Redesigning Medicare Inpatient PPS to Adjust Payment for Post-Admission Complications

Richard F. Averill, M.S., James C. Vertrees, Ph.D., Elizabeth C. McCullough, M.S., John S. Hughes, M.D., and Norbert I. Goldfield, M.D.

Under the Medicare diagnosis-related group (DRG) based inpatient prospective payment system (IPPS), payments to hospitals can increase when a post-admission complication occurs. This article proposes a redesign of IPPS that reduces, but does not eliminate, the increase in payment due to post-admission complications. Using California data that contained a specification of whether each diagnosis was present at admission, and applying a conservative approach to identifying potentially preventable complications, the impact of post-admission complications on DRG assignment was determined. Based on the redesigned IPPS, the increase in Medicare payments due to post-admission complications was reduced by more than one billion dollars annually.

INTRODUCTION

Under the current Medicare DRG-based IPPS, a hospital that fails to prevent a complication after admission may receive a higher payment, because the diagnosis associated with the complication may result in the patient being assigned to a higher-paying DRG. Existing hospital payments methods in the U.S., whether per case (e.g., DRGs), discounted fee-for-service, or per diems, have the same fundamental flaw in that payment is increased when a complication occurs, in effect financially rewarding poor quality care. In IPPS this is a consequence of assigning the DRG comorbidity or complication indicator using discharge diagnoses that include diagnoses that were present on admission as well as diagnoses that develop post admission. Though DRGs were intended to be a "… clinical description of why the patient required hospitalization …"(*Federal Register*, 2001), as a practical (and political) matter it was important in 1983 that the DRGs and other IPPS adjustments explained as much of the between hospital cost variation as possible in order for IPPS itself to be accepted by the hospital industry. Reconsidering the inclusion of post-admission complications in the DRG assignments is consistent with the original intent of DRGs and IPPS and represents a natural evolution of IPPS.

The underlying philosophy of a DRG-based IPPS is to provide hospitals with the financial incentive to control costs by paying a fixed amount, based on the patient's clinical condition. Increasing payment when a post-admission complication occurs undermines the hospitals incentive to control costs. In IPPS the process of establishing the prospective DRG payment amounts is essentially a zero sum method for allocating a fixed budget among hospitals. As a result, the increased payment for patients with complications can result in lower payments for patients without complications. Thus, hospitals with low complication rates are financially penalized. In virtually no other part of the economy can a firm exact a higher price for a process or product, which has proven to be defective. The Deficit Reduction Act (DEFRA) of

Richard F. Averill, James C. Vertrees, Elizabeth C. McCullough, and Norbert I. Goldfield, M.D. are with 3M Health Information Systems. John S. Hughes, M.D. is with Yale University School of Medicine. The statements expressed in this article are those of the authors and do not necessarily reflect the views or policies of 3M Health Information Systems, Yale University School of Medicine, or the Centers for Medicare & Medicaid Services (CMS).

2005 (P.L. 109-171) begins to address this flaw in IPPS by requiring CMS in fiscal year (FY) 2009 to select at least two types of post-admission infections and to no longer allow the selected post-admission infections to affect DRG assignment.

Consistent with the intent of the 2005 DEFRA, the purpose of this article is to propose a redesign of the Medicare IPPS in which, under certain conditions, the amount of the increase in DRG payment due to the occurrence of a post-admission complication is reduced. Although the primary motivation for redesigning IPPS is to provide the financial incentive for hospitals to reduce complications and improve the quality of care, a byproduct of the redesign is that aggregate Medicare payment can be reduced. Therefore, an estimate of the reduction in the additional Medicare payments due to post-admission complications is calculated.

BACKGROUND

Pay-for-performance is an emerging trend in health care financing (Rosenthal et al., 2004). Most pay-for-performance systems have focused on providing retrospective financial bonuses to hospitals if specific process standards (e.g. beta blocker prescribed for acute myocardial infarction (AMI) patients) and outcome standards (e.g. risk-adjusted mortality rates) are met. Thus, most pay-for-performance systems have been exclusively pay extra for performance systems with no financial consequences associated with poor performance. In fact, this approach to pay-for-performance pays extra for what should be standard care.

A second and related trend is the increased use of severity of illness (SOI) adjusted DRG systems to produce hospital comparative report cards (Hibbard et al., 2005) and to determine hospital payment (Health Services Cost Review Commission, 2004). Hospital report cards typically include a comparison of a hospital's actual charges, length of stay, and mortality to State or regional norms on a severity adjusted basis. Payment on a severity adjusted basis has been shown to more accurately explain cost differences across hospitals (Medicare Payment Advisory Commission, 2000). Furthermore, severity adjusted DRG payment systems limit the ability of providers to "cream skim" the DRG system by selectively treating less severely ill patients and reduce the need for payment adjustments such as indirect medical education and disproportionate share.

In recognition of the importance of SOI for understanding hospital cost and quality, the Hospital Fair Competition Act of 2005, which requires Medicare to incorporate a SOI adjustment into the Medicare IPPS, has been introduced in the U.S. Senate (Grassley and Baucus, 2005). The Medicare Payment Advisory Commission (MedPAC, 2000 and 2005) has recommended that Medicare adopt a severity adjusted DRG system. CMS has also proposed severity adjusting the DRGs (*Federal Register,* 2006). Because there is a growing realization that the Medicare DRGs need to adjust for patient SOI, the following simulation of the redesign of the Medicare IPPS will use severity adjusted DRGs. Although there are issues such as cost, administrative burden and potential for upcoding associated with the adoption of any SOI adjustment to the DRGs, it was beyond the scope of this article to examine those issues.

METHODS

The underlying concept of the proposed redesign of the Medicare IPPS is that the increase payment due to post-admission

complications should be reduced. The proposed redesign requires that three additional capabilities be available:

- A method for adjusting the DRGs for patient SOI.
- The ability to distinguish diagnoses that are present at admission from diagnoses that develop post admission.
- The ability to identify diagnoses that represent complications that are potentially preventable.

After discussing how these three capabilities can be addressed, a redesign of the Medicare IPPS, in which the payment increase due to post-admissions complications is reduced, is described.

Adjusting DRGs for SOI

MedPAC's 2000 and 2005 recommendation that a severity adjustment be added to the Medicare DRGs was based on an analysis that used the all patient refined (APR) DRGs. The State of Maryland's all payer payment system began determining hospital payment based on the APR DRGs in July 2005 (Health Services Cost Review Commission, 2004). CMS has also proposed replacing the existing CMS DRGs with a consolidated version of the APR DRG (*Federal Register*, 2006). In addition, APR DRGs are extensively used for quality assessment and in public report cards (Sedman et al., 2004). Because of their applicability for payment and quality, APR DRGs were selected as the method for adjusting for SOI of illness in the following payment simulations.

APR DRGs are composed of 314 base DRGs and 4 SOI subclasses within each base DRG (Averill et al., 2002). (The combination of the base DRG and SOI subclass is referred to as the APR DRG). SOI is defined as the extent of physiologic decompensation or organ system loss of function, and is determined by the presence of secondary diagnoses. These secondary diagnoses represent comorbidities and complications, and can increase the APR DRG severity subclass assigned to the patient. When APR DRGs are used for payment, a higher severity subclass results in higher payments. The logic is similar to, but more sophisticated than the complication or comorbidity logic used by the current CMS DRGs.

Identifying Diagnoses that Develop Post Admission

Hospitals report discharge diagnoses on the current Medicare claim form. Discharge diagnoses include those that were present at admission as well as diagnoses that develop post admission. California and New York require that hospitals provide a present on admission (POA) indicator for each diagnosis that specifies whether the diagnosis was present at the time of admission. MedPAC (2005) has proposed that all hospitals be required to report the POA indicator on all Medicare hospital claims. The next version of the standard claim form, commonly referred to as the UB-04, includes fields for the POA indicator (National Uniform Billing Committee, 2005). DEFRA 2005 requires that the POA indicator be reported on all Medicare claims beginning in FY 2008. The proposed redesign of the Medicare IPPS assumes that the POA indicator will be available on all Medicare hospital claims.

Identifying Potentially Preventable Complications

Complications are harmful events (e.g. accidental laceration during a procedure, improper administration of medication) or negative outcomes (e.g. hospital-acquired pneumonia, C. dificile colitis) that result from the processes of care and treatment

rather than from a natural progression of the underlying illness. Complications do not necessarily represent medical errors, since they are not always preventable even with optimal care. The method for identifying complications used in the following payment simulation is based on a recently developed extension to the APR DRGs referred to as potentially preventable complications (PPCs) (Hughes et al., 2006). PPCs identify 1,450 different diagnoses as potential complications, aggregated into 66 mutually exclusive complication groups ranging from urinary tract infections to strokes. A PPC diagnosis may be preventable for some types of patients, but not for others. Therefore, the PPC methodology includes a series of clinical exclusions. The most common reason for exclusions is that the complication is a natural consequence of one of the diagnoses present at admission, and is therefore, not preventable and should not be considered a PPC. For example, aspiration pneumonia is not considered preventable for patients with seizures or head trauma at the time of admission, and is therefore, not considered a PPC for these patients.

The PPC methodology represents a conservative approach to the identification of complications. A diagnosis can only be a PPC if it occurs after admission. Thus, the PPC methodology requires the availability of the POA indicator. Furthermore, a diagnosis is only designated as a PPC for patients admitted for specific clinical problems. In order for a diagnosis to be considered a PPC it must represent a potential complication of care, occur after admission, and be potentially preventable given the patient's reason for hospitalization. In the following payment simulations, only 29 major PPCs such as strokes and aspiration pneumonia were used (Hughes et al., 2006). Relatively less significant complications (e.g., urinary tract infections) that would have less of an impact on payment were not included in the payment simulations.

Issues in the Redesign of IPPS

The presence of a PPC can change the APR DRG severity subclass assigned to the patient. However, for patients with multiple serious diseases, the presence of the additional PPC diagnosis is less likely to alter the APR DRG severity subclass. To the extent that the presence of a PPC alters the APR DRG severity subclass the elimination or reduction of the payment increase associated with the presence of the PPC represents a means of directly introducing a hospital performance factor into the determination of the IPPS payment at the patient level. Redesigning IPPS to incorporate a payment adjustment for PPCs must simultaneously take into consideration several conflicting requirements:

- Susceptibility to PPCs varies depending on the patient's reason for admission and severity of illness. Therefore, the payment impact of PPCs must be case mix and severity adjusted.
- The PPC occurrence rate can never be reduced to zero even with optimal care. Therefore, hospitals that achieve the lowest observed PPC occurrence rate should not have any reduction in the payment increase due to a PPC.
- Hospital performance on PPCs can only be determined by comparison of its PPC occurrence rate with that of other hospitals. Therefore, a hospital's historical PPC occurrence rate must be taken into consideration when determining the extent of any reduction in the payment increase due to a PPC.
- Retrospective payment adjustments are contrary to the philosophy of IPPS and reduce its effectiveness. Therefore, hos-

pitals must know in advance how PPCs will affect the per-case payment in the prospective year.

These requirements provide the philosophical foundation for the development of an approach to incorporating payment adjustments for PPCs into IPPS.

There are numerous ways that PPCs can be incorporated into an APR DRG-based IPPS. In order to simulate the financial impact of a redesigned Medicare IPPS, it was necessary to select a specific approach for incorporating PPCs. Clearly, the magnitude of the estimated financial impact depends on the specific approach selected. Our intent is to illustrate one approach that will provide a reasonable basis for evaluating the potential financial impact of a redesigned IPPS.

Redesigning IPPS Using Blended Payment Rates

The increase in payment due to a PPC is the difference between the payment amount for the APR DRG assigned including all PPC diagnoses and the payment amount for the APR DRG assigned excluding all PPC diagnoses. Therefore, IPPS could be redesigned to compute payment based on a blending of the payment amount for the APR DRG assigned including all PPC diagnoses and the payment amount for the APR DRG assigned excluding all PPC diagnoses. If P(e) is the payment amount for the APR DRG excluding all PPC diagnoses and P(i) is the payment amount for the APR DRG including all PPC diagnoses then payment can be computed as follows:

$$BP(e) + (1 - B)\ P(i)$$

where B is a blending fraction with a value between zero and 1. The blending fraction determines the extent to which the payment increase due to a PPC is reduced. A blending fraction that approaches 1 eliminates virtually all the payment increase due to a PPC. A blending fraction set to 1 would not be fair since complications occur even under the best care. Furthermore, since patients who are more severely ill are more susceptible to complications, a blending fraction of 1 might encourage hospitals to avoid sicker patients. A blending fraction that approaches zero maintains virtually all of the payment increase due to a PPC. As an essential factor for determining payment, the value of the blending fraction must be set prior to the prospective year. Indeed, in evaluating the success of the Medicare IPPS CMS has stated in the *Federal Register* (2001) the following:

"The success of any payment system that is predicated on providing incentives for cost control is almost totally dependent on the effectiveness with which the incentives are communicated."

Effective communication of the incentive for cost control in IPPS requires that the factors such as the blending fraction used to determine price for each DRG be fixed and known in advance for the prospective payment year.

Computing the Blending Fraction

The fundamental structural change underlying the redesign of IPPS is the determination of the final payment amount based on a blending of the payment amounts determined including and excluding diagnoses that are identified as a PPC. The determination of the value of the blending fraction must take into consideration that PPCs are only potentially preventable and that even the best hospital cannot achieve an actual PPC occurrence rate of zero. Thus, it would not be fair to set the blending fraction to 1 and pay hospitals based on APR DRGs assigned excluding all PPCs. Indeed, the hospitals that have an actual

PPC occurrence rate that is the farthest below their expected PPC occurrence rate should not have any PPCs excluded from the APR DRG assignment because those hospitals represent the best performance that is achievable at present. The challenge is to incorporate the recognition of a hospital's relative performance in term of PPCs into the prospective case-by-case payment system. Operationally, this means that the blending fraction must be hospital specific and established based on a hospital's historical PPC performance. The use of historical hospital data to establish factors that are used in the calculation of the prospective payment amount has been an integral part of IPPS since its inception. The indirect medical education adjustment and disproportionate-share adjustment are example of such factors.

The computation of the blending fraction requires that a hospital's relative historical PPC performance be established. One way of accomplishing this is as follows:

- Establish the case mix adjusted expected number of PPCs for each hospital based on national PPC occurrence rates.
- Develop a PPC achievable performance norm derived from the subset of hospitals that have the fewest number of actual PPCs compared to their expected number of PPCs.
- Establish the case mix adjusted expected number of PPCs for each hospital based on the PPC achievable performance norm.
- For each hospital determine the payment reduction that would result if all PPC that actually occurred were excluded from the APR DRG assignment (referred as the maximum payment reduction).
- Compare a hospital's actual number of PPCs to its expected number of PPCs based on the PPC achievable performance norm in order to determine the fraction of the maximum payment reduction that will be imposed in the prospective year (referred to as the target payment reduction).
- Set the hospital's blending fraction to achieve the target payment reduction.

These six steps define the process for prospectively establishing the blending fraction for each hospital.

- *Establish the case mix adjusted expected number of PPCs for each hospital based on national PPC occurrence rates.*—Using national data from all hospitals, the percent of patients with at least one major PPC for each APR DRG is calculated to establish a national PPC occurrence norm. Then, using indirect standardization, the expected number of patients with at least one major PPC for each APR DRG in a hospital is calculated by multiplying the PPC occurrence rate for the APR DRG from the national PPC occurrence norm by the number of patients in the hospital in that APR DRG. The expected number of patients with at least one major PPC in each APR DRG summed across all APR DRGs is the hospital's overall expected number of patients with at least one major PPC.
- *Develop a PPC achievable performance norm.*—Since the PPC occurrence rate will never be zero, even with optimal care, the establishment of a baseline PPC performance level is necessary in order to obtain a measure of a hospital's relative PPC performance. One approach to creating a baseline PPC occurrence norm is to identify the subset of hospitals that have an actual PPC occurrence rate that is the farthest below their expected PPC occurrence rate and construct a PPC baseline occurrence norm based on the performance of those hospitals. A PPC occurrence norm constructed in this manner can be considered an achievable performance norm.

The subset of hospitals with the best relative PPC performance is likely to differ depending on the type of patient under consideration. Therefore, each of the 314 base APR DRGs is assigned to one of 35 different service lines (e.g. cardiac surgery, obstetrics, etc). For each service line, hospitals are rank ordered in terms of the percent difference between the actual and expected number of patients with at least one major PPC. For each service line the subset of hospitals with the best performance (i.e., actual lower than expected) that comprise 25 percent of the overall patient population is selected (i.e., starting with the hospital with the best performance move down the hospital rank order until the sum of patients in the hospitals selected equaled 25 percent of the patient population). Using the subset of patients selected in this manner, a PPC achievable performance norm for each APR DRG in each service line is computed. Across service lines the number of hospitals and the specific hospitals selected to be included in the PPC achievable performance norm will differ. The net result is a PPC achievable performance norm for each APR DRG in each service line, representing the average percent of patients with at least one major PPC being achieved by the best performing hospitals.

- *Establish the case mix adjusted expected number of PPCs for each hospital based on the PPC achievable performance norm.*—Using indirect standardization, the expected number of patients with at least one major PPC for each APR DRG in a hospital is calculated by multiplying the PPC achievable performance norm by the number of patients in the hospital in each APR DRG. The expected number of patients with at least one major PPC in each APR DRG summed across all APR DRGs is the hospital's overall expected number of patients with at least one major PPC based on the achievable performance norm.
- *Determine the maximum payment reduction for each hospital.*—A hospital's maximum payment reduction (D(h)) is determined by calculating the APR DRG based payments that would result in the previous year if all PPCs that actually occurred were excluded from the APR DRG assignment, and then subtracting that amount from the APR DRG based payments that would result in the previous year if all PPCs that actually occurred were included in the APR DRG assignment.
- *Determining the fraction of the maximum payment reduction that will be imposed in the prospective year.*—The fraction of the maximum payment reduction imposed can be established by comparing a hospital's overall actual number of PPCs to its expected number of PPCs based on the achievable performance norm (referred to as the PPC relative performance fraction). If A(h) is the actual number of major PPCs in the hospital in the base year and E(h) is the expected number of major PPCs in the base year based on the PPC achievable performance norm then the hospital's PPC relative performance fraction (F(h)) is computed as

$$F(h) = (A(h) - E(h)) / A(h).$$

For example, if in the base year the hospital's actual number of major PPCs was two times more than would be expected based on the PPC achievable performance norm, then a reduction in payment equal to 50 percent (F(h) =0.5) of the maximum payment reduction (D(h)) would be imposed. The denominator in the computation of the PPC relative performance fraction is the hospital's

actual PPC rate. This insures that F(*h*) will never exceed 1.0 and that no hospital will ever have the maximum payment reduction imposed. If the PPC relative performance fraction was negative, it would be set to zero (i.e. no reduction in payment would occur). The target payment reduction for a hospital is the product of the PPC relative performance fraction and the maximum payment reduction (i.e., F(*h*) D(*h*)).

- *Setting the hospital's blending fraction.*— The blending fraction (B(h)) for a hospital would be set to achieve the target payment reduction in the prospective payment year. Although the PPC achievable performance norm is establish by service line, the blending fraction is established overall for the hospital and not separately for each service line. B(*h*) would be set such that

$$F(h)\ D(h) = \text{SUM}\ (P(i) - (B(h)\ P(e) + (1\text{-}B(h))\ P(i)))$$

where the sum is across all patients in the base year. By using the base year to set the hospital blending fraction (B(*h*)) in the prospective year, it is assumed that the hospital's case mix and major PPC occurrence rate will remain the same in the prospective year. Thus, a hospital could lower the reduction in payment it incurs in the prospective year by lowering its major PPC occurrence rate during the prospective year. Hospitals whose historical PPC performance was at or below the PPC achievable performance norm would have the blending fraction set to zero so that no decrease in payment would occur.

DATA

The PPC method requires that the POA be available for all diagnoses. Fiscal year 2000 (July 1999-June 2000) claims level data for Medicare patients in California that included the POA indicator was used in the payment simulation. The reporting of the POA indicator by California hospitals was evaluated with an extensive set of edits. This resulted in 114 of the California hospitals being eliminated from the analysis. The final database contained 324 hospitals that appeared to be collecting the POA indicator reliably. These hospitals had 923,751 Medicare discharges. Of these patients 260,435 had at least one major PPC diagnosis reported as a secondary diagnosis. However, only 49,809 of these patients had the major PPC diagnosis occur after admission. After the application of the PPC clinical exclusions, the number of patients with at least one major post admission PPC diagnosis was reduced to 37,390 (4.025 percent of patients). Thus, because of the patient's reason for admission, 25 percent of the patients with a major PPC diagnosis that occurred after admission were not considered to be potentially preventable because of the clinical exclusions in the PPC methodology. If the 37,390 patients with a PPC had the PPC excluded from the APR DRG assignment 14,219 of these patients would be assigned a different APR DRG (1.54 percent of patients) and payments would be reduced by 1.01 percent.

Computing National Estimates from the California Data

The following extrapolates the California results to all of Medicare. The 923,751 Medicare hospital discharges in the FY 2000 California database were increased by 1.133 to reflect growth in patient volume (2000–2004) resulting in an estimate of 1,046,610 Medicare discharge in the 324 California hospitals in 2004. In 2004, Medicare had 11,555,937 discharges in the entire U.S. Thus, Medicare cases from the 324 California hospitals were estimated to

represent 9.057 percent of all U.S. Medicare hospital discharges in 2004. Total Medicare hospital DRG payments were $82.9 billion in 2002. Using an inflation adjustment of 1.20 for 2002 to 2004 resulted in an estimate of $99.46 billion for Medicare hospital DRG payments in 2004, and an average per case payment amount of $8,607. Using the FY 2000 California data, payment weights were computed for each APR DRG using the methodology currently used to compute the Medicare DRG payment weights. The $8,607 per case amount was used to convert the payment weights into Medicare payments. The results from the California data were then inflated to a national estimate by assuming that the 324 California hospitals represented 9.057 percent of payments as well as discharges. Outlier payments and other payment adjustments such as disproportionate share were not included in the simulation. The estimates are an approximation intended to provide an order of magnitude of the payment adjustment associated with PPCs as well as the pattern of payment reductions across hospitals.

RESULTS

The blending fractions ranged from 0 to 0.8336. The percent of hospitals with a blending fraction below 0.4, between 0.4 and 0.6 and above 0.6 is 40.86, 43.96 and 15.18, respectively. Of the hospitals 13.60 percent were below the PPC achievable performance norm across all service lines and therefore, had no payment reduction associated with PPCs. A low blending fraction means that the hospital's performance is close to the PPC achievable performance norm across service lines and the hospital's payments are largely unchanged. Conversely, a high blending fraction means that the hospital is above the PPC achievable performance norm and the hospital's payments are reduced since PPCs in excess of the PPC achievable performance norm do not contribute to the patient's APR DRG assignment. The application of the blending fraction resulted in Medicare payment reductions ranging from 0 to 3.29 percent across hospitals. The percent of hospitals with a Medicare payment reduction below 0.5, between 0.5 and 1.5 and above 1.5 is 34.35, 49.21 and 16.43, respectively.

Nationally, the overall reduction in aggregate Medicare payments would be $1.005 billion (1.01 percent of Medicare DRG hospital payments, as expected since the result is a direct extrapolation from the California data). At one extreme, if the blending fraction was set to 1.0, and all PPCs that were not clinically excluded were eliminated from the APR DRG assignment the overall reduction in Medicare payments would be $2.122 billion. Thus, elimination of the hospital specific blending by setting the blending fraction to one would decrease total payments by an additional $1.117 billion.

Ideally, the reduction in the increase in payment due to PPCs will not be strongly associated with hospital type (such as large size, teaching status, urban location, difficult case mix, etc.). In order to investigate this issue, we estimated a regression model where the reduction in the increase in payment due to PPCs was assumed to be a function of the hospitals' case-mix index (CMI) and the number of discharges. In the regression the dependent variable was the difference between the payment for the APR DRG assigned including all PPCs and the payment determined by blending the payment amount for the APR DRG assigned including PPCs and excluding PPCs, expressed as a percent. The independent variables were selected because they could be determined from the California data. These variables can be expected to correlate with other unavailable hospital

characteristics such as teaching status. The adjusted R^2 for the model was 13.28 percent. The number of observations (hospitals) used in the analysis was 323. The intercept (0.04123) is not statistically different from zero, but the coefficients for the number of cases (-0.00004) and the CMI (-0.60537) are both negative and significant. This means that as the value of these variables increases, the percent reduction in the increase in payment due to a PPC increases. This effect, however, is not large. This, coupled with an R^2 value of only 13 percent, implies that, at a national level, a strong association between the percent reduction in the increase in payment due to PPCs and hospital type is unlikely, although the association is statistically significant.

DISCUSSION

All hospital payment systems increase payment when a PPC occurs. While pay-for-performance arrangements have mainly emphasized bonuses to hospitals for improved performance on quality of care measures, ultimately pay-for-performance arrangements must begin to adjust payments for poor performance. The redesigned IPPS could be implemented on a budget neutral basis which would redistribute the savings associated with PPCs across all the DRGs in effect increasing the average DRG payment and rewarding hospitals with low PPC rates. Alternatively, the savings could be used to reduce Medicare expenditures or used to finance explicit bonuses to high performing hospitals. The prospective determination of a hospital specific blending fraction based on a hospital's historical PPC performance compared to a PPC achievable performance norm not only allows the prospective nature of IPPS to be fully maintained, but also has the following positive attributes.

- Provides a clear financial incentive for hospitals to reduce the occurrence of PPCs.
- Introduces an explicit pay-for-performance adjustment into the case payment structure of IPPS.
- Reduces Medicare expenditures.
- Provides additional funds to reward high performing hospitals.

The use of historical data to establish the blending fraction does not compromise the prospective nature of IPPS. The use of payment adjustment factors computed from historical data has always been a part of IPPS. The outlier thresholds, the indirect medical education factor, and the disproportionate share are all derived from historical data and applied prospectively.

The determination of hospital payment based on a blending of the APR DRG assigned with and without the PPC diagnoses provides a financial incentive for hospitals to report complications. This will improve the data for quality of care and patient safety. Hospitals will have the financial incentive to code diagnoses as present on admission. However, any overcoding of diagnoses as present on admission will create other problems for hospitals. For example, overcoding diagnoses as present at admission would make surgical risk appear artificially high. This could potentially raise problems in cases with poor surgical outcomes that become involved in legal action. Similarly, for medical patients questions could be raised about the timing of the initiation of treatment if diagnoses are inappropriately reported as present on admission. Thus, there are substantial counter balances to the financial incentive to code diagnoses as present on admission.

Any accurate identification of preventable complications will require the present on admission indicator. Thus, any redesign of IPPS to address the issue of complica-

tions can not occur until after FY 2008 when the POA indicator is collected nationally as required by the 2005 DEFRA. Both California and New York have collected this indicator for nearly a decade. Hospitals appear to be able to reliably report the POA indicator. The application of a stringent set of POA edits to the California data resulted in 74 percent of their hospitals passing the edits. Just as there was a dramatic improvement in the accuracy and completeness of the diagnosis and procedure information reported by hospitals after the implementation of IPPS, a similar result would be anticipated for the POA indicator once it is used in IPPS.

The redesign of the Medicare IPPS previously described has the potential to reduce Medicare expenditures, increase payments to high performing hospitals, and simultaneously to provide meaningful financial incentive for hospitals to reduce complications and to improve quality of care. This redesign of IPPS corrects a perverse incentive that has existed in IPPS since its inception. The redesigned IPPS introduces a pay-for-performance factor on a per case basis. By altering payment on a case-by-case basis, the incentive to reduce complications is reinforced with each patient, thereby, strengthening the effectiveness of the incentives inherent in the redesigned IPPS.

REFERENCES

Averill, R.F., Goldfield, N.I., Muldoon, J., et al.: A Closer Look at All Patient Refined DRGs. *Journal of American Health Information Management Association* 73(1):46-50, January 2002.

Federal Register: Medicare Program; Hospital Inpatient Prospective Payment System and FY 2002 Rates 66(87):22668. May 4, 2001.

Federal Register: Medicare Program; Proposed Changes to the Hospital Inpatient Prospective Payment Systems and Fiscal Year 2007 Rates. Proposed Rule. 71(79):24095-24144. April 25, 2006.

Grassley, C. and Baucus, M.: Hospital Fair Competition Act of 2005. 109th Congress, 1st Session. S.1002 (Senate Bill), May 11, 2005.

Health Services Cost Review Commission: *Recommendation to Adopt a Severity Adjusted Grouper*. June 2, 2004. Internet address: http://www.hscrc.state.md.us/current policy papers/documents/severity adjusted grouper.pdf (Accessed 2005.)

Hibbard, J.H., Stockard, J., and Tusler, M.: Hospital Performance Reports: Impact on Quality, Market Share, and Reputations. *Health Affairs* 24(4):1150-1160, July/August 2005.

Hughes, J.S., Averill, R.F., Goldfield, N.I., et al.: Identifying Potentially Preventable Hospital Complications Using a Present on Admission Indicator. *Health Care Financing Review* 27(3):83-93, Spring 2006.

Medicare Payment Advisory Commission: *Improving Medicare's Payment for Inpatient Care and for Teaching Hospitals*. Report to Congress. Washington, DC. June 2000.

Medicare Payment Advisory Commission: *Physician-Owned Specialty Hospitals*. Report to Congress. Washington, DC. March 2005.

Medicare Payment Advisory Commission: *Strategies to Improve Care: Pay for Performance and Information Technology*. Report to Congress. Washington, DC. March 2005.

National Uniform Billing Committee: February 22-23, 2005 Meeting Minutes: 4-10. Internet address: http://www.nubc.org/subscribers/minutes/02_23_05MinFin.pdf (Accessed 2005.)

Rosenthal, M.B., Fernandopulle R., Song H.R., and Landon, B.: Paying for Quality: Providers Incentives for Quality Improvement. *Health Affairs* 23(2):127-141, March/April 2004.

Sedman, A. B., Bahl, V., Bunting, E., et al.: Clinical Redesign Using All Patient Refined Diagnosis Related Groups. *Pediatrics*:114(4):965-969, October 2004.

Reprint Requests: Richard F. Averill, M.S., 3M Health Information Systems, 100 Barnes Road. Wallingford, CT 06492. E-mail: rfaverill@mmm.com