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## Commentary

### Addressing Malnutrition in Cancer Care with Nutrition-Focused Quality Improvement Programs (QIPs) that Support Value-based Payment in the United States

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#### Abstract

It is well documented that malnutrition or its risk poses a significant burden on the health and economic outcomes of hospitalized patients and those receiving care in post-acute care settings. Patients with cancer, especially older adults, are at particular risk. Nutrition-focused quality improvement programs (QIPs) can enhance identification and management of patients who are malnourished or at risk for malnutrition and yield significant improvements in health and economic outcomes. For example, a secondary analysis of at-risk/malnourished cancer patients in a hospital-based, comprehensive nutrition-focused QIP documented significant reductions in 30-day readmission rates and lengths of stay, resulting in potential cost savings of over \$3,800 per patient. With 90% of cancer care in the United States (US) delivered outside the hospital there is a critical need for nutrition-focused QIPs across the care continuum. QIPs can also contribute to value-based quality programs and metrics, such as those of the US Medicare program that focus on improving care for individuals and populations as well as lowering costs. However, to date, there has been a void of nutrition-focused QIPs specific to cancer care. This Commentary describes the issue of malnutrition in cancer, outlines how nutrition-focused QIPs can be developed and provides examples of two QIPs that included a cancer patient population; and finally identifies how nutrition-focused QIPs can align to support current and evolving US value-based payment programs.

**Keywords:** Malnutrition, Cancer, Nutrition-focused quality improvement programs, Value-based payment

## Introduction

It is well documented that malnutrition, specifically protein calorie malnutrition, poses a significant burden on the health and economic outcomes of hospitalized patients and those receiving care in post-acute settings [1]. Patients with cancer are at particular risk [2] and older adults with a cancer diagnosis remain one of the populations most under diagnosed with malnutrition [3]. The under diagnosis of malnutrition in cancer is of concern because there is strong evidence of an association between poor nutrition and decreased tolerance to radiation and chemotherapy treatment, increased length of hospital stay, lower quality of life, and higher mortality [4]. One way to help better the processes for identifying and treating malnutrition is through the development and implementation of a nutrition-focused quality improvement program (QIP) [5]. QIPs can also contribute to value-based quality programs and metrics that focus on improving care for individuals and populations as well as lowering costs, particularly for the United States (US) Medicare program. However, to date, there has been a void of nutrition-focused QIPs in cancer care [6]. This Commentary describes the issue of malnutrition in cancer, outlines the opportunity for and gives two examples of nutrition-focused QIPs that include oncology patient populations, and finally explains how such nutrition-focused QIPs may help support the framework of current and evolving value-based payment programs in the US.

## Malnutrition and Cancer

Cancer--even at an early stage--can result in many biological changes that lead to malnutrition, especially weight and muscle loss. Up to 64% of patients with cancer may lose more than 20 pounds in the 6 months prior to their actual cancer diagnosis [7] and 20-70% of patients with cancer have low muscle mass [8]. Malnutrition can be difficult to detect but is no less prevalent in overweight or obese patients. An estimated 40-60% of newly diagnosed cancer patients are overweight or obese [9-12], 62% of these will develop cancer-associated malnutrition [11], and 15-36% of overweight or obese patients with cancer have low muscle mass [13].

Negative health outcomes associated with muscle loss include treatment toxicity, poor response to treatment, medical complications, physical disability, and ultimately shortened survival [2]. The good news is that early identification and diagnosis of malnutrition and effective nutrition interventions such as oral nutritional supplements have been found to alleviate

the burden of malnutrition and its risk [14]. Meeting nutrition needs before and during treatment may help decrease hospital length of stay, decrease treatment completion rates, manage side effects, reduce readmission rates, and improve patient quality of life [15]. Globally, evidence-based guidelines and recommendations on nutrition in cancer continue to be developed and refined, underscoring its significance, although nutrition is still lacking in many US oncology care standards and guidelines [6]. One way to help improve this for the US is through the development and implementation of nutrition-focused QIPs and outlining how such QIPs can support US value-based payment programs.

## The Opportunity for Nutrition-Focused Quality Improvement Programs (QIPs) in Cancer Care

The goal of a QIP is to identify how care processes, such as identification of and intervention for malnutrition in cancer care, can be improved to benefit both the patient and healthcare system. While QIP models can vary in their approach and methods, all are based on the concept that quality improvement is a systematic, continuous activity leading to measurable improvements in services and health status of the targeted patient population. Specifically, a care process that needs improvement is identified, process changes are implemented, ongoing issues are addressed, and further changes are made to refine the targeted patient care process. Teams may go through this cycle multiple times until they finally arrive at a process change that is the most effective in delivering the desired result [16].

One of the more common quality improvement models in US healthcare is the Model for Improvement (MFI) developed nearly 25 years ago. The MFI uses a rapid cycle process called Plan-Do-Study-Act (PDSA) to test the effects of small changes in processes, formalize them, and then ultimately sustain the effective process changes over time and spread them throughout an organization, and/or across different settings of care [16]. Development and implementation of QIPs in nutrition care has been more recent. The Malnutrition Quality Improvement Initiative (MQii) began in 2013, and it provides an online, interdisciplinary toolkit and support programs based on the PDSA cycle [5]. The MQii has demonstrated that implementing a hospital-based malnutrition QIP can enhance identification and management of patients who are malnourished [17].

There are few if any published studies on nutrition-focused QIPs in cancer care [6]. This presents a real opportunity to use programs such as the MQii and other QIP models to develop

nutrition-focused QIPs targeting malnutrition in cancer care. For example, a secondary analysis of at-risk/malnourished cancer patients in a hospital-based, comprehensive nutrition-focused QIP documented statistically significant reductions in 30-day readmission rates and lengths of hospital stay (Table 1) [18]. These reductions were estimated to result in potential cost savings of over \$3,800 per patient [19]. In another example of the opportunity for nutrition-focused QIPs in cancer care, the same research team studied the impact of a similar QIP (Table 2) on patients receiving home healthcare post discharge from the hospital, skilled nursing facility, or after they were seen in an outpatient clinic. A large percentage of the QIP patient study population had cancer. Significant reductions in 90-day hospitalizations, overall healthcare resource use (e.g., hospitalization, emergency department (ED) and outpatient visits) and cost savings of \$1,500 per patient were observed [20]. These examples illustrate how a nutrition-focused QIP can both improve health and provide economic benefits in acute care as well as post-acute care settings for patients with cancer who are at-risk/malnourished. The PDSA framework was utilized to inform the two QIPs which recognized all patients at-risk for malnutrition or malnourished, rapidly implemented nutrition interventions, continuously educated and monitored patients, and discharged patients home or to the next setting of care with tools and resources to help them make informed decisions pertaining to their nutrition regimen and compliance.

With 90% of US cancer care delivered outside the hospital [21], there is a critical need for nutrition-focused QIPs across the care continuum and in ambulatory clinics specifically. QIPs help optimize interdisciplinary care processes like malnutrition screening and intervention, which may be particularly challenging in US outpatient cancer care settings where the ratio of registered dietitian nutritionists (RDNs) to patients is extremely low (1:2,308) [22]. Further, preliminary research assessing the experience and satisfaction of healthcare providers with outpatient nutrition-focused QIPs supports the potential for such initiatives to be successfully implemented and thus optimize care, improve patient health, and reduce healthcare costs [23]. These outcomes are critical to current and evolving US value-based payment programs.

### **Aligning Nutrition-focused QIPs in Cancer Care to Support Current and Evolving US Value-based Payment Programs**

Nearly two decades ago the basis for high-value healthcare in the

US was defined as being comprised of six domains: care that is safe, timely, effective, efficient, equitable, and patient-centered [24]. All these domains have relevance to malnutrition care and thus could benefit from a nutrition-focused QIP. The US Institute for Healthcare Improvement later developed the six domains into the Triple Aim for optimizing health system performance based on improving the patient experience of care (including quality and satisfaction), improving the health of populations, and reducing the per capita cost of healthcare [25]. These tenets have provided the framework for US healthcare reform as it has continued to transition from a fee-for-service to a value-based healthcare model in both government-funded and private pay programs. Below we outline how nutrition-focused QIPs in cancer care align with the Triple Aim of improving the patient experience of care, improving population health, and reducing healthcare costs.

#### **Improving patient experience of care (quality and satisfaction)**

Each year in the US, over 1.7 million people are diagnosed with cancer [26] and about half are older than 65 years of age and eligible for Medicare [27], the federal health insurance program for older adults and individuals with certain disabilities. Thus, Medicare value-based payment programs have a significant impact on value-based cancer care in the US.

The US Centers for Medicare & Medicaid Services (CMS), as part of its value-based care programs, requires healthcare facilities and clinicians to submit data on specific quality metrics across an array of health conditions and provided services. To date, there have been no required nutrition or malnutrition-specific quality metrics in CMS programs. However, the CMS Hospital Outpatient Quality Reporting (OQR) Program recently finalized and now requires a chemotherapy-specific quality measure (OP-35) that provides an opportunity for improved nutrition in cancer care, such as what could be achieved by a nutrition-focused QIP. Specifically, the OP-35 measure reports the number of patients with cancer who within 30 days after chemotherapy have an ED visit or hospital admission for one of 10 specific conditions (anemia, nausea, dehydration, neutropenia, diarrhea, pain, emesis, pneumonia, fever, or sepsis). Many of these conditions can be impacted by nutrition and nausea/vomiting has been reported as one of the most common complaints in the ED for patients with cancer, second only to fever [28]. A nutrition-focused QIP for outpatient cancer care could align with this measure by improving nutrition care processes to better identify and intervene for nutrition-

**Table 1: Secondary analysis of at-risk/malnourished patients with cancer in a hospital-based, comprehensive nutrition-focused quality improvement program (QIP) [18].**

Study component	Description
Patient population	2,588 at-risk/malnourished patients with any diagnosis who were part of a nutrition-specific QIP analysis <ul style="list-style-type: none"> <li>• 1,269 QIP patients enrolled between October 2014-April 2015</li> <li>• 1,319 retrospective historical controls admitted to QIP hospitals between October 2013-April 2014</li> </ul>
Sub-analysis population	Patients with a diagnosis related group (DRG) coding for cancer <ul style="list-style-type: none"> <li>• 365 patients (14.1% of all patients and the largest subgroup)</li> <li>• 247 were QIP patients and 118 were historical controls</li> </ul>
Comparators	30-day readmission rate and length of stay between QIP patients and historical controls
Nutrition QIP	Nutrition QIP included: <ul style="list-style-type: none"> <li>• Screening with Malnutrition Screening Tool (MST) on admission</li> <li>• Patients at risk for malnutrition (MST score of <math>\geq 2</math>) received condition-specific oral nutritional supplements (ONS)</li> <li>• Discharge planning including nutrition literature and ONS coupons</li> <li>• Nutrition-focused post discharge phone calls</li> <li>• Patients, caregivers, and all health care providers received continuous education related to the nutrition QIP</li> </ul>
Results	Statistically significant reductions in readmission rates and length of stay observed in favor of the QIP patients with cancer diagnoses Relative risk reductions (RRR): <ul style="list-style-type: none"> <li>• 37.6% for 30-day readmissions (26.6% vs. 16.6%, <math>p = 0.034</math>)</li> <li>• 42.7% for length of stay (<math>8.2 \pm 6.8</math> vs. <math>4.7 \pm 3.9</math> days; <math>p &lt; 0.001</math>)</li> </ul>

**Table 2: Elements of a nutrition-focused quality improvement program (QIP) in a home health agency [20].**

Element
Nutrition screening upon admission to home health
Patient and caregiver nutrition education
Motivational interviewing on nutrition
Provision of oral nutritional supplements (ONS) as appropriate
Follow-ups at subsequent home health visits
Discharge planning

related complications that put patients at risk for malnutrition and increase the likelihood of an ED visit or hospital admission. Such a QIP could help target limited oncology resources toward those patients who are at highest risk and potentially reduce unnecessary ED visits and hospital admissions, which could help meet the quality measure goal and reduce costs as well as improve patient health outcomes.

Patient experience of care is an important component of public and private value-based payment programs. CMS has incorporated the Consumer Assessment of Healthcare Providers and Systems (CAHPS<sup>®</sup>) Cancer Care Survey as a required component of its cancer-specific payment models. The Medicare CAHPS<sup>®</sup> has three parallel instruments (specific to radiation oncology, medical oncology, and cancer surgery) and includes several questions related to energy and diet (Table 3). As evidenced by these questions, patients with cancer may in part evaluate providers on the frequency and quality of their conversations about maintaining health and energy levels through diet and exercise. Yet, research has documented that such questions often go unanswered even as nutrition is a significant patient concern; between 30-66% of patients in outpatient cancer centers report that their nutrition information needs are unmet [22]. The opportunity for a nutrition-focused QIP could include targeting improvements in the malnutrition-risk screening process using validated patient-reported tools such as the Malnutrition Screening Tool that asks if patients have lost weight recently without trying and if they have been eating poorly because of a decreased appetite [29]. Another nutrition-focused QIP opportunity could be to focus on improving malnutrition education and intervention processes in the outpatient setting, to help close the gap between patient and family expectations and the nutrition care delivered, including where that care may be delivered.

### Improving population health

In the US, the recent COVID-19 pandemic has led to an exponential expansion in the delivery and government and private pay coverage of telehealth services, including nutrition services. The US telehealth market is expected to reach about \$10 billion by year-end, a year-over-year growth of 80%. During the pandemic, cancer patients have struggled to maintain their recommended treatment regimens and to connect with their healthcare providers in a safe and effective way. A recent American Cancer Society Cancer Action Network survey documented 50% of cancer patients and survivors reported some impact on their

healthcare because of the pandemic [30]. Providing necessary services via telehealth can meet a critical need, increase access, and also create an opportunity for a nutrition-focused QIP to help optimize identifying and intervening for malnutrition via remote care access and potentially save healthcare costs.

### Reducing healthcare costs

High healthcare costs are a particularly important issue for cancer care, with the US spending nearly \$150 billion annually, an amount close to four times more than what is spent on treatment for other common health conditions. In addition, 63% of US cancer patients report financial challenges following a cancer diagnosis [31]. Evidence suggests timely nutrition interventions can help healthcare systems better meet value-based payment program goals and quality measures [19]. This creates a natural opportunity for a nutrition-focused QIP because as discussed earlier, nutrition-focused QIPs in cancer care have been able to document cost savings through improved malnutrition identification and intervention.

One cancer-specific Medicare value-based payment program where a nutrition-focused QIP targeting healthcare cost reductions could align is the evolving Oncology Care First (OCF) model. The OCF builds on the current US Oncology Care Model designed to streamline care coordination while reducing unnecessary costs for cancer patients undergoing chemotherapy. Central to both models is a performance-based payment system that rates cancer care against specific quality measures and cost of care benchmarks. A nutrition-focused QIP could help improve nutrition care processes to better meet these metrics. The OCF is anticipated to continue testing innovative approaches that reduce outpatient cancer treatment expenditures while enhancing quality and patient satisfaction and thus there could be the chance to include optimal nutrition care in the OCF itself. The Academy of Nutrition and Dietetics recently detailed how routinely providing medical nutrition therapy in the OCF and including medical nutrition therapy as an additional service factored into population-based payments would be powerful catalysts to address gaps in nutrition care and improve outcomes as part of cancer treatment protocols [32].

### Summary

Malnutrition is a common and key problem for patients with cancer, whilst lack of nutrition services integration into the cancer health care system and inadequate RDN staffing in outpatient

**Table 3: Consumer Assessment of Healthcare Providers and Systems (CAHPS<sup>®</sup>) Cancer Care Survey questions related to energy and diet.**

Question
In the past 6 months, did you and your drug therapy team talk about any changes in your energy levels related to your cancer or drug therapy?
In the past 6 months, were you bothered by changes in your energy levels related to your cancer or drug therapy?
In the past 6 months, did your drug therapy team advise you about or help you deal with these changes in your energy levels?
In the past 6 months, did you and your drug therapy team talk about things you can do to maintain your health during cancer treatment, such as what to eat and what exercises to do?

cancer centers continue to be major limitations to quality cancer care in the US [33]. Addressing malnutrition and nutritional needs of patients across different care settings has been well documented to improve patient outcomes and reduce costs of care in patients with cancer--nutrition-focused QIPs are one way to help achieve this. Further, implementing nutrition-focused QIPs in outpatient cancer centers provides an opportunity to improve on performance measures and patient reported outcomes while reducing health care costs. These outcomes align to support US value-based payment systems that are focusing on patient experience of care, population health, and healthcare costs and hopefully will generate an increase in the development, implementation, and reporting of nutrition-focused QIPs to benefit all patients with cancer.

### Author Contributions

All the Authors participated in the conception and writing of the manuscript. This material or similar material has not been and will not be submitted to or published in any other publication.

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