Enhancing Identification and Management of Hospitalized Patients Who Are Malnourished: A Pilot Evaluation of Electronic Quality Improvement Measures

Kenneth G. Nepple, MD, FACS; Conrad M. Tobert, MD; Angel F. Valladares, MPH; Kristi Mitchell, MPH; Martin Yadrick, MBI, MS, RDN, FAND

ABSTRACT
Malnutrition in hospitalized patients has long been recognized as a contributor to poor patient outcomes; malnutrition often leads to higher costs of care. Thus, it is important to improve the identification of patients who are at risk for malnutrition or already malnourished and to initiate treatment to optimize outcomes. The Malnutrition Quality Improvement Initiative (MQii) is based on a dual-pronged approach consisting of a set of four electronic clinical quality measures and a Quality Improvement Toolkit that support delivery of high-quality malnutrition care by clinicians including nurses, registered dietitian nutritionists, and physicians. A large pilot hospital validated the four malnutrition electronic clinical quality measures (screening for nutrition risk, assessment, care plan, diagnosis), demonstrating their value in support of continuous quality improvement for hospital-based malnutrition care with the ultimate goal of better patient outcomes while reducing health care costs.

THE PROBLEM: HIGH PREVALENCE OF MALNUTRITION IN HOSPITALIZED PATIENTS

THE PREVALENCE OF MALNUtrition reflects an important unaddressed need in patient care. From 20% to 50% of patients may be at risk for malnutrition or are malnourished upon hospital admission.[1-4] Due to inconsistent practices for risk identification and assessment, only 5% to 8% of inpatients are diagnosed with malnutrition during their hospital stay, when the actual incidence may be much higher.[5,6] There are still significantly disjointed processes with regard to malnutrition risk identification and diagnosis in the hospital that have limited the ability to capture the true at-risk and malnourished population.[7] Malnourished patients typically experience longer hospital stays and higher rates of mortality and readmissions.[8-10] This gap in the recognition of malnutrition is an opportunity to employ a quality improvement (QI) strategy. Nutrition-focused QI is expected to help change care processes in ways that can promote best practice for identification and treatment of malnourished patients. In fact, application of QI has recently been shown to yield better patient outcomes while reducing health care expenditures.[11-14]

SEEKING A SOLUTION: IMPLEMENTING MALNUTRITION-FOCUSED QI

The first step in optimizing malnutrition care is to identify patients at risk for malnutrition. Patients' clinical data can be accessed from their electronic health record (EHR), and such data can be used to identify those at risk for malnutrition. However, electronic clinical data alone—without specific quality metrics and guidelines for use—may fall short of recognition and management of malnourished patients.[15] These constraints limit the ability to meet evidence-based care standards and leverage the EHR in addressing gaps in care.[16] Therefore, a more integrated approach is needed to assist all clinicians on the interprofessional care team in capturing and leveraging clinical data for improved decision making and for delivering cost effective quality care.[17] The development of the Malnutrition Quality Improvement Initiative (MQii) is an innovative approach to overcoming these issues.[18] The MQii links standards of clinical nutrition practice with EHR technology. It also uses an online toolkit of resources to create an effective and efficient system to identify, treat or intervene, and continue to follow patients with malnutrition.

What Is MQii?

The MQii is a partnership between the Academy of Nutrition and Dietetics (Academy), Avalere Health, and other key stakeholders. The aim of the collaboration is to advance evidence-based, high-quality care for hospitalized older patients who are at

risk for malnutrition or are actually malnourished.[18]

The MQii offers clinicians the necessary tools—both measurement and clinical guidance—to leverage hospital EHR infrastructure and to achieve improvements in malnutrition care processes. The MQii provides (1) a set of four electronic clinical quality measures (eCQMs) and (2) the MQii Toolkit, a set of resources that guide implementation of process improvements to help all clinicians in the care team achieve high-quality care.[19]

The Nutrition Care Process and Workflow Elements: What Are Clinical Quality Measures and eCQMs?

The Centers for Medicare and Medicaid Services (CMS) develops standards and regulations that guide the delivery of safe, high-quality, effective health care. Providers receive financial incentives to demonstrate their performance on certain predetermined clinical quality measures that have been developed to ensure the health care delivered meets CMS requirements and regulations.[20]

The Health Information Technology for Economic and Clinical Health Act, enacted as part of the American Recovery and Reinvestment Act of 2009, set the framework to incentivize providers to implement EHRs.[21] CMS has since moved to develop regulations that promote electronic platforms for health information, including eCQMs, to help facilitate the measurement of health care quality in the digital age.[22,23] By 2016, hospitals were required to submit their performance on specific eCQMs as part of the CMS Inpatient Quality Reporting and EHR Incentive Program.[20]

In alignment with these CMS initiatives, the Academy, Avalere Health, and other key stakeholders developed the first-ever eCQMs for malnutrition care as part of the MQii. The malnutrition eCQMs were developed based on a substantive review of the literature and guidance from a technical expert panel (Figure 1). The eCQMs were unique, because they were among the first eCQMs specifically developed for an electronic platform, vs other quality measures that had been developed for different platforms and were then adapted to fit EHRs. The four eCQMs

eCQM	CMS MUC number	Measure description	Measure objective
#1	MUC16-294	Completion of a malnutrition screening within 24 h of admission	Patients aged≥18 received a malnutrition screening and results are documented in their medical record within 24 h of their admission to the hospital.
#2	MUC16-296	Completion of a nutrition assessment for patients identified as at risk for malnutrition within 24 h of a malnutrition screening	Patients aged≥65 who were identified to be at risk of malnutrition from a screening were provided a nutrition assessment within 24 h of the screening.
#3	MUC16-372	Nutrition care plan for patients identified as malnourished after a completed nutrition assessment	Patients aged≥65 who were assessed and found to be malnourished should also have a documented nutrition care plan in their medical record.
#4	MUC16-344	Appropriate physician vs dietitian documentation of a malnutrition diagnosis	Patients aged≥65 who were assessed and found to be malnourished should have a physician-confirmed diagnosis of malnutrition documented in their medical record to ensure care plan implementation and transfer of necessary medical information upon discharge.

Figure 1. Malnutrition evidence-based electronic clinical quality measures (eCQMs) that align with malnutrition care workflow. CMS=Centers for Medicare and Medicaid Services; MUC=measure under consideration.

were evidenced-based and aligned with the recommended approach to the interdisciplinary malnutrition care workflow.[24-27]

Real-World Testing of the Malnutrition eCQMs

Increased focus on health care quality and value has led to a proliferation of programs that rely on quality measure reporting to assess quality of care. Hospitals may be reporting as many as 1,600 quality measures for up to 49 different programs.[28] However, some hospitals have struggled to assess the net cost of reporting because of fragmentation across

hospital cost centers, volatility in reporting requirements, and the difficulty in measuring the impact of improved outcomes on finances.[29] However, parallel research with physician practices has reported heavy reporting burdens on administrators and staff who find that some tools and resources intended to help achieve optimal performance are impractical.[29] This is because many performance-incentive programs have specific requirements, but lack guidance on parallel improvements in clinical processes as has been demonstrated across various settings of care.[15,30] These constraints hamper the ability to implement quality

measures, meet evidence-based care standards, and leverage EHR technology for addressing gaps in care.[16] Therefore, new approaches are needed to assist clinicians in leveraging clinical data for improved decision making in delivering quality care.[17] Malnutrition care in the hospital is a specific gap area that can benefit from new approaches. The MQii was specifically designed as a new dual-pronged approach to implement measures and implementation tools that leverage a hospital's existing EHR. The goal is to achieve improvements in malnutrition care that result in reduced clinical practice variability and better patient outcomes, thus aligning with CMS standards.

It was important to conduct an initial pilot of the dual-pronged approach to establish "proof of concept" for the use of eCQMs for malnutrition care. The pilot would demonstrate how eCQMs could be operationalized in a real-world clinical setting. Selection criteria for a pilot institution included an established EHR system, a highly engaged physician champion, and expert clinical and informatics groups. Based on these criteria, a midwestern, 800-bed academic hospital, serving 36,000 patients annually, was selected as the pilot site.

In 2016, the hospital team participated in a multi-institutional MQii Learning Collaborative, which was a group of six hospitals exchanging best practices for MQii implementation. The pilot's main objectives were to determine the feasibility, reliability, and validity of the four malnutrition eCQMs. The testing approach was in accordance with guidance as outlined by the National Quality Forum[31] and the CMS Measures Management System Blueprint.[32] In addition, eCQM implementation, supported by the MQii Toolkit, was evaluated to improve the malnutrition care workflow process. The method for the development, optimization, and use of the MQii Toolkit is described elsewhere.[19] The results of the 2016-2017 evaluation of the malnutrition eCQMs are reported in this article. The institutional review board approval protocol number for this study is 201512716, from the University of Iowa Institutional Review Board IRB-01 Biomedical.

PILOTING THE MALNUTRITION eCQMs: FEASIBILITY, RELIABILITY, AND VALIDITY

The hospital MQii team, comprised of a physician, registered dietitian nutritionists (RDNs), nurses with clinical documentation improvement expertise, an informatics group, and report analyst, were all involved in mapping the hospital's existing malnutrition care workflow.

First, feasibility was assessed by mapping the malnutrition eCQM specifications to the hospital's EHR to ensure that the required deidentified patient-level data were captured for eCQM reporting. The feasibility review included a review of data availability and accuracy, ability to incorporate codes using a nationally accepted terminology standard, and workflow. Subsequently, reliability and validity testing were performed on patient-level data to determine how well the malnutrition eCQM measure specifications reliably and accurately reflected the data captured and reported from the hospital's EHR. This testing included evaluating the consistency between EHR data and data derived from chart abstraction (where trained chart abstractors collected data from the EHR).

The assessment of eCQM feasibility demonstrated that the hospital's EHR was able to capture the data for whether a nutrition screening and subsequent nutrition assessment had

Table 1. Reliability and validity testing results for critical data elements across four malnutrition eCQMs[a]—agreement between EHR[b] and chart abstraction

Data element name	% Agreement	Kappa statistic of reliability (95% CI)
Data elements with structured data for EHR extraction		
Completion of a malnutrition screening within 24 h of admission (eCQM #1)		
Completion of a malnutrition screening	100	1.0
Malnutrition screening within 24 h of admission	97	0.87 (0.81-0.93)
Malnutrition screening score	95	0.88 (0.84-0.92)
Completion of a nutrition assessment for patients identified as at risk for malnutrition within 24 h of a malnutrition screening (eCQM #2)		
Nutrition assessment	98	0.96
Nutrition assessment within 24 h of screening	92	0.46 (0.35-0.57)
Appropriate documentation of a malnutrition diagnosis (eCQM #4)		
Documentation of malnutrition diagnosis	89	0.28 (0.16-0.40)
Data element name	**% Agreement between chart abstractors[c]**	**Kappa statistic of reliability (95% CI)**
Data elements with only chart abstraction available		
Nutrition care plan for patients identified as malnourished after a completed nutrition assessment (eCQM #3)		
Nutrition care plan documented	83	0.58 (0.52-0.64)
Nutrition assessment findings	91	0.68 (0.61-0.75)

[a]eCQM=electronic clinical quality measure.

[b]EHR=electronic health record.

[c]Nutrition Care Plan Document and Assessment Findings were not available for electronic extract, % agreement is reported as agreement between independent chart abstractors.

been completed. Results for reliability and validity demonstrated acceptable scores for several critical data elements (Table 1). However, there was inconsistent reliability for data elements focused on the degree of malnutrition (ie, nutrition assessment findings) and the presence of a nutrition care plan. These data were limited to manual abstraction from the EHR because documentation was in an unstructured and nondiscrete format such as manual text entry. Thus, at the time of testing, eCQMs with data embedded in the EHR had higher levels of reliability and validity than those that required manual chart abstraction.

After completing reliability and validity testing, the hospital MQii team explored whether the measurement of malnutrition care processes using the four malnutrition eCQMs could identify opportunities for process improvement. To accomplish this step, the performance data on the four malnutrition eCQMs were analyzed, and performance scores were calculated, revealing several gaps in clinical nutrition care processes (Table 2).

PROCESS IMPROVEMENTS

Process improvements, focusing primarily on the three largest gap areas—malnutrition screening, nutrition assessment, and physician documentation of malnutrition diagnosis—were then implemented using the resources available in the MQii Toolkit to educate the staff and modify how information was documented in the EHR.

Malnutrition Screening (eCQM#1)

For eCQM #1, 472 patients (17.1%) were missing a documented nutrition screening in their medical record. Of those who were screened, 1,949 patients (70.7%) met the quality measure criteria of screening within 24 hours and 335 patients (12.2%) were screened, but not within 24 hours. The screening workflows were subsequently assessed, revealing disparate screening practices taking place between patients in intensive care units (ICU) and non-ICU patients. Because the hospital's EHR system captured ICU and non-ICU screenings separately, the true proportion of patients being screened was not reflected in the

original calculation of eCQM #1 performance. This gap was addressed by aligning the screening workflows, beginning with the data capture to improve the screening rate reflected by eCQM #1. The data capture process was revised to reflect inclusion of screened patients admitted directly to the ICU. Subsequently, a revised data extraction demonstrated that the eCQM #1 performance rate improved to 90.5% ($P<0.01$).

Nutritional Assessment (eCQM#2)

The implementation of eCQM #2 highlighted gaps in prompt nutrition assessment and in data collection for the individual components of the nutrition assessment. Specifically related to the latter, approximately 67.9% of patients (n=346) were assessed after being found "at risk" for malnutrition. Observation notes for these patients were extracted, and the severity of malnutrition was identified. Malnutrition severity scores for the patients assessed were 28.6% severe; 14.7% moderate; 7.8% mild; 37.9% "at risk" but not malnourished; and 11.0% not malnourished or at risk. Overall, 19.5% of patients ≥age 65 years were identified as either mildly, moderately, or severely malnourished.

The hospital's EHR did not contain assessment data elements indicating malnutrition severity, nor did it allow RDNs to document the presence of the six clinical characteristics of malnutrition.[33] To facilitate this improvement, the documentation of the six characteristics was modified to use binary (yes or no) discrete and structured data elements. Furthermore, additional data elements mapped to the Malnutrition International Classification of Diseases, 10th revision code set were incorporated to document malnutrition.[34] These modifications increased physician awareness of patient malnutrition status, enhancing the overall continuity of care among clinicians, and assisted in the identification and coding of a malnutrition diagnosis.

Nutrition Care Plan (eCQM#3)

Testing of the nutrition care plan data element demonstrated inconsistent reliability, revealing a need for better discrete and structured documentation of care plan data. Improvements to the

---

Table 2. Baseline eCQM[a] performance scores for pilot hospital

Measure title (eCQM #)	Measure denominator	Measure numerator	Performance rate (%)[b]
1: Completion of a malnutrition screening within 24 h of admission	2,756	1,949	70.7
2: Completion of a nutrition assessment for patients identified as at risk for malnutrition within 24 h of a malnutrition screening	346	98	28.3
3: Nutrition care plan for patients identified as malnourished after a completed nutrition assessment[b]	32	27	84.4
4: Appropriate physician documentation of a malnutrition diagnosis[c]	32	18	56.3

[a]eCQM=electronic clinical quality measure.

[b]Performance rates reflect baseline scores prior to process improvements reported later in the article.

[c]Measure calculation is based off a chart abstracted sample and not representative of the entire hospital's performance, but of the 200 records that were reviewed for abstraction; the data required for full electronic report were not available in the format necessary to report a hospital-wide performance rate.

malnutrition care workflow did not include changes to the nutrition care plan component that were not prioritized at the time of the pilot given the high-performance rate demonstrated by chart abstraction.

Malnutrition Diagnosis (eCQM#4)

One major limitation in identifying the prevalence of a malnutrition diagnosis during a hospital stay is the variability in where physicians document a malnutrition diagnosis in the medical record. A malnutrition diagnosis may be documented in an electronic medical problem list, which is readily captured by eCQM measurement, or documented in a text format, which is not readily available for eCQM measurement. Initial performance on eCQM #4 was 56.3%, which represented the number of patients who had a malnutrition diagnosis documented on their problem list when malnutrition was identified by the RDN in the patient's nutrition assessment. Subsequently, the hospital now encourages the diagnosis of malnutrition to be added to the patient's problem list, if the diagnosis is supported by a nutrition assessment completed by the RDN and confirmed by physician's assessment. This electronic capture of nutrition assessment data has improved the identification of malnutrition by physicians and enhanced their clinical decision making and management of malnutrition.

Overall, the hospital has engaged in cyclic reiterative process improvement initiatives since 2014 to close process gaps in malnutrition evaluation and improve the accuracy of malnutrition assessment. Involvement in piloting the eCQMs from 2016 to 2017 has helped to sustain improvements over time in the diagnosis of malnutrition (Figure 2). As malnutrition knowledge and socialization of the improved process continues to spread throughout the hospital, these numbers may continue to improve. The rate for fiscal year 2018 already surpasses the 8% figure reported in the most recent national surveillance numbers.[6]

PRACTICE APPLICATIONS

The findings indicate that a dual-pronged approach consisting of the suite of validated malnutrition eCQMs, complemented by the MQii Toolkit, can help clinicians understand performance measured by clinical metrics and implement improvements in a rapid-cycle approach. Rapid-cycle QI allows for multiple improvements within a brief period to achieve a much broader goal and sustain those achievements.[35] The clinically meaningful eCQMs quantified the existing gaps in care at the pilot site, and the MQii Toolkit included the means for achieving improvements.

This pilot evaluation supports the evidence demonstrating the value of continuous monitoring of clinical

practice improvement, accompanied by meaningful eCQMs for QI.[17,36] Pilot evaluation findings are also consistent with previous studies identifying that actionable assessments of EHR-sourced quality data require guidance on QI strategies and technical support for proper implementation.[36-41] In turn, implementation success is dependent on effectively staffed interdisciplinary teams with expertise in malnutrition assessment, clinical documentation, EHR workflows, and coding terminologies important for quality reporting.[42] As seen in the pilot evaluation, process improvements may enhance clinical documentation practices to facilitate better monitoring and tracking of at-risk and malnourished patients and to solidify a hospital malnutrition workflow with the potential of lessening the burden of malnutrition reporting efforts. The evaluation was not designed to measure direct impact on patient outcomes, but this could be an area for further follow-up and study.

The long-established lack of clinical awareness of the problem of malnutrition among hospitalized patients continues to be a major gap in quality of care.[6,43] Lack of meaningful quality measurement in malnutrition diminishes the ability to determine to what extent malnutrition best practices are employed in the hospital. For example, The Joint Commission has incorporated standards requiring accredited hospitals to have an established process and criteria for screening, assessment, and development of nutrition plans.[44] However, there is evidence that these standards have not resulted in the consistent adoption of recommended processes for malnutrition care including identification and proper documentation to facilitate treatment.[45] Therefore, the validated eCQMs complemented by the MQii Toolkit can serve as useful tools to help clinicians achieve clinically meaningful quality metrics by filling gaps in existing workflows. Health care policy decision makers should consider this framework when developing new initiatives to address health care value through the improvement of patient outcomes and reduced health care costs across care settings.

The findings may help address challenges hospitals and clinicians face in complying with some of the major areas of QI emphasized by Medicare in
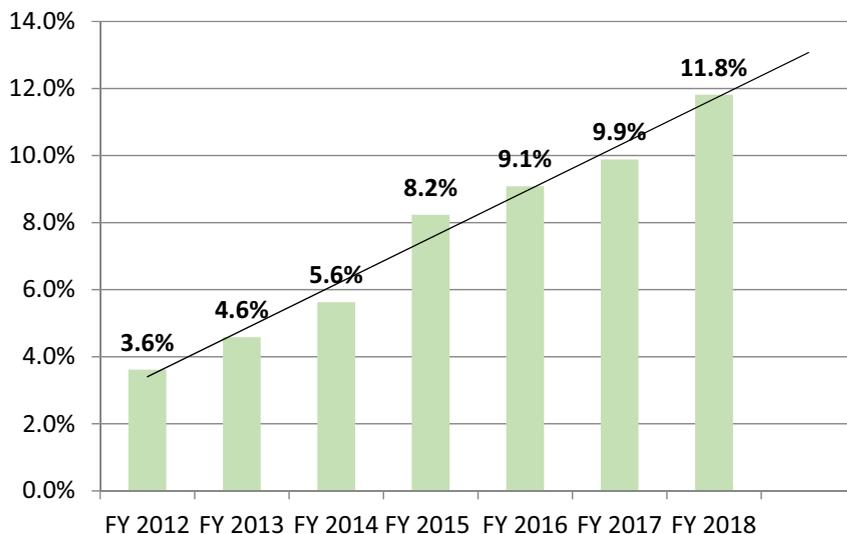
Figure 2. Rate of adult malnutrition identified after inpatient admission. FY=fiscal year.

its National Quality Strategy[23] and in various quality reporting programs. There is evidence that newly implemented value-based payment models and payment reforms are stimulating investments in health information technology to support the shift to patient-centered and outcomes-driven health care.[40] Notably, CMS included clinical practice improvement activities as a category in the Merit-Based Incentive Payment System.[46] The implementation of advanced quality- and value-based programs has spurred the integration of health system data across care settings to track quality of care and facilitate better population health management.[47] As a result, there is an increased focus on care transitions and coordination across care settings to improve patient outcomes and reduce costs and resource utilization.[48,49] Thus, there is an opportunity for expansion of the MQii beyond acute care.

CONCLUSIONS

The dual-pronged approach using the four validated eCQMs and the supporting MQii Toolkit may be a valuable strategy to support clinicians and interprofessional care teams with implementing clinically meaningful metrics and QI projects focused on achieving quality objectives for malnutrition care. Integrating the hospital malnutrition workflow using the MQii recommended process has the potential to lessen the burden of malnutrition reporting and, most importantly, to improve nutrition care for all patients.

References

1. Barker LA, Gout BS, Crowe TC. Hospital malnutrition: Prevalence, identification and impact on patients and the healthcare system. *Int J Environ Res Public Health*. 2011;8(2):514-527.
2. 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. *JPEN J Parenter Enteral Nutr*. 2016;40(4):487-497.
3. Norman K, Pichard C, Lochs H, Pirlich M. Prognostic impact of disease-related malnutrition. *Clin Nutr*. 2008;27(1):5-15.
4. Ruiz AJ, Buitrago G, Rodriguez N, et al. Clinical and economic outcomes associated with malnutrition in hospitalized patients. *Clin Nutr*. 2019;38(3):1310-1316.
5. Tobert CM, Mott SL, Nepple KG. Malnutrition diagnosis during adult inpatient hospitalizations: Analysis of a multi-institutional collaborative database of academic medical centers. *J Acad Nutr Diet*. 2018;118(1):125-131.
6. Barrett ML, Bailey MK, Owens PL. Non-maternal and non-neonatal inpatient stays in the United States involving malnutrition, 2016. U.S. Agency for Healthcare Research and Quality. https://www.hcup-us.ahrq.gov/reports/HCUPMalnutritionHospReport_083018.pdf. Published August 30, 2018. Accessed February 1, 2019.
7. Patel V, Romano M, Corkins MR, et al. Nutrition screening and assessment in hospitalized patients: A survey of current practice in the United States. *Nutr Clin Pract*. 2014;29(4):483-490.
8. Fingar KR. (Truven Health Analytics), Weiss AJ (Truven Health Analytics), Barrett ML (M.L. Barrett, Inc.), Elixhauser A (AHRQ), Steiner CA (AHRQ), Guenter P (American Society for Parenteral and Enteral Nutrition), Brown MH (Baxter International, Inc.). All-cause readmissions following hospital stays for patients with malnutrition, 2013. HCUP Statistical Brief #218. Rockville, MD: Agency for Healthcare Research and Quality. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb218-Malnutrition-Readmissions-2013.pdf. Published December 2016. Accessed February 1, 2019.
9. Lim SL, Ong KC, Chan YH, Loke WC, Ferguson M, Daniels L. Malnutrition and its impact on cost of hospitalization, length of stay, readmission and 3-year mortality. *Clin Nutr*. 2012;31(3):345-350.
10. Hudson L, Chittams J, Griffith C, Compher C. Malnutrition identified by Academy of Nutrition and Dietetics/American Society for Parenteral and Enteral Nutrition is associated with more 30-day readmissions, greater hospital mortality, and longer hospital stays: a retrospective analysis of nutrition assessment data in a major medical center. *JPEN J Parenter Enteral Nutr*. 2018;42(5):892-897.
11. Silver HJ, Pratt KJ, Bruno M, Lynch J, Mitchell K, McCauley SM. Effectiveness of the malnutrition quality improvement initiative on practitioner malnutrition knowledge and screening, diagnosis, and timeliness of malnutrition-related care provided to older adults admitted to a tertiary care facility: A pilot study. *J Acad Nutr Diet*. 2018;118(1):101-109.
12. Sriram K, Sulo S, VanDerBosch G, et al. Nutrition-focused quality improvement program results in significant readmission and length of stay reductions for malnourished surgical patients. *JPEN J Parenter Enteral Nutr*. 2018;42(6):1093-1098.
13. Sriram K, Sulo S, VanDerBosch G, et al. A comprehensive nutrition-focused quality improvement program reduces 30-day readmissions and length of stay in hospitalized patients. *JPEN J Parenter Enteral Nutr*. 2017;41(3):384-391.
14. Sulo S, Feldstein J, Partridge J, Schwander B, Sriram K, Summerfelt WT. Budget impact of a comprehensive nutrition-focused quality improvement program for malnourished hospitalized patients. *Am Health Drug Benefits*. 2017;10(5):262-270.
15. McCullough CM, Wang JJ, Parsons AS, Shih SC. Quality measure performance in small practices before and after electronic health record adoption. *eGEMs (Generating Evidence & Methods to improve patient outcomes)*. 2015;3(1):1. https://doi.org/10.13063/2327-9214.1131.
16. Riahi S, Fischler I, Stuckey MI, Klassen PE, Chen J. The value of electronic medical record implementation in mental health care: A case study. *JMIR Med Inform*. 2017;5(1):e1.
17. Schmajuk G, Yazdany J. Leveraging the electronic health record to improve quality and safety in rheumatology. *Rheumatol Int*. 2017;37(10):1603-1610.
18. Academy of Nutrition and Dietetics. Malnutrition Quality Improvement Initiative. http://malnutritionquality.org. Published 2016. Updated 2018. Accessed May 9, 2019.
19. Fitall E, Pratt KJ, McCauley SM, et al. Improving malnutrition in hospitalized older adults: The development, optimization, and use of a supportive toolkit. *J Acad Nutr Diet*. 2019;119(9 Suppl 2):S25-S31.
20. Doley J, Phillips W, Talaber J, Leger-LeBlanc G. Early implementation of malnutrition clinical quality metrics to identify institutional performance improvement needs. *J Acad Nutr Diet*. 2019;119(4):547-552.
21. US Department of Health and Human Services. Health information privacy: HITECH act enforcement interim final rule. https://www.hhs.gov/hipaa/for-professionals/special-topics/hitech-act-enforcement-interim-final-rule/index.html. Updated June 16, 2017. Accessed March 17, 2019.
22. US Department of Health and Human Services. Centers for Medicare and Medicaid Services. CMS quality strategy-meaningful measures framework. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityInitiativesGenInfo/CMS-Quality-Strategy.html. Published 2017. Accessed April 2, 2019.
23. US Department of Health and Human Services. eCQI Resource Center. Eligible Hospital / Critical Access Hospital eCQMs. https://ecqi.healthit.gov/eligible-hospital/critical-access-hospital-ecqms. Updated May 6, 2019. Accessed May 9, 2019.
24. Tappenden KA, Quatrara B, Parkhurst ML, Malone AM, Fanjiang G, Ziegler TR. Critical role of nutrition in improving quality of care: an interdisciplinary call to action to address adult hospital malnutrition. *JPEN J Parenter Enteral Nutr*. 2013;37(4):482-497.
25. Academy of Nutrition and Dietetics Quality Management Committee. Academy of Nutrition and Dietetics: Revised 2017 Standards of practice in nutrition care and standards of professional performance for registered dietitian nutritionists. *J Acad Nutr Diet*. 2018;118(1):132-140.e115.
26. Academy of Nutrition and Dietetics Quality Management Committee.

Academy of Nutrition and Dietetics: Revised 2017 scope of practice for the registered dietitian nutritionist. *J Acad Nutr Diet*. 2018;118(1):141-165.

27. Swan WI, Vivanti A, Hakel-Smith NA, et al. Nutrition Care Process and Model update: Toward realizing people-centered care and outcomes management. *J Acad Nutr Diet*. 2017;117(12):2003-2014.

28. Murray KR, Hilligoss B, Hefner JL, McAlearney AS, VanBuren A, Huerta TR, Moffatt-Bruce S. The quality reporting reality at a large academic medical center: Reporting 1600 unique measures to 49 different sources. *Int J Acad Med*. 2017;3(1):10-15.

29. Pham HH, Coughlan J, O'malley AS. The impact of quality-reporting programs on hospital operations. *Health Aff (Millwood)*. 2006;25(5):1412-1422.

30. Fontil V, Lyles CR, Schillinger D, et al. Safety-net institutions in the US grapple with new cholesterol treatment guidelines: A qualitative analysis from the PHoENIX Network. *Risk Manag Healthc Policy*. 2018;11:99-108.

31. National Quality Forum. Measure evaluation criteria and guidance for evaluating measures for endorsement. http://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=88439. Published September 2018. Accessed May 9, 2019.

32. US Department of Health and Human Services. Centers for Medicare and Medicaid Services. CMS Measures Management System Blueprint v14.1. http://cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/MMS/MMS-Blueprint.html. Revised February 2019. Accessed March 5, 2019.

33. White JV, Guenter P, Jensen G, et al. Consensus statement of the Academy of Nutrition and Dietetics/American Society for Parenteral and Enteral Nutrition: characteristics recommended for the identification and documentation of adult malnutrition (undernutrition). *J Acad Nutr Diet*. 2012;112(5):730-738.

34. International Classification of Diseases, 10th Revision. https://icd10coded.com. Accessed March 16, 2019.

35. Wofford JL, Campos CL, Jones RE, Stevens SF. Real-time patient survey data during routine clinical activities for rapid-cycle quality improvement. *JMIR Med Inform*. 2015;3(1):e13.

36. Sutherland SM, Goldstein SL, Bagshaw SM. Leveraging big data and electronic health records to enhance novel approaches to acute kidney injury research and care. *Blood Purif*. 2017;44(1):68-76.

37. Bunce AE, Gold R, Davis JV, et al. "Salt in the wound": safety net clinician perspectives on performance feedback derived from EHR data. *J Ambul Care Manage*. 2017;40(1):26-35.

38. Ratwani R, Fairbanks T, Savage E, et al. Mind the gap. A systematic review to identify usability and safety challenges and practices during electronic health record implementation. *Appl Clin Inform*. 2016;7(4):1069-1087.

39. Silver SA, McQuillan R, Harel Z, et al. How to sustain change and support continuous quality improvement. *Clin J Am Soc Nephrol*. 2016;11(5):916-924.

40. Wang JJ, Sebek KM, McCullough CM, et al. Sustained improvement in clinical preventive service delivery among independent primary care practices after implementing electronic health record systems. *Prev Chronic Dis*. 2013;10:E130.

41. Kaplan HC, Brady PW, Dritz MC, et al. The influence of context on quality improvement success in health care: A systematic review of the literature. *Milbank Q*. 2010;88(4):500-559.

42. Cifuentes M, Davis M, Fernald D, Gunn R, Dickinson P, Cohen DJ. Electronic health record challenges, workarounds, and solutions observed in practices integrating behavioral health and primary care. *J Am Board Fam Med*. 2015;28(Suppl 1):S63-S72.

43. Butterworth CE Jr. The skeleton in the hospital closet. *Nutr Today*. 1974;9(2):4-8.

44. Accreditation JC. Comprehensive Accreditation Manual 2019, CAMH for Hospitals Effective January 1, 2019: Standards Elements of Performance Scoring Accreditation Policies. Oak Brook, IL: Joint Commission; 2018.

45. Porter Starr KN, McDonald SR, Bales CW. Nutritional vulnerability in older adults: A continuum of concerns. *Curr Nutr Rep*. 2015;4(2):176-184.

46. Medicare Program; CY 2018 Updates to the Quality Payment Program (CMS-5522-P), 82 FR 30010 (June 30, 2017) (42 CFR § 414).

47. Schneider EC, Hall CJ. Improve quality, control spending, maintain access—Can the merit-based incentive payment system deliver? *N Eng J Med*. 2017;376(8):708-710.

48. Berkowitz SA, Ishii L, Schulz J, Poffenroth M. Academic medical centers forming accountable care organizations and partnering with community providers: The experience of the Johns Hopkins Medicine Alliance for Patients. *Acad Med*. 2016;91(3):328-332.

49. McConnell KJ, Renfro S, Lindrooth RC, Cohen DJ, Wallace NT, Chernew ME. Oregon's Medicaid reform and transition to global budgets were associated with reductions in expenditures. *Health Aff (Millwood)*. 2017;36(3):451-459.

AUTHOR INFORMATION

K. G. Nepple is a clinical associate professor and C. M. Tobert is a resident, Department of Urology, University of Iowa Hospitals and Clinics, Iowa City. A. F. Valladares is senior manager and K. Mitchell is senior vice president, The Center for Healthcare Transformation, Avalere Health, Washington, DC. M. M. Yadrick is director of nutrition informatics, Computrition, Inc, West Hills, CA.

Address correspondence to: Angel F. Valladares, MPH, Avalere Health, 1350 Connecticut Avenue, Suite 900, Washington, DC 20036. E-mail: avalladares@avalere.com