



99 Jonathan Lucas Street
MSC 160
Charleston • SC 29425-1600

May 13, 2008

Reference: CMS-1390-P

Kerry N. Weems
Acting Administrator
Centers for Medicare & Medicaid Services,
Department of Health and Human Services
Attention: CMS-1390-P
P.O. Box 8011, Baltimore, MD 21244-1850

Dear Administrator Weems,

It is my pleasure to provide public comment in response to CMS-1390-P, Medicare Program; Proposed Changes to the Hospital Inpatient Prospective Payment Systems and Fiscal Year 2009 Rates. The focus of these comments and supporting documentation is the adjustment for inpatient nursing care intensity within the payment system and use of nursing intensity data within value-based purchasing to evaluated differences of inpatient nursing performance within DRGs and across hospitals. Specifically, this public comment references key aspects of the January 2007 Research Triangle Institute Report to CMS titled "A Study of Charge Compression in Calculating DRG Relative Weights".¹ The main focus of that report was differential markups of ancillary charges that were potentially distorting the Inpatient Prospective Payment System (IPPS) as identified in the 2005 MedPAC report to Congress.² The RTI report identified a second problem of nursing care cost compression. The report found that the overall costs of nursing care in hospitals are 41% and these costs are allocated as fixed daily room rates. There is no variability in nursing care hours or costs by case mix within the claims data despite substantial evidence that nursing care hours and costs vary substantially for each patient day therefore the current DRG relative weights do not reflect differences in nursing care. The end result is payment inaccuracy and the nearly exclusive influence of ancillary services to set payment weights. There is also a perverse incentive for hospitals to cut nursing staff as reimbursement is not matched to the average amount of nursing time and costs within each DRG as is the ancillary services.

CMS is currently unable to determine how nursing time and costs are consumed for individual patient or distributed within each DRG. Yet CMS is poised to adjust payment for

¹ Dalton, K. (2007). A Study of Charge Compression in Calculating DRG Relative Weights. RTI Project Number 0207964.012.008, Prepared for Centers for Medicare & Medicaid Services, Office of Research, Development, and Information.

² Medicare Payment Advisory Commission (2005). Report to the Congress: Physician Owned Specialty Hospitals. MedPAC [On-line]. Available:
http://www.medpac.gov/publications/congressional_reports/Mar05_SpecHospitals.pdf

hospital acquired conditions. Many if not most of these are nursing sensitive such as pressure ulcers, falls, and infections and there is no current method to determine the relationship between nursing care provided to individual patients and occurrence of these adverse events. For example, if certain hospitals

Lastly, as CMS moves towards a value-based purchasing system, the current and proposed methods to determine costs and reimbursement for inpatient care heavily favor ancillary services and essentially ignore nursing care. Nursing care has no economic value despite the contribution of 1.3 million nurses who work in hospitals across the country. There is clear evidence that nursing workload (measured as hours of care delivered to patients) is directly associated with adverse events such as pressure ulcers, infections, and patient injuries during hospitalization. The lack of nursing data specific to individual patients is troubling and may confound our efforts to find the best evidenced-based solutions to deliver safe, high quality, and high value inpatient care. Unbundling nursing care from current routine and intensive care daily rates and billing for nursing using the 023X revenue code for actual daily nursing time (nursing intensity) expended for individual patient provides a reasonable solution to the problems identified above.

I urge CMS to reconsider the proposed rule for FY2009 and explore ways to:

1. Implement the recommendations of the RTI report to unbundle nursing care from current accommodation (room and board) revenue codes using the 023X Nursing Incremental Charge UB04 revenue code.
2. Modify the Medicare Cost Report to separate out nursing costs and hours of care to allow construction of a cost to charge ratio within the existing routine and intensive care cost centers.
3. Develop a method to evaluate nursing performance by case mix within the new severity adjusted DRG using the unbundled 023X nursing hours and costs data. A method to accomplish this in an upcoming article in the Journal of Nursing Administration is included as an attachment to this public comment (with permission from the editor Suzanne Smith).
4. Incorporate the inpatient nursing performance measure into the emerging value-based purchasing effort in the coming fiscal years to identify low performing hospitals relative to the mean nursing intensity within DRG and high cost hospitals.

I believe that accomplishing these four recommendations will improve overall payment accuracy, lead to a better understanding how nursing care hours and costs are allocated to individual patients and by DRG within and across hospitals, identify hospital nursing performance, and inform policy makers on the state of inpatient nursing care in the United States. I ask you give due consideration to these ideas and I will be happy to provide additional information or consultation.

Respectfully,

John M. Welton, PhD, RN

Associate Professor and Faculty Chair

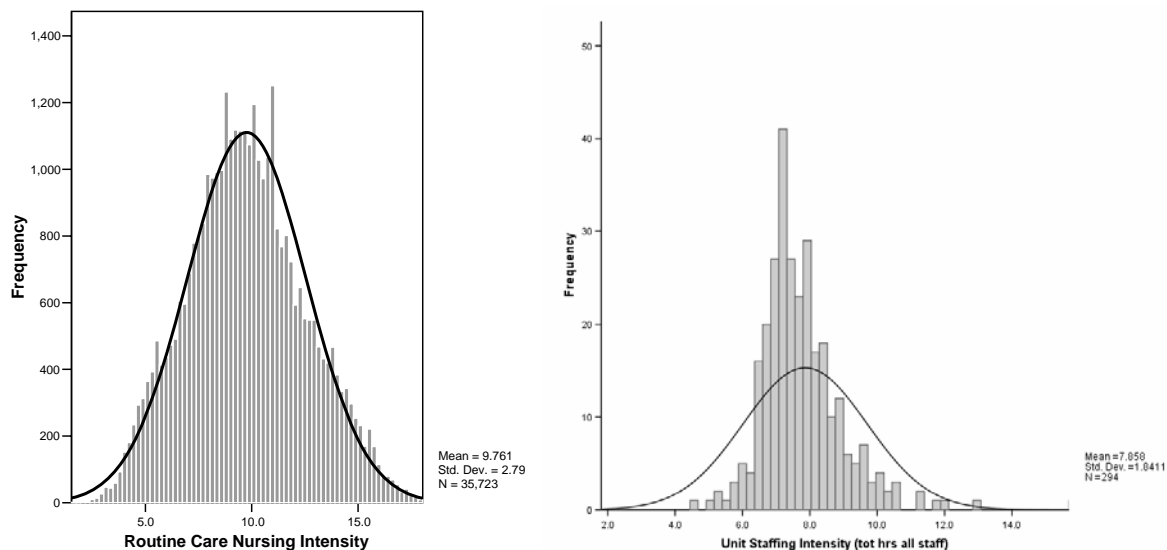
Medical University of South Carolina, College of Nursing

Email: weltonj@musc.edu Phone: 843-792-4623

The Cost of Inpatient Nursing Care

Every patient admitted to a hospital is assigned a registered nurse continuously from admission to discharge to carry out the medical regimen of care and perform independent assessments and treatments for patients. Nursing care can be measured in both the direct hours and associated costs of care delivered to individual patients. For example, if a patient receives a total of 10 hours of care by registered nurses in a 24 hour period of time and the salary of the nurse is \$30 per hour, the direct costs of care is \$300 for that patient day. In Exhibit 1, the distribution of nursing care hours for adult medical surgical units is shown for a single academic medical center (left pane) and all medical-surgical units for hospitals in Massachusetts (right pane). The Medical University of South Carolina Medical Center has used a nursing intensity based patient classification instrument since 2003 where nurses capture their actual hours of care for each patient during the shift using a web-based database (Welton et al., 2003; Welton et al., 2006c). It is clear that the actual nursing care hours are both normally distributed and vary by several hours each day. Likewise, the mean hours of care in Massachusetts have a similar normal distribution.

Exhibit 1. Nursing Intensity Variability



SOURCE: (Welton et al., 2006a) and (Welton et al., 2006d)

The most obvious interpretation of these data is the very dynamic nature of inpatient care and high variability of nursing care hours by patient and unit. Nursing intensity is driven by a number of factors including patient condition, diagnosis, severity of illness, nurse characteristics such as experience level, unit level characteristics such as unit size and case mix, and hospital characteristics, most notably type of hospital such as community hospital or academic medical center (Morris et al., 2007).

Nursing intensity can vary by both diagnosis and severity of illness. For example, data from the MUSC Nursing Intensity Database depict substantial variability in hours of care delivered to patients (Exhibit 2). Patients require increasing amounts of nursing care based on their underlying needs. A patient with a cerebral hemorrhage needs much higher levels of assessment, treatment of increased intracranial pressure, potential for seizures, etc. Such patients

are also totally dependent on nurses for all their care needs such as hygiene, nutrition, and elimination than other patients. It is also instructive to note the differences in care based on higher levels of severity of illness. Although generally there is higher nursing intensity with increased levels of severity of illness as measured within the APR-DRG, the increase is not uniform. For example, care for coronary artery bypass patients does not increase as much as differences in nursing intensity for pneumonia patients. This has implications for the new MS-DRG because nursing intensity varies differently than medical intensity.

Exhibit 2. Nursing Intensity and Selected APR-DRG

APR-DRG	N	APRDRG Severity			
		1	2	3	4
044 INTRACRANIAL HEMORRHAGE	207	16.9	18.5	18.1	19.9
021 CRANIOTOMY EXCEPT FOR TRAUMA	885	13.3	14.2	17.1	17.6
190 ACUTE MYOCARDIAL INFARCTION	233	13.1	14.5	14.2	20.3
166 CORONARY BYPASS W/O CARDIAC CATH	418	13.5	13.8	14.8	18.1
241 PEPTIC ULCER & GASTRITIS	263	11.1	11.9	14.5	14.2
194 HEART FAILURE	819	10.7	11.2	13.2	17.3
463 KIDNEY & URINARY TRACT INFECTIONS	499	10.6	11.6	12.5	15.2
301 HIP JOINT REPLACEMENT	510	9.9	9.6	10.0	14.5
420 DIABETES	676	9.8	11.0	13.1	16.6
662 SICKLE CELL ANEMIA CRISIS	876	9.7	11.0	12.2	16.6
139 OTHER PNEUMONIA	1014	9.5	11.1	12.2	15.9
141 ASTHMA	534	9.1	9.9	9.8	16.0
722 FEVER	424	8.8	10.0	11.2	11.7
225 APPENDECTOMY	168	8.3	9.4	14.6	13.9
640 NEONATE BIRTHWT >2499G NORMAL NEWBORN	3499	7.1	8.6	9.9	.
540 CESAREAN DELIVERY	1506	5.8	6.0	6.7	11.0
560 VAGINAL DELIVERY	3077	5.0	5.2	5.8	8.2
All Discharges	34106	9.3	10.7	12.2	15.9

SOURCE: Medical University of South Carolina Medical Center Nursing Intensity Database, patient discharges during 2004-2005 (Welton et al., 2006e).

Note: APR-DRG is the All Payer Refined Diagnosis Related Group, a registered trademark of 3M Corporation.

The nursing care patients receive is only weakly correlated with the medical care. Therefore medical intensity, typically measured by the procedures physicians perform, the secondary diagnoses, and severity of illness should not be used as the sole basis for determining both the nursing intensity and nursing costs of inpatient care. In a study using data from a nursing classification instrument using nursing diagnosis (Exhibit 3), when compared to both the DRG and APR-DRG, adding the nursing data improved the overall explanatory power to predict length of stay, death, discharge to a nursing home and total charges (Welton & Halloran, 2000; Welton & Halloran, 2005).

It is clear, based on a number of different studies, settings, and nursing specific classification systems, that nursing care has unique properties and varies independently to a certain degree from both the medical diagnosis (such as the DRG) as well as medical intensity of treatment. If payment for hospital care is to be accurate and equitable, there should be some attempt to independently classify the nursing care received by individual patients and allocate the

direct care hours and costs within the billing and reimbursement system. The original conceptualization of the DRG included both an adjustment for nursing intensity for individual patients as well as a separate nursing cost center (Thompson et al., 1979; Thompson, 1984). For example, each DRG would have a unique input for nursing intensity that is derived from patient level information rather than the fixed per diem room rate used in the current implementation of the IPPS to set the relative weights of each DRG.

Exhibit 3. Comparison of DRG, APR-DRG and Nursing Diagnosis

Outcome Variable	Comparison	1 - R ² /R ²	Improvement
Hospital length of stay	NDX + DRG vs. DRG	1 - .329/.253	30.0%
	NDX + APR-DRG vs. APR-DRG	1 - .335/.259	29.3%
Intensive care days	NDX + DRG vs. DRG	1 - .321/.186	72.5%
	NDX + APR-DRG vs. APR-DRG	1 - .448/.349	28.3%
Hospital charges	NDX + DRG vs. DRG	1 - .372/.265	40.3%
	NDX + APR-DRG vs. APR-DRG	1 - .417/.327	27.5%
Hospital death	NDX + DRG vs. DRG	1 - .637/.295	115.9%
	NDX + APR-DRG vs. APR-DRG	1 - .626/.254	146.4%
Discharge to nursing home	NDX + DRG vs. DRG	1 - .626/.254	146.4%
	NDX + APR-DRG vs. APR-DRG	1 - .406/.211	92.4%

SOURCE: (Welton & Halloran, 2005; Welton & Halloran, 2000)

Inpatient Nursing Care Cost Compression

Nursing care is currently bundled into revenue codes for routine and intensive care and expressed as a flat rate per diem charge regardless of the amount of nursing care hours any patient receives. This presents some unique problems within the IPPS. First, there is no way of knowing which patients received more or less nursing care based on the factors identified above. Second, because the daily room rate is fixed, that is, a hospital will likely assign a revenue code and set charge for a semi-private room or ICU day, there is no variability in the level of nursing intensity therefore the revenue code and associated charges do not vary across DRGs and do not influence in the calculation of the DRG relative weight other than the length of stay a patient spends in routine or intensive care (Dalton, 2007).

Quoting from the proposed FY2009 rule (CMS-1390-P):

“Each DRG weight represents the average resources required to care for cases in that particular DRG, relative to the average resources used to treat cases in all DRGs.” [p 53]

The lack of any adjustment for nursing intensity by DRG is contrary to the overall intent of prospective payment, especially in light of the evidence that nursing intensity is highly variable by DRG, severity of illness, and across individual hospitals.

In the final rule for FY2007 published in the Federal Register, the aggregate data for individual cost centers were provided as well as estimated charge markups (Exhibit 4). The table clearly shows two issues in the existing payment approach: 1. nursing care (embedded within routine and intensive care cost centers) makes up nearly half (48%) of all direct costs and 2. while ancillary charges are marked up several hundred percent, routine and intensive care charges are only marked up 19.5 and 40.0% respectively. In a study examining the relationship between nursing intensity and direct nursing costs with daily room and board billing practices at

an academic medical center, the investigators found nursing care was undervalued within the billing system by 32% (Welton et al., 2006b). A similar study across Canadian hospitals found a similar problem with nursing cost compression related to how nursing care was incorporated into the DRG based payment approach (Botz et al., 2006). Since nursing care is not allocated to individual patients or even measured independently, it has no economic value and may be cost compressed which contributes to the payment distortion issue raised in the MedPac 2005 and RTI reports previously mentioned.

Exhibit 4. Inpatient Cost Centers and Charge Markups

Cost Center Category	MedPAR Charge Grouping	Cost-to-Charge Ratio	Charge Markup %	MedPAR Grouping %	Cost Center Category %
Room & Board	Routine Days	0.8365	19.5	28.8	48.0
	Intensive Days	0.7141	40.0	19.2	
Ancillary	Supplies & Equipment	0.3342	199.2	11.5	52.0
	Therapeutic Services	0.3451	189.8	3.8	
	Laboratory	0.2510	298.5	6.7	
	Radiology	0.2390	318.5	4.3	
	Other Services	0.4990	100.4	6.4	
	Drugs	0.2541	293.5	8.8	
	Operating Room	0.3626	175.8	8.1	
	Cardiology	0.1750	471.3	2.4	
				100.0	

SOURCE: Author's calculation based on Centers for Medicare and Medicaid Services FY2007 Cost to Charge Ratios (CCR) and weight factors based on FY2003 data. Available at:

<http://www.cms.hhs.gov/AcuteInpatientPPS/FFD/itemdetail.asp?filterType=none&filterByDID=-99&sortByDID=2&sortOrder=ascending&itemID=CMS061892>

NOTE: Percent markup was calculated as: $((1 / \text{Cost-to-Charge Ratio}) - 1) * 100$

RTI Report

The FY2009 proposed rule (CMS-1390-P) highlights the results of the Research Triangle Institute (RTI) Report commissioned by CMS and reported in January 2007 (Dalton, 2007). The main objective of the study was to investigate and propose solutions raised in the 2005 MedPAC study regarding differential charge markups of ancillary services that were creating perverse incentives to some hospitals to select specific patient populations that were more profitable (Medicare Payment Advisory Commission, 2005; Mitchell, 2005; Guterman, 2006). While the RTI study did find significant differences in ancillary charge markups similar to those shown in Exhibit 4, and proposed several new cost centers to constrain the practice of differential markups, the study also found the additional problem of nursing cost compression. Essentially, they reported the following findings:

1. Inpatient nursing care makes up 41% of hospital direct costs of care.
2. The current practice of embedding nursing care within room and board charges expressed at a flat per diem rate creates a substantial cost compressions issue essentially opposite of the high charge markups for ancillary services.

3. This practice overestimates and underestimates the amount of nursing care (nursing intensity) for each DRG and creates a distortion within the payment system.
4. The primary solution to the problem is to unbundle nursing care from room and board charges using the 023X revenue code for Nursing Incremental Charges and summarize nursing care hours and costs for each patient day using the approach suggested by Welton and colleagues in 2006 (Welton et al., 2006e).

Excerpts from the RTI report are included below for completeness and accuracy:

“[p. 19] Longstanding hospital practices of cross-subsidization have promoted higher markup rates on ancillary services, medical supplies and drugs, which then subsidize nursing units and clinics. In recently-submitted MCRs [Medicare Cost Report], for example, the median cost-to-charge ratio for clinical lab services is 0.23, while the median for routine nursing is nearly 3.6 times as high, at 0.87. Service-specific pricing differentials create bias in charge-based weights by overstating the relative cost for surgical and other cases with relatively higher ancillary service use, and understating it for general medical, psychiatric, and other cases that rely more on nursing care. As the cross-service pricing differentials have increased over time, higher mark-up services have become increasingly over-valued within the system of DRG weights, creating unwanted incentives for hospitals to specialize in certain types of increasingly profitable cases.”

And,

*“[p. 26] Nursing cost compression affects DRG weights the same way ancillary charge compression does, but it has a very different origin. Nursing costs have historically been combined with other facility-related costs plus housekeeping and dietary services, into a single per-diem or average cost per day. Averages are computed across all patients in nonintensive care inpatient units, or across all patients within individual types of critical care units. Inpatient nursing or ‘accommodation’ charges generally follow the same principle; average room rates are set for routine medical surgical, intermediate care or intensive care units, with only minor patient-level adjustments for isolation or other incremental fees. **This is a rather primitive approach for such a significant component of the total inpatient care cost, particularly in comparison to the level of detail available for differentiating ancillary service use at individual patient levels** [emphasis added]. In our analysis files, accommodation charges account for one fourth of billed charges on Medicare IPPS claims. For one in four DRGs they account for more than one-third of charges; and for DRGs related to mental illness and substance abuse, nursing charges account for closer to 60 percent of the total bill. Per diem cost averaging always understates the costs of patients with above-average nursing complexity and overstates them for patients with below average complexity, and to the extent that nursing needs are predictably different by DRG assignment, per diem based DRG cost weights will be severely compressed.”*

And,

“[p. 89] Nursing charges account for one-fourth of IPPS charges and 41 percent of the computed costs from our claims analysis file. Converting from a per-diem to a CCR based method for converting nursing charges to costs should have improved the accuracy of the nursing cost estimate, as did the correction for the intermediate care charge converter. In the absence of a more detailed charge structure to capture patient-level differences in nursing service use, however, claims-based cost estimates continue to understate resource use for high acuity cases and overstate resource use for low acuity cases. To the extent that nursing acuity is systematically different by DRG, DRG cost estimates will be compressed.”

Finally,

“[p. 89] Many hospitals do not track patient-level data that would enable them to identify case-level differences nursing intensity. Hospital management may not be aware of the potential for bias in relative resource weights from the compression brought about by having only average unit-based nursing charges rather than patient-specific service use charges. New York State has designed a system to assign nursing cost increments to Medicaid DRGs based using local expert review of nursing intensity weights (NIWs), but expert consensus on DRG-specific nursing differentials is probably not a practical national-level solution. New York’s system also relies on a separate data collection effort. Unless hospitals begin to implement patient-level charging (making greater use, for example, of the “incremental nursing” charge code) [UB04 revenue code 023X], or begin to implement standard systems for collecting nursing acuity data that could be integrated into claims data, the possibilities for refining the inpatient nursing CCRs used in DRG weight computation are probably limited.”

CMS in its final IPPS rule for FY2008 dated August 22 in CMS-1533 (Centers for Medicare & Medicaid Services, 2007), commented on the RTI report as follows:

“During this second step, RTI noted that a variation of charge compression is also present in inpatient nursing services because most patients are charged a single type of accommodation rate per day that is linked to the type of nursing unit (routine, intermediate, or intensive), but not to the hours of nursing services given to individual patients. Unlike the situation with charge compression in ancillary service areas, there are virtually no detailed charge codes that can distinguish patient nursing care use. Therefore, any potential bias cannot be empirically evaluated or adjustments made without additional data.” (Centers for Medicare & Medicaid Services, 2007) P. 247

And

“The commenters raise interesting concerns related to nursing costs that are variable but are reflected in the DRG weights only as fixed costs through flat room and board charges. There are currently no detailed charge codes that can be used to distinguish the intensity in

*nursing services provided by type of patient. In its report, RTI noted “because intensity of nursing is likely correlated with DRG assignment, this could be a significant source of bias in DRG weights.” Particularly because nursing comprises such a significant portion of hospital costs and charges, we agree that this issue should be further studied. **We are interested in knowing whether the public has any ideas for how the relative weight methodology can systematically recognize and reimburse for differences in nursing resource consumption provided across hospital inpatients. We will consider whether we should study the possibility of using NIWs to recognize nursing intensity in the DRG relative weights.** [emphasis added]” (Centers for Medicare & Medicaid Services, 2007) p. 267*

The CMS comments do not directly address using the 023X revenue code as a way to unbundle nursing care hours as a variable charge from room and board as was mentioned in the RTI report. It is feasible and desirable to reflect the differences in nursing intensity at the individual patient level and the best available approach to do this is to collect daily hours of care for each patient and charge separately using the nursing code. Although there have been a number of issues raised about the potential increase in administrative burden to collect these data, hospitals currently go to extraordinary lengths to capture ancillary charges which make up a little more than half of all direct care expenditure and essentially no effort to capture the variable nursing care component making up the remaining 40-50 % of costs. There are a number of simple to implement methods to capture nursing care hours (nursing intensity) and assign a reasonable charge. For hospitals that have automated staffing assignment data, direct capture of nursing intensity and automated billing is entirely feasible. Compared to the current burden to nurses to capture ancillary charges such as filling out lab, radiology or other charge data, collecting supporting documentation to support charges, and other duties to support inpatient billing, capturing nursing care hours for direct billing would have very little practical impact on nurses’ work or create burdensome administrative activities to hospitals.

Adjusting for Nursing Intensity Improves Payment Accuracy

In a study using administrative data from the Health Care Utilization Project State Inpatient Database (HCUP-SID) sponsored by the Agency for Healthcare Research and Quality (AHRQ), 286 hospitals in 4 states representing 1,856,256 patient discharges in 2002, a nursing intensity adjustment using the New York State Nursing Intensity Weights improved explained total cost variance (R squared) by 8.5% for adult all payer patients (0.4448 vs. 0.4825) and 9.4% for Medicare only patients (0.4387 vs. 0.4798) compared to unadjusted routine and intensive care days (Welton & Dismuke, 2008). The study was funded by the American Organization of Nurse Executives (AONE). Exhibit 5 shows the results of the ordinary least squares regression. The results of this study bolster the findings of the RTI report in that adjusting for nursing intensity may improve the accuracy of the payment system. The full article for this study will appear in the July/August issue of Policy, Politics, and Nursing Practice (Welton & Dismuke, 2008).

Exhibit 5. Unadjusted and Nursing Intensity Adjusted Model Comparison

	All Payer				Medicare Only			
	R ²	F	Sig.	% Improve	R ²	F	Sig.	% Improve
Routine & ICU days only	0.4448	744144.9	<0.001		0.4387	333855.4	<0.001	
NIW adjusted days	0.4825	801253.4	<0.001	8.5%	0.4798	369273.6	<0.001	9.4%

SOURCE: Health Care Utilization Project State Inpatient Database (HCUP-SID). Total patient discharges for the series was 1,856,256 across 286 acute care hospitals in ME, MA, NC, WA during 2002

NOTE: Percent improvement in R² was calculated as: 1- (R² adjusted/ R² unadjusted)

Recommendation 1 and 2

This public comment concurs with the RTI report and asks CMS to implement the recommendations to unbundle nursing care from daily routine and intensive care billing using the 023X revenue code to allocate actual hours of nursing care and associated charges to individual patients. To accomplish this goal, I recommend that CMS review existing policies and procedures to allow hospitals to use the 023X code on a voluntary basis for this purpose and to direct fiscal intermediaries to begin working with hospitals to transition to an independent allocation of nursing time and costs. The Medicare Cost Report will also have to be modified to separate out nursing labor costs within routine and intensive care cost centers matched to the 023X subcodes. It may be helpful to create separate revenue codes and associated nursing cost centers for intermediate care in light of the growing use of these units at US hospitals. Since hospitals currently first identify then roll up nursing labor costs within the existing MCR, there would be little additional burden to hospitals to calculate the nursing costs separate from other department costs within the respective room and board cost centers. The benefits of an improved and more accurate payment should be apparent. Additional recommended changes to the MCR is to keep all direct nursing costs and hours within routine and intensive care cost centers and not use the Nursing Administration cost center for this purpose.

Inpatient Nursing Performance and Value-Based Purchasing

In the FY208 IPPS final rule, CMS established a mechanism to identify those conditions that were acquired in the hospitals and lead to adverse outcomes and higher costs (Exhibit 6). It is evident that many if not most of these conditions are sensitive to inpatient nursing care. There has been extensive study of the relationship of nursing workload and hospital outcomes supporting this contention (Kane et al., 2007a; Kane et al., 2007b). It is prudent for CMS to disallow additional payment when the underlying problems leading to higher costs are directly related to the quality of care patients receive in hospitals. The key issue is how can hospitals best optimize nurse staffing to maximize quality and minimize costs? The new daily nursing intensity data collected within the 023X revenue code is a suitable source of information about nursing care delivered to individual patients to address this question. For example, using aggregate claims data and summary mean nursing intensity and cost data by DRG, hospitals that provide too little nursing care, e.g. mean nursing intensity for the DRG is less than 2 standard deviations below the mean for all other hospitals, patients may experience a higher rate of adverse events. Since the claims data can be directly linked with the discharge data set, the relationship between nursing intensity and the rate of hospital acquired conditions can be measured. If hospitals provide too much care, for example the mean nursing intensity for a

particular DRG is beyond 2 standard deviations of the mean for all other hospitals, adverse events may decrease to a certain point then there are only small marginal improvement in quality and substantially higher costs of care (Donabedian et al., 1982; Donabedian, 1988). Under those conditions, if the high nursing intensity hospitals cannot demonstrate significantly lower rates of hospital acquired conditions, there is no basis for higher payment.

The primary challenge in creating an optimum inpatient payment system that balances the costs of providing care with optimal quality, safety, and outcomes is to directly measure nursing intensity and costs for each DRG to compare the overall performance of inpatient nursing across hospitals.

Exhibit 6. Hospital Acquired Conditions

Implementation on 10/1/08

Catheter-Associated Urinary Tract Infections

Pressure Ulcers

Serious Preventable Event – Object Left in during Surgery

Serious Preventable Event – Air Embolism

Serious Preventable Event – Blood Incompatibility

Vascular Catheter-Associated Infections

Surgical Site Infections - Mediastinitis After CABG

Falls and Fractures, Dislocations, Intracranial Injury &
Burns

Possible Implementation > 10/1/08

Staphylococcus Aureus Bloodstream Infection/Septicemia

Ventilator Associated Pneumonia (VAP)

Deep Vein Thrombosis (DVT)/Pulmonary Embolism (PE)

Recommendations 3 & 4

If recommendations 1 & 2 are implemented by CMS in the coming fiscal years, nursing intensity and cost data will be available within the claims data (UB04) to provide analysis and guidance for policy making. Recommendation 3 and 4 proposes CMS develop an set of inpatient nursing performance metrics based on the claims data to compare nursing care hours with each DRG between hospitals using the 023X Nursing Incremental Charge data. This will allow hospital and nursing administrators as well as policy makers to assess how nursing resources are being expended along with their associated costs. Mean nursing intensity and cost data for individual patients within routine and intensive care could be used to benchmark nursing performance. This approach would allow a reasonable degree of comparability with the assumption that nursing care is reasonably homogeneous within each DRG (Fetter, 1999). A performance based nursing adjustment to the IPPS provides a method to better identify and control costs and create incentives for hospitals to optimize nurse staffing levels to reach the highest quality and safety of care thereby resulting in the highest value.

Conclusions

The primary recommendations of this public comment are to implement the RTI report recommendations to unbundle nursing care from room and board and incorporate daily nursing

intensity hours and costs for each patient day using the 023X Nursing Incremental Charge revenue code. These new data can then be used to develop performance monitoring tools that can measure how direct nursing care time and costs are expended by DRG and across hospitals. Since nursing care makes up between 40 and 50% of all hospital direct costs of care delivered by 1.3 million nurses, it is incumbent on CMS to strongly consider these recommendations. If implemented, a nursing intensity adjustment could lead to greater payment accuracy, better nursing cost finding, potential new solutions to help identify and constrain rapidly increasing inpatient costs, increased inpatient nursing care efficiency, and new methods to identify nursing care performance that could lead to higher quality and patient safety leading to a better value of care.

References

Botz, C. K., Sutherland, J., & Lawrenson, K. (2006). Cost Weight Compression: Impact of Cost Data Precision and Completeness. *Health Care Financing Review*, 27, 111-122.

Centers for Medicare & Medicaid Services (2007). Medicare Program; Changes to the Hospital Inpatient Prospective Payment Systems and Fiscal Year 2008 Rates. Centers for Medicare and Medicaid Services [On-line]. Available:

<http://www.cms.hhs.gov/quarterlyproviderupdates/downloads/cms1533fc.pdf>

Dalton, K. (2007). A Study of Charge Compression in Calculating DRG Relative Weights. *RTI Project Number 0207964.012.008, Prepared for Centers for Medicare & Medicaid Services, Office of Research, Development, and Information*.

Donabedian, A. (1988). The quality of care. How can it be assessed? *JAMA*, 260, 1743-1748.

Donabedian, A., Wheeler, J. R., & Wyszewianski, L. (1982). Quality, cost, and health: an integrative model. *Medical Care*, 20, 975-992.

Fetter, R. B. (1999). Casemix classification systems. *Australian Health Review*, 22, 16-34.

Guterman, S. (2006). Specialty Hospitals: A Problem Or A Symptom? *Health Affairs*, 25, 95-105.

Kane, R. L., Shamliyan, T., Mueller, C., Duval, S., & Wilt, T. (2007a). *Nursing Staffing and Quality of Patient Care. Evidence Report/Technology Assessment No. 151 (Prepared by the Minnesota Evidencebased Practice Center under Contract No. 290-02-0009.) AHRQ Publication No. 07-E005*. Rockville, MD: Agency for Healthcare Research and Quality.

Kane, R. L., Shamliyan, T. A., Mueller, C., Duval, S., & Wilt, T. J. (2007b). The Association of Registered Nurse Staffing Levels and Patient Outcomes: Systematic Review and Meta-Analysis. *Medical Care*, 45, 1195-1204.

Medicare Payment Advisory Commission (2005). Report to the Congress: Physician Owned Specialty Hospitals. MedPAC [On-line]. Available:

http://www.medpac.gov/publications/congressional_reports/Mar05_SpecHospitals.pdf

- Mitchell, J. M. (2005). Effects of physician-owned limited-service hospitals: Evidence from Arizona. *Health Affairs*, 24, 481-490.
- Morris, R., Macneela, P., Scott, A., Treacy, P., & Hyde, A. (2007). Reconsidering the conceptualization of nursing workload: literature review. *Journal of Advanced Nursing*, 57, 463-471.
- Thompson, J. D. (1984). The measurement of nursing intensity. *Health Care Financing Review, Suppl*, 47-55.
- Thompson, J. D., Averill, R. F., & Fetter, R. B. (1979). Planning, budgeting, and controlling--one look at the future: case-mix cost accounting. *Health Services Research*, 14, 111-125.
- Welton, J. M. & Dismuke, C. E. Testing an Inpatient Nursing Intensity Billing Model. *Policy, Politics, & Nursing Practice*, (in press).
- Welton, J. M., Fischer, M., DeGrace, S., & Zone-Smith, L. (2006a). Hospital nursing costs, billing, and reimbursement. *Nursing Economics*, 24, 239-245.
- Welton, J. M., Fischer, M., DeGrace, S., & Zone-Smith, L. (2006b). Nursing intensity billing. *Journal of Nursing Administration*, 36, 181-188.
- Welton, J. M. & Halloran, E. J. (2000). A comparison of nursing diagnosis to the DRG and APR-DRG in predicting hospital death and discharge to a nursing home. In V.Saba, R. Carr, W. Sermeus, & P. Rocha (Eds.), *Proceedings of the Seventh IMIA International Conference on Nursing Use of Computers and Information Science, Auckland, New Zealand, April 28 - May 3, 2000* (pp. 156-160). Auckland, New Zealand: Adis.
- Welton, J. M. & Halloran, E. J. (2005). Nursing diagnoses, diagnosis related group, and hospital outcomes. *Journal of Nursing Administration*, 35, 541-549.
- Welton, J. M., Halloran, E. J., & Zone-Smith, L. (2006c). Nursing Intensity: In the Footsteps of John Thompson. *Studies in Health Technology & Informatics*, 122, 367-372.
- Welton, J. M., Unruh, L., & Halloran, E. J. (2006d). Nurse staffing, nursing intensity, staff mix, and direct nursing care costs across Massachusetts hospitals. *Journal of Nursing Administration*, 36, 416-425.
- Welton, J. M., Zone-Smith, L., & Fischer, M. H. (2006e). Adjustment of inpatient care reimbursement for nursing intensity. *Policy, Politics, & Nursing Practice*, 7, 270-280.
- Welton, J. M., Zone-Smith, L., Hughes, M., Stovall, J., Foulois, B., & Crummer, M. B. (2003). Nurse intensity database pilot study. In H.F.Marin, E. P. Marques, E. J. S. Hovenga, & W. T. Goossen (Eds.), *Proceedings, 8th International Congress in Nursing Informatics, Rio de Janeiro, June 20-25, 2003*. (pp. 123-128). Rio de Janeiro, Brazil: E-papers Servicos Editoriais Ltd.

Implications of Medicare Reimbursement Changes Related to Inpatient Nursing Care Quality

John M. Welton, PhD, RN

Author Affiliation: Associate Professor College of Nursing, Medical University of South Carolina, Charleston, South Carolina

Corresponding Author: John Welton, Medical University of South Carolina, College of Nursing, 99 Jonathan Lucas St., Room 527, Charleston, SC 29425, (weltonj@musc.edu), Day phone: 843-792-4623

Embargoed

Draft paper to be published in The Journal of Nursing Administration, July/August 2008, submitted for public comment regarding CMS-1390-P with permission.

Abstract

Recent changes to the Inpatient Prospective Payment System, formally known as CMS-1533-F, will negatively effect reimbursement to hospitals for patients who develop certain types of nursing sensitive hospital acquired conditions (HAC) such as pressure ulcers, falls with injuries, or nosocomial infections. This article examines the effects of the new payment policy on inpatient nursing care and address ways to improve quality and minimize financial impacts to hospitals. Specific strategies explored are: 1. develop new predictive models based on large multi-institutional datasets to identify patients at risk for HAC; 2. devise ways to collect nurse and patient specific information to better understanding how individual nurses contribute to patient outcomes, 3. create methods to evaluate nursing costs and performance across hospitals; and, 4. identifying ways to decrease high cost and high nursing resource use patients.

In August 2007, the Centers for Medicare and Medicaid Services (CMS) published new rules that will reduce payment to hospitals relative to poor quality of care. The changes in reimbursement are related to the Deficit Reduction Act of 2005 (Public Law L. 109-171) which requires the Secretary for Health and Human Services to select hospital-acquired conditions (HAC) that will be subject to a quality adjustment. The resulting changes to the Inpatient Prospective Payment System, known as CMS-1533-F, target conditions that are high cost or high volume that result in higher payment when present as a secondary diagnosis, not present on admission, and could have reasonably been prevented through application of evidence-based guidelines (1). Eight secondary diagnoses were selected for implementation on October 1, 2008 and additional diagnoses are being contemplated for later fiscal years (Table 1).

Table 1 CMS-1533-F Hospital Acquired Conditions

Implementation 10/1/08
Catheter-Associated Urinary Tract Infections
Pressure Ulcers
Serious Preventable Event – Object Left in during Surgery
Serious Preventable Event – Air Embolism
Serious Preventable Event – Blood Incompatibility
Vascular Catheter-Associated Infections
Surgical Site Infections - Mediastinitis After CABG
Falls and Fractures, Dislocations, Intracranial Injury & Burns
Possible Implementation > FY2008
Staphylococcus Aureus Bloodstream Infection/Septicemia
Ventilator Associated Pneumonia (VAP)
Deep Vein Thrombosis (DVT)/Pulmonary Embolism (PE)

The primary change in reimbursement will be the disallowance of additional payment within a particular MS-DRG (the new severity adjusted Diagnosis Related Group system being phased in by CMS) when a complication or comorbidity (CC) or major complication or comorbidity (MCC) is due to one of the eight selected hospital acquired conditions. The HAC cannot be used as the basis for a higher reimbursement within a DRG (2). At the present time, any additional costs related to a patient's outlier status such as extended length of stay or intensive care use unrelated to the admitted diagnosis or procedure will be reimbursed so this will limit a hospital's financial risk, especially if it accepts transfers from other facilities. However, hospitals should be cautious as the underlying intent of the Deficit Reduction Act of 2005 is to not pay for the additional costs of care related to adverse events that occur during hospitalization.

Most of the initial HACs for payment reduction are clearly if not primarily nursing related. First and foremost, CMS will no longer pay for the costs of poor nursing care relative to the selected HACs. This creates a dilemma as nursing care represents over 40% of a hospitals' direct cost of care (3). Other third party payers are watching the CMS policy changes and may enact similar "no pay for poor performance" measures in the future (4).

Policy Imperative

Changes to the reimbursement formula will shape the delivery of nursing care. Hospitals that have chronic nursing staff shortages may have higher rates of hospital acquired conditions and may be at greater financial risk (5). There is a clear evidence that high nursing workloads lead to a range of nursing sensitive adverse events such pressure ulcers, infections, unanticipated death, etc. (6). The challenge for hospital and nurse executives is to balance the costs and intensity of nursing care to account for differences in care needs for each patient. The potential decrease in payment due to poor quality places the onus on hospitals to do a much better job preventing adverse events by optimizing nursing care.

The policy change also creates an interesting new dynamic in that nursing care will directly impact hospital revenue when the rule becomes effective. This requires new thinking in how we measure the costs, quality, and intensity of inpatient nursing care. To accomplish these goals, hospitals will need to consider new strategies to:

1. Develop ways to predict which patients are at risk for developing HAC on admission to the hospital and provide interventions to decrease adverse events before they occur;
2. Identify the relationships between individual nurses and individual patients to better understand the effects of nursing intensity, direct nursing costs, expertise, academic preparation, skill mix and other nurse specific characteristics on patient outcomes of care;
3. Create methods to compare inpatient nursing performance across hospitals using readily available and new nursing data associated with specific diagnoses and procedures and compare these data to hospital payment to identify inequities between nursing intensity, performance, and reimbursement rates;
4. Place renewed focus and attention on high cost, high resource use, and extended length of stay patients, conduct studies to determine their overall financial and care impact on the health care system, and devise interventions to decrease the number of patients who expend a disproportionate amount of days, dollars, and deaths at US hospitals.

Predicting Patients at Risk for HAC

There is a growing awareness that nursing care, notably its costs and intensity, is inextricably linked to inpatient nurse staffing and the quality and safety of the care nurses deliver to patients. A recent study by Pappas found the rate of adverse events was 21.5% for medical patients and 14.4% for surgical patients with the most frequent event being urinary track infection (7). Each additional hour of registered nurse time per patient day increased the cost per case by \$659. There was an additional cost per case of \$1,005 for urinary track infection, \$2,384 for pressure ulcer, and \$1,631 for pneumonia adverse events. In this study, costs were reported from the hospital cost accounting system which reported actual standardized costs that accumulated throughout the inpatient hospital stay.

Studies in Belgium found the overall incidence of hospital adverse outcomes were 7.1% for medical and 6.2% for surgical patients. Rates for specific diseases include: deep vein thrombosis (6.3); urinary tract infections (32.2); and failure to rescue (240) events per 1000 discharges (8). Another study from Canada found inpatient adverse events were 7.5 per 100 hospital discharges of which 36.9% were preventable and 20.8% resulted in a patient death (9).

In a study of patients undergoing three types of hip replacement procedures, adverse events were 0.68 to 1.36% for deep vein thrombosis or pulmonary embolism, 0.28 to 1.88% for decubitus ulcer, and 0.05 to 0.25% for postoperative infection (10). Nationwide, postoperative sepsis adds 10.9 days and \$57,727 additional costs as well as a 21.9% higher chance for death. Infections related to medical diagnoses add 9.6 days, \$38,656 per case and a 4.31% increase in mortality (11). For Medicare patients, decubitus ulcers add \$700 per case and \$9,000 for postoperative sepsis (12). The costs reported in this study were estimated from charges using a nationally weighted cost to charge ratio.

The Business Case for Nursing

Needleman and colleagues have argued for an increase in overall nursing intensity (hours of nursing care per patient day) and percent of registered nurses to all nursing personnel involved with direct patient care. They argue this will decrease adverse events related to hospitalization (13). One weakness of their argument is that not all patients admitted to the hospital have the same relative risk of developing any particular adverse event and a single patient may have multiple events that lead to higher resources, costs, or unintended death. There are also large differences in the relative use of LPNs at US hospitals with some areas of the country having very low rates such as the Northeast and Northwest states, and other areas such as several Southeast states having much higher rates (14).

A refinement of Needleman's approach is to identify those patients at greater risk for developing one or more adverse events on admission to the hospital and provide higher nursing intensity and assign nurses with more experience or academic preparation to care for those patients. In essence, this changes the nature of hospital quality efforts from analyzing and responding to poor quality, to a model where real-time monitoring predicts patients at risk for an adverse event before it occurs. Knowing which patients are more likely to develop an adverse event provides an opportunity to develop new treatment approaches that may be applied in the early course of hospitalization. Such interventions may increase costs and intensity of nursing care yet overall decrease hospital costs by avoiding adverse events (15).

Linking Nurses and Patients

The origin of the "registered" part of registered nurse come from the rich tradition of Nightingale trained nurses who after graduation from hospital based schools provided care directly in patients' homes. The registries where the lists of these nurses found in schools, pharmacies and physicians offices (16). There was a direct economic relationship between each nurse and their patient and the quality of nursing care was reflected in both payment directly by the family or patient and continued employment. This direct economic connection was lost beginning in the 1920s when nurses transitioned from delivering care in the home to becoming employees of hospitals where acute care was now being delivered (17). Hospitals subsumed the cost of nursing labor within "room and board" charges and the lack of any financial consideration for nursing care within hospitals has been problematic for many decades (18).

Recent studies that attempt to measure and analyze the association between nursing care and patient quality and outcomes have been plagued by the inability to link individual nurses with individual patients. For example, two classic studies investigating nursing workload and nurse-to-patient ratios and adverse hospital events by Aiken and Needleman were only able to measure hospital aggregate nurse staffing levels (19,20). Both of these studies have had a major influence on national health policy and have become the basis for state and national legislation

calling for greater scrutiny of nursing workload or mandating specific nurse-to-patient staffing ratios.

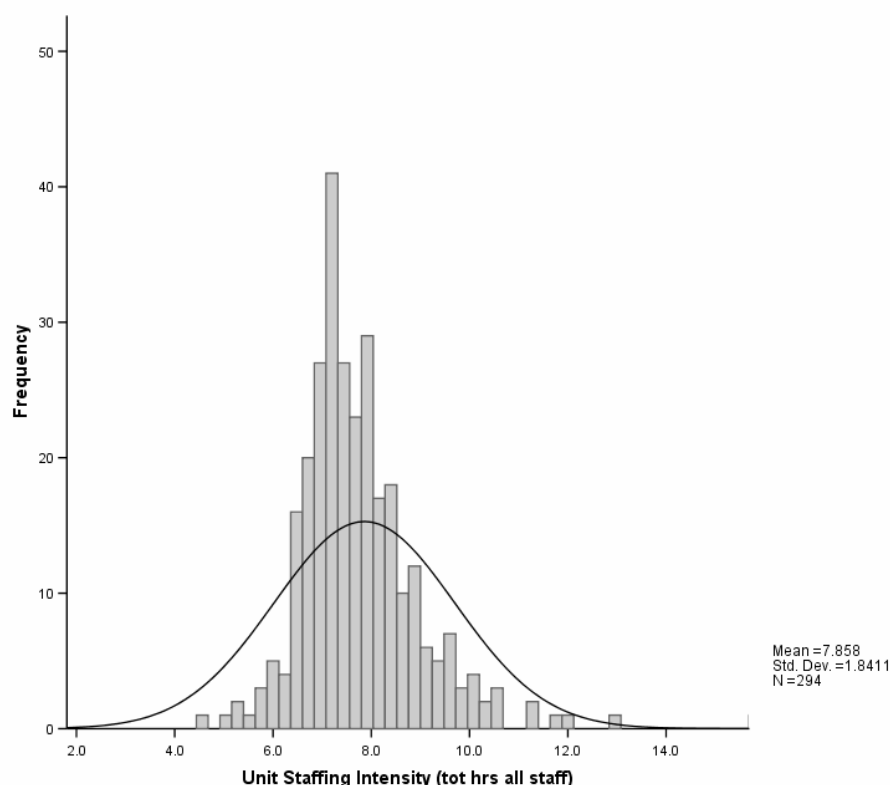
The ideal answer to overcome the limitations of existing studies is to collect data about individual nurses and individual patients. For example, if there was method to collect assignment data on each unit, the overall characteristics of the nurses caring for each patient, as well as the direct nursing time and costs of that care, there would be a robust dataset to analyze and compare the effect of nursing care with the cost, quality, and outcomes of hospitalization with much greater precision. Pooling such data across multiple hospitals would be both informative and provide a greater level of knowledge than exists with current methods to measure nursing care workload or nurse-to-patient ratios.

Interestingly, there is a relatively straightforward way to do this within the existing billing and payment system. John D. Thompson, one of the designers of the DRG, incorporated an adjustment to hospital prospective payment for nursing intensity in the original model (21,22). This was not implemented in the final DRG based prospective payment system. A recent adaptation of the nursing intensity adjustment has been proposed using a separate revenue code to unbundle nursing from room and board (23). This approach uses the existing billing and payment system to identify the unique nursing care time and costs expended each patient day. While it does not contain data about individual nurses, it does capture patient level nursing intensity within the aggregate claims and administrative data sets used to determine national payment policy. A study funded by the American Organization of Nurse Executives found that a nursing intensity adjustment improves explained total hospitalization cost variance by 9.4% for Medicare patients (24). Collecting nursing intensity and cost data will improve the accuracy of the payment system and the data will a valuable contribution to better understand how nursing intensity varies across different DRGs and different hospitals.

Comparing Nursing Care Across Hospitals

The Massachusetts Hospital Association (MHA) and Organization of Nurse Executives (MONE) created the Patients First database as way to publicly report unit level nursing intensity, nurse-to-patient ratios, skill mix and other unit level variables across Massachusetts hospitals (25). Using data supplied for staffing levels during 2006 (26), it is evident that mean staffing levels in medical surgical units is highly variable (Figure 1). This raises a number of questions how to address the crucial “safe staffing” issue. The variability in mean nursing intensity across hospitals and also within hospitals demonstrates the very dynamic and changing nature of inpatient nursing care.

Figure 1. Massachusetts Medical/Surgical Unit Nursing Intensity



The optimum level of nurse staffing is a balance between any individual patient's needs and the availability of nursing resources. Increasing nursing intensity and providing a higher percentage of registered nurses to all nursing personnel, as suggested by Needleman and colleagues, is one way to decrease adverse patient events (13,27,28). However, broadly increasing nursing resources also increases the underlying direct costs of care (29).

The dilemma is how to compare raw nursing intensity scores across different hospitals, even for similar types of unit as shown in Figure 1. Any number of different variables could influence mean nursing care hours such as differences in the nurses, patients, or individual units. We simply cannot say which units are performing well and which are not based on the available data nor can we determine whether these units are at an optimal staffing level.

A much different approach is to incorporate nursing intensity and cost data for individual patients for each day of stay as mentioned above and then compare the aggregate mean nursing intensity with each severity adjusted DRG (the new MS-DRG). This approach would allow a reasonable degree of comparability with the assumption that nursing care is reasonably homogeneous within each DRG. For example, imagine Figure 1 was the mean nursing intensity for care on a medical/surgical unit across multiple hospitals for a particular DRG (we could also construct a histogram for ICU care as well). The aggregate mean nursing intensity for each hospital would be part of a distribution of nursing hours expended for all patients within that DRG. Of concern would be hospital scores at the very low end (left tail) and high end (right tail). The left tail indicates hospitals that are underperforming relative to other hospitals for this same DRG, that is, they are giving substantially lower nursing intensity for this population of patients.

Since the nursing intensity data would be linked to the discharge diagnoses, the association between nursing intensity for individual patients within a DRG could be compared to the amount of additional adverse events. Hospitals with low nursing intensity comparative to other hospitals and with higher adverse events are not performing well. Likewise, hospitals in the right tail have higher nursing intensity compared to other hospitals and could represent excess costs expended for patients within a particular DRG. If these hospitals could demonstrate lower adverse events with the higher staffing levels and lower overall costs as argued by Needleman, there should be at least some accommodation in additional payment to the hospitals for higher performance.

As CMS and other third party payers move towards a pay for performance (or no pay for non performance) model, hospitals will be at risk not knowing the direct effects of nursing care. In a very simplistic way, having patient level nursing intensity data allows hospitals greater analysis and control over their nursing care environment. Future payment models will be increasingly based on value. To that degree, having the ability to establish the economic value of inpatient nursing care will be crucial to attaining and sustaining high performance hospital nursing care in the future.

High Cost, High Resource Use Patients

In a study of adult patients admitted to an intensive care unit over four years at University of North Carolina Hospital in Chapel Hill, patients were grouped into high cost and high length of stay categories. The patients in the 90th percentile of costs (top 10% of ICU costs) consumed a disproportionate amount ICU days and ICU expenditures (30). A similar analysis was conducted using data from a nursing intensity database at the Medical University of South Carolina in Charleston using patient level nursing intensity data collected over a two year period (31). Similar results were found in the 90th percentile of total hospital cost patients (Table 2).

Table 2 Outcomes of Outlier Patients (90th percentile of costs)

	UNC Study	MUSC Data
Patients	10,606	58,473
ICU Days	48.7%	
Total Days		37.8%
Total Costs	50.0%	44.9%
Deaths	32.4%	
Nursing care hours		41.0%

Note: MUSC data is based on adult patients admitted from January 2004 through July 2005.

The results from the two data sources clearly show a small number of patients have a disproportionate amount of days, dollars and deaths, yet little is known about these patients. In the MUSC sample, 10% of the patients consumed 41% of all nursing care hours and 10% of the adult ICU patient in the UNC study consumed 50% of ICU costs. One key unanswered question is whether these high cost and high resource patients also have higher incidences of adverse events? For example, would a patient experiencing a nosocomial pneumonia or central line infection after a routine elective procedure lead to further complications, ICU care, and possibly unintended death? The question is relevant within the context of payment reform because the growing inclination is not to pay for the added costs of care when the condition is preventable. If

the adverse events such as those identified by CMS are the cause for extended ICU care, will future payment be denied? To what degree will other third party payers and health insurers follow suite or even extend the conditions which will not be paid?

Traditionally, the extra costs of care for these high resource patients have been paid with little scrutiny. Hospitals and in particular nurse executives need to focus their attention and monitor this small but costly patient population. There has been encouraging research showing the benefits of hospitals using rapid response teams to potentially mitigate some adverse events (32-35). The RRTs have lowered admissions to intensive care, decreased inpatient mortality, and improved nurse satisfaction. The next logical step will be to identify those patients at risk for RRT response and intervene earlier to prevent exacerbations of underlying problems such as respiratory or cardiovascular compromise. The best strategy to decrease the costs and comorbidity associated with these high resource patients is to prevent the adverse events from occurring and to a large degree that is directly related to nursing care.

Implications for Nurse Executives

There are a number of key lessons and implications for nurse leaders. First and foremost, we need to rethink inpatient nursing quality and move from a model that relies primarily on retrospective analysis and response to a new model that predicts poor quality before it arises and provide interventions to moderate the potential financial impact of adverse events.

Aligning the costs and intensity of nursing care with individual patients is an important strategy to identify and respond to changes in case mix and payer policies. Hospitals that develop the ability to collect data linking nursing care and perhaps associate individual nurses with the processes and outcomes of care for individual patients will be in a much better position to identify and respond to future changes in reimbursement. Restructuring hospital payment to better reflect nursing care will be a crucial policy goal in the future as cross subsidizing nursing care from high revenue patients to high nursing intensity patients will be increasingly more difficult. To accomplish this goal, data will need to be entered into the hospital billing system where it will ultimately become part of the national hospital data collection used to set payment policy. Nurse executives will have a pivotal role in bridging bedside nursing with the executive suite and boardroom. Board members will pose difficult questions as to how nursing care is affecting hospital revenue. This should be seen as a welcome change as inpatient nursing care is now seen as contributing to revenue rather than the traditional view that nursing labor is one of the highest costs to hospitals.

Nurse executives will need to focus new efforts to compare nursing care intensity and costs across different hospital settings by DRG as third party payers become aware of the CMS strategy to not pay for the additional costs of care associated with hospital adverse conditions. In particular, high resource and length of stay patients will need increasing examination as payers put pressure on hospitals to lower costs and increase quality. Multiple strategies should be explored including: collecting daily data about nursing intensity and lengths of stay to identify high resource patients; conducting trend analysis to detect which patients are likely to become outliers; and benchmarking nursing intensity and direct nursing costs across multiple hospitals.

Conclusions

The recent change in reimbursement practices by the Centers for Medicare and Medicaid Services represents a profound shift in payment policy initiated by the Deficit Reduction Act of

2005. CMS will no longer pay for the added costs of care related to hospital acquired conditions such as pressure ulcers and nosocomial infections. Many if not most of the initial 8 conditions are directly related to nursing care therefore hospitals will receive lower payment and less overall revenue for poor nursing care. Hospitals should strongly consider methods to identify the nursing intensity and direct nursing costs expended for individual patients and develop strategies for optimizing staffing patterns to provide the highest quality of care at the lowest costs. In some instances, this may require hospitals to provide higher nursing intensity for selected patients.

Finally, emerging ideas and legislation about inpatient nursing performance will place greater focus on direct nursing costs and intensity of care within DRG categories and across hospitals. This will require a change in billing and reimbursement practices that will eventually lead to establishing a direct economic relationship between individual nurses and patients.

References

1. Centers for Medicare & Medicaid Services. Medicare Program; Changes to the Hospital Inpatient Prospective Payment Systems and Fiscal Year 2008 Rates. Available at: <http://www.cms.hhs.gov/quarterlyproviderupdates/downloads/cms1533fc.pdf>.
2. Kurtzman, E. T. A Summary of the Impact of Reforms to the Hospital Inpatient Prospective Payment System (IPPS) on Nursing Services. Available at: <http://www.rwjf.org/files/research/ippswhitepaper2007.pdf>.
3. Dalton, K. A Study of Charge Compression in Calculating DRG Relative Weights. Research Triangle Park, NC: Research Triangle Institute; Available at: www.cms.hhs.gov/reports/downloads/Dalton.pdf.
4. Carpenter, D. Neverland. Medicare Declares "No Pay for Preventable Errors." Private Insurers Are Sure to Follow. *Hospitals and Health Networks*, 10-7-2007;81(12).
5. Weissman, J. S., Rothschild, J. M., Bendavid, E., Sprivulis, P., Cook, E. F., Evans, R. S., Kaganova, Y., Bender, M., vid-Kasdan, J., Haug, P., Lloyd, J., Selbovitz, L. G., Murff, H. J., and Bates, D. W. Hospital Workload and Adverse Events. *Medical Care*, 2007;45(5):448-55.
6. Kane, R. L., Shamliyan, T. A., Mueller, C., Duval, S., and Wilt, T. J. The Association of Registered Nurse Staffing Levels and Patient Outcomes: Systematic Review and Meta-Analysis. *Medical Care*, 2007;45(12):1195-204.
7. Pappas, S. H. Determining the Hospital Cost of an Adverse Event. *Journal of Nursing Administration*, (In Press)
8. Van den, Heede K., Sermeus, W., Diya, L., Lesaffre, E., and Vleugels, A. Adverse Outcomes in Belgian Acute Hospitals: Retrospective Analysis of the National Hospital Discharge Dataset. *International Journal for Quality in Health Care*, 4-5-2006.
9. Baker, G. R., Norton, P. G., Flintoft, V., Blais, R., Brown, A., Cox, J., Etchells, E., Ghali, W. A., Hebert, P., Majumdar, S. R., O'Beirne, M., Palacios-Derflingher, L., Reid, R. J., Sheps, S., and Tamblyn, R. The Canadian Adverse Events Study: the Incidence of Adverse Events Among Hospital Patients in Canada. *Canadian Medical Association Journal*, 5-25-2004;170(11):1678-86.

10. Zhan, C., Kaczmarek, R., Loyo-Berrios, N., Sangl, J., and Bright, R. A. Incidence and Short-Term Outcomes of Primary and Revision Hip Replacement in the United States. *Journal of Bone & Joint Surgery, American Volume*, 2007;89(3):526-33.
11. Zhan, C. and Miller, M. R. Excess Length of Stay, Charges, and Mortality Attributable to Medical Injuries During Hospitalization. *JAMA*, 10-8-2003;290(14):1868-74.
12. Zhan, C., Friedman, B., Mosso, A., and Pronovost, P. Medicare Payment for Selected Adverse Events: Building the Business Case for Investing in Patient Safety. *Health Affairs*, 2006;25(5):1386-93.
13. Needleman, J., Buerhaus, P. I., Stewart, M., Zelevinsky, K., and Mattke, S. Nurse Staffing in Hospitals: Is There a Business Case for Quality? *Health Affairs*, 2006;25(1):204-11.
14. Welton, J. M. and Keepnews, D. M. Occupational Mix Adjustment: a Risky Plan. *American Journal of Nursing*, 2007;107(7):70-2.
15. Thungjaroenkul, P., Kunaviktikul, W., Jacobs, P., Cummings, G. G., and Akkadechanunt, T. Nurse Staffing and Cost of Care in Adult Intensive Care Units in a University Hospital in Thailand. *Nursing and Health Science*, 2008;10(1):31-6.
16. Reverby, S. M., *Ordered to Care: The Dilemma of American Nursing, 1850-1945*. Cambridge University Press; 1987.
17. Welton, J. M. Mandatory Hospital Nurse to Patient Staffing Ratios: Time to Take a Different Approach. *Online Journal of Issues in Nursing*, 2007;12(3).
18. Thompson, J. D.; Diers, D. Nursing resources. In: RB Fetter, DF Brand, and D Gamache, Eds. *DRGs. Their Design and Development*. Ann Arbor: Health Administration Press; 1991. pp.121-83.
19. Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J., and Silber, J. H. Hospital Nurse Staffing and Patient Mortality, Nurse Burnout, and Job Dissatisfaction. *JAMA*, 2002;288(16):1987-93.
20. Needleman, J., Buerhaus, P., Mattke, S., Stewart, M., and Zelevinsky, K. Nurse-Staffing Levels and the Quality of Care in Hospitals. *New England Journal of Medicine*, 5-30-2002;346(22):1715-22.
21. Thompson, J. D. The Measurement of Nursing Intensity. *Health Care Financing Review*, 1984;Suppl:47-55.
22. Thompson, J. D. and Diers, D. DRGs and Nursing Intensity. *Nursing & Health Care*, 1985;6(8):434-9.
23. Welton, J. M., Zone-Smith, L., and Fischer, M. H. Adjustment of Inpatient Care Reimbursement for Nursing Intensity. *Policy, Politics, & Nursing Practice*, 2006;7(4):270-80.
24. Welton, J. M. and Dismuke, C. E. Testing an Inpatient Nursing Intensity Billing Model. *Policy, Politics, & Nursing Practice*, (In Press)
25. Massachusetts Hospital Association. Patients First. Available at: <http://www.patientsfirstma.org/>.

26. Welton, J. M., Unruh, L., and Halloran, E. J. Nurse Staffing, Nursing Intensity, Staff Mix, and Direct Nursing Care Costs Across Massachusetts Hospitals. *Journal of Nursing Administration*, 2006;36(9):416-25.
27. Needleman, J., Kurtzman, E. T., Kizer, K. W., Needleman, Jack, Kurtzman, Ellen T., and Kizer, Kenneth W. Performance Measurement of Nursing Care: State of the Science and the Current Consensus. *Medical Care Research & Review*, 2007;64(2 Suppl):10S-43S.
28. McGillis, Hall L., Doran, D., Baker, G. R., Pink, G. H., Sidani, S., O'Brien-Pallas, L., and Donner, G. J. Nurse Staffing Models As Predictors of Patient Outcomes. *Medical Care*, 2003;41(9):1096-109.
29. McCue, M., Mark, B. A., and Harless, D. W. Nurse Staffing, Quality, and Financial Performance. *Journal of Health Care Finance*, 2003;29(4):54-76.
30. Welton, J. M., Meyer, A. A., Mandelkehr, L., Fakhry, S. M., and Jarr, S. Outcomes of and Resource Consumption by High-Cost Patients in the Intensive Care Unit. *American Journal of Critical Care*, 2002;11(5):467-73.
31. Welton, J. M.; Zone-Smith, L.; Hughes, M.; Stovall, J.; Foulois, B.; Crummer, M. B. Nurse intensity database pilot study. In: HF Marin and others, Eds. *Proceedings, 8th International Congress in Nursing Informatics, Rio de Janeiro, June 20-25, 2003*. Rio de Janeiro, Brazil: E-papers Servicos Editoriais Ltd; 2003. pp.123-8.
32. Foraida, M. I., DeVita, M. A., Braithwaite, R. S., Stuart, S. A., Brooks, M. M., Simmons, R. L., Foraida, Mohamed I., DeVita, Michael A., Braithwaite, R. Scott, Stuart, Susan A., Brooks, Maria Mori, and Simmons, Richard L. Improving the Utilization of Medical Crisis Teams (Condition C) at an Urban Tertiary Care Hospital. *Journal of Critical Care*, 2003;18(2):87-94.
33. Dacey, M. J., Mirza, E. R., Wilcox, V., Doherty, M., Mello, J., Boyer, A., Gates, J., Brothers, T., Baute, R., Dacey, Michael J., Mirza, Ehsun Raza, Wilcox, Virginia, Doherty, Maureen, Mello, James, Boyer, Amy, Gates, Jonathan, Brothers, Todd, and Baute, Robert. The Effect of a Rapid Response Team on Major Clinical Outcome Measures in a Community Hospital. *Critical Care Medicine*, 2007;35(9):2076-82.
34. Tolchin, S., Brush, R., Lange, P., Bates, P., Garbo, J. J., Tolchin, Sanford, Brush, Robert, Lange, Paul, Bates, Phyllis, and Garbo, John J. Eliminating Preventable Death at Ascension Health. *Joint Commission Journal on Quality & Patient Safety*, 2007;33(3):145-54.
35. Winters, B. D., Pham, J. C., Hunt, E. A., Guallar, E., Berenholtz, S., Pronovost, P. J., Winters, Bradford D., Pham, Julius Cuong, Hunt, Elizabeth A., Guallar, Eliseo, Berenholtz, Sean, and Pronovost, Peter J. Rapid Response Systems: a Systematic Review. *Critical Care Medicine*, 2007;35(5):1238-43.