

A Scoping Review of Exercise Oncology Trials to Inform Best Practice Recommendations for Exercise in Older Adults (65+ years) Living with and Beyond Cancer

Chris Chalmers¹, Elizabeth Eckstrom², Gabrielle Meyers², Kristin Campbell³, Kerri Winters-Stone¹
¹Division of Oncological Sciences, Knight Cancer Institute, School of Medicine, Oregon Health & Science University, Portland OR; ²Division of General Internal Medicine & Geriatrics, Oregon Health & Science University, Portland, OR; ³Department of Physical Therapy, Faculty of Medicine, University of British Columbia, Vancouver, Canada

This work was funded through the following grant: R21CA280996
Contact email: wintersk@ohsu.edu Website: <https://www.ohsu.edu/winters-stone-exercise-lab>

BACKGROUND

- By 2040, 24% of all cancer survivors will be ages 65–74, 31% will be ages 75–84, and 18% will be 85 and older, and face the combined threats of cancer and aging.
- Exercise could improve outcomes for older cancer survivors (OCS), but current exercise guidelines for cancer survivors do not issue age-specific guidelines for OCS due to the lack of clinical trial evidence.

AIMS

- We conducted a scoping review of published controlled exercise oncology trials to assess intervention characteristics, eligibility criteria, feasibility (retention and adherence), and safety, with the goal of informing best practice guidelines for delivering exercise to OCS.

METHODS

- Design:** Scoping review adherent to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines.
- Sample:** Eligible articles reported on controlled trials that allocated people >65 years old at enrollment and a history of cancer to > 1 arm of structured exercise training lasting > 4 weeks that was aimed to improve a health-related outcome.
- Article Selection:** The selection process is shown in Figure 1. Citation details were uploaded to Rayyan; duplicates were removed, two authors independently screened titles and abstracts, reviewed full texts against inclusion criteria, and resolved disagreements with a third author.
- Population Characteristics:** Sample size, age, cancer types (Figure 2).
- Intervention Characteristics:** Study intervention details including intervention modality, length of intervention, degree of supervision, and setting (Table 1).
- Eligibility Criteria:** Inclusion and exclusion criteria, including contraindications to exercise, exclusion for physical and cognitive limitations (Table 2).
- Feasibility** (Table 3)
 - Retention:** Proportion of participants who completed the study out of those enrolled.
 - Adherence:** Proportion of sessions attended out of those prescribed.
- Safety:** Number of mild, moderate, and severe adverse events (Figure 3).

Figure 1. PRISMA Flow diagram for study selection

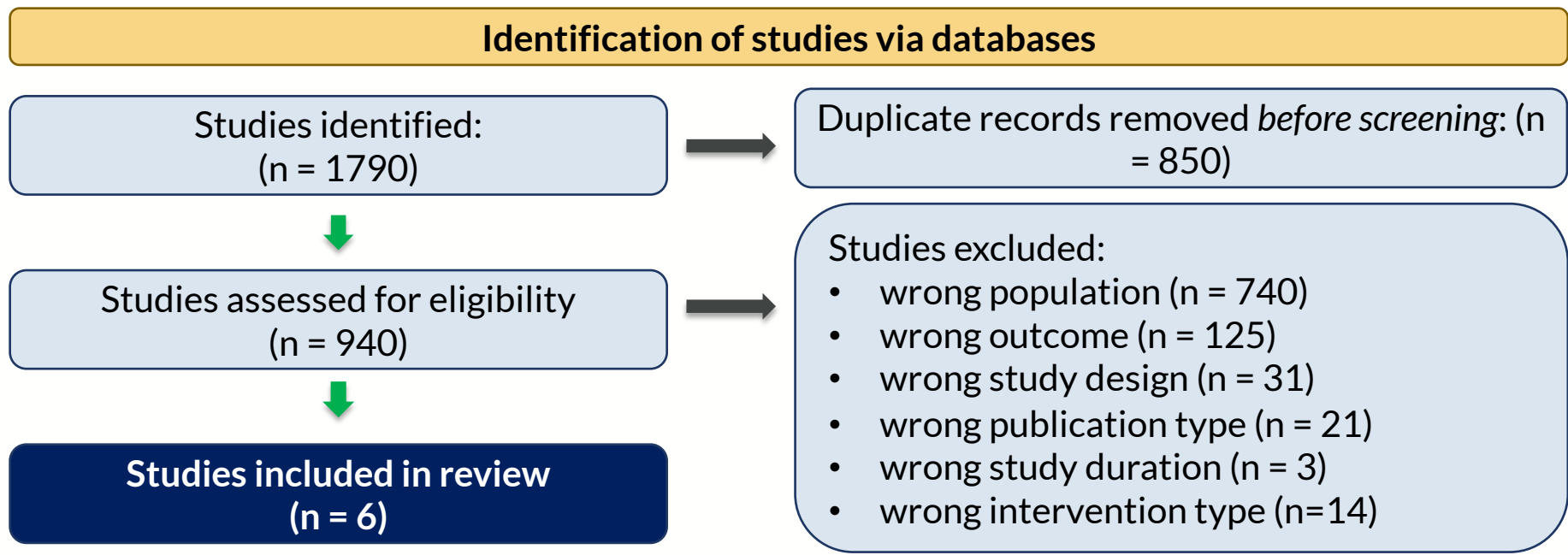


Figure 2. Study sample size, reported age, and included cancer type(s). Age reported: Median [IQR] or {Range}, or Mean (±SD)

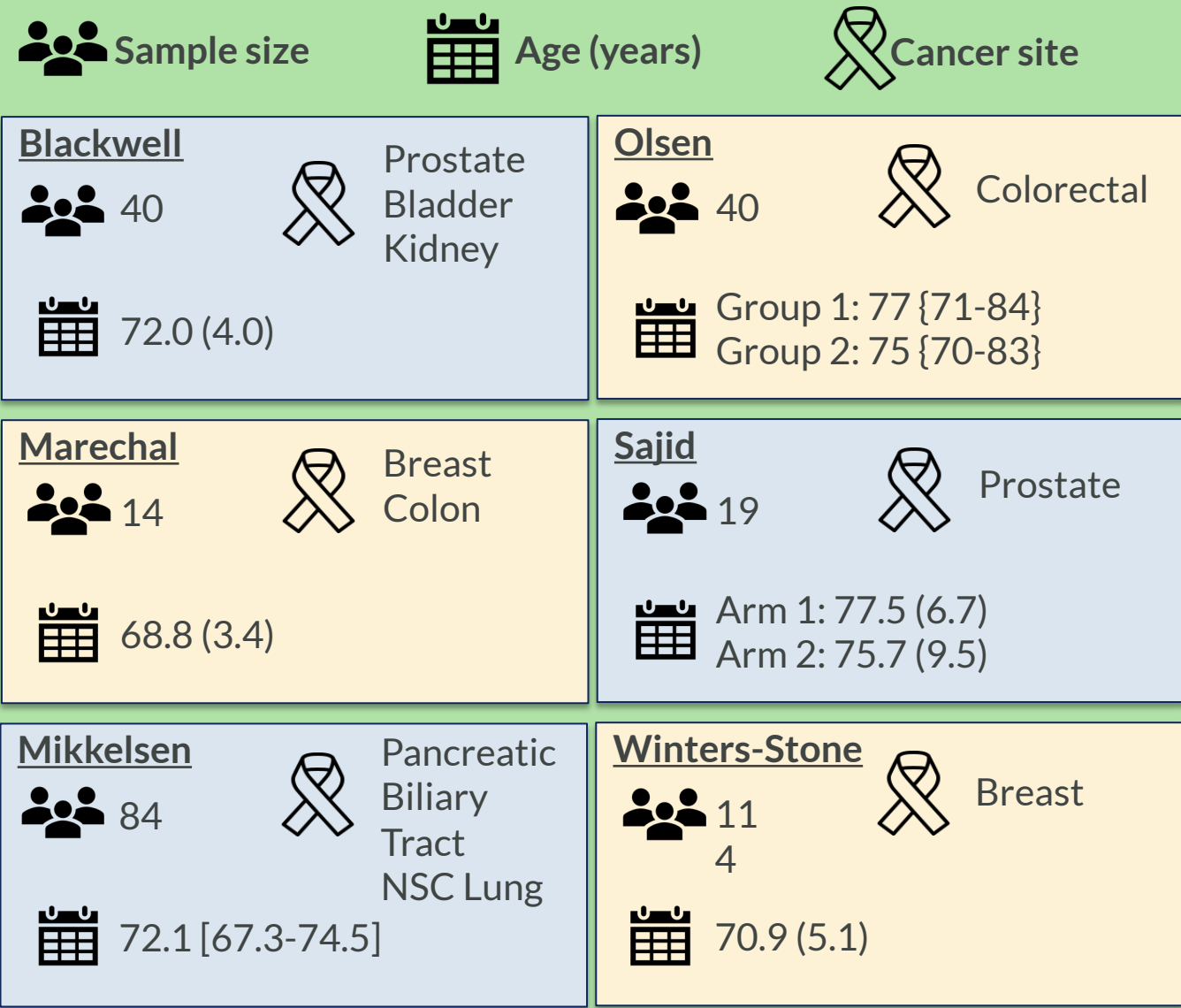
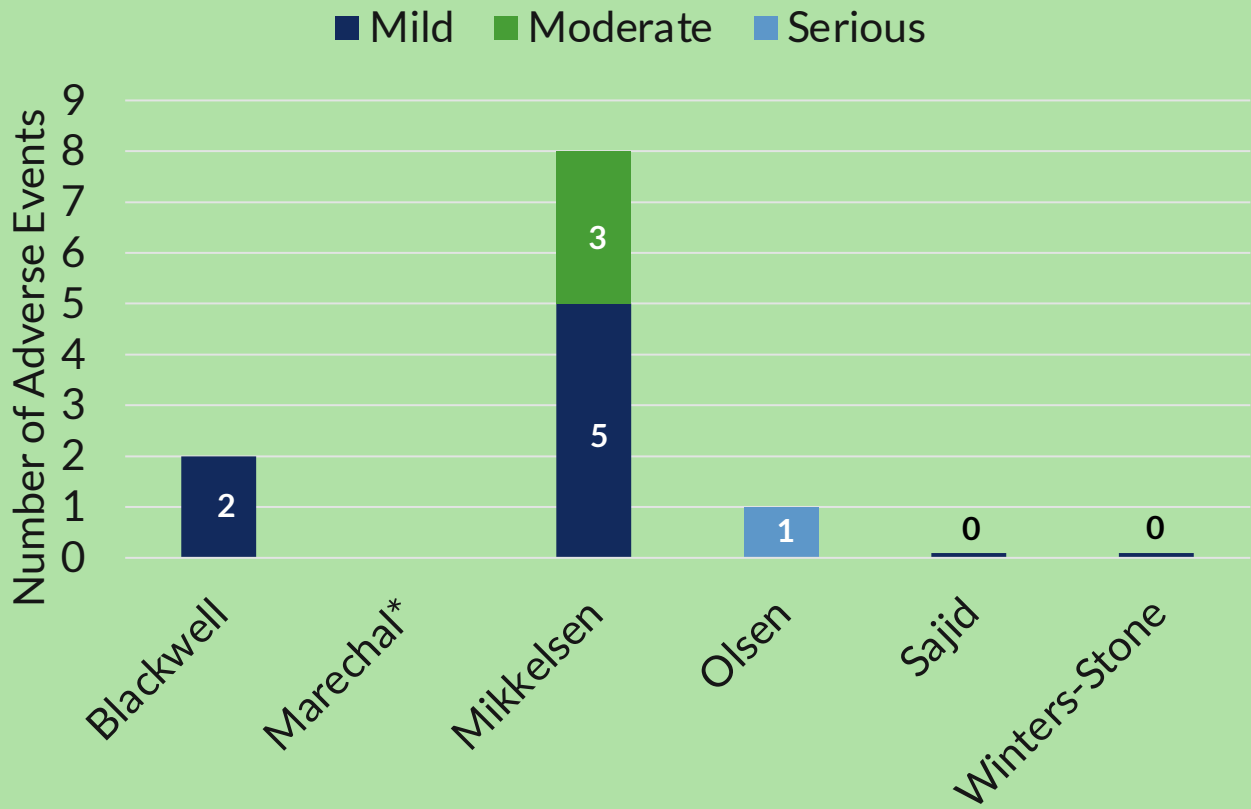


Figure 3. Study safety described by the number of mild, moderate, and serious adverse events. *Not reported



J. E. M. Blackwell et al., "High-intensity interval training produces a significant improvement in fitness in less than 31 days before surgery for urological cancer: a randomised control trial," *Prostate Cancer Prostatic Dis.*, vol. 23, no. 4, pp. 696–704, 2020, doi: 10.1038/s41391-020-0219-1.
R. Marechal et al., "Effect of a mixed-exercise program on physical capacity and sedentary behavior in older adults during cancer treatments," *Aging Clin. Exp. Res.*, vol. 31, no. 11, pp. 1583–1589, 2019, doi: 10.1007/s40520-018-1097-4.
M. K. Mikkelsen et al., "Effects of a 12-Week Multimodal Exercise Intervention Among Older Patients with Advanced Cancer: Results from a Randomized Controlled Trial," *The oncologist*, vol. 27, no. 1, pp. 67–78, 2022, doi: 10.1002/onco.13970.
A. P. Olsen et al., "Physical exercise program to older frail patients receiving chemotherapy for colorectal cancer - feasibility and experiences from the GERICO study," *J. Geriatr. Oncol.*, vol. 14, no. 1, p. 101382, 2023, doi: 10.1016/j.jgo.2022.09.011.
S. Sajid et al., "Novel physical activity interventions for older patients with prostate cancer on hormone therapy: A pilot randomized study," *J. Geriatr. Oncol.*, vol. 7, no. 2, pp. 71–80, 2016, doi: 10.1016/j.jgo.2016.02.002.
K.M. Winters-Stone et al., "A randomized-controlled trial comparing supervised aerobic training to resistance training followed by unsupervised exercise on physical functioning in older breast cancer survivors," *Journal of geriatric oncology* 13.2 (2022): 152-160.

Table 1. Intervention characteristics

Citation	Intervention Modality			Intervention Duration	Degree of Supervision		Exercise Setting	
	Aerobic	Resistance	Balance	Weeks	Supervised	Unsupervised	In-Person	Remote
Blackwell	✓			4	✓		✓	
Marechal	✓	✓		12	✓	✓	✓	✓
Mikkelsen	✓	✓		12	✓	✓	✓	✓
Olsen		✓		12	✓	✓	✓	✓
Sajid	✓	✓	✓	6		✓		✓
Winters-Stone	✓	✓		72	✓	✓	✓	✓

Table 2. Study Eligibility Criteria

Citation	Medical Clearance	Exclusion Criteria		
		Contraindications to Exercise	Physical Function	Cognitive Function
Blackwell	✓	No criteria	No lower limit	No criteria
Marechal	✓	✓	No lower limit	No criteria
Mikkelsen	✓	✓	✓	✓
Olsen	No criteria	No criteria	✓	No criteria
Sajid	No criteria	No criteria	✓	✓
Winters-Stone	✓	No criteria	No lower limit	✓

Reducing exclusion criteria may lead to more generalizable outcomes to the broader OCS population who may have more limitations, but this may also make a study more complex

Table 3. Feasibility described by study adherence & retention

Citation	Adherence	Retention
Blackwell	84%	NR
Marechal	NR	NR
Mikkelsen	Aerobic: 75% Resistance: 69%	75%
Olsen	48%	73%
Sajid	61%	61%
Winters-Stone	72%	77%

Reducing participation barriers like time and travel is now more feasible with the option to deliver supervised exercise remotely, potentially improving study feasibility.

CONCLUSION & FUTURE DIRECTIONS

- Our scoping review highlights the lack of exercise oncology trials specifically designed for older cancer survivors, limiting the ability to develop evidence-based guidelines that address their unique needs.
- While existing studies suggest exercise is generally safe and adherence is moderately good, more inclusive, representative trials are urgently needed to inform best practices and improve implementation in clinical and community settings.