Planning a Demonstration of Per-Case Reimbursement for Inpatient Physician Services under Medicare

Paul B. Ginsburg, Joseph P. Newhouse, Janet Mitchell, Adele Palmer, Marc Freiman, Bruce Hillman, Phoebe Lindsey, Albert Siu

Rand
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PREFACE

In view of the initial success of the Medicare hospital prospective payment system (PPS) in slowing the rate of increase in Medicare outlays for hospital care, many are asking about the potential of per-case payment to slow the rate of increase in outlays for inpatient physician services. The Rand Corporation was asked to assist the Office of Research and Demonstrations, Health Care Financing Administration, in planning a possible demonstration of per-case payment for inpatient physician services. Although this report does not make a recommendation concerning whether to proceed with a demonstration, it discusses key issues in its design. These issues include selecting the options most attractive to demonstrate, participation in the demonstration, setting payment rates, site selection, and evaluation of the demonstration.

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SUMMARY

Outlays for Supplementary Medical Insurance (Part B of Medicare) increased at an annual rate of 18.3 percent from 1979 to 1984. A major component of this increase was due to changes in the volume of services per enrollee. A recent decomposition of trends for a slightly earlier period indicated that increased volume of services per enrollee accounted for 7 percentage points per year, or about 40 percent of growth in outlays for physicians’ services (Juba and Sulveta, in press).

To slow the rise in the volume of physicians’ services, some have proposed that Medicare pay for inpatient physicians’ services on a per-case basis. Such a mechanism could be integrated with the prospective payment system for hospitals (PPS), so that physicians receive a payment that is based on the Diagnosis Related Group (DRG) of the patient.

The attraction of such a payment mechanism is the incentive it gives to physicians to economize on services delivered in the hospital. Lengths of stay might be shortened and fewer assistants used at surgery; and under some versions of this proposal, attending physicians would take into account the level of fees charged by other physicians when choosing which ones to involve in a case. On the other hand, physicians might respond to these incentives by finding ways of beating the system, avoiding any loss to themselves, or by reducing the quality of care through underservice. Large gains and losses to physicians could result not from their relative efficiencies but from the degree of their patients’ resource requirements. If physicians continued to have the privilege of deciding on a case-by-case basis whether to accept Medicare’s reimbursement as payment in full (assignment) or bill the patient additional amounts, some of the risks associated with per-case payment could be borne by the beneficiaries instead of the physicians.

Since per-case payment would be a major departure from the experience of both Medicare and private insurers, its effects are highly uncertain. To many, this uncertainty is too great to contemplate implementing such a policy without first mounting a well-designed demonstration. This report outlines the design of such a demonstration, although we make no recommendations concerning whether The Health Care Financing Administration (HCFA) should proceed with one.
OBJECTIVES OF A DEMONSTRATION

A demonstration would seek to answer the following three questions:

- How would alternative methods of paying physicians affect costs? The presumption is that the methods tested in a demonstration would be budget-neutral in the following sense: If physicians provided the services that they would have under current law, their total reimbursements would approximate what they otherwise would have received. Would such a budget-neutral change in incentives lead physicians to undertake a less costly mix of services, just as a budget-neutral hospital Prospective Payment System has been accompanied by shorter lengths of stay?

- How would alternative methods of paying physicians affect beneficiary access and financial liability? In particular, new assignment policies would probably be desirable if case-based reimbursement were implemented. These new policies might increase or decrease the number of physicians who accept assignment; some physicians might become unwilling to accept Medicare patients.

- If alternative methods of paying physicians do lead them to alter the mix of services provided, what effect would there be on health status outcomes or quality of care? In particular, would any savings come at the expense of health status, and, if so, what would the size of the effect be?

DIMENSIONS OF VARIATION

For reasons described below, any demonstration would apply to an entire local market or markets. As a result, it seems likely that only a limited number of reimbursement methods could be tested in any demonstration. We have therefore attempted to identify the most promising ones for implementation. All case-based methods have some potential drawbacks; reasonable people could differ on whether any of them represent an improvement over a fee-for-service system. Consequently, we also propose that an alternative fee schedule be included in a demonstration. Finally, there would be a control group that would remain on the existing “customary, prevailing, and reasonable” system or whatever modifications of it might be introduced in the future.

Below, we first describe the main features of the two case-based methods of reimbursement that we consider most attractive for a demonstration as well as the revised fee schedule. We then discuss the
rationale for choosing these “treatments.” All three treatments apply only to physicians’ services associated with an inpatient stay.

The first treatment would pay, to the attending physician, a blend of a DRG-based amount and the current customary, prevailing, and reasonable (CPR) reimbursement (or conceivably a blend of per-case payment and an alternative fee schedule). The amount of the per-case payment would equal current reasonable charge levels in each DRG; the weight accorded the per-case payment, however, would decrease as the heterogeneity of the category (measured by charge per case) increased. For example, in a very heterogeneous category, the weight on the per-case payment might be only 0.1; in a relatively homogeneous category it might be 0.7. The attending physician would be responsible for claims by other physicians involved in treatment of a case (we refer to the other physicians as “complementary”).

The second treatment would pay the medical staff of each hospital a fixed amount for each admission; the amount would vary by DRG and would be set so that it would equal current payments in each DRG. If the staff could reach agreement among itself about the division of the lump sum, the carrier could pay individual physicians as per the agreement. Failing such an agreement, HCFA would continue to pay each physician as it does now, but it would pro rate the amount up or down so that the total paid out would be set by the weighted sum of admissions at the hospital (where the weights equal the dollar amounts to be paid for each case).

The third treatment would be a revised fee schedule that gives less weight to procedures and more to cognitive services, such as history-taking and counseling. We suggest that the schedule to be used in the demonstration be developed in consultation with professional medical organizations.

We are not advocating that any of these methods should be part of a demonstration. Each has drawbacks, and the difficult decisions on the nature of the treatments to be included are naturally HCFA’s. We do believe that among case-based methods, the first two treatments are the most promising to test. But both methods may prove undesirable, so it seems prudent to include an alternative fee schedule as well.

Whom to Pay

The first two treatments use per-case reimbursement. With any per-case reimbursement method, one faces the issue of whom to pay: the attending physician; the medical staff; the hospital; or hospital-physician joint ventures.
Paying the attending physician a lump sum per case would change physician incentives the most. As a result, it has the greatest potential for cost containment, but also the greatest risk of adverse outcomes. The potential for cost containment is straightforward; a lump sum gives the attending physician an incentive to produce care efficiently. This incentive extends both to the price of complementary physician services and the quantity of attending and complementary physician services supplied. If there is response to these incentives through the provision of fewer services, Medicare and its beneficiaries should be able to appropriate some or all of those savings in the future by reducing rates.

Unfortunately, there are several potential problems with per-case reimbursement:

- Cases that are receiving the same payment are not homogeneous. As a result, per-case payment creates fiscal “winners” and “losers” among patients. If the physician can predict who will be the losers, such patients could well have access problems (i.e., physicians may not wish to treat them).
- Even if physicians cannot predict the losers, there will be fiscal winners and losers among physicians, who will receive windfall gains and losses through random allocation of profitable and unprofitable patients.
- Some fear that a fixed payment would lead a physician to cut back services to the point that quality of care would be reduced by an unacceptable amount. Reduced use of consultants is a source of particular concern.

Because of these potential problems, we do not recommend a pure case-based payment at the level of the individual attending physician. The first option we do recommend, the blend, mitigates these problems by diluting the incentives in the per-case payment; this naturally dilutes the potential gains as well. Nonetheless, the degree of mitigation is strongest where the problems are expected to be the most severe, namely, in the most heterogeneous DRGs.

Payment to the medical staff, the second option, mitigates the problem of risk to the individual physician by pooling across physicians. Two major questions need to be answered with respect to paying the medical staff: (1) Can the medical staff organize itself to increase the efficiency of the production of services? Those who believe it can point to the decrease in patient-days that followed the introduction of Medicare Prospective Payment System, even though the gain from the reduction did not accrue to the individual physician. Those who are
skeptical point to the problem of motivating the individual physician to take actions for which he or she receives no direct financial reward (and in some instances may lose fees). (2) If the medical staff does organize itself to produce services efficiently, will it also engage in the undesirable behaviors of dropping or avoiding unprofitable, problematic patients and keeping the easier, profitable ones. Those discounting the possibility point to the role of medical ethics and possible long-run adverse consequences if a medical staff gained a reputation for engaging in such behavior.

We have not suggested demonstrations in which payment for both hospital and physician services is made to a single entity (either the hospital, the medical staff, or a joint venture). Joint ventures would be virtually impossible to mandate in a demonstration, and a demonstration with volunteers would not show how such a system might work if it were universal. Payments to either physicians or hospitals would raise severe political objections from the party not receiving the payment; additionally, payments to the medical staff for both physician and hospital services would considerably increase the risk that physicians bear. Under payment to the medical staff, however, a voluntary development of a joint venture with the hospital could be permitted.

**Beneficiary Cost Sharing**

In the per-case options, one could base beneficiary cost-sharing on the CPR system, as at present, or on the per-case payment. If there were no behavioral effects, the question would not be very important quantitatively; 82 percent of hospitalized beneficiaries would have their cost-sharing changed by less than $75. For three reasons, however, we recommend that the cost-sharing be based on the CPR system. First, this would leave a positive price to the beneficiary for the marginal service. Second, although case-based cost-sharing would reduce cost-sharing for some beneficiaries (i.e., those whose bills using CPR would exceed the per-case price), other beneficiaries would find their bills increased in what might seem to be an arbitrary manner. Third, using fees to calculate coinsurance simplifies the problem of interacting with Medi-gap policies, because they are designed to mesh with fee-for-service rather than per-case reimbursement, and fully 80 percent of the beneficiaries have either Medi-gap policies or Medicaid eligibility. In the revised fee schedule option, cost-sharing could be based upon the revised fees.
Assignment Policy

Case-based payment creates two issues for assignment policy. First, continuation of case-by-case determination of assignment by physicians becomes untenable. Second, rules must be developed concerning cases where some of the physicians accept assignment and some do not.

If physicians could decide on a case-by-case basis whether to accept assignment, they could be expected to accept assignment on cases where the per-case payment exceeded actual charges, and not accept assignment in other cases but bill the patient for the excess. Under such circumstances, payments to physicians would needlessly increase; on cases costing less than average, the physician could accept assignment and would be paid more than a competitive price; on other cases the physician could refuse assignment, and be paid (to a first approximation) the competitive price. As a result, case-based payments create a situation where it is desirable to have physicians accept assignment on all cases or on none.

Current law has some inducement to accept assignment on all cases through the concept of the participating physician. This recent change in policy is likely to enhance competition among physicians. But because only 30 percent of physicians participate under current law, and because case-based payment might make participation less attractive, it seems wise to strengthen incentives to accept assignment on all cases. One option would require a physician to accept assignment on all cases or accept it on none. While such a requirement may or may not increase the percentage of bills assigned, it would preclude the excess payments that would accrue to physicians under a policy of case-by-case determination.

In conjunction with such a requirement, one could increase the incentive to accept assignment by paying a different rate for assigned and unassigned cases. (In the limit, when Medicare pays nothing for unassigned cases, one has mandatory assignment.) One could argue against such a differential, however, on the basis that the financial incentive under case-based reimbursement to use a physician who accepts assignment is already quite large; decreasing the amount that Medicare pays in the unassigned case could simply create hardship among some beneficiaries without affecting assignment behavior a great deal. Potentially, one could test the effects of a differential in a demonstration; because of the limited degrees of freedom in a demonstration, however, we do not recommend this.

Even if physicians are required to make an all-or-nothing assignment decision, however, beneficiaries are likely to encounter a mix of
assigned and unassigned physicians during a hospital stay. The prospect of mixed cases calls for additional restrictions on billing practices of physicians, lest the incentives of per-case reimbursement be lost. For example, under lump sum payment to the attending physician, all billing should go through the attending physician. Thus, if the attending physician accepts assignment and another physician on the case does not, the payment of the latter should be a matter only between the two physicians and should not involve the beneficiary. This arrangement would also be suitable in cases where the attending physician does not accept assignment. Although the attending physician may bill the patient for amounts in excess of Medicare's per-case payment, the amount should still reflect the fees that the attending physician has negotiated with others. Indeed, the attending physician should be made responsible for collection of cost-sharing from the patient as well. While this may appear to impose all of the risk of bad debts upon the attending physician, the risk can be reflected in the financial arrangements negotiated between the attending physician and the others involved in a case.

Under payment to the medical staff, the staff as a whole could be required to make an assignment decision for services in that hospital. Indeed the visibility of a hospital staff's assignment decision in an urban area could lead to a high proportion of medical staffs accepting assignment. In areas with little competition among hospitals, such as rural areas, however, assignment could fall with such a requirement.

A requirement of a uniform assignment decision is not essential, however. For example, if pro rata payments are made, with the adjustment based on comparison of a medical staff's fee-for-service billings with per-case amounts, a mixture of assigned and unassigned bills need not detract from the intent of per-case reimbursement. The problem, which is present today, would be the difficulty of patients arranging for a high proportion of the total bill being assigned. Since assignment might be more important to the patient under per-case reimbursement, a lack of uniformity would be less acceptable to beneficiaries.

The problem of mixed cases does not affect the alternative of mandatory assignment—a payment differential between assigned and unassigned cases with a zero payment for the latter. While mandatory assignment would probably result in the highest rate of assignment for cases, the consequences to the beneficiary who has a strong preference for a nonparticipating physician or who cannot find a participating physician would be particularly severe. Under mandatory assignment, those patients with relatively costly cases could have particularly difficult problems of access, though by this reasoning, without mandatory assignment beneficiaries would be at risk for the costliness of their
case. It might not be advisable to use mandatory assignment for a demonstration, both because of the potential problems of access, and also because the effects of the change in assignment policy might overwhelm the effects of per-case reimbursement, thus making it difficult to interpret the findings from a demonstration.

**Coverage of the Demonstration**

All inpatient services to Medicare patients would be covered by the demonstration. Any charges during a window of time (the size to be specified later) before and after the admission would also be included. In order to maintain neutrality with surgical cases that could be treated on an outpatient basis, professional fees for the same procedure should be the same wherever it is performed.

There is considerable difficulty in defining an outpatient case. Hence, outpatient services would not be included, although they could be included in a revised fee schedule (the third option) if desired.

**Participation in the Demonstration**

All physicians in a given market area or areas would be included in the demonstration. If this requirement were not included, no information that could be generalized would be learned. Patients whose expenses were greater than the per-case payment would simply be referred to physicians who were not participating, or, if the attending physician had multiple staff privileges, might be taken to a participating or nonparticipating hospital, according to the financial incentives.

**Setting the Payment Rates**

The relative structure of the per-case payments in the two per-case options would be set using existing billings per case. The optimal structure for the weights in the blend option remain to be determined. Whatever the weights are, we suggest a conversion factor that would maintain local budget neutrality for the purposes of the demonstration. This is also true for the option of continued fee-for-service reimbursement with revised relative values.

**Evaluation Design**

The number of sites to be included is a function of budget, the ratio of between-site to within-site variance (the greater the ratio, the more the sites), and the ratio of variable costs per physician or patient
within a site to the fixed costs per site (the greater the ratio, the greater the optimal number of sites). Estimation of these variances can proceed, but it seems likely that only a small number of sites (conceivably even one per treatment) can be included.

With a small number of sites, one faces a dilemma: If one tries to make the sites assigned to each treatment reasonably comparable (for example, with respect to city size), one must face the possibility that the treatment would have had a different effect in a different-size site; if one does not make the sites comparable, one confounds treatment and site effects. We would rather make the sites reasonably comparable and face the criticism that the treatment might have had a different effect in a different-size site, than face the criticism that the difference across the treatments was really a function of site. We would also suggest a pilot sample in a small rural site before implementation in a larger site.

If the budget is available, we would operate the demonstration for three years; if not, then for two. The first year's experience may be unrepresentative of long-run experience, as physicians learn about the system. Any effects of changed treatment patterns on health would also not show up at once.

Measurement of the cost to Medicare can come from claims, but other measures of cost (e.g., balance billing in unassigned claims) will have to be collected from participants. Measures of health outcomes can come from self-reports by participants, but screening examinations would strengthen measurement of outcomes significantly. Measures of access would also be strengthened by physiologic data. Measures of quality of care would come from the medical record. Measures of how the case-based payment is divided among physicians would have to come from physicians.

Because the design of the demonstration will be a randomized trial, treatment means will be unbiased. Standard transformations, however, would improve on the efficiency of simple means, especially in the case of expenditure.
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I. INTRODUCTION

Supplementary Medical Insurance (Part B of Medicare) is the largest federal domestic program funded from general revenues. Moreover, expenditures on it have increased over the 1979–1984 period at an annual rate of 18.3 percent. The size of the program and its rate of increase have led to continued ferment about the basis for Medicare’s payment of physicians (Burney et al., 1984; Roe, 1981; Institute of Medicine, 1984.)

Medicare reimburses physicians according to whether charges are customary, prevailing, and reasonable (CPR). It pays the lowest of the actual charge, the customary charge (which is the median charge by the physician for that procedure during the previous year) and the prevailing charge, which is the 75 percentile of customary charges in a locality. The lowest of the three is called “reasonable.”

In the recent past, Congress made two key reforms in how Medicare reimburses physicians. In 1972, it enacted a restriction that the prevailing screens in a locality increase by no more than the increase in a Medicare Economic Index (MEI), which is keyed to a measure of price changes in the national economy. This restriction has slowly been converting the CPR system into a fee schedule, as more and more physicians’ reimbursements are bound by the prevailing screen. The exact percentage of physician charges that are now constrained by this index is not known, but knowledgable observers estimate that well over half the billings are so constrained.

Additionally, as part of the Deficit Reduction Act of 1984 (DEFRA) (P.L. 98-369), Congress created the category of a participating physician. A participating physician agrees to accept assignment on all Medicare patients; HCFA, in turn, publicizes the names of participating physicians through directories and toll-free telephone numbers. When the current freeze on fees charged Medicare patients is eased, payments to participating physicians may be permitted to rise more rapidly than those to nonparticipating physicians.

Numerous proposals for more fundamental changes in the basis of physician reimbursement have been made. For example, the incentives to reduce resources inherent in per-case payment have led many to consider a shift from fee-for-service payment. The Congress, when it enacted the Prospective Payment System (PPS) for hospitals (P.L. 98-21), requested that the Department of Health and Human Services study the feasibility and desirability of case-based reimbursement for inpatient physician services.
Outside the federal government, more attention has been given to the use of fee schedules. The American Medical Association has proposed that a fee schedule with relative values different from those under current law be used as the basis of payment. The American Society of Internal Medicine supports such a concept, and argues that the weights for cognitive services be raised relative to those for procedures.

The notion that procedures are reimbursed at too high a rate is also seen indirectly in other proposals. Some, for example, have proposed limiting Medicare support for graduate medical education costs to only three years of education (Iglehart, 1985; Petersdorf, 1985; Menken and Sheps, 1985) on the rationale that we are training too many procedure-oriented subspecialists and that such subspecialists take longer to train. But this appears not to treat the root cause—fee schedules that are overgenerous with procedures.

Little is known about the likely effects of any changes in how physicians are reimbursed, however. With the exception of one small experiment, case-based reimbursement of physicians has never been attempted. Although the expectation of many is that revised fee schedules may lead to a reduced supply of those services for which remuneration is lowered, some theoretical models and some empirical evidence suggests that, as fees are reduced, a given stock of physicians supplies more of certain services (Rice, 1984). (In the long run, however, reduced fees for certain procedures that are concentrated among a few specialties or subspecialties are likely to reduce the number of physicians entering those specialties and thereby the supply of those services.)

The numerous proposals for change and the widespread dissatisfaction with the current system, together with the lack of knowledge of how physicians respond to alternative methods of reimbursement, argue for a demonstration of some alternative proposals. A properly designed demonstration would allow one to project what might happen if a particular change were made nationwide; without the demonstration, one is likely to formulate policy in the dark or merely maintain the status quo.

This report will assess options that one might wish to include in a demonstration using a series of objectives that HCFA and the Congress have for physician reimbursement:

*Improved economic efficiency and reduction in costs.* A reimbursement option should have the potential for improved economic efficiency, which most observers associate with a significant reduction in health system costs. Costs can be lowered through reduced services per admission, a reduced rate of admissions, or a decline in physicians’
charges induced by increased competition. While the level of Medicare program outlays is perhaps of greater immediate interest to HCFA, substantial reductions in outlays over the long term require reductions in the underlying costs. Indeed, in the hospital PPS, the impressive reduction in the rate of increase in hospital costs that has been experienced since the inception of the program and its predecessor (the reimbursement provisions of the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA)) has led the Administration in its Fiscal Year 1986 budget to propose a freeze of PPS rates at the 1985 level and implement that decision through regulation. Additionally, Medicare should not pay more to physicians than it has to.1

*maintenance of access.* At present, virtually all physicians will treat Medicare patients. Maintaining extensive freedom of choice of physician is an objective of the program. If a reimbursement option caused a significant proportion of physicians to discontinue their participation in the program, this would be considered a negative impact.

*maintenance of quality of care.* An important objective is the maintenance of quality of care. Although a demonstration cannot assess the effect of the payment system on the introduction of new technology, it could assess how the application of existing technology might be affected. The quality objective is likely to conflict with the cost-reduction objective. If cost reduction is shown to reduce quality, then elected officials will have to decide whether the size of the decline is acceptable.

*limitation of the financial risk borne by beneficiaries.* Medicare beneficiaries are responsible for two types of payment for physician services. One is scheduled cost-sharing—that is, the $75 annual deductible and the 20 percent coinsurance. The other is the difference between the physician's actual charge and the reasonable charge, which physicians are permitted to bill the patient for if they do not accept assignment. Beneficiaries are particularly sensitive to changes in the latter, since most private supplemental insurance policies purchased by Medicare beneficiaries do not cover these additional charges. Congress would consider increases in exposure of beneficiaries to financial risk to be a negative aspect of a new reimbursement scheme.

*Ease of administration.* Claims processing activities should be fast and economical. Any physician reimbursement system should be designed so that carriers can keep frequency of errors low and be able to police the system for fraud and abuse.

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1In the language of economists, Medicare should not pay rents to obtain physician services.
Ease of evaluation. A demonstration should be so designed that an evaluation that is satisfactory to researchers and understandable to policymakers is feasible.

In addition to these objectives, changes in how physicians are paid are likely to affect the distribution of income among physicians. Policymakers may well want to know the likely redistribution of income among various types of physicians.

The report assesses options according to their effects on these objectives. In many cases, a gain in one objective comes at the expense of another. The baseline for comparison is current reimbursement policies or any changes that might be introduced nationally in those policies. Unfortunately, knowledge concerning how current policies stack up against these objectives is quite limited, because of both limited research and the recency of implementation of important policy changes. Hospital reimbursement has changed from a cost-based system to a prospective one, and policy regarding physician assignment has changed with the development of the “participating physician” category.

The report is organized into two major parts. The first discusses which options within the set of case-based options to demonstrate. Within the first part, Sec. II discusses to whom Medicare should make the per-case payment. Payments can be made to a single physician managing a case, all physicians participating in a case, the medical staff of a hospital, or a hospital. Section III compares options for beneficiary cost-sharing in a per-case payment. The major issue is whether to base the coinsurance amounts on the per-case payment or to continue the fee-for-service basis of the coinsurance. Section IV discusses the issue of assignment. It addresses the question of whether the present policy concerning assignment is viable under per-case reimbursement, and analyzes mandatory assignment and other alternative assignment options, such as requiring physicians to bill all cases on either an assigned or unassigned basis. Section V discusses which physician services should be covered—all inpatient, inpatient plus outpatient surgery, or only a subset of inpatient services. Section VI considers how to define the episode of care that is paid for.

The second part of the report centers on how to proceed with a demonstration. Section VII considers the merits of voluntary versus mandatory participation in the demonstration. Section VIII spells out how to set payment rates for a demonstration. Section IX considers the potential for including an additional treatment—a fee schedule with altered relative values—in the demonstration, and Sec. X the design of an evaluation for a demonstration. Until decisions are made concerning the scope and type of demonstration, discussions on how to proceed must remain quite general.
This report does not include a distinct section discussing the pros and cons of per-case reimbursement of inpatient physicians' services. There are so many aspects of the policy option where major choices must be made that such a discussion would be too abstract. Extensive analysis of per-case payment appears throughout the report, however, in the context of discussion of the various design decisions that must be made.
II. WHOM TO PAY A PER-CASE AMOUNT

Payments from Medicare for inpatient physician services could go to individual physicians, to the medical staff of a hospital or some other organization of physicians as a single entity, or to the hospital in the form of a combined payment for both the physician and hospital components of a stay. Under the first two options, payment could be for only the physician component, or for the hospital component as well. The discussion in this section assumes that the payment is only for the physician component, but indicates how the analysis would change if hospital payments were included as well.

PAYMENT TO INDIVIDUAL PHYSICIANS: SINGLE-ENTITY BASIS

Individual physicians could be paid on a single-entity or multi-entity basis. Under the former, a single physician is paid a per-case amount and is responsible for paying any other physicians in the case who provided services to the patient. The other physicians would then be subcontractors to the physician receiving the per-case payment. Under the latter, Medicare pays directly each of the physicians involved, but adjusts the payments so that the amounts sum to the overall per-case reimbursement. The relationship among physicians treating a patient under the multi-entity basis is more like a partnership, although the attending physician takes the lead in forming the partnership, and thus plays the role of “managing partner.”

Paying an individual physician on a single-entity basis would change physician incentives the most. As a consequence, it has the greatest potential for cost containment, but also the largest risks of adverse outcomes, such as reduced access by beneficiaries or reduced quality of care.

The basic arrangement would have the Medicare carrier make a lump sum payment to the attending physician (presumably the one who signs the discharge papers), who in turn would pay the other physicians participating in the care of the patient for their services. The attending physician would stand to gain or lose to the extent that what was left over after paying other physicians was greater than or less than what he or she would have received under the fee-for-service (FFS) system for the services rendered to the patient.
Physician Incentives

Making the attending physician into a residual claimant for all inpatient physician services would lead to substantial incentives for the control of physician expenditures associated with a hospital stay. The attending\(^1\) would have an incentive to be frugal in providing his or her own services, and to become a prudent buyer of the services of other physicians—consultants, radiologists, and anesthesiologists (hereafter referred to as “complementary physicians”). In purchasing these services, the attending physician would consider both the number of services per-case billed for and fee levels; and he or she would seek to engage complementary physicians with economical practice styles and modest fee levels, holding other characteristics constant.

Economic rewards to attending physicians would come from a number of sources: reduced provision of their own services, shifts in the use of the services of complementary physicians toward those with more economical practice patterns and lower fees, fee reductions and changes in practice patterns on the part of complementary physicians, and reduced ordering of the services of other physicians, such as consultants or assistant surgeons.

It is difficult to estimate the savings that these incentives might induce; indeed, a principal argument for a demonstration project is the need to assess this. It would not be costless for attending physicians to assess the practice patterns of complementary physicians and negotiate fees with them, and the gains would be limited at least initially to the proportion of their practice that was Medicare inpatient services.\(^2\) If physicians had a strong distaste for performing such managerial functions, it is possible that many would simply continue business as usual and regard the resulting gains and losses as windfalls.

Another factor that might limit the potential savings from per-case payment is that some of them already are being realized through responses to Medicare prospective payment of hospitals (PPS). Lengths of stay have declined dramatically, reducing the number of visits by attending physicians. To the extent that X-ray and laboratory use has declined, fewer interpretations by radiologists and pathologists have been ordered.

A number of undesirable incentives are associated with a lump sum payment to the attending physician. Many are the downside of the strong incentives for cost containment. The same incentives that lead

\(^1\)Henceforth, partly for expository economy, we will often follow common medical parlance and refer to the attending physician simply as he attending.”

\(^2\)As has been the case in prospective payment for hospital services, other carriers might begin to pay physicians on a per-case basis as well.
to cost containment pose risks to the quality of care, for example. Not using a consultant will save resources, but might lower the quality of care (Lowenstein, Iezzoni, and Moskowitz, 1985). The risks to quality might be higher than with hospital prospective payment, since physician incomes are not directly affected by the latter. Nevertheless, professional ethics, the risks of malpractice litigation, and the extent to which consultants are overused under FFS payment, might be ample to prevent excessive erosion of quality. Still, one issue to be assessed by a demonstration is whether quality is reduced, and if so, whether by so large a degree as to be unacceptable. (See Sec. X for additional discussion.)

The PPS incentives to classify patients into higher-weighted DRGs are likely to cause more problems under per-case payment of physicians than at present. Physicians are likely to have more influence than hospital employees (principally medical records personnel) over the coding that results in patient classification, and per-case payment gives the attending physician very strong incentives to report diagnoses and complications in a way to influence the assignment of a DRG.

An incentive to admit more patients to the hospital is also a possibility. If patients with only a marginal need for hospitalization tend to have resource needs that are low relative to others in the DRG, and patients with higher resource needs involve less discretion as to whether inpatient care is recommended, per-case payment would leave a net incentive to admit more patients. On the other hand, considering the risks that physicians would face under per-case payment, they might be more inclined to favor outpatient settings where technically feasible, because fee-for-service payment would continue there.

Physicians’ Incomes

By making the attending physician the residual claimant, redistribution of income for inpatient services among physicians would be inevitable.\(^3\) Some redistribution is due to heterogeneity of patients within a particular DRG or other category, and would be inappropriate windfall gains and losses. But some is due to inter-physician practice variations no longer being recognized by the reimbursement system, and this may be quite appropriate.

Degree of Risk. This report can draw on the extensive work conducted by Jan Mitchell and colleagues at the Center for Health Economics Research (Mitchell et al., 1984; Mitchell, 1985) to assess the

\(^3\)Throughout the report, we assume that reimbursement amounts are set initially at a level that leaves aggregate reimbursements unchanged.
amount of redistribution (but not disaggregate it between appropriate and inappropriate categories). Mitchell simulated the impact of DRG reimbursement on attending physicians with 1982 Part B claims data from New Jersey and North Carolina. The analysis assumed that physicians other than the attending were paid the same amount as under FFS reimbursement (Medicare reasonable charges), and that the attending kept the difference between this and the per-case reimbursement. The study did not attempt to simulate induced changes in physicians’ assignment decisions or in additional charges billed to patients in unassigned claims.

In New Jersey, 26 percent of attending physicians, accounting for 21 percent of Medicare cases, would have gained on average more than $150 per case; 4 24 percent, accounting for 19 percent of Medicare admissions, would have had a reduction of more than $150 per case. The North Carolina physicians studied had gains and losses that were somewhat smaller, but the difference is due mostly to the overall lower level of fees in that state.

On the basis of physicians’ annual incomes, these gains and losses do not seem formidable. In New Jersey, 18 percent of physicians would have received at least $5000 less than under Medicare FFS reimbursement for their Medicare inpatient caseload over the course of 1982. But $5000 was only 11 percent of the average physician’s reasonable charges to Medicare in New Jersey in that year. We estimate that it was about 2 to 3 percent of the average physician’s gross income. Thus, while the redistribution among physicians from making the per-case payment to a single physician may be judged inequitable, it is unlikely to threaten the livelihood of many physicians.

The situation looks more serious when one goes beyond averages, however. For example, when gains and losses for surgeons and other attending physicians are arrayed separately, the problem of large percentage gains and losses is more serious for non-surgeons. As discussed below, surgical DRGs are more homogeneous than medical DRGs, and the surgeon accounts for a larger portion of the physician bill in surgical cases than does the attending physician in medical cases.

Markets would probably develop to offer insurance to physicians to limit the risk of unusually expensive cases, though not during a demonstration. Indeed, Lloyd’s of London is offering insurance to hospitals that would augment Medicare’s payments for outlier cases. Presumably, the problem for insurers that some hospitals are more likely than others to have outlier patients has been reflected in the premiums

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4In New Jersey, $150 is 14 percent of reimbursement for the average case.
charged. While physicians would be more difficult for insurers to rate than hospitals (because of fewer Medicare cases), the potential rewards for insurers to develop products would be significant.

Reducing Risk. A powerful tool to reduce the risks to attending physicians under lump-sum payment would be a blending of DRG rates with allowable FFS charges. The proportion of the rate that would depend on FFS would vary by DRG according to the heterogeneity of cases in the DRG, as reflected by some statistic such as the coefficient of variation. Thus, most surgical cases, which have relatively low coefficients of variation, would have relatively little contemporaneous FFS influence on payment rates, while many of the medical cases would have a large FFS component, possibly as large as 80 or 90 percent.

The blend would have varying weights depending upon the DRG. The optimal method for calculating these weights is not now known, but weights could be chosen to make the coefficient of variation within any category the same. Moreover, the level of the coefficient of variation could be chosen; for example, a blend could be chosen to make the coefficient of variation in each DRG 0.10. It is probable that a constant coefficient of variation across categories is not optimal (although it may be close to optimal), but if one decided to proceed with this option, one would want to initiate research into the method of calculating the optimal weights. We conjecture that in any optimal scheme, the weight on the case-based payment will fall with the coefficient of variation. For purposes of thinking about the issue, one might imagine that a category with a coefficient of variation of 1.0 would have a weight of 0.1 on the case-based payment, while a category with a coefficient of variation of 0.25 would have a weight of 0.40 on the case-based payment.

This blending differs from the transition used in PPS in important ways. The FFS component would be based not on some historical record of the individual physician, but on the actual, reasonable FFS charges for that case. This means that the incentives of case-based payment are diluted by the proportion of FFS reimbursements that enter the blend. While this dilution would be quite substantial in many of the medical DRGs, per-case incentives could still be present to any desired degree. Moreover, the information function of per-case payment—showing the physician that his or her performance is more or less costly than that of peers—would be maintained, because the FFS component would be based on current data. This blend could be continued as long as necessary without concern of growing distortions over time.

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5One could also blend a case-based system with an alternative fee schedule. Virtually all of the comments made in this section would also apply to such a blend.
A blend has a number of attractive features besides reduction of financial risk to physicians. First, it would balance incentives to undertreat and over treat. The fear with FFS systems is that the physician is not a perfect agent for the patient, and that the level of fees is such that physicians have incentives to over treat. In a case-based system, the fear is that physicians will undertreat. If these tendencies are correct, an appropriate blend will yield the proper amount of treatment. (And if they are incorrect—for example, because the physician is a perfect agent—the blend does not affect the outcome.)

Second, a blend would reduce the incentives for physicians to reject a case on the basis of its having high resource needs relative to other cases in the same category (e.g., same DRG).

Redistribution Among Physicians. Physicians might object to the change in the nature of relationships among themselves, particularly those bound to be “subcontractors.” Complementary physicians might well lose financially relative to attendings. Given the ample supply of physicians in most areas and specialties today, attending physicians might be in a position to pay complementary physicians less than the latter get from Medicare today. Complementary physicians would now face a knowledgable residual claimant who is purchasing their services, in place of an agent for patients who are highly insulated from prices by insurance. If this happened, it would indicate that today Medicare is paying complementary physicians more than is necessary to induce them to provide services.

This predicted lower payment would not be universal, of course. A renowned radiologist might well command a very high payment from attending physicians. But the tendency would be for lower payments by attending physicians.

The magnitude of income shifts among physicians would depend on the assignment policy (see Sec. IV). If income were redistributed to attending physicians, more physicians would seek to play that role. This would tend to lower the degree of income shifts, but also raise concerns about the quality of care.

Beneficiary Impacts

Beneficiaries have some potential for gains in the long run, but would face short-run problems. The long-run potential is that if Medicare saved a great deal of money through capturing efficiencies achieved by physicians under per-case payment, the degree to which beneficiaries would be asked to shoulder the increasing burden of Medicare through increased premiums or cost sharing could be lower.
In contrast, depending on assignment policy, beneficiaries could find their out-of-pocket costs higher or their access to care diminished (see Sec. IV). If present assignment policies are continued, beneficiaries—instead of their physicians—could bear the risks that come from heterogeneity of cases within a DRG. If their cases required more services than average, the difference between the per-case reimbursement amount and reasonable charges could be passed on to them. If, on the other hand, assignment was mandatory, beneficiaries with high resource needs could experience difficulties in finding an attending physician to treat them.

Administration

Pure lump sum payment to the attending physician would be relatively easy for HCFA to administer. Already, a patient’s DRG must be established. Indeed, a reduction in administrative costs would be possible if carriers did not have to deal with FFS claims. This would avoid the tedious process of calculating customary charges for each physician and prevailing charges for each area for thousands of procedures. But data on FFS charges would be needed for administering a blend, and for evaluation purposes during a demonstration.6

Some of the reductions in administrative costs at HCFA and its carriers would appear as revealed costs to the attending physician. Negotiations would have to be conducted with complementary physicians and their services monitored. Because of the limited time duration of the demonstration and the one-time nature of these costs, physicians might do less of this under a demonstration than under a permanent program.

Carrier Payment of Residual to Attending Physicians

Instead of paying a lump sum for all inpatient physician services to the attending physician, the carrier could pay each of the other physicians his or her charges, and remit the residual to the attending physician. This variation could be a strictly administrative one, but has the potential to have other differences—for example, the carrier might pay different amounts than the attending physician would. In general, introducing the carriers into the process gains the benefits of their substantial administrative experience, but sacrifices flexibility.

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6Not having FFS claims would make evaluation difficult. There would be no way of determining whether services per-case were declining under per-case reimbursement other than by survey, which would be much less reliable than claims data. Thus, filing of FFS claims would have to continue during a demonstration, even if a pure case-based system were being demonstrated.
To duplicate the outcome of a lump sum payment to the attending physician, each complementary physician would bill the carrier for the amount negotiated with the attending. After a specified time period, the carrier and attending physician would settle the difference between the residual and any interim payment to the attending (see below).

 Alternatively, the attending physician could receive bills from the complementary physicians and send them to the carrier with instructions for payment. This would reduce the administrative burden on physicians' offices somewhat, and might be particularly valuable during a demonstration.

 A more substantive change would occur from using various default options to reduce the cost of negotiation for physicians. For example, the carrier could screen fee levels. Carriers could use the current system—develop customary profiles by physician and establish prevailing rates by area and apply such screens to those claims where no negotiation had been conducted. Complementary physicians would then be paid the lower of their charge or the screened amount.

 Alternatively, carrier screens could be tailored more to per-case reimbursement. For example, screens could be applied to total charges for a category of service rather than fees per service. Thus, total charges for radiology services could be screened according to profiles for a specific case type. The screen would then apply both to the level of fees and to the volume of services. As in the case of fee screens, they would not preclude the attending physician's negotiating a lower or higher amount.

 While per-case screens could reduce the administrative burdens on individual physicians, a number of problems would have to be addressed. In those DRGs where the services of a type of physician are needed only for some patients, the profiles developed would tend to be too low in those cases where they were prescribed. This could be dealt with by making the screens contingent on the presence of a type of provider, but incentives to economize, such as one not to use an assistant surgeon, would be sacrificed.

 The resulting rigid allocations of the per-case reimbursement among the different types of physicians involved would intensify the degree of inequities experienced by physicians as a result of heterogeneity of patient needs within a DRG category, however. For example, DRG X might have a radiology screen equal to 12 percent of the per-case reimbursement. By developing fixed proportions of reimbursement for consultants, radiologists, and other categories, some of the relief from heterogeneity of resource needs within DRGs provided by the law of large numbers would be lost.
In conclusion, while continuation of current FFS screens as a default option would be a useful aspect of a demonstration, more complicated screens that refer to total charges by a class of physicians are not desirable, because they would reduce the opportunities for the attending physician to economize and would exacerbate some problems with per-case payment.

PAYMENT TO INDIVIDUAL PHYSICIANS: MULTI-ENTITY BASIS

In contrast to the single-entity mechanisms of a lump sum payment to the attending or carrier payment of a residual to the attending, a multi-entity system of pro rata adjustments could be used (Jencks and Dobson, 1985).

Under this alternative, the carrier would accumulate the FFS bills from physicians delivering services for an individual inpatient case. It then would sum the charges (possibly screened) and compare the total with the per-case payment associated with the patient's diagnostic category. Then it would proportionately increase or reduce the payment to each physician so that total payments were equal to the per-case rate. Thus, rather than the attending physician's being a residual claimant, the risk of per-case payment would be shared among all the physicians delivering services to an inpatient in proportion to their billings.

Compared with lump sum payment, this option would reduce the financial risk to attending physicians, and avoid the political problems of some physicians hiring others. But these gains would come at the expense of a loss in potential for cost containment and some cumbersome problems in administration.

The reduction in risk to the individual physician would be significant, especially in medical cases, where the risks are the largest. In New Jersey and North Carolina, attending physicians accounted for only 50 percent and 60 percent, respectively, of reasonable charges for medical cases.

Pro rata payment would also maintain existing relationships of referral between attending and other physicians. With the attending not acting as a residual claimant, the redistribution of income among

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7While the attending physician would be at risk for profligate provision by complementary physicians, such risks could be handled by choosing whom to refer the patient to. Incentives for profligate service provision would be no higher than under the present FFS system. Complementary physicians on the case, however, would also be at risk of profligate use by other complementary physicians, and they would have less direct control than the attending. See the text for further discussion.
physicians in the lump sum options would not occur. In addition, the extensive negotiation among physicians that was envisioned would probably not occur, because attending physicians would only be mildly interested in the fee levels and practice patterns of complementary physicians. The lessened interest would come about because pro rata payment would dilute the incentives for economizing, as each physician would gain only a fraction of any savings from lower resource use or lower fee levels. The reduction of incentives would be somewhat more serious for medical cases, where the attending physician—who is in the best position to organize the team for lower-cost operation—is responsible for a smaller share of inpatient physician expenses for a case. In contrast, surgeons would still have significant incentives to reduce bills for other physicians involved in a surgical case, since a large share of the savings would accrue to them.

A corollary of diluted incentives is that there would be windfall gains and losses to some complementary physicians from the actions of other complementary physicians. Since the complementary physician does not select the others on a case, this reallocation of gains and losses without responsibility could be viewed as both inefficient and inequitable. Of course, a complementary physician could refuse to participate if a certain attending had a reputation for using other high-cost complementary physicians, but this mechanism appears cumbersome.

The pro rata option would increase the administrative workload of the carriers. The carrier would have to collate all of the bills related to an inpatient stay, compare them with any screens, and compare the sum with the per-case reimbursement. Then, an increase or reduction factor would be applied and the cost-sharing subtracted from the payment.

If pro rata payment were pursued, the type of screening functions pursued by carriers would have to be decided. The carriers could continue to screen bills for the reasonableness of their fee levels. While this would be consistent with longstanding policies, it would have fewer merits under per-case reimbursement.

Under current policies, fee screens directly affect Medicare outlays. The policy reflects Medicare’s willingness to pay only at rates prevailing in the locality. (The Medicare Economic Index departs from this philosophy by making a judgment on the appropriateness of increases in prevailing rates since 1972.)

Under per-case reimbursement, fee screens would not directly affect Medicare outlays. Medicare reimbursements would be set on the basis of historical reasonable charges, with an annual update. Screens for reasonableness of fees would not affect aggregate reimbursement but
would be an issue of distribution of payments among physicians. If the anesthesiologist had a very high fee, and no screens were used, lower payments would be made to the other physicians involved in the case.

Such tensions could probably be handled relatively efficiently without the intervention of the carrier, however. If the anesthesiologist’s fees were too high, surgeons would tend to look for one with lower fees. Supply and demand would determine which physicians could set high fees and continue to be employed and which ones could not. If a surgeon had high fees, other physicians might decline to work on a case with him or her out of concern that the pro rata payment from Medicare would be too low.

The pro rata option has some resemblance to operating policies pursued by independent practice associations (IPAs). In such organizations, physicians are paid on an FFS base, but also share in the profits or losses of the IPA. But IPAs do not depend entirely on such diluted incentives, and tend to use vigorous utilization review procedures.

PAYMENT TO A HOSPITAL’S MEDICAL STAFF

Instead of paying individual physicians, Medicare could reimburse a hospital’s medical staff as a group. In one sense, paying the medical staff is a device to reduce the risk to individual physicians, which could be a significant advantage. In another sense, however, the approach is one of decentralizing the development of methods to pay individual physicians, as medical staffs might go beyond peer pressure and develop various bonuses and penalties for individual physicians.

While payment could go to an entity corresponding roughly to the medical staff, a default position would be payments to individual physicians based on the services each delivers and the aggregate performance of the medical staff. The carrier could pay individual physicians on a reasonable charge basis as under current law, but at the hospital level, compare the total amount reimbursed with what per-case reimbursement would have been. From this comparison, an adjustment factor would be developed. An interim payment could be made, based on historical experience, with a subsequent reconciliation. This approach is similar to the pro rata payments to individual physicians discussed above, but the unit here is the sum of all of the hospital’s cases rather than an individual case.

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8 Alternatively, the factor could be applied in the next period. The previous period’s adjustment factor could be used to set an interim payment, with the final payment based on contemporaneous experience.
The challenge of this option is the motivation of individual physicians to contain costs. Given the large number of physicians that make up the medical staffs of most hospitals, the individual physician might have little incentive to alter behavior. Thus, cost containment would depend upon how effectively medical staffs were able to speak as one voice and instill the group's incentives in each of its members.

The challenge resembles that of an IPA model of a Health Maintenance Organization (HMO). The differences are that IPA revenues tend to be based on capitation rather than DRGs, and that many IPAs are more exclusive in their membership than a hospital medical staff. While the early research literature on IPAs indicated less success in cost reduction than group practice or staff models of HMOs (Luft, 1981), anecdotal information suggests that IPAs have functioned more effectively in recent years.

Recently, medical staffs have gained some experience in influencing the behavior of their members. The task of responding to per-case reimbursement somewhat resembles what they are confronted with now under PPS, and early indications are that physicians have changed their practice patterns in response to the incentives of PPS. Hospitals are developing data systems to identify which physicians are practicing in a relatively costly manner, and there have been reports of peer pressure or even threats of dismissal from the medical staff to change behavior.

Despite such a "running start," the problems of organizing a medical staff to respond to these incentives could be formidable. For one thing, the problem with incentives to individual physicians would be more severe than under PPS, since judicious practice would more often result in a sacrifice of income by the individual (a type of Prisoners' Dilemma). In addition, current medical staffs are very loose groupings of physicians with little structure. Whether they could apply economic sanctions or grant rewards to individual physicians without running afoul of legal constraints is not clear. They might have to organize themselves into a corporation to take strong actions. This might take a great deal of time and effort, and might not occur under a demonstration.

To the extent that medical staffs form corporations and use incentives to influence the behavior of their members, payment by carriers to the medical staff would resemble payment to individual physicians. Then, considerations in deciding whom to pay would revolve around the virtues of decentralization—the merits and the costs of having each staff develop its own method. Presumably, medical staffs could hire a carrier to do the clerical work for it if the carrier were more efficient.
It is difficult to predict in advance how medical staffs would organize themselves to respond to per-case reimbursement. They could find it quite difficult to develop a consensus on bonuses and penalties and find themselves restricted to the use of peer pressure. The fact that medical staffs are not organized to administer payments for care, and come with existing political relationships, increases the uncertainty over how such a model would operate.

In addition to the problems of dilution of incentives to individual physicians, payments to the medical staff have other disadvantages relative to paying individual physicians. First, the prospect of competition among physicians on the staff of a hospital would be sacrificed. The process of attending physicians contracting with others on the basis of price and quality would not occur. Second, unless mandatory assignment were chosen, the assignment decisions of all of the physicians on the staff would have to be coordinated.

COMBINED PHYSICIAN/HOSPITAL PAYMENT

If inpatient physician services were paid on a per-case basis, the payment could be combined with that for hospital services and go to either an individual physician, the medical staff, or a joint venture between the hospital and the medical staff.

Combined Payment to the Individual Physician

Instead of paying the individual physician a per-case amount for all physician services associated with an inpatient stay, Medicare could reimburse the physician for hospital services as well. The physician would then pay the hospital bill out of this amount. Since mandatory assignment applies to hospital care, which is the largest part of the bill, combined payment would probably be feasible only if mandatory assignment applied throughout (see below).

The two advantages of combining hospital and physician reimbursement are a potential increase in competition among hospitals and a resolution of the problem of movement of costs between hospital and physician services. Nevertheless, upon deeper analysis, these advantages are shown to be minor, and more severe disadvantages would have to be faced.

Under current law, Medicare offers patients no financial incentive to use lower-cost hospitals. From a narrow point of view this is less of a problem than before PPS since, with the exception of additional payments for medical education, all hospitals in an area receive the same
payment from Medicare for a given patient. Thus a patient’s choice of hospital has little direct impact on Medicare outlays for hospital care.

From a broader point of view, however, having physicians shop among hospitals for price may offset some of the potential problems with the current system of administered prices under PPS. While PPS does provide incentives for hospitals to contain costs, there is a risk of serious distortions in resource allocation from hospitals not being able to use the price mechanism to compete.

This is analogous to the regulation of airline fares by the Civil Aeronautics Board prior to deregulation in that industry. Under CAB regulation, airlines could not compete through price cuts, but were limited to increasing the frequency of flights (and suffering lower load factors as a result) and increasing amenity levels. With errors in the fixed fares between city pairs, some markets were overserved and others underserved.

With hospitals having strong incentives to compete, but administered prices, competition among hospitals is likely to focus on amenities for patients and nonmonetary inducements to physicians to bring patients to the hospital. Indeed, hospitals are unlikely to cut costs below the DRG rates, since competition will drive them to devote the resources afforded by PPS to attracting additional Medicare patients. With inevitable distortions in setting the Medicare payment rates for different types of patients, dumping of patients likely to result in financial losses is also anticipated.9

By including hospital services in the per-case reimbursements to individual physicians, hospitals would be able to compete on the basis of price. The result could be additional efforts to contain costs, enabling Medicare to reduce its payment rates in the future.

While the problem of distortions in Medicare payment rates for different types of patients would appear to be resolved at the hospital level, in effect the problem would only have been shifted to attending physicians, who now would face an administered price for the entire inpatient episode. To the extent that attending physicians found Medicare inpatient episodes to be profitable, they would want to compete for more patients. But then they would face the problem that hospitals do under PPS today: not being able to use the price mechanism to compete. Except for varying the additional charges to patients in unassigned cases (in the unlikely event that assignment were voluntary), attending physicians would not be able to vary their prices. Indeed, a more direct way of getting around the problem of

9The fact that hospitals cannot move their physical plant from one market to another is likely to exacerbate the effects of an administered price system.
administered prices for hospital services under PPS would be to allow hospitals to pay rebates to (or require fees from) physicians for admitting patients, and in turn allow physicians to give rebates to patients—perhaps limited in size so that patients would not benefit financially from a hospitalization.

Increased competition among hospitals could be impeded somewhat by the actions of medical staffs. Staffs at low-cost hospitals might be reluctant, once the hospital's excess capacity was absorbed, to grant privileges to other physicians to practice at the hospital. This would erode an important competitive advantage of having a low-cost supplier of a very important input.

The second advantage of including hospital reimbursement in the payment to individual physicians is avoidance of the problem of drawing a sharp distinction between hospital and physician services. Under separate per-case reimbursement systems, physicians would have incentives to substitute hospital services for their own. While this might have significance in teaching hospitals, where physicians might attempt to substitute the services of salaried physicians such as residents, in general, the scope for substitution is unlikely to be wide. Under current law, physicians already have incentives to substitute the services of hospital nurses and technicians.

Combined hospital-physician payment has significant disadvantages. One is the amount of risk that the individual physician would face. The average hospital charge for a Medicare admission in New Jersey in 1982 was 3.45 times that for the physician charges associated with the stay. Furthermore, the Mitchell analysis indicated that within DRGs there was more variation in hospital charges than in physician charges.

A second disadvantage is administrative. The distinction between Part A and Part B involves not only different administrative organizations but also thorny issues concerning how much each trust fund must pay. The use of either an intermediary or a carrier to pay both Part A and Part B expenses would be complicated and possibly require changes in law, though probably not for a demonstration. The issue of which trust fund pays is highly sensitive politically. While many analysts have called for combining Parts A and B of Medicare into a single program, Congress has not given the proposal serious consideration (U.S. House of Representatives, 1984).

A third problem would be strenuous opposition from hospitals, who would not be pleased to become suppliers to physicians. This would leave them facing a market much more competitive than the one they face now.
Combined Payment to Medical Staff

Under this option, a lump sum payment would be made to the medical staff for both hospital and physician services provided to a Medicare inpatient. The medical staff would then have to pay both the individual physicians involved and the hospital for its services. This option assumes that the medical staff sets up a corporation to receive payment from Medicare and in turn disburse funds to individual physicians and the hospital.

The only advantage of such an option would be a resolution of boundary problems between hospital and physician services. Payments to individual physicians and the hospital by the medical staff presumably would reflect which party is providing which services.

The benefits of increased competition among hospitals that would be achieved by a combined payment going to individual physicians would be lost because of the medical staff organizations being limited to one hospital in obtaining services. Indeed, the negotiation between the medical staff and the hospital over the price of hospital services would be difficult and unpredictable, because it would entail a bilateral monopoly: one buyer and one seller.

Only two indirect channels for competition would be available. In one, physicians would seek to move from one medical staff to another. Physicians associated with high-cost hospitals would have an incentive to seek to join the medical staff of low-cost hospitals. But physicians on the staffs of low-cost hospitals would not be eager to welcome new members, since they would lose their competitive advantage of access to lower-cost hospital care. Questions of antitrust might well arise in the bargain.

The other channel would be through patients. Physicians associated with low-cost hospitals would be able to offer patients inducements to use them instead of their competitors on the staffs of higher-cost hospitals. The potential of this competitive route would depend on assignment policy and rules regarding physicians' abilities to offer inducements to patients. Neither of these channels for competition is likely to be as effective as individual physicians having incentives to shop among hospitals in deciding where to admit a Medicare patient.

Another disadvantage of this option would be the financial risk to the medical staffs. Assuming that medical staffs allocated gains and losses to their members in proportion to their volume of Medicare billings, risks to individual physicians would be substantial. The Mitchell study calculated per-physician gains and losses from hypothetical joint ventures between medical staffs and hospitals. On the basis of separate urban and rural rates, the bottom 25th percentile of hospitals
had a per-physician loss of $6167 in New Jersey and $2443 in North Carolina. The range is not reported, but to get an indication of the losses at the tails of the distribution, note that at the 25th percentile of teaching hospitals, the per-physician loss was $15,411 in New Jersey and $20,838 in North Carolina. The risks here are lower than with combined payments to individual physicians, but still very substantial. Political opposition from hospitals might be even more extreme than under the combined payment to individual physicians.

Combined Payment to the Hospital

Medicare could pay the hospital a per-case amount that would cover both hospital and physician services associated with a stay. The hospital would then negotiate a contract with each physician, paying out on either a per-case, FFS, or other basis. As in the case of combined payment to individual physicians, this option would reduce problems concerning the boundary between hospital and physician services, and would foster a more competitive market.

Competition in such a market would not be the mere opposite of a combined payment to individual physicians, however. Hospitals could not simply purchase services from physicians because the physicians are the hospitals' source of patients. Rather than probing to find out how little they could pay physicians, hospitals, which now have extensive excess capacity, might find themselves competing to get physicians to admit patients by offering high payments. Unlike an ordinary subcontractor, the attending physician would be bringing with him the entire combined Medicare payment. If this assessment of relative market power were correct, then the competitive outcome could be very similar to the case of a combined payment to the individual physician. Hospitals would have substantial incentives to reduce their costs so that they could offer physicians a more attractive payment to induce them to admit patients there.

Combined payment to the hospital has some important advantages over combined payment to the individual physician. One is that it would avoid the problem of an extensive degree of risk to the individual physician. Combined payment would probably not increase the risk to hospitals a great deal over what it is today under PPS, since DRGs for physician services tend to be more homogeneous than those for hospital services, and the magnitudes are much smaller. The hospital would be in a good position to reduce the risk to individual physicians through a judicious choice of payment method. If per-case reimbursement to physicians involved too much risk, the hospital could blend in elements of FFS payment, in much the same way as Medicare could
under lump sum payment to the individual physician. However, the hospital could not insulate the physician entirely from financial risks without giving up an important tool to induce efficient practice.

Combined payment to the hospital would seemingly require mandatory assignment. The hospital component has had mandatory assignment since the beginning of Medicare, and abandoning such a policy is not politically feasible. Medicare payments to hospitals are roughly 25 percent lower than charges, so any retreat on mandatory assignment for hospital care would risk a major transfer from beneficiaries to hospitals. While competition among hospitals for Medicare patients may produce a significant degree of voluntary assignment, few public officials would be willing to test that market mechanism.

Combined payment to the hospital would probably encounter political problems. While we have argued that physicians might gain financially at the expense of the hospital, physicians might still object on other grounds to becoming subcontractors to the hospital.10 Perhaps most important would be fear of hospital control over the practice of medicine. With organized medicine strongly opposing DRG reimbursement for inpatient services with the payments going to physicians, vigorous opposition to combined payment to the hospital by organized medicine would be likely.

Combined Payment to Hospital-Physician Joint Ventures

Given the likely political opposition to combined hospital-physician payment by the party not receiving it, consideration should be given to combined payment to physician-hospital joint ventures. Such an option would have the virtue of avoiding excessive financial risks to individual physicians. On the other hand, competition among physicians or among hospitals would be sacrificed. It might be offered as an alternative to another system. For example, if medical staffs are paid for physician services only, medical staffs wishing to undertake a joint venture with their hospital could request combined payment. A joint venture, however, is not a good candidate for a demonstration; there is no assurance a joint venture would come forward; even if it did, there is no reason to think it would be representative of experience if this method were used more broadly.

10Indeed, those physicians who are not attendings might not be among the gainers.
CONCLUSIONS

While the choice of who should receive a per-case payment must await discussion of other issues—particularly assignment—some conclusions appear already. Combined hospital-physician payment is not advisable for a demonstration. Only a combined payment to the hospital has clear advantages, but it is not a politically feasible option.

Lump sum payment to the individual physician has attractive incentives, and if blended with FFS payment could keep windfall gains and losses to physicians within bounds. Pro rata payments by carriers to individual physicians is a candidate, but, as is discussed below, is attractive only if mandatory assignment is acceptable. Payment to a medical staff is also a candidate. Table 1 lays out the major options discussed in this section.

Table 1

<table>
<thead>
<tr>
<th>MAJOR WHOM-TO-PAY OPTIONS</th>
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<tr>
<td><strong>Payment to individual physicians</strong></td>
</tr>
<tr>
<td>Lump sum to attending physician; blended rate</td>
</tr>
<tr>
<td>Carrier payment with residual to attending physician</td>
</tr>
<tr>
<td>Carrier payment with pro rata adjustment for all involved in case</td>
</tr>
<tr>
<td><strong>Payment to medical staff</strong></td>
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<tr>
<td><strong>Combined physician-hospital payment</strong></td>
</tr>
<tr>
<td>To individual physician</td>
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<tr>
<td>To medical staff</td>
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<tr>
<td>To hospital</td>
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<tr>
<td>To joint venture</td>
</tr>
</tbody>
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III. BENEFICIARY COST-SHARING

Under current policies, beneficiaries pay a deductible of $75 per year and coinsurance of 20 percent of reasonable charges. Medicare pays the physician (or the patient if assignment is not accepted) 80 percent of reasonable charges once the deductible has been met, so in effect, the physician is responsible for collecting this cost-sharing. The physician has the option of billing the patient for the difference between the actual charge and the Medicare reasonable charge, but must then collect the entire amount from the patient, who then submits a claim to Medicare.

In specifying a schedule of beneficiary cost-sharing for a demonstration of per-case reimbursement, two basic options are available. First, the coinsurance could be applied to the per-case amount that is determined by Medicare. Alternatively, the current system of applying coinsurance on a FFS basis could be continued. In either case, the $75 annual deductible would continue.

This section assesses the two cost-sharing options from several perspectives, including administrative feasibility, incentives affecting resource use, Medicare outlays, and fairness to beneficiaries.

ADMINISTRATIVE FEASIBILITY

The preferred option on the basis of administrative considerations depends upon who receives the per-case payment (Sec. II). If physicians are reimbursed on an FFS basis with periodic pro rata adjustments, then calculating coinsurance on the basis of a per-case payment would have serious problems. Since the pro rata adjustment would not be known until some time after discharge, physicians would not be able to bill the patient for the coinsurance amount at the time of service. They would either have to extend credit to the patient until the adjustment was known, or else bill for coinsurance on a FFS basis and revise the charge at a later date. Either would be cumbersome, and likely to discourage physicians from accepting assignment (see Sec. IV). On the other hand, if the pro rata adjustment were known in advance, such as in the medical staff adjustment option, the problem of retroactivity or revision would not come up.

If Medicare paid physicians on a per-case basis—for example, paying the attending physician, who in turn would be responsible for paying other physicians involved in the case—then calculating the coinsurance
amount on a per-case basis would be simpler. Under this arrangement, per-case coinsurance would eliminate the need to process FFS claims. The carrier would have to know only which DRG the patient had been assigned to. In an assigned claim, 80 percent of the per-case amount would be paid to the attending physician (or hospital or medical staff entity), who would know right away what the patient’s coinsurance liability was. If the claim were not assigned, the carrier would pay 80 percent of the per-case amount to the beneficiary.

While calculating coinsurance on the basis of a per-case reimbursement may make sense under a nationally implemented policy, a demonstration would encounter administrative difficulties with it. Per-case coinsurance could interfere with the provisions of many private supplemental insurance policies held by Medicare beneficiaries. Such policies are written to pay the deductible and 20 percent of reasonable charges but require itemized bills from physicians. While such provisions could easily be modified under a widely implemented policy, a demonstration would have to have the policies assigned to it and in turn pay equivalent benefits. This would add to the expense of a demonstration, and detract from its acceptability. In addition, one of the advantages of per-case cost-sharing—eliminating the need to process FFS bills—would not apply to a demonstration, where monitoring what specific services were delivered would be an important part of the evaluation.

INCENTIVES

While the design of cost-sharing provisions would affect incentives on the part of beneficiaries, the differences would be small. Clearly, FFS cost-sharing places incentives on the beneficiary to use fewer physician services during a hospital stay because each marginal service has a positive cost; per-case cost-sharing, in contrast, does not. The presence of extensive private supplemental coverage and Medicaid coverage, however, diminishes the effects of consumer incentives. Roughly 70 percent of Medicare beneficiaries have additional coverage; for them, the configuration of Medicare cost-sharing is not relevant—only the aggregate amount, which affects the premiums for supplemental coverage.
MEDICARE OUTLAYS

A likely parameter of a demonstration of per-case reimbursement is a restriction of Medicare outlays for benefits to the same amount that would have occurred in the absence of a demonstration ("budget neutrality"), assuming no behavioral change. This is important from the perspective of the validity of the demonstration. If outlays are significantly higher or lower than under current policies, then the demonstration becomes a package of a change in the unit of reimbursement and a change in the level of reimbursement. Of course, behavioral change might lead to a reduction in outlays—for example, through reduced use of assistant surgeons—and this would not pose a problem.

Whether coinsurance was assessed on a per-case or FFS basis would have no effect on Medicare outlays except insofar as the method of payment affected admission decisions. Medicare would be paying physicians (or beneficiaries in cases where assignment was not accepted) 80 percent of the per-case reimbursement rate in either case.

FAIRNESS TO BENEFICIARIES

Whether FFS or per-case coinsurance is used would affect the cost-sharing that is required of these individual beneficiaries without supplemental coverage. Those that use few services relative to others whose cases fall into the same DRG—whether because they are less severely ill than others in the DRG or because their physicians are relatively low-cost practitioners—would pay more under per-case coinsurance than under FFS coinsurance, while others would pay less.

As part of this project, Mitchell simulated the differences in beneficiary liability from calculating coinsurance on a per-case basis instead of an FFS basis, using 1982 claims data from North Carolina and assuming no supplemental coverage (see Table 2). For those beneficiaries with multiple admissions during 1982, the net change in coinsurance for the year was calculated. Fully 82 percent of all beneficiaries would have experienced a change in their total cost sharing of $75 or less. Another 10 percent would have experienced a decline in cost-sharing of over $75. However, cost-sharing would have increased between $75 and $150 for almost 7 percent of beneficiaries, and the
Table 2
CHANGE IN BENEFICIARY COST-SHARING
IN NORTH CAROLINA, 1982

<table>
<thead>
<tr>
<th>Change</th>
<th>Percent of Hospitalized Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease of $150 or more</td>
<td>4.3%</td>
</tr>
<tr>
<td>Decrease of $75 to $150</td>
<td>5.4</td>
</tr>
<tr>
<td>Change of less than plus or minus $75</td>
<td>81.8</td>
</tr>
<tr>
<td>Increase of $75 to $150</td>
<td>6.9</td>
</tr>
<tr>
<td>Increase of $150 or more</td>
<td>1.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

SOURCE: Simulation using 1982 Part B Claims Data from North Carolina.

increase would have been greater than $150 for 1.6 percent of beneficiaries (with an average increase for this last group of $205).

The distribution of changes in cost-sharing is skewed: There are more beneficiaries with substantial decreases in cost-sharing than with substantial increases. At the same time, for the great majority whose cost-sharing changes by less than $75 in either direction, the average change is a small increase ($10). A large number of beneficiaries would pay slightly more to balance out the small number who would pay substantially less. When the fact that 70 percent of the beneficiaries have supplemental coverage to cover some of these changes is taken into account, the proportion of beneficiaries that would have significantly different cost-sharing liabilities is indeed quite small.

It is difficult to say, whether FFS or per-case coinsurance is “fairer,” but FFS might be more acceptable to beneficiaries. FFS cost-sharing would permit those beneficiaries choosing lower-cost physicians to continue to be rewarded for that choice. Their liability would follow more closely the resource requirements for their condition, and would not be subject to the vagaries of classification into DRGs. Indeed, New Jersey’s all-payer hospital prospective payment system has experienced chronic political problems because some self-pay patients receive DRG-based bills that exceed charges by a substantial amount.
CONCLUSION

For a demonstration, continuing to calculate coinsurance on an FFS basis is preferred. Administrative advantages and acceptability to beneficiaries appear to be the major considerations. While lower claims-processing costs (under some variations) might lead a per-case basis to be preferred ultimately if the policy were implemented nationally, these advantages would not hold under a demonstration. Conflict with provisions of existing Medi-gap policies and the need to process FFS claims data to conduct the evaluation of the demonstration argue for FFS cost-sharing in a demonstration. In addition, FFS cost-sharing eliminates the risk of visible situations where beneficiaries choose low-cost providers and have a condition with resource needs much below others in the DRG but have a much higher liability than under current policies. Finally, FFS cost-sharing preserves some incentive to economize for patients once admitted, though extensive use of supplemental coverage makes the effects of such incentives slight.
IV. ASSIGNMENT POLICY OPTIONS

This section describes assignment policy options for a demonstration of per-case payment for physician inpatient services. The traditional method of assignment policy has been case by case; that is, the physician could choose to elect assignment on some cases and not on others. If she or he elected assignment, Medicare reimbursed the physician 80 percent of the customary, prevailing, and reasonable (CPR) fee (after the deductible was satisfied), and the physician collected the other 20 percent from the patient. The patient was not liable for additional payments. If the physician did not elect assignment, the physician collected his fee from the patient and the patient was reimbursed 80 percent of the CPR fee by Medicare.

As part of DEFRA, Congress created another option. If the physician agreed to accept assignment on all bills during a year, he or she could be listed in a directory as a participating physician and his or her name would be available through a toll-free number.

Case-based reimbursement creates three issues for assignment policy. First, unassigned cases would be a greater problem for beneficiaries than under current laws. At present, the beneficiary is at risk for charges exceeding screens. Under per-case reimbursement, the beneficiary would be at risk also for the volume of services delivered. Once the per-case amount was exceeded, the patient would in effect face 100 percent coinsurance for additional services. Such a substantial increase in risk on the part of beneficiaries may be unacceptable.

Second, per-case payment makes case-by-case determination a less attractive policy option. The physician’s incentive would be to accept assignment on all cases where billed fees would have been below the case-based amount and decline assignment on all other cases (unless there were a substantial likelihood of not collecting the CPR amount).\footnote{This statement assumes that physicians who do not accept assignment bill above CPR. One might ask: What prevents physicians from not accepting assignment but charging less than the case-based amount, thereby attracting patients through a lower price? In a theoretical perfectly competitive market, this might in fact be observed. Several defenses of the statement in the text can be made. First, the theoretical argument depends on the elasticity of demand through cost-sharing. If physicians waive cost-sharing, as some now do, the theoretical argument collapses. (Although waiving the cost-sharing is technically illegal, the Justice Department is currently not prosecuting such instances.) That is, if the physician agrees not to bill the patient, the physician has no reason not to bill Medicare for the full case amount. Second, even if physicians do not waive cost-sharing, the elasticity of demand facing the physician is the gross price elasticity multiplied by 0.2, the coinsurance rate. The original elasticity may not be that}
In those cases where the physician accepted assignment, society would be paying more for physician services than under the fee-for-service (FFS) system; in effect, Medicare would not be a prudent buyer for those cases. In the cases where the physician did not accept assignment, physicians would be collecting (to a first approximation) what they might have collected anyway in an FFS world. On balance, society would be paying more for physician services than it would need to (and more than it would under current policies). This selectivity can be prevented by requiring physicians to accept assignment for all cases or decline it for all cases.\(^2\)

Third, case-based payment makes it desirable to treat all physicians on a case similarly with respect to assignment policy. When some physicians accept assignment for the case-based payment and others do not, and the physicians are able to effect transfers of resources among them, it is again possible that more would be paid for physician services than would be paid under the FFS system and more than would be necessary to elicit the services.

The rest of this section focuses on options for assignment policy under per-case payment. It begins with the premise that the combination of per-case payment and current policies with respect to assignment is not acceptable, and examines alternative assignment policies. Particular attention is paid to implications of having a mixture of assigned and unassigned physicians on a case.

**MANDATORY ASSIGNMENT**

Conceptually simplest of the assignment options discussed is mandatory assignment. Physicians must either accept the Medicare reimbursement as payment in full, or Medicare will not pay benefits for that service to the patient.

Mandatory assignment would appear to focus the economic incentives of per-case payment entirely onto the physician and not the beneficiary. It would avoid the problems of mixed (assigned and unassigned) payment.

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\(^2\)Selectivity could still potentially arise if some physicians decline to accept assignment on all cases and they receive disproportionately the more difficult cases. This seems unlikely.
The general problems with mandatory assignment are well known. Not all physicians would provide services for the Medicare fee, and a reduction in choice of provider would result. For some, this will mean paying for services entirely out of pocket. We know from the experience of the Medicaid program that when reimbursement rates are set very low, participation rates will be low (Hadley, 1978). Medicare beneficiaries could fare much better than Medicaid recipients have, however, since reimbursement rates are higher, and Medicare makes up a larger share of the physician services market.

Some additional problems could arise under per-case payment. The additional risks to physicians of per-case payment could make participation under mandatory assignment less appealing than under FFS payment, so that reduction in access is likely to be more severe. Persons with difficult cases might have the most severe access problems.

Mandatory assignment would also generate fierce political opposition from organized medicine.

ALL-OR-NOTHING ASSIGNMENT

As an alternative to mandatory assignment, each physician could be required to accept assignment on either all Medicare claims for a period of time, such as a year, or on none. An all-or-nothing choice could be used in conjunction with a higher rate of payment for physicians who accept assignment on all claims. Such a payment differential would increase the proportion of physicians agreeing to accept assignment.

For cases in which physicians do not accept assignment, the problem of per-case payment incentives being placed on the beneficiary rather than the physician, which was discussed in conjunction with voluntary assignment, would be present, but its magnitude would depend on the economic pressures for physicians to accept assignment. Risk-aversion on the part of patients might increase patients' willingness to search for a participating physician.

Requiring an "all-or-nothing" assignment decision would resolve at least a portion of the problem of physicians' deciding whether to accept assignment according to whether the per-case reimbursement or the FFS reimbursement were higher. If physicians made such calculations, they would have to do so for an entire year's practice. Basing the assignment decision on expected case mix would be feasible for some physicians who specialize in complex, costly cases, but other considerations could dominate their annual decisions.
By allowing each physician to make an assignment decision, however, the issue of mixed cases must be addressed. In the next paragraphs, we consider what to do with mixed cases for each of the "whom to pay" options discussed in Sec. II.

Under a lump sum payment to the attending physician, mixed payment would require a prohibition of balance billing to patients on the part of complementary physicians when the attending physician accepts assignment (technically, the attending would accept financial responsibility for all complementary physicians as a condition of receiving assignment). Otherwise, the incentives of per-case payment would be diluted, since only a subset of physicians on a case would be at risk. Of course, beneficiaries could demand that the attending physician recruit only others that accept assignment to work on the case, but they tend not to make such demands today despite a comparable incentive to do so. If legal, it would be better if complementary physicians only have recourse to the attending physician, whether the latter accepts assignment or not. Having a blended rate does not appear to change the above discussion.

Mixed cases would be easier to handle under the pro-rata method of paying the individual physician. Both assigned and unassigned physicians could have their FFS payment adjusted for the differences between allowable FFS charges and the per-case amount. Physicians not accepting assignment could then proceed to bill the patient for the difference between the Medicare amount and their regular FFS charges. There is a theoretical opportunity for physicians to collude in the following manner. A surgeon and an anesthesiologist, for example, agree to work together. They further agree that the anesthesiologist will not accept assignment. For inexpensive simple cases, the anesthesiologist will not bill, but will receive a kickback from the surgeon. Such "gaming" behavior, however, appears unlikely, because profitable opportunities for kickbacks exist under the present system but do not appear to be extensively exploited.

Under payment to the medical staff, Medicare could require the staff as a whole to make an all-or-nothing assignment decision. While mixed cases could be handled under this option in much the same manner as pro-rata payment to individual physicians, beneficiaries would have a difficult time exercising their preferences for a fully assigned case. Requiring a staff-wide decision could result in a large proportion of staffs deciding not to take assignment, however, leaving beneficiaries in a difficult situation. In rural areas, the staff of the sole hospital would have no competitive incentives to accept assignment. In urban areas, competition could result in most staffs accepting assignment, however, since the assignment status of the hospital would
be easy for beneficiaries to learn and a very important aspect of competition among hospitals and their staffs. In a demonstration, we would suggest that a uniform decision be required in urban areas only.
V. COVERAGE OF THE DEMONSTRATION

This section addresses three issues in defining the scope of a demonstration:

- What types of admissions to include,
- What types of services to cover, and
- What types of hospitals to include.

TYPES OF ADMISSIONS

The Medicare Prospective Payment System (PPS) covers most admissions to community hospitals. In a demonstration of per-case payment for inpatient physician services, one needs to consider whether to limit application to a subset of these admissions. One could limit application on the basis of this type of payment appearing to be inappropriate for certain readily identifiable case types. This course was followed in PPS, where rehabilitation, chronic care, children’s hospitals, and psychiatric hospitals were excluded because of the absence of appropriate classification systems. Another basis for limiting application would be considerations of reducing the complexity of the demonstration, its costs, and the burdens that it might place on the Medicare administrative apparatus and participating providers.

Policy Considerations

A major policy consideration in limiting the application of the demonstration is that Diagnostic Related Groups (DRGs) or alternative classification mechanisms do not do a uniformly good job of grouping cases into categories in which resource use is reasonably homogeneous. The Mitchell report (1984) shows wide variation in the degree of homogeneity within DRGs. For example, DRG 39 (lens procedures) had a coefficient of variation (COV—the ratio of the standard deviation to the mean) of 0.26 in New Jersey and 0.21 in North Carolina, while DRG 133 (atherosclerosis, age < 70 without complications) had COVs of 1.38 and 1.44 in the respective states.

Such a large COV for the latter DRG implies that a uniform per-case payment would lead to physician reimbursements dramatically different from those under the fee-for-service (FFS) system. In this case, FFS reimbursements in New Jersey ranged from $209 at the 10th
percentile of the distribution to $1028 at the 90th percentile, while a
"budget neutral" per-case payment (the mean) would be $587.

This range of FFS reimbursement seems too wide to reflect only
differences in practice patterns among physicians within a state. More
likely, an important part of the variation reflects differences in the
treatment requirements of patients aggregated into DRG 133, some of
which is due to variation in coding procedures.

Using per-case reimbursement for this and other DRGs with high
COVs would risk serious inequities in physician reimbursement. Spec-
ialization by a physician in different types of patients within a DRG
and/or random variation in patients could lead to substantial under-
payment of efficient physicians and overpayment of inefficient ones.
The magnitude of the inequities from random factors would be much
larger if payments were made to a single physician than if they were
made to the medical staff or to the hospital. If assignment were vol-
tary, such heterogeneity would affect beneficiaries’ out-of-pocket pay-
ments, as those with relatively high resource needs would face large
additional liabilities. Under mandatory assignment, access to care for
those with easily identifiable high resources would be threatened.

Such heterogeneity within a category also provides a large incentive
to physicians to select those patients with low treatment needs relative
to others in a category. This would put at a disadvantage those physi-
cians not engaging in such activities, and risk problems of access for
those patients deemed unprofitable.

Several options are available to reduce the problem of inequities
from heterogeneous case groupings. First, the blending of per-case and
FFS reimbursements discussed in Sec. II could be employed. This
would affect the medical DRGs the most, and could sharply reduce
windfall gains and losses from variation in patient needs. Second,
HCFA could not decide not to use per-case reimbursement for those
groupings whose COV exceeded a certain threshold. Groupings with
bimodal distributions of charges would be particularly good candidates
for omission from the demonstration. The choice of a threshold would
of necessity be arbitrary, but the rationale would be easy to under-
stand. Some confusion would result from uncertainty over which cases
would fall under per-case reimbursement. Perhaps more serious would
be cases where the diagnosis was not known at admission. Here, the
payment system would not be known until after discharge, when the
principal diagnosis was established.

A third alternative would involve using per-case reimbursement only
for surgical cases. The Mitchell analysis of New Jersey and North
Carolina showed that surgical DRGs tend to have much more homoge-
eous resource use than medical DRGs. COVs for surgical DRGs
tended to be lower than 0.40, while those for medical DRGs ranged from 0.70 to 1.50. Looked at in another way, surgical DRGs are much more effective in explaining variation in resource costs across patients than are medical DRGs. In New Jersey, surgical DRGs explain 53 percent of variation in costs, while medical DRGs explain only 5 percent. In North Carolina, the respective figures are 64 percent and 3 percent.

Making the distinction on the basis of surgical versus medical cases is easier to understand and implement, and avoids the problem of an arbitrary boundary between two payment systems. On the other hand, it would exclude some medical DRGs that would otherwise be good candidates for per-case reimbursement, and seems a crude attempt at what could be better accomplished by a blend.

While either of these options would reduce significantly the inequities described above, they also would limit any gains from per-case reimbursement—reduced use of physician services through economic incentives. For example, if per-case payment were limited to surgery in New Jersey, 76 percent of the cases and 51 percent of the resources would be excluded from the system.

Indeed, it is conceivable that the medical cases have greater than average potential for resource savings. In surgical cases, roughly two thirds of reasonable charges reflect the fees of the surgeon and the anesthesiologist. Since the services of surgeons and anesthesiologists (or nurse anesthetists) are always required in inpatient surgical cases, and these services are already billed on an inclusive basis, per-case reimbursement offers few advantages in incentives for efficiency over current policies. The only savings for surgical and anesthesiology services would come from decisions to forgo use of assistant surgeons and from price competition among anesthesiologists to work for surgeons.

In medical cases, one does not encounter the phenomenon of a large block of resources with little potential for economizing. In addition, some of the greater heterogeneity of resource-use may reflect a higher degree of practice pattern variation, though we do not know what proportion of this heterogeneity reflects only variations in coding practice. Narrowing the coverage of per-case reimbursement could forgo potential savings in areas where greater attention to the costs of procedures could have the greatest impact.

An interesting perspective on this question comes from data on resource variation for the hospital component of costs per case. A surprising result from the Mitchell study was that DRGs explained more of the variation in physician costs than in hospital costs. In New Jersey, for example, 18 percent of hospital costs are explained by DRGs, compared with 57 percent of physician costs. The difference is due entirely to surgical DRGs, however. For medical DRGs, roughly the same (low) percentage of hospital and physician costs is explained.
Thus, one could argue that if medical DRGs are good enough for per-case payment of hospital costs, they are good enough for inpatient physician fees as well (at least if payments are made to the medical staff or to the hospital).

A problem with limiting a demonstration (or national policy for that matter) to a subset of DRGs is that all potential boundaries are permeable to some degree. Through coding of diagnostic information, physicians would be able to move some cases into or out of the subset reimbursed on a per-case basis. Even using the medical versus surgical criterion would not eliminate this, as the Rand study of the increase in the Case Mix Index (CMI) under PPS showed movement between medical and surgical DRGs (Carter and Ginsburg, 1985).\(^1\)

One final consideration concerns the difference between a demonstration and a national policy. Under a demonstration, we might be more inclined to include a broad range of cases since undesirable impacts of including case types that prove to be too heterogeneous would be limited, and the information gained from a careful evaluation could inform the ultimate decision as to whether to include such case types. On the other hand, too ambitious a demonstration might prove to be infeasible politically. In addition, from an evaluation perspective, an overambitious demonstration risks yielding less reliable information about the likely effects of per-case reimbursement.

Given all of the problems in using only a subset of DRGs in a demonstration, and the attractiveness of using a blend of per-case and FFS payment, we recommend that all DRGs be included. In treatments where risk to physicians is a problem—such as lump sum payments—we recommend that a blend be used.

**Research Considerations**

An entirely distinct aspect of "what to cover" would be a decision on whether to restrict coverage to a limited number of case types so as to increase the likelihood of a successful demonstration. Such a limitation could be justified on several grounds, among them being the cost and difficulty of a demonstration involving many case types. Holding the number of case types down could reduce the number of physicians involved in a demonstration, and perhaps ease the job of hospitals or medical staffs in organizing themselves to respond to the new incentives. Both the demonstration contractor and Medicare's carriers could

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\(^1\) Approximately 12 percent of the additional increase in the CMI attributed to PPS was from departures from trends in the proportion of patients classified into medical versus surgical DRGs. Completeness in coding of minor surgical procedures (e.g., endoscopy) may be an important factor behind the result.
concentrate their resources on dealing effectively with issues stemming from only a few case types. Field staffs would be smaller and easier to manage. A smoothly conducted demonstration is more likely to produce sound and useful research results. Finally, a smaller demonstration might attract less political opposition from groups who might fear a large-scale demonstration as a mere prelude to national implementation.

Limiting the number of case types in a physician DRG demonstration could be less advantageous than in other types of demonstrations, however. Details that require resolution by those conducting the demonstration or the carriers may not be specific to individual case types. Looking back at the national implementation of PPS, for example, one finds that issues specific to individual DRGs are just starting to be addressed.

Limiting a demonstration to a small number of case types might impair the value of the demonstration substantially. Unless the case types were chosen so as to capture a large share of some physicians’ practices, the change in method of reimbursement might not affect physicians enough to get their attention, and the demonstration would underestimate changes in behavior. In addition, pursuing only a limited number of case types would not give policymakers enough information to make a decision on per-case reimbursement. A successful demonstration of a few case types could be the forerunner to a more extensive demonstration, but the long intervening time lapse could severely strain the patience of policymakers.

**Outpatient Surgery**

It may be advisable to include physician reimbursement for outpatient surgery in a demonstration of per-case reimbursement that includes inpatient surgical cases. Technological change, and possibly a desire to avoid the more cost-constrained inpatient environment, have led to a significant shift in the location of surgery to hospital outpatient departments and freestanding surgicenters.

Although outpatient surgery is currently outside the scope of PPS, there are some compelling reasons to consider including it in per-case reimbursement of physician services. A number of surgical procedures can be performed on either an inpatient or outpatient basis. If physicians are paid on a per-case basis for performing the procedure on an inpatient basis, but on a fee-for-service basis for performing it on an outpatient basis, unintended incentives are likely to arise. For example, if the reasonable charge for procedure X is less than the average for surgical procedures in the DRG in which it falls, then the surgeon
would have an incentive to hospitalize the patient. Given HCFA policy
to encourage substitution of outpatient services for inpatient services,
such inadvertent incentives would be a serious problem.

Other factors may further complicate the problem—but with gener-
ally beneficial results. For example, reimbursement of physician ser-
dices for inpatient surgery would be based on what is essentially a fee
schedule, with payment rates possibly evolving toward national uniform-
ity, while fees for outpatient surgery would continue to be based on
reasonable and customary charges, thus varying by individual practi-
tioner to some extent and by area to a greater extent. Over time,
differences in reimbursement could diverge further, because inpatient
reimbursement would tend to be tied to hospital payment rates while
outpatient reimbursement would rise with prevailing fees (constrained
by Medicare Economic Index). Such distortions in relative compensa-
tion are desirable, however. Many consider outpatient procedures to be
underpaid relative to inpatient procedures, a situation discouraging
outpatient care. Allowing such a balance to shift could be desirable.

A disadvantage of including outpatient surgery in a demonstration of
per-case payment is the large amount of development work required.
One cannot use DRGs for outpatient surgery, for example, since the
classification system was developed to reflect a patient’s use of all
inpatient resources, rather than only those directly associated with the
surgical procedure. Presumably, reimbursement could be based on a
procedure classification system—for example CPT-4. But development
of payment rates by procedure on the basis of Part B claims data for
facility charges and surgeons’ fees might lead to serious distortions of
the boundary between inpatient and outpatient surgery. For pro-
cedures that are sometimes performed on an inpatient basis, rates
might be adjusted to ensure that compensation of surgeons was not
higher for inpatient services than for outpatient services.

An alternative way to deal with the inpatient-outpatient boundary
problem would be the use of procedures rather than DRGs to categor-
ize all surgical cases. If this option were of interest, more development
work would be needed. In either case it seems desirable to develop a
flat facility charge for outpatient surgery.

The issue of whether to include outpatient surgery in a demonstra-
tion is part of a larger one of whether to include outpatient services in
general. Outpatient medical care has boundary problems similar to but
perhaps more serious than those described for outpatient surgery. Per-
case reimbursement for inpatient cases but not outpatient ones

2PROs have lists of surgical procedures that must be done on an outpatient basis unless special circumstances apply.
would affect physicians' incentives to hospitalize. This report's discussion is limited to outpatient surgery, however, as much more extensive development work remains before per-case reimbursement for outpatient medical services can be considered.

RANGE OF SERVICES

In contrast to the decision as to which patients to include in a demonstration, this section considers which services associated with a patient's inpatient stay ought to be included in the per-case payment.

The starting point for the discussion is all Part B services delivered to a Medicare beneficiary while an inpatient. (The issue of services delivered to patients in the days immediately before and after a hospital stay is covered in Sec. VI.) To be consistent with PPS, such services would include those produced off site. Under PPS, the nonphysician component of off-site services is included in the DRG rate (this is often referred to as the unbundling provision). To be consistent, the physician component of such services should be included in the per-case reimbursement for physician services.

An option to be considered is whether to limit coverage of a demonstration to the services provided by radiologists, anesthesiologists, and pathologists (RAPs). The intent of this option is to reduce the scope of the demonstration to make it a less radical change in reimbursement. We already pay for all of the nonphysician services associated with RAPs under PPS through Part A.

The services of RAPs are prime candidates for per-case reimbursement. Patients do not choose these providers and have little say about the volume of services provided. In theory, of course, the attending physician is making these decisions as the patient's agent, but agency relationships in a world of imperfect information are themselves imperfect. The discipline of per-case reimbursement may thus be especially valuable here.

A demonstration limited to the services provided by RAPs would not be very valuable, however. RAPs account for only a modest percentage of inpatient reimbursements under Part B. Strong incentives to reduce the volume of services that they provide to Medicare inpatients are already in place through PPS. In addition, what we would learn from a demonstration of per-case reimbursement of RAPs would not tell us much about the merits of a more inclusive per-case reimbursement system.
RANGE OF HOSPITALS

Should a demonstration of per-case reimbursement apply to all types of hospitals included in PPS, or should some types of hospitals be excluded? Consideration might be given to excluding major teaching hospitals from a demonstration, even though they would probably be included in a nationally implemented policy.

The rationale for excluding teaching hospitals is that they would add to the complexity of a demonstration. Many factors would argue for a payment differential for teaching, though the differential would not necessarily be a positive one. For example, the cases in teaching hospitals are probably more complex. On the other hand, interns and residents, whose salaries are reimbursed under Part A, can reduce the workload of attending physicians.

The analytical tasks to develop a teaching differential are not insurmountable, however. Indeed, the Mitchell analysis indicates that any teaching differential would be small. Presumably, the services of interns and residents, which are not billed under Part B, offset the additional severity of the case mix. As attending physicians attempt to substitute interns and residents for other physicians, the teaching differential could be recalibrated to reflect this, and, in fact, the teaching differential in Part B could become negative.

Any exclusion of teaching hospitals could pose serious problems in defining the boundary of the demonstration. Some physicians hold staff privileges at both teaching and nonteaching hospitals. The contrast between per-case reimbursement at one hospital and FFS reimbursement at another could affect admitting patterns significantly and distort the results of the demonstration (see the discussion in Sec. VII). Those cases where per-case reimbursement would constitute significantly lower reimbursement than under FFS would tend to disappear from the demonstration. In addition, some of the competitive aspects of the demonstration could be lost, as physicians found that at some hospitals they did not have to market their services to other physicians. In all, the risks to the validity of the results of the demonstration seem more serious than the additional analytical complexity involved in including teaching hospitals.

Site selection might enable some "having one's cake and eating it, too." Many metropolitan areas have no medical school and hence little teaching activity. By limiting the demonstration to such sites, this complex issue could largely be avoided without major risks to the validity of the results of a demonstration. Generalizability would be sacrificed, however. But teaching hospitals play an important enough role in the medical care system to warrant including them in the demonstration—and using crude estimates to establish a differential.
VI. DEFINING THE HOSPITALIZATION EPISODE

Since outpatient services will continue to be reimbursed as fee-for-service (FFS), the hospitalization episode must be carefully defined. Otherwise, physicians might alter their practice styles to increase reimbursements from Medicare. The division between inpatient and outpatient reimbursement could be altered in two ways. First, physicians might shift services that are normally part of the hospitalization episode to the outpatient venue immediately prior to or following the hospitalization. Some of this shifting would be desirable—reflecting efficiency—but the incentives are to go beyond this. Second, physicians might split what would normally be a single hospital admission into multiple ones. This PPS incentive would be strengthened a great deal.

To avoid these pitfalls, yet insure fairness to physicians, hospitalization episodes must be defined with the following, often conflicting, goals:

- Minimize the number of services related to the illness and occurring during the hospitalization episode that are excluded from the per-case payment and paid on an FFS basis.
- Minimize the number of services unrelated to the illness but occurring during the hospitalization episode that will not be covered under FFS.
- Minimize incentives for physicians to shift services to uneconomic settings or to obtain multiple payments for the same episode of illness.

This section deals with the incentives in a per-case system that might lead some physicians to abuse it and how a demonstration of physician DRGs might seek to minimize such behavior.

SHIFTING EPISODE-RELATED HOSPITAL SERVICES TO THE OUTPATIENT SETTING

One way of dealing with shifting would be to establish "windows"—periods immediately before and after hospitalization when FFS charges for episode-related services would be precluded. An amount could be added to the physician per-case fee to cover the expected pre- and
post-hospitalization services. The Mitchell (1984) analysis of New Jersey and North Carolina data indicates that pre- and post-hospitalization physician charges are well defined and represent a small enough proportion of total episode charges to be susceptible to a window approach. Mitchell found that, for high-volume DRGs, physician costs for the month prior to hospitalization were almost invariably in the $20 to $40 range. The month following hospitalization resulted in DRG-average physician charges from a low of $7 to a high of $74. For different DRGs, 37 to 56 percent of patients incurred pre-hospitalization charges and 11 to 44 percent incurred post-hospitalization charges. The majority of these charges occurred during the one-week periods immediately before and after the hospitalization. The total contribution of pre- and post-hospital costs was less than 5 percent of the total-episode physician costs for most surgical DRGs and 10 to 15 percent for medical DRGs. These estimates are probably too high, since some of the included charges almost certainly were unrelated to the illness that precipitated hospitalization.

The findings cited above, that outpatient services represent only a small part of an illness episode that results in hospitalization, encourage one to adopt the approach of defining the limits of the episode by pre- and post-hospitalization windows. Similarly, this approach is supported by its fairness to physicians. The Mitchell data indicate that variability among the physicians' charges for a given DRG is unaltered by the addition of a suitable pre-hospitalization window amount, and that no physician specialty would experience either great gains or losses in income as a result of adopting this approach. A window approach means that physicians can proceed to shorten hospital stays without any distorting incentives that apply to their own fees.

Per-case reimbursement for inpatient services and FFS reimbursement for outpatient services provide financial incentives to shift services to the outpatient setting. However, physicians' incentives to do so will be restricted by several practice characteristics:

- The extent to which hospital stays can be shortened by performing some traditionally hospital-based services on an outpatient basis. For instance, it is common practice to spend the first day of a hospital admission performing a history and physical examination, and obtaining laboratory and X-ray tests; these might conceivably be performed in the referring or consulting physicians' offices. A short window would permit the shortening of a stay without an increase in Medicare reimbursements to physicians. Should the window prove too short, recalibration would limit windfalls to physicians to a brief period, but could be unfair to less aggressive physicians.
• How similar the quality of shiftable services will be in the two settings. A physician probably interprets a chest X-ray equally well whether before or during a hospitalization. However, biopsies of internal organs and initiation of sensitive drug regimens are services that bear greater patient risks, and are not candidates for shifting.

• Whether the service can be performed electively or is related to an emergency. Obviously, an admission for serious automobile trauma would preclude planned pre-hospitalization charge shifting, whereas it might be quite feasible for an elective hernia repair. Thus, the extent of substitutability that would facilitate shifting of services would vary considerably depending on the DRG category.

• The extent to which physicians can remove temporarily elective services from the date of hospitalization. This should vary greatly among both services and disease categories. For instance, a hematocrit performed two weeks before admission will have very different implications for a patient with chronic hematochezia than for a young male being hospitalized for knee surgery. The test would bear no relevance to the admission condition of the former patient while it would probably serve quite well for the latter.

The last two considerations bear important implications for the selection of the length of the pre- and post-hospitalization windows. If too short a window were instituted, double payment would be facilitated. Too long a window would cause unrelated services to be disallowed for reimbursement. One possible way to avoid this unfairness would be to use a long window but permit physicians to bill for services that they could support as being unrelated to the illness episode which precipitated hospitalization. Another potential problem in setting the length of a window occurs with two temporally close admissions. In this case the physician might be reimbursed twice the average of the first hospitalization’s post- and the second hospitalization’s pre-hospital component.

Thus, the lengths of the windows will have to be carefully considered. Modelling based on historical data, such as that accumulated by Mitchell, is the least expensive and perhaps the most practiced for determining an amount of pre- and post-hospitalization time for inclusion in DRG costs. Using these data enables estimation of the proportion of physician charges related to the hospitalization episode covered by different window lengths. Given the amount of inter-DRG variation, it is possible that these “windows” should be different for
different DRGs. Finally, review of patient hospital records to see whether expected procedures were omitted would be necessary to determine whether physicians were gaming the system by moving services outside of the pre- and post-hospitalization windows. This presumably could be accomplished by the PROs, already established to monitor hospital DRGs, or a similar structure.

SPLITTING ADMISSIONS

Unlike the situation with pre- and post-hospital care, multiple admissions already account for significant Medicare expenditures. The Mitchell study showed that in North Carolina and New Jersey, 30 percent of all admissions were for patients previously admitted that same year; these patients accounted for approximately 50 percent of charges for physicians’ hospital-based services. While the average amount of time between admissions was 110 days, 4 to 27 percent of readmissions, depending on the disease category, occurred within one week. Under FFS reimbursement, physicians had only modest financial incentives to split admissions, these being largely in response to hospital incentives under PPS to shorten stays. However, the institution of per-case payment of physicians would be expected to encourage multiple admissions by more closely aligning physicians’ financial incentives with those of the hospitals.

The problems in controlling the abuse of readmissions under per-case reimbursement are several. First, efforts to penalize physicians for unnecessary readmissions will be hindered by the ability of physicians to readmit patients under the guise of a different diagnosis, since many patients will have multiple significant conditions that physicians could use to explain the need for hospitalization. Secondly, that readmissions are already so common suggests that the practice is often medically appropriate, either in a planned fashion or because it is necessitated by a worsening of the patient’s condition. The former is exemplified by admission for poor kidney function and urinary tract infection secondary to an enlarged prostate gland blocking urination. Prudent practice is to initially admit the patient for catheterization and medical treatment, then discharge the patient for further stabilization prior to readmission for prostatectomy. Finally, where it is claimed that a patient’s deteriorating condition impelled readmission, it will be especially difficult to distinguish among cases where there is premeditated gaming, where financial concerns on the part of the hospital and physician resulted in premature discharge, and where the patient’s condition unexpectedly worsened.
The likelihood of abusive readmissions is intensified by the fact that per-case reimbursement will blur the differences in incentives that have existed between hospitals and doctors under PPS. Under the current reimbursement system, hospitals have had an incentive to reduce the quantity of service and to decrease the length of hospitalization; the physician, operating under different incentives, provides a check on this tendency that may serve the patient's interests. A major concern for per-case payment of physicians is that by aligning physicians' economic interests with those of their hospitals, they face a difficult ethical dilemma which might work to patients' disadvantage. Readmission is one way in which this might be manifest.

Despite the difficulties in identifying unnecessary multiple admissions, it is important that this practice be discouraged, since the implications of its widespread use are potentially so detrimental to both cost-containment and the quality of patient care. One possible mechanism involves surveillance of all multiple admissions, perhaps, again, through the already established mechanism of PROs. Under this scenario, any two admissions for the same patient occurring within a defined period—perhaps a month—would mandate a review to establish the appropriateness of the readmission.

An alternative—not necessarily mutually exclusive—method is to pay less for succeeding admissions than for the first admission for the same diagnosis. This would provide a disincentive for too early discharge that might prove harmful to an ill patient. The Mitchell study indicated that for chronic medical conditions, physician charges were less on the second admission than the first, so that this would be indicated in any case. The level of reimbursement for multiple admissions would determine the extent to which the incentives for appropriate care would be effective; perhaps the hospital reimbursement should be reduced as well (although this aspect may be best considered on its own merits, outside a demonstration). Because there is enough latitude afforded physicians in assigning patients to DRGs, admissions occurring close together in time, but with different diagnoses, would still have to be reviewed to determine whether the physician should receive the full reimbursement for the new diagnosis or the reduced reimbursement for readmission caused by a relapse of the primary cause for admission.
CONCLUSIONS

The prospects for prospectively paying physicians for their inpatient services are tempered by several concerns. To be effective, a system must incorporate, as much as possible, all of the physicians’ services related to the illness episode that precipitated the hospitalization, without precluding appropriate charges for unrelated services. The most reasonable approach to attaining this objective is to establishment of temporal “windows” prior to and following the hospitalization episode which would incorporate charges expected to be incurred in the per-case payment. Still, there is a potential for abuse should this approach be adopted. Shifting of services from the inpatient to the outpatient setting and the splitting of admissions would be encouraged. A combination of appropriate incentives and surveillance would be necessary to ensure that expenditures under prospective payments would not exceed current outlays under fee-for-service and that the alignment of physicians’ and hospitals’ economic interests would not adversely affect the quality of patient care.
VII. PARTICIPATION IN THE DEMONSTRATION

This section addresses the question of whose participation is required in a demonstration of per-case reimbursement of physicians and whether adequate participation can be achieved on a voluntary basis.

The simplest issue is whether hospitals need to participate. Under most types of demonstration, hospitals' explicit participation is not needed because physician payment would continue to be separate from hospital payment, so hospitals would have no direct financial involvement. Hospitals would be affected by the demonstration, since changes in physician behavior in response to the incentives of per-case reimbursement would affect hospital costs as well. For example, if fewer X-rays were ordered to economize on radiologist fees, the hospital would find its radiology costs reduced as well. Nevertheless, there is nothing explicit for the hospital to do to participate in such a demonstration, so an agreement to participate would not be required. Of course, in a demonstration that involved some sort of joint venture between physicians and hospitals, participation by the hospital would be required. We argued in Sec. II, however, that this would be inappropriate for a demonstration program.

Before discussing which physicians need to participate, the issue of whether their participation can be voluntary should be addressed. Allowing individual physicians to decide whether or not to participate would preclude obtaining much of the information that the demonstration is intended to generate and would risk very high costs to HCFA. The most significant problem is that physicians would likely decide whether or not to volunteer according to whether they expected to do well or poorly under per-case reimbursement of their services. Having a subset of physicians expecting to do better than average under the demonstration would severely affect the generalizability of any results. While in theory budget neutrality adjustments in payment rates could avoid large outlays by HCFA, any such adjustments would further compromise validity. The per-case payment rates would potentially be much lower than they would be under a nonexperimental system.

Even if an average draw of physicians were obtained, actions by beneficiaries might distort the validity of the demonstration. If mandatory assignment were an aspect of the demonstration, beneficiaries might be attracted to physician participants. Such an increase in volume would not be the case for the average physician under a fully implemented system of per-case payment.
Physicians would have strong incentives to counsel those patients with relatively high resource needs to go to physicians outside of the demonstration. This would benefit the physician financially (by avoiding a money-losing case) and under voluntary assignment, the beneficiary as well. Indeed, barriers to access for high-cost patients, a possible outcome of per-case reimbursement that is of great concern, would be far less likely to materialize under a voluntary demonstration than under an implemented payment system.

Allowing voluntary participation by individual physicians would also distort the nature of the competition among physicians that is an important element of per-case payment. For example, per-case reimbursement would be less likely to cause a reduction of radiologists’ fees if those with high fees could specialize in working with attending physicians not participating in the demonstration. In general, those physicians likely to suffer the most under competition fostered by per-case reimbursement would be the least likely to volunteer.

If individual physicians are not to be allowed a choice of whether to participate, the question to be faced is which ones to require to participate. In general, we suggest that all physicians in an area be required to participate. It is absolutely essential that all of the attending physicians within a hospital be required to participate. Otherwise, competitive effects would be diluted. Complementary physicians would be in a better bargaining position if a portion of their Medicare work were with attending physicians not participating in the demonstration and thus having less concern with the level of their fees. In any case there would be little basis for deciding equitably which attending physicians were to participate.

Having complementary physicians participate would not be essential in either option of pro rata payment (to the physicians on a case or to the medical staff). It would also occur naturally if attendings were financially liable for the services of complementary physicians. For complementary physicians not to participate would mean that their reimbursements per service would continue to be determined according to Medicare’s reasonable charge rules and charged to the attendings.

A more difficult question is whether all physicians in a market area should be required to participate, or whether the demonstration could be limited to all physicians who practice at one or more selected hospitals. In most areas, conducting the demonstration only at one or a few hospitals would reduce the validity of the demonstration, though not quite as severely as having individual physicians choose whether to participate. Where physicians have admitting privileges at more than one hospital, they would have strong incentives to choose a hospital for their patients on the basis of whether Medicare reimbursements would
be higher on a fee-for-service basis or a per-case basis. Especially for medical cases, the differences in reimbursements for individual cases are likely to be large. Where physicians have the option of having a case either covered by the demonstration or not, the effects on the validity of the demonstration are similar to voluntary participation by individual physicians. Indeed, the problems here could be worse as physicians would in effect be deciding on their participation on a case-by-case basis.

An important exception to this would be a market area where virtually all physicians' practices were limited to a single hospital. In this case, physicians would not be able to decide which of their cases should be paid on a per-case basis. Including only part of a market area would not be problem-free even under this circumstance, however. Physicians could steer a costly patient to a colleague on the staff of a non-participating hospital.

Since payment of physicians on a per-case basis is so controversial an issue, HCFA will want to take a hard look at whether a demonstration with voluntary participation would be at all useful. While we strongly advise mandatory areawide participation from a research perspective, some voluntary models might be considered.

The best possibilities for voluntary demonstrations would be in areas served by only a single hospital. In this case, either a medical staff volunteering or a joint medical-staff/hospital proposal would not run into the problems discussed above. Since these conditions would be found only in a rural area, generalizability would be sacrificed.

The other possibility would be a medical staff of a hospital in an area where physicians tend to have privileges at only one hospital. While patients would still be able to cross the boundary of the demonstration, the degree might be acceptable and could be monitored.
VIII. SETTING THE PAYMENT RATES

Setting the payment rates for case-based reimbursement using DRGs involves calculating two sets of numbers: the cost-weights, or relative values, of the DRGs; and the conversion factor, or dollars, to be assigned to each cost weight. Calculating the cost-weights involves considerable data manipulation, but is conceptually straightforward. This step does not necessarily require critical policy decisions, such as how to treat different specialties, nor what to do about physicians in teaching hospitals.¹ These decisions, however, must be made by the time the DRG cost-weights are actually priced. In the sections that follow, we describe each step in detail, including both the mechanics and the policy decisions that must be made.

Current research at the Center for Health Economics Research is assessing the appropriateness of alternative classification approaches for physician case reimbursement, particularly Systemetrics’ disease staging and Blue Cross of Western Pennsylvania's Patient Management Categories (PMCs). These alternatives are being evaluated both as freestanding alternatives to DRGs and as severity of illness modifiers to DRGs (especially for medical admissions). It is possible that policymakers might want to include PMCs or staging in a physician demonstration project. Preliminary work indicates that these other classification systems are not superior to DRGs for reimbursement purposes (largely because neither one explicitly recognizes surgery), but they are potentially promising as modifiers of medical DRGs. Extensive developmental work would need to be done, however, before they could be tested in a demonstration.²

¹Policy decisions could, however, be taken account of at this stage. Certain specialties or services could be excluded from the base before calculating the cost-weights, for example. Alternatively, separate cost-weights could be computed for specialists and generalists.

²There are, of course, many other packaging approaches like the special procedure packages developed by Janet Mitchell. Since the hospital episode is not the unit of payment in these other approaches, we do not discuss these approaches in this report.
CALCULATING THE COST-WEIGHTS

Merging Hospital and Physician Claims

Medicare hospital (Part A) and physician (Part B) claims are needed
to calculate cost-weights.\(^3\) Although site-specific claims data could be
used to set cost-weights for a demonstration, national data are pre-
ferred. Presumably, any physician DRG payment program actually
implemented would use national, not local, weights, just as PPS does
now for hospitals. (Payment rates, on the other hand, presumably
would have some local geographic modifier; see below.)

It is possible that national cost-weights might not be available for
demonstration purposes. An alternative would be to use a four-state
average of Part B cost-weights, using the Mitchell data base. The sim-
pel correlation coefficients between pairs of states are in the 0.95 to
0.96 range, with a correlation of 0.98 between individual states’ RVS
and a weighted four-state average. Simulation analysis could easily
assess whether any systematic bias might be introduced through this
approach.

The major disadvantage of the Mitchell data base, however, is that
it is based on pre-PPS claims. To the extent that PPS has shortened
stays and reduced ancillary use, we would expect some decrease in Part
B inpatient expenditures as well. Although no empirical evidence is
yet available, it is likely that length of stay and ancillary reductions
have been greater for some DRGs than for others. If so, the relative
cost-weights for physician services would be somewhat different if they
were calculated using post-PPS data.

What data might be available in order to develop post-PPS cost-
weights for a demonstration? One approach would be to obtain post-
PPS hospital and physician claims directly from the intermediaries and
carriers serving the demonstration sites. This is by far the quickest
way to obtain data. The second approach would be to use HCFA’s
B-MAD files. The problem here is that the beneficiary file is a 5 per-
cent sample, and thus would yield a sample of admissions only one-
quarter the size of MEDPAR. However, HCFA will be obtaining 100
percent beneficiary B-MAD files for ten states for calendar year 1984.
(These files are expected to be available shortly.) Unfortunately, no
Western states are included in the 100 percent files, thus limiting the
development of “quasi-national” cost-weights.

\(^3\)This report assumes that the unit of payment is the inpatient stay, exclusive of any
associated ambulatory activity. If the unit were expanded, outpatient claims would also
be needed. Otherwise, the mechanics of setting the payment rates remain unchanged.
The AUTOGRP program would be used to classify the hospital claims into DRGs. Then, based on the beneficiary's HIC number and admission and discharge to include some time “window” before and after hospitalization, all physician claims for inpatient services would be merged. A small number of hospital admissions (roughly 4 percent) will have no corresponding Part B bills and can simply be dropped from subsequent calculations. (These presumably represent Medicare beneficiaries not enrolled in Part B.)

Cleaning the Data

Because the cost-weights will be used to construct the relative values of different types of admissions, it is important that the physician claims accurately reflect the services actually provided during the stay. There are two potential omissions from the physician bills: (1) no claims from an attending physician; and (2) missing services for hospital-based physicians; additionally, we should consider the treatment of resident physicians not now charging Part B. If hospital episodes with these omissions were included in the calculations, the cost-weights would be biased downward unless adjustments or replacements are made.

*No Attending Physician.* It does not seem reasonable to have a surgical DRG without a surgeon's bill, for example, or a medical DRG without a bill for direct patient care. Previous work at Mitchell found that about 8 percent of Medicare admissions were missing a claim from an attending physician. (For surgical DRGs, the attending was defined as the surgeon who performed the procedure that led to that DRG classification; for medical DRGs, it was the physician billing for routine hospital visits.)

We dropped cases without attendings, as their inclusion would have increased within-DRG variation and biased mean estimates downward (the attending accounts for 60 to 70 percent of total physician DRG costs), and because we were specifically interested in the attending as an analytic variable. In addition, the attending physician's bill can be used to correct DRG assignment (as described shortly).

Moreover, these cases need to be dropped for purposes of calculating cost-weights, because we expect the downward bias to be systematically correlated with DRG and with hospital type. Some would be deleted anyway when outliers are trimmed, but only a fraction of the 8 percent that are missing. If cases with missing attendings are distributed proportionately across DRGs, then no systematic bias would be introduced by including them in the calculation of the cost-weights. It is unlikely,
however, that this is the case. As we might expect, patients without attendings are somewhat more likely to be admitted to a teaching hospital, and are somewhat more likely to die, although not overwhelmingly so.

Hospital-Based Physicians. Because of combined billing through the hospital, Part B claims may be nonexistent for hospital-based physician services. This is a particular problem for radiology and anesthesiology and, to a lesser extent, for certain medical services like ECGs and EEGs. (Since routine inpatient lab services are no longer a billable Part B service, one can ignore pathology unless pathologists are brought back under Part B.) Use of these services is systematically related to the type of DRG and, in the case of anesthesia, can account for a relatively large share of total physician DRG costs. The only solution would seem to be to replace these missing costs. This can be done with DRG-specific imputation algorithms and ancillary cost information from the hospital claim. If post-PPS data are used to calculate cost-weights, however, this problem may have solved itself. The hospital incentives in PPS should accelerate the historical trend away from combined billing.

Resident Physicians. Patient-care services provided by residents to Medicare beneficiaries will not appear as Part B bills. (This, of course, is one reason why attending physicians or certain radiology/anesthesiology services may be missing.) This will result in a systematic underestimate of true physician DRG costs in teaching hospitals, and a depressing influence on physician cost-weights, particularly for those DRGs disproportionately treated in teaching hospitals. Salaries of interns and residents, of course, are currently part of a direct pass-through in the hospital PPS. For the purposes of a demonstration it may be unwise to change this. The result, however, is that physicians in teaching hospitals will benefit financially. Their DRG payments would be based on cost-weights that incorporated physician services which in their institution were provided by residents (whose costs are borne by Part A). Thus, physicians in teaching hospitals would enjoy resident inputs in their treatment of Medicare patients without having to pay for them. Moreover, it is difficult to alter this as part of a demonstration, because there are no readily apparent data to estimate the appropriate amount to add per case to adjust for the services of interns and residents. (As noted above, it may be wise for this reason to choose a site without a major teaching hospital.)
Correcting the DRG Classification

Because of faulty hospital procedure coding, a large number of surgical admissions are incorrectly classified as medical DRGs. These cases can be easily identified by the presence of high surgeons' bills and then reassigned based on the procedure code reported by the surgeon. Failure to reassign these cases will produce upwardly biased cost-weights for the medical DRGs. If post-PPS data are used, this problem should largely disappear.

A related problem is discrepancies in the type of procedure reported by the hospital and by the surgeon which would lead to different DRG assignments. It seems reasonable to assume that the surgeon is always right, because his fee depends on the precise procedure code, while prior to PPS the hospital had no incentive to report procedures accurately. Even under PPS, the hospital's incentive to code correctly may not be as strong as that of the surgeon. Reporting an open reduction of the femur rather than a femoral head replacement (DRG210 rather than 209) would reduce the hospital's payment by 9.5 percent, but would lower the physician's DRG payment by 21 percent. Again, these corrections can be easily made based on the Part B procedure code reported by the surgeon.

Trimming the Outliers

Before the final step of actually calculating the cost-weights, extreme values should be removed if one thinks they are due to bad data. This could be done with the same approach used by HCFA in developing the PPS cost-weights, i.e., dropping cases whose costs exceed three standard deviations times the geometric mean for each DRG. This would eliminate about 2 percent of admissions and produce a small decrease in average DRG costs. The effect of trimming is to increase the relative cost-weights for surgical DRGs because of their smaller within-DRG variation.

The Final Step

The actual cost-weights would then be calculated by dividing each mean physician DRG cost by the all-DRG average. In all cases, Medicare reasonable charges would be used to define "costs."

It should be noted that this charge-based approach preserves current reimbursement inequities, particularly the bias in favor of surgical procedures. A lens procedure DRG would be reimbursed at a rate more than three times that of a heart failure DRG, for example, even though
the latter may be more physician time-intensive. This is a major rationale for considering a demonstration of a revised fee schedule, as discussed in Sec. IX.

DETERMINING THE CONVERSION FACTOR

Assuming budget neutrality, the conversion factor is simply a function of the cost-weights, expected DRG mix, and total Part B expenditures for inpatient services. Policymakers, however, may want to vary the conversion factor as a function of, say, geographic location, specialty, and teaching status. For demonstration purposes, budget neutrality should be determined within each site.

Geographic Location

Historically, differential Medicare payment based on location was intended both to adjust for geographic cost-of-living differences and to recognize inter-area practice patterns. The latter has led to variation that is widely thought to be undesirable, e.g., consultation rates 2 to 3 times higher in one area than another, and the use of national cost-weights should help eliminate this.

A higher conversion factor in urban than in rural areas certainly seems appropriate to account for higher factor costs. PPS currently calculates a conversion factor for urban and rural areas by tabulating costs in each location separately. This could also be done for physicians, thereby incorporating both price and intensity differences. In a demonstration, a conversion factor to preserve budget neutrality within each site seems appropriate.

Specialty

To the extent that the classification system adequately captures case severity, some may argue that a higher conversion factor for specialists than for GPs is not necessary. Others may argue that a specialist is inherently providing better care, which, in the absence of a differential, will reduce the amount of specialty care as fewer physicians invest in training. (However, whether the additional quality is worth the additional cost must be addressed.) DRG-specific payment rates could reimburse specialists more only when they treated more complex cases. For example, there is no compelling reason why thoracic surgeons should be paid more than general surgeons for permanent pacemaker insertion, for example, although many Part B carriers do so. But
whether GPs, internists, and cardiologists should all be paid the same for heart failure cases is more problematic.

One policy choice is whether to vary the conversion factor by specialty or not. If suppressing specialty distinctions were thought to be desirable, a demonstration could test the effects of doing so. It appears to us, however, that this would add too much complexity to the demonstration.

If DRG payment is made to the medical staff rather than to the attending, however, the case for a specialty-specific conversion factor is somewhat less; one would rely on the medical staff to make its own assessment of how the DRG payment would be distributed to attendings of different specialties. For example, (assuming no other physician inputs), GPs might receive 90 percent of the heart failure rate, internists 100 percent, and cardiologists 110 percent, with an appropriate triaging of patients by specialty to justify the differential payment. On the other hand, such a policy may be viewed as unfair to staffs with a greater proportion of specialists (i.e., to such a staff this payment method would not be budget-neutral).

**Teaching Hospitals**

Some policymakers have advocated a higher conversion factor for admissions to teaching hospitals. This might be justified if sicker patients are triaged to these institutions. In this case, the conversion factor would be used to offset potential inequities due to systematic within-DRG severity differences. Perhaps not all teaching hospitals would require such an adjustment, rather only those super-specialized tertiary care institutions that could demonstrate a sicker case mix not captured by DRGs.

There would be no justification for a higher rate based solely on their teaching function, for several reasons. First, as discussed above, the cost-weights effectively overpay physicians in teaching hospitals. Second, the rationale for an indirect teaching adjustment for physicians, as is done now in hospital PPS, does not hold. Under PPS, teaching hospitals now receive a lump sum payment to cover the costs of tests and procedures performed solely for teaching purposes. The professional component of those tests (e.g., interpretation), however, is performed by residents whose salaries are paid through Part A. There would be no reason to also reimburse the medical staff an additional amount to cover this component.
SETTING PAYMENT POLICY FOR OUTLIERS

The importance of a payment policy for outliers is critically dependent on the validity of the patient classification system. In any system, there will be a few catastrophically ill patients who will require special treatment by Medicare. Given the serious shortcomings of medical DRGs, an outlier policy becomes an important safety valve in a physician prospective reimbursement system (especially if payment is made to the attending physicians). It is a way of protecting individual physicians and medical staffs from unacceptable risks.

How should outliers be defined? Current hospital PPS criteria would appear inappropriate. Mitchell found little overlap of Part A and Part B outliers; only 15 to 20 percent of high-physician-cost cases were also high-cost hospital cases. Presumably, however, like hospital PPS, outliers for physician payment purposes would be defined as admissions exceeding DRG-specific total-cost thresholds. (It is not clear whether a length of stay threshold would also be appropriate for physicians.)

One critical issue for demonstration purposes is how those thresholds should be determined. This would depend heavily on who receives the DRG payment. A lump-sum payment to the attending physician would require a higher proportion of reimbursements devoted to outlier payments than a payment to the hospital or the medical staff. Using our four-state data base, we can simulate the impacts of alternative approaches, e.g., different thresholds, cost vs. length of stay criteria, or both, etc.

A second issue is how payments should be made to outlier cases. We suggest that for costs in excess of the outlier threshold, services be reimbursed on a fee-for-service basis. This seems straightforward, but note that in most cases there are multiple physicians. Which physician’s costs are counted as occurring before the threshold (and therefore included in the per-case payment) is therefore a relevant issue. We suggest this be done on date of service (i.e., costs be ordered by date of service). For those costs incurred on the day the threshold is reached, we suggest they be allocated pro rata among physicians above and below the threshold. Insofar as payment is going to the medical staff or to an attending who is negotiating with other physicians, this entire issue is of much less significance.

\footnote{This was not calculated using the trim points actually used by PPS, but by simply examining admissions whose costs exceeded 3 standard deviations above the DRG mean.}
IX. A FEE SCHEDULE TREATMENT

Numerous groups in medicine (e.g., the American Medical Association, the American Society for Internal Medicine) are advocating changes in the method of compensating physicians. Instead of per-case payments, however, with the possible distortions from within-group heterogeneity and strengthened incentives to admit marginal cases, these groups advocate a revised fee-for-service (FFS) system. The most common recommendation is to give greater weight to cognitive services, such as history-taking and examinations, and less weight to procedures.

In light of the potential problems with per-case payment and the relatively low marginal cost of including another treatment if a demonstration is undertaken, we recommend that if a demonstration is undertaken, an attempt be made to include an alternative fee schedule as a treatment.

The exact fee schedule to be included depends on whether it is desirable to test the effects of a relative value schedule that has been developed with the assistance of organized medicine, or has been developed as part of a job-evaluation kind of process that attaches relative values to various services. Either alternative will take time and hence delay implementation. A third alternative is to define and test a fee schedule that gives less weight to procedures. Either of the first two development efforts could proceed in parallel.

Including such a treatment would show the degree to which the mix of services delivered responds to such variation. Although the common assumption is that reduced payments for procedures would lower the number done, there is little evidence for such an assertion. Indeed, some evidence suggests the contrary. When fees for services were altered in Colorado, there was a negative association between the change in the fee and the number of services delivered (Rice, 1984). Physicians may substitute a more expensive diagnostic procedure for a less expensive one if the relative price of the former falls. Of course, in a demonstration one could not ascertain the long-run effect of a change in relative fees on specialty choice, and this may ultimately be the area of greatest effect. Nonetheless, in light of the support for a revised fee schedule, it seems appropriate to include such a schedule in any demonstration of per-case payment of physicians.
X. EVALUATION DESIGN

In this section we consider the objectives of the demonstration, and then its methods, including the treatment and control groups, some statistical design decisions, data requirements, and analytic methods. The section ends with an example of how quality of care could be evaluated.

OBJECTIVES OF THE DEMONSTRATION AND OUTCOMES TO BE EVALUATED

The primary objectives of the demonstration are answers to the following questions:

1. What are the cost implications—for Medicare, for its beneficiaries, and for society—of alternative methods for reimbursing physicians? Will case-based payments for physicians lower cost? Will greater weight for cognitive procedures lower cost?

2. What are the health status outcomes of alternative reimbursement methods? If alternative methods do indeed reduce costs, to what degree, if at all, do they also reduce health status? Whether or not outcome effects can be detected, are there changes in process measures of quality of care?

3. What are the implications of alternative reimbursement methods for access to care? There will inevitably be some heterogeneity in case-mix classification; will this heterogeneity cause providers to shun patients whose costs can be predicted to be above average? If so, how often will this happen? What will physician participation be under varying assignment policies?

The secondary objectives of the demonstration are answers to three further questions:

1. If there are cost savings from alternative reimbursement methods, how are these achieved? In particular, to what degree do they represent reductions in the prices paid to providers for a given product (e.g., reduced fees for anesthesiologists if a lump sum payment covers all expenses), and to what degree do they represent reductions in the actual use of services (e.g., shorter lengths of stay, fewer hospital visits per stay, less frequent use of assistant surgeons)?

2. How many physicians will accept assignment? Will payments borne by patients increase? Will prices to non-Medicare patients change?
3. What are the administrative implications? Will claims-processing costs be lower? Will fraud and abuse increase?

METHODS

We begin by considering the nature of the treatments. Then we turn to some statistical issues of experimental design, then to data requirements, and finally to analytical methods.

Experimental and Control Groups

HCFA must, of course, determine the nature of the experimental treatments. The previous sections have outlined numerous possible dimensions of experimentation; each dimension contains several possible variants that could be tested. Thus, the number of possible experimental treatments is much larger than could conceivably be tested.

If it were our decision, we would emphasize the dimension of whom to pay. Here the leading contenders seem to be: (1) payment to the attending physician, determined by a blend of per-case and fee-for-service reimbursement with varying weights; (2) a pro rata payment to the medical staff; and (3) an alternative fee schedule or schedules. Others could differ quite sharply, however; the decision on treatments clearly should reflect the policy interest in each, and that is not our judgment to make.

In contrast to the “whom to pay” decision, we suggest uniformity on other decisions such as assignment, cost-sharing, method to set rates, etc. For assignment, we suggest that it be voluntary, but that physicians be required to make an all-or-nothing choice each year. Fee-for-service cost-sharing is recommended.

In addition to whatever experimental treatments may be decided upon, of course, a control group that remained on the existing payment scheme should be maintained.\(^1\)

Statistical Design Issues

Number of Sites. The number of sites is a complex design issue. In principle, one would like to choose the number of sites to minimize the variance of the quantity one is trying to estimate given a fixed budget. But sites tend to have fixed as well as variable costs. Thus, for a given budget, one can have a larger number of smaller sites but have fewer total physicians or beneficiaries. The optimal number will

\(^1\)The possibility of a control group from an existing HCFA study should be explored.
depend upon the between-site and within-site variances of the quantities one is attempting to estimate, and the magnitude of fixed costs per site and variable costs depending upon the number of physicians (Archibald and Newhouse, 1980 and in press).

The problem is quite complex here because of the number of variables one is interested in analyzing as dependent variables—for example, cost per patient, health outcomes per patient, and acceptance of assignment. In designing the experiment, one can obtain reasonable estimates of between-site and within-site variance in assignment behavior and cost from existing claims files. Between-site and within-site variance in health measures could come from the National Medical Care Expenditure Survey, the Medical Care Expenditure and Utilization Survey, the Health Interview Survey, and possibly the Medical Outcome Study. Estimates of fixed costs per site and variable costs per number of physicians (or patients) within a site will require further specification of the data to be collected during the demonstration.

**Selection of Sites and Assignment of Sites to Treatments.** Once a number of sites is determined, it remains to select the particular sites to be used and their assignment to treatments. (We contemplate that all physicians in a site will be treated similarly. For some analytical purposes this may not be desirable, but for many purposes of the experiment (e.g., assignment policy with a single entity), it would seem to be necessary to treat all physicians within a site similarly.) If the number of sites and treatments permits several sites per treatment (which seems unlikely), sites should be assigned to treatments so there is some balance among the treatments with respect to city size (and hence sophistication of the delivery system) and region (given variation in treatment methods by region).

It seems more likely that the number of sites will not greatly exceed (and may even equal) the number of treatments. If so, one is faced with a dilemma. For reasons of internal validity, one would prefer relatively homogeneous sites (e.g., cities of, say 300,000 to 600,000 in the North Central region). For reasons of external validity, one would prefer to sample cities more broadly. With a budget so limited as to preclude a large number of sites, there is no way around this dilemma. Our view is that geographic diversity is important, both for face validity and because practice patterns differ by region, but that one might attempt to sample from “medium” size cities to avoid confounding city-size with regional effects. Using this strategy, however, one could not estimate any city-size effects. An alternative is to sample from all regions and all city sizes, but one would necessarily give up on trying to disentangle the two effects. Since a key behavioral effect to study is the degree to which physicians and hospitals avoid caring for the
sickest patients, choice of a site with a public hospital (which enhances
the ability to do this) is called for.

Especially for treatments that involve a marked departure from the
status quo, it would be desirable to have a pilot site. This could be a
rural site. If the pilot nearly resembled the "final" treatment, this
would have the benefit of yielding information on experience in a rural
site.

Physicians per Treatment. Assuming all physicians in a site are
assigned to the same treatment, the number of physicians per treat-
ment will be determined by the number and size of sites. If, among
cities of a given size, one opts for cities with more physicians (in order
to generate more physician observations for the fixed costs at a given
site), one may introduce a confounding variable. For example, cities
with more physicians per person may have a different degree of com-
petitiveness and therefore exhibit different responses. We would
attempt to choose cities with roughly similar numbers of physicians per
person in order to avoid this confounding.

Allocation to Treatments. If only one site is used per treatment,
the assignment of site to treatment may as well be done at random.
Face validity is enhanced, and nothing is lost. If, however, more than
one site is used per treatment (clearly desirable if the budget permits;
otherwise site and treatment effects are confounded), the Finite Selec-
tion Model (Morris, 1979) should be used to ensure that, as much as
possible, the sites assigned to one treatment resemble the sites assigned
to other treatments.

Length of the Demonstration. Given a total project budget, one
can operate the demonstration either with more sites for a shorter
period of time or fewer sites for longer. The arguments for more sites
for a shorter period of time are that one obtains results sooner, and
that, if the effect of a treatment in a site is stable over time, more sites
for a shorter period of time will yield estimates with greater precision.
The arguments for fewer sites for a longer period of time are: (a)
There may be some transitory or learning behavior, particularly if the
experimental treatment is a marked departure from current practice, as
most will be; one wants to allow time for learning behavior to take
place, so that steady state behavior may be observed; (b) In order to
observe any changes in health status (as opposed to process of care
changes), one must allow a certain period of time to pass. Based on
experience in Rand's Health Insurance Study, three years appears to be
a reasonable compromise among these positions.
DATA REQUIREMENTS

Measurement of the Effect on Cost

The cost to Medicare of each treatment will be determined from claims submitted to Medicare. In the case of the control group, national program statistics can be used. Costs borne by participants probably have to come from a participant survey. In cases where assignment is accepted, an estimate of participant costs could be made from claims data; one of the outcomes, however, is the amount of balance billing when that is allowed, and a participant survey will be needed to obtain that information. A survey could also measure use by those who do not satisfy the Part B deductible, but do use services; if, however, coverage is limited to inpatient services, all inpatients should satisfy the Part B deductible. Finally, a survey will be needed to determine the degree to which physicians may waive the cost-sharing.

Details of utilization (e.g., the nature of the procedures delivered and the price per procedure) will be easy to obtain from claims data for the fee-for-service alternatives, but may be quite difficult to obtain for a pure case-based method. One might require the individual or organization receiving the reimbursement (e.g., the attending or the medical staff) to prepare a claims form, just as under fee-for-service. Alternatively, dummy claims forms might be filled in by coders using the medical record. The latter strategy, however, runs the risk of noncomparability with data on the control group that come from claims.

Data on fees charged to non-Medicare patients could come from several sources. If cooperation could be obtained from the local Medicare carrier for the carrier’s non-Medicare business, the carrier would be an obvious source. Alternatively, another insurance company may cooperate; it would be wise to use claims data rather than household survey data because of the great number of services that ought to be priced and included in a price (or expenditure) index.

One important piece of information that may be sensitive will be the division of any per-case payments among physicians. This would probably have to come from interviews with physicians, and there might well be a high refusal rate. Nonetheless, it seems likely that some information can be obtained, and, to the degree the market forces fees toward uniformity, the threat of bias from missing data is lessened.
Measurement of the Effect on Health Status Outcomes and Quality of Care

Health status outcomes can be obtained from surveys using self-reported measures. The measures used in the Health Insurance Study are obvious candidates; these general health status measures have been updated and adapted for use among the aged as part of the Medical Outcome Study.

A key design decision will be whether physiologic measures should be gathered as well. Because such data must come from a screening examination, they are much more costly to collect. Also, one must anticipate that some Medicare beneficiaries would have difficulty getting to a screening examination center. On the other hand, it is in the area of physiologic measures that the Health Insurance Study showed effects; moreover, physiologic data will also be useful in the study of access, as described below.

Process quality of care measures should be collected by sampling from medical records, as described at length at the conclusion of this section. Patient surveys will be necessary if patient satisfaction is to be measured.

We also suggest oversampling those in poor health. The Rand Health Insurance Experiment suggested that effects of reductions in services are likely to be stronger among those in ill health, and if there are any untoward effects from our experimental treatments, they are more likely to be among those in ill health. We have not tried to determine the optimal oversampling rate, but caution that the greater the unreliability of any health status measure used, the less the oversampling fraction should be. (Archibald and Newhouse, 1980 and in press).

Measurement of the Effect on Access to Care Assignment Policies

To determine whether those who are ill with costly problems (relative to the reimbursement for the DRG category they are in) have difficulty obtaining treatment, it is, of course, necessary to determine who has such a problem and is known by providers to have such a problem ex ante. Methods for determining this are now rudimentary but are being further developed. The most promising direct measures are physiologic measures and age and socioeconomic characteristics. Assuming the case-based payment is not adjusted for these characteristics, but that they matter importantly for costs, one can assess whether
the frequency of services to ex ante high-cost patients varies by reimbursement method. For example, one could test the hypothesis that services to similar individuals in the control group(s) exceed those in the experimental (case-based reimbursement) groups. One could also compare overall admission rates and readmission rates.

Indirect measures of access are also useful. One could, for example, measure the number of physicians contacted other than through referral; if access is poorer in the case-based groups, one would expect more physicians to turn down patients and hence the number of physicians contacted directly by the patient would be greater. One can also measure patient satisfaction in both the experimental and control groups; if access is affected, satisfaction should be greater in the control group(s).

Measures of the extent to which physicians accept assignment can be determined from administrative data.

**ANALYTIC METHODS**

Because the design of this demonstration will be a randomized design with a control group, comparisons of means across the various treatment groups will yield unbiased estimates of their effects. Efficiency will be improved if observations are available in the before period; thus, the design should be that of a randomized trial with experimental and control groups and before-and-after observations.

The unit of observation will generally be the individual patient or physician. In the case of cost, methods have been developed in the Health Insurance Experiment that improve over simply calculating the mean; these methods account for the portion of the population that spends zero as well as the skewness of the distribution of expenditure. In the case of health status and quality of care, calculation of means will probably suffice. The hypotheses about access relate to an interaction between a measure or measures of severity and the reimbursement method; in particular, the hypothesis to be tested is that per-case methods of reimbursement cause treatment to be less readily supplied to certain patients than under fee-for-service methods of reimbursement. This can be tested using standard regression methods; the dependent variable will be a measure of care given (e.g., admissions) and the explanatory variables can include the interaction term or terms just noted.
EVALUATION DESIGN CONSIDERATIONS FOR QUALITY OF CARE

It is assumed for the purposes of the discussion that follows that this demonstration will incorporate both medical and surgical hospital admissions. It is beyond the scope of this report to discuss which diagnostic categories are more likely to have quality affected by the intervention, and the reader is referred to a discussion of this subject written by Lohr et al. (1985).

Definition and Measurement of Quality of Care

Quality of care means different things to different people, and the relativity of this concept increases the difficulty in measuring it and evaluating changes. In this demonstration, we propose assessing quality of care by evaluating the process and outcomes of medical care based on the extent to which that care contributes to valued outcomes (Donabedian, 1980). Quality of care may also be assessed by evaluating structural features of the system or care setting. However, it is anticipated that the short duration of the demonstration and the limited number of diagnoses under study will not sufficiently influence structural features of the health care system to warrant study.

This demonstration will consider two important facets of quality: the technical quality of care, and the interpersonal dimension of care—the relationship between provider and client, sometimes referred to as the art of care. We elaborate on the technique and art of care in greater detail below.

The technical quality of care is best assessed by judging the process whereby the care was rendered. Five aspects of each provider client encounter are conducive to measuring the process of care in this demonstration (Donabedian, 1980): adequacy of the diagnosis; adequacy of the therapy; minimum redundancy in the use of diagnostic and therapeutic procedures; full exploitation of medical technology; and full exploitation of professional and functional differentiation.

Adequacy of diagnosis is essential for appropriate treatment purposes and is particularly critical to the extension of the prospective payment system to physicians, inasmuch as the payment system is based on diagnostic categories. Adequacy of therapy is of major importance if optimal clinical outcomes are to be achieved. Minimum redundancy of procedures is important to quality because utilization of unnecessary procedures exposes the patient to greater risk of iatrogenic complications, while diverting resources from more useful alternatives. High-quality care is also associated with the full exploitation of
existing medical knowledge and with clinical management that uses the
most efficacious treatments available. The final dimension in technical
quality is the full exploitation of professional and functional differen-
tiation, leading to use of appropriate specialists as the situation
requires. This latter aspect is particularly critical, given the potential
incentives for underutilization of services that could develop when the
prospective payment system is extended to physicians.

Technical quality is also assessed by examining patient outcomes—
the physiologic, clinical, and functional results of medical care. Out-
comes are often difficult to measure, and the planned outcome may not
be fully evident when a patient is discharged from the hospital. The
demonstration would be strengthened by outcome information obtained
through post-discharge followup of patients at 7-day, 30-day, or other
intervals. It is recognized that such followup would involve time and
cost considerations, but the information obtained would complement
the in-hospital data and greatly enhance the evaluation.

The interpersonal dimension of care is less easily measured by pro-
cess measures. While information for determining quality may be
derived through observation of the care rendered, this approach is
costly in terms of time and resources and impractical in a large-scale
demonstration. However, the interpersonal dimension may be
evaluated by outcomes such as patient satisfaction. Ware et al. (1978),
have developed reliable and valid measures of patient satisfaction
which would be useful in assessing quality of care in the demonstra-
tion. Patients could be surveyed to determine their satisfaction with
the care they received in terms of its accessibility and convenience,
finances, physical environment in which the care was provided, availa-
bility and continuity of care, and efficacy/outcomes of care. This
demonstration could incorporate an assessment of patient satisfaction
as an outcome measure of the quality of care rendered.

Assessing Changes in Quality Related to Changes
in the Payment System

The prospective payment system for hospitals was designed to be
budget neutral so that hospitals could be assured of funding levels no
greater than nor less than they would have received under provisions of
the Tax Equity and Fiscal Responsibility Act. It is not clear whether
an unstated goal was quality neutrality—the expectation that quality
would be maintained at least at levels existing prior to prospective pay-
ment. To determine the effect of prospective physician reimbursement
on quality, the evaluation could compare process and outcome mea-
sures in the demonstration and at a comparison site.
Program evaluation should focus on those aspects of care that might be jeopardized by extending prospective payment to physicians. Specifically, the process and outcome measures chosen should focus on the following possible problems (Lohr et al., 1984):

- Underutilization of highly beneficial tests and procedures
- Reduction in the number of referrals to modal specialists
- Premature discharges
- Changes in case mix
- Increase in inappropriate admissions (especially of nonsurgical cases)
- Increased readmissions
- Decreased patient satisfaction
- Impaired functional status
- Increased complications

DATA SOURCES FOR EVALUATING QUALITY OF CARE IN A DEMONSTRATION PROJECT

Data to evaluate inpatient quality of care may be obtained from several sources. A detailed discussion of the use and limitations of these data sources in demonstration projects has been prepared for HCFA by Lohr et al. (1984). Here we summarize how medical records, claims data, and data from patient surveys may be used to measure the quality of care dimensions discussed above.

Inpatient Medical Records

Any serious attempt to evaluate inpatient quality of care will need to include review of the medical records of beneficiaries admitted to the hospital within any of the diagnostic categories covered in the demonstration. The medical record is the best source of information on process measures of quality and provides the most information on underutilization of referrals, laboratory tests, and procedures. Relevant information could be abstracted from the medical record by specially trained nurse reviewers or record abstractors. Dictated summaries of the medical records could be used for physician peer reviews.

To evaluate the technical quality of care, lists of explicit quality criteria could be developed for the diagnoses and procedures of interest (Greenfield et al., 1975). For instance, explicit criteria lists describing various aspects of the hospital management of cholecystitis could be developed or modified from previously created lists. This adapted list, including an algorithm on the essential services to be rendered in
cholecystitis, could be used by record abstractors to evaluate process and to detect underprovision of necessary services. Adherence to the items on the list would be noted, and the various items weighted, to obtain process scores. Cases with scores below a specified level might then be selected for physician peer reviews.

Information on disease severity could also be obtained from the medical record. Several techniques for disease staging (Gonella, 1983; Gonella et al., 1984; Young, 1982) could be applied to medical record data to determine if patients with lesser or greater severity of illness are being admitted. This information might be used to examine use of hospital services by subsets of patients with similar degrees of illness severity.

Judgments on the appropriateness of hospital admission and days of care could be made from reviewing the medical record. Instruments have been developed to determine the appropriateness of acute-level hospital care by Gertman and Restuccia (1981) and by Systemetrics (under HCFA contract 500-80-0053).

While medical record review should be considered the core of an evaluation of the process of care, several limitations should be noted. The process of medical care may not have been adequately recorded in the medical record. This would be a significant problem if demonstration sites or hospitals differed in the accuracy, completeness, and timeliness of their medical record reporting. Furthermore, medical records are not very useful for assessing outcomes of medical care. Only the most immediate or short-term outcomes (e.g., in-hospital death, complications, etc.) could be assessed from the medical record. Outcomes such as wound infections and impaired functional status might not be apparent until after the patient was discharged. Neither does the medical record provide information on the art of care; that information has typically been derived from patient satisfaction surveys. For this reason, the evaluation based on medical records should be supplemented by some form of patient follow-up.

Patient Survey

Critical outcome information could be obtained by surveying a sample of patients discharged from the hospital. Data could be obtained to assess short-term outcomes of clinical interest (e.g., functional impairment, pain control, complications, etc.) as has been done in the Rand Health Insurance Experiment (Brook et al., 1976). Patient satisfaction could be assessed with standardized instruments developed by Ware and others.
Conducting a patient survey will probably require evaluation personnel at the demonstration site. They would be responsible for identifying pertinent patients at the time of discharge, collecting background information, securing cooperation of relevant parties, and conducting followup at the desired intervals. As is the case with process measures, the evaluation staff will need to modify existing instruments or design new instruments for data collection.

Claims Data

The use of Medicare claims data, while requiring no separate data collection, provides the most limited evaluation of quality. No process measures can be obtained from claims data. Only the most limited outcome measures can be obtained (e.g., in-hospital mortality or subsequent readmission). A few adverse outcomes, such as complications developed during the hospital stay, might be discerned from secondary diagnoses; often, however, one would be unable to determine whether the secondary diagnosis represented a complication (i.e., an adverse outcome) or preexisting co-morbidity (and hence not an adverse outcome). The Rand Nonintrusive Outcome study is in the process of validating the limited outcome measures available from claims data by assessing their relationship to quality of care as measured by abstraction of data from medical records.

Claims with diagnoses coded ICD-9 could be used to collect data on case mix using disease staging (Gonella et al., 1984); however, it is likely that this process is less precise than stages obtained from review of the medical record.

More information could be obtained from claims data, to the extent that hospital claims could be linked with other data sets (e.g., Part B or tapes on beneficiary eligibility status) in a timely manner. For example, linking PATBILL files with eligibility files would enable the evaluator to determine 90-day or one-year survival for patients undergoing prostatectomy (Wennberg, 1984). In Canada, Roos and Roos (1983) developed a method for linking provincial claims-data files to examine complications of major surgical procedures. While the application of this method to Medicare claims data merits pursuit, to our knowledge this method has never been validated using Medicare tapes.

Assuming that tapes were readily available in the first place, even the most sophisticated linking of data tapes would provide only limited information on quality. Thus, while analysis of claims data is an important part of quality evaluation, a careful evaluation of quality requires, at a minimum, primary data collection in the form of medical record review with or without a followup patient survey.
AN EXAMPLE: ASSESSING QUALITY OF CARE
FOR PROSTATECTOMY

To illustrate how quality could be evaluated in this demonstration, we outline a proposed evaluation of care for patients admitted for prostatectomy. Prostatectomy was selected because prostatism is prevalent among men in the Medicare population and criteria for assessing it have been developed and tested. While we focus on admissions for prostatectomy, the process we outline below could be implemented for most categories of hospital admissions.

Inpatient Medical Records

As noted above, process measures of care are most easily obtained from review of the inpatient medical record. For example, information could be abstracted from the medical records for all patients admitted for prostatectomy in the demonstration sites. Presence or absence of the following items (adapted from Utah Professional Review Organization 1973 guidelines for benign hyperplasia of the prostate) from the medical record could be recorded by trained nurses or medical record abstractors:

**History:**
Mention of hesitancy-intermittency, dysuria, hematuria, slow stream, incontinence, nocturia, chills and fever, frequency-urgency, and previous urological treatment.

**Physical:**
Prostate size, prostate texture, residual urine after voiding, flank tenderness, and scrotal masses

**Procedures:**
Intravenous pyelogram, blood urea nitrogen or creatinine, acid phosphatase, blood count, urinalysis

**Therapy:**
Prostatic operation, control of post-operative bleeding, and treatment of urinary infections

A more elegant approach to process evaluation would incorporate these criteria into an algorithm simulating clinical decisionmaking. This approach might recognize that examining for "flank tenderness" is most necessary when "chills and fever" are reported in the history. Greenfield et al. (1975) used this approach to develop criteria maps—incorporating explicit criteria within a clinical algorithm. Such a criteria map, developed for hyperplasia of the prostate, is shown in Lewis et al. (1976). As with the simpler explicit criteria list above, a quality score could be generated by nurse abstractors after reviewing the medical record. These quality of care scores for prostatectomy could be compared between hospitals, providers, and demonstration sites. A
sample of medical records, selected because of low criteria map scores, could be copied and reviewed by physicians in the specialty field, urology in this example.

The criteria lists used in the above example are several years old and would need be updated before being implemented. Ideally, the criteria should be adapted in consultation with local physicians at the demonstration sites to reflect prevailing standards of practice. If local practice variation appeared to dictate variation in criteria, a judgment would have to be made that such variation was acceptable (i.e., within the range of clinical uncertainty) or not. Such updated criteria lists could be developed for all the diagnostic categories considered in the demonstration.

As noted above, the medical record could also be used to obtain information on case mix. For example, information on disease staging for benign prostatic hypertrophy (Gonella, 1983) could be obtained from the medical records. Each admission could be classified into one of the following stages:

Stage 1.0 Benign Prostatic Hypertrophy (BPH)
Stage 2.1 Benign Prostatic Hypertrophy with Urinary Tract Infection
Stage 2.2 Benign Prostatic Hypertrophy with Obstruction Leading to Hypertrophy or Diverticuli of Bladder or Atonic Bladder
Stage 3.1 Benign Prostatic Hypertrophy with Bacteremia
Stage 3.2 Benign Prostatic Hypertrophy with Metastatic Infection
Stage 3.3 Benign Prostatic Hypertrophy with Obstruction Leading to Hydroureters or Hydronephrosis
Stage 3.4 Benign Prostatic Hypertrophy with Azotemia
Stage 3.5 Benign Prostatic Hypertrophy with Shock
Stage 4.0 Shock

Such information on staging is potentially quite useful. For example, if the altered reimbursement mechanism increased utilization of prosta-
tectomy, disease staging might reveal that providers were gaming the system by admitting patients with less severe conditions. Alternatively, increased numbers of patients with advanced stages might suggest poor access to care and delay in initiating therapy.

The medical record could also be used to evaluate appropriateness or need for acute-level hospital care. If length of stay for patients with prostatectomy decreased in the demonstration, hospital days could be reviewed for appropriateness using the Appropriateness Evaluation Protocol (Gertman and Restuccia, 1981). This analysis would indicate whether decreased length of stay was due to decreases in appropriate or inappropriate (i.e., non-acute) days.
Patient Survey

Recent studies have shown that prostatectomy is frequently associated with adverse outcomes. Wennberg (1984) has shown that one-year survival after prostatectomy is much lower than that previously reported in the medical literature, and that 13 percent of patients have a second operation within five years. His studies also show that survival varies among hospitals. These studies demonstrate the value of post-discharge followup of patients with prostatectomy. Information on post-discharge deaths, re-operations, and intermediate outcomes could be obtained from a patient survey.

In the case of prostatectomy, the following intermediate outcomes might be examined at 30 or 90 days after discharge:

- Persistent symptoms (e.g., nocturia, dribbling, hesitancy, or dysuria) post-operatively
- Abnormal urinalysis
- Anemia
- Functional status
- General health status
- Patient satisfaction

Information on these outcomes could be collected on all (or a sample of) patients in the demonstration sites having a prostatectomy. A personal interview of recently discharged patients would be required in order to obtain complete information. However, if only a more limited data collection budget were available, information on outcomes (with the exception of laboratory outcomes) could be obtained from a telephone survey. Information on these outcomes would be an important complement to the process measures obtained from the medical record review.

Claims Data

Because the outcomes (e.g., death) available from claims data are relatively infrequent, claims data will be of limited usefulness in evaluating a demonstration. The techniques developed in Manitoba (Roos and Roos, 1983) might be useful in evaluating the incidence of complications from common surgical procedures, but these techniques have never been attempted with the claims data available in the United States.
REFERENCES


Institute of Medicine, Reforming Physician Payment, National Academy of Sciences, Washington, D.C., 1984.


