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CONSENSUS STATEMENT

Exercise recommendations for older adults living with and beyond cancer: A consensus statement by the Advancing Capacity to Integrate Exercise Into the Care of Older Cancer Survivors expert panel

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Abstract

Background: The number of cancer survivors aged older than 65 years is rising rapidly. Current evidence-based exercise guidelines lack specific guidance for older cancer survivors as a result of insufficient evidence. An expert panel was convened to develop consensus-based recommendations for exercise in older cancer survivors.

Methods: The development of recommendations was guided by the Grading of Recommendations Assessment, Development, and Evaluation Evidence-to-Decision framework for good practice statements. The panel drew from the available literature, a Delphi survey of exercise and health professionals, other exercise guidelines, clinical and research expertise, and interest-holder input provided by a community advisory board of older cancer survivors and caregivers ($n = 11$). Recommendations had to be deemed accessible (i.e., no added barriers) to older cancer survivors and feasible to implement. The panel voted on the strength of the recommendation for or against each statement, with consensus set at 85% agreement.

Results: Consensus was reached on 11 recommendations covering the following areas: medical evaluation/clearance for exercise, pre-exercise assessment, exercise prescription, exercise tolerance and safety, exercise delivery, and behavioral support. The recommendations aimed to promote engagement in and uptake of appropriately prescribed exercise programming by older cancer survivors, while keeping barriers and risks as low as possible.

Conclusions: Older cancer survivors can benefit from appropriately prescribed exercise, which should be an essential component of their cancer care. Exercise and health professionals need to consider the unique needs of older cancer survivors to ensure that exercise is safe and effective for this population, while also reducing barriers to reach as many people as possible.

KEYWORDS
cancer survivors, geriatrics, gerontology, physical activity, practice guideline, professional education

INTRODUCTION

By 2040, the proportion of cancer survivors aged older than 65 years in the United States will be 73%, with most surviving 5 years or longer.[1] Cancer and aging are risks for dependence and disability, escalating pain and depressive symptoms, and social isolation that worsen physical and cognitive functioning.[2] There is an urgent need for age-specific interventions to address the unique physiological, functional, and psychosocial needs in older adults (aged ≥65 years) living with and beyond cancer.[3]

Existing evidence consistently shows that more modest levels of exercise, below those recommended for the general public,[4] can improve cancer-related health outcomes.[5] Current evidence-based exercise guidelines for all cancer survivors do not include age-specific guidelines for older cancer survivors as a result of insufficient evidence in this population at the time of their development.[5,6] The resulting research and practice gaps for older cancer survivors may discourage the use of exercise as a low-cost, accessible, and scalable strategy to improve outcomes for this fast-growing population.[3,7]

Expert consensus-based recommendations can address this gap to inform future trials and patient care. Modeled after a similar process to develop exercise recommendations for people with bone metastases,[8] a major goal of the Advancing Capacity to Integrate Exercise Into the Care of Older Cancer Survivors (ACES) initiative (1R21CA280996-01A1) is to develop rigorous and credible guidelines for health and exercise professionals to use when providing structured exercise programming in older cancer survivors with the best available evidence.

MATERIALS AND METHODS

Overview

The ACES expert panel was selected on the basis of experience as older cancer survivors or expertise in caring for older cancer survivors and/or delivering exercise to older cancer survivors (constituents are listed in Table S1). A community advisory board (CAB) of older cancer survivors and caregivers (n = 11) provided interest-holder input and guidance throughout the process. A priori, the panel decided to develop recommendations to complement, but not override, the 2019 American College of Sports Medicine (ACSM) exercise guidelines for cancer survivors.[5] Unless otherwise explicitly stated, the 2019 ACSM cancer guidelines apply to all older cancer survivors, followed by specific complementary recommendations.

Statement development and supporting evidence

With the use of the ACSM cancer guidelines as a basis, an initial set of 20 recommendations was developed by the panel. The panel considered the following types of direct and indirect evidence for each statement: (1) the level of support for the recommendations by an international sample of exercise and health professionals responding to an online Delphi survey (n = 266; Table S2) and separately from the CAB; (2) a scoping review of randomized controlled trials specific to older cancer survivors[9]; and (3) the National Comprehensive Cancer Network (NCCN) survivorship guidelines[10] and general exercise guidelines for older adults from the ACSM guidelines for exercise testing and prescription,[11] National Strength and Conditioning Association,[12] International Conference on Frailty and Sarcopenia Research (ICFSR),[13] and Lee et al., published in the journal of the American Academy of Family Physicians.[14]

Expert panel meeting

In October 2024, the panel convened in person for 3 days, where they reviewed, discussed, iteratively revised, and repeatedly voted on each statement, with the goal of reaching consensus on a final set of recommendations by the last day. The meeting was facilitated by two of the authors (K.W.-S. and K.C.), and statements were organized by topic area to ensure consistency in decision-making.

Methodology for recommendations

The panel followed an approach guided by the Grading of Recommendations Assessment, Development, and Evaluation (GRADE)

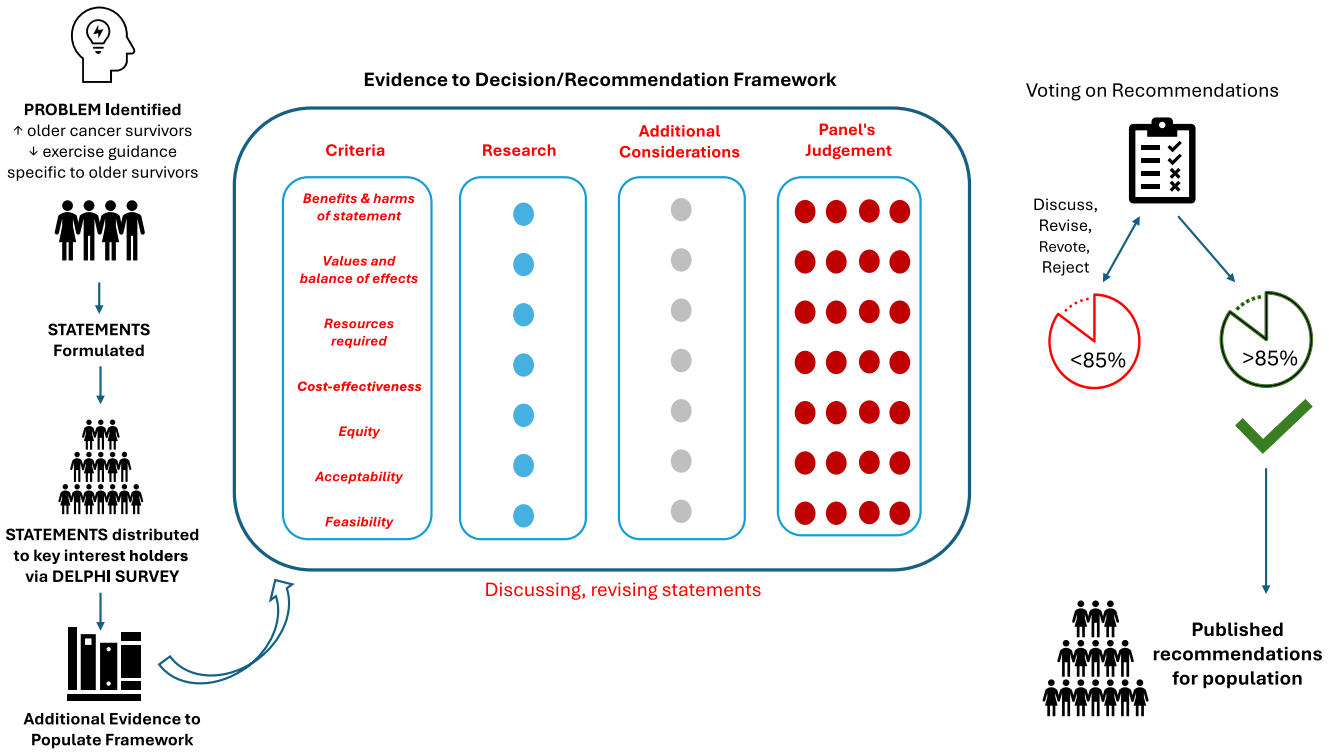

FIGURE 1 Grading of Recommendations Assessment, Development, and Evaluation Evidence-to-Decision framework for developing good practice statements as applied to the Advancing Capacity to Integrate Exercise Into the Care of Older Cancer Survivors initiative.

Evidence-to-Decision framework for developing good practice statements[15] (Figure 1). For each proposed statement, an overview of the evidence was presented along with considerations of the benefits, harms, values, resources required, cost-effectiveness, equity, acceptability, and feasibility. After group discussion, members of the panel voted via an anonymized online survey on (1) whether they supported a recommendation for or against a specific statement, and (2) the strength of the recommendation (strong or conditional). A priori, the panel set consensus at 85% agreement to indicate a strong uniform level of expert agreement, which is also used by the NCCN.[16] Although thresholds often range from 70% to 80%, a higher level was chosen to reflect the limited evidence base in older adults and to strengthen confidence in the recommendations. If consensus was not reached initially, there was further discussion and potential revisions were performed, and voting was repeated until consensus was reached.

RESULTS

Of the original 20 statements, consensus was ultimately reached on 11 recommendations (Table 1). One statement about tracking exercise compliance was omitted at the beginning of the meeting because it was felt not to be specific to older cancer survivors. Statements were often slightly revised during the meeting and before voting. Final recommendations prioritized access to older cancer survivors (i.e., did not increase barriers to exercise) and feasible implementation (i.e., did not require substantial resources). This emphasis led the panel not to recommend a statement about the types of exercise professionals who should deliver exercise to older cancer survivors. After the in-person meeting, of the 19 statements that reached consensus, several were combined to create a more concise and cohesive set of 11 recommendations that were approved by all panel members via email follow-up. The CAB viewed the panel's recommendations as very appropriate for older cancer survivors.

Medical evaluation and clearance before exercise

Statement 1. *For an older cancer survivor, additional medical evaluation beyond what is recommended in the current ACSM and NCCN guidelines is not required to begin an appropriately prescribed exercise program.*

The panel considered whether additional medical clearance and/or evaluation was necessary for several conditions more common in older adults, such as cognitive limitations, frailty, recurrent falls, and mobility impairments. The panel agreed that requiring additional clearance increased barriers to an older cancer survivor who is ready to engage in exercise when appropriately prescribed. However, the panel felt strongly that vigilance and screening for unexplained changes in cognition, mobility, or function, which might indicate a new or worsening condition, should occur across all

TABLE 1 Consensus-based exercise recommendations for older cancer survivors.

	Exercise Domain		Consensus Statement
1	Medical evaluation		For an older cancer survivor, additional medical evaluation beyond what is recommended in the current ACSM EGCS and NCCN guidelines is not required to begin an appropriately prescribed exercise program.
2	Exercise testing		In addition to ACSM-recommended health-related fitness assessments to determine an exercise prescription, the following functional assessments are recommended for older cancer survivors: Timed Up and Go, Short Physical Performance Battery, and tests of static and dynamic balance.
3	Exercise prescription		The exercise prescription for older cancer survivors should include balance training; an appropriate balance prescription is one or two sets of four to 10 different balance exercises at least 3 days per week.
4			The exercise prescription for older cancer survivors should include flexibility training; an appropriate flexibility prescription is for stretches that target each of the major muscle–tendon units held to the point of mild discomfort and/or tightness for 30–60 s per stretch at least 2 and up to 7 days per week.
5	Exercise tolerance and safety		The exercise professional should routinely monitor older cancer survivors for symptoms/conditions, including but not limited to the following: joint pain, fatigue, vertigo/dizziness/lightheadedness, nausea, palpitations, chest pain or heaviness, muscle pain or weakness, shortness of breath, and/or incontinence with movement.
6			An exercise professional should consider the following environmental factors and instructional techniques to deliver safe and effective exercise for older cancer survivors: assess the environment for fall hazards, limit auditory and visual distractions, use appropriate cueing and feedback, demonstrate exercises and repeat instructions as needed, and educate participants about appropriate clothing, footwear, nutrition, and hydration.
7	Implementing prescriptions in practice		A person who prescribes and delivers exercise to older cancer survivors should have empathy and patience and be able to appropriately modify and tailor exercises. It is strongly encouraged for people who prescribe and deliver exercise to older cancer survivors to gain experience, education, and/or advanced certification specific to exercise in older adults and/or cancer survivors.
8			An exercise professional should consider the following when encouraging an older cancer survivor to engage in structured exercise training: behavioral techniques (i.e., goal setting and incentives), education about expected responses to exercise (i.e., delayed-onset muscle soreness), initial starting volume and progression (e.g., start low and go slow), individual circumstances, social support, cancer team support, caregiver support, and/or potential barriers to ongoing exercise.
9			In an older cancer survivor who has significant deficits in strength, mobility, and/or balance, exercise programming should first focus on improving muscle strength, flexibility, and balance before moving on to improving aerobic capacity. In addition, exercise programming should include exercises that emphasize functional movement patterns (e.g., chair stands, stepping routines, walks with turns, etc.) as much as possible.
10			In a supervised setting, the exercise professional should consider personal characteristics (e.g., age, comorbidities, polypharmacy, and physical and/or cognitive limitations) when determining the recommended degree of supervision (e.g., group size and instructor: participant ratio) during exercise.
11			If unsupervised exercise is deemed unsafe, it is important to modify exercises and/or engage a caregiver, family member, or friend to assist the individual and/or provide supervised exercise.

Note: Unless otherwise explicitly stated, the 2019 ACSM cancer guidelines apply to all older cancer survivors, followed by the specific complementary recommendations outlined above.

Abbreviations: ACSM, American College of Sports Medicine; EGCS, Exercise Guidelines for Cancer Survivors; NCCN, National Comprehensive Cancer Network.

phases of exercise programming. Recent or unexplained changes can be queried initially by survivor or proxy self-report at intake and monitored during the exercise program. If changes are noted, training should be deescalated or suspended until a medical evaluation can be conducted and suitability to initiate or return to exercise determined.

Exercise testing

Statement 2. *In addition to ACSM-recommended health-related fitness assessments to determine an exercise prescription, the following functional assessments are recommended for older cancer survivors: Timed Up and Go (TUG), Short Physical Performance Battery (SPPB), and tests of static and dynamic balance.*

Current ACSM and NCCN guidelines recommend using tests of mobility, balance, and functioning in older cancer survivors but do not identify specific assessments. The ACES panel strongly recommended that standardized tests including TUG, SPPB, and static and dynamic balance tests (Table 2) be used when prescribing and implementing exercise for older cancer survivors. Information from these tests should be used in conjunction with data from the ACSM-recommended health-related fitness tests to design safe and effective exercise prescriptions for older cancer survivors. The panel considered that these recommended assessments do not require extensive training or equipment to be administered and can be performed in a wide variety of settings, which makes them highly feasible to implement.

Exercise prescription

The panel agreed that the current ACSM guidelines apply to older cancer survivors as follows: (1) avoid inactivity, (2) engage in 30 min of moderate-intensity aerobic and/or resistance exercise three times per week to improve cancer-related health outcomes, and (3) strive toward 150 min of moderate to vigorous aerobic exercise per week plus twice-weekly resistance exercise, with recommended additional exercise prescriptions specific to older cancer survivors.

Statement 3. *The exercise prescription for older cancer survivors should include balance training; an appropriate balance prescription is one or two sets of four to 10 different balance exercises at least 3 days per week.*

TABLE 2 Tests of mobility, physical functioning, and balance that can aid in developing an exercise prescription for older cancer survivors.

Test	Scoring and range	Clinically relevant values	Administration instructions	Considerations
Mobility				
TUG	• Time to rise from a chair, walk 3 m, turn around, walk 3 m at usual pace, sit in the chair (s) • Continuous measure (shorter times = better mobility)	• >13.5 indicates greater fall risk[17] • MIC, 1.6–8.3 s[18]	• Instructions: https://www.sralab.org/rehabilitation-measures/timed-and-go • Adaptation for remote administration via videoconference available[19]	• Dual-task TUG adds assessment of cognitive functioning[20]
Physical functioning				
Short Physical Performance Battery	• Sum of scores on tests of standing balance, 4 m usual walking pace, and five-time chair stand • Scores on each test are based on performance from 0 to 4 • Range, 0–12 (higher scores = better physical functioning)	• ≤10 indicates increased risk of mobility disability[21] • MCID, 1.0[22]	• Instructions: http://geriatrictoolkit.missouri.edu/SPPB-Score-Tool.pdf • Adaptation for remote administration via videoconference available[19]	• May have a ceiling effect in more functional individuals
Balance				
Static balance: Timed one-leg stance	• Time standing on one leg (s) • Can be completed with eyes open or eyes closed • Continuous measure (longer times = better balance)	• NA	• Instructions: https://sites.pitt.edu/~whitney/sls.htm	• Times longer than 1 min may not be reflective of balance • Eyes open or closed condition depends on the population • Consider safety when administering
Dynamic balance: Functional reach test	• Maximum distance an individual can reach forward while standing in a fixed position • Continuous measure (longer distances = better balance)	• Scores <7 inches indicate limited mobility/ADLs[23] • MIC, 2.17 in Gallagher et al.[18]	• Instructions: https://www.sralab.org/rehabilitation-measures/functional-reach-test-modified-functional-reach-test	• Can be adapted to a sitting position for individuals unable to stand

Abbreviations: ADLs, activities of daily living; MCID, minimal clinically important difference; MIC, minimal important change; NA, not available; TUG, Timed Up and Go.

The current ACSM cancer guidelines do not include balance as a cancer-related health outcome, and there was insufficient evidence to evaluate an exercise prescription for fall prevention. One exercise guideline for older adults issued a specific exercise prescription for balance training in frail older adults,[13] whereas others stated that balance exercises should be performed by those at risk of falling or with frailty but issued no specific prescription.[10,12,14]

The panel strongly recommended that balance training be included in the exercise prescription for older cancer survivors, despite a lack of controlled trials focused on balance training. This recommendation is consistent with the Centers for Disease Control and Prevention's Stopping Elderly Accidents, Deaths, and Injuries recommendations to implement fall prevention exercise programs (e.g., tai chi) in older adults. Older cancer survivors are at a greater risk of falls than the general population of older adults.[24] The panel concluded that all older cancer survivors would benefit from regular balance training to improve postural stability, gait, and balance. Tai chi or the integration of balance training with the ACSM's general balance prescription as part of resistance and aerobic training was endorsed by the panel to enhance feasibility and sustainability. Other exercise recommendations provide a list of suggested balance exercises for older adults, as found elsewhere.[13]

Statement 4. *The exercise prescription for older cancer survivors should include flexibility training; an appropriate flexibility prescription is for stretches that target each of the major muscle–tendon units held to the point of mild discomfort and/or tightness for 30–60 s per stretch, at least 2 and up to 7 days per week.*

The current ACSM cancer guidelines do not include range of motion as a cancer-related health outcome. The NCCN[10] and some other guidelines[11,14,25] recommend that older adults and/or cancer survivors engage in twice-weekly flexibility exercises.

Even with a lack of controlled trials, the panel strongly recommended that flexibility training be included in the exercise prescription for older cancer survivors to improve mobility and range of motion. Based on the clinical and research experience of panel members, range of motion and mobility are critical when beginning a resistance training program because limitations can impede proper exercise form. Some panel members supported yoga specifically. In the absence of specific flexibility training guidelines for cancer survivors, which need to be addressed in future research, the ACSM's general guidelines provide an appropriate flexibility prescription.

Exercise safety and tolerance

Statement 5. *The exercise professional should routinely monitor older cancer survivors for symptoms/conditions including but not limited to the following: joint pain, fatigue, vertigo/dizziness/lightheadedness, palpitations, muscle pain or weakness, shortness of breath, and/or incontinence with movement.*

The panel recommended routine assessment of older cancer survivors' exercise tolerance. Continual assessment of exercise tolerance is imperative, even with an appropriately designed exercise program based on a person's health status, pre-exercise assessments, and attention to training principles. Exercise prescription and/or progression of training should be tailored in part on the basis of exercise tolerance, and suggest modifications for persons on the basis of varying conditions such as joint pain, diabetes, and/or low back pain.[12–14] Signs and symptoms of poor exercise tolerance in an older cancer survivor are typically assessed by observation and/or patient report, via validated tools when possible. It is important to assess baseline symptoms related to preexisting comorbid conditions and monitor for new or worsening signs and symptoms. Poor tolerance can be mitigated by decreasing the volume of exercise within or across sessions and/or modifying or substituting exercises that may be too difficult to perform properly.

Statement 6. *An exercise professional should consider the following environmental factors and instructional techniques to deliver safe and effective exercise for older cancer survivors: assess the environment for fall hazards, limit auditory and visual distractions, use appropriate cueing and feedback, demonstrate exercises and repeat instructions as needed, and educate participants about appropriate clothing, footwear, nutrition, and hydration.*

Exercise delivery to older cancer survivors requires additional attention to the physical and cognitive changes seen with aging that can be accelerated by cancer treatment and compounded by treatment-related side effects such as peripheral neuropathy. Exercise guidelines in older adults recommend a variety of instructional techniques to deliver safe and effective training sessions for persons with dementia, cognitive decline, poor vision, equilibrium and balance issues, low back pain, and/or difficulty handling weights.[12,13] The panel strongly recommended specific environmental and instructional considerations to ensure safe and effective delivery for older cancer survivors (Figure 2). For example, verbal cueing to teach an exercise should be done with clear, slow-paced, jargon/slang-free language at an audible level for the participant, followed by feedback to refine or praise the participant's technique. Modifications to the exercise environment and instructional approaches to enhance safety may be needed to reduce fall risks in older cancer survivors who are at risk for age- and/or treatment-related changes in sensory[26] and neuromuscular function.[27] Furthermore, older cancer survivors should be educated about proper athletic footwear to ensure stability and comfort and breathable clothing to avoid overheating. The panel added that guidance regarding hydration and nutrition before, during, and after exercise should also be provided.

Implementing exercise prescriptions in practice

Statement 7. *A person who prescribes and delivers exercise to older cancer survivors should have empathy and patience and be able to appropriately modify and tailor exercises. It is strongly encouraged for people who prescribe and deliver exercise to older cancer survivors to gain experience, education, and/or advanced certification specific to exercise in older adults and/or cancer survivors.*

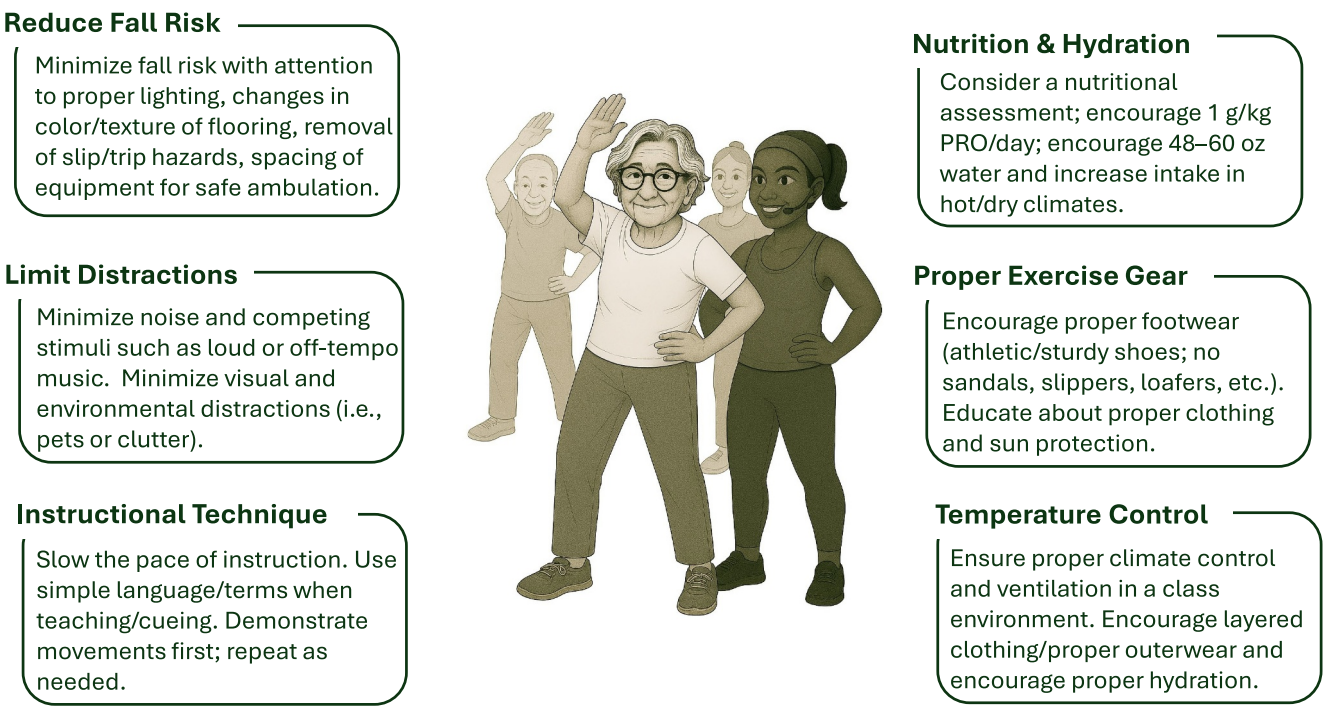

FIGURE 2 Special considerations for safe and effective delivery of exercise to older cancer survivors.

The current ACSM guidelines do not include specific requirements for experience, education, or certification for exercise professionals who prescribe and deliver exercise to cancer survivors, nor are there comparable recommendations from guidelines for older adults. Among published trials that delivered supervised exercise programs, five reported that qualified exercise professionals delivered the study exercise programs,[28–32] whereas two required that exercise professionals had experience working with cancer survivors and older adults.[30,32] Some exercise guidelines recommended that success for older adults with cognitive impairments can be improved by creating a respectful, reassuring, mindful, and empathetic training atmosphere.[12,13] The CAB expressed strong feelings that an exercise professional have high emotional intelligence, empathy, patience, knowledge, and experience when working with older cancer survivors, and be able to tailor and modify exercises appropriately.

The panel felt that requiring an exercise professional to have specific experience, education, and/or advanced certification to work with older cancer survivors could exacerbate inequities in access to exercise support. Although still highly desirable, the panel reworded the statement to encourage exercise professionals to consider gaining experience, education, and certification. The panel felt that flexibility in the recommendation was needed to ensure accessibility, particularly in underserved areas. Certification opportunities for delivery of exercise to older adults exist (i.e., American Council on Exercise [ACE] Senior Fitness Specialist, American Physical Therapy Association Certified Exercise Expert for Aging Adults, and others), and for delivery of exercise to people living with and beyond cancer (i.e., ACSM–American Cancer Society Cancer Exercise Specialist, CanRehab Specialist Instructor in Cancer and Exercise Rehabilitation, ACE Cancer Exercise Specialist, etc.). At the time of publication, no programs yet exist that offer specific certifications for exercise delivery in older cancer survivors, which creates a practice gap that should be filled. Given barriers to workforce training, future efforts should prioritize developing accessible, affordable pathways to ensure that exercise professionals have the training, education, and advanced certification to best meet the needs of older cancer survivors.

Statement 8. *An exercise professional should consider the following when encouraging an older cancer survivor to engage in structured exercise training: behavioral techniques (e.g., goal setting and incentives), education about expected responses to exercise (e.g., delayed-onset muscle soreness), initial starting volume and progression (e.g., start low and go slow), individual circumstances, social support, cancer team support, caregiver support, and/or potential barriers to ongoing exercise.*

A limitation of the ACSM cancer guidelines is the exclusion of behavioral considerations for engagement in exercise for cancer survivors of any age, and the low participation rates among older cancer survivors suggest that this is an important area for consideration.[33] The NCCN guidelines encourage the use of telephone counseling, motivational interviewing, readiness to change, behavioral change techniques, goal setting, and social support.[10] Exercise guidelines in older adults recommend individualized exercise advice, practical implementation solutions, behavioral support systems, and patient preferences to optimize behavioral change and long-term adherence.[12–14]

The panel strongly recommended considering behavioral techniques (e.g., goal setting, incentives, feedback, and positive reinforcement), education, and support to address barriers to ongoing exercise when encouraging an older cancer survivor to engage in a structured exercise program. To allay concerns about the potential harms of exercise, educating older cancer survivors about normal and expected responses when starting exercise, such as muscle soreness and tiredness, and using an appropriate starting volume of exercise, can promote successful engagement early in an exercise program.

Understanding an individual's living circumstances helps ensure that an exercise program is both appropriate and accessible to the individual. Support from the cancer medical team can be particularly important for older cancer survivors during treatment because a provider's recommendation may motivate and reassure them on the relative safety of exercise. Social support from an exercise professional, family member, and/or exercise group can foster accountability, increase enjoyment, and reduce social isolation. Because an older cancer survivor's health status can fluctuate, their ability to engage in regular exercise should be continually assessed and addressed.

Statement 9. *In an older cancer survivor who has significant deficits in strength, mobility, and/or balance, exercise programming should first focus on improving muscle strength, flexibility, and balance before moving on to improving aerobic capacity. In addition, exercise programming should include exercises that emphasize functional movement patterns (e.g., chair stands, stepping routines, walks with turns, etc.) as much as possible.*

Exercise guidelines for older adults recommend that muscle strengthening and balance training modalities should precede aerobic training activities in persons who are frail, have significant deficits in strength and balance, cannot support their body weight independently, and/or are at risk for falls.[13,14] Furthermore, some exercise guidelines emphasize that specific exercises in a muscle strengthening and balance training program target major muscle groups involved in function and mobility and include movement patterns that directly simulate daily activities.[12,13] Among published trials in older cancer survivors, five trials that included objectively measured physical functioning as a study outcome included resistance training in the intervention, and reported improvements in one or more measures of physical functioning.[29–32,34]

The panel recommended an emphasis on strength and balance training and the incorporation of functional movement patterns in individuals with deficits in strength, mobility, and/or balance. The panel revised the wording to focus on older cancer survivors with significant deficits in strength, mobility, or balance, which are easier to identify via recommended assessments. The panel recommended functional movement patterns that mimic challenges to daily activities for older adults, such as chair sit to stand, walking with turning, and stepping routines, with attention to ensuring an adequate range of motion and proper posture first.

Statement 10. *In a supervised setting, the exercise professional should consider personal characteristics (e.g., age, comorbidities, polypharmacy, physical and/or cognitive limitations, and social and behavioral factors) when determining the recommended degree of supervision (e.g., group size and instructor:participant ratio) during exercise.*

Supervised exercise may offer several advantages over unsupervised exercise, such as safety, motivation, and support. There is currently little guidance about what should be considered when triaging an older cancer survivor to an appropriate level of supervision and/or making decisions about group sizes for exercise programs offered to older cancer survivors (e.g., large [$n \geq 15$] vs. small [$n = 3–5$] group exercise sessions vs. 1:1 training). Exercise guidelines for older adults do not recommend specific levels of supervision on the basis of participants' health and abilities, except that supervision may be warranted for persons with cognitive and physical impairments. Published trials of supervised group exercise in older cancer survivors do not provide information about the limits of group size for exercise classes, and several exclude participants with cognitive and physical impairments, who might need lower instructor:participant ratios.

The panel opted for a statement that allowed the exercise professional to consider a wide range of personal characteristics in the context of their experience, and the exercise prescription could guide the optimal level of supervision. Requiring supervision on the basis of specific criteria might unintentionally create barriers for older cancer survivors to accessing exercise programming.

Statement 11. *If unsupervised exercise is deemed unsafe, it is important to modify exercises and/or engage a caregiver, family member, or friend to assist the individual and/or provide supervised exercise.*

Current ACSM cancer guidelines do not identify conditions that may make unsupervised exercise unsafe for older cancer survivors. Severe cognitive and physical impairments may make it difficult for a person to perform exercises correctly and safely on their own. The NCCN guidelines suggest that individuals who are unable to safely perform home exercise without supervision because of physical impairments be referred to physical therapy.[10] Another guideline recommended supervision for older adults with disabilities and/or moderate to severe cognitive impairment, and noted that it was vital in persons with dementia.[12] Among published trials, five of six included unsupervised exercise sessions for part[26,29,30,34] or all[31] of the study intervention, and also had exclusion criteria for physical and/or cognitive limitations for participation. Since the publication of the 2019 guidelines, several validated tools have been developed to discern whether it is not safe for a cancer survivor to exercise unsupervised (i.e., exercise in cancer evaluation and decision support,[35] cardio-oncology rehabilitation,[36] personalised exercise rehabilitation in cancer survivorship,[37] and others[38]) that could be useful in the context of older cancer survivors.

The panel reached consensus on a revised statement removing specific conditions as unsuitable for unsupervised exercise (dementia/Alzheimer disease, dependence on assistive devices, trouble with weight transfer, and recent, recurrent falls). The panel felt that broad categorization of cautionary groups might create unnecessary barriers and exclude capable individuals. The panel encouraged development of an individualized program based on evaluation of an individual's capacity to safely perform unsupervised exercise and incorporating specific modifications, such as seated exercises, use of assistive devices, or assistance by a caregiver, family member, or friend, when needed.

STRENGTHS AND LIMITATIONS

The intent of these guidelines is to complement previous guidelines and promote exercise for older adults. There were both strengths and limitations with this initial effort to issue guidance about the delivery of exercise to older cancer survivors. Strengths include our multidisciplinary panel of experts representing both research and clinical practice involved in the care of older adults and/or cancer survivors; use of the GRADE framework to ensure that recommendations followed a rigorous, reproducible, and transparent process; and inclusion of a patient advocate and community advisory board to ensure that the voices of older cancer survivors and their caregivers were integrated into the recommendations. There were also some limitations. Our panel was from a single geographic region, North America, as a result of funding constraints. Fortunately, our panel members are all well-recognized experts in their respective fields; however, future efforts to revise recommendations may benefit from a broader global representation. Similarly, the focus of the ACES effort was to provide a complementary set of recommendations to the 2019 ACSM cancer exercise guidelines but not to cancer exercise guidelines from other organizations.[6,39–41] Because the ACSM is the largest global sports medicine organization, the panel felt that providing an initial uniform set of guidance (e.g., ACSM cancer exercise guidelines plus companion recommendations from the ACES) would better streamline information for exercise and health professionals. Finally, the current recommendations focus on exercise guidelines for older cancer survivors; however, given the important role of caregivers for older cancer survivors, future efforts should consider exercise recommendations for them as well.

SUMMARY AND FUTURE DIRECTIONS

By following a framework for developing best practice statements, the ACES panel issued complementary guidance to the 2019 ACSM cancer guidelines specific to older cancer survivors. In the absence of sufficient evidence from controlled trials, the panel drew from available evidence from the literature, a Delphi survey, other exercise guidelines, clinical and research experience and expertise, and interest-holder input, including a community advisory board. The panel also integrated considerations of accessibility and feasibility into the recommendations. When clinically appropriate, these recommendations should be applied in conjunction with other condition-specific recommendations, such as those for people with bone metastases.[8] The overarching goal of the panel was to provide recommendations unique to the needs of older cancer survivors, and foster engagement while keeping risks as low as possible. This goal could be achieved by minimizing barriers to exercise, via pre-exercise assessments, when possible, appropriately prescribing exercise, delivering programs that consider the unique needs and preferences of older cancer survivors, and creating a safe exercise environment that considers the social, emotional, and physical health needs and contexts of older cancer survivors. With the rise in the number of older cancer survivors worldwide, there is an urgent need to fortify the evidence base to transform these best practice statements to evidence-based recommendations. The ACES panel issued a set of research goals that could eliminate gaps in knowledge and strengthen the evidence base about the safety, efficacy, and implementation of exercise as standard care for older cancer survivors (Table 3).

TABLE 3 Research priorities to fortify the evidence base for exercise recommendations in older cancer survivors.

Exercise Domain	Priority Research Areas
Medical evaluation	• Clear and consistent reporting of whether trials required provider approval for participation and why • Clear and consistent reporting of exclusion criteria for medical and/or safety reasons • Comparison of AE rates across studies according to medical evaluation and exclusion criteria to document relative risks for AEs to identify which patients and programs may not require evaluation as a result of low risk
Exercise testing	• In studies that target older cancer survivor populations with known limitations, rigorously report on selection of eligibility criteria on the basis of pre-exercise assessments, such as physical functioning or ADLs • Include outcomes meaningful to older cancer survivors • Person-centered outcomes including cognitive and physical functioning, social health (e.g., cancer loneliness), and mental health • Independent functioning • Days remaining in home • Inclusion of outcomes to advance standard care and cost recovery • Treatment tolerance • Emergency department visits • Falls • Clinically relevant change in functional outcomes • Consider standardized assessments, including those described in "Medical evaluation" above, PROMIS measures, and so forth, for comparison across studies and harmonization of data for meta-analyses

(Continues)

TABLE 3 (Continued)

Exercise Domain	Priority Research Areas
Exercise prescription	• Testing understudied exercise prescriptions • Low-intensity exercise • Balance training • Flexibility training
Exercise tolerance and safety	• Reporting of environmental and instructional techniques specific to delivery of exercise interventions in older survivors in published research protocols • Reporting of approaches to monitor and quantify compliance (in addition to attendance to prescribed sessions) to study interventions in published research protocols and primary outcomes articles • Reporting of approaches used to monitor participant exercise tolerance and dose modification protocols in published protocols and/or outcomes articles • Reporting of AEs via CTCAE and/or following ExHaRM guidelines • Categorization and reporting of attributable mild, moderate, and serious AEs via the CTCAE or similar system • Additional categorization of the impact of AEs on ADLs • Number and type of AEs that led to program modification and/or withdrawal
Implementing exercise prescriptions in practice	• Use of best practices for inclusion of older adults in research[42] • Increase volume of studies in understudied samples of older survivors • Frailty • Functional impairments, including cognition • Physically and/or cognitively dependent older cancer survivors • Strengthen reporting and rationale of intervention design components (i.e., FITT) specific to older cancer survivors • Strengthen reporting of instructor education, training, and characteristics • Strengthen reporting of strategies used to enhance adherence and retention • Provide data-sharing access for meta-analyses, such as Bayesian models, individual participant data, and network analyses

Abbreviations: ADLs, activities of daily living; AE, adverse event, CTCAE, Common Terminology Criteria for Adverse Events; ExHaRM, Exercise Harms Reporting Method; FITT, frequency, intensity, time, and type; PROMIS, Patient-Reported Outcomes Measurement Information System.

AUTHOR CONTRIBUTIONS

Kerri M. Winters-Stone: Conceptualization, investigation, funding acquisition, writing–original draft, methodology, writing–review and editing, supervision, and resources. **Gabrielle Meyers**: Investigation and writing–review and editing. **Elizabeth Eckstrom**: Investigation and writing–review and editing. **Andrea Cheville**: Investigation and writing–review and editing. **Jose M. Garcia**: Investigation and writing–review and editing. **Margaret L. McNeely**: Investigation and writing–review and editing. **Supriya Mohile**: Investigation and writing–review and editing. **Karen Mustian**: Investigation and writing–review and editing. **Sarah Neil-Sztramko**: Investigation, methodology, and writing–review and editing. **Laura Q. Rogers**: Investigation and writing–review and editing. **Kathryn H. Schmitz**: Investigation and writing–review and editing. **Anna Schwartz**: Investigation and writing–review and editing. **Jessica Sitemba**: Investigation and writing–review and editing. **Robert Smith**: Investigation and writing–review and editing. **Kristin L. Campbell**: Conceptualization, investigation, writing–review and editing, and methodology.

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CONFLICT OF INTEREST STATEMENT

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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