weights. As mentioned, one BCBSA member plan does not use DRG weights for payment. Two non-BCBSA HMOs calculate their own weights, two use published weights, and one uses different payment rates for DRG-hospital pairs and thus never calculates a DRG weight.

Medicaid Weights

All States develop their own State-specific Medicaid weights. In most cases, Medicaid weights are derived using claims data for the State's own Medicaid program so that the weights reflect the services

actually delivered to the payment system's clients. A variety of strategies are used for those DRGs for which insufficient State-Medicaid-specific data are available. Oregon mixes and matches, using Medicaid data when the sample is large enough and utilizing all Oregon claims (or even Medicare weights or other sources) when the Oregon Medicaid sample is too small. New Mexico also imports relative weights from other sources, including Medicare and CHAMPUS. North Dakota calculates its own weights for 60 DRGs that account for 73 percent of Medicaid expenditures and uses weights from Montana for the remaining, low-frequency DRGs. In New York, a statewide data base (reflecting claims for all payers) is used for all DRGs. Both Medicaid and BCBSA members in New York use the weights published by New York State. In New Jersey, standard amounts per DRG are based on payer.

Several States use Medicare weights to develop Medicaid weights, although none use Medicare weights exclusively. New Hampshire uses State-specific case weights only for psychiatric care and for rehabilitation DRG. Illinois uses length-of-stay (LOS) data from its Medicaid claims to adjust the Medicare weights.

Cost/Charge-Based Weights and Standardization

Many States (including Kansas, Pennsylvania, and Minnesota) use the departmental ratio of cost-to-charges (RCC) method (Newhouse, Cretin, and Witsberger, 1989) to estimate the cost of their cases in weight calculations. Others (e.g., Michigan) use a single Medicaid-specific RCC to calculate cost-based weights. Most of the remainder have adopted HCFA's method of using charges for weight calculations.

There are many cost standardization algorithms in use. Four States adjust their weight calculations for teaching programs, four for average hospital-specific costs or wages, one for disproportionate shares of indigent patients, and three for wages in the geographic area. States that combine data from different temporal periods adjust the data for inflation before calculating weights.

Weights for Special Case Groups

A variety of States use hospital characteristics to calculate weights for one or more special patient populations. For example, Michigan uses "alternate" weights for cases in DRGs 385 through 390 in specially designated units that provide neonatal intensive care. Iowa provides different weights based on three levels of neonatal unit, type of unit providing psychiatric care, and type of unit providing substance abuse care. For example, the DRG weight for an adolescent substance abuse case depends on whether the patient was treated in an adolescent-only unit or a mixed-age unit. New Hampshire calculates only a limited set of case weights but it calculates separate weights for care in different classes of psychiatric units. We previously discussed Montana which uses separate weights for a subset of DRGs in referral hospitals. Alternate weights serve the same purpose as expanding the DRG set to include the kind of hospital providing the care as is done in Ohio, Wisconsin, and Illinois. Thus, one-third of the State Medicaid programs find that the linear model of DRG payment equal to DRG weight times hospital rate is not adequate and that an interaction term where the hospital adjustment depends on the type of DRG is needed. This is most often found for neonatal and psychiatric care, but other examples include rehabilitation and tertiary care DRGs.

Table 8
Exclusions From DRG System

Type of Case	BCBSA Products			Medicaid Plans		
	Number of Products		Percent Excluded	Number of Plans		Percent Excluded
	Excluded	Included		Excluded	Included	
Hospital						
Small Rural	50	39	56	3	18	14
Psychiatric	82	10	89	16	5	76
Pediatric	37	38	49	7	14	33
Rehabilitation	12	NA	NA	12	9	57
Unit						
Psychiatric	59	32	65	10	11	48
Pediatric	15	75	17	—	—	—
Rehabilitation	57	34	63	13	8	62
Intensive Care	15	75	17	—	—	—
Perinatal	NA	NA	NA	2	19	10
Substance Abuse	NA	NA	NA	3	18	14

NOTES: BCBSA is Blue Cross and Blue Shield Association. NA is not available.

SOURCE: Carter, G.M., Jacobson, P.D., Kominski, G.F., and Perry, M.J., RAND, 1994.

Updates

Weight updating occurs annually for eight States, biennially for one State, and triennially for two States. (See Table 5 for State identities.¹³) North Dakota reviews its weights annually to determine if they should be updated. The remaining 10 States have no set schedule for updating weights, although in practice some, including New York, have been updating each year. However, several States have gone for 4 or more years without an update. Similarly, only a little more than one-half of the BCBSA members update annually (59 percent of respondents and 54 percent of products) and 18 percent have never updated. BCBSA products that use published weights are more likely to update annually.

Exclusions from DRG System

Table 8 provides counts of the plans which exclude each type of hospital and unit. Small rural hospitals are much more likely to be excluded from the DRG system

by BCBSA products than by Medicaid plans. Very few plans of either type include stand-alone psychiatric hospitals in their DRG plan. One-half of BCBSA products and one-third of Medicaid plans exclude children's hospitals.

Every State with a Medicaid PPS exempts certain types of hospitals from payment under the system and 13 States exempt certain categories of hospital units from payment under Medicaid PPS. Illinois allows sole community hospitals to choose between the DRG system and cost-based reimbursement. Several of the States that include payment for psychiatric units and perinatal units within the DRG system have developed either separate weights or separate DRGs for different types of unit.

Some additional services beyond those listed in Table 8 are excluded from some PPSs. Eight Medicaid programs and several BCBSA plans exclude one or more categories of transplant surgery. Other categories excluded by at least one product included: coronary artery bypass graft surgery, all open heart surgery, all cardiac cases, burns, trauma, lithotripsy, psychiatric, rehabilitation, and substance abuse cases.

¹³States using Medicare DRGs that do not update their weights annually are using old DRGs.

Outlier Payments

Outlier cases are cases that are so atypical for their DRGs that the DRG payment does not constitute appropriate reimbursement. Cost outliers are extremely costly cases; day outliers are those that stay in the hospital for an exceptionally long time. Fifty-eight BCBSA products use day outliers and 56 use cost outliers. Three of the HMOs use only cost outliers and one uses both day and cost outliers. The fifth plan allows the details of its outlier policy to vary with the individual hospital contract.

Table 9 presents a summary of information on how Medicaid programs handle outlier cases. All but one State (Washington) use LOS to define a day outlier; 17 States (including Washington) define high-cost outliers. The Omnibus Budget Reconciliation Act (OBRA) of 1990 requires all Medicaid programs to make outlier adjustments for medically necessary inpatient hospital care in all hospitals for infants under 1 year of age and in disproportionate share hospitals for all children under 6 years of age. However, most States provide outlier adjustments for all patients. Exceptions are Texas, which restricts outlier payments to care of patients who are under 21 years of age, and New Mexico, which restricts outlier payments to children who meet the OBRA criteria. Wisconsin's cost outlier provisions cover all patients, but day outlier payments are available only for children who meet the OBRA criteria. Similarly, Oregon's cost outlier provisions cover all patients, but day outlier payments are available only for children under 6 years of age at disproportionate share hospitals.

Almost all States have chosen a variant of Medicare's rule that payment for outlier cases should equal an estimate of marginal cost after a case crosses the threshold. Under this rule, day outliers receive the DRG payment

plus a per diem for each outlier day. The day outlier per diem is usually calculated as a fraction of the average cost of a day in the DRG. The analogous high-cost outlier payment is a fraction of costs after the case passes a threshold. The threshold(s) are usually DRG-specific and based on the mean and standard deviation of LOS and cost within the DRG. Wisconsin uses fixed-loss threshold for cost outliers (i.e. the threshold equals the payment plus the loss amount) with a loss amount that differs for small and large hospitals.

Outlier Status and Thresholds

Texas, Michigan, Wisconsin, and Illinois pay the maximum of day or cost. Cost outliers take precedence in South Dakota and Iowa. The procedures of other States are not clear from their regulations.

Payment as Catastrophic Case

Some payers choose to treat some or all outliers as if they were an entirely different class of case and provide payment related to the total cost of the case, rather than to the cost of the case after it passes the threshold. For example, New Mexico pays its Medicaid outlier cases 90 percent of estimated cost. Two of the five HMOs also pay outlier cases a percent of charges. Ohio pays full estimated cost for all cases with costs in excess of \$250,000. Montana puts aside a limited amount of funds that, at the end of the year, are apportioned across cases with billed charges in excess of \$125,000. New Hampshire puts aside a pool for catastrophic cases to be used "at the sole discretion" of a State office.

Use of Short-Stay Outliers

Iowa, Michigan, New Jersey, New York and North Dakota do not use the DRG payment for short-stay outliers and Washington uses a

Table 9
Provisions for Outliers in Medicaid Hospital Prospective Payment Systems

State	Outlier Definitions Based on	Basis of Outlier Payments	Low Resource Outliers	Percent Outliers
Colorado	LOS	DRG + per diem		4.7 days
Illinois	LOS, costs	DRG + per diem, DRG + costs		4.5
Iowa	LOS, costs	DRG + per diem, DRG + costs, full costs (before July 1, 1993)	Short stay paid per diem	
Kansas	LOS, costs	DRG + per diem, DRG + costs		Approximately 10
Michigan	LOS, costs	DRG + per diem, DRG + costs	Short stay paid costs	
Minnesota	LOS, costs	DRG + per diem, DRG + costs		8
Montana	LOS, costs	DRG + per diem, DRG + costs		5.7
New Hampshire ¹	LOS, catastrophic costs	DRG + per diem, catastrophic costs		
New Jersey ²	LOS	DRG + per diem	Short stay paid per diem	Approximately 10
New Mexico	LOS, charges, age	90 percent of costs		
New York	LOS, costs	DRG + per diem, DRG + costs	Short stay paid per diem	
North Dakota	LOS, costs	DRG + per diem, DRG + costs	Short stay paid per diem	6.9 (Not a target)
Ohio	LOS, costs, exceptional costs	DRG + per diem, DRG + costs; 85 percent of cost; 100 percent of cost		
Oregon	LOS, costs, age	DRG + per diem, DRG + costs		7
Pennsylvania ³	LOS, costs	DRG + per diem, DRG + costs		
South Carolina	LOS, costs	DRG + per diem, DRG + costs		9
South Dakota	LOS, costs	DRG + per diem, DRG + costs		12-18
Texas	LOS, costs, age	DRG + per diem, DRG + costs		Approximately 5
Utah	LOS	DRG + per diem		
Washington	costs	DRG + costs	Low cost paid cost	
Wisconsin	LOS, costs, age	DRG + per diem, DRG + costs		8

¹New Hampshire does not allow day outlier payments in DRG 462.

²New Jersey also defines transfer cases and cases in very low volume DRGs as outliers.

³Pennsylvania applies day and cost outlier rules to disjoint sets of DRGs.

NOTES: LOS is length of stay. DRG is diagnosis-related group.

SOURCE: Carter, G.M., Jacobson, P.D., Kominski, G.F., and Perry, M.J., RAND, 1994.

low-cost outlier policy. Such low-resource outliers are paid either a per diem rate or charges times an RCC rather than the DRG payment. In all States, low-resource outlier payments are capped at the DRG rate.

Percent of Payments

Many BCBSA products pay a substantial fraction of their hospital payments as outlier payments. Of the 62 products for which data are available, 24 paid 10 percent or higher of payments and 15 paid 20 percent or higher. Two of the five non-BCBSA HMOs also paid about 20 percent or more in outliers. Similar data are available for only 11 Medicaid programs. For these, the estimate of outlier payments as a proportion of total Medicaid hospital spending ranged from 4.5 percent (Illinois) to 12-18 percent (South Dakota).

Evaluation

Ten States and 67 BCBSA products reported that they have conducted some sort of evaluation of their PPS systems. Six of the 10 Medicaid plans reported that expenditures had been reduced—Michigan, New Hampshire, New Mexico, South Dakota, Texas, and Washington. Wisconsin noted that inpatient expenditures remained the same. Kansas reported that inpatient expenditures actually increased. New Jersey and Ohio did not report outcomes of their evaluations. The BCBSA plans that performed an evaluation were even more likely to find that expenditures had been reduced, with 55 (82 percent) reporting a reduction, 6 no change, and 9 an increase in product expenditure.

CASE STUDIES

We conducted onsite visits at one commercial insurance company, three

employer coalitions, two in the Midwest and one in the Mountain States area, one self-insured firm in the Midwest, and one benefits advisory firm in the East. A second self-insured firm in the Midwest was interviewed by telephone because the firm was identified after our onsite visits to the business coalitions located in the same general area.

Commercial Indemnity Insurer

The insurer is a small firm located in the Midwest. Most of its insurance, including health coverage, is distributed to individuals and small employers through independent agents. Thus, it may be representative of smaller companies operating in the small business indemnity market. The company is just starting to use DRGs, and will use them initially in under 25 percent of its contracted cases. Over time, it hopes to include DRGs in all of its contracts. To operate the program, the insurer has contracted with an independent firm to develop and process the DRG payment system and to develop PPO networks that would be available to small employers. The contracted firm is an outgrowth of a consortium of indemnity insurers, and acts as a vendor of managed-care products.

The company plans to use Medicare DRGs, but will calculate its own weights. Different weights will be calculated for each of five geographic regions. To calculate DRG weights, the contractor will use its own data (consisting of national claims data from member insurers). Weights for DRGs that are split-based on the presence of comorbidities are checked to ensure that the DRG with the cases having the comorbidity has the higher weight of the pair of DRGs. In the rare cases where the DRG with comorbidities has a lower weight, both DRGs are assigned the same, average weight.

Outliers are paid and defined based on charges for the case. An unusual process is

used to define outlier thresholds. First, each DRG is placed in a class based on its MDC and whether it is medical or surgical. Then the 97.5 percentiles of charges are determined for each of these DRG classes and the classes are then placed in three larger DRG sets with relatively homogeneous values of this percentile. Then the 97.5 percentile of each of these three DRG sets is calculated and used as the outlier threshold for each DRG in the set. The outlier payment is the difference between charges for the case and the threshold multiplied by a hospital-specific discount factor.

Each hospital rate will be determined separately through negotiation. If the hospital chooses, it can negotiate rates for individual DRGs for which the hospital has a high volume. Subscribers will not be responsible for any additional charges beyond the DRG amount. Because its insured population is generally younger, the interviewee indicated that the company plans to negotiate rates that pay the lesser of charges or DRGs.

Self-Insured Firm 1

Firm 1 is a moderate-size manufacturer in the Midwest. Our interview focused on non-technical issues because this firm relies on one of the business coalitions, which we also interviewed, to develop the technical methodology for DRGs. This methodology will be discussed later under the heading "Group C."

The employee benefits manager raised three issues of general interest. First, she indicated that one local hospital refused to participate in the coalition's negotiations, leaving the employees at greater financial risk. After an extensive employee-writing campaign, along with a loss of a certain percentage of company patients, the provider agreed to participate in DRG negotiations. Second, the

interviewee was concerned about cases where billed charges are lower than the DRG rate because company policy is to report to employees both the billed charges and the amount paid.¹⁴ To avoid this, the coalition negotiates rates that are the lesser of billed charges or the negotiated DRG rate. Third, she suggested that employers wanted business coalitions to work with providers in a collaborative fashion to reduce health care costs. In this sense, she viewed the problem of health care costs as a community-wide problem that requires community solutions.

Self-Insured Firm 2

Firm 2 is a moderate-size utility in the Midwest. Starting in April 1994, the company planned to convert to exclusive use of DRGs for its 9,000 employees and 35,000 covered lives. Currently, the firm is using a combination of per diems and discounts from charges, amounting to about a self-reported 25 percent discount from charges. Although the interviewee noted that some providers have resisted converting to DRGs, he has successfully negotiated DRG arrangements with three of four health care systems in the metropolitan area. Essentially, the firm has negotiated payment arrangements equivalent to what HMOs pay the contracted facilities. Under DRGs, the interviewee expects to derive about a 40 percent discount from charges, a decline corresponding to 15 percent of charges, compared with current payments.

The firm uses current Medicare DRGs, but relies on a local HMO, which completed our survey, for methodological approaches, and will contract with a third-party administrator (TPA) to reprice cases, verify eligibility, and resolve questions.

¹⁴This serves two purposes. It involves the employee in reducing health care costs and it demonstrates that the company is doing what it can to lower health care costs.

Overview of Business Coalitions

We conducted on-site interviews with three business coalitions. Group A is a health care purchasing cooperative in the Mountain States region, Groups B and C are business coalitions in the Midwest. All three groups share certain characteristics. All of them were formed at about the same time (1989-90) with a common goal of negotiating more cost-effective health care with area providers. Subsidiary goals are to avoid or reduce cost shifting, and to increase provider risk sharing. Each is a coalition of several large employers within a defined geographical area organized specifically to represent the employers in health care issues. Group C began a Small Employer Health Purchasing Initiative for employers with fewer than 100 employees. Group A said that membership for small employers is under active consideration.

As the largest of the coalitions interviewed, Group A represents 40,000 employees and 100,000 covered lives. The smallest coalition, Group B, represents 7,000-8,000 employees and 15,000 covered lives. Interestingly, the interviewee for Group B stated that several of the area's larger employers refused to join the coalition because the CEOs had established relationships with certain hospitals that they were unwilling to disrupt, even for the prospect of lower corporate health care expenditures. Group C represents 25,000 employees and 60,000 covered lives.

Although there appears to be considerable communication between business coalitions, each of the groups interviewed for this study decided independently to use DRGs and to develop its own DRG methodology. In fact, each coalition considered its methodology to be proprietary. All of the groups interviewed felt that most of the Medicare DRGs could be applied to the

non-Medicare population. After all, as they pointed out, the original methodology was developed based on studies of all age groups, not just the elderly.

Although the payment methods differ in detail, all three coalitions use a negotiated DRG rate to set hospital payments. Each coalition uses the Medicare DRG rate as the basis for negotiating a payment rate; the Medicare DRG is usually not the ultimate payment rate. The coalition negotiates a hospital payment rate that is then available to all coalition members. Hospitals may not negotiate separate fees for individual coalition members. In each group, DRGs have been used since the beginning. Groups B and C use DRGs for nearly 100 percent of the cases, and Group A uses DRGs for over 75 percent of its cases.

The coalitions interviewed stated that negotiations with most hospitals went smoothly. To be sure, each group encountered at least one facility that did not want to negotiate DRGs, but only a few hospitals eventually refused to negotiate. Most of the interviewees indicated that hospitals lacked either sophisticated data to understand its costs per case or the sophistication to bargain effectively with large employer coalitions. Thus, the interviewees felt that they were in a stronger bargaining position relative to the hospitals. Paradoxically, several interviewees indicated that the experience of negotiating rates over a few years had strengthened providers by forcing them to become more sophisticated. As a result, hospitals are now able to negotiate based on a greater understanding of their costs.

Each coalition reported different provider types not covered by DRGs. In Group A, small rural, psychiatric, pediatric, chemical dependency/substance abuse, and rehabilitation hospitals are not covered by DRGs. Payment for these services is a

combination of per diems (mental health, with a 12-month cap) and percentage of charges. For Group B, children's hospitals, burn units, and transplants are billed as discounts, albeit low, from charges. Group C also uses discounts from charges for children's hospitals.

Group A

Group A developed a methodology it calls a DRG cap, rather than fixed-price DRGs, as the exclusive payment method for coalition members. Based on DRG rates that are negotiated with each hospital, Group A member companies pay the lesser of billed charges or the negotiated DRG amount. Each hospital rate is determined separately through negotiation that includes rebates based on volume use by members at a particular facility. Generally, DRGs are used with high-volume, low-variation cases where the hospital can predict its costs. Prices are not negotiated for low-volume, high-variation cases such as AIDS, burns, or sick babies. All claims repricing for members is completed in-house by Group A.

In addition to negotiating broad-based DRG rates with each hospital, Group A will also negotiate additional discounts based on whether the employer is willing to select a provider as a PPO or as an exclusive provider organization (EPO). In the EPO, members agree to send their beneficiaries to one hospital and agree to a 30-percent coinsurance differential if the beneficiary chooses another hospital. In the PPO, the discount is less than that given to the EPO, and requires a smaller coinsurance differential.

Group A has developed a cost-benefit analysis tool which allows an employer to predict the financial effect of implementing a PPO or EPO plan. The tool allows an

employer to estimate the amount of shift from out-of-network to in-network providers that will occur as a result of the plan design incentives contemplated by the employer. In the absence of an employer-specified shift percentage, Group A has used a shift of 50 percent for PPO plans and 75 percent for EPO plans.

Group A negotiates with each provider to set specific DRG payments. It calculates its own relative weights based on patient discharge abstracts from all plan hospitals and from statewide cases, and then uses these weights in negotiations. To update payment levels, Group A uses each provider's past charges or costs, peer group averages or costs, and community averages or costs.

Capital, direct teaching, indirect medical education, disproportionate share, and uncompensated-care costs are included in the DRG rate. Outliers are defined by billed charges, and paid based on the DRG plus a discount from charges. Except for non-covered services, subscribers are not responsible for charges beyond the plan's payment.

Group B

Of the business coalition plans we reviewed, Group B uses the simplest methodology. Each hospital is asked to provide its prices for each of the 20 most frequent DRGs. The coalition then negotiates prices for these DRGs with each facility, based in part on the hospital's previous costs and in part on community averages. For the most part, the prices reported by the hospitals are similar, although some facilities offer a lower price to encourage greater coalition use or to create a particular niche. For all other cases, per diems are used. For out-of-plan use, discounts from charges are paid. A TPA is used to price claims based on the negotiated DRG amount.

HCFA weights are used as a point of departure for negotiations with providers. Prices are negotiated every 3 years. In current and future negotiations, inflation rates will be tied to the Consumer Price Index (CPI), not to the health care index. Previous hospital costs/charges will be considered in adjusting provider payment levels in subsequent negotiations.

Group B uses the Medicare outlier definitions. Subscribers are not responsible for payments beyond their plan's coinsurance and deductible amounts.

Group C

Group C's DRG methodology relies primarily on analyzing 60 DRGs to establish "fair market values" by DRG. Analyses are performed on both statewide claims and claims for Group C's population. Each hospital's rate is negotiated separately. Group C appends the contracted amount to all claims and then sends them to the benefit plan administrators for payment. Currently, Group C uses the 3M New York grouper, but would like to move to the 3M all-payer severity-adjusted grouper because of case-mix factors.

Negotiations are based on average charges in the community because these data are more comparable to the coalition's population than HCFA data would be. Group C does not use HCFA weights or payment rates and does not compare the coalition's rates with Medicare rates. Like Group A, Group C pays the lesser of billed charges or the DRG rate. Interestingly, different DRG sets are negotiated with different hospitals, depending on the facility's volume for each DRG. Negotiations cover, at most, 60 high-volume, high-cost DRGs. Low-volume DRGs are generally not included in the negotiations. For all non-DRG cases, the coalition pays a percentage of billed charges.

Prices are negotiated every 2 years. Inflation rates for year 2 are tied to the CPI, not to the health care index. The provider's past charges/costs, peer group average, and national average are also used to adjust provider payment levels. Capital costs, direct medical education costs, indirect medical education costs, and uncompensated-care adjustments are not specifically negotiated.

Outliers are defined as cases costing 200 percent of the DRG rate. The coalition pays the DRG plus 90 percent of the difference between billed charges and 200 percent of the DRG amount. For out-of-network use, most employers apparently hold the subscriber responsible for the difference between the DRG payment and billed charges (usual and customary).

Benefits Advisory Firm

This is a large, Eastern firm that advises a nationwide clientele of employers and other sponsors about benefits programs. We spoke with one of the firm's principals, a senior benefit advisor, who believed that DRGs provide a good basis for paying hospitals because prospective per case payment makes the hospitals responsible for costs. The firm offers DRG-based payment as one of the health care options sponsors should consider, but many of its clients choose alternatives. In the last few years, DRGs have been chosen with increasing frequency and now dozens of their clients use DRGs.

The firm's services include negotiating with hospitals on their clients' behalf. When DRGs have been chosen by the client, the Medicare DRGs and Medicare weights are used as the basis of contract negotiation. Because of the homogeneity of the population, our interviewee believes that the Medicare DRGs are quite adequate for case-mix measurement. In

dozens of hospital negotiations, he encountered only one hospital that wanted different DRGs. The CHAMPUS DRGs were used in that case.¹⁵

Much of the rest of what we learned about the firm's negotiating strategy could also be used in a non-DRG context. For example, the interviewee prefers to select a small number of hospitals with which to negotiate, based on data showing charges and quality of care at hospitals where the clients' beneficiaries have been hospitalized, but some sponsors prefer to have all community hospitals available to their employees. Ideally, the interviewee would negotiate only with hospitals with which he expects to contract. Actual administration of the payment system is usually handled by a TPA.

The firm's primary goal in negotiations is to set up a "win-win" relationship between its client as purchaser and the hospitals it chooses as its suppliers. Contracts are long-term arrangements, often 5 years long. An important element of the win-win strategy is to allow either the hospital or the firm to terminate the contract on relatively short notice (30 days). The termination clause provides the ultimate insurance on the value of the deal to each party. Our interviewee believes that this succeeds in winning the hospital's trust and allows him to obtain, over a period of time, lower DRG rates.

As a direct consequence of establishing trust, the firm is usually able to meet another major goal, obtaining a low total purchase price for hospital services. To reach this goal, most details of the PPS are negotiable. Flexibility on such issues as outlier payments is a way of allowing the hospital

chief financial officer to have some leverage over the outcome of the negotiation. Outlier payments are frequently based on a cost outlier formula (estimating costs via a discount off charges) with thresholds set so that, for many hospitals, only about 1 percent of cases get payments.¹⁶ Substantially larger percentages have been negotiated in rare cases. Exemptions of specific DRGs are rare but negotiable.

In most cases, the firm succeeds in negotiating a substantially better price for its clients than available in the past. On rare occasions, all the hospitals in the community hold firm against negotiating lower prices or the employer is unwilling to negotiate firmly because of a desire to maintain the company's standing in the community.

The attitude toward paying for teaching and/or uncompensated care varies from sponsor to sponsor. Some employers want to play an important role as a force for good in the community. In this case they may choose to cover this kind of hospital expense. Other employers just want to purchase health care as inexpensively as possible.

DEFENSE-RELATED FEDERAL HEALTH CARE AGENCIES

Both the DOD and the DVA operate sizable health care programs. Each has both a direct care system and a medical benefits program which helps to pay for care in the civilian sector. Together, the direct-care programs of the DOD and the DVA include hundreds of hospitals, clinics, and long-term care facilities serving the needs of tens of millions of Federal beneficiaries. The benefits programs function in a way similar to Medicare and non-governmental

¹⁵The CHAMPUS DRGs are described later.

¹⁶The reader is reminded that the outlier share for Medicare is 5.1 percent of payments—not a percentage of cases. The percentage of cases is much lower.

medical insurance programs, reimbursing individual and organizational health care providers for services rendered to eligible beneficiaries and requiring the beneficiaries to share the cost of these services.

DRGs are used by these agencies in two ways. First and most obvious, the medical benefits programs use DRGs to determine payments to civilian hospitals treating DOD and DVA beneficiaries. Second, the direct care programs use DRGs to help manage hospitals. DOD and DVA facilities are required to seek reimbursement from third-party insurers and could use DRGs for this purpose, but do not.

Payment to Civilian Hospitals

CHAMPUS provides medical benefits for non-active duty military health care beneficiaries when care is not available from one of the services' medical treatment facilities. CHAMPUS DRGs are similar to Medicare's with two exceptions: (1) DRG 435 (Alcohol or Drug Abuse or Dependence, Detox or Other Symptomatic Treatment, Without CC) is split into two groups depending on whether or not the age is greater than 21 years; (2) 34 neonatal DRGs are used in place of Medicare's DRGs 385 through 390.

Almost all elements of the payment system are modeled after Medicare's PPS. DRG weights are computed annually from CHAMPUS patient discharge records. Operating payment rates are adjusted for local wage rates, urban/rural status, and Medicare's indirect medical teaching cost factor. Details of the CHAMPUS payment system, including rates, DRG weights, and outlier thresholds, are published annually in the *Federal Register* (e.g., *Federal Register*, 1993). Designation by Medicare as an exempt hospital or unit results in automatic CHAMPUS exemption as well. The operating cost payment rate is updated annually, usually using Medicare's

update factors. Both day and cost outlier payments are made. CHAMPUS also changes payment for short-stay outlier cases.

The General Accounting Office conducted a study of DRG use in CHAMPUS and concluded that CHAMPUS and its beneficiaries saved almost \$1,100 per admission in FY 1989 due to the implementation of the CHAMPUS PPS. Before implementing its PPS in 1987, CHAMPUS paid all billed charges (except for disallowed items.)

The armed services have a limited number of contractual arrangements with civilian hospitals for the care of active duty members in locations where there is no military hospital. DRGs are used to manage payments to civilian hospitals under contract, using CHAMPUS DRGs and DRG weights.

Hospital Management

The Army, Navy, and Air Force directly provide medical care through the Military Health Services System (MHSS). The combined MHSS includes about 120 hospitals and hundreds of outpatient clinics in the 50 States, and others located overseas, providing free outpatient care and inpatient care that costs beneficiaries less than \$10 per inpatient day. DOD requires each of the services to report inpatient workload by DRG, among other tabulations. This information is currently used to manage the hospitals in terms of marginal adjustments to budgets for case mix, but plans to convert to capitated budgets may change this practice.

The Veterans Health Administration (VHA) operates more than 170 hospital centers, serving the needs of as many as 27 million veterans at an annual cost of about \$15 billion for inpatient care. Although the VHA began using DRGs to determine hospital budgets in the mid-1980s, they have now discontinued overt references to DRGs in their calculation of hospital budgets.

DISCUSSION

Cost Containment

Most insurance plans that base hospital payments on DRGs are convinced that their PPS has reduced expenditures for hospital care. The use of DRGs as a basis of payment makes hospitals responsible for costs. Although hospitals could raise revenue by increasing the number of hospitalizations, this is viewed as a difficult thing to do under current utilization review systems. Other payment methods allow hospitals to raise revenues to meet costs in additional ways. Discounts from charges allow hospitals to raise charges. Paying for services or hospital days allows hospitals to increase revenue by increasing volume or changing price structure. Multiyear DRG-based contracts negotiated with rate increases tied to the CPI increase the pressure on hospitals to control costs.

Although the arguments that a PPS based on DRGs will control expenditures make sense a priori, there is little hard evidence. The best evidence we found is that payers who had previously paid full charges did see reductions in their expenditures with the introduction of a PPS. However, it is plausible that any payer that offered a substantial number of patients and that had previously paid full charges for hospital care could negotiate lower rates using almost any payment basis. It is also not evident whether hospitals "upcode" their cases to increase revenue. Although some quality evaluations revealed little DRG creep, it is not entirely clear that the payers have in place the necessary evaluative mechanisms to determine DRG creep.

Whether the reduction in expenditures is accomplished by a reduction in hospital costs or solely by cost shifting is a crucial issue for evaluating DRGs from the point of

view of society as a whole. There is evidence that, in recent years, Medicare's PPS has resulted in cost shifting (Prospective Payment Assessment Commission, 1993). In Medicaid, which has historically not paid full costs, we found no relationship between the extent of cost shifting and the use of DRGs. Some private payers believed DRGs reduced the shifting from public payers onto them with the unmet costs being shifted onto other private payers. What is needed is an analysis of the persistence of savings over time coupled with a determination of the extent to which the savings arise because of a reduction in hospital costs rather than cost shifting. At least two of the business coalitions indicated that data were available to examine savings and that they would cooperate with researchers in subsequent analyses.

Access and Quality of Care

Cost control is, of course, only one of the criteria for evaluating a financing mechanism. Access to care and quality of care are equally important. We judge that DRGs do not decrease access to hospital care. Most States using DRGs provide for payment to all State hospitals. BCBSA-member companies use DRGs within the full variety of their arrangements with hospitals. Our interviewees, although they ran into occasional pockets of resistance, generally succeeded in setting up a DRG agreement with all the hospitals they desired.

Much less is known about whether DRGs affect quality of care. Although Medicare DRGs did not harm quality much in the initial PPS years (Kahn et al., 1990), subsequent outcomes are unknown. Our interviewees did not generally monitor quality of care, though several look to this in the future. In a selective contracting environment where price is explicitly

negotiated such as is found in managed-care systems using DRGs, the possibility of explicit tradeoffs across the cost-quality curve will arise. We expect that this trade-off and its potential liability issues are likely to become important future issues.

DRG Penetration

The extent of DRG use varies considerably both by payer type and geographical area. Government payers (Medicaid, CHAMPUS) use DRGs extensively. For government payers, DRGs offer a structure which ensures that similar providers are treated equally, payments are reasonably predictable, and beneficiaries can have a choice of almost all hospitals. In the private sector, BCBSA members use DRGs extensively; commercial payers and non-BCBSA managed-care plans use DRGs less frequently. Part of the reason may be that BCBSA member plans have greater familiarity with DRGs because many are Medicare intermediaries. Another reason may lie in BCBSA members' large share of the market. A large market share and attendant bargaining power may allow for steeper discounts. At a minimum, plans with larger market share should be able to convince more area hospitals to participate in the program. Large market share may also explain why business alliances successfully use DRGs.

Another factor which may affect the adoption rate of DRGs is the rate of inflation in hospital costs. One would expect greater inflation to cause greater attention to costs by employers and consequently more innovation in hospital payment methods. It is possible that the recent increase in use of DRGs that was seen by our interviewee was caused, at least in part, by hospitals' shifting costs to private payers.

The ability to develop the necessary sophisticated DRG methodology may be a

function of absolute size (rather than size relative to the market), although smaller firms can purchase such methodology. The smaller private firms and coalitions in our study usually relied on some other firm for the technical aspects of using DRGs, while the larger entities were able to develop their own systems. Smaller BCBSA members joined together to develop such technical details as DRG weights.

Although market share, inflation rate, and possibly size are related to DRG adoption, they are unlikely to be the sole factors inhibiting wider DRG use. DRG use by both Medicaid and private payers is less frequent in New England and in the South Atlantic. Thus, an unanswered question from our study is: Why the disparity in DRG use between commercial insurers and our other interviewees and among geographical areas? More to the point, why are DRGs not more widely used?

Patient Acceptance

In general, beneficiaries had no trouble accepting DRG payments. The only issue that arose concerned cases in which charges are less than the DRG payment. It is important that the beneficiary see the hospital bill to verify the delivery of services. Sponsors do not want to give the appearance of paying too much for health care and thus hesitate to pay more than the hospital bill. Several of our interviewees developed systems in which the hospital payment was the minimum of charges or the DRG payment. Although this solves the appearance problem, it limits hospitals' incentive to deal efficiently with relatively inexpensive cases.

Adaptations of Medicare's PPS

Rather than just adopting the Medicare weights and payment rates, DRG users for

the non-Medicare population have developed widely varying diagnosis-related, per discharge, prospective payment systems. No single approach is dominant. Some firms interviewed seemed to negotiate specific prices for so many combinations of DRG and hospital that the paradigm that payment equals rate times weight does not apply. What has emerged appears to be a very flexible payment system in which the only constant is the use of DRGs as a measure of output.

Subsequently, we review the variety of DRG-based PPS systems, concluding by examining the value of the flexibility inherent in the current unstructured use of DRGs in the market.

Limitations of Medicare's DRGs

The Medicare DRGs do not provide sufficient discrimination among some non-elderly clinical groups. For example, although the Medicare DRGs were first built with an all-payer data base, there is a widespread belief that resources required for neonatal care are not adequately captured in Medicare's DRGs. Psychiatric cases are so diverse that even Medicare does not pay for many of these cases under DRGs. Other groups that some of our respondents believe have an inadequate Medicare DRG structure include substance abuse, rehabilitation, and transplants.

Various systems for dealing with this diversity have risen. Most Medicaid plans, and some BCBSA plans, chose technical solutions providing equal payment for similar hospitals. They expanded the DRGs, calculated weights which reflect only their own patient populations, and excluded certain DRGs from their DRG systems. The remaining BCBSA plans, commercial insurers, and employer groups were more likely to negotiate variances with individual

hospitals to whom the issue was important: special payment rates, special outlier rules, or excluding the cases from the DRG system. Indeed, some employer coalitions used DRGs only for a small number of high-volume, low-variability DRGs and for different DRGs at different hospitals.

Limitations of Hospital Payment Adjustments

One-third of State Medicaid programs find that the simple model of weight times rate does not work well for certain patient populations in certain hospitals. Patients in psychiatric wards and neonatal wards were most frequently found to require different hospital-specific adjustments, but adjustments were also sometimes made for rehabilitation units, burn units, and tertiary care DRGs. Payers find it necessary to pay extra for specific patient populations at hospitals that provide extra care to these groups. In the BCBSA, HMO, commercial, and employer-sponsored plans, negotiation provides a similar solution when different rates are negotiated for particular kinds of cases in particular facilities. The implicit model appears to be that there are different referral centers for different kinds of patients. This is probably a more accurate characterization of referral patterns than that implicit in Medicare's payment system where only teaching centers are paid more per case and these centers receive the same proportion more for each case.

Outlier Rules

Some Medicaid programs use more sophisticated payment calculations than Medicare does. Several Medicaid programs calculate the equivalent of "fair weights" in which total reimbursement (including outlier payments) in a DRG is proportional to

costs in that DRG (Carter and Farley, 1993). Almost a third of the States use some form of "low resource" outlier policy to reduce payments to very inexpensive cases. The value of these approaches deserves consideration in an optional all-payer DRG system and in Medicare.

Ratesetting

The most consistent variation among types of payers concerns how the payment rates are set. Medicaid programs tend to announce prices according to a fixed rule. Commercial insurers and self-insured employers tend to negotiate payment rates. BCBSA members are almost equally likely to use either method.

Value of Flexibility

The DRGs are being used in a large variety of ways and thus provide a very flexible payment system. Medicaid programs tailor PPS to account for the special needs of their State's hospital system. BCBSA member plans, despite their historical role of insuring care in all the region's hospitals, use DRGs in establishing different relationships among the hospitals participating in their PPOs, HMOs, POS plans, and traditional indemnity plans. Private payers tend to use DRGs as a payment unit and a starting point for negotiation. The private payers whom we interviewed stated clearly that they wanted a competitive PPS and the flexibility to adapt their payment structures.

The major downside to continuing flexibility in payment rates concerns cost shifting. Because the DRG-based insurance plan pays only a fixed price per discharge, hospitals cannot shift costs onto the DRG payer in the short run. In the long run, if the hospital market is truly competitive, the DRG payer would pay the long run marginal costs of its own patients and thus there would be no cost-shifting. Opening membership in

competing plans and coalitions to all payers should increase competition and thereby reduce the opportunity to shift costs.

Flexibility in payment arrangements may be of substantial value to the health care system. It allows development of a trusted supplier/purchaser relationship between payer and hospital with attendant benefits to both parties. It allows the tailoring of payments to the characteristics of the local hospital system and to the resources needed by the plan's patient population. Volume discounts should encourage specialization with concomitant increases in quality and cost effectiveness. In addition, negotiated volume discounts might increase rationality in an overbedded system by driving the weakest hospitals out of the market.

It is likely that the largest contribution that the HCFA could make toward further use of DRGs by non-Medicare payers systems would be to provide additional information. A set of all-payer DRGs and DRG weights describing a set of hospitalizations that are representative of all U.S. hospitalizations would be of great help to many payers, both current DRG users and others. Absence of suitable DRGs and weights is the reason many commercial insurers give for not using DRGs. Private insurers who use Medicare weights find them to be a useful starting point for negotiations and many would welcome more accurate DRGs. Many BCBSA and Medicaid programs update their weights only infrequently, and a source of accurate up-to-date weights might help.

TECHNICAL NOTE

Medicare's PPS

The Medicare PPS undergoes refinement annually with results published in each year's *Federal Register*. Below we describe how the system works during FY 1995.

Classification System for Discharges

The DRG system used by Medicare was originally developed by Yale University researchers using data from all types of cases, not just Medicare cases. Thus, theoretically, it should also be appropriate for other payers. However, the data set did not include patients at children's hospitals (although it included pediatric patients). The children's hospitals have a different case mix with more tertiary care. Lichtig et al. (1989) show the value of additional pediatric DRGs.

Each year, the Medicare DRG definitions are refined to reflect changes in medicine and increased understanding of the clinical correlates of hospital costs. The original 468 DRGs used in FY 1984 were expanded to 489 valid DRGs in FY 1994. Analyses underlying these refinements are restricted to Medicare beneficiaries. Thus changes in medicine that have occurred since the development of the DRGs and that affect only the non-elderly, non-disabled population may not be reflected in the current Medicare DRG structure (or even in that DRG structure augmented with the pediatric DRGs recommended by Lichtig et al.)

Relative Weights

The DRG prices that each hospital sees are proportional to the DRG weights. According to economic theory, the weights should reflect the relative cost of providing care in each DRG in an efficient hospital. In the absence of information about care in an efficient hospital, HCFA decided that DRG weights should give the expected resource consumption for a typical Medicare case in each DRG relative to each other. So, the average Medicare case in a DRG with weight 2 should require twice as many resources as the average case in a DRG with weight 1.

Medicare's weights are recalibrated each year from charge data for an earlier year's worth of hospitalizations. Before the calculation, charges are standardized by the factors used to pay for operating costs associated with teaching, disproportionate share of poor patients, and variation in input prices.

In the first year of PPS, the charges were first transformed to an estimate of cost using data from the Medicare Hospital Cost Report. This transformation was dropped after analyses showed that cost and charge weights were roughly similar (Cotterill, Babula, and Connerton, 1986).¹⁷

Payment Rates

Medicare's DRG payment for each case is determined by multiplying a payment rate, adjusted by hospital-specific factors, by the weight assigned to the DRG for the patient. Separate rates and adjustment factors are currently used for the capital and operating PPSs.

The Federal DRG payment¹⁸ for operating costs for a case at hospital i in DRG j , OP_{ij} , is given by:

$$OP_{ij} = OR_i * W_j * OA_i$$

where

OR_i is the operating payment rate,
 W_j is the weight for the DRG, and
 OA_i is the factor describing hospital-specific adjustments to the operating payment rate.

¹⁷For a more recent comparison of cost-based weights with charge-based weights, see Carter and Farley (1992).

¹⁸The PPS for capital costs is being phased in over the period from 1992 through 2001. During the phase-in period the total payment for a case is a weighted sum of the Federal DRG payment and a hospital-specific component related to its capital costs.

Similarly, the DRG payment for capital costs, CP_{ij} , is given by:

$$CP_{ij} = CR * W_j * CA_i,$$

where

CR is the national capital payment rate, and

CA_i is the factor describing hospital-specific adjustments to the capital payment rate.

Costs associated with urban location are usually accounted for in the operating rate term rather than in the adjustment term, as is done for capital. There were three payment rates for operating costs: for very large urban areas, other urban areas, and rural areas, but by FY 1995 there are only two, with other urban areas and rural areas sharing the same rate and hospitals in large urban areas receiving slightly higher (1.6 percent) rates¹⁹ (O'Dougherty et al., 1992).

The hospital-specific adjustment factors account for the variation across hospitals in input prices, indirect costs of medical education, and caring for a disproportionate share of poor patients. The operating adjustments are calculated as:

$$OA_i = (PLAB_i * WAGEINDEX_i + (1 - PLAB_i) * COLA_i) * (1 + DSH_i + TEACH_i),$$

where

$PLAB_i$ = fraction of the payment rate that is labor related,²⁰

$WAGEINDEX_i$ = the wage index for the hospital's MSA or rural portion of State,

$COLA_i$ = cost of living adjustment (which is one everywhere except in Hawaii and Alaska),

DSH_i = operating cost payment factor for disproportionate share, and

$TEACH_i$ = operating cost payment factors for the indirect cost of medical education ($TEACH_i = 1.89 * ((1 + (\text{interns} + \text{residents}) / \text{beds})^{.405} - 1)$).

HCFA based the amounts of the capital payment adjustments, in part, on a regression of cost per case (i.e., operating cost plus capital cost net of direct medical education cost) at each hospital on the factors used to adjust operating payments, plus large urban location. The capital adjustment factor, CA_i , is calculated as:

$$CA_i = CAPWAGE_i * CAPCOLA_i * (1 + CAPDSH_i + CAPTEACH_i) * CAPLGURB_i,$$

where

$CAPWAGE_i = WAGEINDEX_i^{.6848}$;

$CAPCOLA_i = 0.3152 * (COLA_i - 1) + 1$;

$CAPDSH_i = \exp(0.2025 * DSHRATIO_i) - 1$,
for urban hospitals with more than 100 beds, = 0.1189 for hospitals with more than 30 percent of income from State/local government for charity care, and = 0 otherwise;

¹⁹ Medicare also provides that sole community hospitals receive the higher of their national rate and a hospital-specific rate based on their FY 1987 costs. Rural referral centers are paid at the urban rate.

²⁰ In the annual presentation of the rates, separate amounts are given for the labor-related portions and non-labor-related portions. The treatment of input prices here is numerically equivalent when PLAB is set equal to the ratio of the labor-related adjusted standardized amount to the sum of the labor- and non-labor-related adjusted standardized amounts. We chose this presentation because it shows more clearly the similarity between the operating and capital payments.

CAPTCH_i = $\exp(0.2822 * (\text{interns} + \text{residents}) / \text{avg_daily_census}) - 1$, and

CAPLGURB_i = 1.03 for hospitals in large urban areas, = 1.00 otherwise.

Treatment of Unusual Cases

Medicare has established categories of outliers which receive supplemental payment amounts. These outlier payments are designed to reduce financial risk to hospitals and reduce financial incentives for hospitals to refuse to serve, or to under serve, exceptionally costly cases. Outlier payments may also help alleviate differences between a hospital's expected DRG payment per case and the cost of efficiently treating that group of cases.

Outlier payment is made in addition to the regular DRG payment. The outlier reimbursement amount covers both operating costs and the Federal share of capital costs. There are two kinds of outliers: Cost outliers are cases whose standardized charges exceed a cost threshold and day outliers are cases that remain in the hospital longer than a day threshold. The thresholds depend on DRG and are set so that the estimated amount of outlier payment equals a policy goal, currently 5.1 percent of Medicare hospital reimbursement.

The cost outlier payment formula uses two RCCs from the most recently available settled Cost Report for each hospital—a ratio of operating costs to charges and a ratio of capital costs to charges. The charges for each potential cost outlier case are multiplied by these ratios and adjusted by payment factors to get an estimate of the standardized operating cost of the case and a second estimate of the standardized capital cost of the case. The cost outlier payment formula pays a fraction of the difference between the sum of these standardized costs for the case and the cost outlier

threshold. The fraction is called the “marginal cost factor” and is currently 0.80 in most DRGs and 0.9 in burn DRGs.

Day outlier payments are being phased out, and the amounts paid for day outlier cases have been reduced over time. For cases that exceed the day outlier threshold, the outlier payment for each outlier day is now 0.47 times the average Federal reimbursement for a day in the same DRG at the same hospital. When a case exceeds both the day threshold and the cost threshold, it receives the larger amount from the two payment formulas.

Medicare also has special payment rules for cases transferred to another short-term general hospital. These transfer cases are paid on a per diem basis capped at the total DRG payment rate. The per diem is equal to the total DRG payment divided by the geometric mean LOS for the DRG. The receiving hospital receives a full DRG payment.

Kinds of Hospitalizations to be Paid Using DRGs

Medicare currently excludes from its PPS psychiatric hospitals, cancer hospitals, children's hospitals, rehabilitation and long-term care hospitals, and hospitalizations in excluded psychiatric and rehabilitation units of short-term general hospitals. Substance and alcohol abuse units were also excluded in the early PPS years.

Kinds of Costs to be Reimbursed Using DRGs

The original Medicare PPS system paid only for operating costs using the DRG rate. Costs of capital and direct costs of teaching were paid on a passthrough basis. As already mentioned, in FY 1992, Medicare began a 10-year transition toward payment of all capital costs through a prospective DRG-based payment. Direct costs of teaching are now supported through prospective, but not

DRG-based, payments. Costs associated with input prices, disproportionate share, and indirect costs associated with medical education are paid through DRG payments via an adjustment to the hospital's rate.

DRG Auditing and Other Review Procedures

Medicare established the peer review organizations in order to review utilization, DRG assignment, and quality of care under the PPS.

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