

Hospital payment in the United States: An overview and discussion of current policy issues

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Abstract

Payment policy in the United States since the introduction of the Medicare Program for the elderly and disabled populations in the 1960s has been evolving from providing little incentive for hospitals to contain costs to its current form, which creates an enormous incentive for cost containment. The Diagnosis Related Group (DRG) system implemented by Medicare for hospital payment in 1983 is viewed favorably in terms of slowing cost escalation of inpatient care, while maintaining quality and access. DRG payments are not fully prospective, in that payments depend on procedures and outlier payments. Medicare spending on hospitals has grown significantly more slowly than spending on other types of services. Implementation has required periodic adjustments with refinements for new technologies, capital costs, and teaching. The main problems with DRG payments are their incentives to contain costs can be too strong, there are incentives for selection, and they may encourage substitution of outpatient for inpatient care without facilitating care management.

Two alternatives to DRG payments to hospitals are a Mixed Payment System and Capitation. Under a mixed system hospitals are paid partially prospectively and partially on the basis of actual costs. This has certain desirable incentive properties in bringing prices more in line with marginal costs without setting them to zero as they are in a fully prospective system. With capitation, payments to providers are made monthly that reflect expected, not actual costs. They have been adopted as an alternative prospective payment mechanism by the Medicare and by many private insurers. Because payments are independent of whether any health services are actually provided, capitated payments create superior incentives for agents to manage all forms of medical care. Risk adjustment is necessary in order to create appropriate incentives for providers to enroll and treat all types of patients without encouraging selection. Although a variety of risk adjustment formulas are used in the United States, the most widely used rely on diagnostic information from medical claims to adjust payments. The US Medicare program started using one such system, based on Diagnostic Cost Groups (DCGs) in 2000 to pay its managed care plans.

Introduction

This paper provides a brief overview of how hospitals are paid in the United States, with a particular emphasis on the shift toward prospective payment in the US Medicare program and its implications for other countries considering similar reforms. After discussing some of the key incentive issues motivating the movement to prospective payment, recent legislation and its impact on hospital payment is reviewed.

The consensus view is that the US Medicare program payment reforms, specifically the DRG system that has been in place since 1983, has been very successful at changing incentives facing hospitals, contributing to shortened lengths of stay, and reduced costs with little evidence of a reduction in hospital quality. At the same time this DRG system has introduced some incentives that are less than desirable. The second half of the paper discusses some of the current challenges facing DRG payments in the US, and suggested refinements to deal with them. The final section discusses the implications of a trend toward capitation, whereby even larger aggregates of spending, embracing an entire year of services rather than a hospital episode, are used to pay provider groups.

Methods of paying hospitals

Recent payment trends in the United States can be seen as a progression from low power to high power payment mechanisms. By “power” I mean the strength of the incentive to reduce costs. Five different payment mechanisms are shown in Figure 1, arranged on a line from those imposing the weakest incentive to contain costs to those imposing the greatest incentive to contain costs. Payment systems also create other incentives that affect treatment patterns, costs, quality and access, but their incentive on cost containment is perhaps the most important for thinking about differences. Key literature on hospital payment incentives is Shleifer (1985), Ellis and McGuire (1986), Laffont and Tirole (1993), and McClellan (1997).

The simplest system is to pay hospitals their actual costs, such as compensating them for salaries, capital, supplies, and so on. There are a variety of ways of paying actual costs, such as by a global budget that is revised on the basis of historic costs, or payments based on lagged hospital spending that are updated to reflect an inflationary trend. Payments based on actual costs create no incentive for providers to contain costs. Many different models lead to the conclusion that if health care providers derive any utility from helping patients, then hospitals that are fully reimbursed for their costs will provide services to the point where the marginal benefit of treatment is zero (for example see Ellis and McGuire, 1986). This result suggests that hospitals will tend to overtreat patients. Also, providers will have no incentive to avoid high cost patients, since they receive the full cost of care regardless of whom they treat. One last incentive effect of cost based reimbursement is that there will tend to be too little effort (or quality which requires effort): since provider payment is not contingent on performance, there is little incentive for hospitals to compete so as to attract patients (Laffont and Tirole, 1993). Clearly, cost based reimbursements create incentive problems for both costs and quality.

At the other end of the spectrum, under a capitation payment system, an entire network of providers (hospitals, doctors, and all other types of providers) would receive payment that reflects the *expected* costs of each patient, rather than the *actual* costs of services provided (van de Ven and Ellis, 2000). In a fully capitated system, provider revenue is independent of the level and quality of services, and strong incentives to contain costs are created, perhaps excessively so if there are inadequate incentives for providers to compete for patients. Since effort is costly, providers will only want to provide quality and effort if it will attract profitable patients. If capitation payments to health plans are not adjusted to fully reflect the expected cost of each enrollee, then capitation creates an incentive for providers to attempt to select profitable cases and avoid treating unprofitable cases. Ellis (1998) describes the various actions of health providers

competing for profitable cases as “creaming” (over providing services to the healthy), skimping (under providing care to the sick) and dumping (explicit avoidance of those who are high cost).

Intermediate between cost-based payment and capitation payment are payment systems that differ in the extent to which services are bundled together for payment. Fee-for-service payment gives providers a price for each service, rather than paying for actual costs. It differs meaningfully from payment based on actual costs when more or less complex cases are charged the same fee, or prices differ from marginal costs. Under a per diem payment system, payments to a hospital for each day in the hospital are constant, regardless of how intensively a patient is treated during a given day. Under a Diagnosis Related Group (DRG) payment system, the hospital is paid a fixed amount per inpatient episode of treatment. It is easy to see that per diem and DRG payment systems create an incentive to contain costs within each unit of payment (per day or per episode). However, they also create distortions on the margin that can be of concern (number of days or number of episodes). Selection incentives are also created, creating a need for adjusting payments to reflect the expected cost of the unit of payment (per day or per hospital episode).

Hospital payment reform in US

The most dramatic policy change affecting hospital payment in the United States was the introduction of the national Medicare program for the elderly in 1967. This program was later extended to persons who are disabled and currently covers 39 million aged and disabled people. In order to ensure that the Medicare program adequately compensated hospitals, hospitals were initially paid *retrospectively*, based on actual costs reported on annual hospital cost reports. This was a step backward from the per diem and fee-based payment systems that were previously in place and the general trend toward *prospective* payments, in which payments are calculated in advance and are hence independent of actual costs.

In the absence of any financial incentives to do otherwise, Medicare hospital payments increased rapidly during the first fifteen years of the Medicare, eventually leading to major reforms in the 1980s. The first hospital payment reform in 1982 introduced episode based payment but was a *partially* rather than a *fully* prospective payment system.¹ It was only partially prospective for two reasons. First, there was significant risk sharing: hospitals could keep some, but not all, of the profits when costs were below revenues (although hospitals bore the full risk of losing money if costs were high!). Second, hospital payments were calculated using peer groups of similar hospitals with a small number of hospitals in some peer groups. An example of a peer group might be all psychiatric hospitals with fewer than 100 beds located in the state of Massachusetts. A given hospital's own cost experience affected payments in subsequent years, and hence payments were not fully prospective. Although the 1982 hospital payment system was revised again in 1983, and hence only used for one year for acute-care general hospitals, this payment formula continued to be used in a variety of exempt hospitals and hospital units, specifically psychiatric, pediatric, rehabilitation, and selected long term care hospitals.

After only one year of the partially prospective system, a five-year transition to the current DRG based hospital prospective payment system was started in 1983.² Unlike the previous system, which calculated one payment rate per hospital, regardless of the complexity of the patient, the DRG system created numerous categories of payment for each hospital, based primarily on the inpatient diagnoses hence its name of Diagnosis Related Groups. Although the name and emphasis is on diagnoses, payments can also reflect whether surgical procedures are used, length of stay, teaching adjustments, transfer status, and cost sharing for outliers, and hence the system

¹ In the US, major legislation is given a name, which is generally very grandiose. The legislation introducing episode-based payment was part of a package of laws called the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982.

² The legislation that implemented DRGs was part of the Consolidated Omnibus Budget Reconciliation Act (COBRA) of 1983.

is not fully prospective or solely based on diagnoses. Further issues and incentive problems with the DRG system are discussed below in the next section.

Other than updating the payment rates and refinements to the classification system, the Medicare DRG payment system remained relatively stable from 1988 through 1997. Major reforms to the DRG system were enacted as part of major legislation in 1997 and 1999.³ Although not yet fully implemented, this 1997 legislation and its refinements require a further movement toward prospective payment. If fully implemented, payments would be largely prospective for currently exempt specialty hospitals (psychiatric, pediatric, rehabilitation and long term care facilities) that were still under the partial prospective payment system of 1982. New payment formulas would also be used for hospital outpatient departments, skilled nursing facilities, and post-acute care services. Implementing all of the provisions of the 1997 legislation has proven difficult, and hence been delayed several times. Further refinements to the 1997 legislation were made in 2000.⁴

In addition to hospital specific reforms, other changes also affect hospital payment policy. Of particular importance is the growth of "managed care" insurance companies called Health Maintenance Organizations (HMOs), that have also been introduced both for privately insured and for Medicare enrollees. HMOs now cover 68 million Americans, representing 43 percent of commercially insured individuals and about 14 percent of all Medicare beneficiaries. HMOs differ enormously in how they are organized, but the typical HMO contracts selectively with only some hospitals in a given area, negotiates discounts or special pricing, and manages care in some fashion. Many, but by no means all, HMOs also pay hospitals using a DRG system. Most HMOs

³ These were the Balanced Budget Act (BBA) of 1997, and the Balanced Budget Reconciliation Act (BBRA) of 1999.

⁴ Benefits Improvement and Portability Act (BIPA) of 2000.

are paid on a capitated system. The Medicare programs capitation formula is now risk adjusted to reflect the age, gender, and inpatient diagnoses of each HMO enrollee.

This very brief overview of US legislation, focused on Medicare payment reforms, highlights that hospital payment reforms have generally been in the direction from low to high power, as discussed at the onset. Further details about, and challenges to, DRG payment are discussed in the next section.

DRG hospital payments in US

The DRG payment system adopted by the Federal government for the Medicare program in 1983 was developed by researchers at Yale University, and had previously been used in only one state (New Jersey) prior to its national implementation. It is striking that the vast majority of health plans uses it today as the primary payment mechanism. Separate models have been developed for Medicare (the elderly and disabled), Medicaid (the poor and high medical costs), and privately insured populations. Other systems of hospital payment, such as per diems are still used although none as widely. Researchers perform ongoing research and development for the DRG classification system at the private firm "3M."

Development of the payment formulas using the DRG system is done in several stages. First, the sample of hospitalization discharges at eligible facilities is selected. As noted previously, admissions at certain specialty facilities are excluded and paid separately. Hospitalizations are then grouped into a broad set of body systems using solely the principle inpatient diagnosis. Examples include neurological disorders, heart conditions, and diseases of the skin and connective tissue. Admissions in each of these broad systems are then differentiated using an algorithm that uses the principle diagnosis, secondary diagnoses, surgical procedures, age and

gender. Each hospitalization is uniquely assigned to one and only one distinct DRG. As of 2001, 499 DRGs are used to calculate payments in the US Medicare program.

Payments for each DRG are calculated using the product of a DRG relative cost weight and a dollar denominated average cost specific to each hospital. The DRG cost weights are based on historic average costs of each DRG, which is found by taking the total covered charges of all discharges in the DRG, and adjusting charges to reflect actual costs. The highest cost 1% and lowest cost 1% of all cases were excluded so as to eliminate the impact of very high and very low cost outliers, some of which reflect data problems rather than actual cost patterns. Since some DRGs occur very rarely, and hence their mean costs cannot be reliably estimated in some cases, the average cost of a group of DRGs was estimated jointly, and the relative cost of the different severity levels was calculated from outside sources (such as over weighted samples of pediatric admissions). The average cost per DRG was converted to a relative cost weight by dividing the DRG specific average cost by the national average DRG payment.

Payments to hospitals using the Medicare DRG relative cost weights are combined with hospital average cost and refined in a variety of ways. Case weights calculated for each patient's DRG are multiplied by a geographic price adjuster that is no longer based on a hospital's own historic cost. Separate adjustments are made to reflect hospital operating and capital payments. Cost weights have been modified gradually over time.

Impact of DRGs in the US

From the time that they were introduced in the US in 1983, economists have been busy predicting and examining the impact of DRG payments. The most carefully predicted impact is that it would reduce average days of care, often called the average length of stay. Shortened stays have clearly occurred, although it is impossible to convincingly separate the impact of DRGs on length

of stay from general trends and impact of technological change. There has also been a short-term decrease in number of admissions, consistent with DRGs encouraging a shift of certain procedures to being an outpatient procedure.

Although many studies have examined the issue, there is little evidence of a significant negative impact of DRGs on quality of care. There are many problems with quality of care in hospitals in the US. But they are not generally attributed to the DRG payment system. It is likely that the DRG payment system has accelerated the shift to outpatient care from conventional inpatient care, which is generally cost saving. Average hospital based DRG payments will tend to increase if less serious cases are treated on an outpatient basis while more serious cases continue to be treated in the hospital.

As alluded to in Figure 1, DRG based payments create distortions between services that are included or excluded from the prospective payment calculation. For example, since inpatient hospital care is paid prospectively while outpatient care is currently not, DRG payment creates an incentive for hospitals to over-admit basically healthy people and avoid admitting people who are expected to be costly or in the hospital for a long time. Similarly, DRGs create an incentive for hospitals to want doctors to provide more extensive and expensive physician time, if this will reduce hospital room and board charges that need to be covered in the capitation formula.

Figures 2 and 3 summarize total Medicare payments in 1980 and 1996, and illustrate how payments to hospitals declined sharply as a percentage of the total Medicare spending. Whereas inpatient spending accounted for 68 percent of the total Medicare spending in 1980, it had declined to only 50 percent in 1996. The same figure highlights the rapid growth in spending on home health and skilled nursing facilities, special facilities for which it is difficult to devise high-

powered payment systems. As they have seen inpatient admissions and days of care decline, hospitals have increased the use of their outpatient departments, which have also seen significant expenditure growth.

An important feature of DRGs is that specialty hospitals are exempt. As can be seen in Figure 4, exempt (non-DRG) payments accounted for 9 percent of total hospital payments in 1997.

Specialty hospitals present particular challenges to a prospective payment system, since their cost patterns tend to differ systematically from norms in other facilities. Legislation passed in 1997 requires that all *specialty* inpatient facilities (pediatric, long term care, burn patients, and rehabilitation facilities) move to prospective payment, although it remains to be seen if all of the specialty facilities can comply.

In addition to the payments to non-DRG admissions, the Medicare program makes numerous adjustments to the payments made to hospitals, many of which introduce retrospective factors. The outlier payment formula was originally intended to pay for 5 percent of all hospital costs, but generally accounts for a much lower percentage, less than 2 percent. Hospitals transferring patients to another facility are not paid the full DRG payment for short lengths of stay, but rather must keep only a per diem fraction of the payment for the initial days of care. Further adjustments are also made for teaching hospitals and capital costs, both of which can be quite substantial. Hospitals serving a disproportionate share of poor or disabled are also paid a supplementary payment. Altogether, DRG prospective payments account for only 66 percent of the total hospital payment in 1997, with the remainder reflecting these additional factors.

Summary comments on US implementation of DRGs

DRGs based payments are now widely accepted in US. Although there are still some critics and problems, DRGs are no longer viewed with as much concern as in the early years. There have

been many small changes in the system, but the basic DRG system remains largely the same from 1983 until the present. Various adjustments have been made over time to improve incentives and fairness, including changes in the way that capital expenses are made, changes in the outlier payment formula, and changes in how teaching expenses are paid. But these changes have generally had a minor impact on the overall incentives of the system. Recent trends are toward increased, rather than reduced incentives for cost containment.

Current policy issues

This section discusses some of the current policy issues related to prospective payment in the US.⁵ As noted in the introductory section, there are two major forms of prospective payment currently in use by the Medicare program. One is the hospital prospective payment system using Diagnosis Related Groups (DRGs), as previously discussed. The other is the capitation program in which competing health plans are paid a fixed annual amount per enrollee. In the former, payments are made on a hospital episode, while in the latter payments are for an annual payment period.

Overall, health plans and providers have been relatively satisfied with prospective payments based on DRGs. Inpatient costs have been growing more slowly than other health care costs, reflecting the US shift toward outpatient and drug treatments in preference over surgery. Current trends in the US are toward more bundling of services into the unit of payment not less.

DRGs are firmly entrenched in payment systems not only of the Medicare program, but also in privately insured and Medicaid settings. DRGS are also used extensively in various hospital management systems, and in order to do case controls for monitoring and quality. DRGs are used

⁵ For a useful discussion of current policy issues see the MEDPAC reports for 2000 and previous years.

by many plans and provider networks internally, even if other payment formulas are used, such as per diem or contracted fees.

Criticisms of US DRG system

If one looks at complaints by the hospital associations, the main complaint is that DRG payments are too low. While perhaps true, this complaint could be made about any payment system, and hence is not a problem with DRGs per se. One problem with DRG payments is that the payment formula requires payments to be calculated for a given year well in advance, introducing the possibility that actual cost inflation will be higher or lower than anticipated. HCFA has generally followed a practice of trying to make up for any forecast errors in subsequent years, which has tended to make hospital payment increases track cost increases quite closely over time.

A second criticism, particularly in the 1980's, is that DRGs may discourage quality or create too strong an incentive for providers to reduce costs. While there is some anecdotal evidence of this, a review of the empirical literature in this area lies beyond what this overview can hope to achieve. MEDPAC 2000 finds that there are no convincing studies that demonstrate quality or excessive cost containment, and proposes to move toward greater, not lesser use of prospective payment.

DRGs find it challenging to incorporate new technologies. For example, cataract eye surgery used to require full anesthesia and hence an extended hospital stay. With the advent of laser surgery, the same or better effectiveness can now be achieved in one day, or even with outpatient surgery. There was a time in the 1980's when hospitals were competing aggressively, even to the point of advertising in national magazines, for cataract patients because the DRG payment, based on the old technology costs was extremely generous relative to new practice. It took several years before payments could be reduced in order to reflect the practice change. Similar patterns

have emerged with other new technologies, some of which are cost increasing rather than cost decreasing. It is readily seen that fixed DRG payments will tend to accelerate the use of cost saving technologies and delay the adoption of cost increasing technologies relative to a payment system that only pays for costs, or uses competitively determined fees.

New technologies can be incorporated into the DRG payments in a variety of ways. The most comprehensive mechanism is to assign diagnoses and procedures affected by the new technology to new DRGs, and split out the payments to reflect cost and practice differences from old technologies. In some cases, it may be adequate to simply recalibrate the DRG case weights to reflect new cost patterns, however this involves waiting until sufficient cost experience has occurred and the data necessary for recalibration has been gathered, which can take several years. Overall technological change can also be reflected in the average annual updates in average payment factors.

The DRG system has always relied on additional funds being used to compensate hospitals for expensive outliers. Although originally intended to pay for five percent of all costs through outlier payments, the initial amounts paid in this manner were less than two percent. Changes in outlier calculations have become more generous in recent years, so that now high cost or long length of stay admissions are eligible for payment of 75% of costs above a threshold.⁶ This US experience highlights that it is important to calibrate the magnitude of outlier payments correctly.

Perhaps the greatest criticism of the DRG system is that it creates distortions on its boundaries. For instance, following a hospital discharge, it is often desirable for patients to receive post acute care services, such as home health and nursing home (“skilled nursing facilities” care). Because

⁶ The technical details of the DRG outlier system are very complex. For an early discussion of why their incentives are not ideal, see Ellis and McGuire, 1988.

hospital payments do not include payment for these services, provider networks have an incentive to discharge patients into these settings, but not to manage their cost or utilization. Some would argue that bundling these services in with the hospital stay would improve incentives. Similarly, certain physician services, such as radiology, anesthesiology, and pathology are done only in a hospital setting, and it would be natural to attempt to bundle these services in with the DRG payment to create better incentives not to use these services excessively.

The legislation of 1997, and its subsequent refinements, proposed to pay nursing services prospectively. Hospital outpatient encounters would also be bundled, and paid prospectively using a formula based on a new Ambulatory Payment Classification (APC) for hospital outpatient services. It is a lot of changes to accommodate in very little time, but it is remarkable how aggressively the Medicare program is trying to bundle together different services.

Alternatives to fully prospective DRGs

Although there are many refinements, as discussed above, the DRG payments system is primarily fully prospective. Laffont and Tirole (1993) and others have shown that in general this polar extreme will not achieve the first or second best. A fully prospective payment system, by setting the marginal payment to zero, pays below marginal costs, and will not in general induce the optimal amount of effort. It also encourages strong selection activities, since within a payment category there is inevitably still some heterogeneity, such that low cost patients are profitable and high cost patients not. A fully prospective payment system can also be unfair to providers who treat a nonrandom group of patients. The DRG system attempts to control for patient severity and heterogeneity, but no payment system can be perfect

Many researchers have recommended softening the incentives of a fully prospective system, such as by encouraging partially prospective payments. One approach, discussed above as part of the

1982 reforms, is to pay hospital a *blend* of their own historic costs and the historic cost of some comparable facility. This approach draws upon the ideas of Shleifer (1985) and his “yardstick competition.” A second approach is the Ellis and McGuire (1986) *mixed* payment system, whereby providers are paid for some portion of their own costs, and the remainder of the payment is a prospectively determined amount. This mixture of own and comparison group costs is an attractive simple approach if the goal is to set prices at marginal costs. In many cases the marginal cost of care is not readily defined, so taking a constant proportion will come close to approximating the true marginal cost. Under some restrictive conditions that others have explored, a mixed payment system can even achieve the first best.

As an illustration, consider a payment system that pays for hospital care by paying 50% based on current year cost and 50% based on DRGs. This mixed system serves four purposes: (1) it sets marginal payment closer to marginal cost, (2) it improves the fairness of the payments to providers, (3) it weakens the incentives for providers to select only healthy people, and (4) it is relatively simple to explain. The main disadvantage of the system is that it is more complex than either the cost-based reimbursement or the DRG system alone, and the assumed 50% payment rate is arbitrary, since marginal costs are not a fixed proportion of total costs.

Capitation

As mentioned above, a significant trend in the US is towards the use of capitation rather than DRG payment systems. For a recent review of the use of capitation payments around the world, see van de Ven and Ellis, 2000. Capitation payments are fixed payments for a year or month, using only information available to the payer (or sponsor, if they assume any role in reallocating risk burdens across plan enrollees).

The great advantage of capitation as a payment system is that it encourages an entity to manage all types of care, without rewarding one particular type of service, such as hospitals or physicians. Effective cost containment under capitation requires coordination among providers; hence hospitals have an incentive to coordinate and plan for post acute care, since this will affect the overall profitability of their service provision. Capitation can be useful for reducing costs and encouraging competition in quality, as long as selection incentives can be contained.

Capitation brings with it a need for risk adjustment. Since plans receive a fixed payment for all patients in a given payment category, providers and plans have an incentive to avoid enrolling those who are more expensive than the capitation payment. This can be done by creaming, skimping, or dumping, as previously discussed. Keenan et al. (2001) have recently quantified the prevalence of risk adjustment in the US. They find that risk adjustment is common among public payers in the US, such as Medicare, Medicaid, but still relatively rare among privately insured groups.

Risk Adjustment Models.

A variety of information has been used for Risk Adjustment. They are presented in Table 1, and are discussed more fully in van deVen and Ellis, 2000. Much has been written about the predictive power of different risk adjustment models, and a growing literature is examining the incentive effects of these different models. Most of this literature has focused on prospective models, which is to say models that use predetermined information from some base period to project future costs for a different prediction period. It would be too much to try to summarize this entire literature here. I will instead highlight the following big picture issues.

Information that can be used for risk adjustment differs enormously in how well it predicts future year costs. Demographic variables such as age and sex explain only 1-3 percent of the variance in

total health spending, and can identify a roughly ten-fold multiple difference between low and high cost. Geographic price variation explains less than one percent of individual level cost variation in Medicare samples, and can distinguish roughly a two-fold difference in predicted costs in the US. Although geographic prices and demographic information such as age and sex are important to control for, they do not control sufficiently for cost differences to avoid strong incentives to select.

The Medicare program, and most commercial payers that have implemented risk adjustment have decided to use diagnostic information to augment the demographic variables. Diagnosis-based risk adjustment models can distinguish 100 fold-difference in expected cost prospectively, and explain about 10 to 15 percent of the total variation. (That is, the conventional R^2 is between .10 to .15.)⁷ While considerably less than explaining all of the variation, research by Newhouse et al. (1989) and others suggests that it may plausibly be that only 20-25 percent of all variation in health care costs is potentially explainable by prior year information.

There are three leading models commonly used for diagnosis-based risk adjustment in the US. These are the Adjusted Clinical Groups (ACGs), developed at Johns Hopkins University by Jonathan Weiner, Barbara Starfield et al. (1996), the Diagnostic Cost Groups (DCGs) model developed at Boston University and Health Economics Research by Arlene Ash, Randall Ellis, Gregory Pope et al. (2000) and the Chronic Disability Payment System (CDPS) developed at the University of San Diego by Richard Kronick and Anthony Dreyfus (1996). Table 2 illustrates that diagnosis based risk adjustment models are now used in a variety of settings in the US.

⁷ Diagnostic information can distinguish 10,000-fold differences in expected costs and achieve an R^2 of .45 if diagnostic information is used to predict concurrent spending from the same year. This framework is useful for profiling and can also be used for risk adjustment, however it is not a prospective payment system.

Although the primary use of Risk Adjustment models is generally viewed as being for adjusting payments to health plans and providers, the same information also has many uses for other purposes besides payment. For example, the same diagnostic classification can be used for risk assessment, to control for quality measurement, identifying high cost individuals for cases management, profiling providers, or calculating the implication of reinsurance.

Prospective payment mechanisms such as DRGs and risk adjusted capitation payments seem destined to remain an important part of the overall provider payment system. As information systems have improved, the burdens placed on providers to provide this information has been reduced. Increasingly payers, health plans and even consumers are seeking accountability in the health care they are paying for, and the same information that is used for these prospective payment systems are also useful for monitoring quality and access. The information available has been seen to increase once payments are based on it and it is monitored. This benefit only adds to the usefulness of basing provider payments on the diagnoses and health status information.

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Figure 1
Methods of paying hospitals

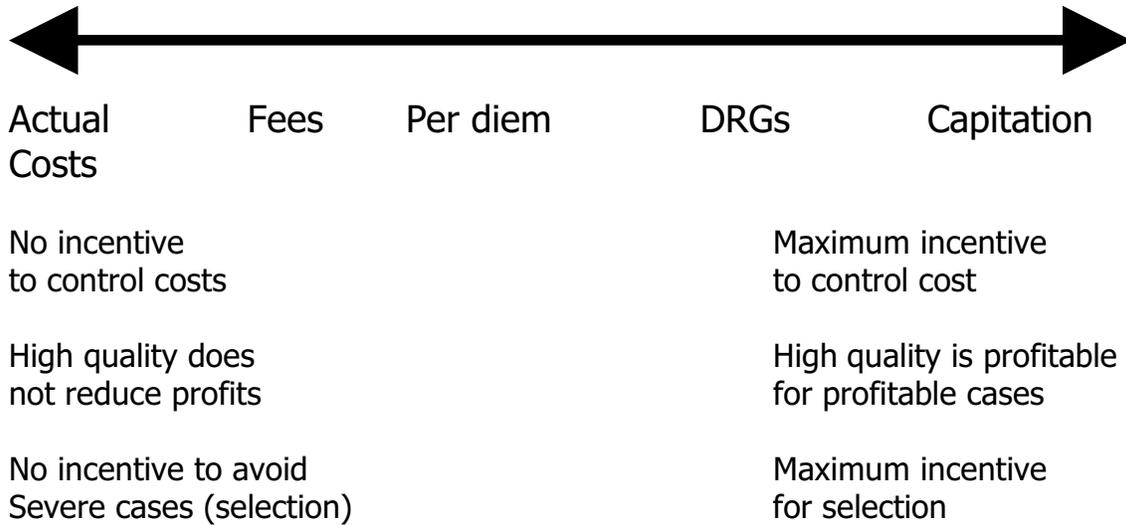
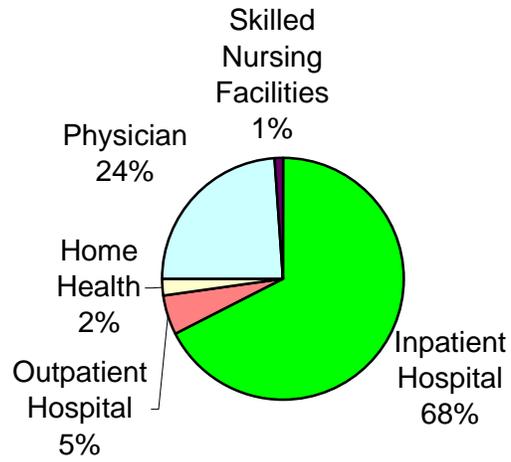


Figure 2
Medicare Spending by Type of Service

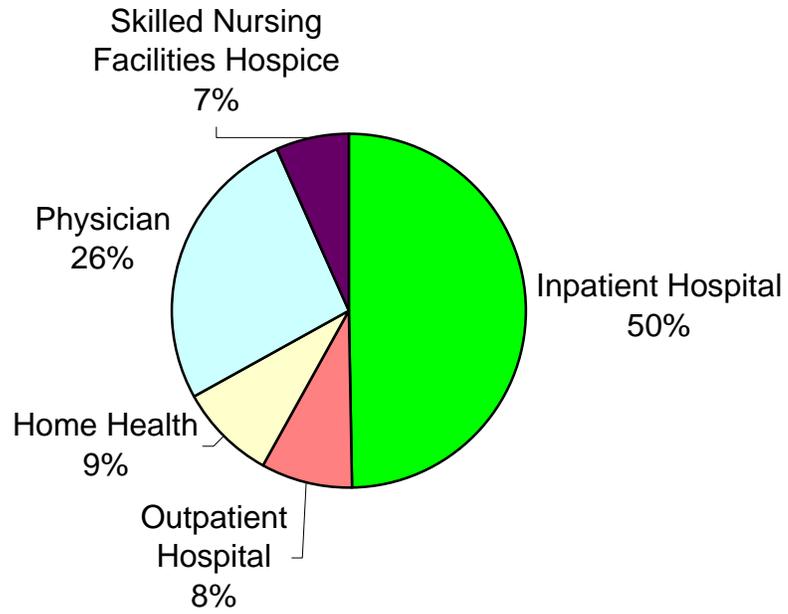
1980



Source: HCFA, 1998

Figure 3
Medicare Spending by Type of Service

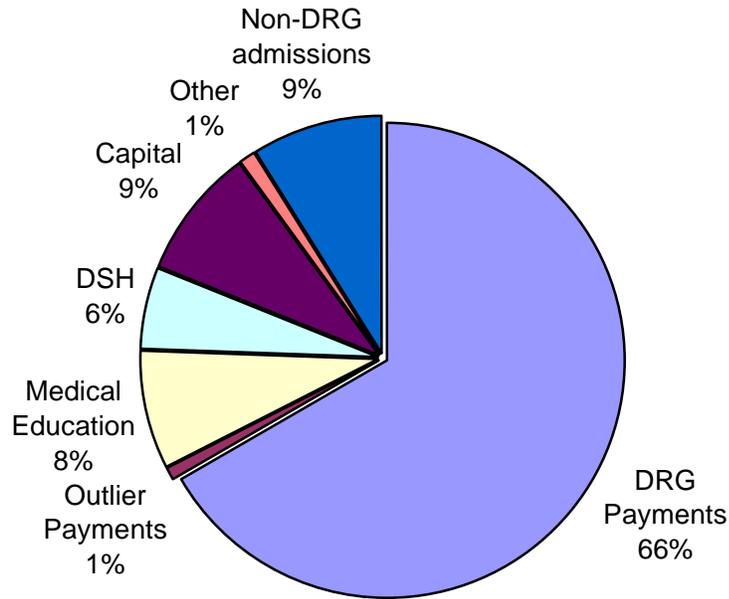
1996



Source: HCFA, 1998

Figure 4

Medicare Inpatient Hospital Payments, FY 1997



Source: HCFA, 1998

Table 1
Information usable for risk adjustment

- Demographics - age, sex, employed/retired
- Prior-year expenditures
- Diagnosis-based risk adjustment
- Self-reported health information
- Information derived from prescription drugs
- Mortality
- Models using other information
- Disability status
- Geography

Table 2

| Setting | Risk-adjusters |
|--------------------------|---|
| Medicare, pre 2000 | age, gender, region, disability, Medicaid, nursing home |
| Medicare, 2000+ | age, gender, region, DCG, Medicaid |
| Minnesota | age, gender, ACG |
| Washington State | age, gender, DCG |
| Missouri state employees | age, gender, DCG |
| Massachusetts | age, sex, DCG |
| Medicaid | various, including age gender, ACG, CDPS |