THE STATE OF CANCER REHABILITATION IN THE UNITED STATES

ABSTRACT

The field of cancer rehabilitation and prehabilitation has grown significantly over the past decade. Advancements in early detection and treatment have resulted in a growing number of cancer survivors in the United States (US), expected to reach 26 million by 2040. Health care professional graduate education is trying to catch up with anticipated clinical demand by increasing the number of cancer rehabilitation fellowship training programs and introducing rehabilitation/prehabilitation concepts earlier in training. Numerous national organizations have issued guidelines for cancer rehabilitation research and posttreatment cancer health care. As treatment modalities evolve, so must research on side-effects and multisystem management over the continuum of care. Current research strategies address different cancer types with a broad focus on timing of interventions, cost effectiveness, efficacy of rehabilitation, and improving screening and assessment tools. A collaborative, interdisciplinary research model is paramount to deepen impact and broaden reach.

Policy supports could advance cancer survivorship and rehabilitative care. Funding to advance evidence-based practices for distress screening, psychosocial support, survivorship care planning, and rehabilitation services remains critical. Current social policies and health care access protections must be expanded to best serve the growing number of cancer survivors in the US. Equitable health care access, health care experience and health care outcomes remain a critical area for research and policy supports. The cost of cancer treatment requires significant reform to ensure access to all.

Rehabilitation services are elements of standards of care for many neurological, cardiological and orthopedic diagnoses, but currently are not standard for actual or potential dysfunctions among cancer survivors. Both the disease process and the variety of therapeutic modalities increase risks of dysfunction, impairments, poor survival, and diminished quality of life. Rehabilitation focuses on optimizing quality of life and maximizing function throughout the continuum of cancer care. Health care professionals are urged to integrate high quality interdisciplinary care to promote collaboration and dissemination of knowledge which will yield better care for cancer survivors. Prehabilitation has the potential to play key roles in reducing or eliminating many cancer-related impairments and disabilities.

KEY WORDS

CANCER REHABILITATION, PREHABILITATION, SURVIVORSHIP, PHYSICAL MEDICINE AND REHABILITATION, PHYSIATRY, PHYSICAL THERAPY

CURRENT STATE OF PRACTICE

In the US, interest in cancer rehabilitation and prehabilitation has grown tremendously over the past decade, with exponential expansion of clinical services and research. The recent report Integrating Cancer Rehabilitation into the Care Continuum published in the journal PM&R summarizes the progress over time, and although there continue to be major gaps in care there have been many important advances. One critical advancement is the effort to standardize cancer rehabilitation and integration into oncology care. The National Comprehensive Cancer Network (NCCN) Clinical Practice Guidelines, the American College of Surgeons Commission on Cancer Program Standards, the American Cancer Society (ACS) and the Association of Community Cancer Centers Cancer Program Guidelines (ACCC) now identify rehabilitation as a crucial if not mandatory component of cancer care. The Commission on Accreditation of Rehabilitation Facilities (CARF) is the main accrediting organization for inpatient rehabilitation facilities in the US, with some international reach. In 2014, CARF initiated accreditation for inpatient cancer rehabilitation units. At the...
writing of this report, there were nine American CARF accredited cancer rehabilitation specialty programs.

LIVESTRONG built consensus among key stakeholders on Essential Elements of Survivorship Care that “any effective cancer survivorship program must provide (directly or via referral) to post-treatment survivors”.18 Rehabilitation is included as a “Tier 2” element – indicating a “high need” that programs should provide (as opposed to Tier 1, “must provide” elements), limited to “rehabilitation for late effects”, though other Tier 2 elements (e.g., nutrition, comprehensive medical assessment, psychosocial assessment) are generally considered elements of comprehensive rehabilitation services. The ACCC’s Cancer Program Guidelines call for “comprehensive rehabilitation services”, offering 14 exemplars of elements of comprehensive services.19 The physician component does not specify physicians trained and board-certified in the specialty of Physical Medicine and Rehabilitation (PM&R), physiatry, but instead notes only “attending physicians”.6 Additionally, US rehabilitation professional organizations have dramatically increased cancer rehabilitation involvement. The American Congress of Rehabilitation Medicine (ACRM) is an interdisciplinary rehabilitation society that is experiencing significant growth of its Cancer Rehabilitation Networking Group (CRNG). During its annual 3-day conference, ACRM offers at least two continuous education tracks on cancer rehabilitation, more than doubling cancer rehabilitation content since 2014 when the CRNG started. The Cancer Physician Rehabilitation Consortium (CRPC), formed in 2017 by a group of cancer physiatrists, is taking on projects including standardizing cancer rehabilitation outcome measures. The American Physical Therapy Association (APTA) Oncology Section has published a quarterly journal, Rehabilitation Oncology, since 1982. The National Institutes of Health (NIH) held the first ever Cancer Rehabilitation Summit in June 2015. The same year, the Rehabilitation Research and Training Centers (RRTC) at NIH convened a panel of interdisciplinary experts to review current literature and practice patterns, identify opportunities and gaps regarding cancer rehabilitation and its support of oncology care, and to make recommendations for future efforts that promote better quality cancer rehabilitation care. Several recommendations from this panel focused on the need for elevating the science in support of rehabilitation interventions in cancer care, and the development of a research agenda. Finally, most academic departments of PM&R recognize that cancer rehabilitation should be a service offered and many are actively recruiting researchers and clinical faculty.

Cancer rehabilitation in the US primarily takes place in outpatient settings — saving both health care costs and improving patient quality of life.10 However, obstacles to broader integration of cancer rehabilitation remain. A recent study found that approximately 90% of National Cancer Institute (NCI) accredited hospitals did not have a link to cancer rehabilitation services on their websites.11 Multiple studies reveal under-referral of cancer patients who could potentially benefit from rehabilitation interventions.1,9,12,13,14 Some under-utilization could relate to lack of awareness of benefits of rehabilitation services for oncology patients.4 Specialty providers may overly concentrate on the disease without considering patient quality of life and functional challenges.12 One strategy to make rehabilitation referrals easier for oncologists is to optimize use of patient impairment screening tools to trigger cancer rehabilitation referrals.15 Also, because much of the clinical growth in the field of cancer rehabilitation is relatively recent, residency programs and professional schools are still trying to adapt. Cancer rehabilitation training during physical specialty PM&R training is currently not the norm, leading many physiatrists to seek additional training or education to better prepare themselves for treating cancer survivors.18 Fortunately, additional training opportunities exist, including a growing number of cancer physiatry fellowships (though currently there are fewer than 10 fellowship positions per year in the US) and an Oncology Physical Therapy Certification program affiliated with the American Board of Physical Therapy Specialties (ABPTS).

Recent interdisciplinary efforts of the Cancer and Aging Research Group (CARG) strongly emphasized the need, in the population of older adults with cancer, for clinical assessment of function prior to the initiation of cancer treatment and for ongoing assessment of function during the trajectory of cancer care.17 These recommendations were deliberated in new guidelines from the American Society of Clinical Oncology (ASCO) emphasizing prospective assessment of function prior to the initiation of chemotherapy treatments in older adults in order to optimally manage vulnerabilities during treatment.18 This lays a strong foundation for clinical integration of rehabilitation providers and services in oncology care and aligns with the aforementioned prehabilitation and prospective models of care purported to enhance physical functioning and improve quality of cancer care.19

**CURRENT STATE OF RESEARCH**

Rapid acceleration in research and publications in oncology rehabilitation has occurred over the last decade. Research findings support a wide array of targeted and effective therapeutic interventions that directly improve functioning during and after cancer treatment.20,21 Trials in palliative rehabilitation demonstrate significant impact on an individual’s mobility, safety, and quality of life.22 Additional efforts highlight the efficacy of proactive models of care, such as prehabilitation and prospective surveillance models, for early identification and prevention of functional decline known to accompany antineoplastic therapies.20,21,24,25,26,27 A recent analysis of the landscape of published literature in PubMed demonstrates significant growth in cancer rehabilitation-related research, however the findings suggest that publication emphasis has strongly supported cognitive, behavioral, and psychological therapies.28 Publications are lacking for studies of functional morbidity and physical rehabilitation research. The analysis provides insights to the gaps and opportunities for future cancer rehabilitation research emphasis.

The expanding evidence base supporting rehabilitation strategies from diagnosis through end of life care, while remarkable for a growing field, still languishes due to a myriad of short-comings.20 Many small, well designed trials demonstrate efficacy but fail to be replicated in larger trials. Reasons for this deficit include: the lack of a research infrastructure to support an adequate scale of research trials; the inadequacy of trained cancer rehabilitation researchers; a paucity of research facilities that integrate rehabilitation trials into cancer care delivery systems; and isolated or meager cancer rehabilitation-related funding.20,24 This could be remedied by a cohesive interdisciplinary research agenda that seeks to expand existing evidence supporting rehabilitation interventions in the context of comprehensive cancer care and builds an evidence base that fills the gaps existing in important research domains.20,21,24 Cancer is unique as its treatments. Known treatment-related side effects can develop as acute, long-term and late, chronic multi-system conditions that may occur over a protracted time course with the impact on function following likewise. These factors require
methodological perspectives on research trials to extend beyond typical rehabilitation research constructs. Traditional randomized controlled trials aimed at testing interventions will satisfy only a portion of the evidence needed to advance rehabilitation interests in oncology. Studies should also seek to identify optimal health care delivery models, cost effectiveness of those models, and impact of interventions on disease-specific outcomes such as disease-free survival, overall survival, mortality, tolerance to antineoplastic therapies, and toxicity burden as they relate to an individual’s functioning before, during and after treatment. 

In the US, oncology rehabilitation advancement depends on two critical research strategies. First, evidence-based interventions must be tested and applied across different cancer disease types and at various points along the cancer care continuum. Current research efforts tend to focus on impairments within a disease state (e.g., lymphedema in breast cancer, or muscle wasting among prostate cancer survivors). While these research efforts have demonstrated fruitful outcomes, the cancer rehabilitation community would be best served by research trials that address the cancer population broadly and regard functional improvements at individual functional, institutional, and societal levels. Interven- tional research trials must be coupled with a research agenda that broadens the focus to include consideration for timing of rehabilitation interventions, testing of care delivery models that include rehabilitation services, examination of the cost effectiveness and comparative effectiveness of rehabilitation strategies, and focus on clinical screening and measurement tools will elevate the field more rapidly and will potentially yield more significant impact on the quality of cancer care.

Second, a research framework would be a strong tool to guide the field to address the most relevant areas of cancer rehabilitation practice and align research efforts to meet the needs and gaps identified in each of these areas as well as to promote optimal dissemination of findings. Researchers must move beyond traditional discipline-centric dissemination and extend the reach of findings into diverse health care professional oncology-focused settings. Collaborative models for research development with our oncology peers can help to facilitate more integrated dissemination.

Interdisciplinary research teams that include oncology providers will not only enhance trial design, but may broaden the audience for dissemination and support the collaborative role that rehabilitation providers could and should play in the cancer continuum. Patient and caregiver awareness of and participation in rehabilitation research trial development is a critical consideration and further facilitates dissemination models. Table 1 highlights a number of research resources that could enhance efforts to meet these needs, to successfully develop research efforts that span rehabilitation and oncologic domains, and should be considered by researchers as they seek to better integrate these fields.

### Table 1. Research Resources: A collection of funding agencies, clinical trial networks, and cancer-related research tools for cancer rehabilitation health care providers.

<table>
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<th>Funding Agencies</th>
<th>Description</th>
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| United States Federal Government – Department of Health and Human Services | Federal agency funding rehabilitation research through various institutes and centers:  
- National Institutes of Health (NIH)  
- National Institute on Disability, Independent Living and Rehabilitation Research (NIDILRR)  
- Centers for Disease Control (CDC)  
- Food and Drug Administration (FDA) |
| United States Federal Government - Department of Veterans Affairs | Rehabilitation Research and Development Service (RR&D) aims to generate knowledge and innovations to advance the rehabilitative health and care of Veterans and the nation. |
| United States Federal Government - Department of Defense | Congressionally Directed Medical Research Programs (CDMRP)  
The Joint Program Committee – 8, Clinical Rehabilitation Medicine (JPC-8) |
| The National Science Foundation | Advancing the progress of science by funding proposals for research and education made by scientists, engineers, and educators from across the country. |
| Patient Centered Outcomes Research Initiative (PCORI) | PCORI was established to fund research that can help patients and those who care for them make better-informed decisions about the health care choices they face every day, guided by those who will use that information. |

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<th>Clinical Trials Networks</th>
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<td>Patient Centered Outcomes Research Initiative (PCORI)</td>
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<td>The Alliance</td>
<td>The Alliance seeks to reduce the impact of cancer by united a broad community of scientists and clinicians who are committed to the prevention and treatment of cancer.</td>
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<td>Organization</td>
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<tr>
<td>NRG Oncology</td>
<td>Research organization formed to conduct oncologic clinical research and to broadly disseminate study results for informing clinical decision making and health care policy.</td>
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<tr>
<td>ECOG-ACRIN Cancer Research Group</td>
<td>A membership-based scientific organization that designs and conducts biomarker-driven cancer research involving adults who have or are at risk of developing cancer.</td>
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<tr>
<td>Southwest Oncology Group (SWOG)</td>
<td>A global cancer research community that designs and conducts publicly funded clinical trials.</td>
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<tr>
<td>Children's Oncology Group (COG)</td>
<td>The COG partners with research scientists from around the world in our efforts to understand the causes of cancer and find effective treatments of children.</td>
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<tr>
<td>National Cancer Institute’s National Community Oncology Research Program (NCORP)</td>
<td>NCORP is a national network that brings cancer prevention clinical trials and cancer care delivery research to people in their communities.</td>
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**Cancer-Related Research Tools**

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<th>Tool</th>
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<tr>
<td>GEM</td>
<td>GEM is an interactive website containing behavioral, social science, and other scientific measures organized by theoretical constructs. GEM enables researchers to collaborate with others, encourages the use of common measures, and facilitates the sharing of harmonized data.</td>
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<tr>
<td>Surveillance Epidemiology and End Results (SEER) – Medicare Health Outcomes Survey (SEER-MHOS)</td>
<td>This database links the SEER cancer registry data, which includes clinical, demographic, and cause of death information for persons with cancer with the MHOS database which includes information about health-related quality of live among Medicare enrollees.</td>
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<tr>
<td>Center on Health Services Training and Research (CoHSTAR)</td>
<td>This program aims to advance health services and health policy research in physical therapy. CoHSTAR offers fellowships, visiting scientist appointments, and hosts summer training institutes. The center also funds pilot studies.</td>
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<td>Center for Medicare Services (CMS) Oncology Care Model (OCM)</td>
<td>This model seeks to have US physician practices enter into payment arrangements that include financial and performance accountability for episodes of care surrounding chemotherapy administration to cancer patients. The practices participating in OCM have committed to providing enhanced services to Medicare beneficiaries such as care coordination, navigation, and national treatment guidelines for care. This model may enable broad opportunities for rehabilitation researchers to study health service delivery and care coordination.</td>
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<tr>
<td>21st Century Cures Act Cancer Moonshot Program</td>
<td>In 2017 a blue-ribbon panel released the Cancer Moonshot report and identified 10 priority areas to accelerate cancer research aims. One area particularly relevant to rehabilitation research: “Minimize cancer treatment's debilitating side effects” seeks to accelerate the development of guidelines for routine monitoring and management of patient-reported symptoms to minimize debilitating side effects of cancer and its treatment. Implementation programs and funding opportunities are available for researchers to advance these priorities.</td>
</tr>
<tr>
<td>National Institutes of Health Research Plan on Rehabilitation</td>
<td>NCNRR has led an effort to release a research plan that lays our priorities in medical rehabilitation research that will guide NIH support for rehabilitation medicine and benefit individuals with temporary or chronic limitations in function that require rehabilitation.</td>
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15. https://www.cancer.gov/research/key-initiatives/moonshot-cancer-initiative
POLICY ENVIRONMENT

Policy protections for cancer survivors in the US have been shaped by organizational leadership and legislative protections at the national level. However, clear challenges remain in advocacy of optimizing routine integration of rehabilitation and cancer survivorship.

Advances have been spearheaded by the National Cancer Institute (NCI), the National Academies of Sciences, Engineering and Medicine (NASEM), the Centers for Disease Control and Prevention (CDC) and the American College of Surgeons’ Commission on Cancer (CoC). NCI expanded its charter to include cancer rehabilitation in 1988. In 1996, the Office of Cancer Survivorship within the NCI was initiated providing a locus for coordinating cancer survivorship research. Since 1998, over $680 million in funding has supported 1,599 survivorship research projects. These studies provide a foundation for future evidence-based survivorship care. The National Academies of Sciences, Engineering and Medicine, under the direction of the Institute of Medicine, issued a series of national reports from 1999-2013, intended to elevate awareness of cancer survivor needs and demanding public commitment to address those needs.

The CoC responded to cancer survivorship advocates and to NASEM reports by requiring its over 1,500 accredited cancer centers to provide distress screening, psychosocial support, survivorship care planning and rehabilitation services. Two legislative acts that have been most influential in protecting cancer survivors are the Americans with Disabilities Act (ADA) of 1990 and the Patient Protection and Affordable Care Act (ACA) of 2010. The ADA issued civil right protections to those with disabilities. Cancer patients often face demanding treatment schedules that require employment accommodations and physical, cognitive and psychological changes after treatment. The ADA provides rights protections to those with disabilities. Cancer patients and survivors also benefited from the extension of coverage on drugs and chronic disease management were also required by eliminating preexisting condition exclusions by insurers. Essential health benefits such as rehabilitation, prescription drugs and chronic disease management were also required to be included in all health insurance plans. Young cancer survivors also benefited from the extension of coverage on parents’ plans through age 26. The current US political environment renders the ACA provisions and protections vulnerable to change or elimination.

Future advocacy efforts should focus on health equity. Survival from cancer and quality of life after cancer are not enjoyed equally by all. Black residents in the US have the lowest cancer survival rates, and are less likely to receive post-treatment surveillance. Access to lifesaving cancer screening, treatment and post-treatment services for American Indians and residents of Pacific Island Jurisdictions are grossly insufficient. Residents of rural areas are less likely to have the finances and employment benefits necessary to travel to post-treatment care. Little is known about survivorship experiences of sexual and gender minorities, because data is rarely collected on sexual orientation or gender identity by cancer centers or in population surveys. Realigned payment incentives are needed to ensure sufficient patient support services, culturally responsive clinical care and ongoing quality improvements to address health inequity challenges.

Affordability of cancer treatment is in critical need of critical and sweeping reforms, so much so that the term “financial toxicity” has recently entered our vocabulary to describe “the harmful personal financial burden faced by patients receiving cancer treatment” and links between financial distress, worse quality of life and increased mortality are demonstrated. Cancer medications in the US can cost patients tens of thousands of dollars a month with marginal changes in drug support services like social work and patient navigation, remain limited in accessibility due to low and varied reimbursement, and at times during which patient rehabilitative needs are likely to surface. These problems will worsen with the proliferation of more targeted therapies. Changing the law to allow the Centers of Medicare and Medicaid Services (CMS) to negotiate drug pricing as the largest purchaser of cancer drugs in the nation is paramount to drug affordability, accessibility, and patient adherence. FDA guidance on clinically meaningful therapeutic outcomes could also improve trial design and help patients, providers and health insurance payers gain better understanding of the risks and benefits of treatment options.

Finally, advocacy for a transparent, integrated data and financing system is important. Health care providers cannot provide quality health care if they lack information necessary to inform clinical care decisions. Open source coding would alleviate the ongoing cost of proprietary software, but the challenges of national-scale data integration while ensuring patient privacy protection remains daunting. Transparency and improved accountability in financing at all levels would inform provision of the highest quality of care for patients while mitigating patient-level and societal financial toxicity.

CHALLENGES AND OPPORTUNITIES

After a systematic review to examine delivery of rehabilitation care and disease progression, Smith and Zheng concluded: “Cancer rehabilitation can be helpful to patients along the spectrum of cancer prognoses.” The convergence of the growing cancer survivor population, scientific and technological advances, recognition of cancer risks and prevalence associated with aging populations, advocacy efforts, and sociocultural emphases on health, well-being, quality of life, return to work, and self-management, may bring rehabilitation professionals and the services they provide to be viewed as essential to quality cancer care. Any and all of these issues create opportunities to advance uptake of rehabilitation management in cancer care. Although it cannot be claimed with certainty, the ACS’s Reach to Recovery program likely was the first formal cancer rehabilitation program in the US. Reach to Recovery, initiated in 1952, adopted by the ACS in 1969, extended to Europe in 1974, was initially dedicated to helping women who had recently undergone breast surgery – during this time frame, various forms of mastectomy. Patient referrals to Reach to Recovery were most often made by staff nurses in post-operative care settings following formal or informal standard physician orders. Between 1952 and current day, one might think cancer rehabilitation would have by now, achieved recognition as an essential component of cancer care. While some progress has been made, it has been painfully slow and hard won. Despite progress, unidentified and unmet needs, particularly functional needs, continue to be problematic for 33%-72% of patients and survivors. In the US, rehabilitation services are included as standard care for many acute health conditions, including stroke, myocardial infarction, and traumatic injuries, but not for cancer survivors. Despite recognition that cancer and cancer treatment modalities place survivors at risk for lasting dysfunctions, poor survival and diminished quality of life, it remains problematic that most survivors are not referred to...
rehabilitation services.\textsuperscript{9,12,13} To integrate rehabilitation into cancer care, knowledgeable, articulate and persuasive professionals with rehabilitation expertise and credibility must be engaged as cancer care standards are defined. Currently, rehabilitation is barely evident or non-existent in these deliberations. The seminal Institute of Medicine report, From Cancer Patient to Cancer Survivor: Lost in Transition, underlying today’s “survivorship” initiatives, did include one physiatrist on the Committee on Cancer Survivorship behind the report.\textsuperscript{39} The nearly 500-page report contained approximately three pages on rehabilitation in a chapter addressing supply, education and training of providers of rehabilitation services – mentions “physiatrists, nurses, and other specialists” but identifies and details workforce issues among only three “important professional groups” - physical therapists, occupational therapists, and speech-language pathologists.

Important workforce challenges exist within physiatry. Annual financial compensation data compiled by the U.S. Bureau of Labor Statistics (BLS) places the specialty at the lower end among medical specialties and PM & R medical residents represent less than 2% of all US residencies.\textsuperscript{53,54,55} Phsyiatrists join other rehabilitation providers in experiencing moral distress and burnout.\textsuperscript{56,57}

The American College of Surgeons’ CoC, the accrediting body for cancer programs, includes “Rehabilitation Services” as an eligibility requirement; however, the Commission on Cancer has historically had limited input on its guidelines from specialty experts.\textsuperscript{58} Individuals living with advanced and/or metastatic disease are often overlooked as candidates for rehabilitation. Attitudes and misconceptions of providers and patients include a belief that rehabilitation is not safe, effective, or the best use of health care resources.\textsuperscript{59} With improvements in cancer treatment for advanced disease, periods of survival continue to lengthen, and the survivor population continues to grow. Treatment for advanced disease, periods of survival continue to lengthen, and the survivor population continues to grow. It is well-known that health care systems and uptake of evidence-based interventions and guidelines is hampered by the prevalence and influence of silos.\textsuperscript{60} Limited understanding of the role of physicians specializing in PM&R and the silos of oncology and rehabilitation, contribute to underuse of systematic focused plans of action that the physiatry approach offers.

Most “cancer rehabilitation” studies and articles, with some exceptions, are published in physiatry and rehabilitation-specific professional journals (versus oncology or other specialty journals), a situation that fosters continued silos. Potential strategies for rehabilitation specialists to advocate for and serve cancer survivors include:\textsuperscript{61}

\begin{itemize}
  \item Integrate rehabilitation clinicians and into existing or developing oncology treatment and survivorship clinics;
  \item Include cancer rehabilitation topics and invite experts to give grand rounds, conference lectures and provide insights at tumor board meetings;
  \item Include descriptions of rehabilitation services on institutional and systems’ web-sites and other marketing tools;
  \item Include cancer prehabilitation and rehabilitation professionals in the formation of guidelines, clinical pathways, and referral algorithms in facilities and professional organizations;
  \item Incorporate rehabilitation medicine reports and studies in the general medical and cancer care literature, and include information in public sources of health and survivorship resources;
  \item Integrate the use of screening tools to assess patients for disability and loss of function;
  \item As components of shared decision-making during communications with patients and caregivers about treatment options, identify and discuss potential benefits of prehabilitation and rehabilitation services;
  \item Assess referral patterns and where gaps exist, expand referrals to cancer rehabilitation professionals and explore possibilities of self-referrals from patients, survivors, and families.
\end{itemize}

### FUTURE DIRECTION

The future depends on integrating interdisciplinary high quality cancer rehabilitation into the oncology care continuum and advancing research to demonstrate efficacy of interventions. Attention must be paid to developing low cost solutions as care must be accessible to all cancer survivors. Prehabilitation will likely play an important role in avoiding or reducing the incidence of impairments and associated disability.

### REFERENCES


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