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Medicare Hospital Payment anti Medical Technology

Probably every new and eagerly expected garment ever put on since clothes came in, fell a trifle short of the wearer's expectation.

Charles Dickens

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Medicare Hospital Payment and Medical Technology

INTRODUCTION

In 1982, over 70 percent of Medicare's payments was for hospital care (135). Furthermore, $34.6 billion (66.3 percent) of Medicare's $52.2 billion' expenditures was for ***inpatient*** hospital care (135,151), and between 1967 and 1982, Medicare program expenditures for inpatient hospital services increased at an annual rate of ***19.2*** percent (151 ,392). Given the importance of expenditures for hospital care in the Medicare budget, it is not surprising that both Congress and the executive branch have had a longstanding interest in controlling the growth of Medicare expenditures for hospital care.

Not only are hospitals important to Medicare, but the Medicare program and its methods of payment are crucial to hospitals. In ***1982,*** Medicare accounted for 35 percent of hospitals' revenues ***(15).*** In **1980,** as shown in table ***17,*** Medicare and Medicaid together accounted for an estimated ***42*** percent of the revenues of a sample of short-term non-Federal hospitals. Because Medicaid hospital payment has traditionally followed the Medicare method in most States, the level and method of payment adopted by Medicare governs a sizable share of the total revenue of many U.S. hospitals. How Medicare chooses to pay hospitals—what it will pay for, how much it pays, and how it computes the level of payment —is therefore an issue of primary importance to hospitals, to the Medicare program, to communities, and to Medicare beneficiaries. Furthermore, hospitals are the major provider of medical technology, particularly sophisticated capital-intensive diagnostic and therapeutic procedures. Hospitals provide these technologies to both inpatients and outpatients. Changes in Medicare's hospital inpatient policy are therefore likely to affect the availability of medical technology for both kinds of patients.

'This $52 2 billion includes administrative expenses as well as benefit payments of $50.9 billion (135)

Table 17.—Sources of Hospital Revenue,[a] 1980

Revenue source	Percent of total revenue
Medicare, ...	34.1 "/0
Medicaid ., ., ...	7.8
Blue Cross	16.1
Commercial	22.4
Other government sources	2.3
All other revenue[b]., ...	17,3

[a]Based on a sample of 4,989 non. Federal not-for-profit short. term general hospitals

[b]Includes operating nonpatient care, and nonoperating revenues

SOURCE J Feder J Hadley, and R Mullner, Poor People and Poor Hospitals Implications for Public Policy " *J Health Polit Policy* Law forthcoming

As described in chapter 2, the Social Security Amendments of 1983 (Public Law 98-21) mandated a change in Medicare's inpatient hospital payment system from a retrospective, cost-based system to a prospective system of payment based on per-case prices for patients in ***470*** separate Diagnosis Related Groups (DRGs). DRGs are a set of patient classes developed to reflect differences in resource needs among different kinds of patients. Medicare's DRG hospital payment system is to be phased in over a 3-year period beginning in October **1983. The** initial set of DRG prices is based on the 1981 average inpatient operating costs per case for each DRG in a 20-percent sample of Medicare claims. The prices will be updated regularly and will be adjusted for each hospital's urban or rural location and area wage rate. They will apply to virtually all short-term acute-care general hospitals in the United States. Under DRG payment, the hospital-specific maximum limit on the amount of inpatient operating costs per case that will be reimbursed will continue to be designated by the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) (Public Law ***97-248).*** Capital expenditures (depreciation and interest and return on equity for for-profit hospitals), direct teaching expenses, and expenses for outpatient services will remain "pass-through" items (i. e., items not subject to controls) as they

were under TEFRA until the end of the transition period. Congress contemplated, but did not specify the method for, the incorporation of payment for capital into the DRG pricing system at the end of the 3-year period.

This chapter describes and analyzes how the incentives in Medicare's DRG prospective hospital payment system may affect medical technology adoption and use. Despite the recent establishment of the new hospital payment strategy for Medicare, it is quite possible that other approaches to hospital payment will be actively considered in the future. Part of the reason is that pressure for cost containment at the Federal level may continue, and part is that individual States may enact hospital cost control systems in which Medicare will agree to participate. Four alternative approaches to hospital payment that have been suggested or applied by public or private payers which might be considered for implementation by Medicare are considered in this chapter:

- alternative prospective payment programs and modifications of Medicare's current DRG system,
- Ž capital payment methods,
- limited provider contracts, and
- increased beneficiary cost-sharing for hospital services.

The alternatives discussed in this chapter pertain only to payment of hospital care. They are not mutually exclusive, but are separated for ease of discussion.[2] Broader alternatives to the current Medicare payment methods, such as Medicare vouchers, which integrate payment for hospital services with that for other health care services, are discussed in chapter **8. Nevertheless, it** is worth noting here that **strategies based on the continued independence of payment for hospital services from that of other health care services represent a limited field of opportunity for reform of Medicare payment.**

[2] For example, capital payment must be considered for all hospital payment alternatives.

PROSPECTIVE PAYMENT OF HOSPITALS

Evolution of Prospective Payment Programs

The Medicare program is not the only third-party payer that has used retrospective, cost-based payment for hospital care over the years. In 1976 and **1981,** for example, about one-half and one-third, respectively, of the Blue Cross plans reimbursed hospitals retrospectively on the basis of their costs (8,153). Furthermore, until 1981, State Medicaid programs were required to follow Medicare's principles of reimbursement for hospitals unless they applied for, and received, a waiver from the Federal Government for an alternative system.

In the late 1960's, however, some States and private third-party payers began the search for alternatives to retrospective, cost-based reimbursement, and alternative payment schemes, broadly termed "prospective payment," appeared in State and voluntary programs throughout the 1970's. Prospective payment programs vary widely, but they all have two features in common:

- the amount that a hospital is paid for services is set prior to the delivery of those services; and
- the hospital is at least partially at risk for losses, or is able to gain from surpluses that accrue during the payment period, or both.

The litmus test of whether a payment system is prospective is the extent to which a hospital's own decisions will alter the payment rate. Medicare's DRG payment system for hospitals is a particular type of prospective payment. The DRG system represents the culmination of years of experimentation with alternative forms of prospective payment by the States and private third-party payers.

The development by States of early prospective payment systems was spurred primarily by rising insurance premiums and Medicaid budgets. In several States, severe financial crises prompted their immediate implementation (155). Federal support of State-run prospective payment experiments was authorized by the Social Security Amendments of 1972 (Public Law 92-603), which gave added impetus to their development. Four States—Maryland, Massachusetts, New Jersey, and New York—have been granted waivers from Medicare's current payment system. These waivers give the State's rate-setting agencies the authority to set Medicare rates.

The oldest prospective payment program, sponsored by Blue Cross of Indiana, began in 1959 and remains in existence today. The first Blue Cross-sponsored prospective payment plans were voluntary programs in which participating hospitals' upcoming budgets were reviewed and approved by an appointed committee. The Blue Cross plan would then pay its share of the budgeted costs, rather than actual costs. Despite the fact that these systems were (or are) voluntary, hospitals were encouraged to participate because of the importance of Blue Cross as a source of revenues. The negotiated hospital budgets sometimes covered self-pay and commercially insured patients as well as patients in the Blue Cross plan. As might be expected given their voluntary nature and limited coverage, however, the Blue Cross-sponsored budget review programs have not been particularly successful in moderating cost increases (311).

State-mandated prospective payment programs have varied widely in their methods of payment and in the payers covered. The earliest State-run prospective program began in New York in 1970 and covered Medicaid and Blue Cross[3] (154). By 1979, there were 13 State-legislated prospective payment programs in effect throughout the United States (7), but the participation of hospitals was mandatory in only 10. These State programs evolved as their shortcomings were uncovered and as the crisis in hospital costs grew. Thus, current State-run prospective payment programs not only vary among themselves at present but also do not resemble their earlier forms.

In 1981, under the Omnibus Budget Reconciliation Act of 1981 (Public Law ***97-35),*** State Medicaid programs were given expanded authority to deviate from Medicare reasonable cost reimbursement methods. As a result, several Medicaid programs have recently enacted prospective payment systems. Some of these Medicaid programs are part of statewide systems; other Medicaid programs have their own prospective payment systems,

Table 18 summarizes the status of mandatory State-level hospital prospective payment programs as of June 1983. At that time, 10 States had a State-legislated program, and another 17 States had a Medicaid-only hospital prospective payment program. Other States had State or local prospective payment programs in which participation and/or compliance was voluntary. One unique approach to hospital payment, discussed later in this chapter, is used in the Rochester, N. Y., area. Bills for the establishment of hospital rate-setting programs are currently under active consideration in six States: Florida, Pennsylvania, Ohio, Illinois, Indiana, and Wisconsin.

Key Features of Prospective Payment Systems

The details of program administration vary widely among prospective payment plans, Nevertheless, there are five components of prospective payment design that are likely to affect the incentives of hospitals to produce services and use technologies, and ultimately to influence the cost of hospital and health care. These are discussed below:

- **Payers** covered-The more payer classes covered by the prospective payment program, the more likely it is that the system will modif y a hospital's decisions regarding the availability and use of services.
- **Unit of payment—All prospective** payment programs set hospital rates either explicitly or implicitly on the basis of one of five units of payment: 1) per service rates; 2) per diem

[3] 'hled]care joined the program in *1980,* and hospital charges made to sell-pay patients and commercial insurance companies were frozen in 1978

Table 18.—Mandatory State-Level Hospital Prospective Payment Programs as of June 1983

	Medicaid-only program	State-legislated program	Medicare participating in State-legislated program	Medicaid participating in State-legislated program
Alabama	X			
California	X			
Colorado	X			
Connecticut		X		
Florida	X			
Georgia	X			
Idaho	X			
Illinois	X			
Kentucky	X			
Maryland		X	X	X
Maine		X		
Massachusetts		X	X	X
Michigan	X			
Minnesota [a]		X		
Mississippi	X			
Missouri	X			
New Jersey		X	X	X
New York		X	X	X
North Carolina	X			
Pennsylvania	X			
Rhode Island		X		X
Utah	X			
Virginia	X			
Washington	X	X		
Wisconsin	X	X		
Total numberof States	17	10	4	5

[a] Minnesota's systemismandatoryin the sense that Blue Cross will not pay more than allowed rates

SOURCE" US Department of Health and Human Services, Health Care FinancingAdministration, unpublished data, May 1982; and R Lyman, US Department of Health and Human Services, Health Care FinancingAdministration, personal communication, June 20, 1983

rates; 3) per castrates (per admission rates); 4) per case rates with adjustments for case mix;[4] and 5) per capita rates. Set prices for individual services give hospitals incentives to produce these services efficiently but also give them incentives to provide more services to each patient (.389). A fixed payment for each day of stay establishes incentivesto reduce the number of services offered per day but to increase lengths ofstay as well. There is strong empirical evidence that these effects from a fixed rate ofpayment per diem actually occur (431). A fixed rate of payment per admission encourages low use of resources per stay and short lengths of stay but also establishes incentives for hospitals to increase admissions and to engage in "cream-skimming" to avoid more serious (and costly) patient types. Per case rates that vary by type of case, as in the Medicare DRG payment system, reduce but do not eliminate the incentive for cream-skimming but leave intact the incentive to increase admissions. Per capita rates, on the other hand, reduce the incentive to admit patients but encourage hospitals to agree to serve only healthier groups,

- **Scope of** coverage—Prospective payment programs vary according to the elements of hospitals' costs covered in the rates. The inclusion or exclusion of capital costs, teaching costs, and outpatient services in the prospective rate are important determinants of how the hospital and other providers behave, and ultimately how medical technologies are used. Hospitals have an incentive to shift services from cost categories with prospectively set limits to those that are still treated as "pass-through" items.
- Extent to which a hospital's own costs determine the level of payment—To be truly pro-

[4] **Case** mix—The relative frequency of various types of patients, reflecting different needs for hospital resources, There are many ways of measuring case mix, some based on patients' diagnoses or the severity of their illnesses, some on the utilization of services, and some on the characteristics of the hospital or area in which it is located (343).

spective, a payment system should render a hospital unable to increase the level of payment by increasing its own costs. If the current payment rate depends on the hospital's past costs, with a 1- or 2-year lag, then the system is not very independent of the hospital's own cost experience, and the incentives in cost-based reimbursement will predominate. On the other hand, if the rate is set on the basis of the hospital's own costs in a base year with infrequent updating except for general inflation indexing, the relationship between cost and prospective price is effectively severed. Likewise, the use of comparative cost data from other hospitals to establish a hospital's payment limit also severs the link between the hospital's own past behavior and its prospective rate and will give the hospital more incentive to contain costs.

- **Program stringency—Under** any particular payment method, a program can be either generous or restrictive. A stringent program is one in which the payment level is low relative to the cost of providing services. Program stringency is a function of numerous aspects of a program's design. For example, a program may or may not allow hospitals to keep any surpluses generated as a result of cost-saving behavior, or it may penalize hospitals more or less severely when costs run above the prospective level. Although overall program stringency is difficult to measure precisely, a rough indicator is the ratio of net revenues to total expenses from those patients covered under the prospective payment program. If the ratio is high, then the program is relatively generous; if it is low, then the program is stringent. Under a stringent method, the hospital must cover operating losses with cash from gifts, depreciation allowances, or revenues from other sources.

  Some have argued that program stringency is the most important factor in the effectiveness of prospective payment programs in reducing hospital costs (64). The stringency of the program is likely to affect the ability of the hospital to generate capital from both internal and external sources. Hospitals operating under more stringent programs therefore would be likely to face higher capital costs, which in turn would affect the adoption of capital-intensive medical technologies.

Effects of Prospective Payment on Medical Technology

There is evidence to suggest that in recent years, some State-1evel mandatory prospective payment programs have had a moderating influence on hospitals' costs (36,64,309,310). A recent study of 15 State or areawide hospital rate-setting programs found that the rate of increase in total expenses per hospital admission was reduced by approximately 2 to 5 percent between 1969 and 1978 in seven States with mandatory programs (64). Apparently, prospective payment programs need time to mature before they begin to influence hospital costs (310). Using national data for the period 1969-80, Sloan estimated that mandatory State prospective payment systems ultimately reduce hospital expenses per adjusted admission by an average of 13 percent relative to States without such systems (309).

That prospective payment can reduce hospital expenditures does not necessarily imply that the use of medical technologies will decrease. In fact, one would expect prospective payment to have different kinds of effects on different technologies (see ch. 3). One indirect method of examining hospitals' technology choices under prospective payment is to study the effect of prospective payment on a related measure: hospitals' choices of labor and nonlabor inputs to the production of services. **If prospective payment makes hospitals more efficient producers of services, both a reduction in the total value of inputs and substitution among different kinds of inputs should be observed.**

Studies of the impact of prospective payment on hospitals' use of labor have documented both a decrease in the total number of hospital employees and a substitution of less expensive for more expensive personnel in States with strong rate-setting systems (132, 179, 187). There is no evidence on whether hospitals reduce nonlabor inputs under prospective payment systems or whether such systems lead to substitution between

capital- or material-intensive inputs and personnel.

There is some evidence regarding the effect of prospective payment on the provision of medical services. As part of a comprehensive study of nine State-legislated hospital rate-setting systems, Worthington and Piro (431) found that programs that pay hospitals on the basis of a per diem rate all produced an increase in the average length of stay and the occupancy rate, This result would be expected from a per diem rate-setting system, because the longer the patients stay, the more revenue the hospitals receive. Although a per diem rate-setting program would also be expected to encourage increases in inpatient admission rates, no such admission effects were found in this study. These results suggest that manipulating hospital admission rates may be more difficult than increasing the length of hospital stay for patients already admitted. **Taken as a whole, however, the results do suggest that decisionmakers in hospitals respond in predictable ways to financial incentives for the use of hospital services.**

A related question with important long-run implications for medical technology is whether prospective payment influences the extent and speed of hospitals' adoption of new technologies. Studies of the impact of hospital prospective payment programs on the adoption of new capital equipment or "technology-intensive" services suggest that prospective payment can have an effect on technology adoption and that the nature of the effect depends on both the specific attributes of the program and the characteristics of the new technology.

Joskow (182), who analyzed the effect of rate-setting programs on the availability of computed tomography (CT) scanning in hospitals, found the number of CT scanners in a State in 1980 to be negatively related to the number of years that rate-setting had been in effect in the State. [5] Hospital rate-setting also led to a shift in the location of CT scanners to physicians' offices.

Cromwell and Kanak (77) recently analyzed the impact of 15 State rate-setting programs on the availability of 13 different services in the hospital between 1969 and 1978. New York's rate-setting program, a restrictive program that pays per diem rates, had the most consistently negative effects on the availability of all types of services. New Jersey's pre-DRG prospective payment system also appeared generally to reduce the availability of complex services. Other States' programs showed no consistent impact on service adoption. It is interesting to note that the service upon which rate-setting had the largest and most widespread negative effect is social work, a labor-intensive, not equipment-intensive, hospital service.

In still another study of hospital payment and technology diffusion, Wagner, et al. (418), investigated the impact of prospective payment in three States (New York, Maryland, and Indiana) on the adoption of five new pieces of capital equipment: electronic fetal monitoring, gastroendoscopy, volumetric infusion pumps, automated bacterial susceptibility testing, and computerized energy management systems. The first three technologies probably raise the daily cost of care, although their effect on the average cost per case is unknown. The latter two are investments in cost-saving equipment. The New York rate-setting system was found consistently to lead to adoption of fewer units of cost-raising technologies and to increase the probability of large hospitals' adopting cost-saving equipment. However, the prospective payment programs in Maryland and Indiana showed no such consistent effects on hospitals' adoption behavior.

Together these studies imply that prospective payment does affect the adoption of new technology in predictable ways but that much depends on the strength and design of the program. New York's system, the oldest and most restrictive rate-setting program, has clearly altered the extent of availability of new technology. Other systems may be too new, too small, or too generous to show long-run consequences.

Medicare's DRG Payment System and Medical Technology

Features of Medicare's DRG prospective hospital payment system currently being implemented create strong incentives for hospitals and

[5] The analysis controlled for possible impacts of other types of hospital regulation, including certificate-of-need (CON) laws.

other providers to use and adopt technologies in ways that are different from those under cost-based reimbursement. Although the DRG hospital payment system does not include payers other than Medicare, the per case payment approach provides incentives to hospitals both to reduce the amount of resources expended per stay and to selectively encourage admissions. [b] These incentives are strengthened because the payments hospitals receive for treating patients are essentially unaffected by the hospital's own costs and because the system puts hospitals entirely at risk for losses.

During the 3-year period of the DRG system's implementation, several key elements of hospital expenses, including capital, teaching, and outpatient expenses, will continue to be paid as pass-throughs. Inputs that are passed-through become less expensive to the hospital relative to inputs subject to controls and theoretically should be used more by hospitals. To discourage hospitals from increasing capital expenditures in anticipation of future controls, the Social Security Amendments of 1983 (Public Law 98-21) deliberately left uncertain whether capital expenditures for new projects begun in the first 3 years of the law's implementation would or would not be included in prospective per case limits at the end of the 3-year period.

Although there is no empirical evidence on the effect of the new DRG inpatient hospital payment system, it is possible to describe how the incentives inherent in the system may alter the **use** of medical technologies. First, however, it must be stressed that financial incentives are but one of several influences on hospitals' decisions to adopt and use technologies. **DRG payment will not have a uniform effect on medical technologies, and in some instances, technologies will be subject to conflicting incentives.** In general, the following can be concluded:[7]

- Under DRG payment, the number and intensity of ancillary procedures provided to inpatients can be expected to decrease overall, but the use of ancillary procedures that can be shown to lower the cost per case can be expected to increase.
- The settings of technology use are likely to be influenced by DRG payment, but the incentives work in conflicting directions and are sensitive to the key features of program design. For example, in the absence of a method for excluding very low-cost patients from the DRG pricing system, DRG payment encourages inpatient admissions for simple procedures. It remains to be seen which incentive will dominate for which procedures. DRG payment will encourage the movement of technologies, particularly those for post-hospital care, into the home and other non-hospital sites of care.
- DRG payment is likely to influence the specialization of services, but the magnitude and direction of these effects is unknown. The incentives to reduce costs encourage concentration of capital-intensive technologies in fewer institutions. Conversely, increasing competition among hospitals for physicians and patients may create incentives for the widespread acquisition of some technologies.
- A change in technology product mix is likely to result from downward pressure on the price and quantity of supplies and, if capital

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DRG payment will affect the settings of medical technology use. Some services provided formerly in the hospital will be provided in increasing numbers on an outpatient basis

[b] The incentive to selectively increase admissions is somewhat moderated by the fact that the hospitals receive different payments for different types of cases. It is not entirely abolished, however, because of the imperfections in the use of DRGs as the case-mix measure.

[7] These conclusions are based on a detailed analysis of DRG payment conducted as part of this project and published in a technical memorandum entitled *Diagnosis Related Groups (DRGs) and the Medicare Program: Implications for Medical Technology* (343).

is included in the DRG rate, capital equipment. Greater prociuct standardization can be expected as more expensive models and procedures are eased out of the market through competition,

It is also possible to describe the incentives regarding the adoption of new technologies and the discarding of old technologies under DRG payment. Many observers have pointed out that per case payment systems in which future levels of payment are largely independent of the hospital's own historical costs create incentives for hospitals to adopt cost-saving technologies-i. e,, technologies whose adoption decreases the ***hospital's*** total cost per case. Given that technologies are neither cost saving nor cost raising independent of the context in which they are used, however, the same technologies are not likely to be adopted by all hospitals, The introduction of new capital-intensive cost-saving technologies in a DRG payment environment is likely to encourage specialization among hospitals as small hospitals become unable to reap the cost-saving benefits of some investments. Some technologies that depend on high volume to be cost saving might be provided to smaller hospitals on a contract basis by large hospitals or independent laboratories. The feasibility of such contractual arrangements would vary depending on the specific uses of technology and the geographical and competitive environment in which the hospitals operate.

The financial incentive to introduce new cost-raising technologies (i. e., technologies whose adoption increases the ***hospitals'*** total cost per case) is lessened, but not eliminated, under DRG payment compared to cost-based payment. Under cost-based payment, the additional hospital costs of new technologies are covered; hospitals therefore have no financial incentives not to adopt such technologies. Under DRG payment, a hospital's adoption of new cost-raising technology is not met with an automatic increase in revenues to cover the additional cost. New technology will have to compete with alternative uses of hospital funds, such as employee wage and benefit increases or additional nursing staff. New technology may be at an additional disadvantage relative to other uses of funds because of the relative uncertainty about its benefits in the early stages of diffusion ***(282).*** The implications are obvious: with limited resources, hospitals will need to assess new technologies more closely and ration resources more carefully.

Nevertheless, the introduction of promising new technologies, even those that are cost raising to the hospital, will be attractive to hospitals as they compete for physician loyalties and, ultimately, the admissions they represent. For example, despite its high capital and operating cost, nuclear magnetic resonance imaging, a new medical imaging technology still in the investigational phase, may be highly desirable to hospitals who seek to protect their admissions base from encroachment by other hospitals. The importance of this incentive as a constraint on the incentive not to adopt new technologies is unknown. Thus, **although DRG payment does not imply that technological change will approach a standstill, the directions of such change are likely to be altered. Overall, the adoption of technologies that are cost raising to the hospital is likely to decline by an unknown quantity.**

Per Capita Prospective Payment

Per capita prospective payment to hospitals refers to an array of methods for paying rates to hospitals in advance based on the number of enrolled or covered individuals rather than on the services provided, days of care, or admissions. A single organization consisting of one or more hospitals takes responsibility for providing all covered hospital benefits to the beneficiary during a specific period of time in exchange for a fixed rate of payment. Beneficiaries may or may not be limited in their choice of place of hospitalization. Under free choice plans, the hospital receiving the per capita payment would have its payment reduced by the payments made to other hospitals for services to the beneficiary. Presumably, the hospital receiving the per capita payment has a financial incentive to see to it that the amount and intensity and, therefore, the cost of hospital care is reduced.

Per capita hospital payment is one of the oldest types of hospital payment mechanisms ***(303).*** This approach emerged from individual hospitals' efforts in the 1920's to stabilize their revenue

sources. As the notion of beneficiary free choice gained prominence with nonprofit health insurance plans, however, payment of hospitals on a unit-of-service basis became the norm. Thus, for almost ***20*** years—from 1946, when the last individual hospital per capita payment plan closed down, until ***1964*** when the Colorado Blue Cross plan initiated such a program in one county—per capita payment of hospitals was nonexistent in the United States ***(303).*** The Colorado Blue Cross program lasted ***18*** months but was abolished with the emergence of Medicare and Medicaid (303).

In 1980, the Blue Cross and Blue Shield Association, with funding from the John A. Hartford Foundation, initiated two demonstrations of per capita hospital payment involving beneficiary free choice (90). In ***1982, 10*** hospitals in ***2*** States (North Dakota and Massachusetts) began receiving per capita payments in an effort to demonstrate that per capita payment would lead to more efficient provision of hospital care ***(90).*** Individual hospitals in these demonstrations have no control over the beneficiaries "assigned" to them. The assignments are made either by the beneficiaries themselves or by the Blue Cross plan. Per capita rates vary with beneficiary characteristics and are based on the hospitalization experience of each group. Thus, an attempt is being made to avoid the problems of cream-skimming—the tendency of hospitals to avoid serving sicker populations—and adverse selection —the tendency of high-risk beneficiaries to seek out more comprehensive and costly care.

Unlike per case prospective payment, per capita hospital payment is designed to encourage hospitals to reduce the rate of admission to hospitals and to expand the use of pre- and post-hospital care outside of the inpatient setting. Since beneficiaries in the demonstrations maintain the right to choose freely their hospitalization site, the success of the program appears to hinge on the degree of cooperation between hospitals and physicians in managing the hospital resources efficient y.

Data are not yet available on the effect of the demonstrations on the use of hospital and other health care services or on hospital costs. However, two observations can be made about the applicability of such an approach to Medicare. First, implementation of per capita payment (especially with free choice of provider) depends on the availability of excellent patient-based data systems through which estimates of per capita costs can be made. Second, the process of "assigning" beneficiaries to "home" hospitals may be feasible in certain communities but may not be universally feasible. Especially when beneficiaries maintain the freedom to choose their place of care, per capita hospital payment may depend for success on the existence of specific hospital market environments.

As with any prospective payment system that encourages hospitals to become more economical in the provision of services, per capita payment runs the risk of discouraging hospitals from providing needed care. In this case, the risk is to underadmit as well as to underprovide services while in the hospital. Finally, per capita payment would be 1ikely to affect the adoption of medical technologies in ways that are similar, but not identical, to the expected effects of DRG payment. For example, whereas DRG payment encourages hospitals to adopt new technologies which will bring in new admissions, per capita payment has the opposite effect.

Areawide Global Prospective Budgeting: The Rochester Area Hospitals' Corp.

Nine hospitals in the Rochester, N. Y., area have been experimenting since 1980 with a global prospective budgeting approach to hospital payment (40,280). The nine member hospitals of the Rochester Area Hospitals' Corp. (RAHC), accept a cap on the aggregate revenues they can receive each year. The areawide revenue cap is developed from the member hospitals' actual costs in a base year (1978) with adjustments for inflation and technological change in subsequent years. Individual hospitals' budgets are allocated from the total in a similar fashion, but some of the revenues are withheld in a special fund to adjust for the cost of increases in admissions and for new equipment or facilities approved by both RAHC and the State. The RAHC board has the responsibility for distributing these special funds among hospitals

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(319). The hospitals are collectively responsible for keeping expenses within the global budget; if areawide admissions increase to the point that the special fund is exceeded, the hospitals must share in absorbing the excess costs.

The experimental global budgeting program in Rochester clearly involves negotiation among hospitals in dividing up available funds for service expansion and modernization. Whether the concept can survive in the long run remains to be seen, In any case, Rochester has some special attributes that make it a particularly fertile environment for such an experiment. First, the hospitals' market area is relatively self-contained and well defind. A global budgeting approach would not be feasible where market areas are not easily defined. Second, the Rochester area has a long history of business, community, and hospital support for areawide planning (319). An earlier experiment funded by the Federal Government, which included a larger area of New York State as well as Rochester, collapsed (319), probably because these two factors were not present.

If successful, Rochester's global budgeting approach would represent an application of allocation of health care resources through a political process. There is clearly an incentive for each hospital to increase its admissions at the expense of others, but without access to funds for new services, the member hospitals may be effectively constrained from doing so. It is not clear how rationing resources on a community level would affect specialization of services or regionalization of facilities. Evidence on the effects of the Rochester experiment is not available at this time. The potential for such an approach as a method for rationing hospital technologies may be great in a few areas of the country where social, political, and demographic conditions are right, but for the reasons given above, it is not likely to be viable as a general approach to hospital payment,

CAPITAL PAYMENT METHODS

The use of new medical technology often depends on hospitals' making investments in capital facilities and equipment. Hospitals' willingness and ability to make these investments in "equipment-embodied technology" (233) are influenced by the third-party hospital payment system. Consequently, an important issue with respect to the diffusion of medical technology is how Medicare pays for hospital capital.

It is important to recognize that **the effects of any capital payment method depend on the larger payment system of which the capital payment method is a part.** Thus, for example, a particular approach to capital payment would have different effects on the use of medical technologies under a cost-based reimbursement system than under a prospective payment system. The history of payment for capital under Medicare's traditional cost-based hospital reimbursement system and under State prospective payment systems is described below. Also discussed below are capital payment options under Medicare's DRG prospective payment system, which is currently being implemented. The capital payment method under DRG prospective payment was left unresolved in the Social Security Amendments of ***1983*** (Public Law 98-21), so detailed examination of the implications for medical technology of various capital payment approaches under DRG payment is both important and timely.

History of Capital Payment Under Medicare

Medicare's cost-based hospital reimbursement system has had strong effects on hospitals' capital acquisition decisions. Traditionally, Medicare has reimbursed hospitals for interest and historical cost depreciation expenses associated with all capital equipment purchases, regardless of whether the equipment was purchased or leased. In theory, when combined with cost-based reimbursement of operating costs, this approach to capital payment encourages hospitals to invest in new facilities and equipment and to finance as much as possible through debt. If a hospital per-

sistently "funds" payments for depreciation (i. e., establishes a separate fund that cannot be used for operating expenses), cost-based reimbursement provides the cash necessary to amortize whatever level of debt the hospital incurs. If all hospital revenues were derived from cost-based payers, capital, as well as all other inputs, could be used in unlimited quantities.

The situation was more complicated in practice. Some experts have claimed that Medicare's cost-based payment system did not pay its fair share of hospital costs, because it did not pay for a share of bad debts and charity care attributable to patients other than Medicare beneficiaries (71). Consequently, hospitals with high burdens of unpaid care and large numbers of Medicare and Medicaid beneficiaries have incurred deficits. Such deficits could only be accommodated by the cash flow generated through depreciation payments or other sources of cash such as unrestricted gifts or non-patient-care revenues. Hospitals with a high proportion of patients covered by insurance plans paying on the basis of charges have had an advantage over others, because they could recover the costs not covered by Medicare for these patients by raising their charges. Other factors being equal, hospitals with a high proportion of patients subject to cost-based reimbursement are likely to receive lower bond ratings[a] than other hospitals (70). Thus, while cost-based reimbursement under Medicare increased hospitals' demand for capital, over time it has also made it more difficult and costly for some hospitals to obtain additional debt financing.

Capital Payment Under State Prospective Payment Programs

With exceptions noted below, those responsible for designing State prospective payment programs have been reluctant to deviate from cost-based reimbursement for capital. Even New York's otherwise restrictive rate-setting program, for example, continues to treat capital expenses as pass-throughs, much as in the Medicare system (154). Payment for capital in some States has been even more generous than under Medicare. Washington, Massachusetts, and Minnesota have used price level depreciation rather than historical cost depreciation ***(76).*** Maryland and New Jersey calculate a capital facilities allowance for buildings and fixed equipment that provides cash sufficient to pay off existing debt and to accumulate a down payment for replacement or additions. In all of these cases, the hospital's payment rate depends on its own capital expenditures.

States have generally looked to the direct regulation of capital expenditures through certificate-of-need (CON) laws as a capital rationing device. CON laws require that hospitals receive approval from a State health planning agency for major capital investments, Although there is a general consensus that capital expenditure regulation as implemented in the States has not been effective in reducing the level of capital expenditures ***(69,414),*** most rate-setting programs assume that the appropriateness of capital investments will be judged through CON.

The only deviations from cost-based reimbursement of capital have been Maryland's and New Jersey's approach to payment for major movable equipment (e.g., beds, diagnostic instruments) and western Pennsylvania's approach to capital payment. In Maryland, the depreciation on major movable equipment available in the hospital in a base year is adjusted in subsequent years by an appropriate inflation factor. The allowance for movable equipment is unaffected by the hospital's subsequent capital expenditure decisions, except for special cases in which the rate-setting commission may make exceptions (185). New Jersey's DRG system has a similar method for major movable equipment. The allowance is adjusted for inflation from a base year, which is updated periodically, Unlike Maryland's allowance, however, the rate of reimbursement for major movable equipment is a blend of the hospital's own capital costs and those of other peer group hospitals ***(416). In*** the western Pennsylvania program, hospitals have a choice of historical cost depreciation not exceeding 4 percent of other allowable costs or any other method that results in less than 3 percent of costs ***(76).*** Thus, hospitals in western Pennsylvania are subject to an effective ceiling on capital reimbursement.

[a]Bond rating is an assessment of the credit worthiness of a hospital by a rating agency such as Standard & Poor's Corp. or Moody's Investors Service

Capital Payment Alternatives Under DRG Payment

What method of payment for capital will eventually be adopted under Medicare's DRG hospital payment system remains to be seen. The Department of Health and Human Services is required by law to report to Congress by October **20,** 1984, on a recommended approach to capital payment. For the time being, capital expenditures by hospital will continue to be reimbursed as before—on a cost basis.

Figure 3 presents the major alternatives for capital payment under Medicare's newly created DRG hospital payment system. **The fundamental issue under DRG payment is whether a hospital's capital payment should or should not be subject to some kind of externally imposed limit.**

Pass-through reimbursement of capital could continue as a permanent feature of DRG payment, As shown in figure **3,** there are three alternative pass-through approaches:

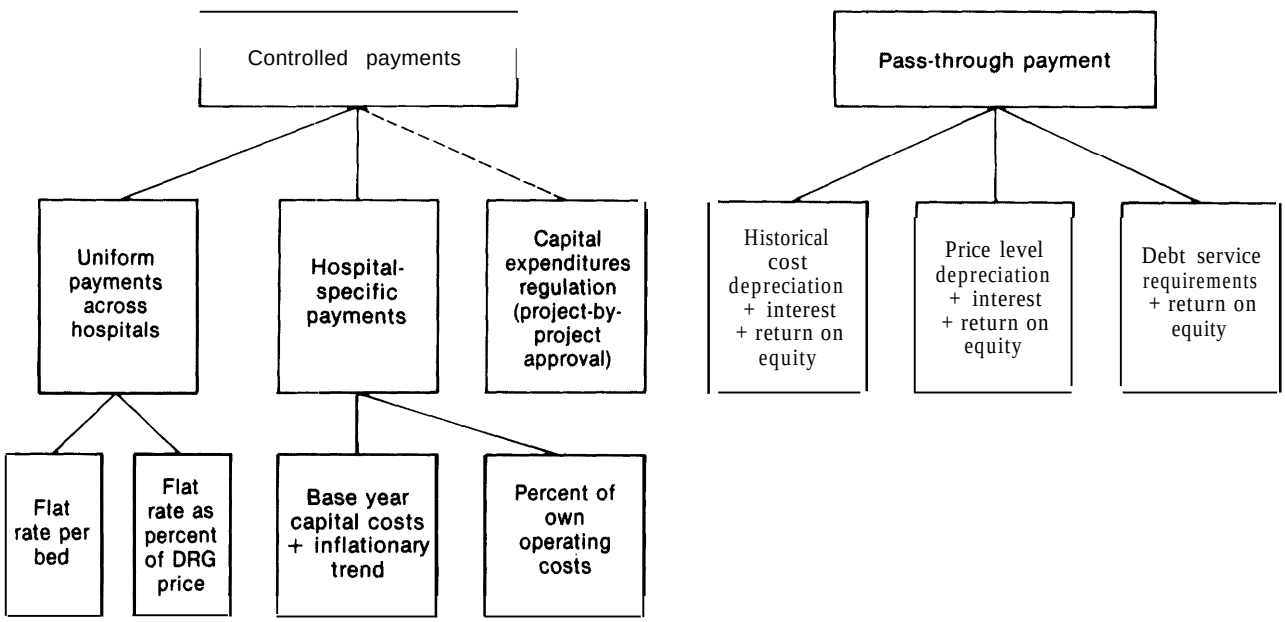
- payment of historical cost depreciation and interest expenses,
- payment by price level depreciation, and
- payment of debt service requirements.

In all of them, the level of payment is directly linked to the amount of capital investment undertaken by the hospital.

Payment of historical cost depreciation and interest expenses represents a continuation of the traditional Medicare method. Payment by price-level depreciation, with hospitals paid according to the current value of the capital assets used up in any year, would be more generous than historical cost depreciation in an inflationary economy. Finally, payment by Medicare of its share of the hospital's debt service requirements would match the flow of capital payments over time more closely with the actual flow of debt payments. In any of these cases, the hospital would receive cash sufficient to cover its debt over the lifetime of an asset.'

'Investments using equity capital rather than debt instruments could be paid depreciation and a return on equity. The issue of which hospitals should receive a return on equity capital and how high this return should be is clearly important to the hospital industry, but it is not a central issue with respect to medical technology and is therefore not discussed in this chapter.

Figure 3.—Options for Capital Payment Under Medicare's DRG Hospital Payment System



SOURCE Off Ice of Technology Assessment

Methods of limiting capital payment fall into three categories:

- methods that establish uniform rates of payment across all hospitals (or all within a class),
- methods that establish hospital-specific controlled rates, and
- methods that condition payment on approval of capital expenditure projects.

The uniform payment approach would treat all hospitals alike, regardless of their capital ***or*** operating expenditures. The uniform payment could be calculated either as a fixed percentage of the DRG price or as a flat rate per bed. Hospital-specific approaches, on the other hand, would take the hospital's capital or operating costs into account in establishing a level of payment but would limit increases in the payment level over time. Thus, for example, capital payments could be limited to a percent of operating costs, so that hospitals with high operating costs would receive a higher capital payment than others; alternatively, the capital payment in any year could be tied to the hospital's actual capital costs (as measured by interest and depreciation) in a base year with adjustments for inflation in subsequent years. If capital payments were controlled through direct regulation of capital expenditures, only projects approved by a CON or other designated agency would be recognized by Medicare for capital payment. Approved projects would then be paid on a cost basis. Areawide or statewide annual capital expenditure limits could be used to establish an upper bound on the value of approved projects. The State of New York is currently considering adoption of such a capital expenditure limit.

The alternative capital payment methods described above can be evaluated on the basis of four general criteria:

- Efficiency—The extent to which the approach promotes the cost-effective use of hospital technology. An ideal method would not distort the relative costs to the hospital of capital and other inputs, would discourage needless duplication of capital-intensive services in the community, would encourage specialization and regionalization of services when appropriate, and would minimize the cost of providing any given level of hospital care,
- **Equity of access to medical technology—The extent** to which the method promotes equal access to capital-embodied medical technology. An ideal method would not deny people living in certain regions or with low incomes access to medical technology that *is* available to others.
- Fairness—The extent to which the method treats all kinds of hospitals alike. An ideal system in this respect would not reward or penalize hospitals according to their ownership status, location, or other factors that lie outside management's control.
- **Feasibility—The** extent to which the method is administratively workable and politically acceptable. An ideal method would involve low administrative costs, minimize the problems of transition from the old to the new payment method, and accommodate the inherent cyclic nature of hospital investments.

A permanent capital cost pass-through under DRG payment violates the efficiency criterion, because it distorts incentives for hospitals to adopt and use capital-embodied technologies. Table 19 shows how a pass-through for capital expenditures influences hospitals' incentives to adopt four different kinds of hospital technology under DRG per case payment. So long as the effect of medical technology acquisition on a hospital's total cost per case is in the same direction as its effect on operating costs, for example, the method of capital payment under DRG payment will not alter the direction of the incentives for technology adoption. Thus, there are disincentives under DRG payment to adopt most quality enhancing, cost-raising (Type I) technologies regardless of the way in which capital is handled. Capital cost pass-throughs weaken the disincentive to adopt such technologies, but they do not remove it. New technologies with high capital costs but only small increases in operating costs would be affected less by DRG payment with a capital pass-through than by DRG payment with capital built into the rate.

Of course, since DRG payment sets up incentives for hospitals to increase admissions, hospitals

Table 19.—lmpact of Technological Innovation on Per Case Costs Under DRG Payment

Type of innovation	Direction of effect on costs: Capital cost per case	Operating cost per case	Total cost per case	Incentives for technology adoption: With capital in rate	Without capital in rate
I. Cost-raising, quality-enhancing new technology	+	+	+	↑	↑
II. Operating cost-saving innovations					
A. Raises total costs	+	–	+	↓	↑
B. Saves total costs	+	–	–	↑	↑
III. Capital cost-saving innovations					
A. Raises total costs	–	+	+	↓	↓
B. Saves total costs	–	+	–	↑	↓
IV. Service/procedure disadoption	–	–	–	↑	↑

SOURCE: Office of Technology Assessment

can be expected to seek cost-raising technologies whose availability promises to bring in profitable admissions. A capital cost pass-through essentially subsidizes this kind of investment, leading potentially to wasteful duplication of these services among hospitals.

In the case of operating-cost-saving (Type II) and capital-cost-saving (Type III) technologies, the incentives for hospitals to adopt may actually be reversed by the policy regarding payment for capital. Of particular concern is the incentive under a pass-through to adopt expensive capital equipment that reduces operating costs but raises total cost per case. Automated hospital information systems, for example, could be evaluated in terms of their ability to reduce operating costs with inadequate regard for their impact on total costs. The more labor-saving capital-intensive system would be preferred regardless of its net impact on costs, Over time, then, hospitals could be expected to become more capital intensive than efficiency would dictate.

Despite the inefficiency inherent in a capital cost pass-through, this approach does well on the other three criteria. Its feasibility has been demonstrated through the years. It is inherently fair because all hospitals are treated alike in their payment. Finally, it poses no barriers to equal access to medical technology, although it does nothing to redress current inequities. Public and inner-city hospitals tend to have lower ratios of capital to total costs than other hospitals, because these hospitals have older facilities and possibly less equipment-embodied technology **(20,188,356).[10] A cost-based system of reimbursement for capital would continue to pay these hospitals relatively less than other hospitals. Because public and inner-city hospitals typically have a high burden of bad debts and indigent care, their reimbursement from depreciation costs is often used to assist their cash flow to subsidize the operating costs associated with this uncompensated** care. Since it is unlikely that the implementation of DRG payment will do much to change the situation, hospitals with low levels of capital assets will continue to receive low payment under a capital cost pass-through.

Despite the low level of capital payment, some hospitals serving poor areas may find their ability to raise capital enhanced by DRG payment with a capital cost pass-through. These hospitals now have the potential to generate operating savings which could be used to offset operating cost losses on bad debts and charity care.

Controlled capital payment is generally more efficient than pass-through capital payment, because the hospital is encouraged to provide its care at the least possible cost. New technologies would be judged by hospitals in terms of their impact on total costs, not just on operating costs. Hospitals would be further encouraged to specialize and join in plans for regionalization of health services. However, it is difficult to devise a controlled

[10] For example, the mean percentage of capital costs to total costs for non-Federal public hospitals in 1981 was 5.2 compared to 6.7 for private not-for-profit hospitals and 8.9 in for-profit hospitals (15).

payment system that is fair to all hospitals. In a uniform payment system, hospitals that in the past have had lower ratios of capital to operating cost would receive more than they had in the past, while those with high ratios would receive less. Thus, public hospitals would, at least in the near term, fare better under a uniform system than they had in the past. But uniform payment of capital also favors multihospital systems, because it allows these affiliated hospitals to pool capital payments and smooth out fluctuations in capital expenditures across hospitals. 11 A uniform rate of payment would also create a difficult and possibly costly transition if hospitals that have made major investments in recent years are not to be unduly penalized. The American Hospital Association has recently proposed a uniform capital payment system that would pay each hospital the higher of cost-based reimbursement or a fixed payment rate during a 1(1-year phase-in period (9). Andersen and Ginsberg have suggested a less generous transition in which "budget neutrality"[12] is maintained by gradually reducing the proportion of the capital payment that is **a** pass-through (15).

Tying the capital payment to the level of capital costs in a base year or to the hospital's operating costs is efficient but may be unfair. This approach tends to reward the hospitals that were most capital intensive in the past, leaving those with low levels of capitalization forever to receive lower payments. Moreover, this approach would not work well for hospitals requiring major capital expenditures in the early years of implementation. Perhaps for these reasons, support for this approach has been limited to the movable equipment portion, which typically has shorter lifetimes and lower variations in asset values among hospitals.

It is difficult to predict the effects of direct regulation of capital expenditures through CON or other agencies. Direct regulation can occur with or without statewide or areawide maximum limits on the total capital outlays over a given period, and the effects can be expected to differ between the two. Although there has been much discussion in certain States about establishing capital expenditure limits or "pooling" capital, all experience to date has been with CON and Section 1122 programs which do not operate with areawide or statewide limits. The experience with capital expenditures regulation in the absence of such limits has been disappointing, with most evaluations concluding that the level of capital expenditures has not been affected (65,69,251,414). Moreover, the distribution of medical technologies among hospitals does not appear to have been improved as a result of CON (65).

The institution of an annual (or perhaps, longterrn) limit on the level of capital expenditures that can be approved by CON agencies would, if it were strictly enforced, ensure that the program has an effect on the total level of capital expenditures. But there is no evidence, either theoretical or empirical, to suggest that the outcome of such a regulatory process would be either efficient or fair (417). A review of the literature on resource allocation decisions by committees revealed that the ultimate outcomes depend both on chance and on the composition of the committee and the procedures governing the decisionmaking process (417). Moreover, the kinds of information needed to make informed tradeoffs among competing capital projects is likely to be unavailable, thus leaving the process even more exposed to political solutions.

Regardless of whether or not an areawide limit is applied, direct regulation of capital expenditures is administratively feasible only for large projects—construction and renovation projects and major new services. The current trend toward high thresholds for inclusion in capital expenditure controls (256) would probably continue, leaving an ever larger proportion of capital-embodied technology needing to be controlled in some other way.

[11] At present, approximately 26 percent of a]] community hospitals are members of multihospital systems. About 11 percent of these systems are proprietary, the remainder are government or not-for-profit systems (51).

[12] "Budget neutrality" means (as specified in the Social Security Amendments of 1983) that the aggregate payments for the operating costs of inpatient hospital services in fiscal years 1984 and 1985 will be neither more nor less than would have been paid under the Tax Equity and Fiscal Responsibility Act of 1982 for the costs of the same services

LIMITED PROVIDER CONTRACTING

Another approach to hospital payment has arisen following recent legislation. In 1981, under Section 2175 of the Omnibus Budget Reconciliation Act of 1981 (Public Law 97-35), Congress gave States greater flexibility in restricting Medicaid beneficiaries' freedoom to choose their providers of medical care. Under this statute, State Medicaid agencies are permitted to apply for waivers from the freedom-of-choice provision of the Social Security Act. Most waivers to date have been for case management systems that restrict the providers from whom a Medicaid beneficiary can obtain primary care (332). The implementation of a hospital-only contracting approach, whereby contracts are negotiated with selected hospitals for provision c)f inpatient care to Medicaid patients, is nevertheless possible. California has recently adopted this approach (226).

The two fundamental variables of hospital contracting are: 1) the rules used to determine which hospitals can serve beneficiaries, and 2) the method used to determine the level of payment for such services. A hospital contracting system could be administered by a negotiated bidding system where the bid price is computed on a per case, per day, or per service basis. Or, the third-party payers could select eligible hospitals on the basis of their per case costs (with or without adjustments for case mix) and either pay a flat prospective rate or continue to reimburse the hospitals on a retrospective cost basis. In either case, by tying a hospital's receipt of revenues to its ability to constrain costs, contracting may encourage hospitals to keep costs low.

The impact of contracting on technology use and on equality of access to medical technology depends to a large extent on the contracting program's design and administration. For example, California's Medicaid program uses a bidding system that encourages hospitals to choose a price for contracted patients that cover short-run, but not long-run, incremental costs of treating those patients. Ln essence, other classes of payers may subsidize the Medicaid program by bearing more than their share of overhead and other fixed costs. At the time that contracting was instituted in California, hospitals in the State were suffering from very low occupancy rates, a condition which encourages hospitals to offer to treat patients at rates below the long-run incremental costs of treating them (172). If the contracting agency selected low-cost providers and then paid a prospective rate based on fully allocated costs, the cost shift to other payers would be eliminated.

Selected provider contracting can have serious implications regarding the equality of access of beneficiaries to medical technologies. If beneficiaries can receive hospital care only in low-cost hospitals, the availability of certain technologies, particularly newer ones, could be restricted. Moreover, as the revenues of contracting hospitals are held down relative to those with other kinds of patients, the discrepancies could widen over time.

With Medicare accounting for about 35 percent of community hospital revenues nationwide, selected contracting with hospitals by Medicare would probably be highly disruptive and would greatly change the patient mix of hospitals. It would be difficult to contract selectively without turning some hospitak into predominately Medicare hospitals, leaving the others to serve private sector patients. This kind of separation of care by payer class is a necessary condition for the development of a two-class hospital system and would represent the abandonment of the principles of equal access on which Medicare was founded.

INCREASED BENEFICIARY COST-SHARING FOR HOSPITAL SERVICES

Still another approach to affecting the use of medical technologies through hospital payment is to increase beneficiary cost-sharing. One example of this approach was found in the fiscal year 1984 budget request of the Reagan Administration. The Administration proposed an increase in

Medicare beneficiary cost-sharing for inpatient hospital services (224). Under the proposal, the beneficiary would continue to pay a deductible approximately equal to the cost of a day's care but would be responsible for additional payments of 8 percent of the deductible for days 2 to 1.s and 5 percent of the deductible for days 16 to 60. In exchange, the beneficiary would no longer be responsible for cost-sharing after ***60*** days.

Increasing patient cost-sharing has the immediate benefit to the Medicare program of shifting the expenditure burden from Medicare to the beneficiary or other third-party payers. Proponents of increased cost-sharing for inpatient hospital services also contend that patients will have greater incentives to resist unnecessary technology—admissions, long stays, and procedures or services offered as part of the stay. Thus, according to this argument, the Medicare program would benefit from these behavioral influences on the use of medical technology due to increased cost-sharing.

Interim results from the Rand National Health Insurance Study, a well-designed experiment, indicate that the level of patient cost-sharing does influence the use of hospital services ***(243).*** This experiment randomly assigned 2,7.56 families whose members were not older than 61 with incomes under $25,000 (in 1973 dollars) to one of six insurance plans with differing levels of deductibles, coinsurance rates, and upper limits on annual out-of-pocket expenditures. Plans with high levels of coinsurance had lower admission rates per capita than plans with low rates of coinsurance. With coinsurance rates of 50 or 95 percent, hospital admission rates for adults were, respectively, about 60 and 40 percent below those with no cost-sharing. However, the annual expenditure per hospitalized patient showed no consistent or significant relation to the level of cost-sharing. Of the patients admitted to the hospital, ***70*** percent exceeded their catastrophic limit. Thus, while patient cost-sharing affects hospital admission rates, it appears to be "a poor instrument for affecting costs once patients are admitted" ***(243).***

It should also be noted that the Rand experiment involved cost-sharing for all covered services, not just hospital care. Part of the decline in rates of hospitalization may have been due to a decline in ambulatory care visits that would otherwise have generated a hospital stay. A hospital-only cost-sharing provision with a catastrophic limit on out-of-pocket expenses might not result in the reductions in hospitalization rates experienced in the study. Moreover, applicability of the Rand study to the Medicare program is limited by its inclusion only of a nonelderly population. It is not known whether the elderly would respond to cost-sharing in the same way or to the same degree. Indeed, evidence from this and another short-term study of hospital cost-sharing indicates that cost-sharing's effects on hospital use vary with the patient's age and sex ***(243,413).***

The effect of any beneficiary cost-sharing proposal on the use of medical technology must be considered in the context of a specific method of hospital payment. Under cost-based reimbursement, hospitals had no financial incentive to reduce occupancy rates or the volume of technology use; increasing coinsurance rates, as opposed to increasing deductible amounts, could conceivably have made patients better consumers of care in the hospital. (However, available evidence does not support this contention.) Under the DRG inpatient hospital payment system, hospital administrators have incentives to implement policies that reduce the length of stay and the use of unnecessary ancillary technologies. Increasing hospital coinsurance rates would probably have little additional influence. Increasing the deductible for hospital admissions, on the other hand, might be more consistent with per case payment. In per case payment, the hospital has an incentive to selectively increase the number of admissions and readmission. At present, the deductible of ***$356*** upon hospitalization covers any readmission within ***60*** days of the original episode (Social Security Act, sees, 1861(a) and 1813(a)), To the extent that hospital-only cost-sharing can be expected to reduce the rate of hospital admissions in the elderly, requiring a second deductible for rehospitalizations within 60 days would counteract the incentive for hospitals to discharge and readmit patients for elective procedures that could be performed during a single stay.

Whether cost-sharing for inpatient hospital care can moderate the use of hospitals and their tech-

nology depends to a large degree on the willingness of Medicare beneficiaries to circumvent cost-sharing by purchasing private supplementary ("Medigap") insurance covering deductibles and coinsurance. In ***1976,*** approximately 63 percent of aged beneficiaries had some form of private supplementary coverage, and 14 percent were eligible for public support, mainly through Medicaid (199). According to one study, most Medigap insurance covers deductibles and coinsurance (217), and joint Medicare/Medicaid beneficiaries have no cost-sharing requirements. These supplementary plans dilute the impact of present cost-sharing provisions.

An increase in Medicare cost-sharing for hospital services would be expected to raise premiums of Medigap policies. The effect of such premium increases on Medigap enrollment has not been studied. Data are available on the correlation between family income and the supplementation of Medicare with private insurance. One study found that, although purchase of supplementary insurance increases with family income, the differences are small across income groups when the availability of public programs, particularly Medicaid, are accounted for (34). Another study found that Medicare families with low incomes were just as likely to purchase private Medigap insurance as families with higher incomes, a finding which may suggest that the elderly are relatively insensitive to premiums in their demand for Medigap coverage ***(216).*** If this is the case, increasing hospital deductibles under Medicare would serve mainly as a means of transferring the burden of expenditure from the public to the private sector, with a particularly heavy burden on the near-poor, without substantially altering patterns of hospital use.

CONCLUSIONS

The Medicare program has recently embarked in a new direction in hospital payment with its DRG prospective payment system for inpatient services. The implications of this approach for the use and adoption of medical technology are varied and to some extent uncertain. Much will depend on the way in which the program is implemented and the changes or refinements that may come in the future. The overall DRG price level and the rates of increase permitted over time will have a great deal to do with hospitals' ability to adopt new medical technologies. If, **as many have** claimed, there is substantial room for increased efficiency in the provision of hospital care, and if the payment level is reasonably generous, DRG payment under Medicare could provide hospitals with substantial surpluses of funds that could be used to provide new technologies and services, If, on the other hand, increases in rates are restrictive or set at a level that reclaims all the cost savings made in the previous years from hospitals, then hospitals would probably find it difficult to finance new cost-raising technologies and services, The results cannot be predicted at this time.

The way in which capital is paid for under DRG payment is a critical issue for medical technology. Permanent continuation of a capital cost pass-through under DRG payment would be inefficient and would ultimately distort hospitals' capital investment decisions, making hospitals too capital intensive. Externally controlled capital payments, on the other hand, are efficient but are difficult to administer effectively or fairly.

Approaches to prospective payment of hospitals other than **DRG hospital payment are certainly possible.** INNovative prospective payment methods such as per capita hospital payment and areawide global budgeting may hold promise in some areas. Furthermore, the current Medicare law encourages States to experiment with these as part of all-payer systems. In addition, case-mix **classification systems with more desirable properties than DRGs may become available in the future** (343).

HCFA expects to hold statewide systems applying for waivers to the cost-containment standard of DRG payment: for Medicare to join in a State system, the State must provide strong evidence

that Medicare's inpatient hospital expenditures will be at least as low as they would be under DRG payment (112). Although the available evidence supports the contention that the hospital cost increases under prospective payment systems implemented by individual States in the mid to late 1970's were lower than those under Medicare's traditional cost-based reimbursement system, there is virtually no evidence on the effects of per case prospective payment using DRGs. Thus, **it is not known how DRGs perform relative to other prospective payment systems or whether the State prospective payment approaches can meet the DRG cost-containment standard.**

Other approaches to the control of hospital costs, including increasing the patient's responsibility for cost-sharing and limiting providers through contracts between Medicare and hospitals, have significant limitations. Patient cost-sharing is not likely to be as effective as desired in altering the patterns of use of hospital technologies because of the patient's relative lack of power and information to make informed decisions about the use of technologies in hospitals and the apparently strong preference of the elderly for supplemental medical insurance regardless of its cost. Finally, although contracting may save program dollars, it represents an abandonment of the principle of assuring beneficiaries freedom of choice of providers on which Medicare was built and forces subsidies of hospital care from other payers.