Redesigning the Medicare Inpatient PPS to Reduce Payments to Hospitals with High Readmission Rates

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A redesign of the Medicare inpatient prospective payment system (IPPS) that reduces payments to hospitals that have high-risk adjusted readmission rates is proposed. The redesigned IPPS uses a readmission performance standard from best practice hospitals to determine the risk-adjusted number of excess readmissions in a hospital and determines the payment reduction for a hospital based on its excess number of readmissions. Extrapolating from Florida Medicare 2004-2005 discharge data, the redesigned IPPS is estimated to reduce overall annual Medicare inpatient expenditures nationally by $1.25, 1.92, and 2.58 billion for readmission windows of 7, 15, and 30 days, respectively.

INTRODUCTION

Pay for performance initiatives, which seek to link payment and quality, have until recently taken the form of financial rewards to providers who meet targets for process measures and intermediate outcomes. The Deficit Reduction Act (DRA) of 2005 (P.L. 109-171) was a major departure in that it required Medicare to eliminate any increase in hospital payments due to the occurrence of certain inpatient complications, referred to as hospital acquired conditions (HACs). Thus, the DRA established a pay for performance model that focuses on an outcome of care as opposed to a process of care and imposed financial penalties for a poor outcomes (i.e., the occurrence of an HAC). Like inpatient complications, readmissions can reflect poor quality and have been found to substantially increase Medicare expenditures. MedPAC has estimated that readmissions result in $15 billion in additional annual Medicare expenditures (MedPAC, 2007). Both MedPAC (MedPAC, 2008) and CMS (*Federal Register*, 2008) have recommended that hospital payments for readmission be reduced. The FY2010 budget from the Obama Administration proposed payment reductions for readmissions as one means of controlling Medicare expenditures.

This article proposes a modification to the Medicare Inpatient Prospective Payment System (IPPS) that would reduce payment to hospitals that experience higher risk-adjusted rates of preventable readmissions than peer hospitals. Modifying payment based on the relative readmission rate of a hospital differs from Medicare's approach to payment adjustments for complications, in which payment is reduced for the individual cases with an HAC. In this article we outline the problems with the HAC approach, explain the advantages of a payment system based on relative hospital readmission rates, propose a redesign of IPPS that incorporates rate-based payment reductions for readmissions, and estimate the amount

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of savings that could be achieved with a rate-based system.

The Problem with HACs

Any change in payment policy for readmissions will require Medicare to obtain enabling legislation that would grant it the statutory authority to reduce payments for readmissions (*Federal Register,* 2008). Any such legislation for readmissions is likely to contain language similar to that included in the DRA for HACs, which limited payment reductions to those complications that "could reasonably have been prevented". The DRA also requires that the DRG payment reductions associated with an HAC be implemented on a case-by-case basis.

The HAC case-by-case payment reductions to the DRG payment amount imply that the preventability of an HAC is known for an individual patient. Since the preventability of most in-hospital complications for an individual patient cannot be known with certainty even with a chart review, the HACs have been limited to complications that are, arguably, nearly always preventable. As a result of such a high threshold only eleven types of complications have been designated as HACs, accounting for less than 0.02% of Medicare inpatient hospital expenditures (*Federal Register,* 2007). Even these eleven HACs have been criticized as unfair and not always preventable (Pronovost, 2008; Inouye, 2009). As long as the payment penalties are based on the current case-by-case method, HACs are unlikely to be significantly expanded, and the associated payment reductions will continue to be minimal (Averill, 2009).

If payment reductions for readmissions were implemented on a case by case basis like HACs, they would likely be limited to readmissions that are virtually always preventable. For readmissions that are clearly related to mistakes in the delivery of care, such as for a foreign object left in after surgery, not paying for the readmission may be justified. However, such extreme errors are rare and will have minimal impact on overall hospital payments. Most preventable readmissions are in fact not clearly linked to a single medical error, and are more likely to result from a series of oversights and inadequacies in the course of the hospitalization or the discharge planning and post-discharge follow-up care.

A further difficulty with a case-by-case approach has to do with its usefulness in improving quality. To hospitals and physicians the imposition of any payment penalty linked to an individual patient implies that there was a preventable quality problem for that patient, which the physician and the hospital will interpret as an accusation of inadequate care. With the exception of the small number of quality problems that are virtually always preventable, labeling the care being provided to an individual patient as implicitly substandard will provoke resistance to any quality related payment reductions. Physicians and hospitals will, predictably and understandably, respond defensively, not only to save face and protect reputation, but also out of fear that the perceived failure could serve as the basis of a malpractice suit. These defensive responses can include demands for an appeals process in order to contest any judgments considered incorrect or unfair, as well as efforts to discredit the methods used to decide which readmissions were preventable. Both these responses will lead to increased administrative costs and detract from the primary goal of identifying and correcting quality problems. A payment policy that contains implied accusations is simply not an effective basis for fostering quality improvement.

Case-by-Case Payment Reductions Based on Averaging

The concept of averaging is inherent in the structure of Medicare's DRG-based inpatient prospective payment system (IPPS). Under IPPS, efficiency (shorter length of stay, lower costs) is financially rewarded and inefficiency (longer LOS, higher costs) is financially penalized. For each patient within a DRG, payment is based on the historical average cost of all patients in the DRG, but variation around that average is of course expected. For example, a patient who stays 10 days when the average length of stay for the DRG is 5 days is not necessarily perceived as having received inferior care. Hospitals expect some patients in the DRG to stay longer, and some to stay shorter than the average. A hospital's performance is judged by how well it does on average, not by assessing length of stay or costs for an individual patient. If, on the other hand, quality measures such as complications or readmissions are linked to case-based rewards or penalties, the emphasis shifts from average performance to the care of the individual patient. The assessment of a complication or a readmission yields a binary judgment—it is either preventable or not preventable in the individual case. But although binary, the judgment is unlikely to be consistent, since we cannot know for certain, or at least are unlikely to consistently agree on the preventability of a specific readmission. The core problem here is that the concept of averaging that works so well in IPPS does not readily transfer to the binary variables produced by a case-by-case pay-for-performance payment policy.

From a purely financial perspective, there is no inherent problem with applying averaging at the case level to binary variables. For example, suppose a particular type of readmission is known to be preventable 66 percent of the time based on previous research. Ideally, there should be no payment for the 66 percent of patients for whom the readmission was preventable and full payment for the 34 percent of patients for whom the readmission was not preventable. In the evaluation of a particular readmission, however, it is not known whether the readmission is one of the preventable ones. A solution in this example would be to pay 34 percent of the payment for all such readmissions, which would result in the same net overall financial impact on hospitals without the need to assess preventability of the readmission for individual patients. While a payment policy based on averaging at the case level is financially reasonable if the preventability of a readmission is known, there are significant problems, as described above, with how it would be perceived.

Rate-Based Payment Reductions

The use of rate-based rewards and penalties, on the other hand, because they reflect overall hospital performance, should prove to be much more broadly applicable. Indeed, MedPAC has proposed a readmission payment policy that would "reduce payments to hospitals with relatively high readmission rates" (MedPAC, 2008). Basing the level of payment reduction on a hospital's relative rate of readmissions avoids the problems generated by a focus on individual cases—implied blame, defensive responses, and diversion of effort from the primary purpose of reducing readmissions. Since readmissions are often the result of problems in the care processes relating to coordination and communication between the hospital and post discharge care providers, a focus on systematic differences in readmission rates across hospitals is appropriate. However, there are many implementation details that need to be worked out in order for this approach to be successful.

The development of a hospital specific payment adjustment for readmissions requires five steps:

1. Identify readmissions that are potentially preventable.
2. Apply risk adjustment to potentially preventable hospital readmission rates.
3. Compare the risk adjusted readmission rates of hospitals.
4. Establish the magnitude of hospital specific rate based payment reductions.
5. Incorporate the payment reductions into IPPS.

The end result of these steps is a single aggregate readmission payment adjustment factor for each hospital. The readmission payment adjustment factor would be computed based on a hospital's readmission rate computed from the most recent available historical data and prospectively applied in the determination of the DRG payment amounts.

METHODS

Identifying Readmissions That Are Potentially Preventable

A hospital's readmission rate should include only those readmissions that could reasonably be expected to be preventable, and should exclude those over which the hospital has no control. This means that at a minimum readmissions that are either planned (e.g., a cancer patient readmitted for chemotherapy) or unpreventable (e.g., a readmission for injuries sustained in a post discharge automobile accident) must be excluded from the calculation of a hospital's readmission rate. The preventability of a readmission also depends on the length of time that has passed since the initial admission; the more closely the readmission follows the discharge date of the prior admission, the more likely it is to be preventable. The maximum number of days allowed between the discharge date of the initial admission and the admission date of the readmission is referred to as the *readmission window*. Consistent with MedPAC's 2007 Report to Congress we examined readmission windows of 7, 15, and 30 days (MedPAC, 2007).

We used the Potentially Preventable Readmission (PPR) methodology to identify readmissions that reasonably could have been prevented (Goldfield, 2008). PPRs were used as the basis of the analysis of Medicare readmissions in MedPAC's 2007 Report to Congress (MedPAC, 2007). The PPR methodology makes explicit recognition that not all types of readmissions are preventable and allows the selection of different readmission windows. PPR logic excludes patients that would predictably be readmitted due to the severity and nature of the underlying illness (metastatic cancer), and for whom the repeat admission is unlikely to be preventable.

In the PPR methodology a readmission is considered potentially preventable if there was a reasonable expectation that it could have been prevented by one or more of the following: (1) the provision of quality care in the prior hospitalization, (2) adequate discharge planning, (3) adequate post-discharge follow-up, or (4) improved coordination between the inpatient and outpatient health care teams. The PPR method categorizes eligible hospital admissions as either a readmission or a candidate admission. Candidate admissions are admissions that are considered at risk for being followed by a clinically related readmission within the specified readmission window (e.g., 15 days after the prior discharge). The readmission rate is calculated as the number of clinically related readmissions divided by the total number of candidate admissions.

Risk Adjusting PPR Rates

Since sicker patients are more likely to be readmitted (Goldfield, 2008), in the absence of risk adjustment hospitals caring for sicker or more vulnerable patients (e.g., safety net hospitals) could be financially penalized by receiving excessive payment reductions for readmissions. This could force these hospitals to avoid admitting higher-risk patients, potentially creating an access problem for some sub-populations of patients.

The PPR method uses All-Patient Refined Diagnosis Related Groups (APR DRGs) for risk stratification for comparing actual and expected hospital PPR rates across hospitals. APR DRGs classify patients according to their reason for admission and severity of illness (Averill, 2002). APR DRGs use data from computerized discharge abstracts to assign patients to one of 314 "base APR DRGs" that are determined either by the principal diagnosis, or, for surgical patients, the most important surgical procedure performed in an operating room. Each base APR DRG is then divided into four severity of illness (SOI) levels, determined primarily by secondary diagnoses that reflect both comorbid conditions and the severity of the underlying illness, creating the final set of 1,256 APR DRGs.

Comparing the Risk Adjusted PPR Rates of Hospitals

A hospital's risk adjusted PPR rate can be compared to a national or state norm in order to calculate the number of "excess PPRs" in a hospital. Using national or State data from all hospitals, the average PPR rate in each APR DRG can be calculated to establish a PPR norm for each APR DRG. Using the selected readmission window and applying indirect rate standardization, the expected number of PPRs for each APR DRG in a hospital is calculated by multiplying the norm PPR rate for the APR DRG by the number of candidate admissions in the hospital in that APR DRG.

Two additional factors influence the expected number of PPRs. The presence of certain major mental health or substance abuse problems (e.g., schizophrenia, alcohol abuse) or extremes of age (i.e., greater than 85) have been shown to systematically increase readmission rates (Goldfield, 2008). Therefore, an additional adjustment for these factors is made in computing the expected number of PPRs for a hospital. The expected number of PPRs in each APR DRG summed across all APR DRGs is the hospital's overall expected number of PPRs. The number of expected PPRs can be compared to the actual number of PPRs as a means of judging a hospital's relative performance.

The above method of calculating the expected number of PPRs establishes the average PPR performance across all hospitals as an acceptable standard. It is important at the time of initial implementation to set a clear long-term performance standard for readmissions. Therefore, instead of accepting the average PPR rates as a performance standard, a "best practice" PPR norm should be created by identifying the subset of hospitals that have the lowest ratios of actual to expected PPR rates. Basing the performance standard on this subset of hospitals would create a performance standard that reflects the PPR rates being consistently achieved by the best performing hospitals.

Since the subsets of hospitals with the best relative PPR performance are likely to differ depending on the type of patient under consideration, we assigned each of the 314 base APR DRGs to one of 35 different hospital service lines (e.g., cardiac surgery, obstetrics, etc.). 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 in that service line was selected. Using the subset of hospitals selected in this manner, a PPR best practice norm for each APR DRG in each service line was computed. Across service lines the number of hospitals and the specific hospitals selected to be included in the PPR best practice norm differed. The net result is a PPR best practice norm for each APR DRG in each service line, representing the PPR rate that is consistently achieved by the best performing hospitals.

Using indirect standardization, the expected number of PPRs for each hospital based on the best practice PPR norm can be computed. The expected number of PPRs is the number of PPRs that would have occurred if the hospital's mix of patients by APR DRG had been readmitted at the same rate as the best practice hospitals. Since it is unlikely that any one hospital will have superior performance across all service lines, the actual overall PPR rate will be higher than the expected for the great majority of hospitals. Thus, the difference between the actual and expected is the number of PPRs for a hospital that could have been prevented if the hospital's performance was consistent with the best practice standard, and provides a measure of the number of "excess" PPRs experienced by the hospital across service lines.

Establishing the Magnitude of Hospital Specific Payment Reductions

A subset of the candidate admissions assigned to each APR DRG, referred to as *initial admissions,* will be followed by one or more PPRs. Each PPR will be assigned to an APR DRG and have an associated payment weight. The payment weight of all PPRs associated with the initial admissions in each APR DRG can be summed. Within each APR DRG, this sum divided by the number of initial admissions is the average relative payment for all the PPRs that follow an initial admission. This average, referred to as the "PPR relative weight" is not a measure of the relative costliness of the initial admission but is a measure of the relative costliness of the PPRs that follow an initial admission. Like the standard MS-DRG payment weights, a single set of national PPR relative weights would be computed and applied to all hospitals. The frequency and relative costliness of the PPRs that follow a initial admission will vary by the APR DRG of the initial admission (e.g., an initial admission for congestive heart failure will have more frequent readmissions than an initial admission for a fractured femur). The PPR relative weights can be used to convert the number of excess PPRs in an APR DRG to a payment reduction amount.

For a hospital (h) the excess number of readmissions is computed as the difference for each APR DRG (g) between the actual number of initial admissions ($A(h,g)$) and expected number of initial admissions ($E(h,g)$).

$$X(h,g) = A(h,g) - E(h,g)$$

The excess number of readmissions will be negative if the actual number of initial admissions is less than the expected. To convert the excess number of readmissions into a hospital payment reduction (R(h)), the number of excess readmissions for each APR DRG is multiplied by the PPR payment weight for the APR DRG (P(g)) times the base rate of the hospital (B(h)) and summed over all APR DRGs.

R(h) = SUM over g (X(h,g) P(g) B(h))

Actual payments for the readmissions are not used in order to protect the hospital from being held accountable for the costs incurred if the readmission is to another hospital that has high costs. If the hospital payment reduction is negative, it is set to zero. This means that a hospital will not be given a payment increase if its actual readmissions are less than the expected. However, if a best practice PPR norm by service line is used, few hospitals will have fewer actual readmissions than expected.

Incorporating the Payment Reduction into IPPS

The total payments to a hospital (T(h)) is the sum of the DRG payment weights for all patients in the hospital times the base rate of the hospital. The PPR payment adjustment factor (F(h)) for a hospital is one minus the ratio of the PPR payment reduction to the total payments.

F(h) = 1.0 – (R(h) / T(h))

Thus, if the PPR payment reduction is one percent of total payments, the payment reduction factor for a hospital would 0.99. The payment adjustment factor is computed based on the most recent available historical data and applied prospectively to the DRG payment amounts.

Data Sources

We analyzed 5,022,969 admissions from all 249 Florida inpatient hospitals for 2004 and 2005. We eliminated a total of 634,491 admissions for which the unique patient identifier, needed to link patients, had not been recorded. Another 76,825 admissions were excluded from the analysis because they were treated in non-acute care hospitals (i.e., long-term care and rehabilitation facilities) or contained inconsistent data elements, including error APR DRG assignment, age and gender discrepancies, hospitalizations with less than $200 or greater than $4 million in total charges, or admissions with a discharge date that preceded the admission date. A total of 4,167,040 admissions from 208 Florida hospitals remained after the initial data editing including 1,710,505 Medicare patients (41.0 percent). We used the Medicare Hospital Impact File in order obtain the hospital data needed to estimate hospital payments. The Florida Provider ID could not be matched to the Medicare Provider ID for 39 of the 208 hospitals, leaving a total of 1,571,421 Medicare patient discharges in 169 hospitals in the final database used for this analysis.

Estimating Medicare Payments

The wage, teaching, disproportionate share and geographic adjustment factors and the labor, non-labor and capital amounts for each hospital were obtained from the Medicare Hospital Impact File and used to compute the base payment rate for each hospital. Payment for individual patients was computed as the product of the hospital's base rate times the MS-DRG Version 26 relative payment weights. Outlier payments and transfer payments were not simulated. MS-DRGs were only used to determine hospital payments.

APR DRGs were used to determine the number of excess readmissions.

RESULTS

Table 1 contains the PPR rate, number of excess readmissions and percent payment reduction for readmission windows of 7, 15 and 30 days. The PPR rates increase from 5.0% with a readmission window of 7 days, to 8.5% at 15 days and 12.6% for 30 days, an increase of 152% from 7 days to 30 days. The number of excess readmissions can be computed relative to the average readmission rate across all hospitals (average readmission norm) or relative to the average readmission rate in the best practice hospitals (best practice readmission norm). The number of excess readmissions can be calculated using either of the norms in two possible ways, either by (1) summing the excess readmissions only from the DRGs in which the numbers of readmissions was greater than expected (a "restricted DRG" approach), or (2) calculating a "net" number of excess readmissions by summing across all DRGs, so that the sum of avoided readmissions in the DRGs where the number of readmissions was less than expected is subtracted from the sum of excess readmissions from the DRGs with greater than expected readmissions (an "all DRG" approach).

Table 1 contains the numbers of excess readmissions and percent payment reduction using both the restricted DRG approach and the all DRG approach, with the expected number of readmissions computed relative to both the average readmission norm and best practice readmission norm. (The net number of excess readmissions for the average readmission norm using the all DRG approach is not displayed, since the excess and avoided readmissions will cancel each other out and yield a net of zero excess readmissions.) The number of excess readmissions using the restricted DRG

Table 1

PPR Rate, Excess Readmission and Percent Payment by Readmissions Window by Alternative Approaches to Computing Excess Readmission and Different Readmission Norms for Florida Hospitals, 2004-2005

Excess Readmissions Calculated Using:	Norm	Actual PPR Rate	7 days	15 days	30 days
			5.0	8.5	12.6
Restricted DRG Approach*	Average Readmission Norm	Number of excess readmissions	21,792	28,579	33,637
		Percent payment reduction	1.3%	1.9%	2.5%
	Best Practice Readmission Norm	Number of excess readmissions	31,163	42,808	51,820
		Percent payment reduction	1.9%	2.81%	3.73%
All DRG Approach**	Best Practice Readmission Norm	Net number of excess readmissions	19,018	26,755	32,975
		Percent payment reduction	1.15%	1.77%	2.38%

* Excess readmissions summed only from DRGs with greater than expected readmissions.

** Excess readmissions summed across all DRGs.

NOTE: Average readmission norm is not displayed since all cells equal zero.

SOURCE: Averill, R.F., McCullough, E.C., Goldfield, N. I., Vertrees, J.C., Fuller, R.L., 3M Health Information Systems, Hughes, J.S., Department of Medicine, Yale University School of Medicine, 2009.

approach increases by approximately 50 percent for the best practice readmission norm as compared to the average readmission norm. The number of excess readmissions using the all DRG approach for the best practice readmission norm is approximately 40 percent less than the number of excess readmissions using the restricted DRG approach.

The restricted DRG approach with the best practice readmission norm yields the largest estimate of excess readmissions. The other two approaches, (restricted DRG approach with the average readmission norm, and the all DRG approach with the best practice readmission norm) yield lower but similar estimates of the numbers of excess readmissions. Using the all DRG approach with the best practice norm would likely represent a payment policy that hospitals would find more acceptable since it gives them credit for avoided readmissions. Therefore, the remaining analyses will focus on excess readmissions using the all DRG approach with the best practice norm.

Using the all DRG approach and the best practice norm, the number of excess readmissions increases by 73.4 percent as the readmission window expands from 7 to 30 days, and total Medicare payments are reduced by 1.15, 1.77 and 2.38 percent for readmission windows 7, 15 and 30 days, respectively. Total Medicare inpatient payments in FY2010 were estimated to be $108.4 billion by multiplying the FY2010 per case payment rate of $9,816 (*Federal Register,* 2009) times the 11,042,661 projected FY2010 Medicare discharges from the FY2009 Final Rule. Extrapolating the Florida results to total Medicare payments, the estimated annual payment reductions nationally would be $1.25, 1.92 and 2.58 billion for readmission windows of 7, 15, and 30 days, respectively.

Table 2 contains the number of hospitals by the percent reduction in total Medicare payments for the three readmission windows. Very few hospitals (ranging from 2 to 5 for the various readmission windows) had no excess readmissions (i.e., actual number of readmissions less than expected readmissions) and therefore no reduction in Medicare payments.

Table 2

Number of Florida Hospitals by Payment Reduction by Readmission Window, 2004-2005

Percent Payment Reduction	7 days	15 days	30 days
% <= 0.0	2	2	5
0.0 < % <= 0.5	18	11	3
0.5 < % <= 1.0	48	23	13
1.0 < % <= 1.5	44	27	20
1.5 < % <= 2.0	21	35	23
2.0 < % <= 2.5	16	20	19
2.5 < % <= 3.0	7	15	21
3.0 < % <= 3.5	5	9	17
3.5 < % <= 4.0	3	8	8
4.0 < % <= 4.5	3	8	12
4.5 < % <= 5.0	1	3	5
% > 5.0	1	8	23

SOURCE: Averill, R.F., McCullough, E.C., Goldfield, N. I., Vertrees, J.C., Fuller, R.L., 3M Health Information Systems, Hughes, J.S., Department of Medicine, Yale University School of Medicine, 2009.

The majority of hospitals had Medicare payment reductions of less than three percent, but the proportion decreased from 92.3 percent at 7 days to 61.5 percent at 30 days.

Table 3 contains the PPR rate, the average Medicare payment weight, the PPR payment weight, the number of excess readmissions and the percent payment reduction by severity of illness for ten selected APR DRGs for a 30 day readmission window. As expected the PPR rate and average Medicare payment weight increase with increasing severity. The PPR weight, which is a measure of the relative costliness of subsequent readmissions, also increases with patient severity of illness during the initial admission. Thus, higher severity of illness during the initial admission means greater cost during the initial admission, a greater likelihood of a readmission and more costly readmissions. The percent payment reduction shows no systematic relationship to the severity of illness during the initial admission. This is not surprising since the computation of the excess number of readmissions upon which the payment reduction is based explicitly adjusts for the impact of patient severity of illness. This finding suggests that patient severity of illness has been adequately recognized in the readmission payment methodology.

Again for a 30 day readmission window, Table 4 contains the Medicare payment reduction by type of hospital as categorized by Medicare disproportionate share percentage, teaching status and location. Virtually all teaching hospitals in Florida are located in large urban locations so a differentiation of teaching hospitals by location was not needed. The 27 hospitals (16.0 percent of hospitals) with a disproportionate share percentage greater than 40 and the 20 rural hospitals (11.8 percent of hospitals) tend to have a higher Medicare payment reduction than other Florida hospitals.

DISCUSSION

The key features of this proposal include the use of a method for identifying readmissions that are both clinically related to the preceding discharge and potentially preventable, the determination of risk adjusted readmission rates, the establishment of a best practice readmission norm based on distinct service lines, and a method to incorporate payment reduction for readmissions into IPPS based on comparisons of readmission rates rather than penalties linked to individual cases. Payment reductions under this proposal will be linked to the amount of deviation of the actual readmission rate from the readmission rate expected based on the best practice norm. The PPR method used in this proposal differs from all cause readmission methods, which consider virtually all readmissions to be preventable. In the PPR logic, only those readmissions judged to have a plausible clinical relationship to the prior admission were used (Goldfield, 2008).

The selection of the readmission window is a critical component of a readmission payment policy since it directly affects the number of hospitalizations that are considered readmissions and therefore the magnitude of the payment reduction. Hospitals will argue that a shorter readmission window such as seven or fifteen days is a more appropriate because hospitals have the greatest degree of control over the clinical processes during the hospitalization and the discharge planning process but have less control over outpatient management beyond the period immediately following discharge. Furthermore, as the readmission window increases, the effects of the clinical care in the initial admission

Table 3

PPR Rate, Payment Weight, PPR Payment Weight, Excess Number of Readmissions and Payment Reductions for Selected Medical APR DRGs by Severity of Illness (SOI) for Florida Hospitals, 2004-2005

APR DRG Number	Medical APR DRG Description		SOI 1	SOI 2	SOI 3	SOI 4
194	Heart Failure	% PPR Rate	13.0%	17.3%	21.4%	21.7%
		Pay Weight	0.7383	0.9053	1.2733	1.5806
		PPR Weight	1.3057	1.4856	1.6433	1.8256
		Excess Readm	202	1009	540	44
		% Pay Reductions	5.0%	3.5%	3.1%	1.3%
140	Chronic Obstructive Pulmonary Disease	% PPR Rate	12.2%	14.6%	18.8%	21.1%
		Pay Weight	0.7383	0.8581	1.0655	1.6285
		PPR Weight	1.4101	1.5514	1.6739	2.0214
		Excess Readm	298	670	439	70
		% Pay Reductions	4.8%	4.4%	4.5%	4.5%
139	Other Pneumonia	% PPR Rate	6.1%	10.7%	15.6%	18.7%
		Pay Weight	0.7614	0.9259	1.1113	1.6895
		PPR Weight	1.5155	1.4753	1.6103	1.9315
		Excess Readm	31	522	344	9
		% Pay Reductions	2.8%	3.1%	2.1%	0.5%
720	Septicemia & Disseminated Infections	% PPR Rate	6.0%	10.9%	16.4%	19.6%
		Pay Weight	1.1404	1.2654	1.6228	2.3522
		PPR Weight	1.2308	1.5084	1.7790	2.0719
		Excess Readm	0	202	414	171
		% Pay Reductions	0.1%	3.4%	3.7%	1.8%
460	Renal Failure	% PPR Rate	14.1%	15.0%	16.5%	22.5%
		Pay Weight	0.8644	1.0152	1.2167	1.6451
		PPR Weight	1.4471	1.6364	1.6761	1.9831
		Excess Readm	33	32	428	69
		% Pay Reductions	15.3%	2.4%	3.5%	4.3%

SOURCE: Averill, R.F., McCullough, E.C., Goldfield, N. I., Vertrees, J.C., Fuller, R.L., 3M Health Information Systems, Hughes, J.S., Department of Medicine, Yale University School of Medicine, 2009.

Table 3—Continued

PPR Rate, Payment Weight, PPR Payment Weight, Excess Number of Readmissions and Payment Reductions for Selected Medical APR DRGs by Severity of Illness (SOI) for Florida Hospitals, 2004-2005

APR DRG Number	Surgical APR DRG Description		SOI 1	SOI 2	SOI 3	SOI 4
175	Percutaneous Cardiovascular Procedures w/o AMI	% PPR Rate	9.9%	13.6%	19.5%	23.8%
		Pay Weight	1.8649	1.8843	2.2955	3.4194
		PPR Weight	1.5733	1.6902	2.0954	2.4035
		Excess Readm	474	501	196	20
		% Pay Reductions	1.8%	2.3%	3.0%	1.7%
221	Major Small & Large Bowel Procedures	% PPR Rate	8.0%	11.2%	15.6%	23.4%
		Pay Weight	1.9824	2.4835	3.7382	5.1298
		PPR Weight	1.5904	1.6194	1.7752	2.0824
		Excess Readm	31	177	158	76
		% Pay Reductions	0.6%	1.6%	1.2%	1.0%
173	Other Vascular Procedures	% PPR Rate	11.5%	16.4%	25.5%	31.0%
		Pay Weight	1.9034	2.1566	2.5511	3.3748
		PPR Weight	1.9479	2.0743	2.4335	2.6769
		Excess Readm	196	200	200	48
		% Pay Reductions	3.7%	2.5%	3.8%	3.0%
165	Coronary Bypass W Cardiac Cath Or Percutaneous Cardiac Procedure	% PPR Rate	11.3%	14.5%	21.7%	27.6%
		Pay Weight	4.6588	4.7144	5.7489	7.1815
		PPR Weight	1.1635	1.4637	1.6321	1.9777
		Excess Readm	22	175	154	75
		% Pay Reductions	1.1%	1.3%	1.1%	1.3%
301	Hip Joint Replacement	% PPR Rate	8.3%	9.4%	12.4%	24.5%
		Pay Weight	2.0259	2.1832	2.8005	3.4701
		PPR Weight	1.7170	1.8693	2.1407	2.0335
		Excess Readm	304	317	37	37
		% Pay Reductions	2.0%	2.3%	0.9%	2.5%

SOURCE: Averill, R.F., McCullough, E.C., Goldfield, N. I., Vertrees, J.C., Fuller, R.L., 3M Health Information Systems, Hughes, J.S., Department of Medicine, Yale University School of Medicine, 2009.

diminish, and the likelihood that a readmission is caused by factors unrelated to the initial admission increases. For example, a readmission for a urinary tract infection within seven days following an admission for major bowel surgery is highly likely to be causally related to the care rendered during the prior hospitalization, such as improper management of an indwelling urinary catheter. If the urinary tract readmission does not occur for 30 days following the bowel surgery, however, the causal link is less direct.

A short readmission window will reduce the immediate financial impact of the readmission payment policy. However, readmissions tend to be concentrated during the time period immediately following discharge. For example, for a 30 day readmission time interval 42 percent of readmissions occur within 7 days (Goldfield, 2008). Given that hospitals have the most ability to control the factors that lead to readmissions during the time period immediately following discharge, and that readmissions are concentrated during this period, a readmission window of 15 days could strike a balance between the amount of savings generated and the risk of holding hospitals accountable for factors beyond their control. Over time the readmission window could be expanded to longer intervals such as 30 days as hospitals implement the systems needed to monitor and prevent readmissions.

The readmission payment adjustment factor for a hospital is based on its number of excess readmissions as determined by a comparison to a readmission best practice rate that is consistently achieved by the best performing hospitals by service line. This represents a departure from the IPPS, where DRG payment amounts are based on the national average cost of providing care to patients in each DRG. In IPPS efficient and inefficient hospitals are blended together to determine the "average" national treatment cost, which is accepted as a reasonable standard. The 1982 HHS Report to Congress proposing IPPS anticipated that a stricter standard such as the median cost would ultimately be adopted (Schweiker, 1982). Although the intended goal was to have IPPS in some manner move toward prices that reflect the best consistently achievable hospital cost performance, such a transition has never occurred and the hospital payments have continued to be based on average cost.

By contrast, the proposed adoption of a hospital best practice standard for determining excess readmissions recognizes the importance of establishing a clear long-term performance standard at the time of the initial system implementation. While the proposed standard is a strict one, the payment reductions associ-

Table 4

Number of Hospitals and Percent Payment Reduction by Hospital Teaching Status and Medicare Disproportionate Share Hospital (DSH) Status for Florida Hospitals, 2004-2005

DSH Status	Major Teaching	Other Teaching	Non-Teaching Large Urban	Non-Teaching Urban	Non-Teaching Rural
Non DSH	2 1.36%	1 1.31%	20 2.17%	20 1.07%	8 1.77%
<40% DSH	3 2.30%	20 2.45%	31 2.60%	28 1.78%	9 3.83%
40%+ DSH	4 3.22%	7 5.04%	12 4.15%	1 1.58%	3 7.97%

SOURCE: Averill, R.F., McCullough, E.C., Goldfield, N. I., Vertrees, J.C., Fuller, R.L., 3M Health Information Systems, Hughes, J.S., Department of Medicine, Yale University School of Medicine, 2009.

ated with readmissions are only applied to the excess readmissions and not to all readmissions. The proposal combines a clear and rigorous long-term performance standard with a relatively conservative payment policy.

Rural hospitals and hospitals with a disproportionate share greater than 40 percent have higher readmission payment reductions, raising the possibility that factors beyond hospital control may play a larger role in determining readmissions to these hospitals. Because travel times in rural areas and access to follow-up care in high disproportionate share areas may increase readmission rates, it may be appropriate to incorporate rural and disproportionate share adjustments in the calculation of the expected readmission rates used to compute the number of excess readmissions in each hospital. Such an adjustment could be computed using regression analysis in a manner similar to the current payment adjustments for hospital teaching status and disproportionate share. The rural and disproportionate share readmission adjustments would alter the distribution of excess readmissions across hospitals but should have minimal impact on the overall number of excess readmissions and payment reductions.

Since payment reductions associated with readmissions impose significant new responsibilities on hospitals necessitating greater communication with physicians, patients and their families and post acute care facilities, it is reasonable to give hospitals an additional period of time to adapt. A phase-in for the introduction of payment reductions for readmissions should be considered, similar to the 3 year phase-in that was used for IPPS in 1983. One way of doing a phase-in would be to limit the magnitude of the payment reduction for any hospital during the initial years of implementation. Since the payment reduction factor for each hospital is expressed as a fraction that is less than one, the payment reduction could be limited to be no less than 99% in the first year, no less than 98% in the second, and no less than 97% in the third year. These limits would reduce the overall payment reduction for a 30 day readmission window from 2.38 percent to 0.91%, 1.63%, and 2.04%, respectively in the initial three years. Such a phase-in would reduce the $2.58 billion per year in national Medicare payment reductions over the first three years (a total of $7.74 billion) to $4.96 billion, which is a 35.9 percent decrease. Since 13.6 percent of the hospitals in Table 2 had payment reductions greater than five percent with a 30 day readmission window, a permanent maximum payment reduction of five percent could be included as a form of stop loss. However, any hospitals that reach the five percent payment reduction limit should be subject to a quality review audit related to readmissions.

Although reducing payment for readmissions can create immediate savings, future savings from lower readmission rates are potentially much greater. Indeed, in 1983 IPPS was implemented on a budget neutral basis and the vast majority of savings resulted from subsequent changes in hospital behavior in response to the inherent IPPS incentives for efficiency. Similarly, the majority of savings associated with payment incentives for reducing readmissions should come from behavior changes that lead to long-term reduction in readmission rates.

The payment reductions generated by the proposed readmission payment policy can be used for a multitude of purposes including reducing Medicare expenditures, providing bonuses to high performing hospitals and increasing primary care physician payment levels. Since the cooperation of primary care physicians is essential for reducing readmission rates, additional funds directed at primary care physicians participating in a medical home could be an effective way of further lowering readmissions. Of course, additional medical home payments would be contingent on the primary care physician's effectiveness in lowering readmissions for his/her patients.

The PPR method relies on discharge abstract codes and is therefore limited by the inherent problems in consistency and completeness of coding. However, risk adjustment is an essential part of determining the number of excess readmissions in a hospital. Failure to code completely and accurately can cause a hospital's risk of readmissions to be underestimated, resulting in a greater financial penalty for readmissions. Thus, the proposed readmission payment policy strengthens the financial incentive for hospitals to code completely and accurately.

APR DRGs were used for risk-adjusting readmission rates. Whether alternative methods of risk-adjustment such as MS-DRGs would have yielded similar results or improved the accuracy of the risk adjustment was not examined.

CONCLUSION

The effective use of payment incentives linked to readmissions will require the comparison of risk-adjusted readmission rates across hospitals, the creation of strict but acceptable best practice standard, and perhaps most importantly, the maintenance of a non-judgmental environment. This proposal establishes a clear and rigorous long-term performance standard to determine excess readmissions but incorporates it into IPPS through a conservative payment policy that determines payment reductions based on excess readmissions and not on all readmissions. The proposed redesign of IPPS results in Medicare payment reductions in the two percent range that create a significant financial incentive for hospitals to control readmissions but are not so large that they create a financial crisis for hospitals. Although the financial savings from reducing payment for readmissions can create immediate savings, future savings from lower readmission rates are potentially much greater and should be the goal of payment reform.

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