REPORT TO THE CONGRESS

Improving Risk Adjustment in Medicare

MEDPAC

Medicare
Payment Advisory
Commission

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Executive summary

Risk adjustment of payments to Medicare+Choice organizations is needed to pay them fairly for the people they enroll. Paying fairly means adjusting the payments plans receive to take into account the predictable variability of health care costs among enrollees. In general, risk adjustment is intended to put plans on an equal footing so they can compete on the basis of the benefits and services they offer and not on whether they attract high- or low-cost enrollees.

The Congress asked MedPAC for recommendations to improve risk adjustment, for information on a specific risk adjustment model, and for recommendations on what to do about payments for specialized plans for the frail elderly. This report gives our response to each of these issues and discusses two additional issues: risk adjustment in Medicare+Choice for the frail elderly and for beneficiaries with end-stage renal disease.

Risk adjustment in Medicare+Choice

The Balanced Budget Act of 1997 directed the Health Care Financing Administration (HCFA) to replace the existing system of risk adjustment—which relied solely on demographic factors—with one that took enrollees' health status into account. HCFA began phasing in payments based on the new model, which measures enrollees' health status using diagnoses from inpatient hospitalizations, in 2000.

Although the new model improves on the demographic system in terms of predicting the costliness of plans' enrollees, it could be improved. Accordingly, we make several recommendations in this report to do so. We also address several questions posed to MedPAC by the Congress regarding the new system.

One improvement to the system that HCFA has proposed is to move to a multiple-site model capable of using diagnoses from inpatient, outpatient, and physician encounters. Implementing this model will not be without cost to HCFA and to plans, but collecting data from multiple sites would allow Medicare to take into account costly diagnoses that do not result in a hospitalization.

> **Recommendation 2A: MedPAC supports HCFA's intention to implement a multiple-site risk adjustment system in 2004 because diagnoses from multiple sites of care yield better measures of resource needs among beneficiaries. The system should be phased in to allow plans time to adjust to the effect on payments and to allow HCFA time to adjust for changes in providers' coding behavior.**

As HCFA implements the proposed multiple-site risk adjustment system, it should consider three additional steps. Two are primarily technical; one looks at payments to Medicare+Choice plans more broadly.

> **Recommendation 2B: HCFA should develop a multiple-site risk adjustment model capable of using more than one year of diagnosis data.**

Recommendation 2C: HCFA should evaluate modeling risk adjustment so that the time lag between the diagnosis data and the cost data the agency uses to estimate payment weights matches the lag between the diagnosis data and the payment.

Using two or more years of data would provide a more complete picture of beneficiaries' health status and thus allow more accurate payment for chronic conditions. Analysis of the additional data would entail some costs on the part of HCFA, but no new data would be required of plans. Conforming the lags between the risk adjustment model and payments could also increase the accuracy of payments.

The third step for HCFA to consider involves supplementing capitation payments with provisions to increase or decrease payments based on enrollees' actual use of services. Such a system would be analogous to what is now done in some of Medicare's prospective payment systems.

Recommendation 2D: HCFA should evaluate using partial capitation as the basis for a payment system for Medicare+Choice plans.

Partial capitation would reduce plans' risks of large losses, as well as their chance to earn large profits. It would also lower the risk of beneficiaries getting too little care under a capitated system.

Risk adjustment for special populations

The Congress asked MedPAC to look at payments for beneficiaries in specialized plans for the frail elderly. We also looked at the frail elderly population in Medicare+Choice more generally and at another special population, beneficiaries with end-stage renal disease (ESRD). Each of these situations presents unique problems for risk adjustment systems and the goal of paying plans fairly. In regard to frail elderly populations we recommend the following:

Recommendation 3A: As it evaluates multiple-site risk adjustment models, HCFA also should evaluate and report to the Congress on alternatives—including hybrid risk adjustment systems and partial capitation—to increase payment accuracy for frail elderly beneficiaries.

Current and proposed encounter-based risk adjustment systems are known to underpredict costs for frail elderly beneficiaries. Other methods that bring in data on functional status or service use might help improve payment accuracy. In addition, because specialized plans for frail beneficiaries also differ in the benefits they offer, we recommend continuing current payment methods for these plans until methods that account for their benefits and population characteristics are developed.

Recommendation 3B: The current method of payment for specialized plans should be used until a cost-effective and accurate alternative is developed that accounts for both the frailty of people enrolled in and differences in the benefits offered by those plans.

Finally, beneficiaries with ESRD have much higher expected costs than the overall Medicare population. In addition, the factors that affect their costs are known and differ from factors affecting costs in the overall population.

> **Recommendation 3C: The Congress should instruct the Secretary to implement a risk-adjusted method to pay for ESRD beneficiaries in Medicare+Choice using factors known to affect their costs.**

In summary, HCFA has proceeded fairly far down the road to adjusting payments to plans based on encounter data from multiple sites of care. We endorse that general direction with certain refinements to improve payment accuracy. At the same time, the agency should continue to look at alternatives. Moreover, until a model that predicts well for all populations is developed, the current model should not be imposed on specialized plans for the frail elderly where harm might be done by an inappropriate payment method or on the ESRD population where a better alternative might exist. ∎

Overview of risk adjustment in Medicare+Choice

The Balanced Budget Act of 1997 (BBA) directed the Secretary of Health and Human Services to begin making payments to Medicare+Choice (M+C) plans on January 1, 2000 using a system that accounts for differences in health status among enrollees. This requirement was motivated by concerns about the limitations of the prior payment system, with its so-called demographic model, which adjusts capitation payments for enrollees' demographic characteristics including age, sex, basis for entitlement (aged or disabled), and whether or not they work, are institutionalized, or are eligible for Medicaid benefits.

As a first step in meeting the BBA requirement, the Health Care Financing Administration (HCFA) began phasing in a new risk adjustment model on January 1, 2000. This principal inpatient diagnostic cost group (PIP-DCG) model measures enrollees' health status using their demographic characteristics and principal diagnoses from hospital inpatient stays (if any) during the previous year. HCFA plans to use the PIP-DCG model only temporarily, intending to replace it with a multiple-site model in 2004 that takes into account diagnoses from physician and hospital outpatient visits as well as hospital inpatient visits.

For 2000 and 2001, the Balanced Budget Refinement Act of 1999 (BBRA) mandated that the new risk adjustment model apply to 10 percent of the payment for M+C plans, and that the remaining 90 percent be based on the demographic model. For 2002, the portion of the payment adjusted using diagnostic data rises to 20 percent. Under HCFA's phase in schedule, by 2003 the risk adjusted portion would increase to 80 percent and 2004 would see full implementation of the multiple-site model. However, proposed but not enacted legislation might change that schedule. How risk adjusted payments are phased in will have significant impact on payment to plans and on the benefits expected from risk adjustment.

The BBRA also mandated that MedPAC recommend improvements to risk adjustment in Medicare+Choice in general, report on risk adjustment and payment for the frail elderly in specialized plans, and answer some specific questions about the PIP-DCG risk adjustment model. This report is our response to that mandate. The remainder of this chapter provides an overview of risk adjustment, Chapter 2 explains our recommendations for improving risk adjustment in Medicare+Choice, and Chapter 3 discusses special populations in Medicare+Choice and the challenge of risk adjustment and payment for the frail elderly and beneficiaries with end-stage renal disease. An appendix provides our detailed analysis of the specific questions on the PIP-DCG model.

Why risk adjust?

Risk adjustment systems attempt to pay health plans fairly for the members they enroll. In the Medicare context, payments to plans that participate in Medicare+Choice are risk adjusted so that the plans are paid fairly for the particular population of Medicare beneficiaries that they enroll. Before discussing risk adjustment systems in Medicare and how well they work, we first review what they are and how they are intended to work.

What is a risk adjustment system?

In the M+C program, monthly payments are made to plans that contract to provide health care for Medicare beneficiaries. In the contracts, the plans stipulate the benefits they will provide to enrollees for the payments specified in HCFAs's payment schedule, which specifies a base payment for Medicare beneficiaries by county of residence. Historically, the base payment was 95 percent of the cost of an average beneficiary in traditional fee-for-service Medicare in a county.[1] Although plans could be paid this average amount for each enrollee, they are not because (1) yearly costs for beneficiaries vary widely, and (2) the variation in costs per beneficiary are to some extent predictable. Payments to plans have always been adjusted to try to account for the predictable variability of costs. A risk adjustment system takes the predictable variability of costs into account by calculating how much payments should depart from the base rate for the set of beneficiaries enrolled in a plan.

How much do costs vary? In 1997, the average cost to Medicare of a beneficiary in the traditional fee-for-service program was about $5,300, but many beneficiaries cost the program very little or nothing at all, and 6 percent of beneficiaries served cost the program more than $25,000 each (HCFA 1999).

If a health care plan enrolled beneficiaries who mirrored the overall beneficiary population exactly, and the plan were paid $5,300 for each beneficiary enrolled, the plan would be paid fairly overall even though costs for individual beneficiaries varied from the average. If instead the plan had enrolled only beneficiaries known to have little or no costs, the plan would be overpaid if it were paid $5,300 per enrollee. Conversely, if the plan had enrolled only beneficiaries known to have high costs, it would be underpaid if it were paid $5,300 per enrollee.

Risk adjustment attempts to pay plans more fairly by adjusting the payments the plan receives to match the expected costliness of the actual mix of beneficiaries enrolled. For example, if we expect a beneficiary will have very low health care expenses, we might adjust the average payment of $5,300 down to $2,000. If we expect the beneficiary to have very high expenses, we might adjust the average payment upward to $20,000. The difficulty is in determining at the beginning of a year which beneficiaries will have low expenses and which will have high expenses during that year. There is no way of precisely predicting costs for a particular beneficiary in a particular year; however, the premise of risk adjustment is that for a large group of beneficiaries with particular characteristics, a reasonable estimate can be made of what that group's costs will be relative to the average of all beneficiaries.[2]

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[1]   The Congress in the BBA, recognizing that the system for determining base payment rates resulted in widely varying rates among counties, modified the system to decrease differences and guarantee a minimum or floor rate. Therefore, current base rates may differ significantly from 95 percent of the average cost for beneficiaries in traditional Medicare in a county.

[2]   For a particular beneficiary in a particular year there is no way to predict health care costs exactly because of the random nature of high-cost events. For example, an apparently healthy person might have a heart attack in any given year that could not have been predicted. These random events give rise to unpredictable variations in individuals' heath care costs. In large populations, however, the overall prevalence of random occurrences can be predicted and are referred to as the insurance risk for the population.

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Different approaches for grouping beneficiaries and predicting those groups' health care expenses give rise to different risk adjustment systems. For example, one might observe that as people get older, their health care costs increase. A simple risk adjustment system would group beneficiaries by age, and the effect of age on health care costs could then be estimated using data for particular age cohorts. In fact, a system much like that (with the addition of several other demographic variables) was used by HCFA to adjust payments to the Medicare risk health maintenance organizations (HMOs) that preceded the M+C program and is still being used in combination with other systems as they are being phased in. This demographic system does not do a very good job of adjusting group payments relative to the average, however, because it explains only about 1 percent of the variation observed in health care costs. Other factors, such as how sick people are at the beginning of the year, have a greater effect on health care costs during the year than the factors in the demographic system.

A system that takes into account more of the factors that affect future health care costs can predict those costs better and would be a better way of adjusting payments. Factors used in a risk adjustment system must be observable, such as age or hospitalizations. Conversely, some hidden genetic defect, although it might have a tremendous affect on future costs, is not observable and cannot be used in a risk adjustment system to place beneficiaries in groups. In addition to being observable in principle, the factor also must be captured in the data available for running the risk adjustment system. Age has been routinely available in administrative data systems, but hospitalizations for plan enrollees have not.

The observability of the factors is both essential for running a risk adjustment system and why risk adjustment is needed at all. If the population mix joining M+C plans exactly mirrored the overall population mix in Medicare, then the costs of the population in the plans would vary just as costs vary in the overall population, and no risk adjustment would be needed. Simply paying the average would be fair. But if the population mix is not the same as the average, and the factors necessitating risk adjustment are observable either to the plans or to beneficiaries, then risk adjustment is needed.

If plans can observe that certain groups of beneficiaries will have predictably lower costs, they have an incentive to attract those beneficiaries and reduce their costs below average. Similarly, plans could try to avoid groups of beneficiaries they expect to have higher costs. For example, if payment did not vary by age, plans might try to attract younger enrollees and avoid older ones.

If factors are observable to beneficiaries they might self select; for example, people without serious medical problems might not be as concerned about having broader choice of physicians as people with serious medical conditions and, hence, might be more likely to join managed care plans. If factors are observable to either plans or beneficiaries, the result might be a different population mix in plans than in traditional Medicare. Whether this selection is favorable or unfavorable, risk adjustment is necessary to pay plans fairly.

Problems with the demographic model

The demographic system, which still determines 90 percent of the monthly capitation payments to M+C plans, pays flat rates for all enrollees within a demographic category, reflecting average expected service use for that group. The demographic system, however, accounts for only a small portion of the predictable variation in costliness among enrollees. Hence, Medicare systematically underpays for enrollees who have serious illnesses and overpays for healthy enrollees. These systematic payment errors create several problems. First, paying plans too little for sick beneficiaries creates incentives to avoid groups of beneficiaries who have or are likely to develop serious illnesses and conversely, to attract healthy enrollees. Further, payment errors may discourage plans from developing effective care management programs for serious acute and chronic conditions because doing so might attract more high-cost beneficiaries. Finally, systematic payment errors may cause Medicare to overpay or underpay in the aggregate if the health status of beneficiaries who enroll in M+C plans differs from the average.

Evidence shows that overpayment due to systematic payment errors has occurred. The General Accounting Office (GAO 2000), Riley et al. (1996), and Hill et al. (1992) all find Medicare paid more under the demographic system than the program would have paid if managed care enrollees were in traditional Medicare. This overpayment reflects a combination of favorable selection (enrollment of relatively low-cost beneficiaries) in Medicare managed care and the failure of the demographic system to adjust payments downward adequately for low-cost beneficiaries.

Whether the favorable selection into plans reflects intentional efforts to attract low-cost beneficiaries or simply that those beneficiaries find managed care more attractive than do higher-cost beneficiaries is not an issue; favorable selection in Medicare+Choice does occur (PPRC 1996, MedPAC 1998, and MedPAC's latest results, which are presented in the appendix) and the demographic system does overpay for healthy beneficiaries.

What risk adjustment is designed to do

Risk adjustment is designed to reduce systematic payment errors by making payments reflect beneficiaries' expected costs more accurately, and in so doing reduce or eliminate the problems related to these errors. Effective risk adjustment allows plans to compete on the basis of benefits and services they offer rather than benefit from attracting favorable risks. Also, under effective risk adjustment, plans might be more likely to develop and market care management programs for beneficiaries with serious conditions. Finally, effective risk adjustment would reduce overpayments to plans in the aggregate.

Risk adjustment will not eliminate overpayments and underpayments to plans that result from base rates being too high or too low. The base rate—called the M+C county payment rate—was originally set at 95 percent of the expected cost of a beneficiary of average demographic status in traditional Medicare in that county. However, in many counties the base rate is now a legislatively determined "floor" rate. In other counties, it is the 1997 rate increased by 2 percent a year, while in a third group of counties the base rate is a blend of updated local rates from 1997 and an average national rate. If these base rates are higher than average fee-for-service costs, which is true by definition in the floor counties, then payments will be too high; that is program costs will be higher than they would have been if the beneficiaries stayed in traditional Medicare. If base rates are lower than expected costs, for example if fee-for-service payments have been rising at more than 2 percent a year in counties at the 2 percent limit, payments may be lower than average fee-for-service payments. Risk adjustment will not correct these problems with the base rate nor is it intended to.

Risk adjustment is also not intended to account for differences in benefit packages. Payments are adjusted relative to the program cost of beneficiaries in traditional fee-for-service Medicare with its specified benefits. If plans have different benefit packages that are more costly, the difference should not be captured through a risk adjustment system, which is meant to predict the expected costs of people as if they were in the traditional fee-for-service program.

If Medicare set base rates equal to average fee-for-service spending, a perfect risk adjustment system would match payments to enrollees' expected costs in the traditional program. The risk adjustment system would account for all the factors associated with predictable variation in beneficiaries' costs, but would not adjust for random variation in costs. For example, because a person who has uncontrolled high blood pressure is at a higher risk for a stroke than a person with low blood pressure, such a person would be predicted to have higher costs. Payments under a perfect risk adjuster would reflect that. The actual costs of the person with high blood pressure depend, in part, on whether the beneficiary has a stroke that year, which depends in part on the luck of the draw. Payments under a perfect risk adjuster for the particular beneficiary would not reflect such random, high-cost occurrences—which are part of insurance risk—but total payments for the plan should.

How much of the total variation in costs is random is not known. One estimate is that at least 20-25 percent of the variation in costs is predictable (Newhouse et al. 1997). If that is correct, then the 1 percent of total variation explained by the demographic system leaves substantial room for improvement. In comparison, the PIP-DCG system is estimated to account for about 5 to 6 percent of the variation in total costs, making it a big improvement over the demographic system, even though it only explains about one-quarter of the predictable variation.[3] The hierarchical coexisting conditions and clinical risk group models HCFA is considering, which rely on data from multiple treatment sites, explain about 11 percent, perhaps half the predictable variation.

Although these multiple-site models are an improvement over the demographic system and should be pursued, the Commission also encourages HCFA to evaluate other risk adjusters because it is doubtful the multiple-site models explain enough variation to reduce the incentive to risk select to negligible levels. In addition, it appears these models will have large data collection costs, and it is not clear whether their additional benefit will be worth the cost.

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[3]   If 25% is predictable, then 6/25 equals approximately 1/4.

Impact of risk adjustment on aggregate payments

HCFA estimates that full implementation of the PIP-DCG model would have reduced payments to M+C plans in 2000 by 5.9 percent (about $2.2 billion). Plans and members of the Congress have argued that the aggregate payment reduction from risk adjustment should not occur, claiming that risk adjustment should be budget neutral. The purpose of risk adjustment, however, is to raise or lower payments to account for the predictable differences in beneficiaries' costs. If M+C enrollees are healthier than average and the PIP-DCG system reflects beneficiaries' expected resource use more accurately than the demographic system, then implementing the PIP-DCG should reduce aggregate payments (MedPAC 1999).

Concerns about aggregate payments should be addressed by considering whether M+C base payment rates are adequate. As previously discussed, the Congress has legislated base payment rates. The correct level for these rates in aggregate is a separate decision from the risk adjustment decision. For any level of base payment rate, risk adjustment should make resulting payments relatively more accurate in terms of the expected costs of beneficiaries. If the Congress wants to establish an aggregate payment target for M+C plans, that decision should be made by changing the base rates. Making risk adjustment budget neutral is essentially an argument for increasing base payment rates and legislating that a certain amount of money should go to M+C plans. For example, if the Congress wished to make risk adjustment using PIP-DCGs budget neutral, base rates could be increased 5.9 percent to offset the expected decrease resulting from fully risk adjusted payments.

Risk adjustment framework

The specific approach taken to risk adjust payments to health plans depends on decisions made as to the appropriate unit of adjustment, what health status factors should be taken into account, and how to collect the needed data.

Unit of adjustment

Two general approaches could be followed for risk-adjusting payments to M+C plans. The approach currently used adjusts payment to plans based on the health status of the individual beneficiaries they enroll. The other would adjust payments based on plan-level measures of health status.

Under the first approach, payments are made on behalf of each individual beneficiary enrolled in the plan, based on the individual's health status in a base period. An advantage of this approach is that payments can follow individual beneficiaries as they move between the traditional Medicare program and the M+C program, or between M+C plans. Another advantage is that if payments are accurate, then plans will not have incentives to avoid any particular groups of beneficiaries. Also, HCFA is further along in modeling individual-based measures than in modeling plan-based measures.

Under the second approach, the sum of the payments for all of the beneficiaries enrolled in a plan could be adjusted based on data collected at the plan level during a base period. Using plan-level data could impose a smaller data collection burden on plans than collecting individual encounters if sample survey data were deemed sufficient. (Some would say survey data are not sufficient because of doubts concerning the validity and reliability of survey data as well as their ability to explain variation in costliness.) Conversely, the data collection burden on HCFA might increase if HCFA also had to collect survey data on the fee-for-service population in each county to use a survey-based approach. Additionally, changes in the risk status of the plan population resulting from enrollment of higher or lower risk individuals during the year would not be reflected in payments. However, plan-level measures could influence plan-level behavior.

Health status factors

Health status can be measured in several ways. Demographic factors—such as age and sex—have been used in the M+C program as proxies for health status. Demographic factors are also used in the commercial health insurance sector to set premiums along with underwriting and experience data when those data are available and their use is allowed. While there is dissatisfaction with relying on demographic factors alone in the M+C program, demographic characteristics remain an important component in current risk-adjustment modeling.

Another potential source for health status measures is surveys of beneficiaries regarding their health status. Researchers have found that measures of self-reported health status are useful in predicting future health care spending, particularly in certain populations such as the frail elderly (see Chapter 3 for more information). Models based on survey data would require sampling populations in both M+C and the traditional program to set comparison measures. Surveys are not currently used for payment purposes in part because policymakers fear that these measures could be manipulated by those receiving payments.

One strong predictor of future healthcare spending is past healthcare spending on behalf of an individual. While measuring spending for beneficiaries in traditional Medicare is straightforward, doing the same for beneficiaries enrolled in M+C plans is more challenging. For example, should spending for services not covered in the traditional Medicare benefit count if it substitutes for care that is in the Medicare package? What prices should be used for services delivered by M+C plans? (The model that HCFA uses to estimate incremental costs is based on the fee schedules and cost limits used by traditional Medicare. Plans may negotiate different fees.) In addition to measurement challenges, some policymakers are concerned that using past spending can lead to incentives similar to those under a cost-based payment system where higher spending is rewarded with higher payments.

The current risk-adjustment model used to pay M+C plans measures health status partially by using diagnoses recorded during Medicare-covered inpatient hospital stays. HCFA is now moving to include diagnoses recorded during outpatient and physician encounters as well. While the possibility of data manipulation to increase payments exists, many analysts believe that diagnoses data are less susceptible to manipulation than plan-reported cost or self-reported health status measures.

Data collection tools

Several different tools could be used to gather data on beneficiaries' health status. Some data are already collected by Medicare and therefore would involve no additional burden or costs. For example, HCFA routinely collects demographic data on all beneficiaries to determine Medicare eligibility. The agency also collects encounter data, including diagnoses, to pay claims for beneficiaries enrolled in traditional Medicare. Other data collection efforts have been initiated for the express purpose of moving to a risk-adjustment system based on the diagnoses presented on encounter data. For example, HCFA has been collecting data from all inpatient hospital encounters and will shortly begin collecting data from hospital outpatient and physician encounters for M+C enrollees. These new sources of data entail new costs.

In addition to administrative, claims, and encounter data, HCFA has access to survey data that could be used in risk-adjustment systems. Every year, the Medicare Current Beneficiary Survey is administered to 12,000 Medicare beneficiaries. The survey asks questions about respondents' health status, use of services, and healthcare spending. Also, HCFA administers the Health Outcomes Survey to 1,000 enrollees of each M+C plan. This survey includes health status questions. These surveys provide useful information, but it is information that is not routinely collected by health plans.

Cost considerations for risk adjustment

As with any other change to the Medicare program, developing and operating a new risk adjustment system is costly. Those costs have to be weighed against the potential benefits of the new system to reach a reasoned judgement about the advisability of making the change.

The benefits of a new risk adjustment system—better access for some higher-cost beneficiaries, fairer payment for M+C plans, and reducing overpayments by the program—have been discussed above. In the following section we consider development costs and operating costs for a risk adjustment system based on encounter data. (Other risk adjustment systems, such as those based on survey data, would have costs in similar categories but a different set of detailed cost elements.) We do not quantify costs, but discuss the array of possible costs that need to be considered.

Development costs

Development costs—principally the one-time costs of developing the system to be put in place—are incurred by both HCFA and the plans. HCFA's development costs include those to develop the risk adjustment method itself, to communicate the new system requirements to the plans, and to develop systems to receive and process the data supplied by the plans. These costs have, for the most part, already been incurred by HCFA for the PIP-DCG model and have been incurred to a lesser extent for the multi-site models.

Development costs for private entities in the M+C program include those to develop systems to collect and process data, transmit them to HCFA, and retransmit in response to HCFA requests for clarification. Collection costs include the costs of renegotiating provider contracts to include encounter data submission, if necessary; communicating data standards to providers; and developing the internal systems to collect, edit and process the data from providers. These costs may vary widely depending on the entities' contractual relationship with the providers. For example, if plans contract on a fee-for-service basis, much of the data and means to collect and process it could already be available. If instead providers operate under capitation, there may be no pre-existing means to collect the data.[4] Reporting encounters with those physicians may require developing new systems and procedures and renegotiating contracts. Many of these costs may already have been incurred at this point for entities already in the program. If providers have not submitted encounter or claims data they too may have to develop new systems.

Operating costs

HCFA, plans, and providers face recurring costs to maintain automated systems, as well as for data origination, collection, and transmittal including rectifying encounter data problems such as duplicate encounters. HCFA also faces the recurring costs to calculate risk scores for both fee-for-service and M+C beneficiaries, calculate payments, and update and maintain the risk adjustment system itself, as well as costs for physician and M+C plan education and training efforts.

Cost impact

The impact on private sector entities of development and operating costs will vary. For example, the fixed cost of developing a data system may be high, which would represent more of a burden for a plan with few beneficiaries than for a large plan. Where costs are related to the number of beneficiaries, such as data transmittal costs, the burden is more even across large and small plans. Burden would also be less related to plan size if costs were shifted to providers. High fixed costs may be more of a burden for local plans than for those plans affiliated with large, national M+C organizations; that burden might discourage new entrants and encourage exit of small, unaffiliated plans. Understanding how costs are distributed is crucial to understanding the burden associated with a new risk adjustment system and the incentives and changes in behavior it might create.

A comprehensive assessment of the costs and benefits of risk adjustment would require estimating the overall costs of the program, delineating the burdens on the different entities, and examining alternative methods for achieving the same benefit. For example, if risk adjusted payments were limited to 10 percent of the total payment and never fully phased in, the benefit would be very limited and the cost may not seem commensurate. In that case, other approaches to more accurate payment such as reassessing the base payments could be more cost effective. ∎

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[4]   Recent research shows that three-fourths of Medicare HMOs use capitation to pay primary care physicians (MedPAC 2000).

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Risk adjustment
in Medicare+Choice

RECOMMENDATIONS

2A MedPAC supports HCFA's intention to implement a multiple-site risk adjustment system in 2004 because diagnoses from multiple sites of care yield better measures of resource needs among beneficiaries. The system should be phased in to allow plans time to adjust to the effect on payments and to allow HCFA time to adjust for changes in providers' coding behavior.

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2C HCFA should evaluate modeling risk adjustment so that the time lag between the diagnosis data and the cost data the agency uses to estimate payment weights matches the lag between the diagnosis data and the payment.

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2D HCFA should evaluate using partial capitation as the basis for a payment system for Medicare+Choice plans.

The Commission believes the benefits of risk adjustment in Medicare+Choice (M+C) make it worth pursuing. As a result, MedPAC has supported risk adjustment (MedPAC 1998, MedPAC 1999a, and MedPAC March 1999b) and continues to support it to ensure that plans are paid fairly and to help ensure beneficiaries' access to the M+C program. The principal inpatient diagnostic cost group (PIP-DCG) model is a move in the right direction, capturing a much greater fraction of the predictable differences in enrollees' costliness than the demographic model. However, policymakers have concerns about the future of risk adjustment and where it is headed. The Balanced Budget Refinement Act of 1999 (BBRA) reflected these concerns in requiring MedPAC to recommend ways to improve risk adjustment in Medicare+Choice.

How well do risk adjustment models work?

Research shows risk adjustment models that use diagnoses from individual-level encounter data perform better than the demographic system. HCFA has focused much of its research on risk adjustment in examining the PIP-DCG model and the diagnostic cost group hierarchical condition category (DCG/HCC) model. As described in Chapter 1, the PIP-DCG model uses the principal diagnoses from hospital inpatient stays in one year to predict costs in the next year. The DCG/HCC model uses diagnoses from multiple sites (physician visits and hospital inpatient and outpatient encounters) to predict costs, and is a model HCFA is considering for 2004. The main benefit of these models over the demographic model is that they pay more accurately for the expected costs of plan enrollees.

Payment accuracy can be evaluated using a predictive ratio, which relates the costs to the Medicare program predicted by a risk adjustment method for a group of people to the actual costs to the program observed for that group.[1] A predictive ratio of 1.0 indicates predicted costs equal actual costs; that is, costs are accurately predicted on average. A value less than 1.0 indicates the risk adjustment system predicts lower costs than actually occurred. Conversely, a ratio greater than 1.0 indicates predicted costs are greater on average than actual costs.

Research by Pope and colleagues (1999 and 2000) presented in Table 2-1 indicates that a model similar to Medicare's demographic system generally has worse predictive ratios than the PIP-DCG and the DCG/HCC models.[2] For example, when Pope and colleagues divided their analytic sample into total costliness quintiles, the demographic model had a predictive ratio of 0.47 for beneficiaries in the fifth quintile (representing the highest-cost beneficiaries). In contrast, the PIP-DCG model had a predictive ratio of 0.75, and the DCG/HCC had a predictive ratio of 0.86. These results indicate that the PIP-DCG model predicts costs for sick beneficiaries much better than the demographic system, and the DCG/HCC does an even better job.

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[1]   Actual costs are defined to be costs to the traditional fee-for-service Medicare program. In other words, risk adjustment systems are not attempting to predict the cost that M+C plans would incur. Accurate payment is defined in terms of fee-for-service costs because a goal of the M+C program is to take advantage of the efficiencies private sector plans may achieve while ensuring that the Medicare program is no worse off. Where plans are more efficient, plans are expected to share the surplus from that efficiency by increasing benefits. The program is no worse off because plans are paid what they would have been paid for beneficiaries if they had stayed in traditional Medicare.

[2]   The actual demographic system used for risk adjustment bases predicted costs on beneficiaries' age, sex, Medicaid status, and institutional (nursing home) status. The model used in Pope et al. (1999) differs from Medicare's demographic model in that it does not use institutional status to predict costs. Also, it does use whether an elderly beneficiary was ever eligible for Medicare on the basis of a disability. Finally, Pope's model is based on a regression prediction, not the AAPCC rate cell approach.

Predictive ratios for demographic, principal inpatient diagnostic cost group, and diagnostic cost group hierarchical condition category risk adjustment models (values closer to 1.0 indicate better prediction)

Cost quintile (base year)	Demographic model	PIP-DCG	DCG/HCC
First (lowest)	2.57	2.09	1.23
Second	1.88	1.54	1.23
Third	1.35	1.10	1.14
Fourth	0.96	0.84	1.02
Fifth (highest)	0.47	0.75	0.86

Note: PIP-DCG (principal inpatient diagnostic cost group), DCG/HCC (diagnostic cost group hierarchical condition category). Base year indicates the year prior to the year in which costs are predicted. For the demographic and PIP-DCG models, the base year is 1995, for the DCG-HCC model, the base year is 1996. Data for the demographic and PIP-DCG results are from the 1995 and 1996 5 percent standard analytic files of Medicare beneficiaries. Data for the DCG/HCC results are from the 1996 and 1997 5 percent standard analytic files of Medicare beneficiaries.

Source: Pope et al. 1999 and Pope et al. 2000.

The PIP-DCG and DCG/HCC models are more accurate because both models account for the impact of serious conditions on beneficiaries' expected costs, whereas the demographic system does not. Consider, for example, two beneficiaries: a 72-year-old male hospitalized with lymphatic cancer in the previous year and a 72-year-old male who had no conditions diagnosed in the previous year. The predicted cost of the beneficiary with lymphatic cancer under the PIP-DCG is $30,059, but the predicted cost of the healthy beneficiary is $3,596. In contrast, the demographic system yields the same predicted cost for both beneficiaries: $4,623.

The PIP-DCG and DCG/HCC models also predict costs for healthy beneficiaries better than the demographic model does. For beneficiaries in the first quintile (representing the lowest-cost beneficiaries), the predictive ratios of the demographic, the PIP-DCG, and the DCG/HCC models were 2.57, 2.09, and 1.23, respectively.

Although the PIP-DCG is better than the demographic system at predicting costs for low-cost beneficiaries, it does not do as well as the DCG/HCC. The DCG/HCC performs better because it does not treat beneficiaries with serious conditions who were not hospitalized the previous year as if they were healthy. For example, PIP-DCG predicts a 72-year-old male with paraplegia but no hospital stays in the previous year to cost $3,596, the same as a 72-year-old male with no conditions in the previous year. In contrast, based on diagnostic information from physician and outpatient hospital claims, the DCG/HCC predicts the paraplegic to cost $8,478 and the beneficiary in good health to cost $1,854.

Our discussion focuses on the predictive ratios of high- and low-cost beneficiaries because it is among these groups that incentives for selection are greatest under the demographic model. To the extent that a risk adjustment model accurately predicts costs for those groups, incentives to attract low-cost beneficiaries and avoid high-cost beneficiaries diminish. Although the incentives are not completely eliminated by the PIP-DCG or DCG/HCC models, the PIP-DCG would reduce them, and the DCG/HCC would reduce them more.

MEDPAC

Move to multiple-site risk adjustment

Although the PIP-DCG model improves on the demographic adjuster, MedPAC recommends that HCFA continue its efforts to move to a multiple-site risk adjustment system in 2004.

<div style="background:black;color:white;text-align:center;font-weight:bold">RECOMMENDATION 2A</div>

MedPAC supports HCFA's intention to implement a multiple-site risk adjustment system in 2004 because diagnoses from multiple sites of care yield better measures of resource needs among beneficiaries. The system should be phased in to allow plans time to adjust to the effect on payments and to allow HCFA time to adjust for changes in providers' coding behavior.

The primary shortcoming of the PIP-DCG is its failure to account for conditions treated in ambulatory settings that predict higher future costs. This shortcoming results in systematic overpayments for healthy beneficiaries and underpayments for beneficiaries with serious conditions who were not hospitalized in the previous year. Also, the PIP-DCG system penalizes plans that are effective in substituting ambulatory care for more expensive hospital inpatient care.

Compared with the PIP-DCG model, a multiple-site system will pay more accurately for beneficiaries' expected costs, thus reducing the problem of overpaying for healthy enrollees and underpaying for enrollees with serious conditions. It also will remove disincentives associated with substituting ambulatory care for inpatient care.

A multiple-site model requires much more data than does the PIP-DCG, raising some cost concerns. Although some of the costs associated with developing a multiple-site model and data collection and processing systems to support it have already been incurred, collecting and processing the data will continue to challenge HCFA, plans, and providers. Therefore, the cost of overcoming those challenges and the extent to which they present barriers to entering the program should be monitored as should the ongoing costs and benefits.

HCFA should phase in multiple-site risk adjustment
Experience with the transition from the demographic model to the PIP-DCG model should help plans adjust to the change from PIP-DCGs to a multiple-site model, but at least some plans are likely to see substantial changes in payment. HCFA calculates payments to M+C plans as the product of an index of enrollees' health status (risk scores), which is calculated using the risk adjustment model, and county base payment rates. Moving from the PIP-DCG model to a multiple-site model can change risk scores substantially: this change affects payments.

For example, a woman in the 65-69 age group with no conditions would have a risk score of 0.45 under the PIP-DCG model, but only 0.23 under the DCG/HCC model, a 49 percent decline. Risk scores also can increase substantially by moving from the PIP-DCG to the DCG/HCC model, especially for beneficiaries with serious conditions who had no inpatient stays in the previous year. For example, a 72-year-old man with diabetes and congestive heart failure who did not receive hospital inpatient care would have a PIP-DCG risk score of 0.71, but a DCG/HCC risk score of 1.05. Also, under multiple-site risk adjustment the risk scores of many more beneficiaries will be affected by diagnoses from health system encounters. Only 12 percent of traditional program beneficiaries have hospitalizations that would affect their risk scores under the PIP-DCG model, but 57 percent of them have health system encounters that would affect their risk scores under the DCG/HCC model (HCFA 2000).

The impact on a plan's aggregate payments of moving from the PIP-DCG model to a multiple-site model will not be as extreme as the change in risk scores indicated in these examples because plans will get higher payments for some enrollees and lower payments for others. Still, there is potential for large changes in payments at the plan level, and some plans will likely see such changes.

Large changes in risk scores could also affect the county base payment rates. HCFA determines base rates as the maximum of three possibilities: a blend of a local payment rate and a national rate; a floor (minimum) rate; or a 2 percent increase from the previous year's payment rate. When HCFA makes the switch from the PIP-DCG model to multiple-site risk adjustment, some counties could see large changes in local payment rates if the average risk score for fee-for-service beneficiaries changes substantially.[3] Large changes in local rates would cause large changes in blended rates and ultimately in payments.

The effect of multiple-site risk adjustment on payments is important because the benefits offered and premiums charged by plans are closely tied to payments. In the most extreme cases, plans facing payment cuts could withdraw from Medicare+Choice, disrupting coverage for their enrollees. In contrast, plans that see large payment increases could provide more benefits or develop better systems of care for beneficiaries with serious conditions.

Transition from the PIP-DCG system to multiple-site risk adjustment could also create problems for HCFA. In particular, while the agency will likely use diagnosis data from traditional Medicare to determine payment weights, M+C providers may code diagnoses differently and more completely when payments depend on how they code. For example, M+C providers may code permanent conditions such as renal failure more persistently than traditional Medicare providers. This difference in coding between traditional Medicare and Medicare+Choice could raise payments beyond what HCFA expects, causing payment weights for some health status categories to be higher than the expected resource use of M+C enrollees assigned to them. HCFA may want to adjust payment weights or base payment rates if coding differences occur.

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[3]   For each county, the local payment rate used in the blended rate is the per capita cost of the traditional program beneficiaries in the county divided by the average risk score of these beneficiaries. If there is a substantial difference between a county's average risk score under the PIP-DCG model and its risk score under multiple-site risk adjustment, replacing the PIP-DCG model with a multiple-site model will have a large impact on the county's local payment rate.

MedPAC

Because of its potential impact on payments and the potential difference in coding between traditional Medicare and M+C providers, MedPAC suggests that HCFA phase in multiple-site risk adjustment. HCFA has not made it clear whether it intends to do that, nor has a phase-in been enacted legislatively. The Commission believes a phase-in would allow plans and HCFA time to address these issues before payments are adjusted exclusively by a multiple-site model.

Using multiple years of diagnoses

Using more than one year of diagnosis data in a risk adjustment system presumably would improve how well the system predicts beneficiaries' costs, as some persistent conditions affect beneficiaries' health and health care costs over time. Using multiple years of diagnosis data would entail some additional costs for HCFA, but should not require additional data or collection efforts by plans.

In addition to making payments more accurate, using multiple years of diagnosis data could make payments more stable as well, which would mean more stable revenue streams to plans. If HCFA uses only one year of diagnosis data in multiple-site risk adjustment, payments would be unstable if M+C providers code permanent conditions with the same lack of persistence displayed by providers in traditional Medicare (MedPAC 1998). Using multiple years of diagnosis data would help solve the problem of unstable payments by carrying diagnoses of permanent conditions over several years.
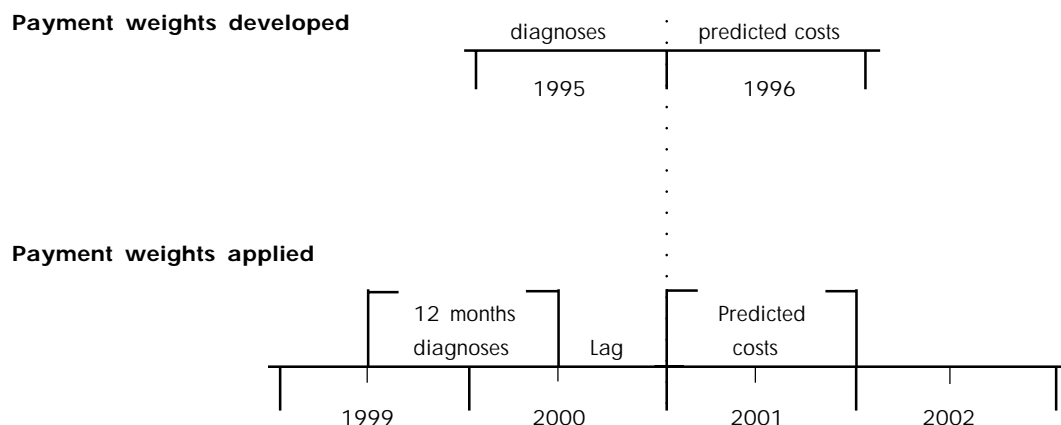
RECOMMENDATION 2B

HCFA should develop a multiple-site risk adjustment model capable of using more than one year of diagnosis data.

Using more than one year of diagnosis data presents three challenges for HCFA. First, the agency would have to track beneficiaries' diagnoses over several years. Second, HCFA would have to account for the fact that costs associated with some conditions diminish over time, but increase for other conditions. For example, payments for beneficiaries who were diagnosed with a condition one year ago should reflect the expected costs of those beneficiaries in the year after diagnosis, while payments for beneficiaries diagnosed two years ago should reflect the typically different expected costs of care two years following diagnosis. Third, HCFA would have to determine how many years of diagnoses to include. On the one hand, each additional year of diagnosis data gives more information about beneficiaries' health. On the other hand, the incremental improvement in payment accuracy provided by each additional year is smaller than the previous year. Also, each additional year may make the risk adjustment system more cumbersome.

Finally, using more than one year of diagnosis data would increase the number of beneficiaries whose health status was measured with more than one condition. MedPAC believes HCFA should consider how beneficiaries' medical conditions interact to affect costs. For example, the resource needs of a beneficiary who has diabetes and suffers a heart attack may be greater than the combined resource needs of a person who has a heart attack and another who has diabetes. MedPAC recognizes that addressing the interaction of conditions could make risk adjustment so complicated that it becomes unwieldy. Nevertheless, the Commission encourages HCFA to at least explore this issue.

**FIGURE
2-1**

Lag between year of diagnoses and predicted costs

Proper treatment of data lags

When HCFA developed the PIP-DCG model, the agency grouped beneficiaries into health status categories on the basis of their diagnoses from hospital inpatient stays in 1995. HCFA estimated a payment weight (expected cost) using cost data from 1996. There was no time separation or lag between the end of the year of diagnosis data and the beginning of the year of cost data HCFA used to estimate payment weights.

In contrast, when HCFA applies the payment weights to determine payments, there is a six-month lag between the end of the year of diagnosis data and the beginning of the actual payment year because plans and the agency need time to collect and evaluate data to determine diagnoses. For example, HCFA will use hospital inpatient diagnoses from July 1999 through June 2000 to risk adjust payments in 2001 (Figure 2-1). The agency could have established a policy of using July 1999-June 2000 diagnosis data to set payments in the first few months of 2001 and then making retroactive adjustments to those payments when complete diagnosis data from January 2000-December 2000 become available. HCFA gave plans the choice of this option, which would adjust payments more accurately for enrollees' expected costs, or payments based on diagnosis data with a six-month lag, which gives plans more certainty because there is no retroactive adjustment of payments. Plans indicated a preference for the latter method.

HCFA's use of lagged diagnosis data to determine payments and non-lagged data to estimate payment weights could potentially decrease the accuracy of the risk adjustment system. We recommend that HCFA examine whether such a decrease has occurred.

RECOMMENDATION 2C

HCFA should evaluate modeling risk adjustment so that the time lag between the diagnosis data and the cost data the agency uses to estimate payment weights matches the lag between the diagnosis data and the payment.

To evaluate the effect of the lag on the accuracy of the risk adjustment systems under consideration, we propose the following: recalculate payment weights, reassign beneficiaries to health status categories, reevaluate the predictive power of the model, and assess the impact on aggregate payments using diagnoses from a time period 18 months to 6 months prior to the start of the year of cost data.

Take the PIP-DCG model as an example. As explained above, HCFA placed beneficiaries in diagnostic cost groups based on their diagnoses from hospital inpatient stays in 1995. It then developed payment weights by associating beneficiaries in these cost groups with their actual costs in 1996. In the experiment we propose, HCFA would repeat this procedure but associate diagnosis data from July 1994 through June 1995 with cost data from 1996. It would then determine the proportion of beneficiaries in each cost group, payment weights, the predictive ratios, the percent of variation explained by the model, and the effect on plans' payments. Finally, these values would be compared with those obtained previously.

We have reason to expect that the experiment might show a substantial difference in at least one of these measures: percent of variation in costs explained. For example, Averill et al. (1999) used a multi-site model (the clinical risk group model) to calculate the difference between the variation in beneficiaries' costs explained by non-lagged diagnosis data versus the variation explained by data lagged six months. They estimated that the variation in beneficiaries' costs explained by the model dropped from 10.1 percent with non-lagged diagnosis data to 8.4 percent with data lagged six months. Our own preliminary analysis using the DCG/HCC model shows similar results.[4] HCFA should determine how much the variation explained by the PIP-DCG and the multiple-site risk adjustment models under consideration drops when using lagged diagnosis data. If the drop is substantial, the benefits of the risk adjustment systems may be less than reported thus far.

If HCFA decides to reconcile the time lag inconsistency, the agency has two options. First, as discussed above, the agency could use lagged diagnosis data to set payments for the first few months of each year, then make retroactive adjustments to payments when a complete set of non-lagged diagnosis data becomes available. Second, the agency could estimate payment weights with lagged diagnosis data and use diagnosis data with the same time lag to set payments. If HCFA uses this latter option, it must be careful not to make the lag too long, as diagnosis data become a less effective tool for predicting beneficiaries' costs as the lag increases.

Evaluate the use of partial capitation

A further step to improve payment accuracy would supplement capitation payment with provisions to increase or decrease payments based on beneficiaries' actual use of services (Newhouse 1998). Conceptually similar payments are made in the inpatient prospective payment system (PPS) for outlier cases that consume exceptionally high levels of resources, payments to PPS-exempt hospitals and the transitional stop-loss provisions in the outpatient PPS.

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[4] We used software from DxCG Inc. in our analysis.

HCFA should evaluate using partial capitation as the basis for a payment system for Medicare+Choice plans.

For example, suppose plans were paid 50 percent based on Medicare allowed costs and 50 percent based on capitated rates. Payments for the cost portion could be based on a fee schedule or reimbursement of cost. If payments were based on a Medicare fee schedule, plans would be paid 50 percent of the fee schedule amount for each covered service provided. If instead the cost portion were based on pure cost reimbursement, plans would receive 50 percent of their allowable Medicare costs, presumably calculated from something like a cost-report or plans' adjusted community rate (ACR) submissions. Regardless of which method was used to determine the cost portion, plans would also get paid 50 percent of the monthly capitated payment for each enrollee.

Partially-capitated payments would reduce plans' risk of suffering large losses and their chance to make large profits. By reducing the risk from enrolling high-cost beneficiaries and the gain from enrolling low-cost beneficiaries, partial capitation would reduce incentives to risk select. The lower risk of large losses might also encourage greater plan participation.

Partial capitation might also lower the risk of beneficiaries getting too little care under a capitated payment system. Since partial capitation would provide some payment for additional services provided, it would reduce incentives that plans or sub-capitated providers might have to limit the amount of care provided.

At the same time, however, partial capitation would increase the risk to Medicare and beneficiaries of excessive resource use and cost. Implementation would require development of appropriate fee schedules and collection of encounter information on units of service provided by plans, or it would require Medicare to reimburse plans based on cost reports or ACR submissions that are not currently adequate for payment purposes. Also, under some circumstances plans may choose to treat beneficiaries by using services that are not covered by Medicare, such as prescription drugs. Under those circumstances, how would plans be paid for the use of legitimate non-covered services? Because of the many operational uncertainties, the Commission recommends only that HCFA evaluate using partial capitation, not that HCFA adopt it as a payment method.

Five questions related to PIP-DCG model

As HCFA moves forward on risk adjustment, policymakers have continued to express concern about the PIP-DCG model, even though it improves upon the demographic system. Some of these concerns are manifested in five questions that the BBRA directed MedPAC to investigate. These questions and a summary of the Commission's analysis follow:

- How well do risk scores from the PIP-DCG risk adjustment model correlate with M+C plans' per capita Medicare costs? We found that plans' per capita payments (risk adjusted) explain a fairly large fraction of the variation in plans' per capita costs—46 to 48 percent, depending on how one measures costs.

- Under the PIP-DCG model, how stable are M+C plans' per capita risk scores from year to year? And what is the potential for substantial changes in risk scores for small plans? From September 1998 to September 1999, the average absolute percentage change in plans' per capita risk scores was 4.4 percent. Nearly one-third of plans had small absolute changes (less than 2 percent), while 33 percent had large absolute changes (at least 5 percent). Compared with all plans, plans with fewer than 5,000 enrollees had a higher average absolute change in per capita risk scores, were less likely to have small changes, and more likely to have large changes. These results reflect two factors that affect plans' risk scores over time: changes in risk scores for the given population and changes in enrolled populations.

- Is there still evidence that M+C enrollees are less costly at their time of enrollment, on average, than are beneficiaries who remain in fee-for-service Medicare? The average cost in 1997 of beneficiaries who enrolled in M+C plans during 1998 was 23 percent lower than the average cost in 1997 of beneficiaries who remained in traditional Medicare in 1998. The risk factors in the PIP-DCG model account for only 8 percentage points of this 23 percent difference.

- Is there still evidence that beneficiaries who voluntarily leave M+C plans are more costly at their time of disenrollment, on average, than are beneficiaries who remain in traditional Medicare? After adjusting for age, sex, and Medicaid differences, our results show beneficiaries who voluntarily disenrolled from Medicare risk plans in 1997 were slightly less costly in 1998, on average, than beneficiaries who did not enroll in Medicare+Choice.

- How does HCFA's decision to exclude "discretionary" hospitalizations affect the PIP-DCG model? Excluding discretionary hospitalizations from the PIP-DCG model increases payments to M+C plans by an average of 1.4 percent. Conversely, HCFA's decision to exclude hospitalizations of fewer than two days decreases payments by an average of 0.7 percent.

The third and fourth questions address the issue of whether plans benefit from favorable selection (enrollment of relatively low-cost beneficiaries). However, these two questions focus on beneficiaries before and after they enroll in M+C plans, and ignore the period of enrollment. Examining costliness during beneficiaries' M+C enrollment would be informative, but there is very little cost information on M+C enrollees. To address this, MedPAC examined mortality rates to compare the health status of beneficiaries in the M+C and traditional programs.

The Commission found that in 1998 the mortality rate for M+C enrollees was 15 percent lower than the rate for beneficiaries in traditional Medicare, after controlling for differences in age, sex, and Medicaid enrollment. However, the difference in mortality rate decreases as length of M+C enrollment increases, controlling for age, sex, and Medicaid differences. Beneficiaries enrolled in Medicare+Choice for less than one year had a 21 percent lower rate than traditional Medicare beneficiaries, but beneficiaries enrolled in Medicare+Choice for more than 5 years had a rate 11 percent lower.

For a more detailed discussion of our analysis of the five BBRA questions and the additional analysis of mortality rates, see the appendix. ∎

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Risk adjustment
for special populations

R E C O M M E N D A T I O N S

3A As it evaluates multiple-site risk adjustment models, HCFA also should evaluate and report to the Congress on alternatives—including hybrid risk adjustment systems and partial capitation—to increase payment accuracy for frail elderly beneficiaries.

....

3B The current method of payment for specialized plans should be used until a cost-effective and accurate alternative is developed that accounts for both the frailty of people enrolled in and differences in the benefits offered by those plans.

....

3C The Congress should instruct the Secretary to implement a risk-adjusted method to pay for ESRD beneficiaries in Medicare+Choice using factors known to affect their costs.

Medicare+Choice (M+C) payment methods need to be refined for two special populations that have higher costs than other beneficiaries—the frail elderly and those with end-stage renal disease (ESRD)—if the Medicare program is to ensure that payments for them reflect their expected costs. Such refinement would help ensure that plans do not have incentives to select against beneficiaries or stint on their care. Payments for special populations should be adjusted for factors known to affect their costs. To account for the additional costs of frail elderly beneficiaries, the Congress and the Secretary should consider augmenting risk adjusters with functional status data or moving toward partial capitation. For beneficiaries with ESRD, readily available demographic and clinical data would better account for beneficiaries' predictable costs than do current M+C payment methods. In addition, it may be desirable to supplement capitated payments with payments based on actual services delivered to help ensure beneficiaries' access to quality care.

A very small number of frail elderly beneficiaries are enrolled in plans that specialize in caring for such people, and the Congress requested that MedPAC study the methods used to pay for their care. Because these specialized plans generally are required to offer benefits in addition to those in the basic Medicare benefit package, plans should be paid using existing payment methods, separate from the general M+C payment system. This will ensure that the frail elderly enrolled in these plans will continue to have access to high-quality care.

Frail elderly beneficiaries

There is no standard definition of frail elderly Medicare beneficiaries. Beneficiaries who are aged and have limitations performing activities of daily living (ADLs) have higher expected costs than other Medicare beneficiaries (Gruenberg et al. 1996, Gruenberg et al. 1999, Liu et al. 1997, Pope et al. 1998, Riley 2000, Veazie et al. 1999). ADLs include bathing, dressing, mobility, transferring, toileting, and eating. In 1996, almost 9 percent of elderly Medicare beneficiaries had difficulty performing five or more ADLs. Congress is concerned about the payment for frail elderly beneficiaries and asked MedPAC to study risk adjustment for payments to specialized plans that serve these beneficiaries.

A good risk adjustment model should help ensure that Medicare payments for frail elderly beneficiaries reflect their expected costs so that plans do not have strong incentives to select against them or stint on their care. In the following discussion, we first consider risk adjustment for frail elderly. Next, we discuss risk adjustment for frail elderly in specialized plans.

TABLE
3-1

**Predictive ratios for alternative risk adjustment models,
by functional status subgroup
(Values closer to 1.0 indicate better prediction)**

	Risk adjustment models					
Functional status	Modified demographic	Survey	PIP-DCG	PIP-DCG and survey	DCG-HCC	DCG-HCC and survey
1–2 ADL limitations	0.80	1.03	0.85	1.03	0.90	1.03
3–4 ADL limitations	0.67	0.94	0.74	0.94	0.85	0.95
5–6 ADL limitations	0.61	1.08	0.72	1.06	0.88	1.08
Elderly helped with 3+ ADLs	0.58	0.97	0.70	0.96	0.88	1.00

Note: PIP-DCG (principal inpatient diagnostic cost group), HCC (hierarchical condition category), ADL (activity of daily living). ADL limitations were measured by report of difficulty in performing activity. Modified demographic model includes age and sex. Data are from the 1992 and 1993 Medicare Current Beneficiary Surveys.

Source: Pope et al 1998.

Risk adjustment for frail elderly

Current and contemplated risk adjustment models, which rely on encounter data to predict differences in beneficiaries' costs, probably will not adequately account for the higher health care use of frail elderly beneficiaries. Several studies have examined use of the principal inpatient diagnostic cost group (PIP-DCG) and hierarchical coexisting conditions (HCC) models with frail elderly populations and consistently found that these models underpredict Medicare spending for such people (Esposito 2000, Gruenberg et al. 1999, McCall and Korb1998, Pope et al. 1998, Smith 2000).[1] For beneficiaries with high levels of disability—having difficulty with five or six ADLs or needing help with three or more ADLs—PIP-DCGs underpredict costs by about 30 percent. This underprediction is not surprising because the PIP-DCG model relies heavily on encounter information for inpatient care to predict costs, while frail beneficiaries are heavy users of care in other settings. However, the HCCs, using diagnoses from multiple sites of care, also underpredict costs for these groups by about 12 percent (see Table 3-1).

For the frail elderly, hybrid risk adjusters perform better than adjusters based on encounter data alone. For example, for elderly beneficiaries who receive help with three or more ADLs, the HCC predictive ratio of 0.88 improves to 1.00 with the addition of survey information on functional status.[2] Hybrid risk adjusters use information collected by surveys of beneficiaries or plans in addition to encounter data.

Survey data may include data on functional status, health status, and presence of chronic conditions. Functional status information describes beneficiaries' performance or performance capacity. ADLs and instrumental activities of daily living (IADLs) are the most common measures of functional status. IADLs include telephone use, shopping, money management, light housework, heavy housework, and meal preparation. In measuring limitations, ADLs can be considered individually, summarized in an index, or used together with IADLs. An individual may be defined as having an ADL limitation if he or she either has difficulty or needs help with performance.

[1]   Here and elsewhere we use spending to refer to resource use as measured by fee-for-service Medicare payments.

[2]   The predictive ratio relates the total costs to the Medicare program predicted by a risk adjustment method for a group of people to the actual costs to the program observed for that group. A predictive ratio of 1.0 indicates that costs are accurately predicted, on average, because predicted costs equal actual costs. A value less than 1.0 indicates the method predicts lower costs than actually occurred while a value greater than 1.0 indicates predicted costs are greater on average than actual costs.

Any decision to use functional and health status data from surveys in risk adjustment for the frail elderly must address several problems:

- Low survey response rates, high use of proxies, and problems of recall when data are collected directly from beneficiaries.

- Costs associated with collecting survey data not included in administrative record systems.

- Potential for data manipulation to increase payment when data are collected from plans or providers. Also, survey data may be difficult to audit.

The federal government has considerable experience collecting data on functional status for purposes other than risk adjustment. It collects such information in a number of ways for use in ongoing program management. In addition to the Medicare Health Outcomes Survey (HOS) for Medicare+Choice enrollees (see text box), these include the Resident Assessment Instrument and Minimum Data Set for residents of skilled nursing facilities and the Outcome and Assessment Information Set instrument for users of home health services.

Medicare Health Outcomes Survey

The Medicare Health Outcomes Survey (HOS), formerly the Health of Seniors Survey, is administered to a sample of beneficiaries in every Medicare+Choice plan. The core of the survey is the Short-Form Health Survey (SF-36), a standardized health status survey designed for use with diverse populations. HCFA augments the SF-36 with questions on the presence of selected chronic conditions, respondent health, and demographic characteristics. Using answers from a subset of questions (the SF-12 instrument questions), it is possible to calculate physical and mental function scores for use in risk adjustment.

The HOS is a self-administered survey. It is conducted by mail with telephone follow-up. HCFA annually surveys 1,000 members of each Medicare+Choice plan (or all members for small plans). Each sample drawn by HCFA is resurveyed after 2 years. Because the survey is already used on a routine basis for Medicare+Choice enrollees, the additional cost of collecting data for risk adjustment would be minimal. However, a sample of the beneficiary population in the traditional fee-for-service program would also have to be surveyed and that additional cost would have to be considered.

HOS response rates are good overall. In tests with frail elderly beneficiaries, response rates were lower and a majority of surveys were completed by proxy. Responses for individual questions (item response rates) are uniformly high. Assuming payment based on response does not alter the response, current sample size, response rates, and item response rates allow calculation of meaningful, statistically valid risk scores by plan (Pope et al. 2000).

As noted above, the HOS is built on the SF-36, for which extensive reliability information is available. Research by the developers of the SF-36 shows high reliability for all scales and nearly identical reliability results for elderly and non-elderly respondents (McHorney et al. 1994). The HCFA contractor developing and testing a version of HOS for the fee-for-service population reports reliability comparable to that reported for the SF-36 in other populations (McCall et al. 2000). Private contractors charge plans about $12 per fielded survey for the HOS. With an average response rate of 60 percent for the 1998 survey, the total cost per completed survey was about $20. ■

It may be possible to collect functional status data for Medicare risk adjustment from administrative data systems in the foreseeable future. It might still be necessary to require additional encounter data to obtain functional information for M+C beneficiaries. The National Committee on Vital and Health Statistics, an advisory committee to the Department of Health and Human Services, recommended in 1996 that functional status be included in a set of core data elements for the national health data system (NCVHS 1996). (It noted, however, that no standard definitions are available yet.) The World Health Organization (WHO) is revising the International Classification of Impairments, Disabilities, and Handicaps and several nations are testing it. WHO expects to present the resulting system for approval by the World Health Assembly in May 2001, after which individual nations may adopt it as they previously adopted the WHO-developed ICD-9 and are expected to adopt the ICD-10 diagnostic classification system.

Whatever the source of functional status data, using them in conjunction with contemplated risk adjustment systems could significantly improve payment accuracy for frail elderly beneficiaries and in doing so help preserve their access to care in M+C plans. Therefore, the Commission believes that HCFA should support further research to evaluate hybrid risk adjustment models to improve payment accuracy for special populations. A hybrid model based on surveys from a sample of enrollees could potentially be used to adjust aggregate payments at the plan level based on the mix of beneficiaries enrolled.

A possible complement or alternative to risk adjustment based on functional status is partial capitation. As discussed in Chapter 2, with this approach capitation payments are supplemented with payments based on beneficiaries' use of services. Additional payments could be based on a fee schedule or reimbursement of cost.

RECOMMENDATION 3A

As it evaluates multiple-site risk adjustment models, HCFA also should evaluate and report to the Congress on alternatives—including hybrid risk adjustment systems and partial capitation—to increase payment accuracy for frail elderly beneficiaries.

Frail elderly in specialized plans

Medicare has developed several specialized plans to test methods of care for frail elderly beneficiaries (Table 3-2). These include Social Health Maintenance Organizations, EverCare, and several programs for dual eligibles (not shown in the table). One program, the On Lok demonstration, has been incorporated into the general Medicare program as the Program of All-Inclusive Care for the Elderly (PACE), an option for all qualifying beneficiaries. These programs differ in the numbers and the characteristics of beneficiaries enrolled (Table 3-3). Medicare has used special payment provisions for care in specialized plans, in part because the benefits in these programs are different.

In the Balanced Budget Refinement Act of 1999, the Congress required MedPAC to comment on the development of a payment methodology for frail elderly beneficiaries enrolled in M+C under a specialized program for the frail elderly.

**TABLE
3-2**

Managed care programs for frail elderly

Feature	S/HMO	PACE	EverCare
Program objectives	Provide an expanded managed care benefits package to prolong independence of frail elderly in community.	Integrate delivery and financing of primary, acute, and long-term care services for a frail elderly population.	Provide better primary care to nursing home residents.
HCFA independent evaluation findings	Integration with primary care not successful; recommended changes led to S/HMO II.	Cost savings to Medicare, reduced use of institutionalized care.	In process, expected completion 2001.
Payment methods	Base rate is 100/95 x Medicare+Choice rate. S/HMO I gets adjuster for NHC enrollees and reduced adjusters for others. S/HMO II uses a multivariate formula.	Base rate is Medicare+Choice rate. PACE gets base rate times 2.39 frailty adjuster for each enrollee.	Base rate is 93/95 x Medicare+Choice rate. EverCare gets institutionalized adjusters for each enrollee.
Benefits	All Medicare benefits, expanded benefits, and long-term care benefits. Outpatient drugs are covered.	All medical and long-term care benefits covered through pooled Medicare, Medicaid, and private capitation payments. Outpatient drugs are covered.	Similar packages to Medicare+Choice plans but no drug coverage.
Eligibility requirements	Same requirements as Medicare+Choice, but beneficiaries under age 65 excluded from S/HMO I. S/HMOs initially limited participation of frail beneficiaries.	Enrollees must meet state criteria for nursing home certifiability and be age 55 or older.	Nursing home residency.
Number of sites	3 S/HMO I, 1 S/HMO II	26	6 under demonstration, 3 Medicare+Choice subcontractors.
Characteristics of sponsors	HMOs and long-term care providers.	Most are freestanding, community-based provider entities; several sponsored by providers that own HMOs.	National HMO corporation— United HealthCare.
First year of operation	1985 (S/HMO I) 1996 (S/HMO II)	1971 (On Lok) 1990 (PACE)	1994

Note: S/HMO (Social Health Maintenance Organization), PACE (Program of All-Inclusive Care for the Elderly), BBA (Balanced Budget Act of 1997), NHC (nursing home certifiable).

Source: MedPAC 1999.

**TABLE
3-3**

**TABLE
3-3** 　Demographic information on Medicare programs for the frail elderly, 1999

Category	S/HMO	PACE	EverCare	Medicare+Choice	Fee-for-service
Number of enrollees	79,166	6,026	10,617	6.5 million	32.4 million
Annual increase in enrollees (1994–1999)	37.5%	22.7%	121.4%	23.7%	0.3%
Age distribution (in percent)					
<65	6	4	1	12	18
65–74	46	24	12	52	42
75–84	36	39	36	29	30
85+	12	33	51	7	11
Mortality rate by age (in percent)					
<65	2	6	19	2	3
65–74	3	11	21	2	3
75–84	7	13	28	5	6
85+	15	21	39	13	17

Note: S/HMO (Social Health Maintenance Organization), PACE (Program of All-Inclusive Care for the Elderly).

Source: MedPAC analysis of data from the Health Care Financing Administration Group Health Plan Master File, Denominator File, and Medicare Prepaid Health Care Plans Monthly Report.

Specialized plans treating large numbers of frail elderly may have greater difficulties than conventional M+C plans with the PIP-DCG interim risk adjustment system. Frail beneficiaries are more costly than Medicare beneficiaries in general and, as discussed above, the PIP-DCG model does not explain their costs well. Because specialized plans currently receive higher payments than those received by M+C plans, they may be adversely affected if payments are risk adjusted. In addition, many have less sophisticated information systems than larger M+C plans and may have greater difficulty reporting encounter data.

Specialized plans generally are required to offer benefits in addition to those in Medicare's basic benefit package. Payment based on regular M+C methods would not account for the costs of these benefits. When M+C plans offer additional or supplemental benefits not covered in the regular benefit package, such as prescription drugs, they cover the costs of these benefits with savings from providing Medicare-covered services more efficiently or with income from beneficiaries' premiums. Conceptually, specialized plans could use the same approach, but this probably would not be feasible for PACE and EverCare, as enrollees are predominantly Medicaid eligible. For these plans, continuing additional benefits would require additional Medicaid funding.

Structural features of specialized plans also give reason for concern when considering basing their payment on risk-adjusted Medicare+Choice rates. Mainstream Medicare+Choice plans enroll a broad spectrum of beneficiaries and can offset high spending on some beneficiaries with low spending on others. Because payment rates are designed to cover expected costs, they should cover plans' overall average costs. By contrast, some specialized plans have disproportionate numbers of costly members and may not be able to offset losses on some members with gains on others.[3]

The small number of enrollees in some specialized plans makes these plans vulnerable to the inaccurate payment associated with inadequate risk adjustment. PACE sites in particular are typically very small. In 1999 half had enrollment of 111 or fewer with one reporting 35 members (National PACE Association 1999). Very small plans may have average costs that differ greatly from the national average in years when they have even a few high-cost members. Even with accurate, risk-adjusted capitation rates, they could experience losses.

RECOMMENDATION 3B

The current method of payment for specialized plans should be used until a cost-effective and accurate alternative is developed that accounts for both the frailty of people enrolled in and differences in the benefits offered by those plans.

The Social Health Maintenance Organization and EverCare demonstrations and the PACE program are not Medicare+Choice plans. Instead, they were designed to provide benefits that differ from those of traditional Medicare and Medicare+Choice. It would be inappropriate to pay them as Medicare+Choice plans unless the Congress and the Secretary chose to change their designs or to adopt new methods for financing the different benefits. Financing options include Medicaid payments, beneficiary premium payments, or savings by plans on delivery of the basic benefit package. The Commission believes that refining risk adjusters for payment for all frail elderly should take precedence over developing adjusters solely for use with these small plans with their unique missions.

Payments for beneficiaries with end-stage renal disease

Beneficiaries with ESRD are another group with higher expected Medicare costs than other beneficiaries. A payment method that recognizes known differences in the costs of beneficiaries with ESRD should help ensure that plans do not have incentives to select against these beneficiaries or stint on their care.

Medicare's payment for the 20,000 beneficiaries with ESRD in Medicare+Choice is not adjusted for factors known to influence costs. Rather, M+C plans in a state are paid 95 percent of the statewide average adjusted per capita cost of caring for ESRD beneficiaries under traditional Medicare. Consequently, plans may be underpaid to the extent that a greater proportion of their members with ESRD have characteristics associated with higher spending levels compared with the state-wide ESRD population, or overpaid if the reverse is true. An analysis from HCFA showed that a greater proportion of ESRD beneficiaries who were in risk-based plans had characteristics associated with higher spending—being older and having diabetes as their cause of ESRD—than ESRD beneficiaries in traditional Medicare (HCFA 1999). Average Medicare payments for ESRD beneficiaries 75 years and older ($56,000) and for beneficiaries with diabetes as the cause of ESRD ($53,000) were about 25 percent more than the 2001 national average of local payment rates ($42,000) (USRDS 2000).

3   Members of Social Health Maintenance Organizations have characteristics similar to beneficiaries in Medicare+Choice plans and original Medicare.

Partly because of concerns that Medicare does not use a payment method that recognizes known differences in beneficiaries' costs, the Congress has not removed the statutory bar that prohibits beneficiaries with ESRD from enrolling in M+C.[4] In June 2000, HCFA clarified its M+C eligibility policy by asserting that ESRD beneficiaries with functioning kidney transplants are no longer considered to have ESRD for M+C eligibility purposes and can enroll in Medicare+Choice plans if they meet all other eligibility requirements (HCFA 2000). Although they cannot enroll in Medicare+Choice, beneficiaries with ESRD requiring maintenance dialysis who were members of a plan before their ESRD diagnosis can continue to be enrolled in plans with a Medicare contract.

The Congress did not specifically require MedPAC to study risk adjustment for payments to plans for beneficiaries with ESRD. However, the Commission believes that M+C payment issues and options for this vulnerable group of beneficiaries should be considered when studying risk adjustment alternatives for the M+C program.

Risk adjustment for beneficiaries with ESRD

Currently, all M+C plans in a state are paid 95 percent of the statewide average adjusted per capita cost of caring for ESRD beneficiaries under traditional Medicare. Payment is not adjusted for factors known to affect the costs of ESRD care.

MedPAC considered whether Medicare should use a payment method guided by information about ESRD treatment methods or whether the program should use the same general methods developed to pay plans for non-ESRD beneficiaries. In evaluating these options, the Commission was guided by the ability of each system to predict the costs of care for beneficiaries with ESRD and by implementation issues, including data availability, reliability, and the potential to manipulate information to increase payment.

<div style="background:black;color:white;text-align:center;font-weight:bold">RECOMMENDATION 3C</div>

The Congress should instruct the Secretary to implement a risk-adjusted method to pay for ESRD beneficiaries in Medicare+Choice using factors known to affect their costs.

In the short-term, a capitated payment method should be implemented as soon as possible that includes only beneficiaries with ESRD and adjusts for factors known to affect costs. MedPAC believes that such a method will better account for the variability of treatment costs than either the current payment method for ESRD beneficiaries in Medicare+Choice or the general M+C payment methods that are currently in use. This recommendation is based on substantial research showing that ESRD beneficiaries are expensive to treat and their costs are variable but to some extent predictable (Farley et al. 1996, Lewin Group 2000, USRDS 2000). It is also based on the lack of evidence demonstrating that general M+C payment methods can predict the costs of beneficiaries with ESRD as well as ESRD-specific methods can.

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[4] Two sections of the Social Security Act bar ESRD beneficiaries from enrolling in managed care: 1851(a) and 1876(d). Until recently, all ESRD beneficiaries were barred by statute from enrolling in Medicare+Choice, unless they were enrolled before ESRD diagnosis. Effective June 2000, HCFA is permitting ESRD beneficiaries with functioning kidney transplants to enroll in Medicare+Choice if they meet all other eligibility requirements.

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ESRD beneficiaries cost about seven times more than average Medicare beneficiaries. Beneficiaries' renal treatment modality—maintenance dialysis or kidney transplantation—is the most important predictor of ESRD costs. Data from the U.S. Renal Data System (USRDS)[5] show the wide range in annualized Medicare spending for each renal treatment modality—from $10,000 for beneficiaries with a functioning kidney transplant (graft) to $49,000 for beneficiaries with a failed kidney graft, $51,000 for beneficiaries requiring maintenance dialysis, and $93,000 for beneficiaries undergoing kidney transplantation (USRDS 2000). Additionally, certain clinical characteristics have been shown to affect ESRD costs. Payments are higher for beneficiaries who have diabetes as the cause of ESRD than for beneficiaries who do not, and payments increase with duration of ESRD (Farley et al. 1996).

MedPAC's key concern about including beneficiaries with ESRD in the general M+C risk adjustment system is the ability of the system to set payments accurately for this relatively small cohort of beneficiaries with chronic, end-stage, expensive illness. Although no published studies have evaluated the effectiveness of the general M+C risk-adjustment models to predict the costs of ESRD beneficiaries, examination of the demographic risk-adjusters suggests that they will not predict costs as accurately as risk-adjusters in an ESRD-specific model. For example, the demographic risk-adjusters used in the PIP-DCG model predict higher spending for men over age 65, compared to women in that age group. In contrast, average annual Medicare payments for women older than 65 years who have ESRD are higher than payments for men in that age group by about 7 percent (USRDS 2000).

MedPAC believes that the additional costs incurred by Medicare in developing and maintaining an ESRD-specific system and by health plans in understanding the system are warranted, given the unique needs of this vulnerable population and the need to minimize plans' incentive to either risk select or stint on the services they provide. Like non-ESRD beneficiaries, beneficiaries with ESRD are entitled to receive the full array of Medicare covered services and Medicare's payment policies should facilitate this.[6]

In the long term, MedPAC encourages the Secretary to explore and evaluate methods to modify the general M+C payment system to account for the variability of ESRD treatment costs. For example, a payment category might be developed that is specific to ESRD beneficiaries and adjusts payments for renal treatment modality and other factors known to affect ESRD costs. The Secretary will need to consider the pros and cons of establishing distinct, risk-adjusted payment rates for a specific illness and its treatments.

Until there is evidence suggesting that the general M+C risk-adjustment models predict the costs of ESRD beneficiaries as well as ESRD-specific models, MedPAC believes that Medicare should use a payment method designed to reflect the treatment options, clinical processes, and variations in costs associated with ESRD. Such a method should better ensure that the unique needs of this vulnerable population are being met by health plans.

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[5] The USRDS is operated by the National Institute of Diabetes and Digestive and Kidney Diseases with support from HCFA. It collects, analyzes, and distributes information on the costs of ESRD care, the incidence and prevalence of treated ESRD, treatment patterns, causes of death, patient survival, and rates of hospitalization.

[6] The 1972 amendments to the Social Security Act extended Medicare benefits for all Medicare-covered services to people of all ages whose physicians certify that they have permanent loss of kidney function that would be fatal unless they receive either maintenance dialysis or a kidney transplant. To qualify for the ESRD program, individuals must be fully or currently insured under Social Security or Railroad Retirement programs, entitled to monthly benefits under one of these programs, or the spouse or dependent child of an eligible patient.

Implementation issues Development of the payment method should be guided by HCFA's experience in implementing the risk-adjusted payment method developed for its ESRD Managed Care Demonstration Project.[7] For this demonstration, HCFA adjusts monthly capitated payments separately for beneficiaries requiring dialysis and beneficiaries with a functioning or failed kidney graft by age (<20 years, 20–64 years, and ≥65 years) and whether diabetes was the cause of ESRD. Kidney transplant procedures are paid for outside the capitated payments as lump-sum payments to the plans over a three-month period.

In designing an ESRD-specific method, the Secretary will need to consider which factors to use to adjust payments. As discussed above, certain demographic and clinical characteristics of ESRD patients have been shown to affect their costs. In addition to the three factors (age, underlying cause of ESRD, and renal treatment modality) HCFA used to adjust capitated payments for its ESRD demonstration project, other factors have also been shown to affect ESRD costs, including basis of Medicare entitlement, gender, duration of ESRD, functional status, and the presence of selected comorbidities (Beddhu et al. 2000, Farley et al. 1996, Lewin Group 2000). ESRD-specific models that include all of these factors have higher explanatory power than models using fewer predictors (Farley et al. 1996, Lewin Group 2000). However, the increased explanatory power given by a large set of adjusters needs to be weighed against the administrative complexity and costs incurred in implementing the payment method as well as its ability to be easily understood by providers. For administrative simplicity, a smaller set of adjusters might be advisable.

The Secretary will need to consider the availability of data when selecting factors to adjust capitated payments. One important source of data about the demographic and clinical characteristics of ESRD beneficiaries is HCFA's Medical Evidence Form (HCFA-2728). HCFA requires that providers complete this form within 45 days of an ESRD diagnosis, as it is used to establish Medicare eligibility for individuals who previously were not Medicare entitled, reclassify previously eligible Medicare beneficiaries as ESRD, and provide demographic and diagnostic information on all new ESRD patients regardless of Medicare entitlement. This form collects information on the date of first ESRD service, the primary disease causing ESRD, the presence of comorbid conditions, values of laboratory indices, use of renal treatment modalities, and patients' employment status at the start of ESRD.

HCFA will have to pay attention to the possibility of gaming in any risk adjustment system. Incentives to increase the number of beneficiaries with a characteristic associated with higher payment rates may be high. Gaming may occur if the Secretary continues to use the underlying cause of ESRD, obtained from HCFA's Medical Evidence Form, as a risk adjuster. However, the potential for gaming using this characteristic and other data obtained from HCFA's administrative databases is less than with other sources of data because the information is more easily amenable to audit.

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[7]   In its ESRD Managed Care Demonstration Project, HCFA is studying whether access to and quality of care can be enhanced by managed care. The demonstration is evaluating a number of issues: 1) whether integrated acute and chronic care services and case management improve ESRD beneficiaries' health outcomes, 2) whether capitation rates reflecting ESRD beneficiaries' treatment needs increase the probability of kidney transplant, and 3) whether additional benefits, such as transportation and nutritional services, are cost-effective. Demonstration services are currently being provided to 1,623 beneficiaries for three years at three sites, with a completion date of fall 2001. The effectiveness of the program will then be evaluated by a contractor.

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Another issue that the Secretary will need to consider is whether to combine risk adjustment for beneficiaries with ESRD with payments based in part on actual services used. Partial capitation would complement risk adjustment and could be especially useful in situations where costs are expensive and variable. As noted previously, HCFA's ESRD demonstration project pays participating sites separate payments to cover the costs of kidney transplantation. By contrast, for the 20,000 ESRD beneficiaries currently enrolled in Medicare+Choice, plans receive no additional payment for the costs of kidney transplantation.

We encourage the Secretary to evaluate the use of partial capitation together with risk-adjusted payments for beneficiaries with ESRD. One group of beneficiaries with very high spending levels is those undergoing kidney transplantation. Because it offers beneficiaries a better quality of life and has been found to be more cost effective than maintenance dialysis, kidney transplantation is the preferred renal treatment modality (Eggers 1992). If payments for transplantation were included in either the dialysis or the post-transplant capitated payment, health plans might be discouraged from promoting kidney transplants because they would receive payments for the high-cost procedure only gradually over time. Plans with beneficiaries who disenrolled, died, or lost Medicare eligibility soon after transplantation would be underpaid. Additionally, including payments for the transplant procedure with post-transplant capitated payments is problematic because the period for plans to recoup their costs is limited. ESRD beneficiaries under age 65 with a functioning graft lose their Medicare entitlement three years following the transplant, unless they qualify for benefits based on disability.

Partial capitation also may be beneficial because costs of care vary for other groups of beneficiaries with ESRD, not just those who receive transplants. The USRDS showed that spending for dialysis beneficiaries in the 90th percentile was about 2.5 times higher than for those at the median and that about 12 percent of dialysis beneficiaries had four or more hospitalizations during the course of a year (USRDS 1999, USRDS 2000). Farley and colleagues (1996) showed that an ESRD-specific payment method that combined risk-adjustment with partial capitation is more accurate than a model not using any form of partial capitation. As suggested in the previous chapter, some form of partial capitation might reduce the risk of plans suffering large losses and the chance for plans to make large profits.

The Secretary will also need to consider whether payments should be administered on a concurrent basis, changing during the calendar year both when dialysis beneficiaries receive a kidney transplant and no longer require dialysis and when beneficiaries with a kidney transplant experience a graft failure and require dialysis. The payment system used for HCFA's ESRD demonstration project was implemented in such as fashion, and HCFA should consider its experience in administering the demonstration project when evaluating the use of such a system for M+C. A concurrent system might present administrative challenges in collecting information on beneficiaries' renal treatment modality and changing payments during the course of the year. An alternative is to design a prospective system, such as the interim PIP-DCG system, with separate payments calculated on an "intention-to-treat" basis for caring for beneficiaries on dialysis and for beneficiaries with a kidney graft . Intention-to-treat methods base payment on the treatment modality furnished to beneficiaries at one particular point in time, such as the start of the year.

Finally, because of the potential deleterious effect on the access to care for ESRD beneficiaries, the Commission reiterates its March 2000 recommendation that the Congress lift the bar prohibiting beneficiaries with ESRD from enrolling in Medicare+Choice once a risk-adjusted payment system and a system to report on the quality of dialysis care are implemented (MedPAC 2000). Beneficiaries with ESRD face significant out-of-pocket expenses (about $10,000 per beneficiary in traditional Medicare) and prohibiting them from enrolling in M+C plans may have a detrimental effect on access, especially for low-income beneficiaries and those unable to obtain supplemental insurance. The Commission remains concerned that ESRD beneficiaries do not have the same freedom of choice to enroll in M+C plans that other beneficiaries do. ■

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Analysis of questions related to risk adjustment using the principal inpatient diagnostic cost group model

In this appendix, we analyze five questions related to the principal inpatient diagnostic cost group (PIP-DCG) model for which the Congress requested answers from MedPAC in the BBRA. We also examine a sixth question regarding mortality rates. The presentation includes discussion of the Commission's analytic methods, findings, and caveats about the findings, when appropriate. The six questions answered include:

- How well do risk scores from the PIP-DCG model explain variation in Medicare+Choice (M+C) plans' per capita Medicare costs, as reported in their adjusted community rate filings?

- Under the PIP-DCG model, how stable are M+C plans' per capita risk scores from year to year? And what is the potential for substantial changes in risk scores for small plans?

- Is there still evidence that M+C enrollees are less costly at their time of enrollment, on average, than are beneficiaries who remain in fee-for-service Medicare?

- Is there still evidence that beneficiaries who voluntarily leave M+C are more costly at their time of disenrollment, on average, than are beneficiaries who remain in traditional Medicare?

- Is there evidence that Medicare+Choice enrollees have lower mortality rates than beneficiaries in traditional Medicare?

- How much does HCFA's decision to exclude "discretionary" hospitalizations affect the PIP-DCG model?

To provide context for our analysis of these questions, we begin by summarizing the important details of how HCFA determines payments in the PIP-DCG model. HCFA first groups enrollees into health status categories according to these risk factors:[1]

- age,
- sex,
- Medicaid status in the previous year,
- original eligibility for Medicare by reason of disability (for aged beneficiaries), and
- principal diagnoses from their hospital inpatient stays, if any, in the previous year.

In 2002, HCFA will begin making extra payments in recognition of the costs of successful outpatient care for congestive heart failure. HCFA will make these payments to M+C plans that meet quality indicator thresholds. These extra payments will be made to qualifying M+C plans in 2002 and 2003 only.

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[1]   A working aged adjustment also may apply.

HCFA currently uses the risk factors listed above to determine beneficiaries' risk scores, which it then multiplies by base payment rates to compute payments. To determine risk scores, HCFA sums the expected costliness associated with enrollees' risk factors and divides that sum by the national average expected costliness. Consider, for example, a 73-year-old man who was eligible for Medicaid and hospitalized for prostate cancer the previous year. The expected costliness in 1996 dollars for his age and sex is $3,598, his Medicaid status would add $2,330, and his prostate cancer would add $2,333. Therefore, his total expected costliness is $8,261. The national average costliness was $5,100 in 1996, so his risk score would be 1.62 ($8,261 divided by $5,100). If the county base payment rate was $500 per month, then HCFA would pay the plan $500 x 1.62 = $810 per month for this beneficiary.

Now we turn to the six questions we analyzed.

First question: How well do risk scores from the PIP-DCG model explain variation in Medicare+Choice plans' per capita Medicare costs, as reported in their adjusted community rate filings?

Each year, M+C plans submit adjusted community rate (ACR) filings, which include benefit and premium proposals for the upcoming calendar year. The ACR filings also show plans' estimated costs for the coming year, which are based on M+C plans' actual costs from two years earlier. For example, in July 2000 plans submitted ACRs with estimated costs for 2001 based on plans' actual costs from 1999. We used the 1999 actual cost data in this analysis.

ACRs are the only source of data on plans' costs, but they have serious shortcomings. First, there likely is wide variation in the methods plans use to determine costs of providing Medicare covered services. For example, plans generally serve both the Medicare population and the non-aged working population. For their ACRs, plans must estimate what proportion of their total costs is attributable to Medicare enrollees. They likely use a variety of methods to make this estimation, so what the ACR cost data measure probably varies as well. Second, there is probably wide variation across plans in measuring administrative costs because HCFA has not provided plans with firm guidelines on how to determine them. Because of these shortcomings, we caution about the reliability of results based on these data.

We also caution that analyzing cost data for plans participating in 1999 may not be appropriate for characterizing plans that intend to participate in Medicare+Choice in 2001. Many of the plans participating in Medicare+Choice in 1999 have since withdrawn, and they may have had costs that were high relative to payments (or risk scores). (The ACR data do not allow us to observe the relationship between costs and risk scores for plans that have withdrawn from the program). Therefore, the data may provide an inaccurate representation of how well currently participating plans' risk scores correlate with their costs.

Method

Our analysis of this question deviated slightly from the BBRA directive because we measured how well plans' per capita payments—rather than risk scores—from the PIP-DCG model explain their per capita costs. We chose to use payments rather than risk scores because payments and costs reflect regional differences in input prices and practice patterns, whereas risk scores do not. Therefore, payments are on a more level playing field with costs than are risk scores (and are ultimately what matters).

Our analytic method consists of regressing per capita 1999 costs that plans report in their 2001 ACRs against their per capita payments from the PIP-DCG model.[2] We estimated two simple equations in which per capita payment was the only variable used to explain per capita costs. First, we estimated how well plans' per capita payments from the PIP-DCG model explain their per capita medical care costs under the basic benefit package in traditional Medicare (Model 1). Model 2 is identical to the first, except we replaced medical care costs with total costs, which include administrative costs.

An important statistic produced by these regressions is the coefficient on per capita payments, which indicates the average increase in per capita costs for each dollar increase in per capita payments. A value of this statistic equal to 1.0 would indicate that, on average, two plans receiving different per capita payments have per capita costs that differ by the same amount.[3] A value less than 1.0 would mean that the margin between payments and costs tends to be larger for plans with relatively high payments. Conversely, a value greater than 1.0 indicates the margin between payments and costs tends to be larger for plans with low payments.

However, even if a one-dollar increase in payments corresponds to a one-dollar increase in costs, on average, individual plans could have substantial differences between their per capita payments and their per capita costs. Therefore, it is useful to know how efficiently plans' per capita payments match their per capita costs, or, in statistical terminology, how much of the variation in per capita costs is explained by per capita payments. The R^2 statistic measures the variation explained. The higher the R^2 value, the more of the variation in costs is explained by payments.

Results

Results from estimation of Model 1 show that plans' per capita medical costs increase by an average of $0.56 for each dollar increase in per capita payments (Table A-1). The R^2 from this regression is 0.48, indicating per capita payments at the plan level explain about 48 percent of the variation in per capita medical care costs at the plan level.[4] Results from Model 2 indicate that per capita total costs increase $0.67 for each dollar increase in payments, and that per capita payments explain about 46 percent of the variation in total costs.

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[2]   The regression line estimated was: per capita costs = A + B x per capita payments + E.

[3]   Although the BBRA directed MedPAC to investigate how well payments explain the variation in costs, this statistic tells us nothing about variation explained. However, this statistic still provides valuable information because it tells us whether per capita costs and payments differ systematically with plans' per capita payments.

[4]   These R^2 values are much higher than those in the main text because we are comparing plan-level rather than individual level figures. It is the figures in the text using individual level data that indicate plan incentives to select individuals.

Relation between per capita costs and per capita payments for Medicare+Choice plans, 1999

Relationship variables (plan per capita amounts)	Cost increase for each dollar of payment increase	Variation in costs explained by payments
Medical costs and PIP-DCG model payments (Model 1)	$0.56	48%
Medical costs and demographic model payments (Model 1)	0.50	45
Total costs and PIP-DCG model payments (Model 2)	0.67	46
Total costs and demographic model payments (Model 2)	0.60	44

Note: PIP-DCG (principal inpatient diagnostic cost group risk adjustment model). Results are based on a sample of 151 Medicare+Choice plans. Medical costs include plans' costs for the basic Medicare benefit package. Total costs include medical and administrative costs. Model 1 shows the correlation between plans' per capita payments and their per capita medical costs. Model 2 shows the correlation between plans' per capita payments and their per capita total costs.

Source: MedPAC analysis of Medicare+Choice encounter data and 1999 cost data from adjusted community rate filings for 2001.

The results from Model 1 and Model 2 indicate that per capita payments explain a fair amount of variation in per capita costs, but per capita costs increase by much less than one dollar for each one-dollar increase in per capita payments. At least two factors could be contributing to the latter relationship. First, the PIP-DCG model could do a poor job of reflecting beneficiaries' relative costliness. Second, plans that serve counties with relatively high per capita costs in traditional Medicare may have greater opportunity to reduce their costs below the traditional Medicare costs in their counties than do plans that serve counties with relatively low traditional Medicare costs. This results in larger differences between per capita payments and costs for plans in counties with high traditional program costs because payments to plans depend heavily on traditional Medicare per capita costs in the counties they serve.

We used regression analysis to confirm that plans in counties with high traditional Medicare costs tend to have larger differences between their per capita payments and per capita costs than do plans in counties with lower traditional Medicare costs. For each plan, we calculated the difference between the plan's per capita payments and per capita medical costs and regressed this difference against the average traditional Medicare costs in the counties the plan serves.[5] Results show that this difference increases by an average of $0.35 for each dollar increase in the average costs in the counties served.

We also considered whether the low rate of increase in per capita costs relative to per capita payments may reflect large plans having lower per capita costs than small plans, perhaps because fixed costs are fairly constant across plans. To analyze this possibility, we performed two regressions: plans' per capita medical costs against their numbers of enrollees, and plans' per capita total costs against the numbers of enrollees. Both regressions show a weak relationship between per capita costs and their number of enrollees, so we reject this possibility as a factor contributing to the low rate of increase in per capita costs.

[5]   For each M+C plan, we calculated average county costs as a weighted average of the traditional program costs in the counties the plan serves. The weight for each county is the fraction of the plan's enrollees in that county.

Correlation of demographic payments and costs
Over the 2000-2004 period, HCFA will phase in the PIP-DCG model in place of the demographic model. How much better is the PIP-DCG model?

To answer this in the context of the first question, we re-estimated the regressions for Model 1 and Model 2 but replaced per capita payments from the PIP-DCG model with per capita payments from the demographic model. The results from the re-estimations make it clear that the PIP-DCG model provides a small improvement at the plan level (Table A-1). Under the demographic model, per capita medical costs increase by $0.50 for each dollar increase in per capita payments, and payments explain about 45 percent of the variation in medical costs. Also, total costs increase by $0.60 for each dollar in payments from the demographic model, and the variation explained is 44 percent.

This last exercise shows that compared to the PIP-DCG model a one-dollar increase in payment under the demographic system corresponds to a little smaller increase in costs. Also, the demographic system explains only a little less of the variation in plans' costs than does the PIP-DCG system. These small differences between the PIP-DCG and demographic systems are to be expected because the set of beneficiaries in plans is not random and under-represents high-cost beneficiaries for which the PIP-DCG model is a better predictor. Therefore, this test is not a good one for comparing how well costs correlate with payments under the two models.

Second question: Under the PIP-DCG model, how stable are Medicare+Choice plans' per capita risk scores from year to year? And what is the potential for substantial changes in risk scores for small plans?

Because HCFA uses risk scores from the PIP-DCG model to risk adjust payments to M+C plans, instability in plans' per capita risk scores over time will likely cause instability in their per capita payments. Small plans are especially vulnerable because large changes in payments for only a few enrollees could drastically affect total revenue.

Some might argue that an issue more important than stability of payments is stability of payments relative to costs. This argument is based on the belief that the purpose of risk adjustment is to pay plans accurately for the expected cost of their enrollees. If the expected costliness of a plan's enrollees increases substantially from one year to the next, an effective risk adjuster would cause a similar change in the plan's average payments. In this case, stable payments would be detrimental to the plan's financial health. Others might disagree with this perspective, arguing that stable payments are always preferable because they enable plans to charge stable premiums, which helps reduce the beneficiaries' uncertainties about their future health care costs.

**Stability of Medicare+Choice plans' per capita risk scores
under the principal inpatient diagnostic cost group
risk adjustment model, 1998–1999**

	Plan size	
Statistic	All plans	< 5,000 enrollees
Average absolute percentage change	4.4%	5.8%
Percent of plans with change ≤ 1 percent	15.0	10.2
Percent of plans with change ≤ 2 percent	31.1	24.5
Percent of plans with change > 5 percent	33.0	46.9
Percent of plans with change > 10 percent	8.1	13.3

Note: Results are based on a sample of 273 for "all plans" and 98 for plans with fewer than 5,000 enrollees.

Source: MedPAC analysis of September 1998 and September 1999 Medicare+Choice encounter data collected by HCFA.

Method and results

We examined the stability of M+C plans' per capita risk scores by looking at the distribution of the absolute value of the percentage change in plans' per capita risk scores from September 1998 to September 1999. This examination revealed per capita risk scores are not stable, with an average absolute change of 4.4 percent. We also found that 15 percent of plans had very small changes (1 percent or less), 31.1 percent had small changes (2 percent or less), 33 percent had large changes (more than 5 percent), and 8.1 percent had very large changes (more than 10 percent) (Table A-2). Much of the change in per capita risk scores was in the upward direction. About 66 percent of plans had higher per capita risk scores in 1999 than in 1998.

Small plans show less stability Investigation of the potential for substantial changes in per capita risk scores for small M+C plans required a somewhat arbitrary decision on the definition of a small plan. We chose to define them as having fewer than 5,000 enrollees in September 1998. Per capita risk scores for this group were less stable than for all plans in the sample, as expected. The average absolute percentage change was higher for small plans, at 5.8 percent. Also, small plans were less likely to have small changes, as only 10.2 percent of them had an absolute percentage change of 1 percent or less, and 24.5 percent had a change of 2 percent or less. Finally, small plans were more likely to have had large absolute percentage changes; 46.9 percent of them had absolute changes of greater than 5 percent, and 13.3 percent had changes of more than 10 percent (Table A-2).

Whether small plans face a high potential for large changes in per capita risk scores cannot be determined with certainty because there is no clear definition of a "high" potential. Nevertheless, we believe the data show that small plans are quite likely to have large changes in per capita risk scores.

**Stability of Medicare+Choice plans' per capita risk scores
under the principal inpatient diagnostic cost group model
after removing new enrollees and disenrollees, 1998–1999**

Statistic	
Average absolute percentage change	7.3%
Percent of plans with change ≤ 1 percent	7.3
Percent of plans with change ≤ 2 percent	12.1
Percent of plans with change > 5 percent	69.2
Percent of plans with change > 10 percent	21.6

Note: Results are based on a sample of 273.

Source: MedPAC analysis of September 1998 and September 1999 Medicare+Choice encounter data collected by HCFA.

Higher stability in demographic model To provide a point of comparison for the stability of risk scores, we examined the stability of payments under the demographic model.[6] These payments show more stability than risk scores. For example, plans' per capita payments from the demographic model from September 1998 to September 1999 had an average absolute percentage change in payments over that period of 3.5 percent. Also, only 14.3 percent of plans had absolute changes of greater than 5 percent, and 2.2 percent had changes of more than 10 percent. It may appear that payments from the demographic system are less likely to have small absolute changes because only 5.9 percent had absolute changes of less than 1 percent and 16.8 percent had changes of less than 2 percent. However, nearly all plans received 2 percent updates in their base payment rates from 1998 to 1999, so it is not surprising that a relatively small percentage of plans had demographic payments that changed by less than 2 percent.

Controlling for new enrollees and disenrollees
The year-to-year changes in per capita risk scores provide a measure of the stability of plans' revenue. However, they do not represent the stability strictly attributable to the PIP-DCG model because they also include the effects of enrollment changes between September 1998 and September 1999. For example, even if risk scores from the PIP-DCG model are perfectly stable, enrollment and disenrollment of beneficiaries between September 1998 and September 1999 could have caused their plans' per capita risk scores to change over that period.

We found that excluding new enrollees and disenrollees from the analysis reduced the stability of plans' per capita risk scores. For all plans, the average of their absolute percentage change increased to 7.3 percent. Also, the percentage of plans with absolute percentage changes of 1 percent or less decreased to 7.3 percent, and the percentage with changes of 2 percent or less was only 12.1 percent. Moreover, 69.2 percent of plans had absolute percentage changes of more than 5 percent, and 21.6 percent had changes of more than 10 percent (Table A-3).

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[6]   In our comparison of the PIP-DCG to the demographic system, we chose to use payments from the demographic system rather than demographic scores. We did this because each beneficiary has two demographic scores—one for Part A services and one for Part B services—so comparing stability of PIP-DCG risk scores to stability of demographic payments is more straightforward.

Why are risk scores more likely to change when new enrollees and disenrollees are excluded? All else being equal, the risk score for a given set of enrollees will rise over time as those enrollees age. And, if enough of a plan's enrollment changes age category, the change in the risk score may be large. New enrollees, however, tend to have lower risk scores (mainly because they are younger) and offset the impact that aging of continuing enrollees has. (The opposite is true for disenrollees, but there are many fewer of them.) Thus, when new enrollees and disenrollees are excluded from the analysis, stability falls.

Factors underlying risk score increase
The fact that per capita risk scores increased from September 1998 to September 1999 for 66 percent of plans raises the question: why did per capita risk scores increase for most plans? Of the variables used to determine risk scores, age and health status categories have the most influence. Hence, the overall increase in plans' per capita risk scores was probably caused by higher average ages, more costly health status categories, or both.

Examination of the data shows the prevalence of higher per capita risk scores does not appear to be due to beneficiaries being in more costly health status categories. The PIP-DCG model assigns each beneficiary to 1 of 16 numbered health status categories called PIP-DCGs, in which higher numbers reflect higher risk scores.[7] Data from plans that participated in Medicare+Choice in both September 1998 and September 1999 show that 53.7 percent had lower per capita PIP-DCG numbers in September 1999 than in September 1998. Also, we found that the average of plans' per capita PIP-DCGs declined from 4.62 to 4.58 over that period.

The tendency for plans' per capita risk scores to increase over the September 1998-September 1999 period depends heavily on how the per capita age of their enrollees changed relative to the per capita PIP-DCG numbers. Most plans that had risk score declines from September 1998 to September 1999 had relatively large decreases in per capita PIP-DCGs. Conversely, plans that had risk score increases from September 1998 to September 1999 either had relatively small decreases in PIP-DCGs that were more than offset by higher per capita age, or they had increases in both per capita PIP-DCGs and age. Most plans—80.2 percent—had higher per capita age in 1999 than in 1998, which explains why per capita risk scores increased for a strong majority of plans.

Third question: Is there still evidence that Medicare+Choice enrollees are less costly at their time of enrollment, on average, than are beneficiaries who remain in fee-for-service Medicare?

Previous studies—MedPAC (1998) and PPRC (1996)—indicate that enrollees of Medicare risk plans were much less costly just prior to enrollment than were beneficiaries who stayed in traditional Medicare. Also, MedPAC (1998) determined that the PIP-DCG model does not adequately adjust payments downward to reflect the lower costliness of those enrollees. M+C plans are generally similar to Medicare risk plans, so the 1998 MedPAC study suggests that M+C plans still benefit from favorable selection (enrollment of low-cost beneficiaries) even if payments are risk adjusted by a PIP-DCG model.

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[7]   The 16 PIP-DCGs are numbered 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 20, 23, 26, and 29.

MEDPAC

The data used in these studies are somewhat dated, and some have argued that, on average, M+C enrollees are no longer much more healthy at their time of enrollment than are beneficiaries in traditional Medicare. In response, the Congress requested MedPAC to use the most recent data available to test this assertion.

Method

In satisfying the Congressional request, we used a sample of beneficiaries enrolled in Part A and Part B of traditional Medicare for all of 1997. We divided this sample into two groups— those who stayed in traditional Medicare throughout their 1998 entitlement (traditional Medicare group) and those who enrolled in Medicare+Choice in 1998 (M+C group)—and compared the average program costliness in 1997 for the two groups. We also used DxCG, Inc. software to determine average 1997 payments under the PIP-DCG model for both groups. The difference in average payments between groups indicates how much of the difference in costs is due to risk factors in the PIP-DCG model: age, sex, Medicaid status in the previous year, eligibility for Medicare by reason of disability (for aged beneficiaries), and principal diagnoses from hospital inpatient stays in the previous year.

Determining 1997 payments under the PIP-DCG model requires data on beneficiaries' diagnoses from hospital inpatient stays from July 1995 through June 1996. Therefore, the analytic sample includes people continuously enrolled in Part A and Part B of traditional Medicare from July 1995 through December 1997. We excluded from the traditional Medicare group beneficiaries who did not live in a county with at least one M+C plan in 1998, because plans have located predominantly in counties with relatively high per capita costs in traditional Medicare and failure to make this adjustment would introduce a downward bias in the costs of traditional Medicare beneficiaries.

We also modified the traditional Medicare group by controlling for a potential bias in the (often) high costs related to death. To be in the M+C group, a beneficiary had to survive until enrolling in an M+C plan in 1998, but traditional Medicare beneficiaries only had to survive until January 1, 1998—a generally less stringent survival criterion. Some of the traditional Medicare beneficiaries who died in 1998 could have enrolled in Medicare+Choice if they had lived longer. However, their 1997 costs related to their deaths are included in the average costs of the traditional Medicare group, so there is an upward bias on the often high costs just before death in the traditional Medicare group.

To correct the problem, we calculated the percentage of the M+C group that enrolled in an M+C plan in each month of 1998. Based on these percentages, we randomly assigned a "pseudo" M+C enrollment month in 1998 to each traditional Medicare beneficiary. The probability of being assigned to a month is equal to the percentage of actual M+C enrollments that took place in that month. For example, in the M+C group, 9 percent of enrollments in 1998 took place in March, so a traditional program beneficiary had a 9 percent chance of having March as their pseudo-enrollment month. Finally, we eliminated traditional Medicare beneficiaries who died before their pseudo-enrollment month, which gives the traditional Medicare group the same survival criterion as the M+C group.

**Examining Medicare+Choice enrollees' costs
in the year prior to enrollment, 1997**

Measure of cost or payment	Ratio, average for new M+C enrollees to average for traditional Medicare beneficiaries
Actual costs	0.77
Payments from PIP-DCG model	0.92

Note: M+C (Medicare+Choice), PIP-DCG (principal inpatient diagnostic cost group). All beneficiaries analyzed were in Part A and Part B of traditional Medicare from July 1995 through December 1997. Traditional Medicare beneficiaries stayed in traditional Medicare in 1998, but M+C enrollees joined a Medicare managed care plan in 1998.

Source: MedPAC analysis of 1995 through 1998 5 percent standard analytic files of Medicare beneficiaries.

Results

In 1997, the ratio of average program costs of the M+C group to the average program costs of the traditional Medicare group was 0.77. This indicates that the M+C group was 23 percent less costly in the calendar year before their M+C enrollment than the traditional Medicare group. Further, the ratio of average PIP-DCG payments for the M+C group to the average PIP-DCG payments for the traditional Medicare group is 0.92, which means that average PIP-DCG payments are 8 percent lower for the M+C group compared to the traditional Medicare group (Table A-4).

These results imply that the risk factors included in the PIP-DCG model (previously listed) account for just 8 percentage points of the 23 percentage-point difference in average costs between the two groups. To the extent that M+C plans continue to experience favorable selection of new enrollees, they benefit significantly because the PIP-DCG model does not adequately adjust payments to reflect the relatively low cost of those enrollees.

Some of the difference in average costs between the two groups may be due to a smaller percentage of the M+C group relative to the traditional Medicare group having supplemental insurance coverage such as Medigap before enrolling.[8] Previous MedPAC analysis indicates that in 1998 26 percent of first-year Medicare+Choice enrollees did not have supplemental coverage in the previous year. At the same time, 13 percent of beneficiaries who lived in a county with at least one M+C plan and remained in the traditional program in 1998 were without supplemental coverage in 1997 (MedPAC 2000). We do not believe, however, this difference in supplemental coverage could explain all of the difference in costs between these two groups, even after controlling for differences in risk.

The results presented here differ from a previous analysis (MedPAC 1998) that used a similar method and reported a ratio of average program costs for the M+C group to the traditional Medicare group of 0.72. The discrepancy between studies makes it appear that the degree of favorable selection in Medicare+Choice has declined, but the difference is because the 1998 analysis did not include an M+C pseudo-enrollment adjustment for the traditional Medicare group. Indeed, after we re-calculated the average costliness of the traditional Medicare group without the pseudo-enrollment adjustment, the costliness of the M+C group relative to the traditional Medicare group declined to 0.72, the same as we found before.

[8] Supplemental coverage—which includes Medigap, coverage through a former employer, Medicaid, and other public health insurance programs—is generally thought to induce higher spending.

Finally, some would argue that our results overstate the degree of favorable selection because although new enrollees in Medicare+Choice are lower cost, they trend towards the average cost in traditional Medicare over time. This "regression toward the mean" has most recently been argued by the General Accounting Office (GAO 2000). Later, we present an analysis showing that M+C enrollees have a lower mortality rate than traditional Medicare beneficiaries, but the difference narrows as length of M+C enrollment increases, which supports the concept of regression toward the mean.

Fourth question: Is there still evidence that beneficiaries who voluntarily leave Medicare+Choice are more costly at their time of disenrollment, on average, than are beneficiaries who remain in traditional Medicare?

This question overlaps with the third in the sense that the purpose is to search for evidence of favorable selection in Medicare+Choice. In this case, MedPAC was directed to find out if M+C plans benefit because relatively costly enrollees leave. We do not believe, however, that the results from this analysis should have much influence because the rate of voluntary disenrollment from Medicare+Choice is quite low.

Method

The sample we used for this analysis consists of two distinct groups. One group—the traditional Medicare group—began its Medicare entitlement during or before 1997, was enrolled in Part A and Part B of the traditional program throughout 1997 entitlement, and maintained that status throughout 1998 entitlement. The other group—the risk plan group—left Medicare risk plans some time in 1997, enrolled in Part A and Part B of traditional Medicare, and maintained that status throughout 1998 entitlement. We eliminated people from the traditional Medicare group if they did not reside in a county with at least one risk plan in 1997 because most risk plans were established in counties with relatively high per capita costs in traditional Medicare and failure to make this adjustment would introduce a downward bias in the costs of traditional Medicare beneficiaries.

To determine whether beneficiaries who disenrolled from Medicare risk plans were costly in relation to the traditional Medicare group, we compared the average 1998 program costs of the risk plan group with the average 1998 program costs of the traditional Medicare group. We also compared average 1998 payments from the demographic system, but excluded adjustments for institutional status.[9] The difference in average payments between groups indicates how much of the difference in costs is due to differences in age, sex, and Medicaid status.

Results

There is little difference in 1998 program costliness between the two groups. The ratio of average costliness of the risk plan group to that of the traditional Medicare group is 1.02. Further, the average adjusted payments in 1998 for the risk plan group is only 5 percent higher than the average for the traditional Medicare group. These results suggest M+C plans actually experience slight adverse selection on the disenrollment of beneficiaries. However, the infrequency of voluntary disenrollment makes the impact of the adverse selection small.

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[9]   We could not adjust for institutional status because that information was not available for traditional Medicare beneficiaries on the enrollment and claims files we used in this analysis. This method for estimating payments is basically the same as that used by PPRC (1996).

Our results differ substantially from a previous analysis (PPRC 1996) that also examined the costliness of Medicare risk plan disenrollees. Results from that study showed that risk plan disenrollees were much more costly than traditional program beneficiaries. However, two differences in method exist.

First, PPRC examined disenrollees' costliness in the six months immediately after leaving a risk plan, but MedPAC analyzed costliness in the calendar year after disenrollment. MedPAC's method means that disenrollees in its sample had to survive from the time they left their risk plans in 1997 through at least January 1998. The disenrollees in PPRC's sample did not have to meet that survival criterion, so MedPAC's sample could be healthier, on average. This would be especially important if it was common for risk plan enrollees to leave their plans shortly before death, which is a plausible scenario. Second, the PPRC sample had to be enrolled in traditional Medicare at least three months before enrolling in a risk plan, but beneficiaries in MedPAC's sample could have enrolled in a risk plan as soon as they were eligible for Medicare. This is important because MedPAC analysis reveals that in July 1997, 16.9 percent of beneficiaries in Medicare risk plans enrolled in their current plan at age 65. The next most common age for enrollment was 66, accounting for 7.7 percent of enrollees. The people who enrolled at age 65 without first being in traditional Medicare for at least three months would not be included in the PPRC's disenrollee sample, but they would be part of MedPAC's analysis. Hence, MedPAC's sample may have a lower average age.

Fifth question: Is there evidence that Medicare+Choice enrollees have lower mortality rates than beneficiaries in traditional Medicare?

Analysis of the third and fourth questions shed some light on the degree of favorable selection in Medicare+Choice, but an obvious shortcoming of both analyses is that they do not focus on the costliness of M+C enrollees while enrolled in the M+C program. The reason for analyzing the costliness of M+C enrollees before enrollment into Medicare+Choice (as in the third question) and after disenrollment from Medicare+Choice (as in the fourth question) is quite practical: there are scant data on beneficiaries' costliness while enrolled in Medicare+Choice.

Despite the scarcity of cost data, other variables can be used to measure the health status of M+C enrollees during their period of enrollment relative to beneficiaries in traditional Medicare. In this case, we compared the mortality rates of these two groups.[10]

Method
The sample we used in this analysis consists of beneficiaries enrolled in Medicare at the start of 1998 and maintained that enrollment throughout 1998 or until death in that year. We compared the mortality rates of two groups from this sample. One group was enrolled in traditional Medicare on January 1, 1998 (traditional Medicare group); the other was enrolled in Medicare+Choice on January 1, 1998 (M+C group). We controlled for differences in age, sex, and 1998 Medicaid status between groups because these three variables are strong indicators of mortality risk.

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[10] We show later in this section that there is a lower mortality rate in Medicare+Choice. It is plausible that the lower mortality rate in Medicare+Choice could be due to better access to services or quality care. However, the difference between Medicare+Choice enrollees and traditional Medicare beneficiaries gets smaller as length of M+C enrollment increases. This narrowing of the difference in mortality rates between groups reduces the credibility of the notion that it could be due to M+C enrollees receiving better health care.

MEDPAC

**Mortality rate of Medicare+Choice enrollees
relative to traditional Medicare beneficiaries, 1998**

Length of Medicare+Choice enrollment	Mortality rate relative to traditional Medicare beneficiaries
All enrollees	15% lower
1 year or less	21% lower
1–2 years	17% lower
2–3 years	15% lower
3–4 years	13% lower
4–5 years	10% lower
More than 5 years	11% lower

Source: MedPAC analysis of 1998 Medicare 5 percent denominator file and group health plan master file.

Earlier, we discussed regression toward the mean: M+C enrollees are much healthier than traditional program beneficiaries when they first enroll, but the difference in health status between these two groups narrows as length of M+C enrollment increases. Although there is evidence supporting regression toward the mean, we did our own analysis of this issue by computing the mortality rates for beneficiaries with different lengths of tenure in Medicare+Choice.

Results
After adjusting for differences in age, sex, and Medicaid status, the ratio of the mortality rate of the M+C group to that for the traditional Medicare group was 0.85 in 1998; in other words, the M+C group had a mortality rate 15 percent lower than that of the traditional Medicare group, indicating favorable selection in Medicare+Choice.

We also calculated the mortality rate of each M+C plan relative to the average mortality rate for all plans. The standard deviation of these relative mortality rates was a fairly high 0.2, which could be an indication of differences between plans in terms of favorable selection.

Finally, our analysis of mortality rates shows the difference in morality rates between M+C enrollees and Medicare beneficiaries narrows the longer M+C enrollees participate in the M+C program. After controlling for age, sex, and Medicaid differences, we found the mortality rate of beneficiaries enrolled in Medicare+Choice for one year or less was 21 percent lower than the mortality rate of beneficiaries in traditional Medicare. In contrast, the mortality rate of beneficiaries enrolled in Medicare+Choice for more than 5 years was just 11 percent lower than the mortality rate of beneficiaries in traditional Medicare (Table A-5).

TABLE A-6	Average length of Medicare+Choice (risk plan) enrollment, February 1996—February 2000

Month and year	Average length of enrollment (in months)
February 2000	46.0
February 1999	39.4
February 1998	35.8
February 1997	34.7
February 1996	35.3

Source: MedPAC analysis of Medicare group health plan master file.

Results from analysis of this question combined with those from the third question suggest there is favorable selection in Medicare+Choice, especially for enrollees who have been enrolled a short time. However, combining the results from analysis of this question and the fourth question provides evidence that the difference in costliness between M+C enrollees and traditional program beneficiaries narrows the longer that beneficiaries are enrolled in Medicare+Choice. This supports previous analyses that have suggested the presence of regression toward the mean.

Regression toward the mean could be an indication that favorable selection would become less of an issue in Medicare+Choice if enrollment levels stabilize because stable enrollment would probably result in increased average length of enrollment. Table A-6 shows the effect of stable and unstable periods of enrollment on average length of M+C enrollment. From February 1996 to February 1997, a period of rapidly increasing M+C enrollment, average length of M+C enrollment declined from 35.3 months to 34.7 months. But from February 1999 to February 2000, a period of flat M+C enrollment, average length of enrollment increased from 39.4 months to 46.0 months.

Sixth question: How much does HCFA's decision to exclude "discretionary" hospitalizations affect the PIP-DCG model?

Before HCFA began using the PIP-DCG model, the agency was concerned about incentives plans might have to "game" the system by hospitalizing beneficiaries for conditions they previously had not. To counteract this incentive, HCFA put two restrictions on the hospitalizations it counts to determine payments under the PIP-DCG model. First, HCFA does not count hospital inpatient stays it considers to be discretionary, which it defines as those with principal diagnoses that:

• represent only minor or transitory diseases or disorders,
• are rarely the main cause of an inpatient stay, or
• are vague or ambiguous.

Second, HCFA does not count hospital inpatient stays shorter than two days.

Clearly, these exclusions affect per capita payments to plans, but it is unclear whether payments increase or decrease. When HCFA developed the PIP-DCG model, the agency grouped beneficiaries into health status categories and determined an expected costliness for each. HCFA's decision not to count discretionary or short hospitalizations required the agency to group beneficiaries with such hospitalizations into the base category, which includes beneficiaries who had no hospital inpatient stays. On the one hand, this increases the costliness of the base category and thus increases payments for beneficiaries with no inpatient stays. On the other hand, these exclusions reduce the number of enrollees for whom payments are adjusted upward due to hospitalizations. Therefore, one cannot determine whether these exclusions will increase or decrease payments without doing a numerical analysis. In fact, it is entirely possible for one exclusion to increase payments and for the other to decrease payments.

Method and results

We would like to determine the combined effect of these two exclusions on plans' per capita payments, which would require comparing payments from the PIP-DCG model with payments from a risk adjustment model that is identical, but without these exclusions. However, the latter risk adjustment model has not been developed. As a compromise, we performed two separate analyses: one calculated the effect on per capita payments of excluding discretionary hospitalizations, and the other computed the impact of excluding hospital stays of less than two days.

Effect of excluding discretionary hospitalizations We used a three-step method to estimate the effect on payments to M+C plans of excluding discretionary hospitalizations. First, we calculated the payments that plans would receive from an alternative risk adjustment model developed by HCFA. This alternative model is identical to the PIP-DCG model, except the alternative model does not use two risk factors used by the PIP-DCG model—Medicaid status and ever eligible for Medicare because of disability—nor does it exclude hospital stays of less than two days. Second, we determined payments that plans would receive from a second alternative risk adjustment model developed by HCFA. This model is identical to the first alternative, except it does not exclude discretionary hospitalizations. Third, we computed the difference in payments that plans would receive under these two alternative risk adjustment models.[11]
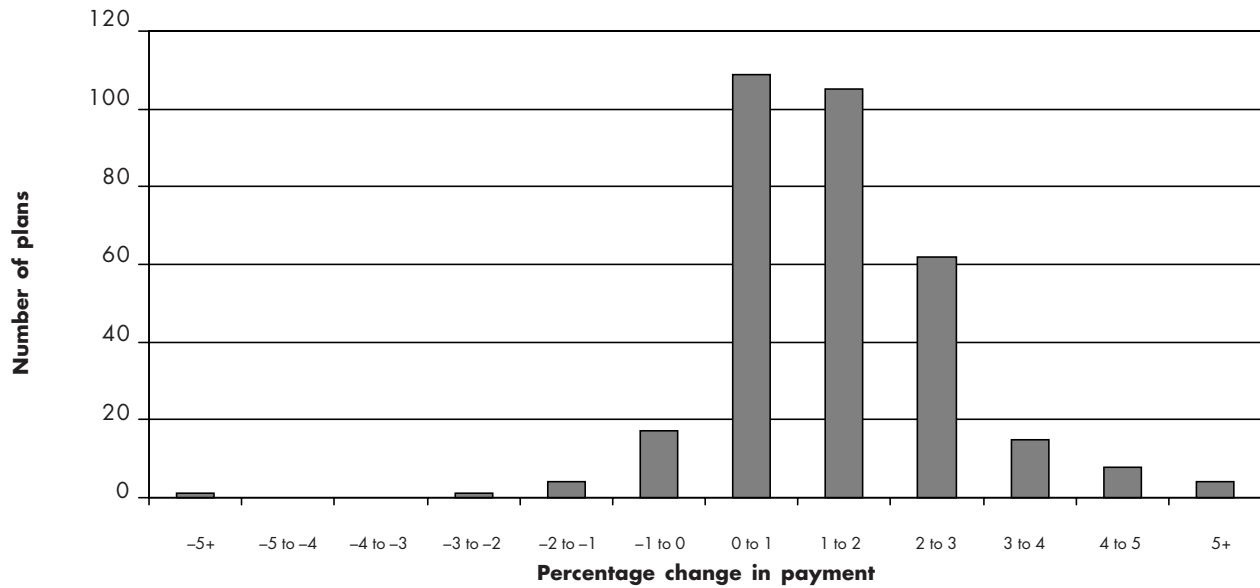
Because the only distinction between these two alternative models is whether they exclude discretionary hospitalizations, the difference in payments between the two models reveals the effect of this exclusion on payments. Excluding discretionary hospitalizations increases per capita payments to 93 percent of plans, with an average increase across plans of 1.4 percent (Figure A-1).

Effect of excluding hospitalizations shorter than two days To determine the effect of excluding hospitalizations lasting less than two days, we used two more risk adjustment models developed by HCFA in a method that is otherwise identical to the one used to estimate the impact of excluding discretionary hospitalizations. One of these risk adjustment models is simply the PIP-DCG model. The other is identical to the PIP-DCG model, except it does not exclude hospitalizations shorter than two days (Pope et al. 1999). Because these models are identical except for whether they exclude short hospital stays, differences in payments between models reveals the impact of excluding such stays.

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[11]   The two alternative risk adjustment models are described in detail in Pope et al. (1999).

**Impact of excluding discretionary hospitalizations
from the principal inpatient diagnostic cost group model**
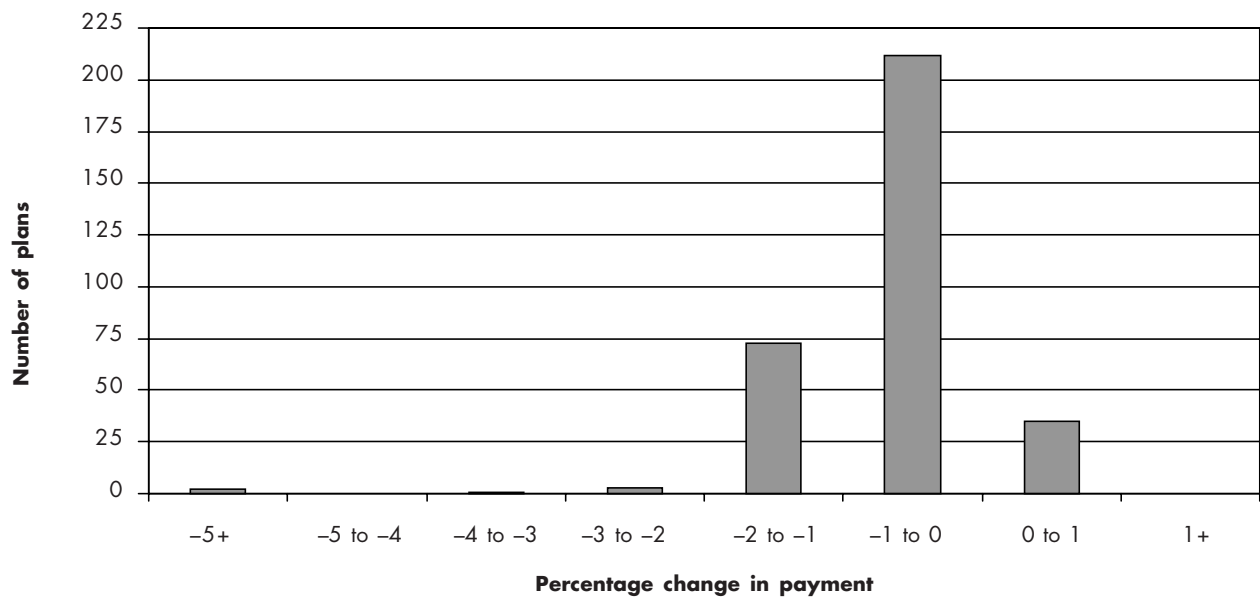

Note: Distribution includes 326 Medicare+Choice plans.

Source: MedPAC analysis of September 1998 Medicare+Choice encounter data.

**Impact of excluding one-day hospitalizations
from the principal inpatient diagnostic cost group model**

Note: Distribution includes 326 Medicare+Choice plans.

Source: MedPAC analysis of September 1998 Medicare+Choice encounter data.

MedPAC

The exclusion of inpatient stays shorter than two days reduces payments in 89 percent of plans and results in an average decrease across plans of 0.7 percent (Figure A-2).

Caveat about results

We caution readers about the results in Figures A-1 and A-2 because there are two important issues we could not address. The first is how much more frequently plans would hospitalize enrollees if HCFA did not add these exclusions to the PIP-DCG model. If plans would hospitalize more frequently without the exclusions, then payments without exclusions would be higher than what we estimate. The second issue we could not address is how county base payment rates would change if HCFA had implemented risk adjustment without either of these exclusions. If we had calculated the effect on base payment rates, our results may have been a little different because payments to plans are the product of their enrollees' risk scores times a base payment rate. ■

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