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The Influence of Medicare Home Health Payment Incentives: Does Payer Source Matter?

During the late 1990s, the U.S. government instituted an interim payment system (IPS) to constrain Medicare home health care expenditures. Previous research has focused largely on the implications of the IPS for Medicare patients; this study broadens the analysis to consider patients with other payer sources. Using the National Home and Hospice Care Survey, we found similar effects of the IPS across payer types. Specifically, the IPS was associated with a decrease in care for the sickest patients, less agency assistance with activities of daily living, and shorter length of use. However, these changes did not translate into worse discharge outcomes.

Prior to the Balanced Budget Act (BBA) of 1997, home health agencies were paid on the basis of their costs, up to pre-established per-visit limits. Under this system, agencies could enhance their revenues by providing a greater number of beneficiaries with additional visits. Over the period 1990 through 1997, Medicare home health expenditures grew annually at a rate more than three times that of the rest of the Medicare program (U.S. GAO 2000). The number of home health care users per 1,000 beneficiaries increased from 57 to 109, and the average number of visits per user doubled from 36 to 73.

The 1997 BBA changed Medicare home health eligibility and coverage rules and reformed the payment methodology by instituting a prospective payment system (PPS) for home health care reimbursement (Komisar 2002). As implemented on Oct. 1, 2000, Medicare pays home health agencies a set payment rate for each 60-day episode of care, regardless of the specific services delivered. While the PPS was being developed, however, the Centers for Medicare & Medicaid Services (CMS) instituted an interim payment system (IPS). That was phased in beginning October 1997, with the start of each agency's cost reporting period. The IPS constrained agency reimbursement by reducing the per-visit payment limit and introducing an annual per-beneficiary cap.

Although only in place for a brief period (1997–2000), the IPS was a unique natural experiment with important policy and research implications for today's home health care sector. By tightening the per-visit limit and imposing a per-beneficiary limit, the IPS provides an opportunity to study the

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effect of payment generosity on utilization and discharge outcomes. These relationships are particularly important in the context of the Deficit Reduction Act of 2005, which froze 2006 Medicare home health care payments at 2005 levels. Moreover, there has been very little research considering the implications of Medicare home health care payment policy for non-Medicare patients. The payment changes under the IPS allow for the examination of treatment and outcomes of home health care patients with different payer sources.

Previous work has shown that the payment changes introduced in the IPS were associated with large decreases in Medicare utilization and expenditures (McCall et al. 2003b; Murkofsky et al. 2003). Specifically, there was a 22% decrease in the proportion of beneficiaries using home health services, a 39% decrease in the number of visits per user, and a 27% decrease in the length of use. Moreover, the U.S. General Accounting Office (1998) reported that the IPS was related to an increase in voluntary agency closures, predominantly concentrated in states with particularly high agency growth in the pre-IPS period.[1] As such, there was not evidence of increased access problems in those high-closure states. Importantly, the decrease in utilization under the IPS has not been found to correspond to a decrease in patient outcomes, including functioning, mortality, use of hospital and emergency care, and patient satisfaction (McCall et al. 2003a, 2004).

However, there has been relatively little research addressing whether the changes under the IPS had implications for other payer groups. Because Medicare is the dominant payer of services, the payment changes introduced under the IPS may have affected the care of home health care patients with other payer sources. We explore legal, economic, and behavioral explanations for why an agency may value treating all patients according to the same criteria. Alternatively, the decreased generosity of Medicare under the IPS may have led to the increased use of non-Medicare services if payer sources such as Medicaid and private insurance functioned as potential substitutes for Medicare.

Given the potential implications of the IPS for non-Medicare home health patients, the omission of these patients from prior analyses may yield misleading policy implications. Using a national survey of current and discharged home health patients, our study examines the implications of the IPS for the entire home health care sector.

Conceptual Framework

This section provides a detailed summary of the payment changes under the IPS before analyzing the potential implications of the IPS for the care of Medicare and non-Medicare patients.

Nature of the Payment Change

Although the broad implications of the IPS are straightforward, the details of the payment policy are more complicated (MedPAC 1999). Prior to the BBA, Medicare reimbursed home health agencies based on their actual costs up to an aggregate limit, which was calculated by multiplying the national per-visit limit for each of six types of visits by the number of visits of each type provided by the agency. The national limit was set at 112% of the mean cost for each visit type.

The BBA introduced two changes to this payment system. First, it added a per-beneficiary limit, which was 98% of the average per-beneficiary costs for each agency in fiscal year 1994 (and then adjusted for inflation) and the average per-patient cost for agencies in the region. In calculating an agency's specific per-beneficiary limit, 75% of an agency's historical costs were blended with 25% of the median costs of agencies in the same region. The average per-beneficiary limit for new agencies (Medicare certified post-1994) was set at the national median for established agencies. Second, the BBA decreased the per-visit cost limits from 112% of the national mean cost per visit to 105% of the national median. Because the medians were less than the means, the reduction ended up exceeding 7%. For cost-reporting periods beginning in fiscal year 1998, Medicare paid agencies the lower of their actual costs, the aggregate per-beneficiary limit, or the aggregate per-visit limit. As a note, some minor changes were made to these rules over the course of the IPS.

Given the tighter per visit limit and a new annual per-beneficiary limit, the IPS should—on the surface—predominantly affect the behavior of agencies with per-visit costs in the far right tail of the distribution. For agencies with costs considerably below these limits, there was clearly

no incentive to change behavior. However, it is important to note that the per-visit and per-beneficiary limits are applied to *aggregate* agency costs. Thus, an agency does not need to keep the cost of each visit below the limit or to restrict the visits provided to each beneficiary to base-year levels. Rather, agencies can balance high-cost visits with low-cost ones to stay below the limits. Similarly, an agency could treat a mix of more intensive and less intensive beneficiaries and still not exceed the per-beneficiary limits. Thus, the application of the IPS to aggregate agency costs has potential implications across the distribution of beneficiaries served.

Implications for Medicare Patients

We hypothesize that the IPS provided strong economic incentives to home health agencies to alter the care of Medicare patients. Specifically, we posit that the IPS had implications for the care of the sickest patients, the intensity of services delivered, the length of use, and the outcome at the time of discharge. We present hypotheses regarding the effect of the IPS on each of these outcomes for Medicare patients before turning to the potential implications for non-Medicare patients.

A primary policy concern under the IPS was access to home health care, particularly for the sickest beneficiaries requiring the most costly medical care (U.S. GAO 1998; U.S. Office of Inspector General 1999). Because of the tighter per-visit limit and the introduction of the per-beneficiary cap, agencies had a strong incentive to accept healthier Medicare patients needing fewer resources. Indeed, a survey sponsored by the Medicare Payment Advisory Commission (MedPAC) indicated that some agencies were no longer taking patients they previously would have admitted (MedPAC 1999).[2] Specifically, the survey suggested that long-term or chronic care patients were less likely to be admitted by these agencies as a result of the IPS. Thus, we predict that under the IPS, agencies provided less care for the sickest home health care patients.

Once an agency admitted a patient, there was an incentive under the IPS to provide fewer services along both the intensive and extensive margins in order to keep costs within the payment limits. Along the intensive margin, results of the MedPAC (1999) survey suggested that certain agencies responded to the IPS by providing fewer services per user relative to the pre-IPS period. Thus, we predict that home health agencies provided fewer services to Medicare patients under the IPS. Along the extensive margin, the payment cap under the IPS increased the incentive to discharge Medicare patients earlier. Thus, we hypothesize that the IPS was associated with a decreased length of use among Medicare patients.

Finally, depending on the marginal productivity of the home health services eliminated under the IPS, the policy change may have affected patient discharge status. Assessing whether additional home health services are productive is difficult because there are no agreed-upon standards of what constitutes necessary or appropriate home health care; patients have chronic and overlapping care needs, and even the most basic unit of service—the visit—is not specifically defined (U.S. GAO 2000). Nevertheless, if the IPS eliminated productive home health care services, then we would expect higher mortality, more discharges to an institutional setting, and fewer discharges after the goals of care had been met. Alternatively, if the services eliminated under the IPS were not productive, then we would not expect a change in discharge status.

Potential Implications for Non-Medicare Patients

The implications of the IPS for other payer groups are less straightforward. Importantly, nearly all home health agencies are certified to care for Medicare and Medicaid patients (National Center for Health Statistics 2004). Although there is some specialization by payer type, most agencies care for a patient population covered by a variety of payer sources. Medicare is the dominant payer of services, accounting for just over half of all home health care patients; Medicaid, private insurance, and other payers cover the remaining patients. These payer sources are not necessarily mutually exclusive, but we follow previous research by categorizing individuals based on their primary payer source (e.g., Murkofsky et al. 2003).

Every state Medicaid program is mandated to offer home health services to individuals who qualify for federal income maintenance payments (e.g., Social Security Income and Aid to Families with Dependent Children) and individuals who are "categorically needy." Services must include

visits by registered nurses, visits by credentialed home health aides, and medical supplies and equipment. In addition, states may choose to cover physical, occupational, and speech therapies, and audiology services. States reimburse agencies using various methodologies including fee-for-service, prospective, and cost-based methodologies (Kaiser Family Foundation 2004). As of October 2004, only a handful of state Medicaid programs had home health care payment systems that mirrored the Medicare payment system.[3] Importantly, there were not wide-scale changes in Medicaid payment policies for home health care over our period of study, although there was an expansion in Medicaid home- and community-based services in certain states (Grabowski 2006).

There are multiple sources of private insurance coverage for home health care with large variation in the rules for payment of such services. Commercial health care plans such as Blue Cross and Blue Shield generally pay for skilled professional home health care services with some cost-sharing provisions. Managed care organizations and other group health plans often include coverage for home health care. Other sources of private insurance for home health care services include Medigap policies and long-term care insurance. Finally, some individuals pay for services out of pocket based on a negotiated fee between the patient and the provider. Other sources of home health care coverage include state and local service programs through the Veterans Administration, the Older Americans Act, social services block grant programs, community organizations, the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), and workers' compensation.

Depending on the interrelationship among the various payer types, the IPS may have affected the care of non-Medicare patients. First, there are potential legal, behavioral, and economic explanations for why the IPS may have had similar implications for Medicare and non-Medicare patients. From a legal perspective, providers certified to accept Medicaid or Medicare patients often are required by the CMS to provide care of equal quality to all patients, regardless of payer type or generosity. However, monitoring and enforcing this uniform quality constraint may be quite difficult. From a behavioral perspective, there is a longstanding notion that professional norms matter in health care (Arrow 1963). Behavioral constructs such as trust, fairness, and regret may explain why providers value treating all patients according to the same criteria (Frank 2004; Freidson 1994). From an economic perspective, certain aspects of health care are produced jointly for all payer types and may exhibit economies of joint production. For example, an agency's investment in staff training (or lack thereof) would have implications for all patients, regardless of payer source.

Alternatively, there are reasons to suspect that other payer groups may serve as potential substitutes for Medicare-financed home health care. The underlying motivation for this substitution may occur at the patient, agency, or government level. From the individual's perspective, a decrease in Medicare benefits under the IPS might lead a patient to seek alternative coverage from other public or private sources. From an agency's perspective, the decrease in the generosity of Medicare payment under the IPS would make other payer groups relatively more attractive. Although economists generally have been skeptical about cost shifting in the hospital context (Morrisey 1996), there is also the possibility that agencies could raise prices to privately insured patients to compensate for the decrease in Medicare generosity. There is some support for cost shifting across public agencies in the payment of managed mental health care services (Norton, Lindrooth, and Dickey 1999). In terms of home health care, state Medicaid programs are thought to employ a "Medicare maximization" strategy, whereby Medicaid is the "wrap around" payer for dual eligibles (Wiener and Stevenson 1998). In a survey of state units on aging and Medicaid departments conducted in 1998, three-quarters of the states responded that Medicare funding of home health care was maximized (Murtaugh et al. 1999). If Medicare payments were indeed maximized, then a decrease in Medicare payment generosity under the IPS may have caused caseworkers to direct the dual-eligible population toward Medicaid.

Finally, the care of non-Medicare and Medicare home health care patients may be unrelated. Unlike hospitals or nursing homes, home health care is not based in a common institutional setting and spillovers across patients of different payer types may be minimal. If this is the case, then the IPS should not have affected the care of non-Medicare patients.

Some previous research on the interdependence of different funding sources for home health care has found a negative relationship between Medicare and Medicaid home health care use at the state level (Cohen and Tumlinson 1997; Kenney, Rajan and Soscia 1998; Liu, Wissoker, and Rimes 1998). We are aware of only one previous study that examined this issue in the context of the IPS (Han et al. 2004). In this study, the length of home health care use for Medicaid or private insurance patients did not change under the IPS, suggesting that the care of Medicare and non-Medicare patients is not related.

We build on this earlier work by considering the effect of the IPS across different payer groups in the care of the sickest patients, the intensity of services delivered, the length of use, and the outcome at the time of discharge. If the predictions for Medicare carry over to the non-Medicare patients, then this would be suggestive of some commonality in the treatment of different payer groups. Alternatively, if we obtain the predicted Medicare effects but the opposite effects for non-Medicare patients, then this would be suggestive of some shifting (or substitution) across payer sources. Finally, if we observe the expected results for Medicare patients and no effect for the non-Medicare patients, then this would be suggestive of no relationship in the care of patients with different payer sources.

Data and Methods

Our study used the 1994, 1996, 1998, and 2000 waves of the National Home and Hospice Care Survey (NHHCS), a nationally representative survey of home and hospice care agencies and their current and discharged patients. The NHHCS was conducted by the National Center for Health Statistics. The data were collected using a two-stage sampling process. In the first stage, agencies were selected randomly (by size) from 24 strata according to agency type (home health, hospice, or mixed), region (Northeast, Midwest, West, or South), and location in a metropolitan statistical area (MSA). An interviewer contacted the administrator (or designee) for each sampled agency and collected general information on the agency. In the second stage of the sampling process, up to six current and six discharged patients were chosen randomly from each of the selected agencies; we excluded all hospice patients, however. Patient-level data were obtained via personal interviews with the agency staff member who was most familiar with the patient's care, along with a review of the patient records, if necessary. The final samples included 17,029 current and 15,885 discharged home health care patients.

To investigate the hypotheses outlined in the previous section, we examined two outcomes among current home health enrollees, level of illness at the time of admission and service intensity use, and two outcomes among discharged patients—length of use and discharge status. From the NHHCS current patient file, we used up to six admission diagnoses to calculate a Charlson comorbidity score based on the presence of one or more of 18 chronic medical conditions, such as diabetes, chronic renal insufficiency, liver disease, dementia, and cancer. This score is associated with increased mortality (Charlson et al. 1987) and also has been shown to predict functional decline and mortality in long-term care patients (Bravo et al. 2002). Because we ultimately are interested in agency behavior toward the sickest patients and because nearly half of patients had a Charlson score of 0, we established a "high" Charlson category based on whether the individual had a score of 2 or more (the sickest patient in our data had a score of 14). Among current home health care patients, 26% of our sample had a high Charlson score.

To model service intensity, we constructed a measure of the number of activities of daily living (ADLs) for which the patient received some help from the agency. The six ADL categories were bathing, dressing, eating, transferring in or out of beds or chairs, walking, and toileting. Because we are interested in high service use patients, we dichotomized this outcome by categorizing patients that received help with four or more ADLs. Among current patients, 23% of our sample received help with at least four ADLs.

Among discharged patients, length of use was defined as the number of days from admission to discharge. Given the skewed nature of length of use, we constructed dummy variables measuring discharge within 30 days and discharge within 60 days (Han et al. 2004). Our data indicated 47% of the sample was discharged within 30 days, and 73% within 60 days. Finally, we modeled

Table 1. Variable means (constructed with survey weights)

	Current ($N = 17,029$)	Discharged ($N = 14,885$)
1994 wave	.250	.189
1996 wave	.321	.279
1998 wave	.249	.274
2000 wave	.179	.258
Medicare	.602	.657
Medicaid	.174	.104
Private insurance	.097	.177
Other payer	.127	.062
Control variables		
Female	.666	.625
Married	.301	.385
Marital status missing	.127	.124
African American	.133	.095
Other race	.031	.040
Race missing	.159	.177
Hispanic	.041	.046
Lives in metropolitan statistical area	.785	.857
Region: West	.121	.167
Region: South	.340	.265
Region: Midwest	.225	.213
Region: Northeast	.315	.356
Age less than 65	.281	.305
Age 65–74	.189	.222
Age 75–84	.317	.306
Age 85+	.213	.168
Lives alone	.323	.261
Lives in an institution	.078	.069
Referral source: self/family	.066	.033
Referral source: hospital	.329	.470
Referral source: nursing home	.026	.024
Referral source: other	.216	.126
Has primary caregiver	.740	.791
Vision difficulty	—	.175
Hearing difficulty	—	.156
Charlson score = 0	—	.466
Charlson score = 1	—	.275
Charlson score = 2	—	.177
Charlson score = 3	—	.044
Charlson score = 4+	—	.037
Length of use <30 days	—	.471
Length of use 30–59 days	—	.255
Length of use 60–99 days	—	.100
Length of use >99 days	—	.174
For-profit agency	.388	.314
Ownership missing	.027	.013
Group-owned agency	.451	.457
Group-owned missing	.040	.039
Hospital-based agency	.299	.396
Hospital-based missing	.041	.034

the reason for discharge using four mutually exclusive categories: goals met (67% of our sample), transfer to an inpatient care setting (17%), death (4%), and other (11%). The "goals met" category consists of recovery, stabilization, family and friends resuming care, and services no longer being needed. Inpatient care settings include both hospitals and nursing homes. The other category consists of those sample people who were no longer eligible for services, were transferred to some other outpatient care setting, or moved out of the area.

We constructed four primary payer categories: Medicare, Medicaid, private insurance, and other payer.[4] The "other payer" category consisted of: other governmental assistance, out-of-pocket expenses, Supplemental Security Income, religious organizations, Veterans Administration, CHAMPVA/CHAMPUS, other military medicine, and other. We did not include secondary payer sources in our models, but our results are robust to the inclusion of dummy variables modeling secondary payer source.[5]

The implementation of the IPS, represented by a dummy variable, is the key policy variable of interest. Because the IPS was implemented on Oct. 1, 1997, data from the 1994 and 1996 waves were assigned to the pre-IPS period; data from the 1998 and 2000 waves were assigned to the post-IPS period. One potential issue with this assignment for the 1998 NHHCS wave is that patients may have been admitted in the period preceding the IPS (e.g., approximately 18% of Medicare home health patients in the 1998 wave were admitted prior to Oct. 1, 1997 (Han and Remsburg 2003)). Unfortunately, we were not able to correct for this issue employing the public use NHHCS files, but if anything, this would bias our results toward finding no effect of the IPS. An additional concern with our dummy variable approach is that outcomes may have evolved over time under the IPS. In the early part of the IPS period, agencies may have been slow to adjust behavior, and in the latter part of the period, agencies may have adjusted behavior in anticipation of the PPS. In a set of robustness checks (available on request from the authors), we confirmed that our primary results are similar to those generated by models that alternately excluded either the 1998 or 2000 waves from the analysis.

A number of covariates were included in our multivariate models (see Table 1 for descriptive

statistics). At the person level, demographic variables included gender, age, race, ethnicity, and marital status. We also included the patient's referral source (physician, hospital, self/family, nursing home, or other), living arrangement (lives alone, institution, or other), and presence of a primary caregiver. At the agency level, we controlled for whether the agency was for-profit, group-owned, and hospital-based. Finally, we included dummy variables for whether the agency was located in a metropolitan statistical area and for region of the country (Northeast, Midwest, West, or South). For race, marital status, and the agency-level variables, we also included dummy variables for missing observations to maximize our sample size. In the discharge analyses, we included dummy variables for the Charlson score, vision difficulty, and hearing difficulty. Because individuals discharged earlier are necessarily associated with a lower probability of negative outcomes such as death or institutionalization, we also included length of use dummy variables (30 to 59 days, 60 to 99 days, >99 days) in the discharge destination regressions.

The empirical models exploit the panel nature of the NHHCS data to examine the implications of the IPS. The initial specification conditions on those individuals with Medicare as the primary payer source. We estimated models of the following form:

$$Y_{it} = IPS_t\gamma + X_{it}\beta + \varepsilon_{it} \quad (1)$$

where Y_{it} refers to the outcome measure for patient i at time t, X_{it} includes an intercept and a set of patient and agency level controls, and ε_{it} is the error term. *IPS* is a dummy variable measuring those patients surveyed in the 1998 and 2000 waves. Thus, the basic identification strategy implicit in equation 1 relies on comparing outcomes for Medicare patients before and after the implementation of the IPS. To directly test whether the IPS had implications for non-Medicare patients, we re-estimated equation 1 conditional on Medicaid, private insurance, and other payer. The estimates from this model provided information on whether the outcomes of interest changed for other payer groups in the IPS period.

We analyzed whether the implications of the IPS differed for Medicare patients relative to non-Medicare patients. Thus, we estimated the following model containing data from all four payer groups:

$$\begin{aligned} Y_{it} = {} & IPS_t \times Medicare_{it}\alpha + IPS_t\gamma \\ & + Medicare_{it}\delta + Private_{it}\phi \\ & + Other_{it}\lambda + X_{it}\beta + \varepsilon_{it} \end{aligned} \quad (2)$$

where we included an interaction of the IPS and Medicare variables. The interaction term is the key coefficient of interest in this model, allowing us to construct a "differences-in-differences" estimate. Basically, we compare the pre/post difference in outcomes for Medicare patients relative to the pre/post difference for non-Medicare patients. The failure to observe significant differences across payer types under the IPS would be consistent with the idea that the decrease in payment generosity under the IPS had similar implications for Medicare and non-Medicare patients.

Given the binary nature of the outcomes, these models were estimated as probits, but the coefficients are presented as marginal probability effects. Thus, the coefficient estimates can be interpreted as the percentage-point change in the dependent variable following the adoption of the IPS. Given the complex survey design, the svy commands in STATA software (version 8.02) were used to incorporate the NHHCS weights to account for the unequal probability selection of patients, and also to correct the standard errors for clustering within agencies. Because strata were not included on the NHHCS public use file, we constructed this measure using the agency type, region, and MSA variables (Carlson, Gallo, and Bradley 2004).

As a final methodological point, the interaction term in a probit model is not directly interpretable (Ai and Norton 2003). Existing software to correct for this issue does not take account of complex survey weights (Norton, Wang, and Ai 2004). Thus, we estimated equation 2 using a linear probability model. Once again, the coefficient estimates can be interpreted as the percentage-point change in the dependent variable. In a set of robustness checks excluding the complex survey weights, these results were similar in magnitude and precision to the probit marginal probability estimates.

Results

Before examining the full multivariate estimates, we present unadjusted results documenting the outcomes of interest by payer type for the pre-IPS

Table 2. Proportions of patients with various outcomes by payer, pre- and post-implementation of the interim payment system (IPS) (constructed with survey weights)

	Pre-IPS	IPS	Overall
Charlson score of 2 or higher			
All	.27	.24	.26
Medicare	.30	.26	.29
Medicaid	.25	.21	.23
Private insurance	.23	.23	.23
Other payers	.18	.18	.18
Agency assistance with four or more activities of daily living			
All	.24	.23	.23
Medicare	.25	.21	.23
Medicaid	.29	.29	.29
Private insurance	.19	.11	.15
Other payers	.15	.32	.22
Discharged: death			
All	.06	.03	.04
Medicare	.06	.03	.04
Medicaid	.02	.05	.04
Private insurance	.04	.02	.03
Other payers	.10	.03	.07
Discharged: institution			
All	.18	.16	.17
Medicare	.20	.19	.20
Medicaid	.17	.12	.15
Private insurance	.12	.07	.09
Other payers	.18	.16	.17
Discharged: goals met			
All	.64	.70	.67
Medicare	.62	.67	.65
Medicaid	.66	.69	.68
Private insurance	.77	.85	.81
Other payers	.49	.59	.53
Discharged: other			
All	.12	.11	.11
Medicare	.11	.11	.11
Medicaid	.15	.13	.14
Private insurance	.08	.07	.07
Other payers	.08	.07	.23
Length of use less than 30 days			
All	.38	.54	.47
Medicare	.35	.51	.44
Medicaid	.40	.50	.45
Private insurance	.52	.66	.61
Other payers	.36	.61	.47
Length of use less than 60 days			
All	.65	.79	.73
Medicare	.63	.79	.72
Medicaid	.65	.72	.68
Private insurance	.76	.87	.82
Other payers	.56	.70	.62

and IPS periods (see Table 2). With a few exceptions, trends in the means of the outcomes among Medicare and non-Medicare patients were similar over the two periods. For example, across all four payer groups, the proportion of patients discharged with the goals of care met increased in the IPS period. Similarly, both Medicare and non-Medicare patients were more likely to be discharged within 30 or 60 days in the IPS period. On the other hand, the proportion of patients receiving agency assistance for four or more ADLs declined for Medicare and privately insured patients, increased for patients with other payer sources, and remained relatively consistent for Medicaid patients. Overall, however, these descriptive results suggest that the IPS may have had similar implications for Medicare and non-Medicare patients.

The full regression results for Medicare patients are contained in Tables 3 to 5, and the key IPS coefficient estimates of interest for all four payer groups are summarized in Table 6. The first set of multivariate results examines the implications of the IPS for Medicare patients (see Table 6, column 1).[6] The first row explores the hypothesis that the IPS decreased care for the sickest patients. As expected, the adoption of the IPS was associated with a statistically significant ($p < .05$) 3.9 (from a base of 29%) percentage-point decrease in the care of Medicare patients with a Charlson score of 2 or more.[7] The second row examines the relationship of the IPS and the intensity of agency-provided services. The adoption of the IPS was significantly ($p < .05$) related to a 4.4 (from a base of 23%) percentage-point decrease in agencies assisting patients with four or more activities of daily living. This finding is consistent with our hypothesis that the IPS decreased intensity of services, although an alternative explanation is that the trend toward admitting healthier patients resulted in fewer patients needing agency assistance with ADLs.

It also was hypothesized that the IPS would result in a less favorable discharge from home health care after controlling for length of use. Thus, we expected an increased number of discharges to death or an institution, and a decreased number of discharges in which the goals of care were met. However, the IPS was significantly ($p < .05$) associated with a 1.4 (from a base of 4%) percentage-point *decrease* in deaths among

Medicare patients, adjusting for other factors, including the Charlson score at admission. Changes in the other discharge outcomes were not statistically significant at conventional levels. Thus, there is no support for our hypothesis that patients experienced less favorable discharge outcomes under the IPS.

The final hypothesis regarding the IPS was that it would result in a shorter length of use for home health care patients. There is strong support for this hypothesis. Among Medicare patients, the IPS was significantly ($p < .01$) associated with a 15.4 (from a base of 44%) percentage-point increase in patients whose length of use was less than 30 days, and a 15.9 (from a base of 72%) percentage-point increase in patients whose length of use was less than 60 days.

We next examined the specific implications of the IPS for the Medicaid, privately insured, and other payer groups. The Medicaid results (column 2) are particularly important, given the potential substitution of Medicaid and Medicare services under the IPS. Interestingly, there was no indication of a substitution across Medicare and Medicaid patients. If anything, the Medicaid results were generally similar to the Medicare results in terms of the direction and magnitude of the estimates. However, given the smaller sample size, the estimates were generally less precise, with only two of the estimates achieving statistical significance. Among Medicaid patients, the IPS was associated with a 6.9 (from a base of 15%) percentage-point decline in discharge to institutions, and a 12.6 (from a base of 68%) percentage-point increase in individuals being discharged within 60 days.

The results for privately insured patients (column 3) were also quite similar to the Medicare results in terms of the direction and magnitude of the effects. Once again, however, the standard errors were larger, which resulted in fewer statistically significant findings. Among privately insured patients, however, the IPS was significantly associated with a decrease in agency assistance for people with four or more ADLs, a decrease in discharge to death, an increase in discharge after the goals of care were met, and increased discharge within 30 and 60 days.

The other payer category (column 4) looks similar to Medicare in terms of length of use, but different in the provision of services to individuals with four or more ADLs. Specifically, the IPS was significantly associated with a 25.5 (from a base of 47%) percentage-point increase in discharge by 30 days, and a 15.4 (from a base of 62%) percentage-point increase in discharge by 60 days. The only other statistically significant result indicated that the IPS was associated with a 7.2 (from a base of 22%) percentage-point increase in agency assistance with patients for four or more ADLs. The other results were not statistically significant.

Table 3. Full Medicare regression results: current patients

	High Charlson Score	High ADL
IPS (post-1997)	−.039 (.016)	−.044 (.019)
Female	−.047 (.018)	.017 (.016)
Married	.009 (.021)	.026 (.018)
Marital status missing	−.045 (.025)	.014 (.027)
African American	.024 (.030)	−.009 (.023)
Other race	−.069 (.044)	.081 (.073)
Race missing	−.044 (.026)	−.017 (.026)
Hispanic	.079 (.048)	.063 (.043)
Lives in MSA	−.010 (.018)	.023 (.019)
Region: West	.018 (.028)	−.059 (.027)
Region: South	−.012 (.024)	.027 (.026)
Region: Midwest	.009 (.025)	−.065 (.025)
Age 65–74	.027 (.036)	.047 (.030)
Age 75–84	−.007 (.035)	.055 (.025)
Age 85+	−.067 (.037)	.121 (.029)
Lives alone	.015 (.022)	−.024 (.019)
Lives in an institution	−.035 (.032)	−.096 (.024)
Referral source: self/family	.030 (.040)	.037 (.027)
Referral source: hospital	.042 (.021)	−.032 (.020)
Referral source: nursing home	.007 (.049)	.012 (.037)
Referral source: other	.003 (.026)	.055 (.026)
Has primary caregiver	.025 (.030)	.059 (.020)
For-profit agency	−.012 (.019)	.044 (.021)
Ownership missing	−.035 (.031)	−.087 (.032)
Group-owned agency	−.023 (.017)	−.042 (.019)
Group-owned missing	.016 (.048)	−.045 (.054)
Hospital-based agency	−.008 (.017)	−.015 (.019)
Hospital-based missing	.028 (.072)	.155 (.101)
N	9,983	9,983

Notes: Standard errors are in parentheses. ADLs = activities of daily living; IPS = interim payment system; MSA = metropolitan statistical area.

Table 4. Full Medicare regression results: discharged destination

	Death	Institution	Goals met	Other
IPS (post-1997)	−.014 (.006)	−.002 (.018)	.009 (.020)	.009 (.012)
Female	−.017 (.007)	−.013 (.017)	.056 (.022)	−.021 (.014)
Married	−.011 (.006)	.021 (.023)	.011 (.026)	−.013 (.016)
Marital status missing	−.001 (.010)	−.022 (.028)	.030 (.036)	−.003 (.021)
African American	−.010 (.006)	.001 (.029)	−.004 (.035)	.013 (.019)
Other race	−.017 (.006)	−.022 (.038)	.048 (.046)	.003 (.031)
Race missing	.029 (.020)	−.012 (.021)	−.039 (.038)	.004 (.015)
Hispanic	−.011 (.008)	−.088 (.028)	.154 (.041)	−.036 (.026)
Lives in MSA	−.016 (.006)	.002 (.016)	.006 (.021)	.011 (.010)
Region: West	.012 (.011)	−.068 (.022)	.045 (.029)	.028 (.023)
Region: South	.013 (.009)	−.042 (.024)	−.004 (.030)	.044 (.023)
Region: Midwest	.004 (.007)	−.060 (.022)	.036 (.028)	.038 (.025)
Age 65–74	.014 (.012)	−.050 (.030)	.041 (.044)	−.005 (.019)
Age 75–84	.040 (.014)	−.019 (.032)	.008 (.048)	−.031 (.020)
Age 85+	.047 (.017)	.032 (.035)	−.038 (.049)	−.032 (.019)
Lives alone	−.022 (.005)	.018 (.026)	.020 (.028)	−.004 (.014)
Lives in an institution	−.002 (.011)	.057 (.029)	−.041 (.036)	−.007 (.020)
Referral: self/family	−.005 (.015)	−.015 (.048)	.033 (.087)	−.007 (.025)
Referral: hospital	−.010 (.006)	−.004 (.020)	.036 (.025)	−.019 (.013)
Referral: nursing home	−.013 (.008)	.030 (.050)	−.042 (.064)	.023 (.039)
Referral: other	.025 (.021)	−.050 (.024)	.018 (.045)	−.007 (.019)
Has primary caregiver	.0001 (.008)	.003 (.026)	.028 (.031)	−.023 (.017)
For-profit agency	−.005 (.006)	.022 (.021)	−.042 (.022)	.025 (.015)
Ownership missing	−.001 (.008)	−.030 (.043)	−.035 (.065)	.059 (.031)
Group-owned agency	.004 (.005)	.001 (.018)	−.016 (.021)	.007 (.013)
Group-owned missing	−.010 (.011)	−.038 (.029)	.016 (.055)	.034 (.054)
Hospital-based agency	−.005 (.005)	−.008 (.019)	.005 (.022)	.011 (.015)
Hospital-based missing	−.012 (.008)	.060 (.053)	.021 (.051)	−.043 (.024)
Charlson score = 1	.004 (.009)	.071 (.021)	−.086 (.026)	.014 (.014)
Charlson score = 2	.030 (.017)	.084 (.028)	−.095 (.042)	−.011 (.016)
Charlson score = 3	.025 (.016)	.156 (.043)	−.154 (.048)	−.008 (.021)
Charlson score = 4+	.051 (.022)	.336 (.063)	−.337 (.056)	−.029 (.017)
Difficulty seeing	.013 (.007)	.039 (.021)	−.044 (.022)	−.013 (.012)
Difficulty hearing	.004 (.006)	.015 (.019)	−.055 (.024)	.035 (.015)
Length of use 30–59 days	.0003 (.007)	−.064 (.017)	.090 (.023)	−.025 (.015)
Length of use 60–99 days	.002 (.007)	−.028 (.025)	.064 (.032)	−.035 (.014)
Length of use >99 days	.039 (.015)	.082 (.027)	−.178 (.027)	.031 (.020)
N	9,194	9,194	9,194	9,194

Notes: Standard errors are in parentheses. IPS = interim payment system; MSA = metropolitan statistical area.

The final set of results test whether the effects for Medicare patients under the IPS differed relative to non-Medicare patients (see Table 7). As noted earlier, we constructed this test by interacting Medicare status with the IPS dummy variable. The interaction terms are presented in column 1 along with the main effects (columns 2 and 3). Across the different outcomes, only the ADL and mortality models indicated statistically significant effects. In particular, Medicare patients were associated with a 5.1 (from a base of 23%) percentage-point decline in high ADL assistance and a 3.3 (from a base of 4%) percentage-point decline in mortality under the IPS relative to non-Medicare patients. Although the other interaction terms were not significant, the large standard errors make it difficult to rule out a lack of precision in these estimates.

Although we find evidence consistent with the idea that the IPS had implications for non-Medicare patients, we recognize the limitation that we cannot separate the effects of the IPS from other factors that may have influenced the home health care sector over this time period. That is, we may have misattributed the effects of some other policy or market change over this time period to the IPS. This could occur in one of two ways. First, it is possible that over the same period

when the IPS affected the care of Medicare patients, there were other policies or changes that had implications for privately insured, Medicaid, and other patients. Alternatively, it is possible that the IPS had no effect for any of these payer groups (including Medicare), and we are simply observing secular trends across all payer groups. Concurrent changes in the home health environment include: Medicare antifraud initiatives, the removal of venipuncture as a qualifying service for Medicare home health eligibility, more stringent Medicare claims review and sequential billing policies, market forces affecting the supply of home health agency employees (e.g., the nursing shortage), and technological changes in the delivery of services (MedPAC 1999).

The first three factors were targeted toward the Medicare population, and if anything, likely played a relatively minor role in the effects observed in this study. The final two factors—the supply of home health care workers and technological advances—would have implications for all home health care patients, but would not necessarily explain the changes observed under the IPS. Finally, the changes observed under the IPS may be attributable to other policy changes outside the home health care sector. For example, the Medicare prospective payment system for skilled nursing home care became effective July 1998 and may have changed the mix of patients seeking home health care services. If present, these effects should be concentrated among Medicare patients. Nevertheless, a potential area for future study would be examination of the implications of Medicare payment changes across different care settings, including skilled nursing homes, inpatient rehabilitation facilities, and home health care.

Given that we observe changes among both Medicare and non-Medicare patients and there is not a competing factor that adequately explains our findings, we assert that our results are suggestive of an IPS effect. Nevertheless, we acknowledge that we cannot unambiguously rule out other secular changes over our period of study.

Another potential limitation associated with our study is the limited precision in some of our estimates. Given that roughly two-thirds of all home health patients are covered by Medicare, the nationally representative NHHCS sample consists of relatively few non-Medicare observations. Another limitation of the data set is the inability to disentangle agency effects given a maximum of six observations per agency. Agencies that care predominantly for Medicare patients should experience the effects of the IPS,

Table 5. Full Medicare regression results: length of use (in days)

	Length of use <30	Length of use <60
IPS (post-1997)	.154 (.021)	.159 (.023)
Female	−.014 (.027)	−.025 (.018)
Married	.026 (.035)	.008 (.036)
Marital status missing	.001 (.042)	.024 (.036)
African American	−.031 (.033)	−.042 (.027)
Other race	−.066 (.059)	−.071 (.065)
Race missing	−.010 (.032)	−.002 (.033)
Hispanic	.082 (.062)	.090 (.037)
Lives in MSA	.077 (.019)	.090 (.019)
Region: West	.005 (.038)	.049 (.041)
Region: South	−.097 (.033)	−.092 (.035)
Region: Midwest	−.156 (.032)	−.009 (.038)
Age 65–74	−.046 (.038)	.015 (.036)
Age 75–84	−.072 (.035)	−.010 (.031)
Age 85+	−.101 (.041)	−.062 (.042)
Lives alone	.034 (.032)	.021 (.029)
Lives in an institution	−.014 (.037)	.010 (.034)
Referral source: self/family	−.154 (.047)	−.211 (.066)
Referral source: hospital	.026 (.025)	.024 (.020)
Referral source: nursing home	.075 (.064)	.014 (.048)
Referral source: other	−.020 (.042)	−.020 (.041)
Has primary caregiver	.015 (.029)	−.023 (.024)
For-profit agency	−.034 (.027)	−.028 (.027)
Ownership missing	−.080 (.042)	.036 (.042)
Group-owned agency	.059 (.025)	.032 (.025)
Group-owned missing	.108 (.044)	.073 (.058)
Hospital-based agency	.086 (.024)	.040 (.024)
Hospital-based missing	.030 (.051)	−.040 (.060)
Charlson score = 1	−.058 (.027)	−.061 (.022)
Charlson score = 2	−.93 (.029)	−.094 (.032)
Charlson score = 3	−.107 (.044)	−.105 (.039)
Charlson score = 4+	−.075 (.053)	−.063 (.062)
Difficulty seeing	−.027 (.025)	−.017 (.020)
Difficulty hearing	.034 (.028)	.005 (.022)
N	9,257	9,257

Notes: Standard errors are in parentheses. IPS = interim payment system; MSA = metropolitan statistical area.

Table 6. Implications of the interim payment system for home health care patients

Dependent variable	Medicare (1)	Medicaid (2)	Private insurance (3)	Other payer (4)
Currently enrolled home health patients				
Number of patients	9,983	2,898	1,617	2,486
Charlson score of 2 or higher	−.039**	−.017	−.007	.007
	(.016)	(.029)	(.038)	(.032)
Agency assistance with four or more ADLs	−.044**	−.039	−.051*	.072*
	(.019)	(.035)	(.028)	(.040)
Discharged home health patients				
Number of patients	9,194	1,576	1,858	1,383
Discharged: death	−.014**	.008	−.005*	−.002
	(.006)	(.005)	(.003)	(.004)
Discharged: institution	−.002	−.069**	−.013	.008
	(.018)	(.032)	(.016)	(.029)
Discharged: goals met	.009	.058	.054*	.063
	(.020)	(.053)	(.032)	(.060)
Discharged: other	.009	−.001	−.018	−.033
	(.012)	(.022)	(.017)	(.050)
Number of patients	9,257	1,619	1,947	1,417
Length of use less than 30 days	.154***	.081	.126***	.255***
	(.021)	(.057)	(.048)	(.065)
Length of use less than 60 days	.159***	.126***	.082***	.154**
	(.023)	(.048)	(.035)	(.066)

Notes: Standard errors are in parentheses. All models include the variables detailed in Table 1. The discharge status models include dummy variables controlling for length of use. ADLs = activities of daily living.
*** $p < .01$.
** $p < .05$.
* $p < .10$

while agencies with no Medicare patients should not. An alternative empirical strategy to the one utilized here would be to compare the implications of the IPS across agencies with high and low proportions of patients with Medicare as the primary payer. In an evaluation of the adoption of the Medicare PPS for skilled nursing facilities, Konetzka and colleagues (2004) employed this "differences-in-differences" approach in treating nursing home residents in low-Medicare nursing homes as a control for unobserved variation over time within the industry. With the NHHCS, we do not have a variable measuring agency payer mix. However, both of these data limitations—sample size and the lack of an agency payer mix variable—may be addressable in future work using data from the Outcome and Assessment Information Set (OASIS), CMS-mandated assessments of all home health care patients at certified agencies.

In sum, our analyses indicate that the Medicare IPS for home health care services resulted in less care for the sickest patients, a lower intensity of services, and decreased length of use. These findings hold for both Medicare and non-Medicare patients. Despite the decline in length of use, we did not observe significantly worse discharge outcomes even after controlling for health at the time of admission.

Discussion

Previous work examining the IPS either focused solely on Medicare patients (e.g., McCall et al. 2003b; Murkofsky et al. 2003) or a single outcome for all patients (e.g., Han et al. 2004). This study is the first to consider the implications of the IPS for a range of outcomes across patients with different payer sources. Across these outcomes, our results are suggestive of common effects under the IPS for Medicare and non-Medicare patients. These findings fit into a larger health services literature examining the treatment of patients with different payer sources in a common setting. Typically, this literature highlights the potential benefits of these arrangements for publicly insured patients. For example, there is evidence that Medicaid patients receive higher quality care

when cared for alongside non-Medicaid patients in both hospitals (Dranove and White 1998) and nursing homes (Grabowski, Gruber, and Angelelli 2005). In recognition of these spillovers, policymakers often encourage the integration of publicly insured patients into mainstream medicine. Examples include the Veteran's Administration requirement that its hospitals be affiliated with a teaching hospital, and—before it was recently repealed—CMS limiting health maintenance organizations in the number of Medicare patients they could accept (Norton 2000).

In the same vein of potential spillovers across different payers, this study highlights how a decrease in the generosity of public payment had similar effects among Medicare and non-Medicare home health patients. Specifically, the IPS was associated with a decrease in Medicare home health care for the sickest patients, a decline in agency assistance for patients with four or more ADLs, and a decrease in length of use. Only two outcomes—agency assistance with four or more ADLs and discharge to death—were associated with statistically significant differences across Medicare and non-Medicare patients. These results highlight the need to think broadly when evaluating policy changes. In the case of the IPS, focusing on Medicare patients alone may have led to an underestimation of its overall effects.

Table 7. Effect of the interim payment system (IPS) on Medicare relative to other payer groups

Dependent variable	IPS* Medicare	IPS	Medicare
Charlson score of 2 or higher ($N = 16{,}984$)	−.021 (.028)	−.018 (.021)	.080*** (.026)
Agency assistance with 4+ ADLs ($N = 16{,}984$)	−.051* (.029)	.004 (.025)	.051** (.023)
Discharged: death ($N = 14{,}107$)	−.033* (.018)	.013 (.013)	−.007 (.032)
Discharged: institution ($N = 14{,}107$)	.024 (.033)	−.032 (.027)	.002 (.031)
Discharged: goals met ($N = 14{,}107$)	−.014 (.035)	.030 (.030)	.122*** (.047)
Discharged: other ($N = 14{,}107$)	.023 (.024)	−.011 (.020)	−.117*** (.042)
Length of use < 30 days ($N = 14{,}240$)	.044 (.047)	.115*** (.047)	−.058 (.064)
Length of use < 60 days ($N = 14{,}240$)	.061 (.044)	.089*** (.033)	.052 (.065)

Notes: Standard errors are in parentheses. All models include the control variables detailed in Table 1. The discharge status models include dummy variables controlling for length of use. ADLs = activities of daily living.
*** $p < .01$.
** $p < .05$.
* $p < .10$.

From a policy perspective, this observation can be used to help frame a welfare analysis of the IPS. Clearly, a full calculation of the welfare implications of the IPS is beyond the scope of this paper, but any budgetary savings generated from a decrease in utilization under the IPS must be weighed against any negative patient outcomes. As noted previously, we found evidence that access to home health services declined for the sickest patients under the IPS. With our current data, it is not possible to assess the health implications for those individuals who did not receive home health care services during the IPS period. Moreover, these data cannot address the potential use of other long-term care services by these individuals. For those patients who did receive agency care, however, our results indicate stable discharge outcomes under the IPS, even after accounting for the healthier mix of patients at admission. Although we cannot measure other important home health care outcomes such as morbidity, independence, and family stress, our findings are similar to earlier work showing no decline in these other outcomes for Medicare patients under the IPS (McCall et al. 2003a, 2004). One interpretation of these results is that those services eliminated under the IPS may not have constituted beneficial services. Once again, there are not agreed-upon standards of what constitutes medically necessary or appropriate home health care services. In support of this point, the General Accounting Office (2000) reported wide geographic variation in Medicare home health care utilization prior to the implementation of the IPS. For example, Medicare home health care users in Maryland received an average of 37 visits in 1997, while users in Louisiana received 161 visits. This variation in use, which persists after controlling for patient diagnoses, may suggest that the service use decline under the IPS represented "flat of the curve" home health care, offering few additional benefits for patients.

Ultimately, this study highlights some potential welfare gains under the IPS, mainly lower

utilization without a corresponding decline in patient discharge status, and a potential welfare loss—worse access to home health care services for the sickest patients. However, we still know relatively little about the marginal productivity of home health care services. Moving forward, additional data will be necessary to analyze this issue in the context of the Medicare home health care PPS currently in place. Nevertheless, our results suggest that the proposed freeze to Medicare home health care payments in the coming fiscal year under the deficit reduction bill will have implications for both Medicare and non-Medicare patients.

Notes

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1 The General Accounting Office (GAO) noted that the agencies which closed were typically smaller and provided, on average, more visits per beneficiary (90.2 compared with 65.2 for those that didn't close), suggesting that less efficient agencies closed following the IPS (GAO 1998).

2 Throughout the manuscript, we use the terms "admit" and "discharge" to describe the period of home health care enrollment. Although these terms have different implications relative to institutional health services, their use is standard in both the home health care literature (e.g., Murkofsky et al. 2003, Han et al. 2004) and the National Home Health and Hospice Care Survey documentation.

3 As of October 2004, Louisiana was the only state with a purely prospective Medicaid home health care payment system. Georgia, Indiana, New York, North Carolina, North Dakota, and Oklahoma had prospective systems based on historical costs. Collectively, these seven states account for 17% of all Medicare beneficiaries (Kaiser Family Foundation 2004). The majority of the remaining states reimbursed Medicaid home health care using a fee-for-service system, which often included a cost-based cap.

4 The National Home Health and Hospice Care survey asked two questions related to the expected source of payment for care. The first question asked the respondent to identify the "primary" expected source of payment for care, and the second asked the respondent to identify all "secondary" sources of payment.

5 Of particular policy interest are those individuals who are dually eligible for Medicare and Medicaid coverage. Our data do not allow us to explicitly identify the dual-eligible home health care population, but we can establish whether Medicare patients also were covered by Medicaid. In the current patient sample, 11.1% of the Medicare primary payers had Medicaid as a secondary payer source.

6 In the regression tables, we present only the coefficient estimates that explore our primary hypotheses. However, the full regression results are available upon request from the authors.

7 For both the Charlson score and activities of daily living measures, our results were robust to treating these outcomes as continuous measures.

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