Including Hospice in Medicare Capitation Payments: Would it Save Money?

Gerald Riley M.S.P.H., and Charles Herboldsheimer

Hospice services received by Medicare risk-based health maintenance organization (HMO) enrollees are paid on a non-capitated basis, creating financial incentives for HMOs to encourage their terminally ill patients to elect hospice. Using Medicare administrative records for 1998, we found that hospice enrollment in the last month of life was significantly higher among HMO enrollees than among beneficiaries in fee-for-service (FFS). However, low mortality rates among HMO enrollees produced similar population-based rates of hospice use in the HMO and FFS sectors. Simulations showed that including hospice care under capitation payments in July 1998 would have produced very small savings for Medicare.

INTRODUCTION

Hospice services have been a covered benefit under Part A of Medicare since 1983. To qualify for hospice benefits, a beneficiary must have a life expectancy of 6 months or less, assuming the illness runs its normal course (as certified by a physician), and must voluntarily elect hospice care. Once a beneficiary elects hospice care, the beneficiary foregoes all curative treatment for the terminal illness and related conditions (though curative treatment is covered for unrelated conditions), and in return is eligible to receive a variety of palliative care services, including some not normally available under regular Medicare benefits. Hospice services are paid for on the basis of four prospective per diem rates, with each rate determined by the level of service and whether it is provided at home or on an inpatient basis. Hospice use has increased significantly in recent years, accounting for just 0.1 percent of Medicare expenditures in 1988 and 1.0 percent in 1998 (Health Care Financing Administration, 1989; 2000). About 20 percent of Medicare beneficiaries who died in 1998 used hospice services (U.S. General Accounting Office, 2000). Despite the growth in hospice use, many experts believe that access to hospice care under Medicare is limited, and that enrollment in hospice often occurs too late (Medicare Payment Advisory Commission, 1999; Christakis and Escarce, 1996; Rhymes, 1990; U.S. General Accounting Office, 2000; Virnig et al., 1999).

Under Medicare's risk contracting program, managed care plans are paid a capitated rate for providing all Medicare covered services except hospice services. Prior to 2000, capitated payment was based on the adjusted average per capita cost (AAPCC); beginning in 2000, payment is partly based on principal inpatient diagnosis cost groups (PIPDCGs), which incorporate diagnostic information from inpatient hospital stays (Pope et al., 2000). Payment for hospice services has always been made outside the capitation rate, using the same per diem rates applied in the FFS sector. Hospice costs were originally excluded from the AAPCC because at the time the

The authors are with the Centers for Medicare & Medicaid Services (CMS). The views expressed in this article are those of the authors and do not necessarily reflect the views of CMS.

hospice benefit was introduced into Medicare in 1983, there were few hospices and little financial data on which to base cost estimates. Hospice payment under managed care was addressed in the Balanced Budget Act of 1997, which specified that for Medicare+Choice enrollees electing hospice care, the Medicare+Choice plan receives a reduced capitation payment to cover only additional benefits the plan provides outside the regular Medicare benefit package. Medicare-covered services are paid on a FFS basis and hospice care is paid using standard per diem rates.

Payment for hospice services outside the Medicare capitation rate produces financial incentives for HMOs to encourage their terminally ill enrollees to elect hospice care. The reason is that medical care expenses in the last months of life tend to be very high (Lubitz and Riley, 1993). Medicare's capitation rate is not adjusted for end-of-life care, so HMOs will usually lose money on enrollees who are near the end of life. If terminally ill enrollees elect (non-capitated) hospice care, HMOs can avoid incurring high terminal care expenses for these enrollees, and any associated losses.

Previous research has shown that HMO enrollment is associated with greater use of hospice services among terminally ill Medicare beneficiaries (Virnig et al., 2000; Virnig et al., 1999; Mentnech et al., 1999). With the growth in hospice care, Medicare's hospice payment policies have become a potentially important influence on patterns of end-of-life care in HMOs. Although the optimal level of hospice use is unknown, it is of policy interest to know how the use of hospice care differs in the HMO and FFS sectors, and what the financial implications are of carving out hospice services from capitated payments.

This article has two primary purposes: (1) to compare levels of hospice enrollment between Medicare's HMO and FFS sectors, and (2) to simulate the impact on Medicare expenditures of using a capitation-based method of paying for hospice care received by risk-based HMO enrollees.

METHODS

Three separate analyses were conducted involving three different beneficiary samples. We:

- Examined hospice enrollment in the last calendar month of life for beneficiaries dying in HMOs and in FFS in 1998.
- Compared mortality rates in HMOs and FFS in 1998, including deaths from cancer, to determine differences in demand for hospice services between the HMO and FFS sectors.
- Estimated actual Medicare payments on behalf of risk-based HMO enrollees in July 1998 and compared that with simulated Medicare payments for the same enrollees under the assumption that hospice services were included in capitation payments.

Hospice Enrollment

Using Medicare's enrollment database, we identified a 10-percent random sample of beneficiaries who died in 1998 and were entitled to Part A and Part B at the time of death. Within this group, we identified persons who were members of a risk-based HMO at the time of death (n=21,330). We then identified those who were in FFS at the time of death and who resided in a county with three or more decedents from risk-based HMOs (n=88,501). FFS decedents were selected from counties with three or more HMO decedents in order to increase the validity of the HMO-FFS com-

parisons. Logistic regression was used to examine the association of HMO membership with hospice enrollment in the last month, controlling for age, sex, race (black), end stage renal disease (ESRD) status, State buy-in status (a proxy for Medicaid eligibility), and area of residence. Because hospice use may be determined in part by availability of health care resources, the model also incorporated county level variables on number of hospices per 1,000 Medicare beneficiaries, number of home health agencies per 1,000, and number of hospital beds per 1,000 in 1998, defined from the provider of services file and enrollment data. Area of residence was represented by a series of 40 binary variables identifying all counties with 100 or more HMO decedents; a separate series of binary variables indicated State of residence for persons who did not reside in 1 of the 40 counties with 100 or more HMO decedents.

Decedents from cost-based HMOs (including health care prepayment plans) were included in the analysis if they lived in a county with three or more risk-based HMO decedents (n=1,988). Cost-based HMOs do not receive capitation payments, but are paid on a cost basis for all Medicare-covered services provided to their Medicare enrollees. As with risk-based HMOs, payment for hospice care is made directly to the hospice on a per diem basis. The purpose of including decedents from cost-based HMOs in the analysis was to examine the level of hospice use within an HMO population where there was an absence of strong financial incentives to refer terminally ill enrollees to hospice care.

Over one-half of Medicare hospice enrollees have a primary diagnosis of cancer, with other common diagnoses being congestive heart failure, chronic obstructive pulmonary disease, and Alzheimer's disease (U.S.General Accounting Office, 2000; Haupt, 1998). Because hospice use is largely driven by cancer deaths, differences in hospice enrollment between the HMO and FFS sectors may be attributable to proportionately more cancer deaths in one sector. A disproportionate number of cancer deaths may occur in either sector because of selection, differences in cancer screening patterns, or other factors. We therefore supplemented the analysis of hospice enrollment with data from the Surveillance, Epidemiology, and End Results (SEER) Medicare linked database. The SEER program receives uniformly reported data from 11 population-based cancer registries covering 14 percent of the U.S. population (Potosky et al., 1993). The registries report information on each incident cancer case (excluding non-melanoma skin cancer) among residents of the 11 reporting areas, including date and cause of death. SEER data have been linked to Medicare records at the individual level through 1996. From SEER Medicare records, we determined the percent of 1996 cancer deaths in SEER reporting areas that occurred among elderly risk-based HMO enrollees. This was compared with the percent of all 1996 deaths that occurred among elderly risk-based HMO enrollees in the SEER areas, as determined from the 5 percent Medicare denominator file. Comparing the percentage of cancer deaths attributable to risk-based HMO enrollees with the percentage of total deaths attributable to risk-based HMO enrollees indicates whether the risk-based HMO population experienced a disproportionate number of deaths from cancer, which would increase the demand for hospice services.

Mortality Rates

Using the 1998 Medicare denominator file, we identified a 1-percent random sample of beneficiaries who were entitled to

Part A and Part B in January 1998. Persons who were in FFS in January 1998 were eliminated from the sample if they lived in a county that did not have at least three risk-based HMO enrollees. This left 55,077 risk-based HMO enrollees and 185,287 beneficiaries in FFS. We used a proportional hazards model to estimate the relative risk of death in 1998 among HMO enrollees, controlling for age, sex, race, State buy-in status, ESRD status, and State of residence. Switchers from HMO to FFS or vice versa were censored at the time of their switch.

Payments

Analysis of Medicare payments was based on all beneficiaries enrolled in risk-based HMOs in July 1998 (n=5.97 million). We limited this analysis to July enrollees because individual level payments for HMO enrollees are recorded on monthly files; it was beyond the scope of the study to analyze payment data for more than 1 month in 1998. The first step was to determine actual Medicare payments for risk-based HMO enrollees in July 1998. For those HMO members enrolled in hospice, Medicare payments were comprised of claims-based payments for Medicare-covered services made on a FFS basis (including hospice services), plus reduced capitation payments made to the HMO. Claims-based payments incurred in July 1998 were estimated from dates of service on the claims; if the dates of service covered more than 1 calendar month, the payment was prorated. Capitation payments for persons enrolled in hospice were estimated from the July 1998 HMO payment file (which contains capitated payments for each HMO enrollee and their demographic characteristics) and from the AAPCC ratebook. For those HMO members not enrolled in hospice, the July 1998 HMO payment file was used to capture capitated payment amounts. Adjustment records on the payment file were ignored, other than routine adjustments used to account for additional payments related to institutional status.

The second step in the analysis was to simulate HMO payments in July 1998 under the assumption that hospice services were included in the capitation payments. To do this, we first estimated what payments would be to risk-based HMOs if all enrollees (including those enrolled in hospice) were covered under the existing AAPCC. We then increased the simulated Part A payment amount by 1.75 percent, based on our estimate that hospice payments comprised 1.75 percent of Part A costs under FFS in 1998. Because the AAPCC is based on national FFS cost data, we assumed that including hospice services in the AAPCC for 1998 would have resulted in an increase in Part A payments to risk-based HMOs of approximately 1.75 percent. The third and last step was to compare actual costs with simulated costs to estimate the effect on Medicare expenditures of including hospice services under capitation.

RESULTS

Hospice Enrollment

The sample of 1998 HMO decedents had proportionately fewer disabled beneficiaries under age 65 and fewer persons dying at age 85 or over than the sample of FFS decedents (Table 1). The HMO sample also had a significantly higher proportion of males and a lower proportion of black beneficiaries, ESRD patients, and State buy-ins than FFS.

Persons dying in risk-based HMOs were significantly more likely to be enrolled in hospice than were persons dying in FFS. Among HMO decedents, 27.0 percent were enrolled in a hospice in their last

Table 1

Demographic Characteristics and Use of Hospice Services Among Medicare Beneficiaries Who Died in 1998, by Health Maintenance Organization Enrollment Status

Characteristic	Risk (*n*=21,330)	Fee-for-Service (*n*=88,501)
Age[1]	Percent	
Under 45 Years	0.4	1.3
45-54 Years	1.0	1.7
55-64 Years	3.0	3.5
65-69 Years	12.9	8.7
70-74 Years	17.7	**13.4
75-79 Years	19.8	17.2
80-84 Years	18.8	19.0
85-89 Years	14.9	17.7
90 Years or Over	11.6	17.5
Male	51.3	**44.0
Black	9.3	**10.1
End Stage Renal Disease	1.7	**3.3
State Buy-In	10.4	**22.2
Hospice Enrollment		
Enrolled Last Month of Life	27.0	**19.4
	Days	
Average Length of Stay[2]	38.0	*40.2

*p<0.05.

**p<0.001.

[1]Significance testing for differences in age between health maintenance organization and fee-for-service was conducted for all age groups together.

[2]Average number of days enrolled in last year for hospice periods beginning within 1 year of death.

SOURCE: Medicare enrollment database as of September 1999.

month, compared with 19.4 percent of FFS decedents (p<0.001). Among hospice enrollees, the average number of days enrolled in hospice in the last year of life was slightly lower for persons in risk-based HMOs than for persons in FFS (38.0 days and 40.2 days respectively, p<0.05) (Table 1). After controlling for age, sex, race, ESRD status, State buy-in status, and area of residence, however, the difference was not significant (regression analysis, data not shown).

The odds ratio for hospice enrollment in the last month was 1.30 for risk-based HMO decedents, controlling for age, sex, race, ESRD status, State buy-in status, and area of residence (95 percent confidence interval = (1.25, 1.35)) (Table 2). For decedents from cost-based HMOs, the odds ratio for hospice enrollment was not significantly different from 1.0 (OR=1.06, 95 percent confidence interval = (0.95, 1.20)).

Several demographic characteristics were associated with hospice enrollment (Table 2). With respect to age, hospice enrollment was lowest among disabled beneficiaries under age 65 and highest among persons dying at age 65-74. Hospice enrollment was higher among females than males. Black persons, individuals with ESRD, and State buy-ins were significantly less likely to enroll in hospice.

The analysis of SEER Medicare data revealed that, among elderly beneficiaries in SEER areas, 16.8 percent of deaths from cancer in 1996 occurred among enrollees in risk-based HMOs. In comparison, 14.3 percent of all 1996 deaths among elderly beneficiaries residing in SEER areas occurred among enrollees in risk-based HMOs. When the data were broken down by 5-year age groups, a similar pattern, though less pronounced, was observed. This suggests that cancer accounted for

Table 2

Odds Ratios for the Association of Beneficiary Characteristics with Enrollment in Hospice in the Last Calendar Month of Life, Among Medicare Beneficiaries Dying in 1998

Characteristic	Odds Ratio	95 Percent Confidence Interval
Age and Sex		
Males		
Under 45 Years	0.73	*(0.59, 0.92)
45-54 Years	0.53	*(0.43, 0.66)
55-64 Years	0.78	*(0.68, 0.88)
65-69 Years	1.25	*(1.15, 1.35)
70-74 Years	1.25	*(1.16, 1.33)
75-79 Years	1.16	*(1.09, 1.24)
80-84 Years	1.11	*(1.03, 1.18)
85-89 Years	1.07	(0.99, 1.15)
90 Years or Over	0.94	(0.86, 1.02)
Females		
Under 45 Years	0.75	(0.55, 1.03)
45-54 Years	0.89	(0.71, 1.12)
55-64 Years	1.18	*(1.02, 1.36)
65-69 Years	1.75	*(1.61, 1.90)
70-74 Years	1.49	*(1.39, 1.60)
75-79 Years	1.31	*(1.23, 1.40)
80-84 Years	1.22	*(1.14, 1.30)
85-89 Years	1.13	*(1.06, 1.20)
90 Years and Over	1.00	—
Black	0.79	*(0.74, 0.83)
End Stage Renal Disease	0.54	*(0.48, 0.60)
State Buy-In	0.69	*(0.66, 0.72)
Enrolled in Cost-Based HMO	1.06	(0.95, 1.20)
Enrolled in Risk-Based HMO	1.30	*(1.25, 1.35)

* Confidence interval does not include 1.0.

NOTES: HMO is health maintenance organization. Odds ratios were derived from logistic regression model with hospice enrollment (yes/no) as the dependent variable. Regression also controls for area of residence and availability of hospice, home health, and hospital services. Odds ratios significantly greater than 1.0 indicate a higher probability of hospice enrollment.

SOURCE: Medicare enrollment database as of September 1999.

proportionately more deaths among HMO enrollees, which may explain higher rates of hospice enrollment among HMO enrollees in the last month of life.

Mortality Rates

Among the sample of beneficiaries enrolled in a risk-based HMO in January 1998, 3.86 percent died in 1998, compared with 5.21 percent of the FFS sample ($p < 0.001$). After adjusting for age, sex, race, State buy-in status, ESRD status, and State of residence, the relative risk of death for HMO enrollees was 0.85 (95 percent confidence interval = (0.81, 0.90)), indicating lower mortality among HMO members than among persons in FFS (data not shown in tables). This is consistent with other research that has found favorable selection within the Medicare HMO population (Riley et al., 1996; Physician Payment Review Commission, 1996).

The low mortality rate among HMO enrollees offsets the high level of hospice use among terminally ill persons in HMOs to produce a population-based rate of hospice use in HMOs that is similar to that in FFS. To provide a rough illustration, the proportion of January 1998 HMO enrollees who died that year was 0.0386, ignoring the effects of switching. From Table 1, the proportion of decedents who used hospice services was 0.270, resulting in a crude annual population-based rate of hospice use of 0.0386 x 0.270 = 0.0104, or 104 hospice users per 10,000 HMO members. In FFS, the crude population-based rate of hospice

Table 3

Estimated Effect on Medicare Payments of Including Hospice Services Under Capitation for Risk-Based HMOs, July 1998

HMO Enrollee	Actual	Hospice Capitation (Simulated)	Difference (Actual-Simulated)
Total	$2,809,565,116	$2,807,628,643	$1,936,473
Hospice Enrollees[1]			
Total Payments	37,232,229	8,433,698	28,798,531
Claims Payments for Hospice Services	33,002,985	0	33,002,985
Claims Payments for Non-Hospice Services	525,104	0	525,104
Part A Capitation Payments	[2]3,704,140	[3]4,890,748	-1,186,608
Part B Capitation Payments	0	[4]3,542,950	-3,542,950
Not in Hospice[5]			
Total Payments	2,772,332,887	2,799,194,945	-26,862,058
Part A Capitation Payments[6]	1,534,974,733	[7]1,561,836,791	-26,862,058
Part B capitation payments[6]	1,237,358,154	1,237,358,154	0

[1] *n*=14,549.

[2] Estimated from HMO payment file for July 1998 and the ratebook for 1998. Reflects reduced capitation for persons enrolled in hospice at the beginning of the month.

[3] Simulation based on the HMO payment file for July 1998 and the ratebook for 1998. Simulation reflects full capitation payment for hospice enrollees. Part A capitation amount increased by 0.0175 to reflect the addition of hospice costs to the Part A adjusted average per capita cost.

[4] Simulation based on the HMO payment file for July 1998 and the ratebook for 1998.

[5] *n*=5,960,280.

[6] Based on HMO payment file for July 1998. Excludes payment adjustments other than those for institutional status.

[7] Part A capitation amount increased by 0.0175 to reflect the addition of hospice costs to the Part A adjusted average per capita cost.

NOTE: HMO is health maintenance organization.

SOURCES: Medicare claims files for 1998; July 1998 HMO payment file; HMO ratebook for 1998.

use was 0.0521 x 0.194 = 0.0101, or 101 hospice users per 10,000 FFS members, which is similar to the HMO rate. The similarity of population-based rates of hospice use in the HMO and FFS sectors in 1998 means that per enrollee hospice costs were similar, given that the distributions of length of stay in hospice were similar. This has implications for the payment analysis as explained in the following section.

Payments

As previously noted, the analysis of payment data is based on all Medicare beneficiaries enrolled in risk-based HMOs in July 1998. As shown in Table 3, of these 5.97 million enrollees, 14,549 were enrolled in hospice for at least part of the month, including those who died in July and those who survived. Medicare paid approximately $33 million for hospice services and $525,000 for other Medicare-covered services received by these enrollees on a FFS basis. An additional $3.7 million in reduced capitation payments was paid to HMOs for their hospice enrollees. There were approximately 5.96 million risk-based HMO enrollees not enrolled in hospice in July 1998; Medicare payments for these enrollees were approximately $2.77 billion under the AAPCC. Total Medicare payments on behalf of all risk-based HMO enrollees (including hospice and non-hospice enrollees) that month were about $2.810 billion.

Table 3 shows simulated payments on behalf of risk-based HMO enrollees in July 1998 under the assumption that hospice care was included in the capitation payment. For hospice enrollees, AAPCC amounts were estimated to be $8.4 million, after adjusting the Part A amount to reflect the additional cost of incorporating hospice

costs. For non-hospice enrollees, the AAPCC was estimated to be $2.80 billion after adjustment. The simulated AAPCC for hospice and non-hospice enrollees combined was estimated to be $2.808 billion.

Savings under capitation for hospice care were estimated by comparing total actual payments with total simulated payments. Subtracting simulated payments from actual payments yields a difference of $1.9 million, which represents 5 percent of actual payments made for hospice enrollees, and only 0.07 percent of actual payments for all risk-based HMO enrollees in July 1998. Estimated savings amounted to about $23 million on an annual basis. Actual payments were close to simulated payments under capitation because the population-based rates of hospice use were similar in the HMO and FFS sectors in 1998.

DISCUSSION

Hospice Enrollment

The high rate of hospice enrollment among terminally ill members of risk-based HMOs is consistent with financial incentives produced by the method of payment for hospice care. The lack of an association of hospice use with membership in a cost-based HMO is also consistent with the notion that hospice use in risk-based HMOs is influenced by payment policies. Nonetheless, caution should be exercised in attributing levels of hospice enrollment to financial incentives. First, selection effects may explain the higher use of hospice among risk-based HMO enrollees, i.e., persons joining managed care may also be more likely to enroll in hospice. For example, persons enrolling in HMOs may be more receptive to the concept of care management or they may prefer less aggressive care. They may also be generally more knowledgeable about alternative health care arrangements and/or more interested in exploring their care options. Second, average length of stay in hospice was similar among persons in risk-based HMOs and in FFS. If risk-based HMOs were successfully encouraging terminally ill enrollees to elect hospice for financial reasons, one might expect HMO enrollees to elect hospice earlier than persons in FFS, producing longer stays. Third, we found a higher percent of deaths due to cancer in the HMO sector, which would increase the demand for hospice services regardless of payment arrangement. However, Mentnech et al. (1999) found that among persons dying of lung and colorectal cancer, hospice use was significantly higher in risk-based HMOs than in FFS. Fourth, greater use of hospice care in HMOs may reflect better patient communication and case management. HMOs may be better able to identify those with terminal illness who may benefit from a more palliative approach to care and to communicate care options. Despite uncertainty about the reasons for high hospice enrollment, current payment methods clearly produce financial incentives for HMOs to encourage hospice election, and may be influencing patterns of end-of-life care among their enrollees.

A difficulty in evaluating hospice enrollment rates in risk-based HMOs is uncertainty about appropriate levels of hospice use. Hospice use has increased rapidly in recent years under Medicare, and continues to grow (U.S. General Accounting Office, 2000). Wide geographic variation in hospice utilization has been reported among Medicare decedents (Virnig et al., 2000; U.S. General Accounting Office, 2000), and there is often the perception that access to hospice care is a problem for some populations, resulting in underutilization (Rhymes, 1990; Virnig et al., 1999;

U.S. General Accounting Office, 2000). Many hospice stays are initiated very close to death, perhaps with little benefit to the patient (Christakis and Escarce, 1996; Medicare Payment Advisory Commission, 1999). It was not possible to determine from our data whether levels of hospice use in either the HMO or FFS sectors were clinically appropriate.

Current Medicare payment policies may limit innovation in end-of-life care among HMOs. Persons near the end of life often have complex needs that must be met by an array of service providers. HMOs are in a position to provide a comprehensive set of services to dying patients that can be coordinated across multiple providers and delivery sites (Lynn et al., 1998; Medicare Payment Advisory Commission, 1999). The combination of integrated delivery systems and capitation potentially allows a great deal of flexibility in providing medical and supportive care to dying patients, including those not eligible for hospice because the timing of death is unpredictable (Lynn et al., 1998). Payment policies that promote hospice enrollment may limit incentives for managed care plans to experiment outside the hospice setting with alternative ways to care for patients who are near the end of life.

The level of hospice enrollment among terminally ill persons in the FFS sector may be influenced by levels of hospice enrollment in the HMO sector. Virnig et al. (2000) found high rates of hospice use among Medicare beneficiaries in FFS who lived in areas of high HMO penetration. Such spillover effects would tend to decrease observed differences in rates of hospice enrollment between the HMO and FFS sectors.

Capitation for Hospice Services

If hospice services for HMO enrollees were included in the capitation payment, HMOs might still have some financial incentive to encourage hospice election among their terminally ill enrollees. Kidder (1992) found hospice care to be somewhat less expensive than conventional end-of-life care in 1986, although it is not clear whether those savings persist following regulatory changes in Medicare and the significant growth in hospice utilization. If hospice care continues to be less expensive than conventional care, HMOs would achieve savings by encouraging the use of hospice under capitation.

Our findings suggest that if hospice care for HMO enrollees were included in the capitation payment, aggregate Medicare expenditures would remain approximately the same as they are now. This finding is attributable to the offsetting effects of low mortality and high hospice enrollment in the HMO sector. If selection patterns change in the Medicare+Choice program, or if patterns of hospice use change, significant cost implications of current hospice payment policy may emerge.

Limitations

The simulation of HMO payments used existing AAPCC demographic cost factors for 1998 and did not account for any changes that would need to be made to the Part A factors to account for hospice costs. It was beyond the scope of this study to recalibrate the Part A demographic cost factors for purposes of simulating capitation payments that would include hospice care.

Medicare is currently phasing in a new risk adjuster to its HMO payment formula, based on the PIPDCG model. Under PIPDCG, capitated payments are expected to decrease for the average plan (Health Care Financing Administration, 1999). Consequently, if hospice care were capitated under a PIPDCG-based risk adjustment system, savings might be higher than those estimated under the AAPCC.

The SEER-Medicare database has some limitations for measuring the percentages of deaths due to cancer in the HMO and FFS settings. SEER registries obtain data only on incident cancer cases in their reporting areas; if a Medicare beneficiary is first diagnosed while residing in a non-SEER area, the beneficiary is not captured in the database, even if the individual subsequently moves to a SEER area and dies of the cancer. In addition, 5 percent of deaths among SEER cases had an unknown cause of death.

CONCLUSION

End-of-life care continues to be an important topic in discussions about appropriateness of services, quality of life, and health care expenditures. Hospice has become an increasingly important component of this care, particularly within the Medicare population. Medicare policies on hospice care are expected to have an increasingly important effect on quality of life and program costs in the managed care sector.

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REFERENCES

Christakis N.A., and Escarce, J.J.: Survival of Medicare Patients After Enrollment in Hospice Programs. *New England Journal of Medicine* 335(3):172-178, July 18, 1996.

Haupt, B.J.: Characteristics of Hospice Care Users: Data from the 1996 National Home and Hospice Care Survey. Advance data from Vital and Health Statistics. No. 299. National Center for Health Statistics. Hyattsville, MD. 1998.

Health Care Financing Administration: *1989 HCFA Statistics.* HCFA Pub. No. 03294. U.S. Government Printing Office. Washington, DC. 1989.

Health Care Financing Administration: *1999 HCFA Statistics.* HCFA Pub. No. 03421. U.S. Government Printing Office. Washington, DC. 2000.

Health Care Financing Administration: Proposed Method of Incorporating Health Status Risk Adjusters Into Medicare+Choice Payments. Report to Congress. Baltimore, MD. 1999.

Kidder, D.: The Effects of Hospice Coverage on Medicare Expenditures. *Health Services Research* 27(2):195-217, June 1992.

Lubitz, J.D., and Riley, G.F.: Trends in Medicare Payments in the Last Year of Life. *New England Journal of Medicine* 328(15):1092-1096, April 15, 1993.

Lynn, J., Wilkinson, A., Cohn, F., and Jones, S.B.: Capitated Risk-Bearing Managed Care Systems Could Improve End-of-Life Care. *Journal of the American Geriatric Society* 46(3):322-330, March 1998.

Medicare Payment Advisory Commission: Improving Care at the End of Life (Chapter 7). Report to Congress. Washington, DC. 1999.

Mentnech, R.M., Greenberg, L.G., and Lubitz, J.D., et al.: Hospice Use Among Aged Medicare Beneficiaries Diagnosed with Lung or Colorectal Cancer. Presentation at the Annual Meeting of the Association for Health Services Research. Chicago, IL., June 1999.

Physician Payment Review Commission. Annual Report to Congress. Washington, DC. 1996.

Pope, G.C., Ellis, R.P., Ash, A.S., et al.: Principal Inpatient Diagnostic Cost Group Model for Medicare Risk Adjustment. *Health Care Financing Review* 21(3):93-118, Spring 2000.

Potosky, A.L., Riley, G., Lubitz, J., et al.: Potential for Cancer Related Health Services Research Using a Linked Medicare-Tumor Registry Database. *Medical Care* 31(8):732-748, August 1993.

Rhymes, J.: Hospice Care in America. *Journal of the American Medical Association* 264(3):369-372, July 18, 1990.

Riley, G., Tudor, C., Chiang, Y., and Ingber, M.: Health Status of Medicare Enrollees in HMOs and Fee-for-Service in 1994. *Health Care Financing Review* 17(4):65-76, Summer 1996.

U.S. General Accounting Office: Medicare: More Beneficiaries Use Hospice, But for Fewer Days of Care. GAO/HEHS-00-182. U.S. Government Printing Office. Washington, DC. September, 2000.

Virnig, B.A., Kind, S., McBean, M., and Fisher, E.: Geographic Variation in Hospice Use Prior to Death. *Journal of the American Geriatric Society* 48(9):1117-1125, September 2000.

Virnig, B.A., Persily, N.A., Morgan, R.O., and DeVito, C.A.: Do Medicare HMOs and Medicare FFS Differ in Their Use of the Medicare Hospice Benefit? *The Hospice Journal* 14(1):1-12, 1999.

Reprint Requests: Gerald F. Riley, M.S.P.H., Centers for Medicare & Medicaid Services, 7500 Security Boulevard, C3-20-17, Baltimore, MD 21244-1850. E-mail: griley@cms.hhs.gov