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Healthcare Systems-Based Exercise Oncology Programs: Emphasizing and Speaking the Language of the Clinic and Patient

Jessica S. Gorzelitz,[1,2,3] Mary A. Kennedy,[3,4] Kim Dittus,[5] Sami Mansfield,[6] Karen Wonders,[7,8] Pamela A. Hansen,[9,10] Adriana M. Coletta,[9,11] Neil M. Iyengar,[12] Kelley Covington Wood,[13] Anna L. Schwartz,[14] Melanie Potiaumpai,[15] Anna Campbell,[16] and Kathryn H. Schmitz[15]

ABSTRACT

Introduction: Exercise oncology services are evidence based and aim to reduce symptom burden and potentially improve outcomes in adults living with and beyond cancer. Healthcare system-based exercise oncology programs include exercise prior to, during, and after treatment, but the implementation and maintenance of these programs are not well documented. We aimed to describe five healthcare system-based exercise oncology programs in the United States, including service information and barriers to and facilitators of program success. **Methods:** This was a qualitative case study of five healthcare-based exercise oncology programs in the United States informed by the Exploration, Preparation, Implementation, Sustainment framework. We conducted semistructured online interviews with the founders and other key representatives of each program assessing program structure, adoption, and integration into the healthcare system. Data were evaluated using qualitative descriptive methodology. **Results:** In each healthcare-based exercise oncology program, trained exercise professionals delivered in-person, virtual, or hybrid exercise programs to adults with cancer. Buy-in from healthcare system leadership, clinicians, and administration was key to success. All programs were designed to meet the needs of the individual healthcare systems. Institutionalization of the programs into existing healthcare systems facilitated sustainment. Length and exercise prescription for each program varied, but individually tailored exercise programs with physical or functional assessments (often pre/post) were reported by most programs. Funding was a common barrier. **Conclusions:** Institutional priorities and buy-in from both leadership and clinicians were used to establish and maintain five healthcare-based exercise oncology programs from across the United States. These programs followed evidence-based recommendations provided by exercise professionals within the healthcare system to serve patients from the healthcare system's catchment area. Healthcare systems exploring the creation of exercise oncology programs should consider institutional structures, provider priorities, resources (e.g., staff, finances), leadership buy-in, and financial support.

INTRODUCTION

Exercise (including aerobic and muscle strengthening) is recommended for those living with and beyond cancer due to many positive health effects and reductions in symptom burden (1). Exercise participation has a low national prevalence among cancer survivors, estimated between 10% and 20% (2,3), and many barriers preventing participation in exercise have been reported (4–11). Embedding exercise programming within a hospital or healthcare setting as part of routine cancer care has been shown to be an effective way to increase exercise accessibility and improve health outcomes for people receiving cancer treatment (12–16). Despite the demonstrated effectiveness, there is a dearth of exercise oncology programming available for people receiving cancer treatment across the United States. The lack of availability is especially notable in rural regions, areas with low socioeconomic or health literacy, areas with high cancer incidence, and populations with high racial and ethnic diversity, which are known to have poorer cancer outcomes (17–20).

The processes that underpin the implementation and sustainment of healthcare-based exercise oncology programs are not well understood. Furthering the challenge

[1]Department of Health and Human Physiology, University of Iowa, Iowa City, IA; [2]Holden Comprehensive Cancer Center, University of Iowa, Iowa City, IA; [3]School of Medical and Health Sciences, Edith Cowan University, Joondalup, WA, Australia; [4]Nutrition and Health Innovation Research Institute, Edith Cowan University, Joondalup, WA, Australia; [5]Division of Hematology, Oncology and Palliative Care, University of Wisconsin–Madison, Madison, WI; [6]Cancer Wellness for Life, Denver, CO; [7]Maple Tree Cancer Alliance, Dayton, OH; [8]Department of Kinesiology and Health, Wright State University, Dayton, OH; [9]The Huntsman Cancer Institute at the University of Utah, Salt Lake City, UT; [10]Division of Physical Medicine and Rehabilitation, University of Utah, Salt Lake City, UT; [11]Department of Health and Kinesiology, University of Utah, Salt Lake City, UT; [12]Department of Medicine, Memorial Sloan Kettering Cancer Center, New York, NY; [13]ReVital Cancer Rehabilitation, Select Medical, Mechanicsburg PA; [14]Coleman Health, LLC, Parks, AZ; [15]Division of Hematology and Oncology, University of Pittsburgh, Pittsburgh, PA; and [16]Edinburgh Napier University, Edinburgh, Scotland, UK

Address for correspondence: Jessica S. Gorzelitz, Ph.D., M.S., 115 S Grand Ave, Room 110 IBIF, Iowa City, IA 52245 (E-mail: jessica-gorzelitz@uiowa.edu).

ORCID ID: Jessica S. Gorzelitz: 0000-0001-9230-0593

of operating an exercise oncology program within a healthcare system is that, at present, these services are not reimbursed by third-party payers. To align exercise oncology with institutional priorities requires financial/revenue alignment. Previous work has examined implementation facilitators for evidence-based exercise interventions in non-research settings (21–24); however, the included programs operated in outpatient rehabilitation clinics and community and home-based settings and did not include any US healthcare system-based examples. Given the unique challenges of implementing exercise in clinical care (24), it is important to learn about effective strategies for program design, integration, and maintenance from programs that have demonstrated success in clinical settings.

Our aim for this study was to examine the implementation processes of five exercise oncology programs operating within healthcare systems in the United States. We used the Exploration, Preparation, Implementation, Sustainment (EPIS) framework to guide our evaluation (25). This framework describes key phases of implementation and the factors within and across an implementation context (e.g., healthcare system) that influence the implementation process. The results of this study will add to the nascent evidence base of programmatic components and processes necessary for developing and operating an exercise oncology program as part of standard clinical care.

METHODS

This was a qualitative case study of five healthcare systems-based exercise oncology programs in the United States using semistructured interviews with program representatives done via Zoom (Zoom Communications Inc., San Jose, CA) in 2023. The Moving Through Cancer Taskforce invited five established exercise oncology programs to participate based on convenience sampling. Part of the sampling approach was based on geographic regions including the Pacific Mountain West, Midwest, Mid-Atlantic, and Northeastern regions. Eligible programs needed to be operational within a hospital or healthcare system. We deliberately invited programs with different models; using this approach, we aimed to understand foundational components of success across different models of care. All invited programs accepted the invitations. Online interviews were scheduled with the program founders between March and April of 2023. Additional program representatives were included in the interview for one program because the founder thought their perspectives were important to provide all the information required. First, verbal consent was provided by all interviewees prior to the start of each interview. Interviews were led by the first author (J.S.G.), with additional authors serving as additional interviewers (K.H.S., A.C., and M.A.K.). Interviews were semistructured based on an interview guide (Supplemental Content 1, http://links.lww.com/TJACSM/A280) developed by the study team and informed by relevant constructs of the EPIS framework (Table 1) (25,26). The interview guide included the following topics: program history and origin; programmatic characteristics including delivery, staff, and exercise dosing; and contextual factors (inner and outer setting) that influenced implementation and sustainment. Each interview lasted approximately 60 min and was audio recorded and transcribed using transcription software built into Zoom.

This study was conducted as a quality improvement project and did not involve human subjects research as defined by the US Federal Policy for the Protections of Human Subjects (45 CFR 46, Subpart A). The Institutional Review Board-01 at the University of Iowa determined that this was not human subjects research (#202411574) and was exempt from review. All participants in this study provided verbal consent to participate in the interviews and to have the interviews recorded. Verbal consent was deemed appropriate for this study due to the minimal risk involved and the nature of the quality improvement project. Participants were informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any time without any consequences. The data collected were anonymized to protect the privacy and confidentiality of the participants. No identifying information was included in the analysis or reporting of the results.

Audio transcriptions of the interviews were checked for accuracy prior to analysis, which used a qualitative descriptive methodology (27,28). Data were analyzed deductively according to relevant constructs of the EPIS framework. Each transcript was reviewed by two authors (J.S.G. and M.A.K.) who extracted key programmatic aspects relevant to each interview question. Extracted elements included descriptions of the program's location and setting, a summary of the program, and a description of the program's content. The creation of each program was summarized, including key stakeholders, physician champions, and the program founder. We reported how each program was integrated into the healthcare system, including referral workflow and electronic medical record (EMR) integration and tracking. Information was extracted about how each program was initially funded and if additional funding was available. We assessed key barriers and facilitators of success for each program (Table 2). Finally, all data relevant to program design and delivery were extracted, summarized, and compared within and across programs (Table 3). Additionally, representative quotes related to each of the topics in the interview guide were reported (Table 4).

RESULTS

University of Vermont Steps to Wellness

Program setting

The Steps to Wellness (STW) program is within the University of Vermont Medical Center hospital system in Burlington, Vermont.

Program description

All patients receive an initial assessment by a physical therapist (PT) and a medical doctor (MD) or advanced practice provider (APP) to determine eligibility for participation in a 12-wk exercise program offered within hospital space (Table 1). The initial assessment is billed to insurance, and participation in the exercise program is free. People with metastatic cancer can extend beyond 12 wk without being charged. A fee-for-service option is available for everyone else once the initial 12 wk have been completed.

2379-2868/1002/e000301
Translational Journal of the ACSM

TABLE 1

Relevant EPIS Framework Constructs Explored and Described across Interviews.

	EPIS Construct	Definition
Outer context	Funding/contracting	Financial support from the implementation system
	Patient/client characteristics	Characteristics of the target population
Innovation factors	Innovation characteristics	Characteristics of the innovation to be implemented
	Innovation fit	How much or how well the innovation fits the needs of the population it serves and the context in which it is delivered
Inner context	Organizational characteristics	Existing structures or processes in an organization that have an influence on implementation
	Leadership	Characteristics of people within the organization who have influence over the implementation
	Quality and fidelity monitoring/support	Steps taken to ensure ongoing and consistent delivery of the innovation
	Organizational staffing processes	Processes within an organization that influence the staff involved in the delivery and/or implementation of the innovation
	Individual characteristics	Characteristics of individuals that impact the implementation steps related to the innovation

Adapted from Moullin et al. (26).

Starting the program

STW was created in 2011 by two internal oncology clinicians who recognized a need for a rehabilitation program for people with cancer similar to those available for cardiac and pulmonary patients. The hospital had a "huge, beautiful cardiac rehab clinic," which was run by a clinician who supported the vision to offer an exercise oncology program and offered use of the clinic. The founders secured two small grants to provide initial funding. STW was designed as a clinical program with a database connected for research purposes.

Program integration

Referral Pathways

People are referred to the program by a clinician (i.e., physician, nurse, social worker) or self-referred. All referrals must be endorsed by a physician. Referrals are entered into the EMR, which triggers an assessment appointment with the PT and MD/APP. All referral communications are documented in the patient's chart in the EMR.

Generating Referrals

The founders regularly attend nurse and physician monthly meetings to generate program referrals. Although all physicians are supportive, most are too busy to refer. Referrals depend mostly on nurses. Additionally, marketing materials were developed to generate self-referrals.

Barrier to success: maintaining referrals

Keeping referrals top-of-mind for clinicians is difficult. Shifting job responsibilities of the founders (one is retired and the other added more clinical time due to the loss of oncologists) made it difficult to continue to make sure the program was "in somebody's face." Further, turnover among nurses requires continual work to engage new cohorts of referring clinicians.

Facilitators of success

Use of Existing Infrastructure

Connecting the program to the hospital was critical because existing space and systems within the cardiac rehabilitation department (e.g., electronic referral system) could be used. New models of care did not have to be invented.

Align with Hospital Goals and Needs

Generating revenue for the hospital (via PT/MD/APP assessments) was important to ensure hospital buy-in. Also, the exercise program offers the hospital a chance to highlight the "human side" of their work and was seen as a value-add for their business.

Cancer Wellness for Life

Program setting

Cancer Wellness for Life (CW4L) is a hospital-based consultative exercise delivery model that was started in Lenexa, Kansas.

Program description

CW4L is an exercise program outside the healthcare system that is part of a care plan based on patient performance, clinical measures, and health system-identified disease priorities. The founder (who established a contract with the health system) created an exercise program aligning with American College of Sports Medicine guidelines to leverage a navigational structure to connect people with exercise. Staff include a clinical exercise physiologist and a cancer-specific PT. Complexity is associated with the number of sessions per patient (range, 1–5), which is assessed periodically (mean, 3–5 sessions). Program participation is free to patients.

Starting the program

The founder of CW4L knew there needed to be an exercise-specific service that aligned with the healthcare system's objectives. The founder started with awareness and education and then built patient care and operations; tracking outcomes was implemented from the beginning. The program was created in 2017 as a one-person operation and eventually added three staff. There was a strong physician champion (breast oncologist) who understood hospital operations and cancer governance/administration and brought the program to physicians championing the importance of exercise. Nurse navigators are essential for helping patients learn about and navigate the program because nurses transect disease-specific teams. Oncology operations were critical for leadership

TABLE 2

Program Characteristics of Five Healthcare System-Based Exercise Oncology Programs.

Program Name and Year Started	Who Delivers and Credentials	Program Length or Sessions Per Person	Location in Cancer Control Continuum	1:1 or Groups; Online or Telehealth	Exercise Dosing (FITT)	Target Population and Program Reach	Evidence-Based Program Components	Reporting Measures
University of Vermont Steps to Wellness (2011)	Athletic trainer (BS)	24 sessions per person; 2 d·wk^{-1} for 12 wk	Peritreatment and survivorship	Groups of 4–6 roll in 3- to 4-wk group; mostly in-hospital with online options	Upper/lower body resistance 20–40 min; balance activities; aerobic training 15–40 min at RPE of 12–14 Borg	All cancers; 230 annual referrals of 3219 receiving treatment at University of Vermont Medical Center (12%–14%)	Follow ACSM guidelines; the Oncology Hematology Rehabilitation Program was established in August 2011 to provide exercise and rehabilitation to individuals with cancer. Phase 2 oncology rehabilitation is also called Steps to Wellness	Evaluation tracking, how many sessions patients attend, type of cancer and treatments, people not fit enough to exercise needing PT first, whether patients ended up back in exercise program, dropouts and reasons why
Cancer Wellness for Life (2017)	CEP and oncology PT—past CETIs and oncology nurses	Mean sessions 3–5 per person based on complexity	Diagnosis and when treatment is 80%, but have some survivorship and screening	Most (80%–90%) is 1:1 with a few groups; only in-person	Personalized program based on clinical assessment of patient	All cancers; 30% of patient volume; mean 3300 analytic cases	Evidence-based program following exercise dosing and recommendation	Tracking number of patients served, number of times patients seen (by complexity score), performance outcomes, referrals; compare patients who participated in this program vs those that did not against length of stay and ER admissions for cost savings and measured downstream revenue
Maple Tree Cancer Alliance (2016)	Staff have BS in exercise science/public health; exercise oncology instructor, Maple Tree Cancer Alliance certified, NASM endorsed	~36 sessions per person 1× per week via three-phase model; assess every 12 wk	Diagnosis through treatment	All 1:1; pre–COVID-19 was 100% in-person, now combined in-person and online options	Phases dictate intensity; active lower 30%–45% HRR, work for up to 30 min per session; frequency 1× per week; phase 2 is 65% of $\dot{V}O_{2max}$	Referred 587 from the Kettering Cancer Center of 2100 cases	Staying abreast of evidence-based guidelines and recommendations	Total monthly appointments, number of program completers, within participant fitness/performance changes; patient testimonials are also captured
Huntsman Cancer Institute at the University of Utah Personal Optimism with Exercise Recovery (POWER) Program (2005)	Exercise specialist; BS or MS in exercise science or kinesiology; ACSM certifications	9-mo duration with 12-wk phases with varied weekly frequency by phase; most opt for one supervised visit per week and one unsupervised session per week. From 2016 to 2019, mean duration of participation was 16 wk (15)	Full continuum	Started 1:1 or 2:1 depending on risk; both virtual and in-person; did virtual pre-COVID-19 pandemic	Not cookie cutter, whatever patient tolerates; sensitive to total burden; symptom burden tailoring	All cancers; annual assessment was 365; Huntsman Cancer Institute had 5394 annual cases[a]	Following all the governing bodies: ASCO, AMA, PM&R, CoC, ACSM; continual staff training; want to keep patients and make them lifelong exercisers	Data from the assessment sessions carried out by PM&R MDs and exercise physiologists and exercise training sessions with exercise physiologists are documented in the EMR; POWER is a clinical program; with the institution's research informatics infrastructure, data is pulled from EMR to

Continued on next page

								analyze outcome data for effectiveness
Memorial Sloan Kettering Healthy Living Program (2019)	Nurse practitioner, registered nurse, exercise physiologist (ACSM/ACS certified), RD	Varies based on need	Treatment and survivorship; most patients start at < 1 month of breast cancer diagnosis	All 1:1; telehealth only	Exercise prescriptions are individualized and target ACSM/ASCO guidelines; no predefined FITT	Breast cancer; enrolled 1043 of the potentially eligible patients 1445[a]	ASCO and ACSM guidelines and rapid translation of research findings from the MSK Exercise Oncology research program	Independent financial sustainability (i.e., not continuously reliant on hospital resources), proportion of patients transferred to survivorship care (i.e., smooth transition from oncology to survivorship program), patient satisfaction

ACS, American Cancer Society; ACSM, American College of Sports Medicine; AMA, American Medical Association; ASCO, American Society for Clinical Oncology; CEP, cancer exercise physiologist; CETI, Cancer Exercise Training Institute; CoC, Commission on Cancer; COVID-19, coronavirus disease 2019; ER, emergency room; FITT, frequency, intensity, time, type; HRR, heart rate reserve; NASM, National Academy of Sports Medicine; PM&R, physical medicine and rehabilitation; RD, registered dietician; RPE, rating of perceived exertion; VO_{2max}, maximal oxygen consumption.

[a] These data are for 1 yr and vary monthly and annually.

buy-in, including cancer-center-specific directors and leaders at the facilities. The founder had the ear of executives at the cancer center and learned how to efficiently convey their message and stay viewable by participating in cancer and healthcare credentialing, as well as local and national tumor conferences.

Program integration

Referral Pathways

A physician breast oncology program champion drove early referrals. Based on ongoing needs, there are two primary referral pathways, including standard automatic referrals for specific patient populations as part of their care plans. These patient populations include those who have resectable pancreatic or esophageal cancers, have head and neck cancers, are bone marrow transplant recipients, have breast (including metastatic) cancer, and have glioblastomas. Other patients are referred based on functional changes or needs as identified by oncology staff who have been trained in simple validated assessments (functional, strength, ability limitations). Patients can also self-refer.

Electronic Medical Records Integration

EMR access started from the beginning of CW4L as deemed necessary by the founder. Wellness staff (exercise professionals) are treated and badged as staff, giving them access to inpatient and outpatient EMR. EMR is used to monitor patients and communicate with care teams and includes documentation, notes, and assessments. Exercise oncology staff add assessments, plans of care, and recommendations into the EMR for both the provider and patient.

Barrier to success: staff and leadership

Barriers such as staff turnover and leadership changes make it difficult to maintain program continuity. Not having access to or face time with leadership or providers is a barrier to program growth.

Facilitators of success

Physician Champions and Clinical Communication

A physician champion facilitated introductions to other providers to spread program awareness. The physician champion also helped navigate hospital systems, ultimately helping to get peer providers and physicians onboard, including excellent buy-in from gastrointestinal surgeons and cardiology staff. Program staff participate in tumor conferences and credentialing meetings both for the system and individual hospitals.

Communicating Program Value and Patient-Reported Outcomes

CW4L emphasizes tracking outcomes (patient and facility levels) to share with leadership. It is "focused on emphasizing and speaking the language of the clinic and patient in everything we do," including communicating to providers the role of exercise in improving function in activities of daily living that are immediately viewable to the provider and patient.

Maple Tree Cancer Alliance

Program setting

Maple Tree Cancer Alliance (MTCA) is a network of hospital-based programs that started at the Kettering Cancer Center in Dayton, Ohio.

TABLE 3

Comparison of Programmatic Elements by Exercise Oncology Program.

	University of Vermont Steps to Wellness	Cancer Wellness for Life	Maple Tree Cancer Alliance	Huntsman POWER Program	MSK Healthy Living Program
Was the founder internal to healthcare system?	Y	N	N	Y	Y
Did they have seed funding prior to the start of program?	Y	N	Y	N	Y
Is there a clear ongoing funding stream?	Y	N	Y	Y	Y
Is the program integrated within EMR system?	Y	Y	Y	Y	Y
Is the exercise programming evidence-based?	Y	Y	Y	Y	Y
Was an internal physician champion present at the start of the program?	Y	Y	N	Y	Y
Do patients perform exercise from a space within the hospital?	Y	N	Y	Y	N
Does the program offer exercise as a part of a larger package of wellness services (vs exercise only)?	Y	Y	Y	Y	N
Is there active support from hospital leadership/ administration?	Y	Y	Y	Y	Y
Do patients pay out-of-pocket for services?	N	N	N	Y	N
Does the program track key reporting elements for their hospital?	Y	Y	Y	Y	Y
Does the program have a system set up to routinely report outcomes to hospital leadership?	N	Y	Y	Y	Y

N, no; Y, yes.

Program description

Participants receive one in-person one-on-one training session per week on-site at the hospital. The program has three phases with assessments completed after 12 wk. Each participant receives, on average, 36 sessions. Sessions include exercises consistent with participant ability and goals.

Starting the program

MTCA began in 2011 as a standalone organization and clinical programs began in 2016 in the Kettering Health Network. The program was adapted to fit into the clinical setting and connected with administration and leadership who invited MTCA to present a proposal for seed funding; it ultimately received 2 yr of pilot funding. Nurses were the first to buy in and were critical to success. Currently, there are over 86 different clinical partnerships with MTCA outside the Kettering Health Network.

Program integration: referral pathways

Patients are referred to the program by physicians, nurses, social workers, friends, and family or are self-referred. Referrals include a physician clearance pathway and are managed through e-fax cloud-based software that interfaces with the EMR. There is bidirectional communication with exercise and clinical staff. There is infrastructure for tracking and monitoring patient exercise tolerance and patient-reported outcomes.

Barriers to success

Long-Term Participant Retention

Participants who join want to stay for life; there is no policy or upper limit on the number of services or the amount of care provided by MTCA. Some participants stay longer than the program can support, which creates a barrier for higher-need patients for whom the program can seem inaccessible.

Finances

Cost is a barrier to serving more patients. The payment structure includes the hospital paying for the individual exercise appointments each patient receives and is supplemented by grant funding so that patients do not pay for services.

Facilitators of success

Data Reporting

The founder monitors and reports back referral conversions to the providers, including the percentage of patients completing the exercise program. These referral conversions are a key metric for the program's success and inform a quarterly report that includes the conversions, outcomes, and patient testimonials. The founder is an invited leader to the oncology service line weekly meeting for the American College of Surgeons Commission on Cancer (CoC) Committee.

Space

Space for MTCA is currently donated by the Kettering Cancer Centers. MTCA's expansion into other cancer centers has included planning for space in the building plans for each of the new cancer centers.

Huntsman POWER

Program setting

The Personal Optimism with Exercise Recovery (POWER) program is an on-site exercise oncology clinical program within the Linda B. and Robert B. Wiggins Wellness and Integrative Health Center located at the Huntsman Cancer Institute at the University of Utah.

Program description

Exercise prescriptions follow recommendations from the American Society for Clinical Oncology, American Medical Association, American Academy of Physical Medicine and Rehabilitation, CoC, and American College of Sports Medicine.

TABLE 4

Representative Quotes from Interview Participants.

Interview Category (EPIS Framework Construct)	Quote	Program
Starting the program		
Inner context, leadership	"The biggest piece of success to really get people to listen was when I had an opportunity to get the ear of the administrator who took this to the hospitals."	Cancer Wellness for Life
Inner context, leadership	"I can't state this enough…the [POWER Program] would have never gotten started without the support of our administrative leadership because they really were the ones who saw the vision and created the space for us to try this out."	Huntsman POWER Program
Outer context, funding; inner context, organizational characteristics	"[Healthcare leadership] became really interested because it aligned with an institutional priority. And then became supportive. So, they actually provided funding to get us off the ground for the first year."	MSK Healthy Living Program
Inner context, leadership	"I was spending a lot of time talking to nurses, talking to physicians, trying to get them to make referrals into the [exercise] program."	Maple Tree Cancer Alliance
Program integration		
Inner context, organizational staffing processes	"Nurses were the first to buy in, so that without the nurses I don't think we'd be standing here today."	Maple Tree Cancer Alliance
Outer context, patient characteristics	"I would say a lot of it has been patient to patient. A lot of it is patients hearing about it from other patients."	Huntsman POWER Program
Facilitators		
Innovation factors, innovation fit	"Focused on emphasizing and speaking the language of the clinic and patient in everything we do."	Cancer Wellness for Life
Innovation factors, innovation characteristics	"The other piece to the referral model that helps is that we are generating some revenue for the hospital because if we were dependent solely on donated funds, it wouldn't happen."	Steps to Wellness
Innovation factors, innovation characteristics	"I think that the automation is really important because I think that we wouldn't be able to address the volume of patients, nor would my colleagues have any interest if they have to do anything. So, I don't say that meanly, but it just is the real truth."	MSK Healthy Living Program
Inner context, leadership	"We were there from the ground up, so they put [the exercise space] into the plans as they were building the Cancer Center. It's honestly one of the best things that ever happened."	Maple Tree Cancer Alliance
Barriers		
Inner context, individual characteristics	"Referrals. I think it is so hard to keep [the exercise program] at the top of people's minds."	Steps to Wellness
Inner context, organizational staffing processes	"General nursing when you're thinking of infusion nursing or you know specific groups like the surgeons, nurses, or radiation nurses. We've seen so much staff change that I think it's a little bit harder to have as much of a leadership representation from that group."	Cancer Wellness for Life
Outer context, funding/ contracting	"Workforce is not an issue with us. It's money…the patients don't pay anything."	Maple Tree Cancer Alliance

The program is delivered in three 12-wk phases. The first phase has two sessions per week. The second phase has one session per week with the goal of working toward independence and graduating from the program. Mean duration in the program is 9 months, and patients receive 35–40 sessions on average. Sessions include resistance exercise, aerobic training, balance, and flexibility. Patients pay a nominal fee for exercise sessions. Assessments at the beginning of the program or at the start of a phase might be billed to insurance if a physical medicine and rehabilitation physician is present.

Starting the program

Huntsman POWER was started in 2005. The founder (from within the healthcare system) noticed patients presenting with shoulder issues to a sports medicine clinical practice after breast cancer treatment. A nurse practitioner in the oncology clinic helped the founder to brainstorm ways to get patients active. The founding team benchmarked other programs across the country and approached the chief executive officer of Huntsman who is supportive of the program. Oncologists are also supportive, especially with referrals.

Program integration

Referral Pathways

The preferred referral method is direct provider referral through the EMR. Referrals include the reason for referral and key patient notes, so exercise oncology program staff know what to expect. Referrals also come informally from providers (through recommendations; not EMR driven), from infusion nurses, and by written referral. Patients can also self-refer from fliers or word of mouth.

Electronic Medical Records Integration

Huntsman POWER is part of the Wellness Center and integrated as an embedded clinic with a clinic identification code and its own referral identification code. These referrals and codes are similar to other clinical services like labs or imaging. Scheduling staff help to get patients in for new patient assessments. Patient charting, tracking, and notes are completed in the EMR.

Barriers to success

Oncology Provider Reach

It is challenging to scale service delivery because some oncologists are too specialized, and it is also hard to understand who is responsible for referral. Seventy-eight percent of all referrals come from the same 15 providers.

Resources

Money, staff, and space subsidizing were identified as barriers for scaling the reach of program.

Facilitators of success

Program Location and Alignment

Huntsman POWER has an umbrella association as a wellness program with a survivorship program. The program is on site in a location that is commonly accessed by patients (between the pharmacy and another clinic). Space and cost are, thus, heavily subsidized by Huntsman.

Alignment of Organization's Values

The program aligns with the principles of the Huntsman Cancer Institute: "Patients and community first, united effort, excellence in all we do." Leadership is proud of the program and keen to highlight it on tours to showcase the excellent clinical services available at Huntsman. "I can't state this enough, like the program would have never gotten started without the support of our administrative leadership because they were the ones who saw the vision and created this space for us to try this out."

Staff Training and Interprofessional Interactions

The program has an excellent training program for staff, which is helpful for staff retention and high-quality service delivery. Huntsman POWER nurtures and maintains physician relationships to foster effective communication between providers.

Memorial Sloan Kettering Healthy Living

Program setting

The Memorial Sloan Kettering (MSK) Healthy Living program is offered within the MSK Cancer Centers at the Breast and Imaging Center in Manhattan in New York.

Program description

The program is a comprehensive lifestyle program including services to address nutrition, exercise, sleep, and mental, emotional, financial, sexual, and spiritual health needs. Services are tailored to each patient's needs based on the results of a comprehensive self-assessment questionnaire, a cancer treatment plan, and nurse navigator assessment. There is no cost to patients for services. Exercise services are delivered virtually.

Starting the program

MSK Healthy Living was started by a clinician (medical oncologist) and physician administrator (service chief), both internal to the hospital system. The founders recognized a gap in service; exercise was offered to patients through clinical trials, but strict eligibility criteria excluded many patients. The program proposal aligned with a core institutional initiative to optimize survivorship care, which led to support from hospital-system leadership.

A needs assessment was conducted with physicians to inform the program design. Most (98%) thought it was important to incorporate lifestyle recommendations into care, but the majority (>50%) were too busy to do it on their own and wanted a standardized structure to "relieve the burden and take additional work off their plate." The program began with a 1-yr pilot with both administration and academic leadership interest. The research community was engaged throughout to ensure that the translation of research findings into standard-of-care clinical practice remained evidence based.

Program integration

Referral Pathways and Structure

Referrals are managed through the MSK EMR system. All new eligible medical oncology patients receive an introductory email through the patient portal with an explanatory video about the program and a link to a customized needs/risk assessment survey. Responses to the survey are automatically scored, and high-risk scores generate referrals to appropriate clinical services (e.g., exercise oncology, nutrition, integrative medicine). Scores and subsequent referrals are compiled into an individualized wellness care plan, which is reviewed with each patient by the nurse navigator within 2 wk of completing the initial assessment. Participants meet with the Healthy Living nurse practitioner, who is a clinician trained in survivorship and lifestyle medicine, approximately 6 months after the initial assessment. Follow-up visits with the nurse practitioner continue every 6–12 months (in parallel with medical oncology visits), and ultimately, the Healthy Living program nurse practitioner assumes survivorship care of the participant once medical oncology care is completed.

Barriers to success

Funding

The program was limited based on personnel, and additional funding was not available, restricting the growth of the program into regional sites and other cancer types.

Timing for Integration

The program design required integration into the MSK EMR system, which took approximately 1.5 yr to establish.

Facilitators of success

Automation of Referrals

Ensuring that the referral process was driven via automation removed the burden from physicians, who were supportive of the program but too busy to be primarily responsible for referrals.

Prioritization of Hospital Needs

Being flexible in aligning the program design with the hospital's needs (i.e., survivorship metrics) was critical to get buy-in and support. This included structuring the program around a financially sustainable business model while avoiding additional costs to patients.

DISCUSSION

In our exploration of established exercise oncology programs, we observed factors across the EPIS framework that allowed these programs to successfully operate within their hospital settings. Each of the five surveyed programs adapted to the needs of their hospital settings to create exercise oncology programs that could integrate into established systems. These programs represent variety in geographic location, analytic case load, and volume of individuals to serve in their catchment area. Despite this variation, each program consistently found ways to design and deliver exercise oncology programs within a hospital setting. Several interviewees explicated the support of leadership at the highest level, including executive and cancer center leadership, as essential for maintaining the success of their programs. Physician champions, integration into hospital systems and priority areas, and the role of clinical providers in supporting and referring to the programs were cited by several programs as facilitators of success. Commonly reported barriers included staff, personnel, and sustainable sources of funding. Some of these barriers limit the number of patients that could be enrolled in the exercise oncology programs. Although the referral rates of these programs are higher than previously reported referral rates of 15% to exercise oncology programs, the rates are still far too low given the consistent and strong evidence that exercise is beneficial for cancer patients both during and after treatment (29–31). Hospitals and cancer centers should find solutions to provide exercise programs for all patients to address the lack of existing exercise oncology programs.

Undertaking a context analysis to understand if and how a program could be supported is an important first step because there is not one single right model for providing exercise oncology programs and services. In this analysis of only five programs, varied approaches were observed for costs, staffing models, reimbursement structures, and referral pathways. For example, Huntsman POWER uses direct provider referral, or that of any member of the clinic team (e.g., registered nurses, physician assistants), to their program using the EMR. STW allows any level of provider (physician, nurse, social worker) to refer, whereas the MSK Healthy Living program uses predefined eligibility criteria to automate referral of new patients. All three programs support patient self-referrals as well. These are varied approaches that serve the needs of the individual institutions. Understanding context and needs is especially important for increasing the number of exercise oncology programs in high-need areas, including areas that are rural, have lower socioeconomic status, and have a high cancer burden (18). For example, the Huntsman POWER program serves five states in the Intermountain West (Utah, Idaho, Montana, Nevada, and Wyoming) using a telehealth model to serve individuals in these rural, remote areas. These five programs described within the EPIS framework serve as referent case studies for building and sustaining exercise oncology programs within a specific context.

The cost and staffing barriers prevalent in the programs in this analysis are not unique to healthcare system-based exercise oncology programs. In 2022, Adsul et al. (21) conducted a similar implementation assessment of community- and evidence-based interventions for cancer survivors including the Better Exercise Adherence after Treatment for Cancer program, Active Living After Cancer, and Strength After Breast Cancer. These programs represent various delivery contexts (home-based, community-based, referrals), yet the most common barriers to integrating these programs were found to be costs, capacity, and readiness at the organizational level; the authors did not report staffing to be a primary barrier in these programs (21). Several of the current exemplar exercise oncology programs were successful, in part, due to the founders and leadership learning how to communicate the value of their programs to healthcare leadership and administrators in a way that aligned with the institutional priorities of the healthcare system. This implementation strategy of aligning goals between the organization and the exercise oncology program (evidence-based intervention) was used in a recent case study identifying causal pathways in implementing exercise oncology programs (23). The five exercise oncology programs discussed here were also successful because they were able to find and secure resources and support the workforce delivering these programs; both strategies have been identified as established implementation factors for sustainability and maintenance (23).

There are strengths of this study. One strength of our investigation was using EPIS as an established implementation science framework to guide our approach to data collection and analysis. This framework-guided approach recognized the multiple contextual layers that influence implementation and enhanced the comprehensiveness of the findings. We also included programs from different geographical areas of the United States and with different program structures, organizational sizes, and cancer focuses to provide a comprehensive view of exercise oncology programs without overrepresenting a single site or location. Further, we included established programs, each with several years of experience of program delivery. The leaders of these well-established programs had important insights to share about their programs, and were extremely generous and forthcoming with their data in the hope of helping others develop exercise oncology programs.

There are also several limitations to our approach. First, we do not have a representative sample of all exercise oncology programs; rather, this was a selected sample of established programs. The convenience sampling of programs is an established limitation of this type of work, and our results should be interpreted with caution because these findings will not apply to all programs. Future work should consider nascent programs, smaller programs, and exercise oncology services provided outside of the healthcare setting. We also only collected information from the program perspective, we did not engage other stakeholders, including organizational leadership, clinicians, or patients, for additional insight. In our approach, we did not ask about the costs to deliver the programs; the Moving Through Cancer Taskforce is currently leading a cost evaluation as a future direction. Funding has been and will continue to be an issue for the maintenance of these exercise oncology programs. Identification and utilization of funding models is a crucial area of future research, which should include the option of third-party payer reimbursement. Furthermore, although we asked about reach metrics (32), the utility of the reach metrics is limited given that most of these programs are resource constrained and thus did not aim to reach all the individuals in the catchment area.

In this project, we presented five exemplary exercise oncology programs and described how they were initiated, implemented, and maintained. We investigated key programmatic elements as well as barriers to and facilitators of success. As supported by the American Society for Clinical Oncology, there is not one approach or one program that will meet the needs of all patients or survivors; as the field moves forward, we will need different programs with varied timing, programmatic components, and intensities to serve the growing number of individuals living with and beyond cancer. This project highlights the importance of understanding contexts to create tailored programs and strategies because each institution will have unique needs for a program to effectively integrate into their system. One possible future goal would be the development of an implementation toolkit for starting and sustaining exercise oncology programs within healthcare systems. Based on results presented herein, there are some common factors (e.g., champions, alignment with leadership priorities, resources for staffing costs, funding challenges); however, there are many elements to program development and sustainment that appear to be highly specific to the individual healthcare system. Further explication of the steps for developing and sustaining exercise oncology programming is needed for exercise to become standard-of-care in the oncology setting. Exercise is important for cancer care, and more programs are needed to provide exercise to all people with cancer. As the evidence base evolves, so too must our approach to implementing and sustaining access to exercise oncology programs.

PRACTICAL APPLICATIONS

Understanding the best-practice implementation strategies of successful healthcare system-based exercise oncology programs will help guide others looking to embed appropriate exercise oncology programming into their clinical settings.

The results of the current study do not constitute endorsement by the American College of Sports Medicine.

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

The authors have no conflicts of interest to report. No funding was received to directly support this work.

REFERENCES

1. Campbell KL, Winters-Stone KM, Wiskemann J, et al. Exercise guidelines for cancer survivors: consensus statement from International Multidisciplinary Roundtable. *Med Sci Sports Exerc*. 2019;51(11):2375–90.
2. Cao C, Friedenreich CM, Yang L. Association of daily sitting time and leisure-time physical activity with survival among US cancer survivors. *JAMA Oncol*. 2022;8(3):395–403.
3. Cao C, Patel AV, Liu R, et al. Trends and cancer-specific patterns of physical activity, sleep duration, and daily sitting time among US cancer survivors, 1997–2018. *J Natl Cancer Inst*. 2023;115(12):1563–75.
4. Avancini A, Trestini I, Tregnago D, et al. Willingness, preferences, barriers, and facilitators of a multimodal supportive care intervention including exercise, nutritional and psychological approach in patients with cancer: a cross-sectional study. *J Cancer Res Clin Oncol*. 2023;149(7):3435–45.
5. Burse NR, Bhuiyan N, Mama SK, Schmitz KH. Physical activity barriers and resources among Black women with a history of breast and endometrial cancer: a systematic review. *J Cancer Surviv*. 2020;14(4):556–77.
6. Farrokhzadi L, Dhillon HM, Goumas C, et al. Physical activity correlates, barriers, and preferences for women with gynecological cancer. *Int J Gynecol Cancer*. 2016;26(8):1530–7.
7. Fernandez S, Franklin J, Amlani N, et al. Physical activity and cancer: a cross-sectional study on the barriers and facilitators to exercise during cancer treatment. *Can Oncol Nurs J*. 2015;25(1):37–42.
8. Mizrahi D, Naumann F, Broderick C, et al. Quantifying physical activity and the associated barriers for women with ovarian cancer. *Int J Gynecol Cancer*. 2015;25(4):577–83.
9. Nadler M, Bainbridge D, Tomasone J, et al. Oncology care provider perspectives on exercise promotion in people with cancer: an examination of knowledge, practices, barriers, and facilitators. *Support Care Cancer*. 2017;25(7):2297–304.
10. Smaradottir A, Smith AL, Borgert AJ, Oettel KR. Are we on the same page? Patient and provider perceptions about exercise in cancer care: a focus group study. *J Natl Compr Canc Netw*. 2017;15(5):588–94.
11. Smith-Turchyn J, Richardson J, Tozer R, et al. Physical activity and breast cancer: a qualitative study on the barriers to and facilitators of exercise promotion from the perspective of health care professionals. *Physiother Can*. 2016;68(4):383–90.
12. Newton RU, Kennedy MA, Singh F, et al. Safety, effectiveness, and uptake of exercise medicine integrated within a cancer care center. *Semin Oncol Nurs*. 2020;36(5):151073.
13. Wonders KY, Wise R, Ondreka D, Gratsch J. Cost savings analysis of individualized exercise oncology programs. *Integr Cancer Ther*. 2019;18:1534735419839466.
14. Rowed K, Shen S, Smith A, et al. Early integration of exercise into breast cancer care: the MSK healthy living program. *J Am Soc Clin Oncol*. 2023; 41(16 suppl):e24047.
15. Coletta AM, Rose NB, Johnson AF, et al. The impact of a hospital-based exercise oncology program on cancer treatment-related side effects among rural cancer survivors. *Support Care Cancer*. 2021;29(8):4663–72.
16. Dittus K, Toth M, Priest J, et al. Effects of an exercise-based oncology rehabilitation program and age on strength and physical function in cancer survivors. *Support Care Cancer*. 2020;28(8):3747–54.
17. Lutgendorf SK, Ramirez E, Schrepf A, et al. Rural residence is related to shorter survival in epithelial ovarian cancer patients. *Gynecol Oncol*. 2021;163(1):22–8.
18. Schmitz KH, Demanelis K, Crisafio ME, et al. Proximity to cancer rehabilitation and exercise oncology by geography, race, and socioeconomic status. *Cancer*. 2025;131(1):e35515.
19. Weaver KE, Palmer N, Lu L, et al. Rural-urban differences in health behaviors and implications for health status among US cancer survivors. *Cancer Causes Control*. 2013;24(8):1481–90.
20. Singh GK, Williams SD, Siahpush M, Mulhollen A. Socioeconomic, rural-urban, and racial inequalities in US cancer mortality: part I—all cancers and lung cancer and part II—colorectal, prostate, breast, and cervical cancers. *J Cancer Epidemiol*. 2011;2011:107497.
21. Adsul P, Schmitz K, Basen-Engquist KM, Rogers LQ. Studying the implementation of exercise oncology interventions: a path forward. *Transl J Am Coll Sports Med*. 2022;7(4):1–8.
22. Adams JL, Martin MY, Pisu M, et al. Determining patient needs to enhance exercise program implementation and uptake in rural settings for women after a cancer diagnosis. *Support Care Cancer*. 2021;29(8):4641–9.
23. Czosnek L, Rankin NM, Cormie P, et al. "Now is the time for institutions to be investing in growing exercise programs as part of standard of care": a multiple case study examining the implementation of exercise oncology interventions. *Support Care Cancer*. 2023;31(7):422.
24. Kennedy MA, Bayes S, Newton RU, et al. Implementation barriers to integrating exercise as medicine in oncology: an ecological scoping review. *J Cancer Surviv*. 2022;16(4):865–81.
25. Aarons GA, Hurlburt M, Horwitz SM. Advancing a conceptual model of evidence-based practice implementation in public service sectors. *Adm Policy Ment Health*. 2011;38(1):4–23.
26. Moullin JC, Dickson KS, Stadnick NA, et al. Systematic review of the Exploration, Preparation, Implementation, Sustainment (EPIS) framework. *Implement Sci*. 2019;14(1):1.
27. Colorafi KJ, Evans B. Qualitative descriptive methods in health science research. *HERD*. 2016;9(4):16–25.
28. Stanley M. Qualitative descriptive: a very good place to start. In: Nayar S, Stanley M, editors. *Qualitative Research Methodology for Occupational Science and Occupational Therapy*. London: Routledge; 2014. pp. 21–36.
29. Ligibel JA, Bohlke K, May AM, et al. Exercise, diet, and weight management during cancer treatment: ASCO guideline. *J Clin Oncol*. 2022;40(22):2491–507.
30. Schmitz KH, Campbell AM, Stuiver MM, et al. Exercise is medicine in oncology: engaging clinicians to help patients move through cancer. *CA Cancer J Clin*. 2019;69(6):468–84.
31. Ligibel JA, Pierce LJ, Bender CM, et al. Attention to diet, exercise, and weight in oncology care: results of an American Society of Clinical Oncology national patient survey. *Cancer*. 2022;128(14):2817–25.
32. Kwan BM, McGinnes HL, Ory MG, et al. RE-AIM in the real world: use of the RE-AIM framework for program planning and evaluation in clinical and community settings. *Front Public Health*. 2019;7:345.