

Granting Order-Writing Privileges to Registered Dietitian Nutritionists Can Decrease Costs in Acute Care Hospitals

MANY HEALTH CARE INSTITUTIONS are seeking to decrease the cost of providing safe, high-quality care because of changes in payment processes used by the Centers for Medicare and Medicaid Services (CMS) and other payers. Malnourished patients are at risk for poorer health outcomes, such as longer hospital length of stay, higher readmission rates, and increased mortality.^{1,2} This increases the cost of care; however, no corresponding increase occurs in payment from insurers. Granting nutrition-related order-writing privileges (OWPs) to registered dietitian nutritionists (RDNs) can help acute-care hospitals enhance the quality of care provided to malnourished patients, improve outcomes, and decrease the costs associated with this care. Documenting potential cost savings while demonstrating improved patient outcomes can build a persuasive case to expand the scope of privileges provided to RDNs. These cost savings may be realized in direct ways, such as reduced labor and supply costs, as discussed in the first section of this article, or in indirect ways, as described in the second section of this article.

This article was written by **Wendy Phillips, MS, RD, FAND**, certified nutrition support clinician, certified lactation educator, and division director of clinical support, Morrison Healthcare, St George, UT; and **Jennifer Doley, MBA, RD, FAND**, certified nutrition support clinician, regional clinical nutrition manager, Morrison Healthcare, Tucson, AZ, and dietetic internship director, Carondelet Health Network, Tucson, AZ.

<http://dx.doi.org/10.1016/j.jand.2016.06.009>

RDN OWPs: POTENTIAL REDUCTION IN DIRECT COSTS

Following the methodology provided by CMS in the February 7, 2013 *Federal Register*³ to estimate direct cost savings by OWP implementation may be one way to illustrate potential savings in one's own facility. When applying this methodology, one must understand the assumptions used by CMS in their own cost savings calculations. In 2012, 4,900 hospitals received reimbursement from CMS, with an average bed size of 165.³ CMS then made the following assumptions:

- Five percent of hospitals either had already granted OWPs to RDNs and, therefore, would not realize further cost savings, or would not grant privileges going forward.
- Although CMS cannot be certain how many hospitals will grant OWPs to RDNs, they assumed that at least 15% will.
- Therefore, the expectation was that 15% to 95% of hospitals would realize cost savings from implementation of OWPs for nutrition professionals.

Direct cost savings were assumed to be accomplished in two ways: reducing the expense of goods and services by avoiding inappropriate nutrition orders, such as inappropriate parenteral nutrition (PN), and reducing labor expenses by allowing professionals who are paid less per hour to write necessary orders and manage nutrition care.

Reducing Inappropriate PN Orders

The Academy of Nutrition and Dietetics (the Academy) provided CMS with evidence of cost savings from RDN OWPs by citing a study by Peterson and colleagues,⁴ in which a 613-bed hospital saved \$169,000 by reducing the use of

PN solutions, materials, and pharmacy labor because of RDNs having OWPs and ensuring PN was ordered appropriately. This study was published in 2010,⁴ but it used cost data from 2003, so CMS adjusted that data to 2012 figures based on the Consumer Price Index. Because the average bed size of CMS-funded hospitals is 165,³ this savings amount was adjusted to reflect an average savings per hospital of \$45,641. Assuming that 15% to 95% of the 4,900 hospitals would allow OWPs, expected annual savings range from \$33,546,135 to \$212,258,855 nationally. [Table 1](#) describes recommended steps for implementing a similar quality assurance/performance improvement program to track potential cost savings by following evidence-based guidelines to reduce inappropriate PN use.

In the example provided, the potential annual direct cost savings for reducing inappropriate PN by authorizing RDN OWPs is \$78,100.

Reducing Labor Expenses

In addition to the reduction in supplies and labor cited in the Peterson and colleagues study, CMS recognizes that additional time and salary savings would be realized if and when RDNs are provided the autonomy to write nutrition orders independently.³ Their methodology to determine this additional direct cost savings can be followed to estimate cost savings in other facilities. [Table 2](#) lists data necessary to replicate these calculations in another facility, with a column including assumptions made by CMS in their methodology.³ The information required for items 1 through 4 can be obtained from hospital administration, human resources, or the hospital finance department. The clinical nutrition department should track the information needed for rows 5 through 8 for a 3-month period and then calculate averages.

Table 1. Quality assurance/performance improvement (QAPI) steps to assess financial impact of inappropriate parenteral nutrition use

QAPI steps	Sample calculations
Step 1. Using evidence-based guidelines such as the ASPEN/SCCM ^a guidelines to determine appropriate use of PN, track the number of inappropriate PN days over a designated period (at least 3 months is recommended).	Step 1. Total inappropriate PN days based on RDN data collection—Month 1: 21 days, Month 2: 27 days, Month 3: 23 days; total for 3-month period=71 days
Step 2. Work with the pharmacy department to establish the cost per day of providing PN, including PN solution, pharmacist labor, bags, and tubing. Work with nursing administration to determine nursing labor costs and any other potential costs to administer PN.	Step 2. PN supplies—\$120/day, Pharmacist labor (salary + benefits for order review and compounding)—\$165, total cost \$285. Additional nursing labor to administer PN instead of oral or enteral nutrition (EN): 10 minutes/day=\$5 (salary and benefits). Total cost of all items=\$290/PN day.
Step 3. Determine how much it would have cost per day to feed the patient without PN (average patient meal costs/day are approximately \$15)	Step 3. Cost to provide EN or oral diets for each patient=\$15/day
Step 4. Subtract amount in step 3 from amount in step 2.	Step 4. \$290-\$15=\$275 net cost/day for inappropriate PN
Step 5. Multiply total inappropriate PN days by the costs per day in step 4 to determine a total cost for the 3-month period.	Step 5. 71 days×\$275/day=\$19,525 for 3-month period.
Step 6. Extrapolate this to an annual figure to determine estimated yearly savings.	Step 6. Extrapolate to 1 year: \$19,525×4=\$78,100

^aAmerican Society of Parenteral and Enteral Nutrition and the Society of Critical Care Medicine.³

In this methodology, time assumptions were made for writing orders for patients who were either nutritionally noncomplex or complex.³ The RDNs would not write all nutrition orders for every admitted patient, because not all patients are seen by the RDN; physicians and other licensed independent practitioners would write orders for patients not managed by the RDNs. Noncomplex dietary orders were described as “ordering and monitoring of laboratory tests, subsequent modifications to orders, and dietary orders for discharge/transfer/outpatient follow-up as needed.” More complex dietary orders were defined as those for Medical Nutrition Therapy “(for example, PN, tube feedings, patients with multiple comorbidities, transition of patient from parenteral to enteral feeding, and so forth), including ordering and monitoring of laboratory tests, subsequent modifications to orders, and dietary plans and orders for discharge/transfer/outpatient follow-up as needed.”³ Since 2011, when the Academy suggested these definitions to CMS, a new method for categorizing the complexity of patients has emerged from the Academy’s Dietetic Practice-Based Research Network.⁵ To be consistent

with this more recent literature, clinicians should use the definitions provided by the Dietetic Practice-Based Research Network in a recent analysis of inpatient acute-care staffing needs.⁶ High-complexity patients are considered those needing nutrition interventions that warrant frequent comprehensive reassessments, in which the RDN documents the impact of the interventions using evidence-based nutrition outcomes. Typically these patients have a chronic or complex disease state that impacts nutritional status, are receiving enteral nutrition or PN requiring frequent adjustments, or require comprehensive nutrition education and corresponding interventions.⁶ All other patients are considered “nutritionally stable” or noncomplex for the purposes of this cost calculation.

To determine the percentage of patients who are nutritionally complex, the RDNs can track the following three metrics over a given period: the number of patients seen, the number considered nutritionally complex per the above definition, and the number for whom they would have written a nutrition order. This information can be recorded as part of a departmental

productivity monitoring tool and evaluated at the end of the tracking period.

The calculations below explain how CMS arrived at an estimated savings of \$49,803,600 to \$315,422,800 per year, using the assumptions described in [Table 2](#).

- Minimum calculations based on assumptions that 15% of hospitals will allow OWPs for RDNs: (735 hospitals×5,600 inpatient hospital stays×0.17 hours for basic nutrition orders×\$44 per hourly wage difference)+(735 hospitals×1,400 inpatient hospital stays×0.42 hours for complex nutrition orders×\$44 per hourly wage difference)=\$49,803,600
- Maximum calculations based on assumptions that 95% of hospitals will allow OWPs for RDNs: (4,655 hospitals×5,600 inpatient hospital stays×0.17 hours for basic nutrition orders×\$44 per hourly wage difference)+(4,655 hospitals×1,400 inpatient hospital stays×0.42 hours for complex

Table 2. Data required to determine potential direct cost savings of registered dietitian nutritionists' (RDNs') order-writing privileges

Information needed	Assumptions made by Centers for Medicare and Medicaid Services (CMS)	Your facility
1. Average RDN salary+benefits	\$35/h ^a	
2. Average licensed independent practitioner (LIP) (physician, nurse practitioner, physician assistant) salary+benefits	\$79/h ^a	
3. Number of hospital stays per year	Average 7,000 per hospital ^b	
4. Average length of stay (LOS)	5 d ^b	
5. Percentage of patients considered nutritionally stable	80% (5,600 stays)	
6. Average number of minutes per 5 ^c -day admission spent by the LIP writing nutrition orders for nutritionally stable patients	8 min (0.17 h)	
7. Percentage of patients admitted that are considered nutritionally complex	20% (1,400 stays)	
8. Average number of minutes per 5 ^c -day admission spent by the LIP writing nutrition orders for nutritionally complex patients	25 (0.42 h)	

^aBased on national salary surveys cited by CMS.¹ The salary difference between the LIP and the RDN is \$44/h.

^bAmerican Hospital Association data, as cited by CMS in the February 7, 2013 *Federal Register*.

^cReplace with average LOS for your facility.

nutrition orders×\$44 per hourly wage difference)= \$315,422,800/year.

Therefore, the calculation for the individual hospital would be:

(# Inpatient hospital stays/year×percentage of stays requiring complex nutrition orders×time [in hours] to write complex nutrition orders)+(# Inpatient hospital stays/year×percentage of stays requiring basic nutrition orders×time [in hours] to write basic nutrition orders)×Average salary difference between RDNs and licensed independent practitioners (LIPs)=Potential cost savings/year.

Although they did not have the means to estimate additional cost savings, CMS acknowledged that further reductions in expenditures were likely because of improvement in other patient outcomes, possibly leading to decreased

LOS and fewer readmissions.^{3,7} RDNs are recognized as the health care providers most qualified to accurately identify and treat malnutrition. Allowing RDNs to independently write orders has been proved to increase the frequency and timeliness of critical nutrition therapies to treat and prevent malnutrition⁷; thus, RDN OWPs can potentially significantly reduce their hospital's costs through reductions in LOS and readmissions.

RDN OWPs: POTENTIAL REDUCTION IN INDIRECT COSTS

Several publications in recent years detail the RDN's impact on a hospital's financial status by increasing reimbursement through improved identification and documentation of malnutrition.⁸⁻¹¹ This practice, although important, does not make the case for implementation of RDN OWPs, because order writing is not necessary for either identification or documentation of malnutrition. However, OWPs do

significantly impact the ability of the RDN to effectively *treat* malnutrition, the next necessary step after diagnosis.

The first section of this article addressed how RDN OWPs can directly impact hospital costs by reducing the use of inappropriate and costly nutritional therapies, and by reducing labor costs of higher-paid practitioners who write nutrition orders. This second section addresses how RDN OWPs can affect hospital costs via improved patient outcomes. The following reasoning explains this link:

1. Malnutrition increases hospital costs because it results in a longer LOS^{1,12-16} and less reimbursement because of increased rates of readmission^{2,16-21} and hospital-acquired conditions (HAC).²²⁻³¹
2. Nutrition intervention is more effective at treating malnutrition than is standard care.³²⁻³⁴
3. RDN OWPs improve implementation of nutrition interventions by increasing the number, appropriateness, and timeliness of interventions implemented.^{7,35-38}

Providing evidence for each of these statements can help make a financial case for putting RDN OWPs into practice in an acute-care facility. Furthermore, collecting data from one's own facility can provide a more accurate estimate of the potential financial impact of OWPs.

COST OF MALNUTRITION

Malnutrition negatively impacts a number of clinical outcomes and thus indirectly affects health care costs.³⁹⁻⁴² Total LOS, intensive care unit LOS, readmission and mortality rates, and risk of falls, postsurgical infections, and pressure ulcer development are all higher in patients who are malnourished, creating a significant cost burden for the hospital.

Length of Stay

Table 3 summarizes results of recent studies examining the effect of malnutrition on LOS. Each study used validated tools for diagnosing malnutrition (Subjective Global Assessment) or identifying nutritionally at-risk patients (Nutrition Risk Screening-2002, or

Table 3. Malnutrition and length of stay (LOS)

Study	Malnutrition assessment tool	Patients	Hospital LOS	Intensive care unit LOS
Allard and colleagues, ¹³ 2015	SGA	n=1,015	Well-nourished—6 d Moderately malnourished—7 d Severely malnourished—9 d	
Coltman and colleagues, ¹⁴ 2015	SGA	n=294	Well-nourished—6.9 d Malnourished ^a —9.9 d	Well-nourished—3.7 d Malnourished ^a —5.4 d
Tangvik and colleagues, ¹⁵ 2014	NRS-2002	n=3,279	Not nutritionally at risk—5 d Nutritionally at risk—8.3 d	
Sheean and colleagues, ¹⁶ 2013	SGA	n=260	Well-nourished—8 d Malnourished ^a —11.3 d	Well-nourished—2.7 d Malnourished ^a —4.1 d
Lim and colleagues, ¹ 2012	SGA	n=818	Well-nourished—4.6 d Malnourished ^a —6.9 d	
Amaral and colleagues, ¹² 2007	NRS-2002	n=469	Not nutritionally at risk—7.6 d Nutritionally at risk—14.7 d	

^aIncludes those patients identified as moderately and severely malnourished.

NRS-2002). In all cases, nutritionally compromised patients were hospitalized for 2 to 3 days longer than their well-nourished counterparts, with the exception of those in the study conducted by Amaral and colleagues,¹² in which the LOS difference was greater than 7 days.

To estimate the cost of malnutrition related to a greater LOS in one's own facility, the hospital's average LOS, the total number of inpatients admitted in a given time frame, and the average cost for an inpatient day can be obtained from the finance department. If the hospital's cost per inpatient day is not available, an estimate may be used. In 2013, the estimated cost was \$2,289/d for nonprofit hospitals and \$1,791/d for for-profit hospitals in the United States.³⁹

Another parameter needed to estimate malnutrition-related LOS costs is the percentage of the total hospital population that is malnourished. To obtain this estimate, one of the two following methods can be used.

1. The clinical nutrition team records the number of patients they diagnose with malnutrition during a given time. That number is then divided by the total number of patients admitted during the same time. This method should be used only if a validated nutrition

screening tool is in place and used appropriately. Because RDNs do not see all patients, the assumption must be made that the patients the RDNs did *not* see were well nourished; this assumption cannot be made if a validated tool for detecting malnutrition risk is not used.

2. An alternative and simpler method is to use an estimate based on current literature. The percentage of malnourished inpatients varies widely by study, from 15% to 70%,¹³ because of an inconsistent definition of malnutrition and differing patient populations; however, most reviews cite an approximate prevalence of 30% to 50%.^{40,41} An approximate range (ie, 30% to 40%) can be used in the following calculations to provide an estimated LOS cost range.

Table 4 shows example calculations used to estimate costs related to the effect of malnutrition on LOS. Because malnutrition is often present on admission, and rapid RDN intervention will not necessarily resolve malnutrition during a short inpatient admission, granting RDNs OWP may not significantly affect LOS costs. However, because this estimation can illustrate to hospital administrators that

malnutrition contributes significantly to costs, it emphasizes the need for new strategies to decrease malnutrition rates, such as privileging RDNs to write nutrition-related orders.

Readmissions

Readmissions within 30 days of discharge have come under scrutiny in recent years because of changes in Medicare payment associated with the Affordable Care Act. Hospitals with high readmission rates for Medicare patients with specific conditions (acute myocardial infarction, heart failure, pneumonia, chronic obstructive pulmonary disease, and total hip or knee arthroplasties) face a 3% reduction in payment for all Medicare patients, not only readmitted patients.⁴² Because malnutrition has been associated with higher readmission rates in a wide variety of patient populations,^{1,2,17-21} it contributes a financial burden to the hospital via reduced Medicare reimbursement.

Hospital-Acquired Conditions

As of October 2008, Medicare does not pay hospitals for the cost to treat HACs, limiting reimbursement to only the standard payment for the principle DRG. Furthermore, Medicare payment is also reduced when hospitals have high overall rates of HACs, which

Table 4. Estimating costs due to malnutrition-related increased length of stay (LOS)

Information needed	Example hospital data
Total inpatients per year	7,000
Average LOS	4.5 d
Percentage of patients malnourished	30%
Steps	Example calculations
Calculate total patient days/year	$7,000 \times 4.5 = 31,500$ d
Calculate total malnourished and well-nourished patients/year	$7,000 \times 0.3 = 2,100$ malnourished $7,000 \times 0.7 = 4,900$ well-nourished
Assume well-nourished LOS (wLOS) is 2 d < malnourished LOS (mLOS)	$wLOS = mLOS - 2$
Total patient days = malnourished pt days + well-nourished patient days	$31,500 \text{ d} = (2,100 \times mLOS) + (4,900 \times wLOS)$
Calculate average mLOS and wLOS	$31,500 = 2,100 \text{ mLOS} + 4,900 (mLOS - 2)$ $31,500 = 2,100 \text{ mLOS} + 4,900 \text{ mLOS} - 9,800$ $41,300 = 2,100 \text{ mLOS} + 4,900 \text{ mLOS}$ $41,300 = 7,000 \text{ mLOS}$ $mLOS = 5.9$ d $wLOS = 3.9$ d
Calculate total malnourished days	$2,100$ malnourished pts $\times 5.9$ d = $12,390$ d
Assuming malnourished patients had been well-nourished, calculate difference in patient days	$12,390 - 2,100 (3.9 \text{ d}) = 12,390 - 8,190 = 4,200$ d
Calculate cost of extra days caused by malnutrition	$4,200 \times \$1,791 = \$7,522,200/\text{y}$ (for profit) $4,200 \times \$2,289 = \$9,613,800/\text{y}$ (nonprofit)

Table 5. Malnutrition and nosocomial infections

Study	Risk factor/ Patients assessment tool	Results
Thibault and colleagues, ²³ 2015	n=1,091 Intake \leq 70% of estimated needs	OR ^a 2.26
Mercadal-Orfila and colleagues, ²⁴ 2012	n=1,075 Nutritional risk (NRS-2002 score \geq 3)	OR 2.5 (respiratory) OR 1.8 (urinary)
Cosqueric and colleagues, ²⁵ 2006	n=101 Sarcopenia (DEXA ^b), >65 y of age	RR ^c 2.1
Schneider and colleagues, ²⁶ 2004	n=630 Well-nourished (NRI ^d) Moderately malnourished (NRI) Severely malnourished (NRI)	Prevalence 4.4% Prevalence 7.6% Prevalence 14.6%

^aOR=odds ratio.^bDEXA=dual-energy x-ray absorptiometry.^cRR=relative ratio.^dNRI=Nutrition Risk Index.

include pressure ulcers, postoperative wound dehiscence, central venous catheter-related bloodstream infections, and postoperative sepsis.²³ Participating hospitals in the lowest performing quartile have a 1% payment reduction for all Medicare discharges.

Because reduced immunity, increased incidence of infection, and delayed wound healing—complications associated with malnutrition—can contribute to four of the eight HACs, malnutrition can be reasonably assumed to reduce reimbursement via its effect on HAC prevalence. Tables 5 and 6 present study results confirming the link between malnutrition, infection rates, and pressure ulcer development.

Other Costs

The cost of a hospital stay for a malnourished patient has been reported to be approximately 20% to 38% greater than the cost for a well-nourished patient; however, in most studies this increase appears to be attributable to the longer LOS associated with malnutrition.^{1,12,15,43} The cost of care provided, regardless of LOS, may be higher because of complications related to malnutrition, which can increase utilization of health care provider labor, medications, medical equipment, and other resources.⁴¹ However, direct care costs associated with malnutrition are difficult to accurately determine because of the number of confounding factors involved in assessing this effect.

NUTRITION INTERVENTION: IMPACT ON MALNUTRITION

After making the case that malnutrition imposes a significant cost burden on the hospital, the argument must then be made that nutrition interventions are effective in treating malnutrition and nutrition-related outcomes. The following studies provide evidence of this link.

In a nonrandomized controlled trial,³² patients were screened for malnutrition using the Short Nutritional Assessment Questionnaire, and those identified as at risk were referred to the RDN and provided meals high in calories and protein. The control group received the usual care, were not routinely screened for nutrition status, and referral to the RDN only occurred by additional indication. Results of the

Table 6. Malnutrition and pressure ulcers

Study	Patients	Risk factor/ assessment tool	Odds ratio
Tsaousi and colleagues, ²⁷ 2015	n=471	Nutritional risk (MUST ^a score \geq 2)	3.8
Brito and colleagues, ²⁸ 2013	n=473	Moderate and severe malnutrition (SGA ^b)	10.5
Banks and colleagues, ²⁹ 2010	n=2,208	Moderate malnutrition (SGA) Severe malnutrition (SGA)	2.2 4.8
Shahin and colleagues, ³⁰ 2010	n=6,460	BMI ^c <18.5 Undesired weight loss 5%-10%	2.5 5.2
Compher and colleagues, ³¹ 2007	n=3,214	BMI \leq 18.5	1.8

^aMUST=Malnutrition Universal Screening Tool.

^bSGA=subjective global assessment.

^cBMI=bone marrow index.

study showed that the intervention group received an additional 600 calories and 12 g protein daily, and they had a mean total LOS that was 1.08 days shorter than that of the control group.³²

Rüfenacht and colleagues³³ examined the effect of RDN intervention on hospitalized malnourished patients both in the hospital and 2 months after discharge. Groups were randomized to receive an oral nutrition supplement (ONS), or ONS with RDN counseling and other individualized interventions. Although both groups showed increases in calorie and protein intake, the RDN intervention group was more likely to be meeting at least 75% of their calorie needs at discharge than the ONS group. Furthermore, the quality of life of the RDN intervention

Table 7. Improved outcomes as a result of registered dietitian nutritionist (RDN) order-writing privileges (OWPs)

Study	Parameters	Results
Imfeld and colleagues, ³⁵ 2012	Error rates for nutrition orders before and after RDNs granted access to electronic order entry n=1,305	15% error reduction after RDNs given order-writing access 39% reduction in time delay (from time order entered on paper chart to entry in computer)
Peterson and colleagues, ³⁶ 2010	Rate of inappropriate PN use	Pre RDN OWP: 46% inappropriate PN ^a use Post RDN OWP: 27% inappropriate PN use, 20% cost savings
Duffy and colleagues, ⁷ 2008	Outcomes for nutrition support patients with RDN-managed orders vs MD ^b -managed orders n=169	Hyperglycemia—PN 38% vs 95%, EN ^c 31% vs 42%, EN & PN 30% vs 100% Abnormal potassium—PN 14% vs 35%, PN & EN 16% vs 63% Abnormal phosphorus—PN 12% vs 45%, PN & EN 23% vs 68%
Younkman and colleagues, ³⁷ 2008	Time delay of implementation of RDN recommendations	Pre RDN OWP—only 47% of RDN recommendations were implemented, with a 17-h time delay Post RDN OWP—no time delay
Duffy and colleagues, ³⁸ 2007	Outcomes for nutrition support patients with RDN-managed orders vs MD-managed orders n=190	PN patients—RDN group had lower rate of hyperglycemia (>150 mg/dL) (23% vs 57%) EN patients—RDN group had lower incidence of gastric residuals >300 mL (6% vs 100%) PN & EN patients—RDN group had higher number of patients receiving \geq 85% of nutrition needs in 48 hours (65% vs 0%)

^aPN=parenteral nutrition.

^bMD=medical doctor.

^cEN=enteral nutrition.

group improved from discharge to 2 months post discharge, whereas the quality of life for the ONS group did not.³⁴ Although total cost of care and cost savings attributable to improved outcomes was not quantified, this study demonstrates the importance of RDN intervention to improve nutrition-related outcomes.

In another study of 259 patients, the intervention group received individualized nutritional treatment from an RDN during hospitalization and during three home visits after discharge, whereas the control group received standard care, or standard care and one RDN visit during hospitalization. Six months after hospitalization, the treatment group saw improvements in Mini Nutritional Assessment scores (a validated measure of nutrition risk) and lower mortality rates (3.8 vs 11.6%).³⁴ Again, although overall cost reductions were not directly measured, RDN intervention was proven to improve nutrition-related outcomes.

RDN OWPs: IMPROVED DELIVERY OF NUTRITION CARE

The final line of reasoning in the case for implementation of RDN OWPs is to show that OWPs improve the execution of nutrition-related orders. A number of studies have examined the impact of RDN OWPs on care delivery, showing improvements in patient outcomes, timeliness of care delivery, and reduced medical errors. Although most of these measures are difficult to quantify in terms of cost, improving these measures enhances the hospital's financial health, either through avoiding reductions in Medicare reimbursement (ie, by reducing HACs) or by increasing cost effectiveness of care (ie, by reducing LOS and having a lower-cost provider [RDNs] manage nutrition care). [Table 7](#) summarizes results of studies that assessed the impact of RDN OWPs on care delivery.

CONCLUSION

In granting hospitals the ability to give RDNs OWPs, CMS is acknowledging the critical role the RDN plays in the delivery of high-quality care with reduced costs in the hospital setting. Enhancing the ability of the RDN to implement evidence-based therapeutic nutrition interventions can significantly impact health outcomes, particularly in those

patients that are malnourished. RDN OWPs also can help hospitals realize direct cost savings as a result of reductions in health care provider labor and inappropriate use of nutritional therapies. Furthermore, improved outcomes translates into indirect cost savings via reductions in LOS and avoidance of Medicare payment penalties for high readmission and HAC rates.

Although the evidence presented in this article is not conclusive in establishing a link between RDN OWPs and cost savings, strategies for analyzing the financial benefit of RDN OWPs are presented as a basis to initiate further research on the effect of RDN OWPs on patient outcomes and costs.

References

1. Lim SL, Ong KC, Chan YH, et al. Malnutrition and its impact on cost of hospitalization, length of stay, readmission and 3-year mortality. *Clin Nutr.* 2012;31(3):345-350.
2. Felder S, Lechtenboehmer C, Bally M, et al. Association of nutritional risk and adverse medical outcomes across different medical inpatient populations. *Nutrition.* 2015;3(11-12):1385-1393.
3. Medicare and Medicaid Programs; Part II—Regulatory provisions to promote program efficiency, transparency, and burden reduction. *Fed Reg.* 2013;78:9216-9245.
4. Peterson SJ, Chen Y, Sullivan CA, et al. Assessing the influence of registered dietician order-writing privileges on parenteral nutrition use. *J Am Diet Assoc.* 2010;110:1702-1711.
5. White JV, Guenter P, Jensen G, et al. Consensus statement: Academy of Nutrition and Dietetics and American Society of Parenteral and Enteral Nutrition characteristics recommended for the identification and documentation of adult malnutrition (undernutrition). *J Parenter Enteral Nutr.* 2012;36:375-283.
6. Hand RK, Jordan B, DeHoog S, Pavlinac J, Abram JK, Parrot JS. Inpatient staffing needs for registered dietitian nutritionists in 21st Century Acute Care Facilities. *J Acad Nutr Diet.* 2015;115(6):985-1000.
7. Duffy JK, Gray RL, Roberts S, Glanzer SR, Longoria SL. Independent nutrition order writing by registered dietitians reduces complications associated with nutrition support. *J Am Diet Assoc.* 2008;108(suppl 1):A9.
8. Cobb B, Hardin E, Click A, Watson L. Customizing malnutrition documentation accelerates hospital revenue and RD value. *J Am Diet Assoc.* 2011;111(9 suppl):A77.
9. Bristol SE, Bashir A, Bursey J, et al. Identification and coding of malnutrition and obesity in an acute care setting. Abstract/Poster presented at annual conference for the Academy of Nutrition and Dietetics, October 2013.
10. Suarez J, Willcutts K, Phillips W. Accuracy of malnutrition documentation in the hospitalized adult: A retrospective analysis of four adult patient populations at the University of Virginia Medical Center. Abstract/poster presented at annual conference for the Virginia Academy of Nutrition and Dietetics, Fairfax, VA, April 12, 2016.
11. Phillips W, Willcutts K. Reducing missed opportunities for hospital revenue and impacts on the case mix index through a malnutrition coding initiative. Abstract/poster presented at the annual symposium for the Clinical Nutrition Manager's dietetic practice group of the Academy of Nutrition and Dietetics, Austin, TX, April 19, 2016.
12. Amaral TF, Matos LC, Tavares MM, et al. The economic impact of disease-related malnutrition at hospital admission. *Clin Nutr.* 2007;26:778-784.
13. Allard JP, Keller H, Jeejeebhoy KN, et al. Malnutrition at hospital admission—Contributors and effect on length of stay: A prospective cohort study from the Canadian Malnutrition Task Force. *J Parenter Enteral Nutr.* 2016;40(4):487-497.
14. Colman A, Peterson S, Roehl K, et al. Use of 3 tools to assess nutrition risk in the intensive care unit. *J Parenter Enteral Nutr.* 2015;39(1):28-33.
15. Tangvik RJ, Tell GS, Eisman JA, et al. The nutritional strategy: Four questions predict morbidity, mortality and health care costs. *Clin Nutr.* 2014;33:634-641.
16. Sheean PM, Peterson SJ, Chen Y, et al. Utilizing multiple methods to classify malnutrition among elderly patients admitted to the medical and surgical intensive care units (ICU). *Clin Nutr.* 2013;32(5):752-757.
17. Mullen MG, LaPar DJ, Daniel SK, Turrentine FE, Hanks JB, Smith PW. Risk factors for 30-day hospital readmission after thyroidectomy and parathyroidectomy in the United States: An analysis of National Surgical Quality Improvement Program outcomes. *Surgery.* 2014;156(6):1423-1430.
18. Zhang JQ, Curran T, McCallum JC, et al. Risk factors for readmission after lower extremity bypass in the American College of Surgeons National Surgery Quality Improvement Program. *J Vasc Surg.* 2014;59(5):1331-1339.
19. Fontes D, Generoso Sde V, Toulson Davisson Correia MI. Subjective global assessment: A reliable nutritional assessment tool to predict outcomes in critically ill patients. *Clin Nutr.* 2014;33(2):291-295.
20. Agarwal E, Ferguson M, Banks M, et al. Malnutrition and poor food intake are associated with prolonged hospital stay, frequent readmissions, and greater in-hospital mortality: Results from the Nutrition Care Day Survey 2010. *Clin Nutr.* 2013;32(5):737-745.
21. Kassin MT, Owen RM, Perez S, et al. Risk factors for 30-day readmissions among general surgery patients. *J Am Coll Surg.* 2012;215(3):322-330.
22. Centers for Medicare and Medicaid Services (CMS). Hospital-acquired condition reduction program fiscal year 2016 fact sheet. <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/HAC-Reduction-Program.html>. Accessed July 8, 2016.

23. Thibault R, Makhlof A-M, Kossovsky MP, et al. Healthcare-associated infections are associated with insufficient dietary intake: An observational cross-sectional study [published online April 29, 2015]. *PLoS One*. <http://dx.doi.org/10.1371/journal.pone.0123695>.
24. Mercadal-Orfila G, Lluch-Taltavull J, Campillo-Artero C, Torrent-Quetglas M. Association between nutritional risk based on the NRS-2002 test and hospital morbidity and mortality. *Nutr Hosp*. 2012;27(4):1248-1254.
25. Cosqueric G, Sebaq A, Ducolombier C, et al. Sarcopenia is predictive of nosocomial infection in care of the elderly. *Br J Nutr*. 2006;96(5):895-901.
26. Schneider SM, Veyres P, Pivrot X, et al. Malnutrition is an independent factor associated with nosocomial infections. *Br J Nutr*. 2004;92(1):105-111.
27. Tsaousi G, Stavrou G, Ioannidis A, et al. Pressure ulcers and malnutrition: Results from a snapshot sampling in a university hospital. *Med Princ Pract*. 2015;24(1):11-16.
28. Brito PA, de Vasconcelos Generoso S, Correia MI. Prevalence of pressure ulcers in hospitals in Brazil and association with nutritional status: A multi-center, cross sectional study. *Nutrition*. 2013;29(4):646-649.
29. Banks M, Bauer J, Graves N, Ash S. Malnutrition and pressure ulcer risk in adults in Australian health care facilities. *Nutrition*. 2010;26(9):896-901.
30. Shahn ES, Meijers JM, Schols JM, et al. The relationship between malnutrition parameters and pressure ulcers in hospitals and nursing homes. *Nutrition*. 2010;26(9):886-889.
31. Compher C, Kinoshian BP, Ratcliffe SJ, Baumgarten M. Obesity reduces the risk of pressure ulcers in elderly hospitalized patients. *J Gerontol A Biol Sci Med Sci*. 2007;62(11):1310-1312.
32. Kruizenga HM, Van Tulder MW, Seidell JC, et al. Effectiveness and cost-effectiveness of early screening and treatment of malnourished patients. *Am J Clin Nutr*. 2005;82(5):1082-1089.
33. Rufenacht U, Rühlin M, Wegmann M, et al. Nutritional counseling improves quality of life and nutrient intake in hospitalized undernourished patients. *Nutrition*. 2010;26:53-60.
34. Feldblum I, German L, Castel H, et al. Individualized nutritional intervention during and after hospitalization: The nutrition intervention study clinical trial. *J Am Geriatr Soc*. 2011;59(1):10-17.
35. Imfeld K, Keith M, Stoyanoff L, et al. Diet order entry by registered dietitians results in a reduction in error rates and time delays compared with other health professions. *J Acad Nutr Diet*. 2012;1656-1661.
36. Peterson SJ, Chen Y, Sullivan CA. Assessing the influence of registered dietitian order-writing privileges on parenteral nutrition use. *J Am Diet Assoc*. 2010;110(11):1703-1711.
37. Younkman JE, Guay-Berry P, Rotello L, et al. Improving the quality and timeliness of nutrition intervention through independent dietitian order writing in a community hospital. *J Am Diet Assoc*. 2008;108(9):A-86.
38. Duffy J, Gray RL, Roberts S, Cheng M. Independent nutrition order writing by registered dietitians improves patient outcomes. *J Am Diet Assoc*. 2007;107(8):A86.44.
39. Becker's Hospital Review. <http://www.beckershospitalreview.com/finance/average-cost-per-inpatient-day-across-50-states.html>. Accessed February 22, 2016.
40. Bosen BS, Maddox PJ, Ray N. A position paper on how cost and quality reforms are changing healthcare in America: Focus on nutrition. *J Parenter Enteral Nutr*. 2013;37(6):796-801.
41. Tappenden KA, Quatrara B, Parkhurst ML, et al. Critical role of nutrition in improving quality of care: An interdisciplinary call to action to address adult hospital malnutrition. *J Parenter Enteral Nutr*. 2013;37(4):482-497.
42. Centers for Medicare and Medicaid Services (CMS). Hospital Readmission Reductions Program. <https://www.cms.gov/medicare/medicare-fee-for-service-payment/acuteinpatientpps/readmissions-reduction-program.html>. Accessed March 26, 2016.
43. Chima CS, Barco K, Dewitt ML, et al. Relationship of nutritional status to length of stay, hospital cost and discharge status of patients hospitalized in the medicine service. *J Am Diet Assoc*. 1997;97(9):975-978.

DISCLOSURES**STATEMENT OF POTENTIAL CONFLICT OF INTEREST**

No potential conflict of interest was reported by the authors.

FUNDING/SUPPORT

No funding was received in preparation for this manuscript or any activities associated with it.