



Catalyzing Progress: a Comprehensive Review of Cancer Rehabilitation Education for Rehabilitation Specialists

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Abstract

Purpose of Review The growing population of cancer survivors shows the crucial role of cancer rehabilitation. Despite advancement in cancer treatments, a significant proportion of survivors experience physical and cognitive impairments. This paper looks to review the current state of cancer rehabilitation education, focusing on interdisciplinary rehabilitation specialists. Physician education in cancer rehabilitation is examined, revealing disparities among programs and the slow integration into PM&R residency training.

Recent Findings The number of physician-focused cancer rehabilitation fellowships are growing and significant variation exists among these programs. Therapist education in oncology rehabilitation is also expanding including certification programs with the role of organizations such as APTA, AOTA, and ASHA. Accreditation standards from CARF, NCCN, and CoC can provide potential benchmarks for practice requirements alongside the advancements made by AAPM&R, ACRM, and MASCC.

Summary This paper notes the strides made in cancer rehabilitation education but also highlights the persistent gaps that exist. While there are promising findings, there are also large opportunities for future growth in cancer rehabilitation education. Our hope is that this exploration can inspire expanding opportunities for growth within the interdisciplinary field of cancer rehabilitation.

Keywords Cancer diagnoses · Survival rate · Quality of life · Cancer rehabilitation · Cancer rehabilitation education · Oncology care continuum · Physical impairment · Cognitive impairments · Psychosocial impairments · Spiritual impairment · Interdisciplinary rehabilitation specialist · Physiatry · Physical therapy · Occupational therapy · Speech-language pathology · Rehabilitation training programs · Oncologist education · Cancer survivorship

Introduction

In 2023, over 1.9 million new cancer diagnoses were estimated in the USA (excluding basal and squamous skin cancers). A significant portion of these will add to the

exponentially growing population of over 18 million Americans living with or beyond cancer [1]. Many types of cancers have become chronic diseases as treatments and early diagnoses have advanced. These advancements have improved survival rates, yet 60–90% of survivors will experience at

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least one physical or cognitive impairment [2]. The goal of cancer rehabilitation is to help improve the quality of life and functional status of patients.

Cancer rehabilitation is an essential component of the oncology care continuum that focuses on diagnosing and treating cancer survivors' physical, psychosocial, cognitive, and spiritual impairments in an effort to restore function and quality of life at any stage of cancer treatment [2, 3]. While cancer rehabilitation was first described by Lehman in 1978, there still remains significant gaps in exposure to cancer rehabilitation in rehabilitation training programs [4–6]. In addition, oncologists lack necessary education of the benefits of rehabilitation for the cancer survivors [4].

With a growing number of cancer survivors, the need for robust cancer rehabilitation education continues to grow. In addition, outreach and education for oncologists on the benefits of cancer rehabilitation throughout the cancer continuum and when and how to refer is essential. This paper discusses the current state of cancer rehabilitation education for interdisciplinary rehabilitation specialists. By reviewing the current state, the goal is to stimulate discussion and propel the subspecialty forward.

History of Cancer Rehabilitation Programs

Despite early legislative support such as the Regional Medical Program Act of 1965 and the National Cancer Act of 1971, many cancer rehabilitation programs faltered throughout the mid-twentieth century. Slow progress was largely attributed to poor planning, untrained personnel, failure to inform referring clinicians, inadequate operational space, and an increasing emphasis on pharmacological cures of cancer [7, 8]. For instance, in 1971 only 1000 of 260,000 participants in the federal Vocational Rehabilitation Program were cancer survivors [9].

However, two model programs overcame these limitations to establish successful cancer rehabilitation centers. It is thus worth examining the success of these initiatives at the University of Texas MD Anderson Cancer Center (MDACC) and Memorial Sloan Kettering Cancer Center (MSKCC).

Both programs emerged from regional healthcare corporations. MDACC partnered with the Baylor College of Medicine and the University of Texas at Houston Medical School, while the MSKCC Rehabilitation Center partnered with Memorial Hospital and the Institute of Rehabilitation Medicine. Collaborative teams of physiatrists, therapists, oncologists, psychologists, advanced practitioners, and support staff grew the programs to meet cancer survivors' unique needs. MDACC's program aligned with its larger institution's physical therapy (PT) and occupational therapy (OT) departments, while MSKCC's team directly employed approximately 100 therapists [2].

Both developed inpatient consultation services and outpatient programs, while the MDACC developed an inpatient rehabilitation unit. Clinical advancements coincided with this growth, evident as clinicians became proficient in targeting various musculoskeletal, neuromuscular, cardiopulmonary, integumentary, and psychological issues [4].

Physician Cancer Rehabilitation Education

Despite significant rehabilitation needs of cancer survivors, advancement in making this a substantial portion of PM&R residency training has moved slowly. Each program widely varies in cancer rehabilitation exposure. Fifty-eight percent of programs have ≤ 3 dedicated faculty members who strictly see cancer survivors and 32% of programs have no faculty dedicated to cancer rehabilitation [5]. Programs with limited cancer rehabilitation resources report barriers of program size, resources, legislative barriers, fears of non-compliance in 60% acute inpatient admission rule, perception of low demand for all care settings, and lack of institutional support [7]. To help bridge this educational gap, a "Specialized Curriculum for Cancer Rehabilitation Medicine in Physical Medicine and Rehabilitation Residency Training and Beyond" was written in 2022 by the AAPM&R's Cancer Rehabilitation Medicine Curriculum Workgroup. The curriculum was organized into 6 areas: global impairment/symptom specific, cancer diagnosis specific, procedure, areas of practice, wellness/survivorship, and general information [10]. Each part of the curriculum is classified as "core" for all PM&R residents or "specialized" knowledge/skills to be gained through fellowship or other advanced training [11]. This tool can help residency programs identify any gaps which they can fulfill through lectures, conferences, journal clubs, and workshops.

Contemporary physiatry accreditation boards have not yet outlined concrete expectations for cancer rehabilitation during training, while current literature suggests that exposure to major domains of cancer rehabilitation is inconsistent between different residency programs [12].

Improving the lack of designated competencies during physiatry training is addressed in "Cancer Rehabilitation Medical Knowledge for Physiatry Residents: Literature Subtopic Analysis and Synthesis into Key Domains" [12]. In this article, Vargo et al. propose a systematic framework of core clinical domains for all physiatry programs and residents. Using evidence- and consensus-based guidelines, the authors organize a comprehensive curriculum through which providers can gain a foundation for managing cancer survivors shown in Fig. 1 below. Likewise, it also provides residents and fellows with reference points to explore more advanced subtopics (i.e., pediatric vs geriatric concerns, during-treatment vs end-of-life care) [13].

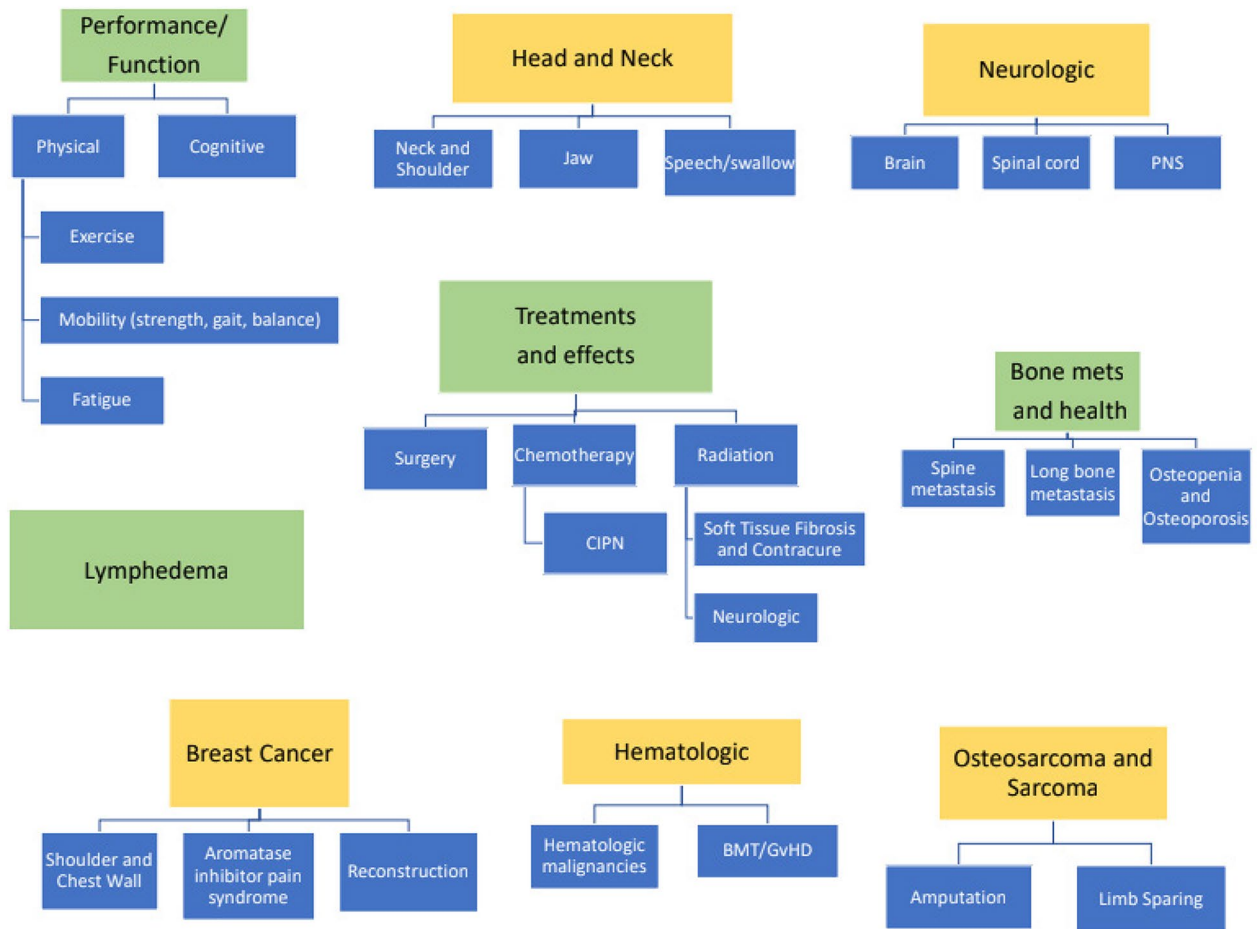


Fig. 1 Used from Vargo M, Clark M, Khanna A, Christensen Holz S (2020) Cancer rehabilitation medical knowledge for psychiatry residents: literature subtopic analysis and synthesis into key domains. *PM R* 12:829–836 with permission from the author

Vargo et al. noted that this prototype is subject to modification and is not designed to limit the scope of existing programs. It is instead intended to “more clearly define the minimum knowledge expectations” that training entities should emphasize [13]. By developing a training model from which accrediting institutions can define key clinical domains to be prioritized by residency programs, this approach provides educational guidance in cancer rehabilitation at a systemic level.

Most physiatrists take a board examination after their residency and must maintain certification given by the American Board of Physical Medicine and Rehabilitation (ABPMR). ABPMR provides physiatrist board certification and certification maintenance to improve the quality of patient care through encouraging continuous learning. The current requirements addressing cancer rehabilitation are within the 8% of medical rehabilitation which also includes cardiopulmonary, GU/GI, infectious disease, endocrine/metabolic diseases, and transplants [11]. Given the low

emphasis of cancer rehabilitation on this board examination, PM&R trainees may be less incentivized to study and learn about cancer rehabilitation than other content areas such as musculoskeletal medicine, brain injury, or spinal cord injury.

Cancer Rehabilitation Fellowship

MDACC and MSKCC have taken significant steps to expose trainees to a wide spectrum of ailments, fostering specialized rehabilitation skills in cancer rehabilitation across inpatient and outpatient settings. In 2007, MDACC established partnerships with local teaching programs to offer dedicated PM&R physician residency rotations and fellowships geared exclusively toward cancer rehabilitation [2, 7]. Similarly in 2010, MSKCC also pioneered a cancer rehabilitation fellowship and integrated core cancer rehabilitation rotations into its affiliated PM&R residency program [4]. The success of these pioneering programs has inspired the establishment

of cancer rehabilitation fellowships in numerous other programs, a trend that has persisted from the latter part of the twentieth century into the twenty-first century.

The evolution of cancer rehabilitation physician fellowship has significantly advanced the field. Presently, there are ten fellowship programs in the USA and one in Canada. Notably, there exists considerable variation among these fellowship programs, given the absence of an accrediting body, standardized guidelines, and subspecialty certification [14]. This void results in the lack of official certification opportunities for practicing physicians seeking to deepen their understanding of cancer rehabilitation.

Despite the growth in cancer rehabilitation fellowships, there is limited information published about these training programs. This lack of available material demonstrates a clear need to examine contemporary cancer rehabilitation education and teaching programs. A published study detailing the first four cancer rehabilitation fellowships revealed variation in the duration of time spent in consultation and outpatient setting, with some programs not incorporating acute inpatient care. Educational strategies encompassed didactic lectures, grand rounds, institution-level cancer lectures, journal clubs, and multidisciplinary meetings. All programs emphasized the importance of research and quality improvement projects, facilitation of mentorship, and providing the necessary time for research project completion [14]. To enhance our understanding of the current cancer rehabilitation fellowships, the authors of this paper created a comprehensive survey which was distributed to all currently existing programs; the findings are detailed in Table 1. Considering the complexity of cancer patients, there may be merit in extending physiatrist training with a fellowship for the duration of an extra year to acquire the specific knowledge required for delivering comprehensive cancer rehabilitation care, supplementing the education received during residency training [11, 12].

Therapist Education

A 2022 review examining therapist preparation in oncology rehabilitation, spanning from entry-level to advanced practitioner, identified only 12 articles, with just 2 meeting the author's criteria [15]. Both articles focused on entry-level physical therapy (PT) education, while only one focused on lymphedema. This gap in research demonstrates the need for structured guidance for advancing cancer rehabilitation education for therapists. The evolution of the cancer rehabilitation specialty began in clinical care with individualized mentorship, eventually progressing to post-professional education. Initial courses focused on providing didactic knowledge of cancer and its treatment, often lacking practical application. Additionally, most were limited in scope by

diagnosis (e.g., breast cancer) or point in the cancer continuum (e.g., post-operative) and lacked ongoing support or mentorship.

Any comprehensive reflection on the evolution of cancer rehabilitation education must encompass the role of lymphedema care. While lymphedema care is a Commission on Accreditation of Physical Therapy Education (CAPTE) entry-level Doctor of Physical Therapy (DPT) requirement, its prevalence in occupational therapy schools remains unknown. Despite not being included in CAPTE requirements, 87% of DPT programs include an introduction to cancer rehabilitation [16]. However, early and additional post-operative certification programs exposed therapists to working with cancer survivors but tended to focus on one impairment without addressing the broader role of rehabilitation in enhancing survivorship and quality of life throughout the cancer continuum. The 2012 Cancer Prospective Surveillance Model article series highlighted the numerous benefits of early rehabilitation care and rehabilitation integration into the cancer care continuum [17]. These seminal articles highlighted the need for progressive education that focuses on providing therapy for survivors before the onset of impairments. They demonstrated the benefits of all four pillars of the Dietz Classification of Cancer Rehabilitation (preventative, restorative, supportive, palliative) [18].

As education has advanced, collaborative approaches have expanded to unite all rehabilitation clinicians, offering discipline-specific training as well. Over the past decade, significant strides have been made in post-profession education, including comprehensive training programs, physical therapy residency and board certification, and occupational therapy oncology badge certification.

Through the work of certification programs including the former Survivorship Training and Rehabilitation (STAR) program, Physiological Oncology Rehabilitation Institute (PORi), and Select Medical's exclusive ReVital Cancer Rehabilitation program, approximately 5000 physical therapists (PT), occupational therapists (OT), and speech-language pathologist (SLP) have been educated in cancer rehabilitation in the last 15 years. The requirements during certification training and maintenance vary greatly between programs, and some training models have highlighted challenges to the sustainability of training models and ongoing competency.

In 2017, the American Physical Therapy Association (APTA) introduced the inaugural oncology physical therapy description of specialty practice in pursuit of board certification in oncological PT. The first class of American Board of Physical Therapy Specialty (ABPTS) board-certified clinical specialists in oncologic physical therapy occurred in 2019, with nearly 200 certified specialists in 2023. To support clinicians' advancement into cancer rehabilitation specialization, 6 accredited and 2 candidate American Board

Table 1 The 2023 survey of PM&R Cancer Rehab fellowship program

Program	Kessler	Atrium Health/ Carolinas Rehab	University of Michigan	Medstar	University of Pennsylvania	University of Miami	Northwell health	Ohio State University	Memorial Sloan Kettering Cancer Center	MD Anderson
What year was your program established?	2023	2019	2018	2016	2020	2020	2022	2020	2010	2007
How many PMR-trained faculty members are in your program?	1	25	3	2	26	3	4	27	9	8
How many of them are cancer rehab trained?	0	1	1	1	2	2	3	0	3	1
How many of your faculty specialize in cancer rehabilitation?	1	4	3	2	2	2	4	2	9	8
How many fellows do you take in your cancer rehab fellowship?	1	1	1	1	1	1	1	1	2	2
What percent of your fellowship is inpatient based?	10% (consult)	50% (inpatient and consults)	50 (consults only)	10% or less	30%	16.60%	10%	60%	50% (consult)	25
What percent of your fellowship is outpatient based?	80%	50%	50	90%	70%	32%	90%	40%	50%	25
How many fellows have graduated from your cancer rehab fellowship?	0	1	5	7	3	2	1	2	24	26
Can a student rotate for a cancer rehab elective?	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

of Physical Therapy Residency and Fellowship Education (ABPTRFE) oncology residencies are currently available, with new programs added each year (Table 2). These programs offer a comprehensive 12- to 15-month development in oncology PT through didactic education, clinical mentorship, and exposure to cancer research, conferences, and advocacy. The APTA Academy of Oncologic Physical Therapy also hosts conferences, courses, and special interest groups. Additionally, it publishes the *Rehabilitation Oncology Journal* and hosts a student and young professional mentorship program, aiming to increase awareness and accessibility to specialty training for PTs.

While PT boasts an extensive and diverse range of discipline-specific education, OT specialization has expanded notably, facilitated by the initiatives like the American Occupational Therapy Association (AOTA) oncology badge program, the cancer rehabilitation community of practice, and advocates such as Dr. Mackenzi Pergolotti and Dr. Robin Newman [19, 20]. These influential figures have presented compelling evidence showcasing the diverse roles that OTs can play in caring for cancer survivors, such as post-operative breast cancer care, management of cancer-related cognitive decline, and sustaining occupational roles throughout the cancer journey.

Entry-level speech language pathologist (SLP) education includes the fundamental principles of assessment and intervention for head and neck cancer survivors, given that dysarthria and dysphagia are common conditions managed by SLPs. With the growth of cancer rehabilitation as a specialty, post-professional education is expanding SLPs' involvement to include head and neck lymphedema and cancer-related cognitive impairment. Similar to the growth of PT, the expanding clinical roles of SLPs have further highlighted the need for comprehensive training not only in the adverse effects but also in the background anatomy and physiology of cancer and its treatment for all rehabilitation professionals.

As the number of cancer survivors increases, ongoing research reinforces the pivotal role of rehabilitation in cancer care. A widening gap in the specialized rehabilitation workforce looms unless we strategically elevate the knowledge and skills of entry-level clinicians, community-based general practitioners, and cancer rehabilitation specialists. This approach will require therapists and educators to break the thought process that some have that cancer is a precaution or "red flag" to fear or avoid. The rehabilitation community must embrace the responsibility of caring for the estimated 18.1 million cancer survivors, a population 60 times larger than the spinal cord injury community and over 18 times larger than those receiving knee replacements each year in the USA [1, 21, 22]. To achieve this, cancer rehabilitation must be integrated as a core competency for students and practicing rehabilitation clinicians. The APTA has taken

initial steps by recently outlining these competencies and developing an academic curriculum manual to reduce implementation barriers. AOTA and American Speech and Hearing Association (ASHA) should adopt a similar approach to increase consistency for multi-disciplinary care.

Cancer Rehabilitation-Focused Organizations

Various organizations, including the American Academy of PM&R (AAPM&R), American Congress of Rehabilitation Medicine (ACRM), and Multinational Association of Supportive Care in Cancer (MASCC), are actively contributing to the advancement of cancer rehabilitation. Since 2018, AAPM&R has been spearheading PM&R BOLD to envision the future for cancer rehabilitation medicine. This initiative outlines core services provided by physiatrists, aiming to integrate cancer rehabilitation into standard PM&R residency curriculum [23]. Simultaneously, ACRM has dedicated a subsection for cancer rehabilitation to provide education, professional development, and advocate for standards in clinical practice and research for all rehab professionals [24]. MASCC is committed to promoting education and research on supportive care for the cancer population, covering prevention and management of adverse effects of cancer and its treatment [24, 25].

Accreditation

In the realm of accreditation, the Commission on Accreditation of Rehabilitation Facilities (CARF) has formulated standards for cancer rehabilitation centers, as outlined in the 2014 CARF Medical Rehabilitation Standards Manual [13]. These standards serve as a potential blueprint for defining practice and educational benchmarks. CARF emphasizes a holistic, person-centered interdisciplinary team approach, spanning inpatient, outpatient, and community-based programs. Notably, a cancer rehabilitation specialty program necessitates a PM&R physician or a qualified physician, along with a therapy team of physical and occupational therapists and a speech-language pathologist with specialized training in cancer rehabilitation [13]. Achieving CARF accreditation mandates competencies and the application of evidence-based practices that encompass preventive, restorative, supportive, and palliative rehabilitation [26]. In addition, there are ongoing educational requirements for this certification, so these guidelines can be another source to enhance cancer rehabilitation education.

In the USA, there are 69 National Cancer Institute-designated cancer research institutions, with 47 being comprehensive cancer centers. The National Comprehensive

Table 2 The 2023 survey of physical therapy cancer rehab residency programs

Program	Baylor Scott and White Institute for Rehab Oncology Residency	City of Hope Oncology Residency	Corewell Health East Oncology Residency	Duke University Health System Oncologic Residency	Memorial Sloan Kettering Oncology Residency	The Ohio State University—The James Cancer Hospital & Solove Research Institute Oncologic Residency	University of Southern California Oncology Residency	West Virginia University Oncology Residency
	2019	2019	2018	2018	2016	2020	2022	2022
What year was your program established?	2019	2019	2018	2018	2016	2020	2022	2022
How many faculty are board-certified clinical specialists?	5	2	5 (certified in onco, neuro, and geriatrics; others are pelvic floor and lymphedema therapists)	7	3	3	5	1
How many residents do you take per year?	2	1	1–3	1	1	1	2	1
What percent of your residency is inpatient based?	10%	50%	50%	40	50%	33%	50%	< 10%
What percent of your residency is outpatient based?	90%	50%	50%	60 (including home health and hospice)	50%	67%	50%	90%
How many residents have graduated from your cancer rehab residency?	4	3	14	4	2	3	First class to graduate November 3, 2023	First class to graduate July 2024
What type of didactic experience does your resident obtain?	Lymphedema, synchronous, and asynchronous courses offered through ReVital Cancer Rehabilitation; expert-led onsite training with lab- and case-based learning; assigned reading; tumor boards, grand rounds, Commission on Cancer member, case reflection (written and oral defense)	- Didactic readings tied to clinical experience - Faculty lectures - Oncology specific con-ed courses - Case conferences - MD clinic observations - Weekly grand rounds	Six core modules — didactic lectures and homework including literature reviews, journal clubs, annotated bibliographies, or service-learning experiences. This is a hybrid distance learning, online, and in-person laboratory and classroom experience	Didactic experiences include lectures, condensed courses, journal review, and narrative reasoning	Asynchronous lectures, live lectures, literature review, other readings, therapist-lead in-services, journal rounds, journal clubs	The resident presents and/or collaborates with other PT residents/fellows or special guest lecturers with specialty knowledge on a topic area on a near weekly basis (conference versus journal club) to learn content that is a part of the DRP and essential for specialty oncology rehab practice. Specialty observations including specialty clinics (i.e., GVHD, pancreatic), other practice sites within the OSU system (i.e., Dodd Rehabilitation Hospital) to gain specialty knowledge	There is asynchronous (recorded) lectures, live lectures, literature review, oncology curriculum content teaching in an entry-level DPT program	There are five 1-credit courses that are part of the didactic curriculum that develops critical thinking across the cancer continuum. These courses are in-person synchronous. In addition to these hours, residents also participate in journal clubs, surgical observations, tumor boards, teaching within the WVU DPT curriculum, and serving as facilitators within WVU Interprofessional Education

Table 2 (continued)

Program	Baylor Scott and White Institute for Rehab Oncology Residency	City of Hope Oncology Residency	Corewell Health East Oncology Residency	Duke University Health System Oncologic Residency	Memorial Sloan Kettering Oncology Residency	The Ohio State University—The James Cancer Hospital & Solove Research Institute Oncologic Residency	University of Southern California Oncology Residency	West Virginia University Oncology Residency
What type of cancer diagnoses does your resident treat?	Minimum of 90% of the diagnoses defined by the Description of Residency Practice	Pretty much all diagnoses on DSP Hematological, all types of solid tumors breast, GI, gyn, prostate, lung, neuro, peds, etc	Breast cancers; acute oncologic illness, lung, thoracic, circulatory cancers; gastrointestinal, gynecological and genitourinary cancers; head/neck cancers and bone cancers	Breast, head and neck, prostate, leukemia, lymphoma, multiple myeloma, sarcoma, gyn-omc, GI, GU, lung, brain	All diagnoses listed in description of specialty practice and description of residency practice with exception to pediatrics and lymphedema	All diagnoses in the DSP/DRP in the inpatient and outpatient setting. Possibility of pediatric-specific.	Cancer pathologies from breast, head and neck, and lung, leukemia, bone and soft tissue sarcomas, brain	Cancer pathologies from breast, head and neck, lung, hematological, GI/GU/GY. Setting up: pediatric observation
What type of lymphedema training is included in your training?	Full certification (CLT)	16-h con-ed course, 8-h clinical observation	7-8-week rotation with a focus on upper quadrant	CLT course plus onsite mentorship/training	Didactic learning, observations, and mentorship	Formal lymphedema training (i.e., Norton course) is not provided, but active learning alongside CLT, CLT-LANA therapists on a daily basis is an integral part of our outpatient rotation(s)	~ 8 h of lecture, ~ 16 h of lab, teaching ~ 12 h of lymphedema labs, and it is incorporated with many of our case discussions	Onsite mentorship and training by a CLT-LANA is incorporated into patient care, case discussions, and clinical learning but not formal course nor certification is offered

Cancer Networks (NCCN) has tried to address patient needs by requiring survivorship care plans for oncology patients, addressing challenges such as cancer-related fatigue, lymphedema, and chemotherapy induced neuropathy [6]. These NCCN standards offer a potential avenue for cancer rehabilitation programs to collaborate with oncology programs.

The Commission on Cancer (CoC) of the American College of Surgeons serves as an accrediting body for numerous cancer programs, requiring that programs make rehabilitation care accessible to their patients [13]. The specific CoC rehabilitation standard is another great way for cancer rehabilitation programs to collaborate with oncology programs and expand cancer rehabilitation services.

Collectively, these accreditation standards offer an educational lens through which to examine the required skills, services, and knowledge for rehabilitation specialists. They provide valuable insight into determining the core educational needs of rehabilitation professionals and underscore the importance of educating oncology teams on the critical role of rehabilitation in aiding their patients.

Conclusions and Future Directions

As the number of cancer survivors continues to rise, the demand for cancer rehabilitation services is escalating. Despite this, there are notable gaps in educational programs for clinicians, hindering the proper preparation of the rehabilitation workforce to deliver optimal care. Encouragingly, strides have been taken in enhancing education for both physiatrists and therapists, establishing cancer rehabilitation as a fundamental competency through the creation of specialized training programs and fellowships. However, a critical need persists to broaden the foundational training for rehabilitation professionals who may not specialize in cancer rehabilitation, aiming to enhance overall patient access to care. In addition, there is a significant requirement for further research into interventions within the realm of cancer rehabilitation. Ultimately, our aspiration is to optimize and standardize education, providing rehabilitation clinicians with comprehensive training essential for supporting survivors across the entire cancer continuum.

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Data availability No datasets were generated or analysed during the current study.

Declarations

Competing interests Dr. Newell is an employee of Select Medical and a prior employee of Oncology Rehab.

Dr.Thess is employed by Select Medical.

Human and Animal Rights and Informed Consent This article does not contain any studies with human participants or animals performed by any of the authors.

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References

1. Cancer facts & figures 2023. <https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/2023-cancer-facts-figures.html>. Accessed 5 Nov 2023
2. Stubblefield MD. Cancer rehabilitation. *Semin Oncol*. 2011;38:386–93.
3. Silver JK, Raj VS, Fu JB, Wisotzky EM, Smith SR, Kirch RA. Cancer rehabilitation and palliative care: critical components in the delivery of high-quality oncology services. *Support Care Cancer*. 2015;23:3633–43.
4. Lopez-Aponte C, Ramos-Guasp W, Sepulveda-Irrizary F, Lopez-Acedo CE, Rosario-Concepcion R. Physiatrists' attitudes and knowledge about cancer rehabilitation. *Cureus*. 2022;14: e28622.
5. Raj VS, Balouch J, Norton JH. Cancer rehabilitation education during physical medicine and rehabilitation residency. *Am J Phys Med Rehabil*. 2014;93:445–52.
6. Yadav RR, Ngo-Huang AT, Ng A, Fu JB, Custodio C, Wisotzky E, Mitra R, Bruera E. Characteristics of cancer rehabilitation fellowship training programs in the USA. *J Cancer Educ*. 2018;33:1364–7.
7. Grabois M. Integrating cancer rehabilitation into medical care at a cancer hospital. *Cancer*. 2001;92:1055–7.
8. Mayer DK. The healthcare implications of cancer rehabilitation in the twenty-first century. *Oncol Nurs Forum*. 1992;19:23–7.
9. Harvey RF, Jellinek HM, Habeck RV. Cancer rehabilitation. An analysis of 36 program approaches. *JAMA*. 1982;247:2127–31.
10. Wisotzky E, Smith S, Ruppert L, Mayer RS, Shahpar S, McMichael B, Clark M, Brunner M, Thompson B, Vargo M. Specialized curriculum for cancer rehabilitation medicine in physical medicine and rehabilitation residency training and beyond. *PM R*. 2022;14:1297–8.
11. Curricula. In: [aapmr.org. https://www.aapmr.org/education/graduate-medical-education-\(gme\)-corner/curricula](https://www.aapmr.org/education/graduate-medical-education-(gme)-corner/curricula). Accessed 10 Jun 2023
12. ABPMR — part I. <https://www.abpmr.org/Primary/PartI>. Accessed 5 Nov 2023
13. Vargo M, Clark M, Khanna A, Christensen Holz S. Cancer rehabilitation medical knowledge for physiatry residents: literature subtopic analysis and synthesis into key domains. *PM R*. 2020;12:829–36.
14. Cancer of any site — cancer stat facts. In: SEER. <https://seer.cancer.gov/statfacts/html/all.html>. Accessed 10 Jun 2023
15. Boright L, Compagner E, Harrington S. Entry-level to advanced practitioner preparation in oncology rehabilitation: a review. *Rehabil Oncol*. 2022;40:E1–3.
16. Doublestein DA, Spinelli BA, Goldberg A, Larson CA, Yorke AM. Facilitators and barriers to the use of outcome measures by certified lymphedema therapists. *Rehabil Oncol*. 2023;41(121):128.
17. Stout NL, Binkley JM, Schmitz KH, et al. A prospective surveillance model for rehabilitation for women with breast cancer. *Cancer*. 2012;118:2191–200.
18. Chowdhury RA, Brennan FP, Gardiner MD. Cancer rehabilitation and palliative care-exploring the synergies. *J Pain Symptom Manage*. 2020;60:1239–52.
19. Pergolotti M, Williams GR, Campbell C, Munoz LA, Muss HB. Occupational therapy for adults with cancer: why it matters. *Oncologist*. 2016;21:314–9.
20. Newman RM, Alfano CM, Radomski MV, et al. Catalyzing research to optimize cancer survivors' participation in work and life roles. *OTJR*. 2019;39:189–96.
21. Jette DU, Hunter SJ, Burkett L, et al. Physical therapist management of total knee arthroplasty. *Phys Ther*. 2020;100:1603–31.
22. [No title]. <https://www.nscisc.uab.edu/Public/Facts%20and%20Figures%202019%20-%20Final.pdf>. Accessed 5 Nov 2023
23. Cancer rehabilitation medicine practice area. In: www.aapmr.org. <https://www.aapmr.org/about-aapm-r/visioning-pm-r-bold/cancer-rehabilitation-medicine-practice-area>. Accessed 18 Sep 2023
24. (2014) Cancer. In: ACRM. <https://acrm.org/acrm-communities/cancer/>. Accessed 18 Sep 2023
25. (2022) About. In: MASCC. <https://mascc.org/about-mascc/>. Accessed 18 Sep 2023
26. Website. <https://carf.org/Programs/ProgramDescriptions/MED-Cancer-Rehabilitation-Specialty-Program/>. Accessed 18 Sep 2023

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