Reimbursement under diagnosis-related groups: The Medicaid experience

by Fred J. Hellinger

The implementation of the Medicare prospective payment system has sparked the growth of similar Medicaid systems. Eight State Medicaid agencies now employ a system based on diagnosis-related groups (DRG's), and another four State Medicaid agencies are planning to implement such systems in the near future. The eight DRG-based systems in existence in 1986 are examined in this article. Preliminary evidence presented herein indicates that Medicaid DRG-based systems have experienced reduced rates of increase in expenditures for hospital services and that hospital admission rates have not increased under these systems.

Introduction

The implementation of the Medicare prospective payment system (PPS) has given rise to the growth of Medicaid systems that are also based on diagnosis-related groups (DRG's). Although New Jersey has operated an all-payer DRG-based system since 1980, no Medicaid-only DRG-based system existed at the time that the legislation enacting PPS was passed in April 1983 (Davies and Westfall, 1983). This article examines Medicaid-only DRG-based systems. In 1986, eight States operated such systems (Michigan, Minnesota, Ohio, Oregon, Pennsylvania, South Dakota, Utah, and Washington). Another four states (Connecticut, Montana, South Carolina, and Texas) are planning to implement such systems in the near future (Davies and Westfall, 1983; *Medicare Prospective Payment*, 1986).

Medicare's PPS went into effect on October 1, 1983. The DRG rates set under PPS cover only operating costs and do not include payments for capital costs, direct medical education, outpatient costs, or the costs of outliers. The rates for the first 4 years of PPS are and will be a blend of hospital-specific rates, regional rates, and national rates. The regions are census regions, and each region is divided into rural and urban areas for a total of 18 regional rates.

The total reimbursement from Medicare to the hospital is equal to the amount reimbursed for DRG rates plus reimbursement for capital costs, direct medical education costs, outliers, and an adjustment for indirect medical education costs. Reimbursement for capital costs and direct medical education costs is still made on a retrospective-cost basis, although various proposals to include capital costs in the DRG rate have been advanced.

Psychiatric, rehabilitation, children's, and long-term care hospitals are excluded under PPS. Distinct-part psychiatric and rehabilitation units of short-term general hospitals are also excluded. Reimbursement for outliers is made on a modified-cost basis. Cases in which the length of stay exceeds the geometric mean by 1.94 standard deviations or 20 days are length-of-stay outliers; cases in which costs exceed 1.5 times the DRG rate or $12,000 are cost outliers. Medicare reimburses hospitals for 60 percent of the per diem DRG rate (this is equal to the DRG rate divided by the average length of stay for that DRG) above the threshold for length-of-stay outliers, and 60 percent of the costs above the threshold for cost outliers.

The primary reason States have adopted a prospective-rate system for hospitals is to contain expenditures for hospital services (Seitz, 1986). Preliminary evidence presented herein indicates that Medicaid DRG-based systems have experienced reduced rates of increase in expenditures for hospital services, and that hospital admission rates have not increased under these systems.

State Medicaid DRG-based systems have adopted many of the practices used by the Medicare PPS. For example, all Medicaid DRG-based systems employ the methodology used by Medicare to translate charges into costs. (Medicare determines the ratio of a patient's charges in a specific department to total charges in that department and multiplies this amount by total departmental costs to obtain an estimate of the cost of care provided to that patient in the given department.) Also, most Medicaid DRG-based systems use methods similar to those in the PPS to provide for pass-throughs or retrospective adjustments to the DRG rate to reconcile capital costs with amounts reimbursed for these costs. In addition, PPS and all Medicaid DRG-based systems provide no adjustments for volume (although the Maryland and New Jersey all-payer DRG-based systems do have such adjustments). Neither PPS nor any Medicaid DRG-based system covers outpatient, home health, or physician's services.

Medicaid DRG-based systems also differ from PPS in important respects. For example, no Medicaid DRG-based system uses Medicare's methodology of

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The views expressed herein are those of the author. No official endorsement by the National Center for Health Services Research and Health Care Technology Assessment is intended or should be inferred.

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adjusting for wage rate and indirect medical education effects to obtain "standardized" costs for each hospital. Under PPS, these standardized costs are averaged to obtain regional and national standardized rates and are then applied to an individual hospital by using that hospital's wage index and number of residents per bed to establish its regional and national rates.

States employ a simpler method to set group rates. They define groups according to size, location, and teaching status. DRG rates are then set based on the average cost per case for all members of the group, without making further adjustments for differences in wage rates or in the number of residents per bed. Some States include different types of hospitals under their systems than does PPS (e.g., PPS excludes freestanding psychiatric, children's, and rehabilitation hospitals, and Minnesota includes all of these hospitals under its DRG-based system). In addition, some States use different definitions for neonatal, burn, and psychiatric DRG's, set only one base rate for all hospitals, and provide for adjustments to rates for hospitals that serve a large number of poor patients.

The experience of these States constitutes a rich source of information. In recent years, an increasing number of Blue Cross/Blue Shield plans, health maintenance organizations (HMO's), and commercial insurers have begun reimbursing hospitals on the basis of DRG's. The experience of these States may be of particular interest to these and other insurers (including Medicare) that reimburse on the basis of DRG's, as well as insurers considering implementing such a system.

In this article, particular attention is paid to comparisons of how relative weights are derived, how outliers are defined, and what kinds of hospitals are excluded under each system. Preliminary evidence is presented regarding the impact of prospective payment systems, and data on total Medicaid costs, length of stay, and number of admissions are presented from some of the systems. Data for many of the systems are not yet available. The correlations presented in this article do not necessarily imply causation. Changes in total Medicaid costs, length of stay, and number of admissions may be attributable to factors other than the implementation of a DRG-based Medicaid system, for example, the increasing popularity of HMO's preferred provider organizations (PPO's), and other managed-care systems. The effects of these systems on hospital costs and volume are also discussed in this article.

State diagnosis-related-based Medicaid systems

Utah

Utah was the first State to implement a DRG-based reimbursement system for inpatient hospital services (Duncan, 1986; Wasek, 1985). In early 1983, Utah received a freedom-of-choice waiver from the Health Care Financing Administration (HCFA) to establish a selective-contracting system, but the Utah Hospital Association supported a DRG-based system in preference to a selective-contracting system. On July 1, 1983, the State of Utah implemented its system, 3 months after passage of the law that established PPS and 3 months before the effective date of PPS.

Utah adopted the Federal DRG definitions and the DRG relative weights published in the September 1, 1983 *Federal Register*. Interim payments were made from July to November 1983 based on the percentage of billed charges. In November 1983, the computer work was completed, and the DRG rates were set using the Medicare relative weights published in September. Retroactive adjustments were made for cases treated between July and November 1983. Utah does not use hospital-specific and regional rates. There is one statewide base rate that is negotiated with representatives of the hospital industry. This base rate was $2,144 for fiscal year 1985. Capital costs and direct medical education costs are defined using Medicare definitions and are reimbursed on a reasonable-cost basis.

Utah makes interim payments using the projected ratio of pass-through costs to total allowable costs for each hospital. For example, if the DRG payment is $2,000, and capital and direct medical education costs are 10 percent of total allowable inpatient costs, then the interim payment is $2,200. The Utah system guarantees a minimum payment of 60 percent of billed charges and a maximum payment of 110 percent of billed charges.

The Utah DRG system includes distinct-part psychiatric units, distinct-part rehabilitation units, and out-of-State hospitals. The Utah State Hospital and the Primary Children's Medical Center are exempted from the DRG system. Utah uses the Medicare definition for length-of-stay outliers but does not recognize cost outliers. Hospitals are paid on the same basis as Medicare for length-of-stay outliers.

The most unusual aspect of the Utah system is the negotiation process to set the base rate. All major hospitals have a representative at the negotiations. The State has the final authority to set rates, and the rates have been low in an attempt to control Medicaid inpatient hospital costs.

Pennsylvania

The Pennsylvania Medicaid program is the third most expensive in the Nation, with expenditures in excess of $2.3 billion for fiscal year 1984, because of its exceptionally large number of eligibles (Feinberg, 1986; *Pennsylvania Bulletin*, 1984). Beginning July 1, 1984, Pennsylvania hospitals were reimbursed rates for Medicaid services derived from a DRG-based methodology. David Feinberg (Director of Policy and Program Development, Medical Assistance Program, Pennsylvania Department of Public Welfare) stated that the adoption of a DRG-based payment system stemmed from the Omnibus Reconciliation Act of

1981, which allowed States to reimburse on other than a cost-related basis; the Social Security Amendments of 1983, which established PPS; and a report from the Governor's Task Force on Health Care Cost Containment, which proposed the adoption of a prospective rate-setting system.

Pennsylvania Medicaid had a 10-percent cap on increases in expenditures in fiscal year 1983 and an 8-percent cap in fiscal year 1984. The program reimbursed hospitals on a reasonable-cost basis using Medicare cost principles from 1966 until fiscal year 1983. In 1982, the Governor proposed that reimbursement be limited to hospital days less than the 75th percentile for the length of stay. This evoked strong opposition from hospital groups, which stood to lose 20 percent of their Medicaid income. It also muted much of their opposition to the proposed DRG-based system.

Pennsylvania's DRG system is one of the Nation's most complex. Payment rates are based on DRG relative values derived from the States paid-claims data for the 2 most recent calendar years. Hospital rates are set on a phased-in basis: fiscal year 1985 rates were 75 percent hospital-specific and 25 percent peer-group-specific; fiscal year 1986 rates were 50 percent hospital-specific and 50 percent peer-group-specific; and rates for fiscal year 1987 and beyond are 100 percent peer-group-specific.

Peer groups are defined using a methodology that employs 13 variables to derive 8 peer groups. The 13 variables include measures in each of the following four areas: teaching status, medical assistance volume (e.g., number of medical assistance cases, ratio of medical assistance to total costs), environmental characteristics, and hospital costs. Variables measuring environmental charcteristics include the percentage of persons below the povery limit in the hospital's county, the median family income in the county, the unemployment rate in the county, and the wage index for the county. The eight peer groups are derived by averaging the per diem costs of hospitals with similar scores in each of the four areas.

Direct medical education costs and capital costs for fixed equipment are pass-throughs; capital costs for major medical equipment are included in the base rate. Psychiatric hospitals, rehabilitation hospitals, and distinct-part rehabilitation units of general hospitals are excluded from this system, but children's hospitals and distinct-part psychiatric units of general hospitals are included. Length-of-stay outliers are defined and reimbursed using Medicare's methodology, but cost outliers are recognized only for burn victims and neonates. Cost outliers are paid at 100 percent of the per diem cost average for the DRG (i.e., the DRG rate divided by the average length of stay for that DRG). Pennsylvania's own data were used to set relative values for each DRG.

The DRG base rates (i.e., the reimbursement rate for a DRG with a relative value of one) were set to be budget-neutral for fiscal years 1985 and 1986 (budget-neutral is defined to be the amount that would have been spent under the previous system). Base rates have grown 10 percent in 2 years. State officials expected no increase in the base rate for fiscal year 1987, when the system will be used to limit Medicaid expenditures, instead of maintaining budget neutrality.

Ohio

Ohio implemented a DRG-based system on October 1, 1984 (the beginning of fiscal year 1985 in Ohio) in response to rapidly increasing Medicaid spending (Glynn, 1986; *Overview*, 1984). Medicaid expenditures for inpatient hospital care grew 146 percent between fiscal year 1979 and fiscal year 1984 while the number of eligibles grew by less than 25 percent. The two largest increases occurred between State fiscal years 1981 and 1982 (40 percent) and between State fiscal years 1982 and 1983 (32 percent). Medicaid expenditures for hospital inpatient care grew 13 percent between fiscal year 1983 and fiscal year 1984. The Ohio DRG-based system was established to reduce the rate of increase in Medicaid expenditures to 7.5 percent per year for inpatient hospital care.

Prior to using the DRG-based system, Ohio reimbursed hospitals using the cost-based reimbursement system established by Medicare. In May 1983, Governor Celeste formed the Commission on Ohio Health Care Cost Containment to study ways of controlling Medicaid expenditures for inpatient hospital services. The Commission recommended that the Medicaid program adopt a prospective payment system similar to PPS. The Ohio Department of Human Services developed a DRG-based system.

Ohio uses the same DRG classification system as does Medicare; however, the relative weights assigned to each DRG are different. Medicare's methodology for determining relative weights was adopted using Ohio Medicaid claims from fiscal year 1981 to fiscal year 1983. In situations where there were too few claims in a DRG, Pennsylvania Medicaid and Ohio Medicare data were used to supplement the Ohio data. Ohio Medicare data were used to calculate relative weights for DRG's where both Ohio Medicaid and Pennsylvania Medicaid had too few cases.

The Ohio system excludes freestanding rehabilitation and freestanding long-term care hospitals and includes distinct-part psychiatric and distinct-part rehabilitation units. Excluded hospitals are reimbursed on a reasonable-cost basis. Special relative weights are calculated for hospitals with distinct psychiatric units, reflecting the cost of treating psychiatric patients in all hospitals with distinct psychiatric units. In addition, special relative weights are calculated for neonatal cases (DRG's 386–390) treated in different level nurseries. For example, a separate relative weight for DRG 388 (prematurity without major problems) for hospitals with level III nursery units is calculated using data only from hospitals with level III nursery units.

Ohio decided not to employ a statistically complex peer-grouping methodology. The State wanted to use a peer-grouping methodology that could be easily

understood by hospitals. Twenty peer groups are defined in Ohio's system. There are 10 groups based on location and wage indexes, 1 group for teaching hospitals, 7 for children's hospitals, 1 for rural hospitals, 1 for rural referral centers, and 1 for out-of-State hospitals. Each children's hospital constitutes a separate peer group. The peer-group rates were phased in completely by July 1986. Hospitals were paid 50 percent hospital-specific and 50 percent peer-group rates for fiscal year 1985. They were paid 25 percent hospital-specific and 75 percent peer-group rates for fiscal year 1986. Outliers are treated the same way they are under Medicare, except neonatal length-of-stay outliers are defined as cases 1 or more standard deviations above their mean and are reimbursed at 80 percent of the relevant per diem. A new group of outliers termed extraordinary outliers was recently added.

The DRG base rate is adjusted downward 3.38 percent to account for improved accuracy in coding invoices and reduced by .5 percent to account for incentives to increase admissions. Ohio contracted with Data Resources, Inc. to develop an Ohio regional hospital market basket to estimate their trend factor.

Washington

On January 1, 1985, the Washington State Medical Assistance Program began to pay for inpatient hospital services provided to Medicaid recipients according to a DRG-based system (Bedell, 1986; *State Plan*, 1985). Prior to this date, the Medicaid program in Washington State paid prospective rates determined by a budget-review type of system trended or extrapolated forward and constrained by peer-group standards.

The Washington State system sets hospital-specific DRG rates and uses the relative values determined by Medicare. Rates are derived using data from Medicaid claims and cost reports. The charges on the Medicaid claims form are used to derive the operating cost for each charge, using the same methodology employed by Medicare (i.e., the product of the ratio of departmental charges for a given patient to total departmental charges, multiplied by departmental costs, is used to estimate costs in an ancillary department that are attributable to a patient; and the number of days of care is multiplied by the cost of care in the unit, as derived from cost-report data, to estimate the cost of care in routine and special care units). The Medicare definition of capital costs and direct medical education costs is used to set the capital-cost component and the direct medical education component of the hospital-specific DRG rate. The hospital's capital and direct medical education costs are divided by the number of patient days to determine the per diem capital and direct medical education costs. These costs are multiplied by the number of Medicaid patients days and divided by the number of Medicaid discharges to obtain their cost per discharge. In order to standardize for case mix, this amount is divided by the hospital's case-mix index.

The operating-cost component, capital component, and direct medical education components are trended forward using different factors. The operating-cost component is trended forward using the latest HCFA hospital input price ("market basket") index. The capital-cost component and the direct medical education cost components are trended forward using unique factors derived by the Washington State Hospital Commission. The Commission computes its own trend factors for each of these components and administers a budget-review system that sets rates for all non-Medicare and non-Medicaid patients in the State.

The DRG rates are then reduced by 5.3 percent to adjust for expected improvements in reporting of discharge data and are reduced by another 7.8 percent to establish funds for the payment of outlier cases. Washington State recognizes cost outliers but not length-of-stay outliers. Cost outliers are defined as cases whose costs exceed 1.5 times the basic DRG payment or $12,000, whichever is greater. These cases are reimbursed 80 percent of the costs in excess of the cost threshold.

The Washington State system excludes services provided in identifiable rehabilitation hospitals and units of general hospitals dedicated to the provision of rehabilitation services. Psychiatric services are treated in the same manner. Medicare definitions for these units and hospitals are employed. In addition, services provided in alcoholism and detoxification units and services provided in long-term care hospitals are also excluded. Again, Medicare definitions are used to define such units.

Michigan

The Michigan Medicaid inpatient hospital DRG reimbursement system was implemented in February 1985 (Medical Services Administration, 1984; Seitz, 1986). It replaced a cost-based reimbursement system with some incentives for hospitals to keep costs below a prospective budget limit. The budget limits were set on a hospital-specific basis. As in other States, Medicaid cost increases forced State officials to reevaluate their reimbursement system. The current DRG-based system was recommended by the Michigan Medicaid Task Force, established in July 1983, and was originally scheduled to be implemented in October 1984.

The Michigan system does not use peer groups. It sets rates based on data from each hospital. Relative weights are calculated using a 100-percent sample of State Medicaid claims from calendar years 1981–83 and hospital-specific cost-report data. Michigan uses the Medicare methodology to calculate the relative weights. Special weights were calculated for the neonatal DRG's (385–390) for two groups of hospitals. Data from claims of hospitals with neonatal units approved by the Department of Public Health were used to establish relative weights for hospitals with such units. Data from claims of hospitals that do not have neonatal units approved by the Department

of Public Health were used to set relative weights for these hospitals.

Capital costs and direct medical education costs are calculated using Medicare definitions. Per-case amounts are added to the DRG payments, with settlement made at the end of the year to reconcile capital and direct medical education payments with actual costs.

A sum of $20 million has been set aside to reimburse hospitals for indigent care. There is an add-on payment for each Medicaid claim, which is based on the ratio of Medicaid and bad-debt charges to total inpatient charges. The Michigan system was designed to be budget-neutral, so that the $20 million is subtracted from the amount to be reimbursed for Medicaid services before DRG payment rates are set. Budget neutrality is defined to be the same amounts in payments that would have been made under the prior system. The DRG rates are based on 1982–83 data inflated to fiscal year 1986. The projection resulted in aggregated Medicaid payments of $536 million in fiscal year 1986. The legislature recently created a second add-on for disproportionate-share hospitals only (beyond the $20 million for fiscal year 1987).

Outlier payments are made for cases that fall above or below (this is the only system that defines outliers below the mean) 3 standard deviations of the geometric mean for days of care except for cases in Department of Health approved neonatal and burn units. Cases in these units are defined as outliers if they fall more than 2 standard deviations above or below the geometric mean for days of care. No special payment is made for cost outliers. Freestanding psychiatric and rehabilitation hospitals and Medicare-certified, distinct-part psychiatric units of general hospitals are excluded from this system. Care provided to Medicaid recipients in excluded facilities is reimbursed at a prospective per diem rate calculated from 1983-filed cost-report data, updated for inflation.

South Dakota

The new South Dakota State Medicaid plan establishes a DRG-based rate-setting system (*State Plan*, 1985). It was approved by HCFA on October 23, 1985, with an effective date of March 29, 1985. (State plans are sometimes approved with an effective date earlier than the approval date.) The South Dakota plan replaces a retrospective cost-based plan similar to Medicare's cost-based system. South Dakota uses Medicare's relative weights, since available data are insufficient to develop State-specific DRG weights.

Originally, hospital-specific rates were set for all hospitals that experienced more than 30 Medicaid discharges in the base year. Hospitals with fewer than 30 discharges are grouped, and a single target amount and case-mix index are derived because of the erratic impact on the development of hospital-specific target amounts and case-mix indexes for hospitals with so few Medicaid discharges. DRG rates are derived from Medicaid claims paid by the Department of Social Services during the period of January 1, 1984 through September 30, 1984. South Dakota has recently adopted peer groups.

Medicare's methodology is used to obtain cost estimates of the operating cost per Medicaid discharge from claims and hospital cost-report data. Capital costs and direct medical education costs per discharge are obtained by dividing these costs by the proportion of Medicaid to total inpatient days and dividing this amount by the number of Medicaid days. The capital cost per discharge, direct medical education cost per discharge, and operating cost per discharge are summed to obtain an estimate of the base-year Medicaid rate per discharge. Updating from the base period is accomplished using Medicare's update factors. The resulting amount is then divided by the hospital-specific case-mix index to obtain the hospital-specific amounts on which the peer-group rates are based.

The South Dakota Department of Social Services will consider adjusting the capital portion of the target rate on January 1 and July 1 of each year. Any hospital that has capital expenditures in excess of $2,000 per licensed bed may request a review and possible adjustment to its capital costs. Hospitals with less than $2,000 in capital costs per licensed bed will generally not be granted an adjustment.

The South Dakota system treats outlier cases and transfer patients using Medicare's methodology. Psychiatric hospitals, rehabilitation hospitals, perinatal units (level III only, upon request and justification), psychiatric units (only upon request and justification), and crippled-children's hospitals are excluded. The payment for excluded hospitals and units will continue to be on a retrospective cost-based system.

Minnesota

The Minnesota Department of Human Services began using a DRG-based hospital reimbursement system on August 1, 1985 (*State Plan*, 1986). This system uses 35 diagnostic categories instead of the 470 Medicare DRG's. The 35 categories include the 23 major diagnostic categories used by the DRG methodology (e.g., diseases and disorders of the nervous system, diseases and disorders of the circulatory system, diseases and disorders of the blood and blood-forming organs), plus 12 DRG's that are treated as separate diagnostic categories, e.g., vaginal delivery with complicating diagnosis (DRG 372); depressive neurosis (DRG 426); psychosis (DRG 430); childhood mental disorders (DRG 431); bronchitis and asthma, ages 0–1 (DRG 98); and bronchitis and asthma, ages 2–17 (DRG 98). Data from claims for State fiscal years (August 1 to July 30) 1983 and 1984 were used to establish relative values for the 35 diagnostic categories.

The Minnesota system sets hospital-specific rates. A hospital's allowable base-year cost per admission is

trended forward to obtain a categorical rate per admission by hospital. The allowable base-year cost is obtained by subtracting pass-through costs (capital, direct medical education, malpractice insurance, and property tax) and dividing by a case-mix index. The case-mix index is derived using Medicare's methodology, except there are 35 diagnostic categories instead of 470 DRG's. The trend factor is obtained from the most recent *Health Care Costs* published by Data Resources, Inc. (DRI). Separate DRI cost indexes are multiplied by the proportion of a hospital's operating costs in salaries, employee benefits, medical fees, raw food, medical supplies, pharmaceuticals, utilities, repairs and maintenance, insurance, and other operating costs in order to obtain the trend factor. The categorical rate per admission for a hospital is equal to the adjusted base-year cost per admission multiplied by the hospital's trend factor, plus the budget-year pass-through cost per admission. Any discrepancy in the amount reimbursed for pass-through costs and actual pass-through costs is reconciled at the end of the fiscal year.

The Minnesota system is the most inclusive of all State Medicaid systems. Children's hospitals, distinct-part psychiatric units, distinct-part rehabilitation units, out-of-State hospitals, HMO's, and freestanding psychiatric and rehabilitation facilities are all included in this system. Length-of-stay outliers are defined as cases for which days of care exceed by 2 standard deviations the geometric mean for all cases, except neonatal cases (for which it is 1 standard deviation). Reimbursement for length-of-stay outliers equals 60 percent of the hospital's categorical rate per day for the given category, except for neonatal cases for which the reimbursement is 80 percent. Cost outliers are handled similarly, except that cost outliers for all cases (except neonatal) are defined as those cases that exceed 3 standard deviations from the geometric mean of the costs for the diagnostic category.

The Minnesota system provides for a disproportionate-share adjustment. The adjusted base-year cost per admission is increased for hospitals whose medical assistance and general assistance medical care admissions exceed 15 percent. For hospitals with between 15 and 20 percent, the disproportionate-share adjustment is 0.25 percent for each percentage point above 15 percent up to 20 percent; for hospitals with between 21 and 25 percent, it is 0.50 percent for each percentage point above 20 percent up to 25 percent; for hospitals with 26–30 percent, it is 0.75 percent for each percentage point above 25 up to 30 percent; and for hospitals above 31 percent, it is 1 percent for each percentage point above 30 percent. Although this adjustment has been costly, rates have not been reduced to compensate for the adjustment.

Oregon

Oregon established a DRG-based Medicaid reimbursement system on October 1, 1985 (Cheriel, 1986), replacing a system that reimbursed on a flat-rate-per-discharge basis. The flat rates per discharge were institution-specific and derived from the cost per case in the institution in the previous period trended forward. Oregon established the flat-rate-per-discharge system because of rapid increases in Medicaid expenditures experienced under the previous retrospective cost-based system. Cost increases during the years under the flat-rate-per-discharge system were between 4 and 5 percent.

Oregon uses Medicare relative weights. Specialty hospitals and distinct-part psychiatric and rehabilitation units are excluded. Out-of-State hospitals are included. Direct medical education and capital costs are pass-throughs. Outliers are not recognized under Oregon's system. This policy is currently under study, but a change is not imminent. The Oregon system is the only DRG-based system that does not recognize any outliers and reimburses all cases within a DRG at the same rate. Because the system is so young, State officials have not assessed the impact of this policy.

There is one statewide base rate. This base rate is multiplied by the relative weight of each DRG to set the reimbursement rate for each DRG. This rate is set to achieve budget neutrality. In the future, Oregon will probably keep Medicare relative weights but is undecided on a methodology to update its base rate.

Preliminary evidence

Utah experienced lower total Medicaid expenditures in fiscal years 1984 and 1985. However, Utah expenditures increased $5 million (to $34 million) in fiscal year 1986. Total expenditures were $30 million in fiscal year 1983, $29.3 million in fiscal year 1984, and only $29.0 million in fiscal year 1985 (Utah hospitals have a fiscal year beginning July 1). The number of beneficiaries increased by 1 percent between fiscal year 1983 and fiscal year 1985. The cost per admission remained virtually constant during that period ($1,900 per admission in fiscal year 1984 and $1,912 in fiscal year 1985), as the number of admissions fell slightly. The average length of stay fell 2 percent during fiscal year 1985, from 5.25 days in fiscal year 1984 to 5.14 days for fiscal year 1985. The average length of stay for psychiatric patients is increasing and is now 13 days, and psychiatric admissions are increasing at more than 13 percent per year. The State is paying a capitated rate for ambulatory psychiatric services, but this does not cover inpatient psychiatric services. Hence, there is an incentive to increase the volume of psychiatric services provided on an inpatient basis.

Evidence from Pennsylvania indicates that the length of stay has dropped for Medicaid enrollees from 5.7 days in fiscal year 1984 to 4.8 days in fiscal year 1985 and that the number of admissions has also dropped. This may be due to the slight drop in the number of Medicaid-eligibles. The number of admissions per 1,000 eligibles rose from 215.1 in fiscal year 1984 to 215.3 in fiscal year 1985. Total Medicaid

expenditures for inpatient hospital services increased about 3 percent during the first year of the program.

Ohio Medicaid expenditures for inpatient hospital services increased 2 percent during fiscal year 1985, the first year of the new system. State officials believe there has been a large drop in the length of stay and a slight drop in the number of admissions. Between July 1984 and January 1985, hospitals were provided an interim payment unrelated to invoices, which may have resulted in an overestimate of fiscal year 1985 costs. As of July 1, 1986, Ohio will be shifting to a fiscal year that begins each July 1.

The intent of the new Washington State system was to be budget-neutral. Yet, an error in the State's DRG model produced rates that were too high, and estimates of the deficit run about $50 million for the first 2 years of the program. The error was corrected February 1, 1986, and the DRG rates are now lower than they were for the previous fiscal year. Hospitals are currently suing Washington State for the cutback, and the State may discontinue this sytem. The length of stay for Medicaid patients is falling, and the volume of outpatient services is increasing dramatically. The capital component is also increasing rapidly, due to increased equipment purchase and renovation activities.

The Medicaid system in Michigan has experienced significantly lower lengths of stay. Data from 54,000 claims for services provided after February 1, 1985, show an average length of stay of 4.5 days, compared to an average length of stay of 5.6 days for the quarter ending September 1984. The reduction in the length of stay has been experienced across all DRG's. For example, the average length of stay for the three most common newborn DRG's fell from 3.3 days to 2.7 days for DRG 373 (vaginal delivery without complications), from 6.4 days to 5.3 for DRG 371 (cesarean section with complications), and from 5.0 days to 3.5 days for DRG 372 (vaginal delivery with complications). The average charge per Medicaid case has fallen from $3,500 before DRG's to $2,900 after implementation of the new system. Medicaid does not pay on the basis of charges, but charges provide an indication of the level of resources used. Evidently the hospitals in Michigan have reduced the amount of services used, rather than incur losses treating Medicaid patients. Michigan is planning to move to a system that blends hospital-specific rates with some peer-group rates on January 1, 1987. This date may be postponed, however, because of technical difficulties.

Discussion

The experience of States using methods other than Medicare's PPS to set DRG-based rates may provide valuable information on the feasibility of alternative approaches. The experience of States that employ disproportionate-share adjustments for hospitals that serve an unusually large number of poor patients, include different types of hospitals than PPS, or set only one statewide rate may be particularly important to Medicare.

The variety of methods used by States to set DRG-based rates reflects, to some extent, the special characteristics of each State. For example, States with small Medicaid populations use Medicare relative weights, because their populations are too small to construct their own relative weights; States with large Medicaid populations derive their own relative weights. The percentage of hospital revenue derived from Medicaid patients is also important—the lower this percentage, the more flexibility the State system has in setting rates.

The variety of rate-setting methodologies reflects, to some extent, dissatisfaction with certain aspects of the PPS methodology. For example, no Medicaid DRG-based system uses Medicare's methodology of standardizing hospital costs. Medicare adjusts each hospital's costs to make them equivalent to those of a hospital in an area with the average wage index and no teaching program; Medicare averages these "standardized" costs for hospitals in each region and in the Nation, and then uses the individual hospital's wage index and the number of residents per bed to adjust the standardized average to set the individual hospital's regional and national rate. States define groups of hospitals by location, teaching status, and size. The average costs in these groups are used to set base rates for the hospitals in each group.

State Medicaid DRG-based systems not only differ from PPS in important respects, they differ among themselves. For example, Medicaid DRG-based systems define outliers differently. Some systems recognize only length-of-stay outliers (Utah and Michigan), while Washington State recognizes only cost outliers, and Oregon does not recognize any outliers. States that define cost and length-of-stay outliers often use different definitions than Medicare uses, and special criteria are often used to define neonatal outliers. Ohio, for example, defines a length-of-stay outlier as a case that exceeds the geometric mean by at least 2 standard deviations, except for neonatal outliers, which are defined as cases that exceed the geometric mean by at least 1 standard deviation.

State programs also vary according to the types of hospitals excluded under their systems. Minnesota provides for no exclusions of any type. Oregon excludes all freestanding psychiatric and rehabilitation hospitals as well as all distinct-part psychiatric and rehabilitation units. Other Medicaid DRG-based systems fall somewhere between Minnesota and Oregon in their exclusion policies.

All systems except Minnesota use the Medicare definitions of DRG's. Minnesota uses 35 categories of DRG's (mainly the major diagnostic categories used in the DRG methodology) to define case types. Some States subdivide existing DRG's for neonatal, burn, and psychiatric patients. This reflects the large variation in the costs of cases in neonatal, burn, and psychiatric DRG's and widespread concern about the homogeneity of patients in these DRG's. Research is seeking new ways to improve the homogeneity of cases in these DRG's. In addition, several States

define outliers for these DRG's differently than they do for other DRG's.

Section 2173 of the Omnibus Reconciliation Act of 1981 requires that States give consideration to hospitals serving a disproportionate share of poor patients. State programs that set hospital-specific rates claim that such rates inherently take into account the special circumstances of each hospital. Only the Michigan and Minnesota systems make explicit adjustments for indigent care. Michigan adds an indigent-care factor for each hospital, based on the hospital's ratio of Medicaid and bad-debt charges to total inpatient days. Minnesota increases base rates only for hospitals with more than 15 percent medical assistance and general assistance admissions. Pennsylvania includes county income as a determinant of a hospital's peer group and argues that this satisfies the disproportionate-share requirements. Yet the Utah and Oregon DRG-based systems set one statewide rate and make no adjustment for hospitals that serve a disproportionate share of poor patients.

Some States implemented their DRG-based systems to be budget-neutral, and others sought to restrain expenditures for inpatient hospital care. Given current budgetary pressures, it is likely that many States will begin to use their DRG-based systems to contain expenditures for inpatient hospital care. Already, several States that established their systems to be budget-neutral have indicated an intention to use their systems to contain expenditures for inpatient hospital care in the near future.

Preliminary evidence on the impact of these systems on total expenditures shows that States that have adopted prospective DRG-based systems have experienced relatively low rates of increase in expenditures. State Medicaid expenditures for all States rose 10.6 percent for fiscal year 1985 (Kominski et al., 1984). Yet, Utah Medicaid experienced about a 2-percent decrease in its total health outlays during the first year of its DRG-based system (fiscal year 1984) and about a 1-percent decrease during fiscal year 1985.

Preliminary evidence on hospital expenditures indicates that Pennsylvania Medicaid experienced a 3-percent increase in hospital expenditures in the first year of its program (fiscal year 1985), and hospital expenditures in the Ohio Medicaid program rose about 2 percent in the first year of its program (fiscal year 1985).

Most States that established DRG-based systems did so after experiencing large increases in Medicaid expenditures. Consequently, there may be more fat in hospital budgets in the early years of a DRG-based prospective payment system than in later years, and there may be more fat in the hospital budgets in States that established DRG-based systems than in States that have not. This suggests that the effects of DRG-based systems may be greatest during their first few years of operation. However, studies have shown that the effects of prospective rate-setting systems are greater after they have been in operation for a few years (Coelen and Sullivan, 1981). Presumably, these systems learn during their first few years and become more effective with time. This learning effect may help offset any reduction in the impact of DRG-based systems after the fat in hospital budgets is trimmed during the first few years of operation.

The preliminary results from States show that Medicaid-only DRG-based systems have not led to increases in the number of admissions as had been feared. (New Jersey has experienced an increase in the number of admissions.) If controls on per-case reimbursement levels had led to an increase in the number of admissions, then total Medicaid expenditures for hospital services might not be lowered. There is a substantial amount of evidence indicating that limiting physician reimbursement on a per-service basis only leads to an increase in the number and intensity of services provided to patients and does not lower total outlays to physicians (Gabel and Rice, 1985).

To assess the impact of DRG-based systems on total system expenditures, it is necessary to estimate the impact of the system on expenditures not covered under the system. With available data, it is not possible to determine precisely the magnitude of any additional expenditures for uncovered services occasioned by the use of DRG-based systems that cover only hospital care. Nevertheless, the enactment of PPS has been associated with increases in many uncovered services. Outpatient care, home health care, and capital costs have increased at a faster rate than hospital costs, and in a few States, psychiatric and alcohol-related admissions have increased rapidly since implementation of a DRG-based system (American Hospital Association, 1985). A recent American Hospital Association publication reports that "HHS [U.S. Dept. of Health and Human Services] contends that the ratio of capital to operating costs has increased dramatically under PPS and that at a time when hospital expansion is unnecessary, this rapid increase is not appropriate" (American Hospital Association, 1985). This is consistent with evidence from several State Medicaid agencies. Washington State, in particular, has experienced a large increase in capital costs since implementation of its DRG-based system.

Outpatient care is not covered by PPS or any Medicaid DRG-based system, and the volume of outpatient care has increased substantially since the implementation of PPS. The number of outpatient hospital visits has risen from less than 57 million in October 1983 to more than 61 million in June 1985, while the number of hospital admissions has fallen from 9.3 million to 8.6 million during the same period (American Hospital Association, 1986). A recent publication of the American Hospital Association (1985) states that "Outpatient utilization for hospitals surged in the second quarter of 1985, up a seasonally adjusted 3.4 percent from the first quarter, according to an AHA report on hospital costs and utilization. Reflecting the movement away from inpatient hospital use were declining admissions and reductions in length of stay."

These data relate to all patients (not only Medicaid patients) and are not directly applicable to the Medicaid experience. Yet, it is likely that systems that restrict reimbursement for hosptial care will find that the amount of care provided outside the hospitals then increases. These trade-offs may be significant, and the consequential question is whether any increase in outpatient services is offset by savings in inpatient care.

There are other indications of shifting from covered to uncovered services. Data from the PPS 1984 Annual Report submitted by the Department of Health and Human Services to Congress show that Medicare rates of growth during fiscal year 1984 for outpatient hospital payments (11.9 percent), skilled nursing facilities (9.0 percent), and home health care payments (22.8 percent) exceed the rate of growth for inpatient hospital payments (8.2 percent) during this period (*Report to Congress*, 1986). Evidence from State Medicaid agencies suggests that payments for psychiatric care and the treatment of substance abuse in special facilities or distinct-part units excluded under the DRG-based system are increasing more rapidly than overall Medicaid costs.

A major problem in estimating the impact of DRG-based systems for Medicaid is that these systems were implemented during a period of considerable change. During the past few years, the proliferation of HMO's and PPO's has accelerated, many States have obtained freedom-of-choice waivers that limit the choice of providers for Medicaid recipients, and numerous hospitals have been purchased by chains. Additionally, many hospitals have entered into arrangements with organizations to help them improve their management, and several costly new technologies have become more readily available (e.g., magnetic resonance imaging and extracorporeal shock wave lithotripsy).

It is difficult to isolate and estimate the impact of any one of these simultaneously occurring events. In particular, it is difficult to isolate and estimate the impact of DRG-based rate-setting systems, as these systems have only been in operation a year or two, and there are few, if any, data available from the period after their adoption. There may also be a lag in the effects caused by these new systems. Consequently, it will be some time before we can assess the full impact of Medicaid DRG-based prospective rate-setting systems. Nonetheless, the relatively low rates of increase in expenditures experienced by States with such systems are likely to encourage more States to adopt similar approaches.

Acknowledgments

I am grateful to Ira E. Raskin, of the National Center for Health Services Research and Health Care Technology Assessment, and to John Burckhardt, of the Office of the Assistant for Health, for their valuable comments.

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