

Report from the ACSM Roundtable on Exercise and Cancer Prevention and Control

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2018



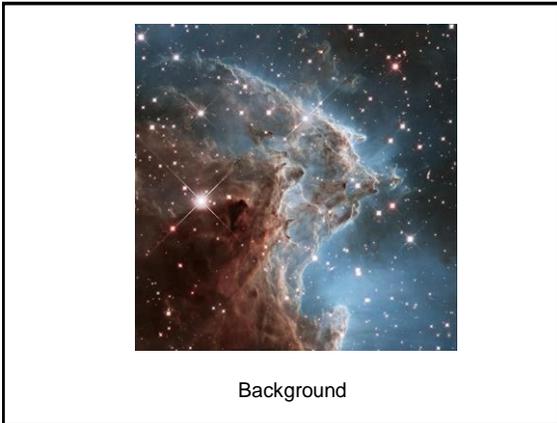
**International, Multidisciplinary
Roundtable on Exercise and
Cancer Prevention and Control**

March 12-13, 2018
San Francisco, California

Co-Chairs:
Kathryn H. Schmitz, Ph.D., M.P.H., FACSM, FPOS
Charles E. Matthews, Ph.D., FACSM




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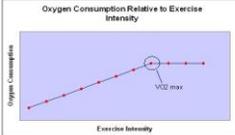


As physical therapists we:

- Treat patients who are “deconditioned” and/or “weak” and have resulting deficits in their functional capacity
- Write goals that include “strengthening”, “increasing endurance”, “reconditioning” our patients”
- Write treatment plans that include **exercise** based interventions

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Oxygen Consumption Relative to Exercise Intensity







Paradox

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1983

- Outcomes:
 - Cancer survivors were able to complete the training program
 - Trained subjects were able to work harder i.e. achieved a higher peak work load than control (untrained cancer survivors)
 - Trained subjects were able to work longer than controls
 - Trained subjects improved their peak VO_2 by 40% relative to pre-exercise value

M. Winningham. Unpublished dissertation. OSU 1984

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1998

- "...cancer patients suffering from primary fatigue should not be advised to increase the amount of daily rest. Rather, they should be counseled to carry out aerobic exercise; counseling should include a precise definition of duration, intensity, and frequency of training. "

Dimeo et al. Med Sci Sport Exerc. 1998:30:475
Dimeo et al. Cancer Suppl. 2001. 92:1689

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Australian Association for Exercise and Sport Science position stand.

- "Resistance may be encountered from clinicians, other allied health professionals, as well as family and friends of cancer patients."

Emerging Evidence in the Field of Exercise Oncology since the first ACSM Round Table

PubMed search on March 4th 2018 via Endnote

Hayes, et al. J Sci Med Sport 2009: 428

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Your Prescription for Health

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FITT PRINCIPLE

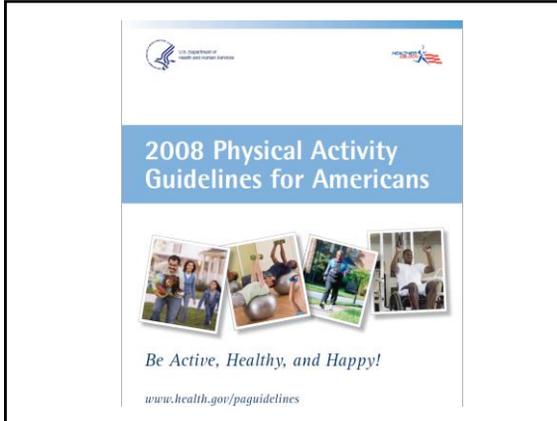
- FITT: Frequency, Intensity, Time (duration), Type

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FITT PRINCIPLE

- Threshold model:
 - Achieve sufficient physiological challenge to bring about adaptive changes/training, effects, reconditioning
 - Combining these elements (FITT) creates a prescription for an adequate volume of exercise to bring about an adaptive response (reconditioning, strengthening & improved physical function)

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2008 PAG for Americans

- Key points for adults:
 - All adults should avoid inactivity
 - Some physical activity is better than none
 - For substantial health benefits, adults should:
 - do at least 150 minutes per week of moderate-intensity aerobic activity
 - or 75 minutes per week of vigorous-intensity aerobic activity
 - For additional benefit increase exercise duration to 300 min of moderate or 150 min of vigorous aerobic activity

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2008 PAG for Americans

- Adults should **also** perform muscle-strengthening activities



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2008 PAG for Americans

- Included cancer survivors in with individuals who have a chronic medical condition
 - “Adults with chronic conditions should be under the care of health-care providers”
 - “People with chronic conditions and symptoms should consult their health-care providers about the types and amounts of activity appropriate for them.”

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2008 PAG for Americans

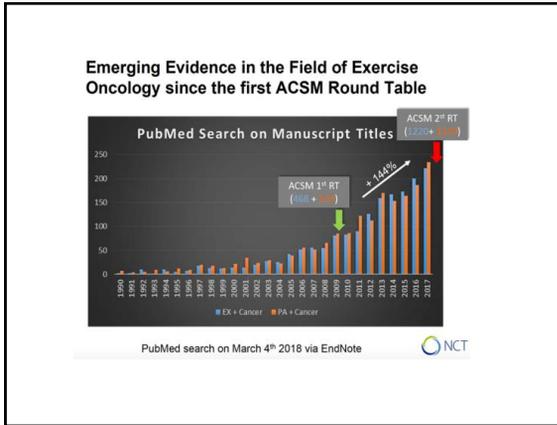
- Active Older Adults
 - All older adults should avoid inactivity & be as physically active as their abilities and conditions allow
 - 150 min of moderate activity/75 min of 75 min of vigorous intensity
 - Individual sessions of aerobic exercise > 10 min

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2008 PAG for Americans

- Active Older Adults
 - Engage in **strengthening** activities
 - Engage in balance exercise/activities
 - Older adults should determine their level of effort for physical activity relative to their level of fitness
 - Those with chronic conditions should understand whether and how their conditions affect their ability to do regular physical activity safely.

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2009

SPECIAL COMMUNICATIONS
Roundtable Consensus Statement

American College of Sports Medicine Roundtable on Exercise Guidelines for Cancer Survivors

EXPERT PANEL
 Kathryn H. Schmitz, PhD, MPH, FACSM
 Larry S. Coates, PhD
 Charles Matthews, PhD, FACSM
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 David A. Galvão, PhD
 Brian Miller M. Pate, PhD
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 Kathleen Y. Wolke, ScD, FACSM
 Robert J. Singh, MD, FRCPC
 Alejandro Luchs, MD, PhD
 Carole M. Schneider, PhD, FACSM
 Victor E. van Gentzen, MD
 Anna E. Schwartz, PhD, FACSM

In 2009, the American Cancer Society (ACS) estimated that there were nearly 1.5 million new cases of cancer diagnosed in the United States and just more than 500,000 people who died from the disease (16). Currently, there are about 12 million cancer survivors in the United States, and this number grows each year (16,17). Improved prognosis on the basis of earlier detection and newer

Schmitz et al. Med Sci Sport Exerc. 2010;42:1409-1429.

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ACSM Roundtable on Exercise Guidelines for Cancer Survivors

- Why convene the Roundtable:
 - "...to distill the literature on the safety and efficacy of exercise training during and after adjuvant cancer therapy and to provide guidelines."

Schmitz et al. Med Sci Sport Exerc. 2010;42:1409-1429.

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20ACSM Roundtable on Exercise Guidelines for Cancer Survivors 2010

- Because the guidelines from PAG 2008 accommodate chronic conditions and the health status of the individuals, its exercise objectives (150 min moderate activity etc.) "are generally appropriate for cancer survivors."
- Adaptations may be required because of health status, treatments received and anticipated disease trajectory

Schmitz et al. Med Sci Sport Exerc. 2010;42:1409-1429.

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TABLE 2. Preexercise medical assessments and exercise testing.

Cancer Site	Breast	Prostate	Colon	Adult Hematologic (No HbCT)	Adult HbCT	Gynecologic
General medical assessments recommended before exercise	Recommend evaluation for peripheral neuropathies and musculoskeletal morbidities secondary to treatment regardless of time since treatment. If there has been hormonal therapy, recommend evaluation of fracture risk. Individuals with known metastatic disease to the bone will require evaluation of the safety of exercise before starting. There is always a risk that metastasis to the bone or cardiac toxicity secondary to cancer treatments will be undetected. This risk will vary widely across the population of survivors. Fitness professionals may want to consult with the patient's medical team to discern this likelihood. However, requiring medical assessment for metastatic disease and cardiotoxicity for all survivors before exercise is not recommended because this would create an unnecessary barrier to obtaining the well-established health benefits of exercise for the majority of survivors, for whom metastasis and cardiotoxicity are unlikely to occur.	Patients should be evaluated as having established consistent and proactive infection prevention behaviors for an existing colostomy before engaging in exercise training more vigorous than a walking program.	None	None	Identify those patients who may require additional medical assessment for the safety of activity beyond cancer-specific risk. Recommend evaluation for lower extremity lymphedema before vigorous aerobic exercise or resistance training.	
Cancer site-specific medical assessments recommended before starting an exercise program	Recommend evaluation for muscle strength and wasting	Established consistent and proactive infection prevention behaviors for an existing colostomy before engaging in exercise training more vigorous than a walking program.	None	None	Identify those patients who may require additional medical assessment for the safety of activity beyond cancer-specific risk. Recommend evaluation for lower extremity lymphedema before vigorous aerobic exercise or resistance training.	
Exercise testing recommended	No exercise testing required before walking, flexibility, or resistance training. Follow ACSM guidelines for exercise testing before moderate to vigorous specific exercise training. One-sit-to-stand maximum testing has been demonstrated to be safe in breast cancer survivors with and at risk for lymphedema.	None	None	None	None	
Exercise testing mode and intensity considerations	As per outcome of medical assessments and following ACSM guidelines for exercise testing.	None	None	None	None	
Contraindications to exercise testing and reasons to stop exercise testing	Follow ACSM guidelines for exercise testing.	None	None	None	None	

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20ACSM Roundtable on Exercise Guidelines for Cancer Survivors 2010

- Provided guidance for exercise testing and requisite medical assessments
- Impact of comorbidities on participation by individuals with select diagnoses in an exercise program described
- Insufficient evidence to describe diagnosis specific exercise prescriptions

Schmitz et al. Med Sci Sport Exerc. 2010;42:1409-1429.

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20ACSM Roundtable on Exercise Guidelines for Cancer Survivors 2010

- Exercise Guidelines:
 - “Exercise prescriptions should be individualized according to a cancer survivor’s pretreatment aerobic fitness, medical comorbidities, response to treatment, and the immediate or persistent negative effects of treatment that are experienced at any given time”

Schmitz et al. Med Sci Sport Exerc. 2010;42:1409-1429.

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ACSM Roundtable on Exercise Guidelines for Cancer Survivors 2010

- Conclusions:
 - Participation in exercise training is safe during and after treatment
 - In doing so, improvements can be expected in aerobic fitness, muscular strength, QOL, and fatigue in survivors of breast, prostate, colon, gynecological and hematologic cancers
 - Resistance training can be performed safely by breast cancer survivors with and at risk for lymphedema

Schmitz et al. Med Sci Sport Exerc. 2010;42:1409-1429.

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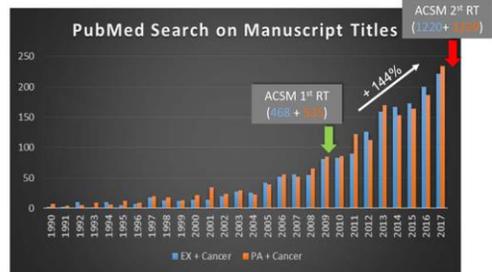
ACSM Roundtable on Exercise Guidelines for Cancer Survivors 2010

- Other conclusions/comments
 - “Multiple research gaps remain in this field, including the need for greater specificity about the dose–response effects of specific modes of exercise training”
 - Initiated discussion about training and credentialing of those who provide exercise based treatment of cancer survivors

Schmitz et al. Med Sci Sport Exerc. 2010;42:1409-1429.

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Emerging Evidence in the Field of Exercise Oncology since the first ACSM Round Table



PubMed search on March 4th 2018 via EndNote



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American College of Sports Medicine Cancer and Exercise Roundtable



- Review new evidence since 2010 Roundtable
- Role of exercise in:
 - Cancer prevention
 - Cancer treatment-related side effects
 - Survivorship and end of life
- Models of care for implementation
- Anticipate new publications for exercise guideline and prescription Spring of 2019

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Kristin Campbell, PT, PhD



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2018 ACSM Roundtable Exercise guidelines for cancer survivors: Evidence in prevention & survivorship

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Outline

1. Update on evidence for physical activity & cancer:
 1. Prevention
 2. Cancer-specific & all-cause mortality
2. Process to develop new physical activity guidelines for cancer survivors
3. What does this mean for physical therapists?

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I. Physical activity & cancer prevention & survivorship

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State of Evidence on Physical Activity and Cancer Prevention:

Cancer	Level of evidence, 2008 (U.S. Department of Health & Human Services)
Colon	Strong
Breast	-
Kidney	Strong
Endometrial	-
Bladder	Limited
Esophageal adenocarc.	-
Stomach (cardia)	-

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State of Evidence on Physical Activity and Cancer Prevention:

Cancer	Level of evidence, 2018 (U.S. Department of Health & Human Services 2018)	Level of evidence, 2008 (U.S. Department of Health & Human Services)
Colon	Strong Moderate (sitting time)	Strong -
Breast	Strong	Strong
Kidney	Strong	-
Endometrial	Strong Moderate (sitting time)	Limited -
Bladder	Strong	-
Esophageal adenocarc.	Strong	-
Stomach (cardia)	Strong	-

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State of Evidence on Physical Activity and Cancer Prevention:

Cancer	Level of evidence, 2018 (U.S. DHHS)	Level of evidence, 2008 (U.S. DHHS)
Lung	Moderate Moderate (sitting time)	Limited -
Hematologic	Limited	-
Head and neck	Limited	-
Pancreas	Limited	-
Prostate	Limited	No effect (limited)
Ovary	Limited	Limited
Brain	Not assignable	-
Thyroid	No effect (limited)	-
Rectal	No effect (limited)	No effect (limited)

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State of Evidence on Physical Activity and Survival: Major sites

Cancer Site	Pre-diagnosis PA		Post-diagnosis PA	
	Cancer-Specific	All Cause Mortality	Cancer-Specific	All Cause Mortality
Breast	↓↓	↓↓	↓↓	↓↓
Colorectal	↓↓	↓↓	↓↓	↓↓
Prostate	Null	↓↓	↓↓	↓↓
Lung	↓	NA	NA	↓
Kidney	↓	NA	NA	NA
Endometrium	Null	Null	NA	NA
Ovarian	Null	Null	NA	NA

Courtesy of ACSM Roundtable Meeting Friedenreich CM, et al. *Clin Cancer Research* 2016; 22: 4766-75 (updated to January 31, 2018)



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State of Evidence on Physical Activity and Survival: Other sites

Cancer Site	Pre-diagnosis PA		Post-diagnosis PA	
	Cancer-Specific	All Cause Mortality	Cancer-Specific	All Cause Mortality
Esophageal	NA	NA	↓	↓ NS
Gastric	NA	NA	NA	↓
Lymphoma (NHL)	NA	↓	↓ Borderline NS	↓
Melanoma	Null	NA	NA	NA
Glioma	NA	NA	NA	↓
Childhood cancers	NA	NA	Null	↓ Borderline SS

Courtesy of ACSM Roundtable Meeting Friedenreich CM, et al. *Clin Cancer Research* 2016; 22: 4766-75 (updated to January 31, 2018)

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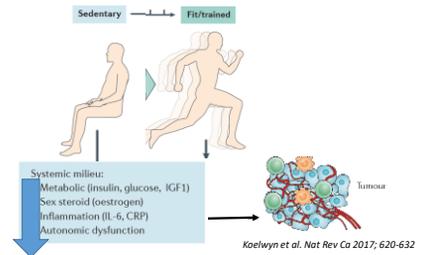
Next generation of research: More precision

Physical Activity and Breast Cancer Survival: By Estrogen Receptor Status					
Pre-diagnosis PA			Post-diagnosis PA		
ER Status					
Overall (n=17)	ER+ (n=3)	ER- (n=3)	Overall (n=12)	ER+ (n=3)	ER- (n=3)
0.82 (0.73-0.92)	0.71 (0.36-1.40)	0.67 (0.35-1.28)	0.69 (0.56-0.84)	0.62 (0.28-1.37)	0.51 (0.33-0.80)

Courtesy of ACSM Roundtable Meeting Friedenreich CM, et al. *Clin Cancer Research* 2016; 22: 4766-75 (updated to January 31, 2018)

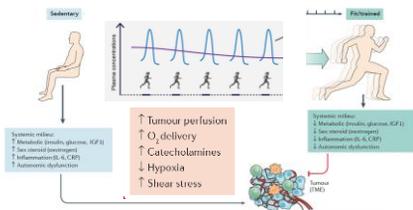
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How does physical activity change cancer risk & outcomes?



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How does physical activity change cancer risk & outcomes?



Koelwyn et al. *Nat Rev Ca* 2017; 620-632*
Hajman *Biochem Soc Trans* 2017; 45:905-911

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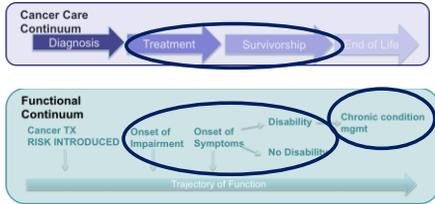


Photo: Kim Stalbrecht (Vancouver Sun)

II. Efficacy of exercise for cancer survivors

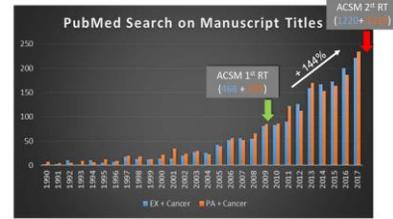
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Where does exercise fit into cancer treatment & survivorship?



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Emerging Evidence in the Field of Exercise Oncology since the first ACSM Round Table



Slide courtesy of ACSM 2018 PubMed search on March 4th 2018 via EndNote

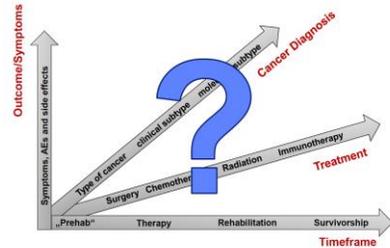
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How to translate new evidence into updated guidelines?

- More research on:
 - [Other cancer sites](#) that physical activity is safety and efficacy
 - [Other treatment side effects](#) that physical activity may be beneficial
 - [Clinical outcomes](#) (treatment tolerance & treatment efficacy)

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Decisions on how to focus the guidelines?



Slide courtesy of ACSM 2018

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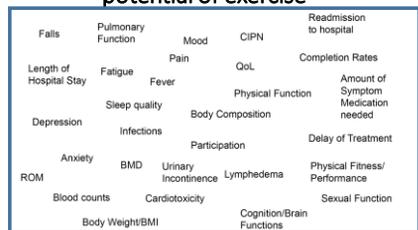
What do YOU think?

Q37: Cancer exercise guidance could be organized by tumor site, outcomes, treatment type, or time frame. We want to know how YOU would rank them. Rank the following categories from 1-4, with 4 being most important:

Slide courtesy of ACSM 2018

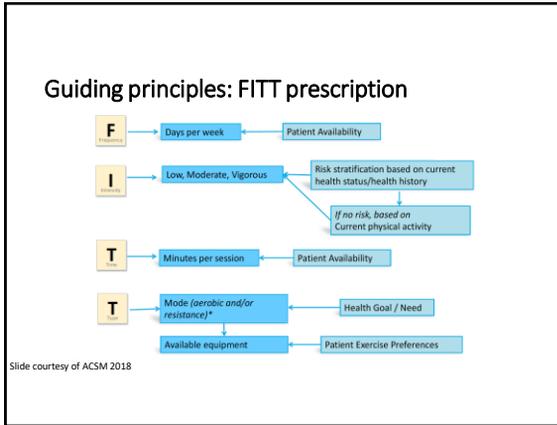
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Symptoms/side effects of cancer & therapeutic potential of exercise



Slide courtesy of ACSM 2018

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Guiding principles: Specificity

General mode: aerobic, resistance, flexibility, agility, balance
 • How do we categorize multi-modal exercise? Is aerobic + resistance its own mode?
 • What do we do with 'non-traditional' modes such as tai chi, pilates, soccer, etc.

Specific mode: cycling vs. walking, free vs. machine weight, etc.

Level of evidence
 • Head to head trials
 • Comparison across trials / Systematic reviews

Slide courtesy of ACSM 2018

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Challenges #1: Handling what is the same and what is different

Across all cancer diagnoses:

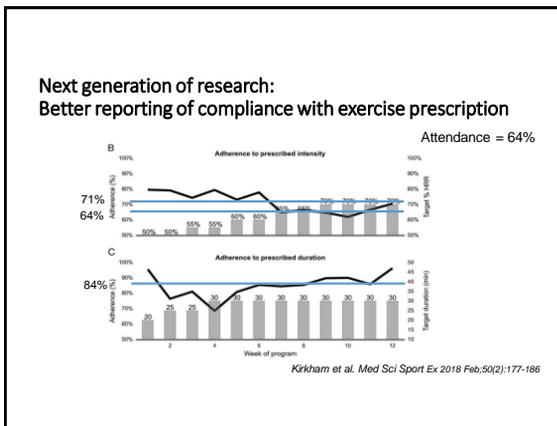
- Disparity in volume of exercise research by tumor site
- Significant heterogeneity in treatment within disease states
- Survival disparities

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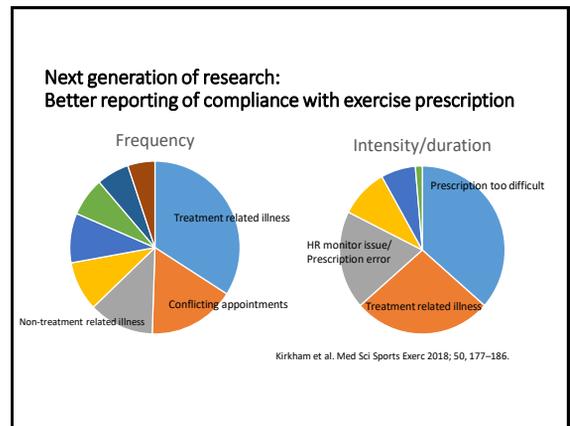
Challenge #2: Does the literature provide enough detail for FITT prescription?

Campbell et al. *BJSM* 2012; 46:909-916; Winters-Savre et al. *BJSM* 2014; 48: 987-95; Neil-Sztramko et al. *BJSM* 2017 (e-pub Mar 42); Neil-Sztramko et al. *BJSM* 2017 (e-pub Nov 21).

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Solutions (Process):



Literature search



Kerri Winters-Stone, PhD
& 16 person writing team!

Which exercise prescriptions improve quality of life and physical function in patients with cancer during and following treatment? A systematic review and meta-analysis of randomised controlled trials

Winters-Stone, K¹, Barbeau, M², et al. (2018). *Journal of Clinical Oncology*, 36(15), 1653-1661.

Identify recent high quality systematic reviews and meta-analyses



Extract FITT from interventions

Efficacious dose for specific outcome

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III. What does this mean for physical therapists?

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2019 ACSM Exercise Guidelines for Cancer Survivors

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Current ACSM Guidelines for Cancer Survivors

- "Avoid inactivity"
- "Return to daily activities as soon as possible after surgery"
- "Continue normal activities and exercise as much as possible during and after non-surgical treatment"
- "Recommendations are the same as age-appropriate guidelines..." for Americans
 - At least 150 min/week aerobic exercise & strength training 2 sessions per week, major muscle groups

Schmitz et al. Med Sci Sports Exerc. 2010; 42:1409-26

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Overall Summary

- Consistent evidence that physical activity:
 - ↑ risk of many common cancers
 - Improves survival after breast, colorectal and prostate cancer
- Increasing evidence for efficacy of exercise to:
 - Manage side effects of cancer treatment
 - Improve physical function & QoL
- Additional precision to guide exercise prescription coming soon
- Challenge remains on how we translate this into clinical practice!

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Acknowledgements



Guidelines Writing Team:

- Kerri Winters-Stone
- Katie Schmitz
- Charles Matthews
- Steve Morris
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- Alpa Patel
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- Kerry Courneya
- David Zucker
- Frank Perna
- Trisha Hue
- Alpa Patel



AMERICAN COLLEGE OF SPORTS MEDICINE
LEADING THE WAY

Sunflower Wellness
Living through cancer with exercise

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Models of Care to Support Dissemination and Implementation

Nicole L. Stout DPT, CLT-LANA, FAPTA

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Integrating Recommendations into Practice

- The uptake of exercise and rehabilitative interventions in oncology care has languished
 - Lack of oncology provider awareness regarding appropriate interventions and the timing of these interventions
 - Lack of clinical pathways to facilitate triage to appropriate levels of exercise and rehabilitation intervention based on the individuals needs
- What programs offer a successful framework to support the tactical implementation of these recommendations into practice?

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Exercise is Medicine

“You wouldn’t give your patient a bag of pills and say “take some of these an see what works to improve your heart condition”, exercise needs to be prescribed just as we prescribe medications. Anne Swisher PT, PhD

BUT...Are we missing the first step?

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The Right Prescription Today

Is The Wrong Prescription Tomorrow

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Principles of Precision Medicine

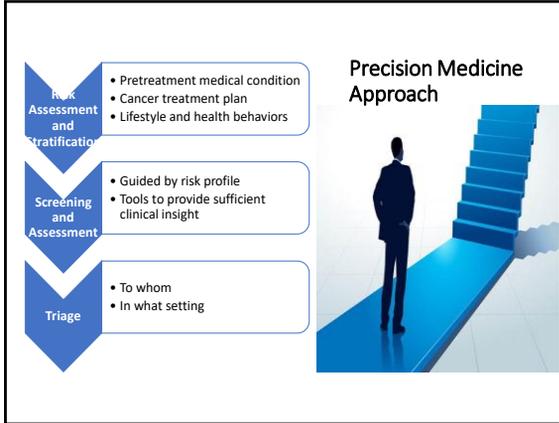
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Theoretical Framework

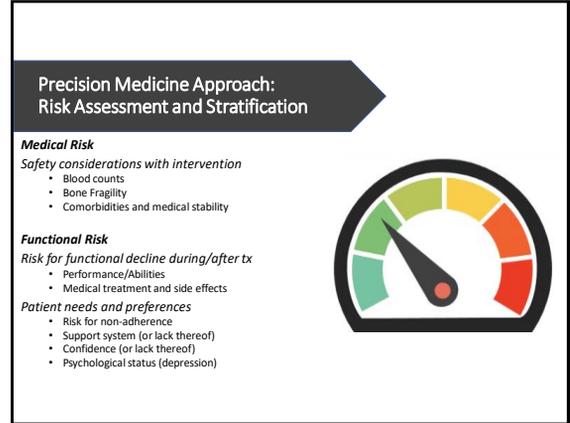
Cheville, A. L., et al. (2017). "Cancer rehabilitation: an overview of current need, delivery models, and levels of care." *Physical Medicine and Rehabilitation Clinics* 28(1): 1-17.

Alfano, C. M., et al. (2016). "Developing High-Quality Cancer Rehabilitation Programs: A Timely Need." *Am Soc Clin Oncol Educ Book* 35: 244-249

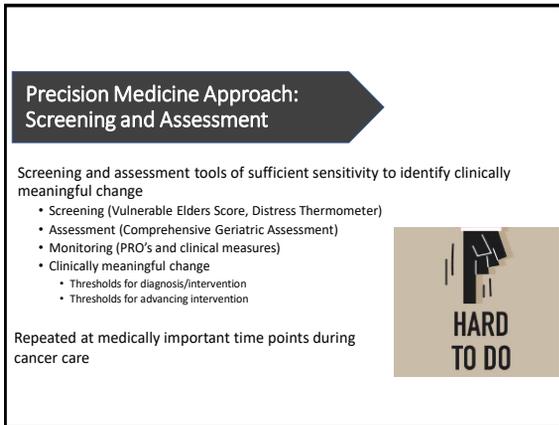
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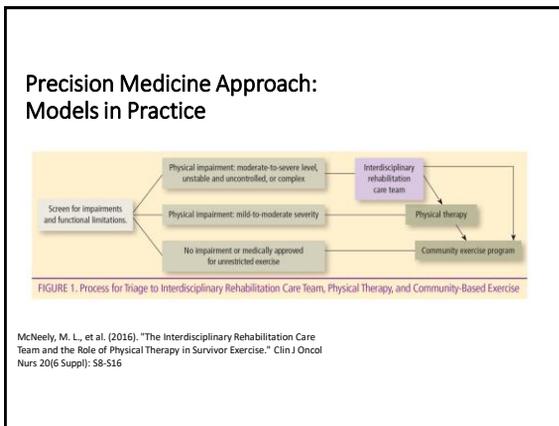
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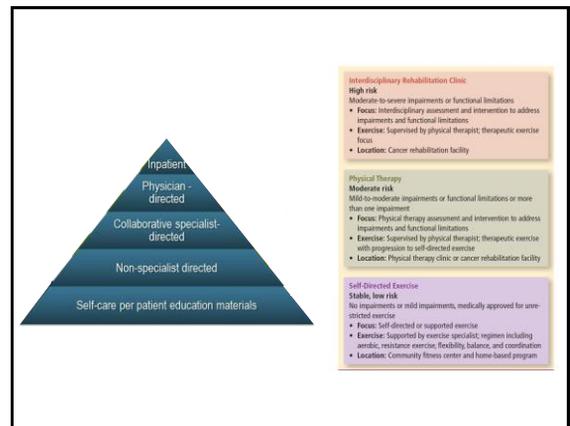
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A BIG PUSH...

- ACSM/ACRM Presidential Taskforce Triage Model Development (2019)
- ACRM Cancer Rehabilitation Guideline Project (2019)
 - Systematic Review
 - WHO/Cochrane Guideline Scoping Project
- 2020 Commission on Cancer Standards Revision

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Physical Therapy

Long-Term Survivorship Care After Cancer Treatment: A New Emphasis on the Role of Rehabilitation Services

Call to Action:

- Implement models of prospective care.
- Develop targeted education and training initiatives to assure the knowledge and skills of our workforce.
- Understand the effectiveness of rehabilitation services in improving costs, utilization, and meaningful functional outcomes.

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Thank you for the privilege of the lectern!

Questions/
Comments

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