Cancer care in outpatient cancer centers is a critical issue in the US health care system. It is well documented that malnutrition adversely affects key outcomes, including morbidity and mortality, as well as hospitalizations, readmissions, and other variables that may increase cost of oncology care.\textsuperscript{1,2} Based upon this evidence, the Oncology Nutrition Dietetic Practice Group (ON DPG), a practice group of the Academy of Nutrition and Dietetics (Academy), formulated a strategic plan to address nutrition-related gaps in cancer care. The ultimate goal of the strategic plan is to improve patient access to oncology nutrition care from the time of diagnoses, through treatment and into cancer survivorship, for whatever period of time survivorship may encompass.

A key outcome of this project will be to identify how the clinical and research oncology nutrition communities can work together to create the supporting data and build the body of evidence to ensure the cost of comprehensive nutrition care is universally reimbursed by insurers and/or consistently included in bundled payment models for the total oncology care experience. Improved access to oncology nutrition care can be realized through improved payment models, and this process can serve as a framework and a model for securing consistent nutrition care for additional chronic disease states. All registered dietitian nutritionists (RDNs) must be committed to a future in which compensation for specialized nutrition care is the expectation rather than the exception.

This paper describes accomplishments to date in the process of identifying and addressing gaps in oncology nutrition care, and details future plans for moving toward universal access to nutrition care in outpatient oncology treatment facilities. In 2012, ON DPG engaged in conversations with the National Academies of Sciences, Engineering and Medicine (NASEM) with a resultant concept paper describing the rationale for investigating the consequences of inadequate access to nutrition care in outpatient cancer centers. This paper formed the basis for the 2016 NASEM-sponsored public workshop, which was convened in Washington, DC. Shortly thereafter, the proceedings of the workshop were published in the report, Examining Access to Nutrition Care in Outpatient Cancer Centers.\textsuperscript{3} We present next steps in the strategic planning and implementation process and share a framework for moving toward universal access to oncology nutrition care.

**BACKGROUND AND SIGNIFICANCE**

Access to Medical Nutritional Care

With the advent of more effective options for managing cancer symptoms and treatment side effects, approximately 90% of oncology patients now receive treatment in outpatient cancer centers and clinics.\textsuperscript{6} This paradigm shift, from an inpatient to an outpatient treatment model, affects quality of care for oncology patients and has important implications impacting the delivery of nutrition services. Previous standards set by The Joint Commission directed hospitals to define criteria for nutritional screening, which is to occur within 24 hours of admittance into the hospital.\textsuperscript{7} Nutritional screening on an inpatient basis generally is employed nationwide. Yet ambulatory standards of nutritional care, including screening, remain ambiguous and inconsistently applied across health care settings. Therefore, access to oncology nutrition care is left to the discretion of individual ambulatory entities or health care providers. As a result, the vast majority of cancer patients treated in outpatient cancer centers do not have access to oncology nutrition services.

The subsequent loss of access to ambulatory oncology nutrition services coincides with growing evidence supporting the role of nutrition in optimizing treatment outcomes and maximizing patient quality of life (QOL). Indeed, numerous mainstream professional organizations, including the American College of Surgeons Commission on Cancer,\textsuperscript{8,9} the Association of Community Cancer Centers,\textsuperscript{10} the American and European Societies of Parenteral and Enteral Nutrition,\textsuperscript{2,11} the National Institute for Health and Care Excellence of Great Britain,\textsuperscript{12} and the Victorian Department of Health in Australia\textsuperscript{13,14} fully endorse and recognize nutrition services as an essential component of cancer care. These organizations advocate for formalized nutrition screening and assessment, nutrition care plans, and early medical nutrition therapy (MNT) when deficits are detected among patients with cancer. In the United States, there is a need for RDNs to have a more prominent role as key members of the oncology health care team.

Although benchmarking data on access to nutritional care remain limited,
it is estimated that RDNs provide 0.5 full-time equivalents in inpatient cancer centers and 0.2 full-time equivalents for ambulatory chemotherapy and radiation areas even though the vast majority of patients are treated in outpatient settings.15 Sixty-four percent of oncology RDNs report working in inpatient settings, and 36% report working in outpatient settings.16 These data, however, do not provide insight into the full-time equivalents in outpatient cancer centers or the patient-to-nutrition care provider ratio. Colleen Gill, who surveyed National Cancer Institute (NCI) Comprehensive Cancer Centers, found an average RDN-to-patient ratio of 1 RDN to 2,674 patients (personal communication, 2014). In another survey of NCI Comprehensive Cancer Centers, 30 centers (94%) reported offering RDN referrals or consult-based services. Yet these results provide no assurance that a patient needing or requesting clinical nutrition interventions will actually be referred or eventually seen by an RDN.17 Important barriers, including lack of Medicare reimbursement for referral-based nutrition consultation and out-of-pocket patient expenses, continue to permeate throughout oncology ambulatory settings and negatively impact patient outcomes.5

**Nutrition Status and Treatment Outcomes**

Malnutrition occurs in up to 80% of cancer patients at some point during cancer care, with the majority (>50%) of cancer patients exhibiting nutritional impairments at their initial oncology visit.18-20 It is well documented that malnutrition negatively affects outcomes; involuntary weight loss of just 5% of body weight decreases survival in cancer patients.21,22 The Academy’s Evidence Analysis Library (EAL) on Oncology found conclusive evidence (grade I and II) that poor nutritional status is associated with increased morbidity and mortality.23 Furthermore, weight loss, malnutrition, sarcopenia, cachexia, and fatigue, all nutrition-related outcomes associated with cancer, were associated with increased mortality.23-26 Other analyses demonstrate that markers of malnutrition, such as weight loss, low muscle mass index, and muscle attenuation, independently predict shorter survival.27-32

In addition to increased mortality and reduced survival, malnutrition increases treatment interruptions, readmission rates, and the risk of cancer recurrence while reducing patient QOL.33-36 Patients receiving multimodal treatments are especially vulnerable while often experiencing multiple side effects that result in inadequate nutrient intake and subsequent weight loss leading to treatment interruptions, unplanned hospital admissions, lengthier hospitalizations, greater and more severe treatment side effects, dose-limiting toxicities, and reduced functional performance.37-44 Evidence shows that MNT improves treatment tolerance, reduces treatment breaks, decreases unintentional weight and lean body mass losses, increases QOL, decreases unplanned hospitalizations by >50%, reduces length of hospital stay (LOS), and improves overall survival.23,31,34,45-55 Yet despite data documenting a high prevalence of malnutrition in cancer patients during treatment, fewer than 60% of at-risk individuals received any nutrition interventions.56

Historically, nutrition-related clinical trials have not focused on early MNT or intensive nutrition interventions at varying stages of malnutrition or standardized times in ambulatory oncology settings.57-60 Although systematic reviews and meta-analyses document benefits for increased macronutrient intake during treatment, gaps in research continue to exist.60,61 Unfortunately, the few studies that have attempted to measure nutritional interventions during outpatient oncology care have been plagued by poor study design and methodological and implementation flaws. Examples include poor adherence,57 inappropriate interventions for late-stage disease or malnutrition,58 confounding comorbidities such as cachexia,59 inadequate comparisons of intensive nutrition interventions against established interventions for QOL maintenance,60 underpowered studies exhibiting significant heterogeneity, and disparate standardization for confounders being included in meta-analyses.61 In many nutrition intervention studies, the nutrition interventionist is not clearly defined. It is critical to describe the professional qualifications of those that deliver nutrition education and interventions to vulnerable cancer patients needing specialized MNT. Lack of agreement also persists and must be resolved on which malnutrition measurement tool most accurately and precisely captures malnutrition risk, in which populations, and over which times.52-55

At the other end of the spectrum, excess energy intake leading to overweight and obesity has negative health consequences for cancer patients.58 In certain cancer types, obesity at diagnosis and weight gain during and after treatment—common among cancer survivors—are associated with poorer outcomes, decreased disease-free and overall survival, and possibly accelerated cancer progression.66-72 Advanced pancreatic cancer patients with sarcopenic obesity—those that are overweight or obese with high fat mass yet low skeletal muscle mass—have the shortest survivals.58 In patients with solid tumors of the respiratory or gastrointestinal tract, sarcopenic obesity was associated with poorer functional status compared with obese patients who did not have sarcopenia; sarcopenia was an independent predictor of survival.59 Despite the evidence of poorer health outcomes in cancer patients who are overweight and obese, an obesity paradox—cancer patients with elevated body mass indexes have improved survival compared with normal-weight patients—may be occurring in patients with certain types of cancer. The obesity paradox may be a reflection of methodological mechanisms including the crudeness of body mass index as an obesity measure, confounding, detection bias, reverse causality, and collider bias.60 It is imperative that overweight and obesity in cancer patients not be labeled “protective” or “harmful.” It is imperative that oncology RDNs screen for malnutrition to facilitate the early identification of patients who are malnourished or who are at risk for malnutrition, regardless of their body mass index.

Body fat management is key to controlling prevalent comorbid conditions,81-83 and RDN-led weight management programs have proven to be much more effective at achieving appropriate body weight and improved...
metabolic parameters compared with usual care or access to weight control programs. In primary care settings, RDN-led weight management interventions have proven effective for achieving measurable weight loss goals. Weight management interventions for survivors that include behavioral adaptations are found to be the most effective. RDNs are uniquely qualified to deliver such interventions. Unfortunately, as documented in the NASEM Workshop Summary on The Role of Obesity in Cancer Survival and Recurrence, quality nutrition care for cancer survivors, delivered by an RDN, is difficult to procure. Additional research is needed to confirm the ability of these interventions to achieve and maintain clinically meaningful weight loss.

The use of dietary supplements in the cancer population is also a concern. According to the Dietary Supplement Health and Education Act (DSHEA) of 1994, a dietary supplement is a product taken by mouth intended to supplement the diet that bears or contains one or more of the following dietary ingredients: vitamins, minerals, herbs, or other botanicals; amino acids, dietary substances for use by humans to supplement the diet by increasing the total dietary intake; or a concentrate, metabolite, constituent, extract, or combination of any ingredient described. Dietary supplement use is underreported to the oncology care team and may interfere with treatment effectiveness and even prove detrimental. Over 60% of cancer patients and over 80% of long-term survivors report using vitamin or mineral dietary supplements. Data from the National Health and Nutrition Examination Survey confirm that cancer survivors consume more botanical dietary supplements than the general US population. The current knowledge of the effectiveness of dietary supplements in cancer care is limited. A report from the US Preventive Services Task Force concluded that the evidence is insufficient to assess the balance of benefits and harms from the use of multivitamins and single or paired nutrient supplements for the prevention of cancer, except for beta carotene and vitamin E, for which the findings are negative. Given the extensive array of dietary supplement products on the market, lack of enforced quality control in manufacturing, variations regarding recommended dosing, availability of combined formulations, bioactive heterogeneity, paucity of evidence of efficacy, and conflicting reports of safety, it is imperative that RDNs carefully assess the patient’s need for dietary supplements to optimize cancer treatment and care.

**Costs of Malnutrition**

In adult oncology patients, malnutrition—both over- and undernutrition—associates with higher hospital costs, primarily related to increased rates of hospital admissions and readmissions as well as increased LOS. Other parameters that may increase costs due to malnutrition include additional primary care provider consultations and increased medication utilization. Few studies have directly examined the cost-effectiveness of nutritional interventions; however, data support oncology nutrition interventions are effective at reducing costly complications of cancer care, including longer LOS, hospital admissions and readmissions, and frequent and more severe chemotherapy and radiation therapy side effects. Establishing consistent use of electronic medical records (EMRs) across the United States would provide a means of aggregating large data sets of key outcomes, such as hospital readmission rates, emergency room visits, and treatment breaks, which could be used to identify cost savings that arise from systematically applied oncology nutrition interventions delivered by RDNs.

The cost of failing to address overnutrition is staggering. The estimated annual health care costs of overweight- and obesity-related illnesses are $190 billion or almost 21% of annual medical spending in the United States. Recent analysis indicates the cost of obesity and obesity-related treatments was approximately $427.8 billion in 2014. Intensive lifestyle interventions reduce the risk of conversion from prediabetes to diabetes by 58%, and weight loss of just 5% to 10% of body weight reduces cardiovascular risk factors. Because overweight and obese cancer survivors are at higher risk for cardiometabolic complications compared with those maintaining a healthy body weight, addressing overnutrition is essential in maximizing health outcomes and decreasing the overall cost of care.

**ISSUES AND CHALLENGES**

The NASEM Workshop, “Examining Access to Nutrition Care in Outpatient Cancer Centers” was instrumental for the ON DPG to explore how health outcomes and cancer survival in outpatient cancer centers are affected by current standards for nutritional services, nutritional interventions, and patient access to MNT. The specific NASEM Workshop objectives are outlined in Figure 1.

Premeeting workshop preparation by NASEM included forming a planning committee of experts in the fields on oncology nutrition, who, over the course of several months, developed the workshop agenda and coordinated the speakers and presentations.

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**Objectives**

- Describe the current status of nutritional care for oncology outpatients, including the availability of data during treatment and long-term survivorship.
- Describe the ideal care setting, including models of care within and outside the United States.
- Describe the potential benefits of outpatient nutritional care on morbidity, mortality, and long-term survival.
- Describe the issues relating to cost-benefit assessment for both recent diagnosis and post-treatment care.
- Describe the barriers to achieving an ideal care setting and the information resources available to patients.

**Figure 1.** Objectives of the National Academies of Sciences, Engineering and Medicine Workshop, Examining Access to Nutrition Care in Outpatient Cancer Centers. Republished with permission of the National Academy of Sciences from: National Academies of Sciences Engineering and Medicine. Examining Access to Nutrition Care in Outpatient Cancer Centers: Proceedings of a Workshop. Washington, DC: The National Academies Press; 2016; permission conveyed through Copyright Clearance Center, Inc.
Various experts, including oncology researchers, RDNs, medical oncologists, health care economists, and policy makers, partook in the NASEM Workshop as planning committee members, speakers, and attendees. Presentations and discussions focused on data demonstrating enhanced therapeutic efficacy, reduced complications, improved QOL and health for cancer survivors, reduced risk of recurrence that may be realized when dietary and nutritional strategies are integrated into patient care plans, and the impact of integrating nutrition services on health care expenditures. The report generated from the NASEM Workshop outlines the state of the science and the existing gaps. Gaps include the following.

Insufficient Funding for Nutrition and Cancer Research
A call was made for more grants to be awarded to institutions with the infrastructure to offer combined degree training programs, particularly focused on PhDs/RDNs. The dietetic profession would benefit from advanced oncology training grants aimed at providing strong mentorship, leadership and professional development training, and nutrition-specific translational oncology research to inform clinical recommendations, measure impact, and disseminate results. The long-term goal of filling this gap is to position PhDs and RDNs to serve in nationally recognized leadership roles to advocate for RDN reimbursement and evidence-based practice.

Lack of Standards of Care Supporting Evidence-Based Nutrition Care
The ON DPG, with guidance from the Academy’s Quality Management Committee, developed Standards of Practice (SOP) and Standards of Professional Performance (SOPP) as tools for RDNs currently in practice or interested in working in oncology nutrition to address their current skill level and to identify areas for additional professional development in this practice area. Furthermore, many organizations have developed generic recommendations guiding when to refer patients for nutrition care. However, there are no consistent evidence-based protocols dictating standardized oncology nutrition care. The oncology organizations that provide the framework for cancer care in the United States must collaboratively develop and implement peer-reviewed standards for cancer centers. For example, the National Comprehensive Cancer Network (NCCN), an alliance of leading cancer centers devoted to patient care, research, and education, creates and routinely updates guidelines for cancer therapy, profoundly influencing the quality of cancer therapy in the United States. The integration of MNT and nutrition services into the specific NCCN guidelines is needed to set the standards of nutritional care. For example, evidence supporting positive outcomes for head and neck and oral cancer after receiving MNT is strong. Given the severe and often debilitating treatment effects of therapy, MNT could greatly improve dietary intake and the likelihood that patients receive the most effective therapies and at prescribed doses and frequency.

Inconsistent Implementation of Evidence-Based Standards of Care
The American Institute for Cancer Research/World Cancer Research Fund and the American Cancer Society have released evidence-based dietary and physical activity guidelines for cancer prevention and survival. Yet the messaging surrounding these guidelines are not promoted effectively in cancer centers, survivorship clinics, or to the public. The 2017 European Society for Clinical Nutrition and Metabolism expert group created and described evidence-based recommendations for the implementation of a multi-disciplinary team approach to prevent malnutrition during cancer treatment. These recommendations note the following steps to ensure optimal nutrition care of oncology patients:

1. screen all patients with cancer for nutritional risk early in the course of their care, regardless of BMI and weight history;
2. expand nutrition-related assessment practices to include measures of anorexia, body composition, inflammatory biomarkers, resting energy expenditure, and physical function; and
3. use multimodal nutritional interventions with individualized plans, including care focused on increasing nutritional intake, lessening inflammation and hypermetabolic stress, and increasing physical activity.

The guidelines emphasize the importance of preserving adequate nutritional status for cancer patients to improve tolerance of antineoplastic therapy, reduce treatment complications, minimize treatment cost, and protect patient QOL.
a score aligning with nutritional risk.111,112

Lack of Integration of Nutrition Services into the Health Care System
Many experts think the failure of nutrition integration lies with the primary care providers who are not adequately trained in nutrition nor educated in the evidence supporting nutrition.5 Oncology MNT is a specialized dietetic practice that requires extensive counseling and training, national registration, certification, and often licensure. Increasing overall awareness of the beneficial roles of RDNs in oncology settings is essential to promote the profession and remind health care providers that MNT provided by RDNs improves patient outcomes and QOL.5

Inadequate RDN Staffing in Cancer Centers
Additional RDN staffing in cancer centers is required to meet oncology patient demands. Most cancer centers are grossly understaffed in RDN services. Many oncology RDNs also provide coverage for other services, at multiple clinics, in different locations, often serving up to 4,000 outpatients per day. Lack of institutional infrastructure is a barrier to RDN staffing. RDNs need a dedicated space to adequately and confidentially counsel patients. In addition, relevant data should be integrated directly into EMR systems, so data are accessible to all members of the health care team.

Lack of Reimbursement for RDN Services
The greatest barrier to adequate oncology RDN staffing involves the lack of reimbursement for professional services. Hospitals and other institutions do not invest in a service unless they can see a tangible return on investment.3 Until Centers for Medicare and Medicaid Services and private insurers reimburse RDN services, hospitals and oncology clinics are unlikely and unable to adequately staff their nutrition departments. Future bundling of payments for oncology care may further reduce access to oncology nutrition care.

Utilization of Dietary Supplements Is High in Cancer Patients and Often Underreported
Although some supplements may be beneficial when deficiencies are present, others may cause serious side effects or have the potential to interfere with cancer treatment. Several large NCI-sponsored clinical trials of dietary supplements have found them to be harmful.113,114 There was a recommendation from the NASEM Workshop participants for more careful and precise use of language and a need to encourage consumers to be conscious about products being marketed with vague and nonspecific names.9

Research Gaps
More research is warranted related to standardized malnutrition screening and validation of nutrition-related prognostic indicators. These data, once obtained, must be incorporated into predictive models, so malnutrition risk can be identified earlier and treated more aggressively. Cancers have definitive treatments based upon cancer site, stage, genetics, and patient comorbidities. The same framework should be applied with MNT to improve patient outcomes. Risk needs to be modeled and nutrition care pathways developed, implemented, and evaluated.7

Research on viable models for reimbursement and best practices for securing reimbursement is sorely lacking. More data are needed to identify the most effective screening tools and ongoing assessments required for quality improvement initiatives and outcomes tracking, with an eye toward cost-benefit analysis. Investigations of the costs and benefits of RDN-delivered MNT should be expanded to include a wide variety of outcomes. For example, by keeping patients well nourished, we may be able to limit or eliminate costly interventions, such as intravenous fluids, hospital admissions and readmissions, and emergency room visits. The cost savings realized should be considered in the organization’s fiscal analyses to determine adequate RDN staffing patterns.

Existing literature does not address disparities in outcomes when nutrition interventions are delivered by an RDN vs a non-nutrition-trained health care provider. In many publications, a thorough examination of the study methodology section fails to yield a definitive description relating to the provider implementing nutrition services. This is especially problematic given that RDNs are the only professionals qualified, competent, and licensed to perform MNT.

Standardization of translatable, effective nutrition messaging tailored to individual patients can address the heterogeneity that plagues many nutrition intervention study designs and generic counseling sessions. Continuing to focus on lifestyle behaviors that include dietary and physical activity patterns, rather than a reductionist approach (eg, one nutrient, one outcome), is required to move the field forward.

Evidence continues to emerge that individual cancers may require their own nutritional prescriptions to elicit optimal outcomes.115 Given adequate staffing and support, RDNs will be in the best position to rapidly translate evidence-based guidelines into practice across a variety of outpatient settings. Research gaps also include applying risk-stratified guidelines not only tailored to specific cancers but translated to disparate populations (eg, pediatrics, food insecure populations). This includes the need for a better understanding of how widening gaps in health outcomes and insurance disparities impact patient behaviors and present system-level barriers to success.

Additional research also is needed related to the role of dedicated nutrition staffing for the prevention of cancer recurrence, secondary cancers, and comorbidities. RDN-delivered MNT is well accepted and reimbursed for treating diabetes and renal disease. Lifestyle therapies for prediabetes is becoming more widely accepted as a standard of care given the published successes of the Diabetes Prevention Program (DPP), a program fully endorsed and supported by the Centers of Disease Control and Prevention (CDC). All people with nutrition-related chronic diseases, including cancer, could benefit from professional nutrition counseling to improve QOL and disease-related health outcomes.

Given the severe shortage of practicing oncology-trained and credentialed RDNs, advanced technologies,
including telehealth and telenutrition, will likely play a greater role in MNT delivery. Remote technologies, especially for high-risk, rural patients with limited health care access, have the potential to reach a population that has been previously underserved. Moving forward, telenutrition delivery of the Nutrition Care Process (NCP), group sessions, and family interventions must be developed, implemented, and evaluated in oncology cohorts. RDNs can and should position themselves on the cutting edge of this growing area of research.

**CORE CONCEPTS AND STRATEGIC PLAN**

**Core Concepts**

As a direct result of the gaps identified at the NASEM Workshop, the ON DPG developed core principles to achieve improved health outcomes of cancer patients, as seen in Figure 2. These core concepts align with the mission of the ON DPG: To empower ON DPG members as oncology nutrition leaders and experts through advocacy, education, and research. Translational research is the foundation upon which all other principles are based. Key concepts include evidence, policy, practice, leadership, advocacy, and precision of scientific and clinical language. These cores overlap and build upon each other as one principle informs the foundation for the next.

Research represents the backbone of dietetics, and since its inception, the Academy intended the dietetics profession be rooted in science. Per the Academy, research:

- provides the framework for discovering and verifying cause-and-effect relationships between nutritional variables and health outcomes;
- fosters development of new therapies to improve public health and care delivery;
- forms the basis for education, because it drives the core knowledge and competencies

RDNs are expected to understand and practice; and

- strengthens and sustains the knowledge base of the dietetics profession.

All facets of medical research are important to guide evidence-based oncology nutrition practices; however, clinical research, including intervention and observational studies, is especially impactful for translation into clinical practice. In addition, data mining and add-on studies remain critical for the creation of more robust nutrition evidence.

Data mining, an investigational concept that emerged in the 1990s, provides the methodology and statistical tools to transform reams of data into information useful for clinical decision making. Data mining can generate scientific hypotheses from large experimental data sets, clinical databases, or biomedical literature.

Add-on studies allow for the data collection of nutrition-related variables within an existing study. For example, the Women’s Health Initiative (WHI), a large clinical trial and observational study of heart disease, cancer, stroke, osteoporosis, and dementia in over 160,000 healthy postmenopausal women, has allowed for add-on studies investigating specific nutrition research questions, such as multivitamin use and its impact on health. Secondary research, such as systematic reviews and meta-analyses, are instrumental for delineating the state-of-the-science and the established evidence, and for identifying additional research questions. Quality assurance and quality improvement projects can be helpful in laying the foundation for future clinical trials.

Translational research provides the basis for evidence-based practice, education, and public policy. Evidence-based practice is a cornerstone of best practice in health care and is included in national health strategies. In addition, evidence-based care is recommended by the Academy and supported by the Academy’s EAL. Continued evidence that oncology MNT positively impacts health outcomes will position oncology RDNs as the leaders in oncology nutrition care, serving as a trusted resource to educate and promote best practices for the public.

![Figure 2. Oncology Nutrition Dietetic Practice Group Core Concepts for Improved Access to Oncology Nutrition Care.](image-url)
policy makers, practitioners, and all stakeholders.

Oncology RDNs have always advocated for their patients, yet now they are called upon to advocate on a grander scale. By actively participating in the legislative and regulatory processes, RDNs can impact health care delivery and payment systems to maximize and support oncology nutrition services. Furthermore, by collaborating with national oncology organizations and established key alliances, RDNs will obtain a larger voice to impact policy and health care reform.

**ON DPG Strategic Plan**

Figure 3 showcases the strategic plan, in which the core concepts were developed into a working plan. The strategic plan organizes the priority activities and describes the focus and processes needed to accomplish the goal of improved access to oncology nutrition care and, ultimately, overall improved patient care and health outcomes.

**MOVING FORWARD**

The ON DPG is already taking steps to move this initiative forward. Since 2016, the ON DPG has initiated several targeted projects to address gaps as identified in the NASEM Workshop.

A Quality Assurance Performance Improvement Project (QAPI) was launched in 2017 to leverage EMR data

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**Figure 3.** Oncology Nutrition Dietetic Practice Group Strategic Plan for Improved Patient Care and Health Outcomes of Cancer Patients. The plan begins with education and training, explains the types of research that should be employed by oncology registered dietitian nutritionists (RDNs) to produce the evidence to inform clinical practice recommendations. Evidence-based practice guidelines should lead to policy implementation and improved health care delivery. Advocacy should be interspersed throughout all facets of the strategic plan. The ultimate goal is to improve access to oncology nutrition care, patient care, and health outcomes of cancer patients. Abbreviations: ACCC=Association of Community Cancer Centers; ACS=American Cancer Society; AONN=Academy of Oncology Nurse and Patient Navigators; ASCO=American Society of Clinical Oncology; ASPEN=American Society for Parenteral and Enteral Nutrition; CoC=Commission on Cancer; DoD=Department of Defense; MASCC=Multinational Association of Supportive Care in Cancer; NCCN=National Comprehensive Cancer Network; NIH=National Institutes of Health; ONS=Oncology Nursing Society.
to systematically evaluate malnutrition risk in oncology care settings by implementing a validated MST nationwide. This QAPI was launched to address gaps in the literature regarding systematic screening for malnutrition risk with a validated malnutrition screening tool, appropriate oncology RDN staffing patterns to meet patient demand, and inconsistent financial and reimbursement models for outpatient nutrition care access across cancer care centers nationwide.

The objective of phase 1 is to assess the feasibility of implementing a validated MST within the EMR to describe the current status of nutritional care for oncology outpatients and define work standards, workflow, and frequency of MST utilization.

The objective of phase 2 is to collect data to assess the needs of patients, patient outcomes, and capacity to provide quality nutrition care with existing staffing. This phase will establish metrics to monitor the use of MST, workflow, utilization, and volumes at each center to determine RDN capacity and need. Developing and collecting metrics to measure the impact of nutritional care on patient outcomes (treatment tolerance, clinical quality indicators and hospital admissions, treatment interruptions, symptom management, weight loss or gain, cost-benefit assessment, emergency department visits and hospitalizations, extra visits for fluid repletion) and patient-reported QOL in the oncology patient population is an important goal of phase 2.

Current collaborators include Health Partners in Minnesota, The Ohio State University, and Dartmouth-Hitchcock, New Hampshire. At all three centers, the validated MST has been fully integrated into the EMR Epic flow sheet, thus providing ongoing discreet variable data reports. Data collection, analyses, and dissemination of results are ongoing. Preliminary results were published and awarded a Food & Nutrition Conference & Expo (FNCE) Top-Scoring Abstract Award. This award was granted by the Academy’s Committee for Lifelong Learning (CLL) and Dietetics Practice Based Research Network (DPBRN) Oversight Committee. The second abstract, “Implementing and Evaluating the Malnutrition Screening Tool in Electronic Health Records for Outpatient Cancer Centers,” has been accepted for presentation at the 2018 NCCN Annual Conference.

In 2017, an online RDN Staffing Survey was developed and disseminated nationally to ON DPG members, Academy members, and oncology RDNs at various cancer centers. These data are intended to capture RDN staffing patterns at national cancer centers and will address gaps in the literature related to barriers to accessing nutrition services in outpatient cancer centers. This survey is a follow-up to an NCI-designated cancer center survey conducted in 2011 and 2013 (unpublished, Gill). In addition to general staffing patterns, the current survey will provide a real-time description of outpatient oncology RDN staffing patterns, patient volume and analytical cases, workload, referrals and billing, and oncology nutrition screening practices.

In 2017, nutrition care recommendations were added to the NCCN Clinical Practice Guidelines for Head and Neck Cancer and Pancreatic Cancer. The NCCN is a nonprofit alliance of 27 leading cancer centers that direct the NCCN Clinical Practice Guidelines in Oncology Care. The NCCN guidelines apply to 97% of cancer patients in the United States and remain the recognized standard for clinical practice policy in cancer care. The guidelines are the most thorough and frequently updated clinical practice guidelines available in any area of medicine and are provided in an effort to guide treatment decisions of people involved in cancer care including the medical care team, payers, patients, and their families. The guidelines advocate for a multidisciplinary approach that is evidence based and consensus driven and ensures “that all patients receive preventive, diagnostic, treatment and supportive services that will most likely lead to optimal outcomes.” The NCCN guidelines are reviewed by an expert multidisciplinary panel on an ongoing basis and updated after critical review of the best evidence. Committee members of the ON DPG submitted recommendations for changes to the guidelines specific to head/neck cancer and pancreatic cancer to the NCCN review board. The changes included inclusion of MNT provided by RDNs as part of the cancer care pathway for these tumor types. The 2017 Head and Neck Cancer Guidelines now include the recommendation, “A registered dietitian should be part of the multidisciplinary team for treating patients with head and neck cancer throughout the continuum of care.” The NCCN 2017 Pancreatic Cancer Guidelines now state that a nutrition evaluation should be carried out by a “registered dietitian” for patients with pancreatic cancer. NCCN’s inclusion of evidence-based nutrition guidelines are necessary to close the critical gap in evidence and standards for nutritional services. ON DPG recognizes this as an important step toward payer coverage of nutrition services in the future. More importantly, inclusion of nutritional guidelines embrace NCCN’s mission of “improving the quality, effectiveness, and efficiency of cancer care so that patients can live better lives.”

The NCI developed a Request for Applications (R01, R21) through their Provocative Questions mechanism. The goal of NCT’s Provocative Questions is to challenge the scientific community to creatively think about and answer important but nonobvious or understudied questions in cancer research and to stimulate NCI’s research communities to use laboratory, clinical, and population research in especially effective and imaginative ways. The NASEM Workshop was the impetus for Provocative Question 11, which asks, “Through what mechanisms do diet and nutritional interventions affect the response to cancer treatment?” A better understanding of how nutrition affects cancer outcomes could help guide future research designed to (1) identify beneficial and detrimental interactions between nutritional interventions and specific cancer therapies; (2) identify patients most likely to benefit from specific nutritional interventions; and (3) optimize, and eventually individualize, nutritional interventions for specific patients.

CONCLUSIONS

Access to nutrition care in outpatient cancer centers remains inadequate. It is well established that malnutrition has a profound impact on cancer treatment and survivorship, yet most outpatient cancer centers have limited
or no nutrition services provided by RDNs. This deficiency is disconcerting given most cancer patients will experience malnutrition at some point during their treatment course, and malnutrition has been shown to result in poorer treatment outcomes that contribute to morbidity and mortality.

As identified in the NASEM Workshop, there is strong evidence that poor nutritional status negatively affects cancer health outcomes. There is less evidence for the role of nutritional interventions on cancer health outcomes. Providing the evidence necessary to integrate nutritional interventions into standard cancer care will take an understanding of the current state of the science (systematic reviews and meta-analyses), an analysis of gap areas, a research agenda that focuses on priority areas, and a workforce of oncology RDNs educated and trained in conducting research. More research to support the role of RDNs in managing treatment-related side effects and preventing malnutrition is urgently needed. Additional research focusing on the impact of cost-effectiveness on nutritional interventions would provide rationale for RDN reimbursement. In addition, promoting the use of validated malnutrition risk screening tools with defined outpatient referral pathways must become standard clinical practice. Taken together, these initiatives will support the establishment of RDN staffing guidelines and drive the integration of national nutrition interventions into outpatient cancer treatment settings. Ultimately, RDNs must be included in the standards of outpatient care established by the accrediting organizations. As cancer treatment has moved to the outpatient setting, nutrition interventions, provided by RDNs, have become imperative to ensure the best outcomes for both patients in treatment and in survivorship.

References


