

The National Academies of Sciences, Engineering, and Medicine

Food and Nutrition Board

Examining Access to Nutrition Care in Outpatient Cancer Centers

Planning Committee on Assessing Relationships between Access to
Standardized Nutritional Care and Health Outcomes and Cost-Effectiveness of
Care in Outpatient Cancer Centers

March 14, 2016

The National Academies Keck Center
500 Fifth Street, NW
Washington, DC 20001

Examining Access to Nutrition Care in Outpatient Cancer Centers

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Statement of Task

An ad hoc planning committee will plan a one-day public workshop exploring evolving interactions between nutritional care, cancer, and health outcomes. Specifically, workshop participants will explore how the following parameters affect the health outcomes and survival of cancer patients in outpatient cancer centers: current standards for nutritional services, the role of nutritional intervention in nutritional status and morbidity and mortality in oncology patients; and benefits associated with access of oncology patients to medical nutrition therapy. The workshop also will explore nutritional interventions and cost of outpatient care. The workshop discussions will take into account a range of analytical approaches, including use of aggregate data from electronic medical records, to assess cost-benefit relationships between oncology nutrition services and health outcomes and survival. The committee will plan and organize the workshop, select and invite speakers and discussants, and moderate the discussions. An individually-authored summary of the presentations and discussions at the workshop will be prepared by a designated rapporteur in accordance with institutional guidelines.

Agenda

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Room 100

500 Fifth Street, NW

Washington, DC 20001

Workshop 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 U.S.
- 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

7:30 am

Registration

INTRODUCTION AND OPENING REMARKS

8:00

Welcome

Cheryl Rock, University of California San Diego, Planning Committee Chair

8:05

Keynote

Steven K. Clinton, Ohio State University

8:25

Sponsor Panel (5 minutes each)

- American Institute for Cancer Research, *Deirdre McGinley-Gieser, Senior Vice President for Programs*
- NIH, National Cancer Institute and Office of Dietary Supplements, *Elaine Trujillo, Nutrition Science Research Group, National Cancer Institute*
- Alcresta, Inc., *Karen Sullivan, Director of Marketing*

- American Cancer Society, *Colleen Doyle, Managing Director, Nutrition and Physical Activity*
- Oncology Nutrition Dietetic Practice Group/Clinical Nutrition Management Dietetic Practice Group, *Katrina Claghorn, Advanced Practice Clinical Dietitian Specialist Patient & Family Services, University of Pennsylvania*
- Academy of Nutrition and Dietetics and the AND Foundation, *Alison Steiber, Chief Science Officer*

SESSION 1: Current Knowledge and Status of Nutrition Practice in Oncology Outpatient Care

Moderated by Cheryl Rock, University of California, San Diego, Planning Committee Chair

9:00 Nutritional Interventions and Issues in Early Oncology Treatment
Mary Platek, Roswell Park Cancer Center

Nutritional Interventions and Issues in Long-Term Oncology Care
Cheryl Rock, University of California, San Diego

10:00 Panel Discussion: Data Gaps in Current Nutrition Practice in Oncology Outpatient Care
Session Speakers

10:20 Break

SESSION 2: Models of Care – National and International Perspectives

Moderated by Kim Robien, George Washington University, Planning Committee Co-Chair

10:40 Models of Nutrition Care in Outpatient Oncology in the U.S. and Barriers to Achieving Ideal Care
Rhone Levin, Dell Children's Medical Center

Models of Nutrition Care in Outpatient Oncology Internationally
Liz Isenring, Bond University, Queensland, Australia

11:30 Panel Discussion: Data Gaps in Models of Care
Diana Dyer, Consultant, Ann Arbor, Michigan
Session Speakers

Noon Break for Lunch

SESSION 3: Benefits and Costs of Care

Moderated by Nico Pronk, HealthPartners, Inc. and Wendy Johnson Askew, Nestle Nutrition North America

1:00 Cost/Benefit Considerations
Jim Lee, Altarum Institute

1:20 Perspectives on Oncology Nutrition Care: Employers and Other Purchasers
Brenna Schebel, National Business Group on Health

1:40 Panel Discussion: Data Gaps in Outcomes and Costs of Care
Session Speakers

2:00 Break

SESSION 4: Dissemination Science and Implementation – Reaching the Ideal

Moderated by Marian Neuhouser, Fred Hutchinson Cancer Research Center

2:30 Dissemination and Implementation of Nutritional Care in Acute Care and Specialized Centers
Barbara Grant, Saint Alphonsus Cancer Care Center

Dissemination and Implementation of Nutritional Care in Community Settings
Colleen Doyle, American Cancer Society

Development of Clinical Practice Guidelines
Joan McClure, National Comprehensive Cancer Network

3:30 Data Gaps in Communication and Dissemination of Oncology Care
Session Speakers

SESSION 5: Facilitated Discussion: Synthesis of the Evidence

4:00 *Discussion Leaders:*

Steven Clinton, Ohio State University
Kim Robien, George Washington University
Suzanne Dixon, The Health Geek LLC

Questions for Participant Discussion:

- What is new and creative in oncology nutrition care that will move the field forward?
- How can we make the RD/RDN part of the health care system?
- How can nutrition care become part of routine oncology care in the outpatient setting?
- How will nutrition care in outpatient centers be paid for?
- What is the evidence to justify the need for nutrition care in outpatient oncology?

4:40

Chair's Summary and Recognition of Additional Sponsors

Cheryl Rock, Professor, Department of Family Medicine and Public Health, University of California, San Diego

Recognition of Additional Sponsors:

OptionCare, Noreen Luszc, Nutrition Program Director

Medtrition, Evelyn Phillips, Corporate Clinical Dietitian Consultant

Savor Health, Susan Bratton, Founder and CEO

The Annie Appleseed Project, Ann Fonfa, President

5:00 pm

Adjourn Meeting

**Planning Committee on Assessing Relationships between Access to Standardized
Nutritional Care and Health Outcomes and Cost Effectiveness of Care in Outpatient
Oncology Centers**

Cheryl Rock, PhD, RD (Chair)

Professor
Department of Family Medicine and Public
Health
Cancer Prevention and Control Program
University of California San Diego

**Kim Robien, PhD, RD, CSO, FAND (Vice-
chair)**

Associate Professor
Exercise and Nutritional Science
Epidemiology and Biostatistics
George Washington University

Steven K. Clinton, MD, PhD

Professor of Internal Medicine
Division on Hematology and Oncology
The Ohio State University

Wendy Johnson-Askew, PhD, MPH, RD

Director of Public Policy
Nestle Nutrition, North American

Marian Neuhouser, PhD, RD

Member, Cancer Prevention Program
Public Health Services Division
Fred Hutchinson Cancer Research Center

Nico Pronk, PhD

Vice President for Health
Management/Health Chief Officer
HealthPartners, Inc.

Consultant

Mei Chung, PhD, MPH
Research Assistant Professor
Tufts University

Staff

Ann L. Yaktine, PhD, RD
Director
Food and Nutrition Board

Noa Nir
Senior Program Assistant

Sponsors

The National Academy of Sciences W.K. Kellogg Foundation Fund

The American Institute for Cancer Research

The Oncology Nutrition Dietetic Practice Group of the Academy of Nutrition and Dietetics

The National Institutes for Health, National Cancer Institute and Office of Dietary Supplements

Alcresta, Inc.

The Academy of Nutrition and Dietetics Foundation

The American Cancer Society

The Academy of Nutrition and Dietetics

Savor Health

OptionCare

The Clinical Nutrition Management Dietetics Practice Group of the Academy of Nutrition and Dietetics

Medtrition

The Annie Appleseed Project

Biographical Sketches

Speakers

Steven Clinton, MD, PhD, is Professor in the Department of Internal Medicine, Division of Medical Oncology at The Ohio State University. He is the Program Leader for the Molecular Carcinogenesis and Chemoprevention Program of the Comprehensive Cancer Center and serves the James Cancer Hospital as Director of Prostate and Genitourinary Oncology. Dr. Clinton is a faculty member of the campus wide Ohio State University Nutrition Graduate Program (OSUN) and is Co-Director of the Center for Advanced Functional Foods Research and Entrepreneurship. His research examines fundamental mechanisms underlying the development of cancer and studies novel prevention and therapeutic strategies in human clinical trials. His cancer research interests within nutritional sciences include the roles of energy intake, bioactive lipids, vitamin D, and carotenoids, and other phytochemicals.

Suzanne Dixon, MPH, MS, RDN, is an epidemiologist and Registered Dietitian, and an author, speaker, and internationally recognized expert in nutrition, chronic disease prevention and management, and health and wellness. She is best known as the creator of the award-winning website CancerNutritionInfo.com (sold in 2005), which was acclaimed by the New York Times and named one of Time magazine's 50 Coolest Websites of 2005. She has numerous scholarly and popular literature publications and has received awards from the Academy of Nutrition and Dietetics for Innovative Nutrition Education Programs for the Public and Distinguished Practice in Oncology Nutrition. Ms. Dixon received her training in epidemiology and nutrition at the University of Michigan, School of Public Health at Ann Arbor, and currently runs her own consulting business in Portland, Oregon.

Colleen Doyle, MS, RD, is Director of Nutrition and Physical Activity for the American Cancer Society. She is a Registered Dietitian who has worked in the health promotion field for over 20 years. In her role as director, she has been instrumental in developing strategies to increase awareness of the importance of diet and exercise for chronic disease prevention and management, and to create changes in schools, worksites and communities that can help improve healthy lifestyles. Colleen has extensive media and public speaking experience. She has appeared on national broadcasts, including CNN, Headline News, Discovery Health and the Do It Yourself Network, as well as numerous local news and cable television shows. She is frequently quoted in nationwide publications including USA Today, the Washington Post, and the Los Angeles Times and is a frequent presenter at both scientific and consumer meetings, and has authored numerous scientific and consumer articles on nutrition and physical activity.

Diana Dyer, MS, RD, is a registered dietitian in Ann Arbor, Michigan, and a two-time breast cancer survivor. She is also a survivor of neuroblastoma, a childhood cancer. After a 20-year career working in the specialty area of critical care nutrition, Ms. Dyer combined her personal experience and professional expertise to focus her efforts on increasing awareness of the benefits of proactively including nutrition as a component of true comprehensive cancer care. Ms. Dyer authored the book A Dietitian's Cancer Story, with proceeds contributed to an endowment she established at the American Institute of Cancer Research (AICR) in Washington, D.C. that funds research focused

on nutrition and cancer survivorship. She has served as a consultant to the University of Michigan's Integrative Medicine Research Center, The American Institute for Cancer Research, and is on the Professional Advisory Board for the Wellness Community of Southeast Michigan. Ms. Dyer has been a board member of the Oncology Nutrition Dietetic Practice Group of the American Dietetic Association and was the founding chair of their Survivorship Subunit.

Barbara Grant, MS, RDN, CSO, FAND, is the outpatient oncology dietitian at the Saint Alphonsus Cancer Care Center in Boise and Caldwell, ID. Ms. Grant has over 30 years of experience in cancer nutrition. At Saint Alphonsus she provides individualized nutritional counseling and educational classes for individuals diagnosed with cancer throughout the continuum of care. Ms. Grant is a founding member and past chair of the Oncology Nutrition Dietetic Practice Group of the Academy of Nutrition and Dietetics. She is a contributing editor to the Clinical Guide to Oncology Nutrition and co-author of Management of Nutrition Impact Symptoms in Cancer and Educational Handouts, among her many patient and professional publications.

Liz Isenring, PhD, is Professor and Head of Program in the Faculty of Health Sciences and Medicine at Bond University, Australia. She is internationally recognized in the areas of oncology nutrition, nutrition in older adults, nutrition screening and assessment. She supervises HDR students in a broad research program that includes oncology nutrition, nutrition for older adults, managing malnutrition and developing evidence-based nutrition guidelines for improving the care of patients. Her students have won numerous research awards. Previously, she led the development and contributed to several sets of Australian and International evidence-based guidelines leading to improved nutrition care. She is Nutrition Section Editor for Current Oncology and Associate Editor for Nutrition and Dietetics.

Jim Lee, MS, is Vice President and Director, Systems Research and Initiatives Group (SRI), Altarum Institute. Mr. Lee has been with Altarum Institute for more than 20 years. Before his current position, he served as Director of Altarum's Medical Care Systems Group, where he led public health informatics and health quality research programs. Mr. Lee's most recent work focuses on health technology assessments drawing on administrative, financial accounting, and clinical data to support clinical trials, practice guideline development, and program evaluations. His recent studies include evaluation of the cost-effectiveness of alternative diagnostics in lung, breast, and cervical cancer; rapid identification and intervention in severe sepsis; and HIV viral load surveillance protocols.

Rhone Levin, MEd, RD, CSO, LD, has been a Registered Dietitian for 24 years and has specialized in oncology nutrition. She is board certified in oncology nutrition. Ms. Levin is an oncology dietitian at the Dell Children's Medical Center. Previously she was at the Mountain States Tumor Institute for St. Luke's Health System. She is a co-writer: Symptom Management Interventions for Oncology Patients, a project of the ON DPG and Academy of Nutrition and Dietetics: in press: Work group Academy of Nutrition and Dietetics: Evidence Analysis Library oncology revision of evidence based nutrition research.

Joan McClure, MS, is Senior Vice President of Clinical Information and Publications at the National Comprehensive Cancer Network (NCCN). Ms. McClure is responsible for the NCCN Clinical Practice Guidelines in Oncology, associated Guidelines for Patients in English and Spanish, the NCCN Drugs & Biologics Compendium, and The Journal of the NCCN. Ms. McClure also serves as an Associate Editor for JNCNN. Updated annually, the clinical practice guidelines are recognized as the standard for clinical policy in the United States and have served as a model for guidelines programs elsewhere in the world. Ms. McClure previously directed investigator and patient recruitment efforts in oncology for a multinational contract research organization where she also managed the technical and scientific effort to identify and develop standards for medical and toxicology data for submission to regulatory authorities in the U.S., Europe, and Japan.

Mary Platek, PhD, MS, RD, is Research Assistant Professor at Roswell Park Cancer Institute. Dr. Platek is a nutritionist and clinical epidemiologist with expertise in nutrition interventions for chronic disease management. Her research interests include cancer-related malnutrition and cachexia. She had clinical experience in diverse patient and community settings as well as university teaching. She was responsible for establishing and directing an accredited dietetic internship program for the State University of New York and received the Outstanding Dietetic Educator award from the New York State Dietetic Association. She completed an NIH fellowship in the epidemiologic and basic science of cancer prevention at Roswell Park Cancer Institute where she actively examines nutritional status and intervention with outcomes of treatment in various cancer populations.

Cheryl Rock, PhD, RD, is Professor in the Department of Family Medicine and Public Health, and the Cancer Prevention and Control Program, University of California, San Diego, School of Medicine. Dr. Rock's research efforts are focused on the role of nutritional and dietary factors in the development and progression of cancer, particularly breast cancer, and healthy weight management in adults. Her research efforts address diet composition and weight management, and how diet, adiposity and physical activity affect biomarkers and risk and progression of cancer and other chronic diseases. Dr. Rock has served on numerous NIH and USDA review panels and committees, and she has served on editorial boards for several peer-reviewed journals. To date, she is the author of more than 240 scientific papers and book chapters. Dr. Rock completed undergraduate training in nutrition and dietetics at Michigan State University, achieved a Master of Medical Science degree in clinical nutrition at Emory University, and was awarded a doctoral degree in nutritional sciences from the University of California, Los Angeles.

Brenna Haviland Shebel, MS, is Director of Health Care Cost and Delivery at the National Business Group on Health.® Her areas of focus are consumer-directed health care, consumerism, employee communications and engagement, and cancer. She coordinates the operations of the Institute on Health Care Costs and Solutions. In addition, she served as project manager for the Employer's Guide to Cancer Treatment and Prevention, a major, multi-year initiative to help employers address a growing health care challenge - cancer in the workplace. Prior to joining the Business Group, Ms. Shebel worked for Healthy Maine Partnerships (HMP) in promoting physical activity,

nutrition, and tobacco resistance activities in schools, communities and workplaces in southern Maine where she led efforts to establish tobacco-free communities, created youth advocacy programs in three school districts, and assisted with workplace wellness initiatives. She is a Certified Health Education Specialist (CHES).

Moderators

Wendy Johnson-Askew, PhD, MS, is Vice President of Corporate Affairs with Nestle Infant Nutrition, North America. In this role she leads the Corporate Affairs Function which includes Medical Advocacy and Public Policy, Nutrition, Health and Wellness and Corporate Communications. Wendy is a member of the Institute of Medicine's Food Forum and a member of the International Food Information Council Board of Directors. She is an active member of the American Public Health Association where she is a Past Chair of the Food and Nutrition Section and a member of the Inter-Sectional Council Steering Committee. Prior to joining Nestle, Dr. Johnson-Askew was employed by the National Institutes of Health, Division of Nutrition Research Coordination as a public health nutrition and health policy adviser. While there she was actively involved in the development and follow-up actions to the Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity and the Dietary Guidelines process. She developed scientific symposia on communicating dietary information and determinants of eating behavior which informed the granting process by leading to the development of requests for proposals. Dr. Johnson-Askew's research interests include determinants of eating behavior, racial and ethnic health disparities and obesity.

Marian L Neuhouser, PhD, RD, is Full Member in the Cancer Prevention Program, Division of Public Health Sciences at the Fred Hutchinson Cancer Research Center in Seattle, WA. She is also Core Faculty in Nutritional Sciences and Affiliate Professor of Epidemiology, both in the School of Public Health, University of Washington. Dr. Neuhouser is a nutritional epidemiologist whose primary research focus is nutrition and energy balance and their relationship to cancer prevention and cancer survivorship. She has broad experience and leadership in large clinical trials, including the Women's Health Initiative and the Prostate Cancer Prevention Trial, small-scale controlled dietary interventions, and large observational cohorts. In addition, a portion of Dr. Neuhouser's research portfolio is focused on methods to improve diet and physical activity assessment and numerous aspects of health disparities, which links together nutrition, energy balance and cancer risk. Dr. Neuhouser was a member of the 2015 Dietary Guidelines Advisory Committee and currently serves as Vice-President of the American Society for Nutrition (2015-16) to be followed by President (2016-17).

Nico Pronk, PhD, FACSM, FAWHP, is Vice President for Health Management and Chief Science Officer for HealthPartners, a non-profit, member-governed integrated health system headquartered in Minneapolis, Minnesota. Dr. Pronk is also a senior research investigator at the HealthPartners Institute for Education and Research; adjunct professor for Society, Human Development and Health at the Harvard School of Public Health; visiting research professor in Environmental Health Sciences at the University of Minnesota, School of Public Health; member of the Task Force on

Community Preventive Services; and founding and past-president of the International Association for Worksite Health Promotion. His research expertise lies in the areas of population health improvement, the role of physical activity in health, and the impact of multiple health behaviors on health outcomes. Dr. Pronk is particularly interested in improving population health in context of the employer setting, the integration of health promotion with occupational safety and health, and the integration of health promotion, behavioral health, and primary care. Dr. Pronk received a Ph.D. in exercise physiology from Texas A&M University and completed postdoctoral studies in behavioral medicine at the University of Pittsburgh Medical Center and the Western Psychiatric Institute and Clinic in Pittsburgh.

Kim Robien, PhD, RD, CSO, FAND, is Associate Professor at the George Washington University in the Milken Institute School of Public Health. She is a Registered Dietitian, nutrition scientist, and epidemiologist whose research focuses on nutrition in relation to cancer prevention and survivorship. She is a Certified Specialist in Oncology Nutrition (CSO), and practiced as an oncology dietitian for more than 10 years prior to beginning her research career. Dr. Robien serves as Program Director for the Master's in Public Health degree program in Public Health Nutrition at GW. She is a widely published scientific researcher, and also serves as a member of the Editorial Boards for the Journal of the Academy of Nutrition and Dietetics and Nutrition in Clinical Practice.

Background and Significance

Standards for nutritional services

With the advent of more effective options for managing cancer symptoms and side effects, most oncology treatment has moved to an outpatient model; about 90 percent of oncology patients now receive treatment in outpatient cancer centers and clinics.¹ This change from the previous model of inpatient care has important implications for the overall quality of care for oncology patients, and particularly for care related to access to nutrition services. Standards set by the Joint Commission on Accreditation of Healthcare Organizations mandate hospitals define criteria for nutritional screening and that screening occur within 24 hours of admittance into the hospital.² Ambulatory nutritional care standards, however, are ambiguous and inconsistently applied across health care settings. Access to oncology nutrition care is left to the discretion of the ambulatory entity and/or the health care providers. As a result, a large majority of individuals treated in outpatient cancer centers do not have access to oncology nutrition services.

The loss of access to oncology nutrition services coincides with a growing recognition of the importance of providing nutritional care to optimize oncology treatment outcomes and maximize patient quality of life. Numerous mainstream professional organizations, including the American College of Surgeons Commission on Cancer,³⁻⁴ the Association of Community Cancer Centers,⁵ the American and European Societies of Parenteral and Enteral Nutrition,⁶⁻⁷ the National Institute for Health and Care Excellence of Great Britain,⁸ and the Victorian Department of Health in Australia⁹ recognize nutrition services as an essential component of cancer care. These organizations call for formalized nutrition screening and assessment, care plans, and early nutrition intervention when deficits are detected. The U.S. stands alone in failing to specify and cover the inclusion of a registered dietitian nutritionist (RDN) on the multi-modal oncology care team.

Nutrition status and treatment outcomes

Malnutrition occurs in up to 80 percent of cancer patients at some point during cancer care.¹⁰ Malnutrition negatively affects outcomes; involuntary weight loss of just 5 percent decreases survival in cancer patients.¹¹⁻¹²

The evidence analysis report by the Oncology and Nutrition Evidence Analysis Project of the Academy of Nutrition and Dietetics notes that poor nutritional status was associated with increased morbidity and mortality.¹³ Further, weight loss, malnutrition, sarcopenia, cachexia and fatigue, all outcomes associated with cancer, were associated with increased mortality.¹³ Other analyses demonstrate that markers of malnutrition, such as weight loss, low muscle mass index, and muscle attenuation, independently predict survival.¹⁴

In addition to reduced survival, malnutrition impairs the ability to complete treatment, reduces quality of life, and increases the risk of cancer recurrence.¹⁵⁻¹⁹ Patients receiving multi-modal treatments experience multiple side effects, which may result in inadequate dietary intake and consequent weight loss, leading to treatment breaks, longer hospitalizations, unplanned hospital admissions, more severe treatment side

effects, dose-limiting toxicities, less delivered chemotherapy, and decreased quality of life and performance status.²⁰⁻²³

On the other hand, nutritional interventions have been shown to improve treatment tolerance, reduce treatment breaks, decrease weight loss and loss of lean body mass, increase quality of life, decrease unplanned hospitalizations by more than 50 percent, reduce length of hospital stay (LOS), and improve survival.^{15-19, 24-30} Despite surveys documenting malnutrition rates of up to 67 percent in cancer populations, these same surveys found less than 60 percent of those classified as malnourished received nutrition interventions of any type.³¹

At the other end of the spectrum, excess energy intake leading to overweight and obesity have negative health consequences on cancer patients.³² 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 enhanced cancer progression.³²⁻³⁸

Regardless of the impact of weight loss on cancer survival, weight management is key to controlling prevalent co-morbid conditions,³⁹⁻⁴⁰ and dietitian-led weight management programs have been shown to be significantly more effective at achieving appropriate body weight and metabolic parameters at one year compared with usual care or free access to a weight control program.⁴¹ Unfortunately, as noted in the Institutes of Medicine (IOM) Workshop Summary on The Role of Obesity in Cancer Survival and Recurrence, quality nutrition care for cancer survivors, delivered by a RDN, is difficult to procure.⁴²

Access to medical nutritional care

Data on access to nutritional care is limited. One source estimates that RDNs provide 0.5 Full Time Equivalents (FTEs) in inpatient cancer centers and 0.2 FTEs for chemotherapy and radiation areas, which represent typical outpatient center services.⁴³ In a practitioner survey of oncology RDNs, approximately 64% worked in an inpatient setting and 36% in an outpatient setting.⁴⁴ However, this sample does not provide insight into the FTEs in outpatient cancer centers or the patient-to-nutrition care provider ratio.

Costs of malnutrition

In adult oncology patients, poor nutritional status is associated with higher hospital costs, primarily related to increased rates of hospital admissions or readmissions and increased LOS.⁴⁵⁻⁴⁶ Other parameters that may increase hospital costs, including higher rates of consultation with a general practitioner and higher rates of medication, are associated with risk of malnutrition in cancer patients.⁴⁷ Fewer studies have directly examined the cost-effectiveness of nutritional interventions, however, ample data support that 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.¹³ Establishing consistent use of Electronic Medical Records (EMRs) across the U.S. would provide a means of aggregating large care outcome datasets, which could

then be used to identify cost savings that arise from systematically applied oncology nutrition interventions delivered by RDNs. The cost of failing to address obesity, another form of malnutrition among cancer survivors, is high. In 2008, the medical costs of obesity-related illness in the U.S. were estimated at \$209.7 billion.⁴⁸ By decreasing risk of poor health outcomes these costs can be better controlled. Intensive lifestyle interventions have been shown to reduce the risk of conversion from pre-diabetes to diabetes by 58%, and weight loss of just 5 to 10 percent of body weight among obese individuals reduces cardiovascular risk factors.⁴⁸ Since overweight and obese cancer survivors are likely at higher risk for heart disease, diabetes, stroke, and hypertension compared with those maintaining a healthy body weight, treating obesity is an important intervention step to maximize short- and long-term health outcomes in cancer survivors and decrease the overall cost of care.

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