Evidence and Implementation of Physical Activity Guidelines in Cancer Control and Survivorship

Prajakta Adsul, MBBS, PhD, MPH; Karen Basen-Engquist, PhD, MPH; Laura Rogers, MD, MPH; Kathryn Schmitz, PhD, MPH

Session Chair: Kathryn Schmitz, PhD, MPH

AICR's Lifestyle and Cancer Symposium: Evidence Matters

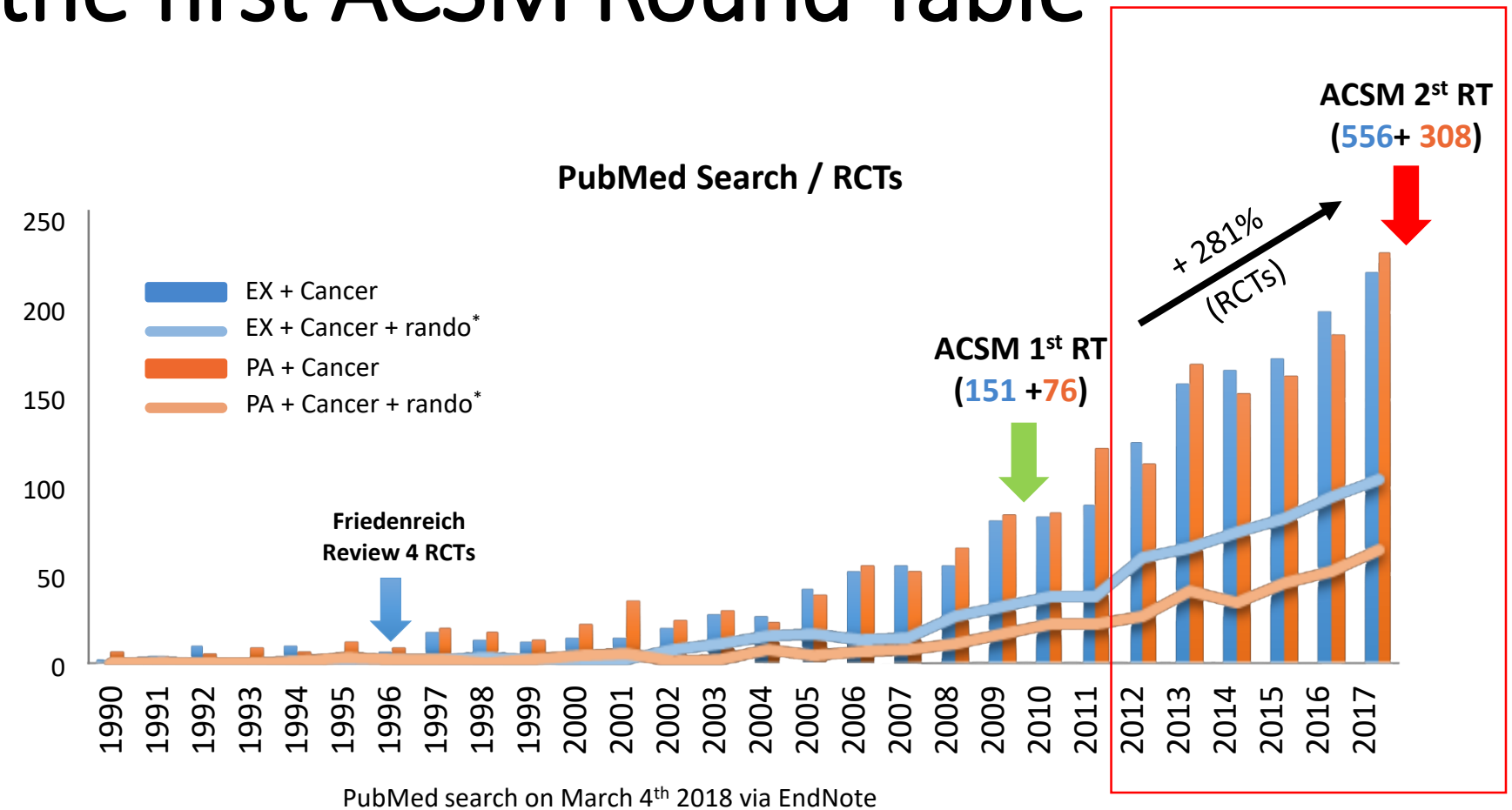
Agenda for the session

- Presentation of the exercise oncology evidence base
- 3 Case Studies of Implementing Exercise Programs after Cancer
  - Strength After Breast Cancer (Schmitz)
  - BEAT Cancer (Rogers)
  - Active Living After Cancer (Basen-Engquist)
- Brief primer on Implementation Science (Adsul)
- Q&A among the panel and audience
- Closing

Exercise Oncology Evidence Base

Dr. Kathryn Schmitz

RCTs in the Field of Exercise Oncology since the first ACSM Round Table



PubMed search on March 4th 2018 via EndNote

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International, Multidisciplinary Roundtable on Exercise and Cancer Prevention and Control

ACSM SCIENTIFIC ROUNDTABLE

March 12-13, 2018
San Francisco, California

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

- Partner Organizations
  - ACS
  - NCI
  - APTA
  - AAPMR
  - ASCO
  - SSO
  - CARF
  - ACRM
  - ACLM

- CSEP - Canadian
- MacMillan - UK
- ESSA - Australian
- KDNP - Dutch
- DVGS - German

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Partners

ACSM New Guidelines / Publications

Three peer-reviewed journal articles, Released 16 October 2019

Journal	Topic
MSSE	• Exercise & Cancer Prevention and Recurrence
MSSE	• Exercise During and After Treatment: FITT Prescriptions
CA	• Exercise Is Medicine in Oncology: • A Call to Action

SPECIAL COMMUNICATIONS

PennState Cancer Institute

American College of Sports Medicine Roundtable Report on Physical Activity, Sedentary Behavior, and Cancer Prevention and Control

ALPA V. PATEL[1], CHRISTINE M. FRIEDENREICH[2], STEVEN C. MOORE[3], SANDRA C. HAYES[4], JULIE K. SILVER[5], KRISTIN L. CAMPBELL[6], KERRI WINTERS-STONE[7], LYNN H. GERBER[8], STEPHANIE M. GEORGE[9], JANET E. FULTON[10], CRYSTAL DENLINGER[11], G. STEPHEN MORRIS[12], TRISHA HUE[13], KATHRYN H. SCHMITZ[14], and CHARLES E. MATTHEWS[3]

[1]Behavioral and Epidemiology Research Program, American Cancer Society, Atlanta, GA; [2]Cancer Epidemiology and Prevention Research, Cancer Control Alberta, Alberta Health Sciences, Calgary, CANADA; [3]Division of Cancer Epidemiology and Genetics, National Cancer Institute, Bethesda, MD; [4]Institute of Health and Biomedical Innovation, Queensland University of Technology, Brisbane, AUSTRALIA; [5]Department of Physical Medicine and Rehabilitation, Harvard Medical School, Boston, MA; [6]Department of Physical Therapy, University of British Columbia, Vancouver, CANADA; [7]Oregon Health & Science University, Portland, OR; [8]George Mason University, Fairfax, VA; [9]Office of Disease Prevention, National Institutes of Health, Bethesda, MD; [10]Physical Activity and Health Branch, Division of Nutrition, Physical Activity, and Obesity, Centers for Disease Control and Prevention, Atlanta, GA; [11]Department of Hematology/Oncology, Fox Chase Cancer Center, Philadelphia, PA; [12]Department of Physical Therapy, Wingate University, Wingate, NC; [13]Sunflower Wellness, San Francisco, CA; and [14]Department of Public Health Sciences, Penn State College of Medicine, Penn State University, Hershey, PA

ABSTRACT

PATEL, A. V., C. M. FRIEDENREICH, S. C. MOORE, S. C. HAYES, J. K. SILVER, K. L. CAMPBELL, K. WINTERS-STONE, L. H. GERBER, S. M. GEORGE, J. E. FULTON, C. DENLINGER, G. S. MORRIS, T. HUE, K. H. SCHMITZ, and C. E. MATTHEWS. American College of Sports Medicine Roundtable Report on Physical Activity, Sedentary Behavior, and Cancer Prevention and Control. *Med. Sci. Sports Exerc.*, Vol. 51, No. 11, pp. 2391–2402, 2019. **Introduction:** The American College of Sports Medicine convened an International Multidisciplinary Roundtable on Exercise and Cancer in March 2018 to evaluate and translate the evidence linking physical activity and cancer prevention, treatment, and control. This article discusses findings from the Roundtable in relation to the biologic and epidemiologic evidence for the role of physical activity in cancer prevention and survival. **Results:** The evidence supports that there are a number of biologically plausible mechanisms, whereby physical activity can influence cancer risk, and that physical activity is beneficial for the prevention of several types of cancer including breast, colon, endometrial, kidney, bladder, esophageal, and stomach. Minimizing time spent in sedentary behavior may also lower risk of endometrial, colon and lung cancers. Conversely, physical activity is associated with higher risk of melanoma, a serious form of skin cancer. Further, physical activity before and after a cancer diagnosis is also likely to be relevant for improved survival for those diagnosed with breast and colon cancer; with data suggesting that postdiagnosis physical activity provides greater mortality benefits than prediagnosis physical activity. **Conclusions:** Collectively, there is consistent, compelling evidence that physical activity plays a role in preventing many types of cancer and for improving longevity among cancer survivors, although the evidence related to higher risk of melanoma demonstrates the importance of sun safe practices while being physically active. Together, these findings underscore the importance of physical activity in cancer prevention and control. Fitness and public health professionals and health care providers worldwide are encouraged to spread the message to the general population and cancer survivors to be physically active as their age, abilities, and cancer status will allow.

Key Words: PHYSICAL ACTIVITY, SEDENTARY TIME, CANCER, PREVENTION, SURVIVAL

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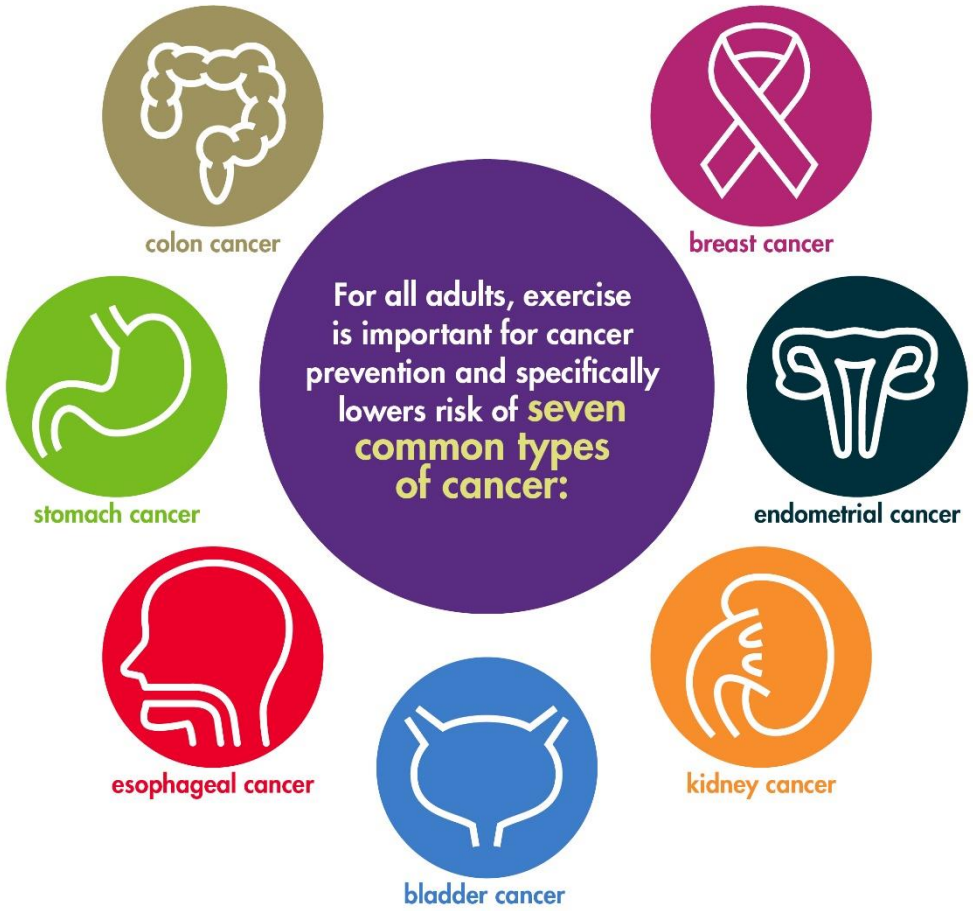
Exercise For Cancer Prevention and Treatment



Exercising during and after cancer treatment:
- decreases fatigue, anxiety and depression
- improves physical function and quality of life
- does **NOT** exacerbate lymphedema

For cancer survivors, incorporate exercise to improve survival after a diagnosis of breast, colon and prostate cancer

Citation: http://bit.ly/moving-through-cancer

ExeRxcise is Medicine® | AMERICAN COLLEGE of SPORTS MEDICINE®

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Exercise Guidelines for Cancer Survivors: Consensus Statement from International Multidisciplinary Roundtable

KRISTIN L. CAMPBELL[1], KERRI M. WINTERS-STONE[2], JOACHIM WISKEMANN[3], ANNE M. MAY[4], ANNA L. SCHWARTZ[5], KERRY S. COURNEYA[6], DAVID S. ZUCKER[7], CHARLES E. MATTHEWS[8], JENNIFER A. LIGIBEL[9], LYNN H. GERBER[10,11], G. STEPHEN MORRIS[12], ALPA V. PATEL[13], TRISHA F. HUE[14], FRANK M. PERNA[15], and KATHRYN H. SCHMITZ[16]

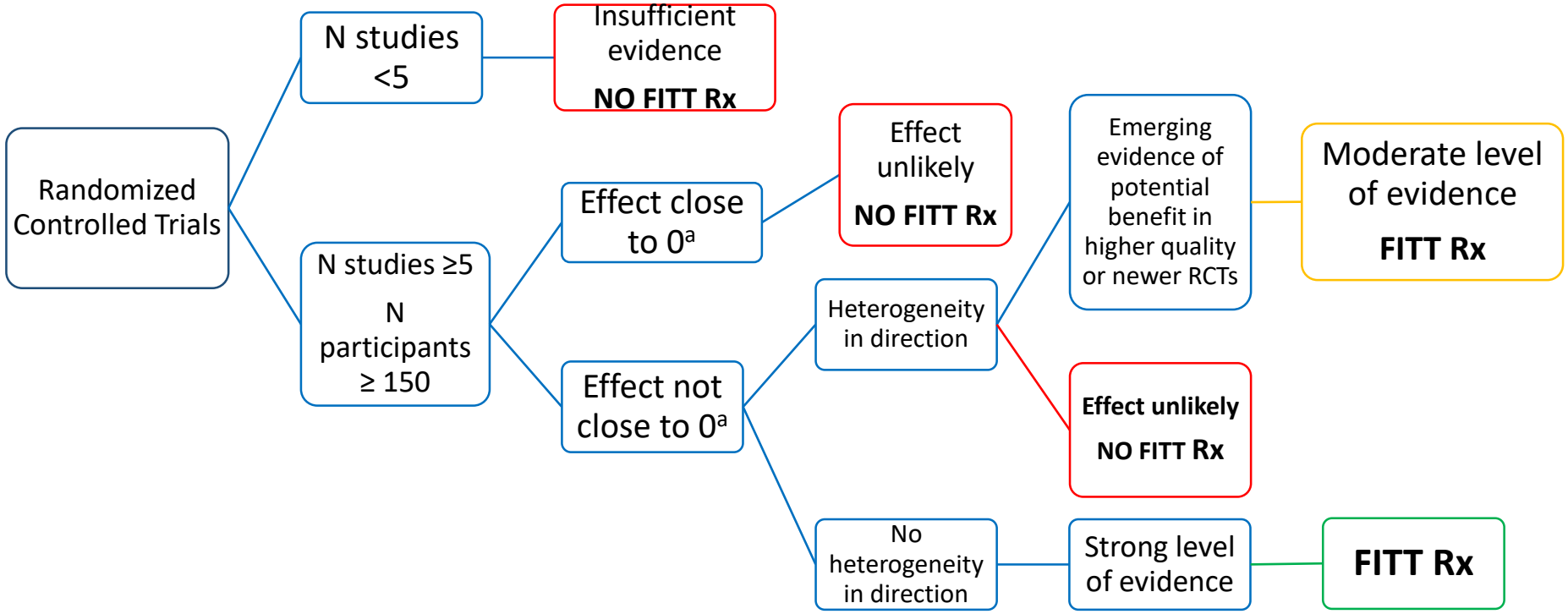
[1]Department of Physical Therapy, Faculty of Medicine, University of British Columbia, Vancouver, CANADA; [2]School of Nursing and Knight Cancer Institute, Oregon Health Sciences University, Portland, OR; [3]Division of Medical Oncology, National Center for Tumor Diseases (NCT) and Heidelberg University Clinic, Heidelberg, GERMANY; [4]Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht University, Utrecht, THE NETHERLANDS; [5]School of Nursing, Northern Arizona University, Flagstaff, AZ; [6]Faculty of Kinesiology, Sport, and Recreation, University of Alberta, Edmonton, CANADA; [7]Cancer Rehabilitation Medicine Services, Swedish Cancer Institute, Swedish Health Services, Seattle, WA; [8]Metabolic Epidemiology Branch, Division of Cancer Epidemiology and Genetics, National Cancer Institute, Rockville, MD; [9]Havard Medical School, Boston, MA; [10]Department of Medicine, Inova Fairfax Medical Campus, Falls Church, VA; [11]Center for the Study of Chronic Illness and Disability, George Mason University, Fairfax, VA; [12]Physical Therapy, Wingate University, Wingate, NC; [13]Epidemiology Research, American Cancer Society, Atlanta, GA; [14]Department of Epidemiology and Biostatistics, University of California San Francisco, San Francisco, CA; [15]Division of Cancer Control and Population Sciences, Behavioral Research Program, Health Behaviors Research Branch, National Cancer Institute, Rockville, MD; and [16]Public Health Science, Penn State Cancer Institute, Penn State College of Medicine, Hershey, PA

ABSTRACT

CAMPBELL, K. L., K. M. WINTERS-STONE, J. WISKEMANN, A. M. MAY, A. L. SCHWARTZ, K. S. COURNEYA, D. S. ZUCKER, C. E. MATTHEWS, J. A. LIGIBEL, L. H. GERBER, G. S. MORRIS, A. V. PATEL, T. F. HUE, F. M. PERNA, and K. H. SCHMITZ. Exercise Guidelines for Cancer Survivors: Consensus Statement from International Multidisciplinary Roundtable. *Med. Sci. Sports Exerc.*, Vol. 51, No. 11, pp. 2375–2390, 2019. **Purpose:** The number of cancer survivors worldwide is growing, with over 15.5 million cancer survivors in the United States alone—a figure expected to double in the coming decades. Cancer survivors face unique health challenges as a result of their cancer diagnosis and the impact of treatments on their physical and mental well-being. For example, cancer survivors often experience declines in physical functioning and quality of life while facing an increased risk of cancer recurrence and all-cause mortality compared with persons without cancer. The 2010 American College of Sports Medicine Roundtable was among the first reports to conclude that cancer survivors could safely engage in enough exercise training to improve physical fitness and restore physical functioning, enhance quality of life, and mitigate cancer-related fatigue. **Methods:** A second Roundtable was convened in 2018 to advance exercise recommendations beyond public health guidelines and toward prescriptive programs specific to cancer type, treatments, and/or outcomes. **Results:** Overall findings retained the conclusions that exercise training and testing were generally safe for cancer survivors and that every survivor should "avoid inactivity." Enough evidence was available to conclude that specific doses of aerobic, combined aerobic plus resistance training, and/or resistance training could improve common cancer-related health outcomes, including anxiety, depressive symptoms, fatigue, physical

FITT Decision Tree

Adapted from Dutch PA guidelines



STRONG	MODERATE	INSUFFICIENT
Anxiety	Bone Health	Cardiotoxicity
Depressive Sx	Sleep	CIPN
Fatigue		Cognitive Function
HR-QOL		Falls
Lymphedema		Nausea
Physical Function		Pain
		Sexual Function
		Treatment Tolerance

MOVING THROUGH CANCER

PennState Cancer Institute

Infographic available at www.exerciseismedicine.org/movingthroughcancer

MOVING THROUGH CANCER:
Exercise for people living with and beyond cancer

TO GET STARTED
Avoid inactivity; moving more and sitting less benefits nearly everyone

FOR OVERALL HEALTH
Aim to meet the current exercise guidelines for adults[1]

Moderate Aerobic Exercise
At least 150–300 mins per week

OR

Vigorous Aerobic Exercise
At least 75–150 mins per week

(or a combination of moderate/vigorous aerobic exercise)

+

Resistance Exercise
2x per week

FOR PEOPLE DURING & FOLLOWING CANCER TREATMENT
Research shows lower amounts of exercise can still help with the following cancer treatment-related symptoms:

- Cancer-related fatigue
- Health-related quality of life
- Physical function
- Anxiety
- Depression
- Sleep
- Lymphedema[2]
- Bone health[3]

To improve these symptoms, choose an exercise plan below:

Aerobic Exercise
3x per week
30–60 mins
Helps to manage the following symptoms:

OR

Resistance Exercise
2x per week
2 sets/8–15 reps
Helps to manage the following symptoms:

OR

Aerobic Exercise
2-3x per week
20–40 mins
+
Resistance Exercise
2x per week
2 sets/8–15 reps
Helps to manage the following symptoms:

[1] Physical Activity Guidelines for Americans, 2018
[2] Progressive supervised resistance training does not exacerbate lymphedema
[3] At least 12-months of resistance training plus high impact training needed

CA: A Cancer Journal for Clinicians

PennState Cancer Institute

CA CANCER J CLIN 2019;0:1–17

Exercise Is Medicine in Oncology: Engaging Clinicians to Help Patients Move Through Cancer

Kathryn H. Schmitz, PhD, MPH [1]; Anna M. Campbell, PhD [2]; Martijn M. Stuiver, PT, PhD [3,4,5]; Bernardine M. Pinto, PhD[6]; Anna L. Schwartz, PhD[7]; G. Stephen Morris, PT, PhD[8]; Jennifer A. Ligibel, MD[9]; Andrea Cheville, MD[10]; Daniel A. Galvão, PhD [11]; Catherine M. Alfano, PhD [12]; Alpa V. Patel, PhD[13]; Trisha Hue, PhD[14]; Lynn H. Gerber, MD [15]; Robert Sallis, MD[16]; Niraj J. Gusani, MD, MS [17]; Nicole L. Stout, PT, PhD[18]; Leighton Chan, MD, PhD[18]; Fiona Flowers, BS[19]; Colleen Doyle, MS, RD[20]; Susan Helmrich, PhD[21]; William Bain, PhD[22]; Jonas Sokolof, DO[23]; Kerri M. Winters-Stone, PhD [24]; Kristin L. Campbell, BSc, PT, PhD [25]; Charles E. Matthews, PhD [26]

[1]Department of Public Health Sciences, Penn State College of Medicine, Hershey, Pennsylvania; [2]School of Applied Sciences, Edinburgh Napier University, Edinburgh, United Kingdom; [3]Center for Quality of Life, Netherlands Cancer Institute, Amsterdam, The Netherlands; [4]ACHIEVE, Faculty of Health, Amsterdam University of Applied Sciences, Amsterdam, The Netherlands; [5]Department of Clinical Epidemiology, Biostatistics and Bioinformatics, Amsterdam UMC, University of Amsterdam, Amsterdam, The Netherlands; [6]College of Nursing, University of South Carolina, Columbia, South Carolina; [7]School of Nursing, Northern Arizona University, Flagstaff, Arizona; [8]Department of Physical Therapy, Wingate University, Wingate, North Carolina; [9]Division of Women's Cancers, Dana Farber Cancer Institute, Boston, Massachusetts; [10]Department of Physical Medicine and Rehabilitation, Mayo Clinic, Rochester, Minnesota; [11]Exercise Medicine Research Institute, Edith Cowan University, Joondalup, Western Australia, Australia; [12]Survivorship, American

Multiple organizations around the world have issued evidence-based exercise guidance for patients with cancer and cancer survivors. Recently, the American College of Sports Medicine has updated its exercise guidance for cancer prevention as well as for the prevention and treatment of a variety of cancer health-related outcomes (eg, fatigue, anxiety, depression, function, and quality of life). Despite these guidelines, the majority of people living with and beyond cancer are not regularly physically active. Among the reasons for this is a lack of clarity on the part of those who work in oncology clinical settings of their role in assessing, advising, and referring patients to exercise. The authors propose using the American College of Sports Medicine's Exercise Is Medicine initiative to address this practice gap. The simple proposal is for clinicians to assess, advise, and refer patients to either home-based or community-based exercise or for further evaluation and intervention in outpatient rehabilitation. To do this will require care coordination with appropriate professionals as well as change in the behaviors of clinicians, patients, and those who deliver the rehabilitation and exercise programming. Behavior change is one of many challenges to enacting the proposed practice changes. Other implementation challenges include capacity for triage and referral, the need for a program registry, costs and compensation, and workforce development. In conclusion, there is a call to action for key stakeholders to create the infrastructure and cultural adaptations needed so that all people living with and beyond cancer can be as active as is possible for them.
CA Cancer J Clin 2019;0:1-17.

Keywords: exercise, physical medicine and rehabilitation, physical therapy, supportive care

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Step 1: ASSESS

Question #1: *How many days during the past week have you performed physical activity where your heart beat and your breathing is harder than normal for 30 minutes or more?*

Question #2: *How many days during the past week have you performed physical activity to increase muscle strength, such as lifting weights?*

Question #3: *Would this patient be safe exercising without medical supervision (e.g.; walking, hiking, cycling, weight lifting)*

Question #3 answer is Yes.

(Patient is ambulatory, ECOG score 0-2)

- **Step 2: ADVISE**
  - EIM ExRx for Oncology, based on current report of activity to increase to guidelines recommendation
- **Step 3: REFER** to best available community program

Question #3 answer is No

Or

I'm not sure and I don't have the capacity to evaluate.

(ECOG score 3+ or other complications present)

- **Step 2: ADVISE**
  - Advise patient to follow-up with outpatient rehabilitation healthcare professional for further evaluation
- Step 3: REFER
  - Outpatient rehabilitation health care professional will recommend best available program

MOVING THROUGH CANCER

Rx Pad

- Intended to ease referrals
  - Assess, advise, refer
  - Infographic available at:
  - www.exerciseismedicine.org/movingthroughcancer

Moving Through Cancer

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Name: _____ Date: _____

Aerobic Activity 3 or more days/week

Intensity: ❑ Light (casual walk) ❑ Moderate (brisk walk) ❑ Vigorous (like jogging)

Time (minutes/day): Build up to 30 minutes/day

Type: ❑ Walk ❑ Run ❑ Bike ❑ Swim/Water Exercise ❑ Other _____

Steps/day: ❑ 2,500 ❑ 5,000 ❑ 7,000 ❑ 9,000 or more ❑ Other _____

What about aerobic activity?

- Moderate activity is at a pace where you can talk but cannot "sing." Examples: *brisk walking, light biking, water exercise* and *dancing.*
- Vigorous activity is at a pace where you have trouble talking and may be out of breath. Examples: *jogging, tennis* and *fast bicycling.*
- While the recommendation is to build up to 30 min/day, at least 3 days/week, you can exercise for any length of time. For example, you might walk:
  - 5 minutes here, 10 minutes there
  - 15 minutes daily
  - Just work your way up to 30 minutes 3 days/week
- Gradually build up to a daily step count of 7,000-9,000 steps/day.

Muscle Strength Training 2 days/week

What about strength training?

- You don't have to go to a gym. You can use elastic bands, do body weight exercises (kitchen counter push-ups, chair sit-to-stands) or lift dumbbells. Heavy work around your home also builds strength.
- Strengthen your legs, back, chest and arms. To start, try 10-15 repetitions using light effort. Build up to medium or hard effort for 8-12 repetitions. Repeat 2-4 times, 2-3 days/week.
- Give yourself a rest day between each strength training session.

Notes (local programming, specific risks or instructions):

See www.exerciseismedicine.org/movethruca for a registry of local programs.

Prescriber's Signature:

How will you get started **this week?**

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MOVING THROUGH CANCER

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1630 Programs on this registry

Exercise is Medicine | AMERICAN COLLEGE of SPORTS MEDICINE

MENU

EIM / United States / Moving Through Cancer

MOVING THROUGH CANCER

The mission of *Moving Through Cancer* is to assure that all people living with and beyond cancer are assessed, advised, referred to and engaged in appropriate exercise and rehabilitation programming as a standard of care.

Moving Through Cancer has developed a searchable registry to help health care providers, exercise professionals and patients find appropriately trained professionals and programs in their communities. This registry includes clinical, community and home-based exercise programs designed to help those living with or beyond cancer to achieve meaningful and optimal health, quality of life and function.

Click here if you wish to add a program to the registry or if you wish to edit your program, please contact Kathryn Schmitz at kzs95@psu.edu.

Exercise Programs Registry

Clinical Resources

- Moving Through Cancer Rx Form
- "Being Active with Cancer" patient handout
- "Sit Less, Move More," patient handout

Evidence-Based Science

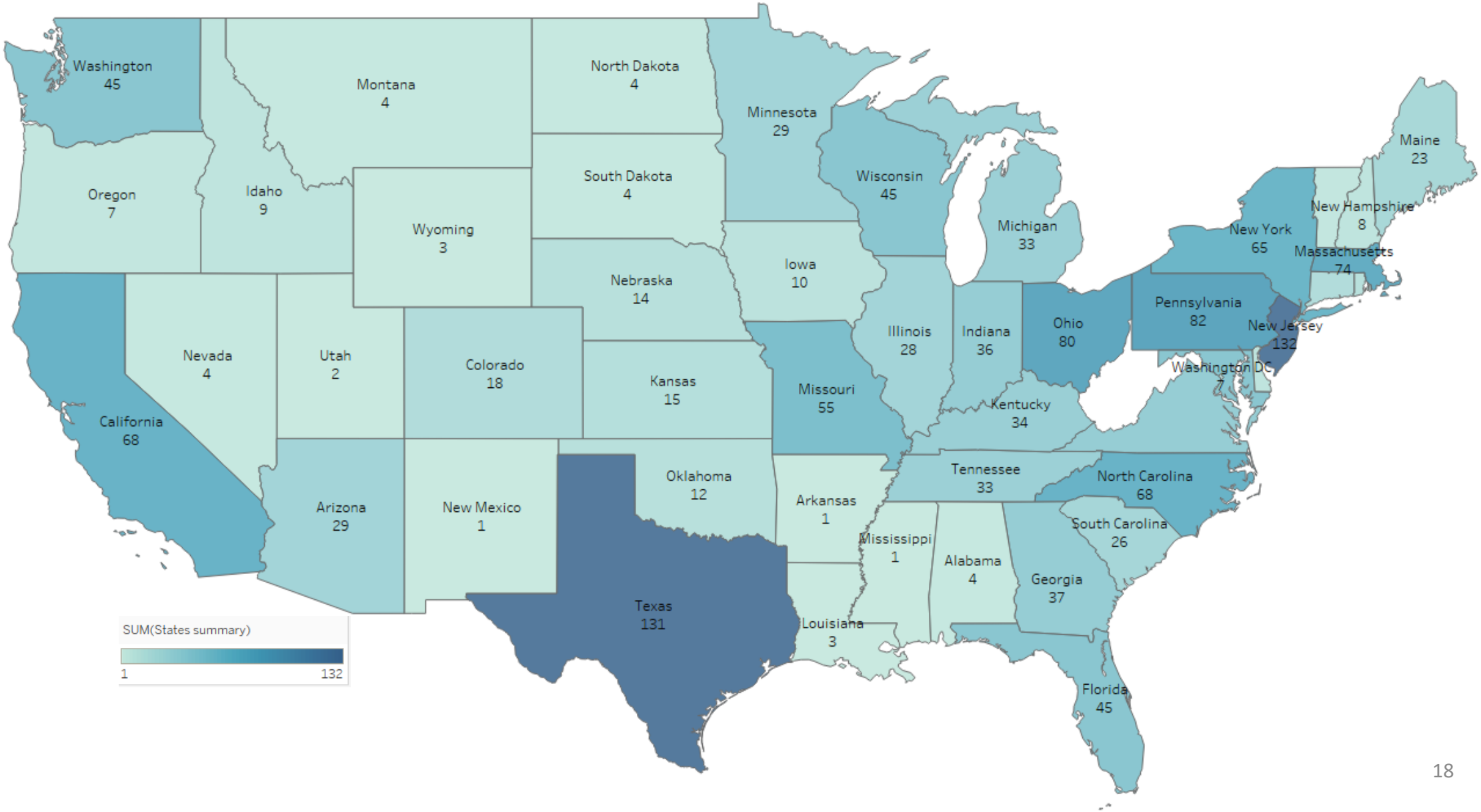
- Physical Activity in Cancer Prevention and Treatment: A Scientific Review
- Cancer and Exercise: 2018 Roundtable Proceedings (3 papers)

RESOURCES

Resources

- ACSM/ACS Certified Cancer Exercise Trainer (Web Link)
- ACSM's Guide to Exercise and Cancer Survivorship (Web Link)

U.S. Oncology Exercise Programs Distribution



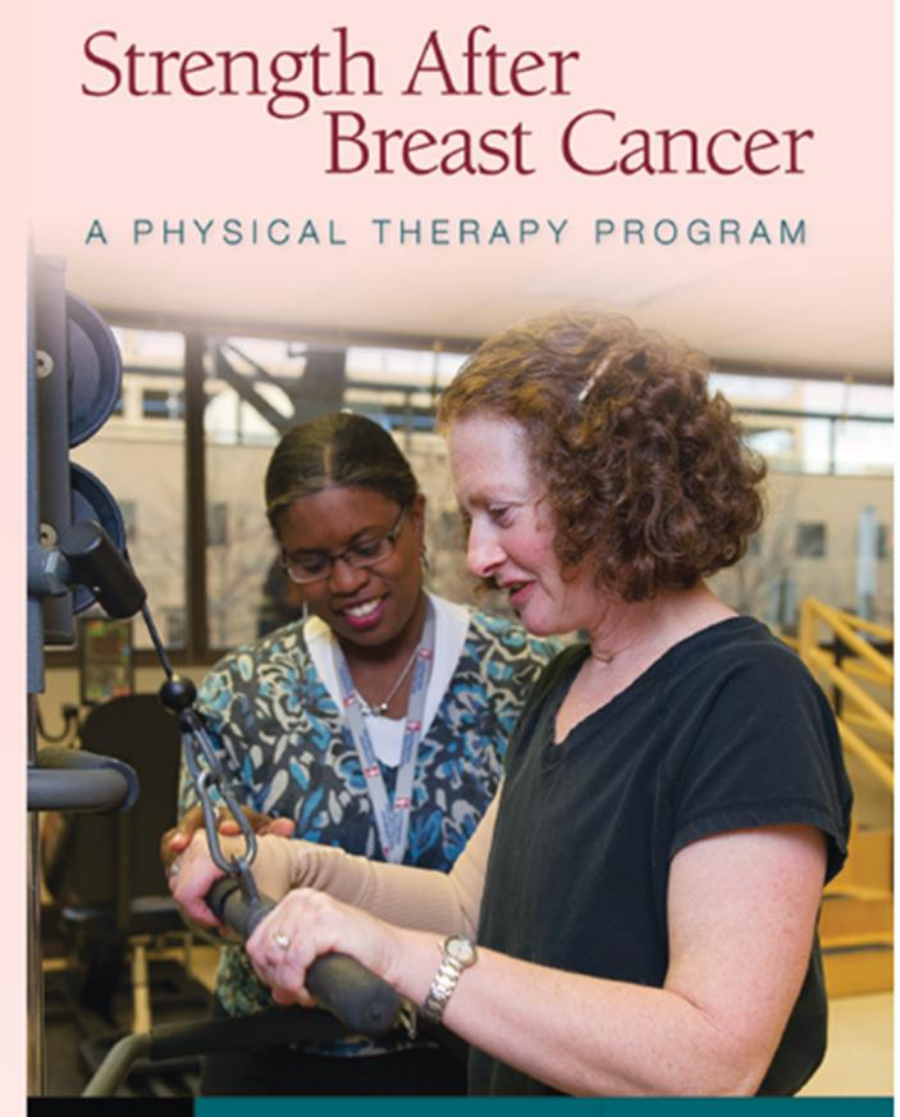
Study 1: Physical Activity and Lymphedema trial (PAL trial)

Dr. Kathryn Schmitz

PennState Cancer Institute

PAL
Physical Activity & Lymphedema

Evidence Based Intervention delivered in YMCAs



Evidence Base for the Intervention……

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The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Weight Lifting in Women with Breast-Cancer–Related Lymphedema

Kathryn H. Schmitz, Ph.D., M.P.H., Rehana L. Ahmed, M.D., Ph.D., Andrea Troxel, Sc.D., Andrea Cheville, M.D., Rebecca Smith, M.D., Lorita Lewis-Grant, M.P.H., M.S.W., Cathy J. Bryan, M.Ed., Catherine T. Williams-Smith, B.S., and Quincy P. Greene

PAL Physical Activity & Lymphedema

ORIGINAL CONTRIBUTION

CLINICIAN'S CORNER

ONLINE FIRST

Weight Lifting for Women at Risk for Breast Cancer–Related Lymphedema

A Randomized Trial

Kathryn H. Schmitz, PhD, MPH
Rehana L. Ahmed, MD, PhD
Andrea B. Troxel, ScD
Andrea Cheville, MD, MSCE
Lorita Lewis-Grant, MPH, MSW
Rebecca Smith, MD, MS
Cathy J. Bryan, MEd
Catherine T. Williams-Smith, BS
Jesse Chittams, MS

Context Clinical guidelines for breast cancer survivors without lymphedema advise against upper body exercise, preventing them from obtaining established health benefits of weight lifting.

Objective To evaluate lymphedema onset after a 1-year weight lifting intervention vs no exercise (control) among survivors at risk for breast cancer–related lymphedema (BCRL).

Design, Setting, and Participants A randomized controlled equivalence trial (Physical Activity and Lymphedema trial) in the Philadelphia metropolitan area of 154 breast cancer survivors 1 to 5 years postunilateral breast cancer, with at least 2 lymph nodes removed and without clinical signs of BCRL at study entry. Participants were recruited between October 1, 2005, and February 2007, with data collection ending in August 2008.

Intervention Weight lifting intervention included a gym membership and 13 weeks of supervised instruction, with the remaining 9 months unsupervised, vs no exercise.

Main Outcome Measures Incident BCRL determined by increased arm swelling during 12 months (≥5% increase in interlimb difference). Clinician-defined BCRL onset was also evaluated. Equivalence margin was defined as doubling of lyphedema incidence.

Results A total of 134 participants completed follow-up measures at 1 year. The proportion of women who experienced incident BCRL onset was 11% (8 of 72) in the weight lifting intervention group and 17% (13 of 75) in the control group (cumulative incidence difference [CID], −6.0%; 95% confidence interval [CI], −17.2% to 5.2%; *P* for equivalence = .04). Among women with 5 or more lymph nodes removed, the proportion who experienced incident BCRL onset was 7% (3 of 45) in the weight lifting intervention group and 22% (11 of 49) in the control group (CID, −15.0%; 95% CI, −18.6% to −11.4%; *P* for equivalence = .003). Clinician-defined BCRL onset occurred in 1 woman in the weight lifting intervention group and 3 women in the control group (1.5% vs 4.4%, *P* for equivalence = .12).

Conclusion In breast cancer survivors at risk for lymphedema, a program of slowly progressive weight lifting compared with no exercise did not result in increased incidence of lymphedema.

Trial Registration clinicaltrials.gov Identifier: NCT00194363

JAMA. Published online December 8, 2010. doi:10.1001/jama.2010.1837 www.jama.com

More than 2.4 million breast cancer survivors live in the United States.[1] Lymphedema ranks high among their concerns because it causes swelling and discomfort, impairing arm function and quality of life[2,3] and increasing health care costs.[4] Lymphedema remains a frequent complication among survivors, despite lymphatic-sparing procedures such as sentinel lymph node biopsy. Of the 61% of patients who undergo sentinel lymph node biopsy, 5% to 7% develop breast cancer–related lymphedema.[5,6] However, one-third of patients with breast cancer require complete axillary dissection,[5] which is associated with 13% to 47% incident lymphedema.[7,8]

Breast cancer survivors at risk for lymphedema alter activity, limit activity, or both from fear and uncertainty about their personal risk level, and upon guidance advising them to avoid lifting children, heavy bags, or other objects with the at-risk arm.[9,10] Such guidance is often interpreted in a manner

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Breast Cancer Res Treat
DOI 10.1007/s10549-009-0550-7

EPIDEMIOLOGY

Changes in th
a one-year st
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Rebecca M. Speck · (
Rehana L. Ahmed · I
Kathryn H. Schmitz

Lymphology 43 (2010) 1-13

IMPACT OF LYMPHEDEMA AND ARM SYMPTOMS ON QUALITY OF LIFE IN BREAST CANCER SURVIVORS

J.M. Hormes, C. Bryan, L.A. Lytle, C.R. Gross, R.L. Ahmed,

J Cancer Surviv (2014) 8:260–268
DOI 10.1007/s11764-013-0337-z

Departı
of Epid
CRG),
Center
Epidem

Influence of weight training on skeletal health of breast cancer

Published Ahead of Print on May 11, 2015 as 10.1200/JCO.2014.57.7395
The latest version is at http://jco.ascopubs.org/cgi/doi/10.1200/JCO.2014.57.7395

JOURNAL OF CLINICAL ONCOLOGY | ORIGINAL REPORT

Weight Lifting and Physical Function Among Survivors of Breast Cancer: A Post Hoc Analysis of a Randomized Controlled Trial

Justin C. Brown and Kathryn H. Schmitz

What is the PAL Trial EBI?

- Pre-intervention evaluation to ensure safety
- Pre-intervention education about lymphatic system
- Supervised exercise sessions with well trained professional
  - Teaching
    - Proper biomechanics
    - ‘Start low, progress slow’
- Continued exercise in unsupervised setting
- Return to PT for evaluation if symptoms changes

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Key Implementation Questions

- Could PAL be delivered in the Outpatient Rehabilitation setting?
  - Yes, over 800 women completed the program during the 18 month implementation period
- Will physicians refer to the program?
  - Yes, 40% of eligible women were referred into the program
- Will insurance pay for the revised program?
  - Yes!
- Will the intervention maintain efficacy in the new setting?
  - Yes it did!

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Implementation methods and strategies used

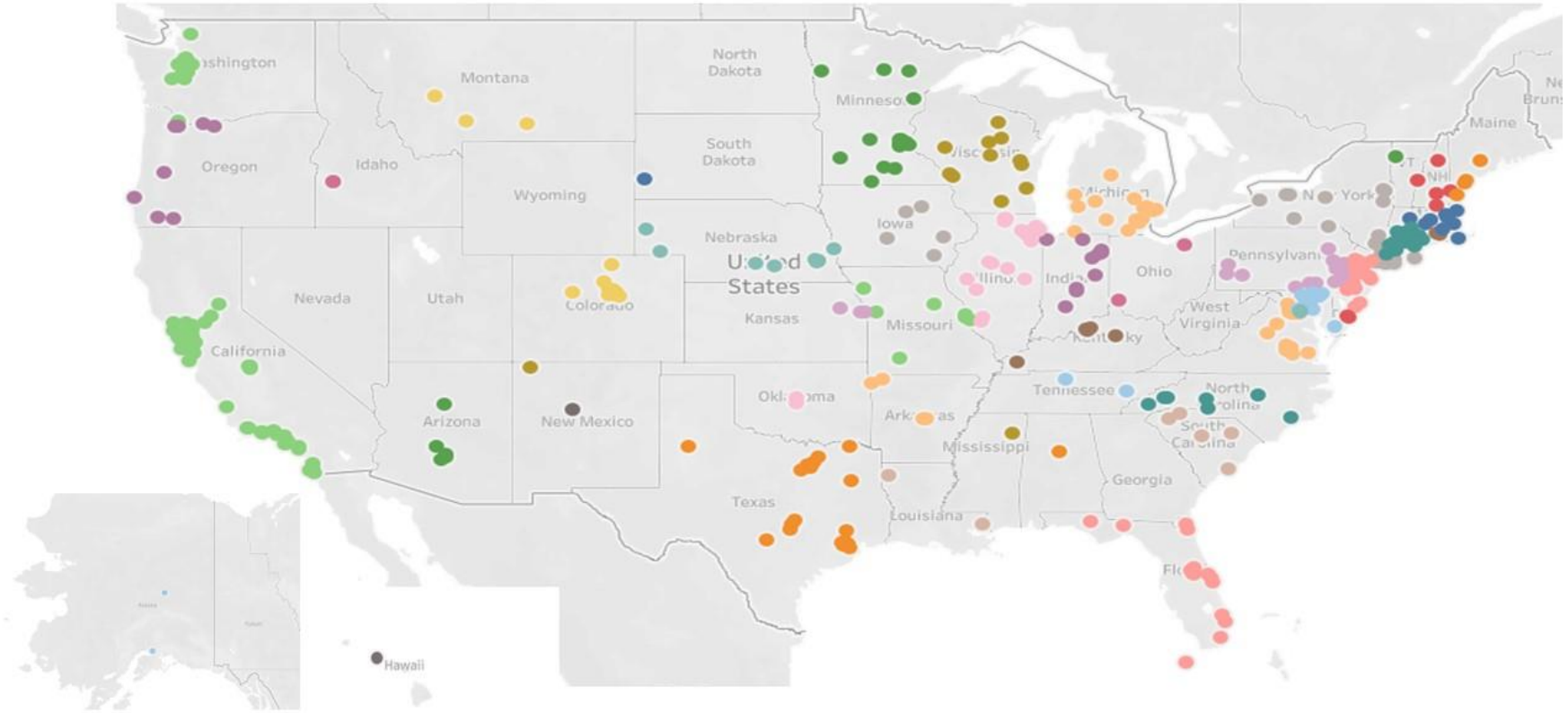
- Identified champions
- Adapt intervention
- Assess readiness
- Develop and implement trainings for
  - Clinicians
  - PTs
- Technical assistance
  - EMR changes
- Audit and feedback
- Development of a toolkit

Developed an Online Training for Strength ABCs

- Partnership with Klose Training and Consulting
- Over 700 have completed the training!
- $125 for 4 hour training
- Certified Exercise Professionals are Eligible

KLOSE TRAINING
LYMPHEDEMA CERTIFICATION

Distribution of Strength ABCs in the USA in 2020



Evaluation of Dissemination (Calos et al. 2020)

- Survey of course completers (self-report)
  - 96 respondents
    - 67% had implemented SABC
      - 93% of these were still delivering it
        - Those delivering it were delivering all components
    - Average # of patients = 13/clinic
    - 50% Patient referrals were from oncology clinics
    - 72% were receiving reimbursement for services
    - 96% were delivering 1:1 sessions (not group)

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Study 2: Beat Cancer

Dr. Laura Rogers

Better Exercise Adherence after Treatment for Cancer (BEAT Cancer)

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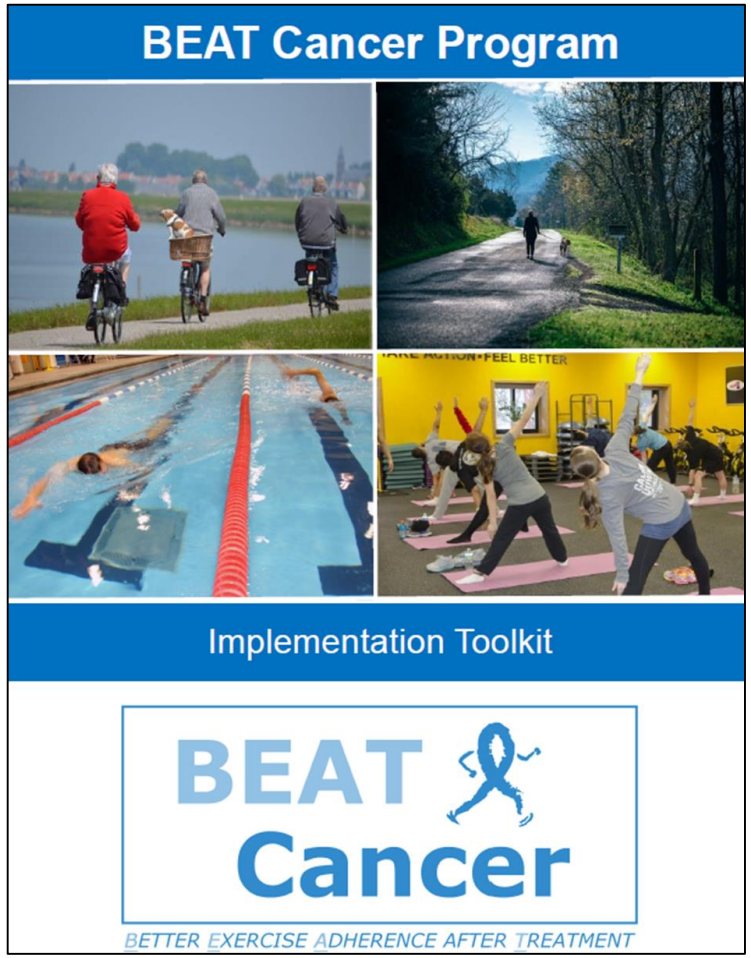

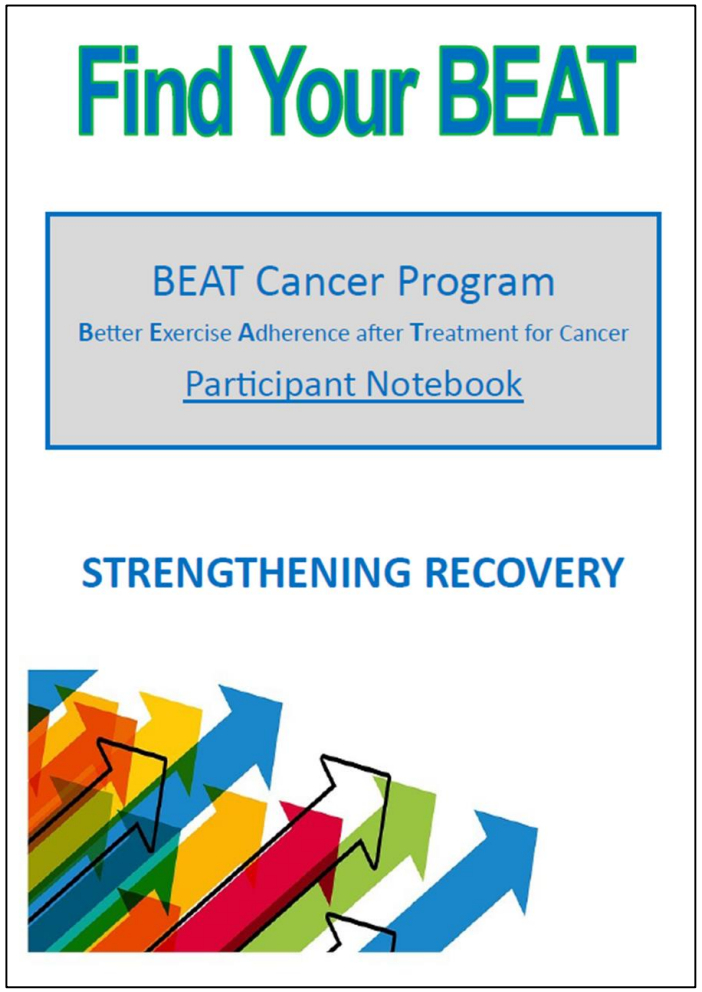

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Evidence base for the intervention…

Physical Activity and Sleep Quality in Breast Cancer Survivors: A Randomized Trial

LAURA Q. RO
ANDRES FOR
[1]Department of
and Recreation,
Birmingham, Bi
[5]Statistics and
Springfield, IL;
Urbana, IL

Received: 11 February 2016 | Revised: 27 July 2016 | Accepted: 14 August 2016
DOI 10.1002/pon.4254
WILEY

PAPER

**Effects of
interventi
symptom**

Laura Q. Roge
Sandra K. Vica

Received: 21 October 2016 | Revised: 10 February 2017 | Accepted: 7 April 2017
DOI: 10.1002/pon.4438
WILE

CLINICAL CORR

**Effects of E
subjective**

Diane K. Ehlers[1]
Edward McAuley

Breast Cancer Res Treat
DOI 10.1007/s10549-016-3945-2

CLINICAL TRIAL

**Effects of a multi
intervention on b
in a randomized**

Laura Q. Rogers[1] · Kerry S
Steven Verhulst[4] · Sandra K

Breast Cancer Res Treat
DOI 10.1007/s10549-014-3216-z

CLINICAL TRIAL

Effects of the BEAT Cancer physical activity behavior change intervention on physical activity, aerobic fitness, and quality of life in breast cancer survivors: a multicenter randomized controlled trial

Laura Q. Rogers · Kerry S. Courneya · Philip M. Anton · Patricia Hopkins-Price · Steven Verhulst · Sandra K. Vicari · Randall S. Robbs · Robert Mocharnuk · Edward McAuley

BEAT Cancer efficacy (R01-CA1369859): Odds of meeting recommendations (≥ 150 weekly minutes ≥ moderate intensity physical activity)

	Month 3	Month 6
	Adjusted* odds ratio (p value)	Adjusted* odds ratio (p value)
Meet recommendations (accelerometer)	2.2 (.042)	2.4 (.024)
Meet recommendations (self-report)	5.2 (<.001)	4.8 (<.001)

*Adjusted for baseline value, study site, breast cancer stage, history of chemotherapy, history of radiation therapy, comorbidities, current hormonal therapy, and marital status

Rogers et al., BCRT 2015

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What is the BEAT Cancer EBI?

Intervention goal = 150 weekly minutes moderate intensity exercise (primarily walking)

Week*	0	1	2	3	4	5	6	7	8	9	10	11	12
Supervised exercise		3	3	2	2	1	1						
Home-based exercise				2	2	3	3	5	5	5	5	5	5
Update face-to-face counseling									1		1		1
Discussion group	1	1	1		1		1		1				

*Participants also given an educational notebook and personal heart rate monitor.

Rogers et al., Contemporary Clinical Trials 2012

Find your BEAT: Toolkit to increase physical activity in rural cancer survivors (R21CA182601)

- Adapt the BEAT Cancer physical activity behavior change intervention:
  - Non-research setting implementation
  - Cancer types other than breast cancer
- Develop an implementation toolkit
- Proof of concept testing
- In collaboration with a rural cancer community network site

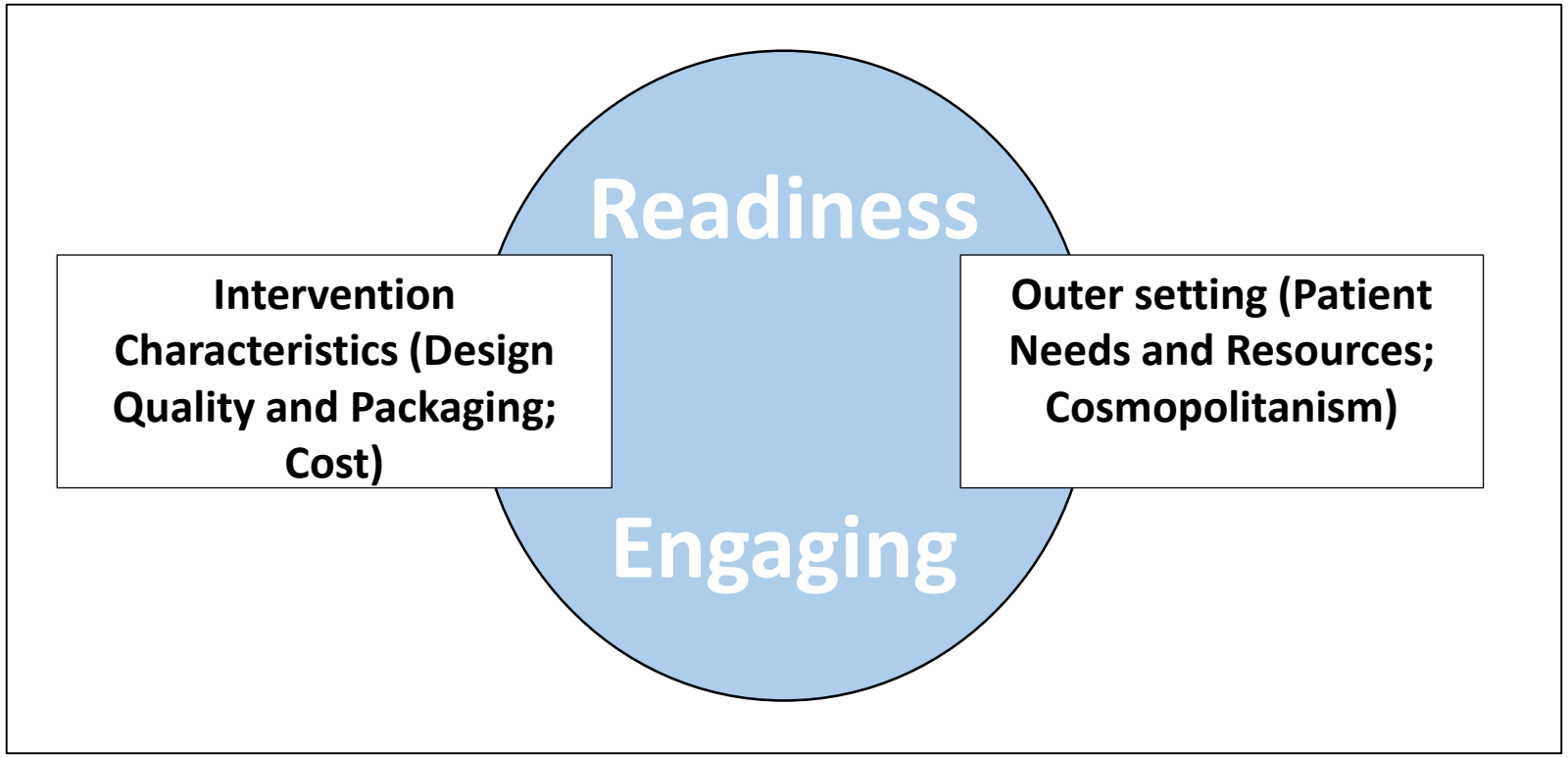
Key implementation questions

- Related to BEAT Cancer implementation by a non-research, community cancer care site:
  - Better understand factors to consider related to setting and delivery
  - Identify potential implementation barriers and facilitators
  - Determine contents for an implementation toolkit relevant for a broad range of settings (e.g., rural, urban, community, clinical, fitness settings)

Implementation methods and strategies used

- Cost – NCI funding
- Champions – identified through our institutional partnerships
- Leadership buy-in – multiple on-site meetings
- Stakeholder input – cancer survivors, potential interventionists, community/organizational stakeholders
  - Consolidated Framework for Implementation Research (CFIR)
- Readiness – training and toolkit

Understanding setting and delivery factors



Rogers et al., JCSU 2019, Qu et al., Imp Sci Com 2020, Adams et al., JSCC in press

Implementation barriers and facilitators

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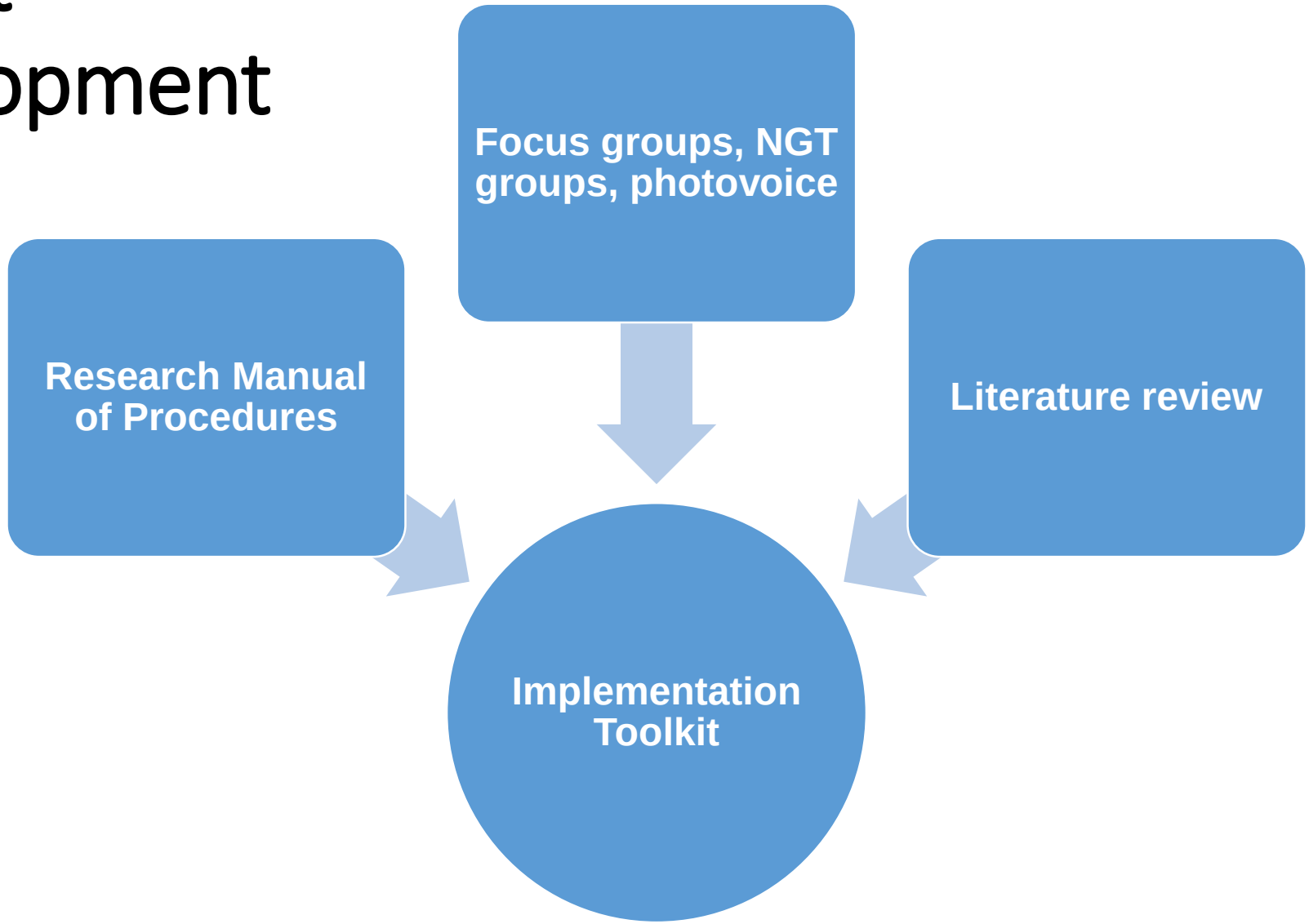
Barrier or facilitator (source)	Possible implementation strategy	Implementation outcome potentially influenced by strategy
Convenient location (cancer survivors)	Distance-delivery, collaboration with community organizations	Adoption, acceptability, penetration (reach)
Free transportation for participants (interventionists)	Gas cards, use existing public services	Acceptability, penetration (reach), adoption
Staff training, good communication tools, & physician buy-in (stakeholders)	Facilitation, toolkit, webinar training, physician champion, part of patient care plan	Fidelity, adoption

Rogers et al., JCSU 2019, Qu et al., Imp Sci Com 2020, Adams et al., JSCC epub

Implementation toolkit development



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BEAT Cancer Program

Implementation Toolkit

BEAT Cancer

BETTER EXERCISE ADHERENCE AFTER TREATMENT

Interventionist training

6 group sessions

Find Your BEAT

BEAT Cancer Program

Better Exercise Adherence after Treatment for Cancer

Participant Notebook

STRENGTHENING RECOVERY

Technical assistance

Eleven staff training videos

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Table of Contents

General Information

Overview of the Core Components

The BEAT Cancer program Core Components also provide the basis for achieving benefits that are more intangible in nature. Participants of the BEAT program have reported that having support from staff and other participants, being held accountable and obtaining knowledge for safe and effective physical activity are among some of the benefits of the program.

Figure #4 below illustrates a breakdown of the benefits each component provides. It is important to optimize these core benefits as you adapt the Core Components before and during program implementation.

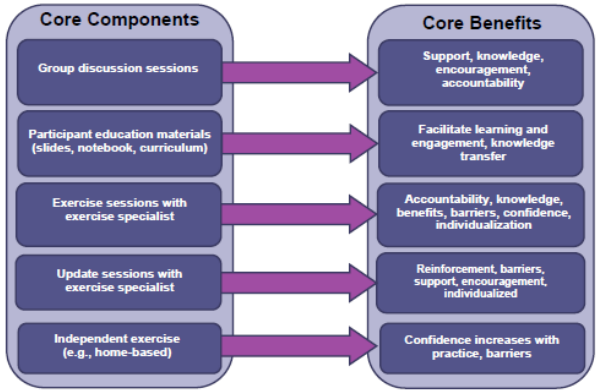


Figure #4

Program Planning

Characteristic	Suggested adaptation
Use of treadmills for supervised exercise sessions not available	Use indoor or outdoor track/trail for supervised exercise sessions
Formal meeting space for group sessions not available or not preferred	Use a private room or space in a coffee shop, community center, church, or park for group sessions; use online/social media
Long travel distances for participants	Visual communication using available technology
Lack of transportation available to participants	Obtain support from local advocacy groups to cover travel costs; determine local transportation resources available for individuals on a limited income; offer gas vouchers
Lack of exercise facilities for home-based exercise	Develop list of local possibilities to distribute to participants; consider alternative home-based activities such as free online exercise and walking videos
I don't have childcare	Identify stakeholders or other community services who can help
I can't come more than twice a week	Evenly distribute the session timeline while maintaining the recommended number of sessions overall
Population may not be able to afford clothes appropriate for physical activity	Ask retailers to provide a discount for participants; identify advocacy groups who can help
Your facility has a nutritionist on staff	Utilize the nutritionist during the program, many previous participants expressed interest in improving their diet
Broaden patient education to add topics that the participants express interest in learning	Recruit "specialists" who may have expertise in certain areas linked to cancer survivorship (e.g. patient advocates, dieticians, spiritual counselor, health counselors, etc.).

Figure #5

4 Implement Adapted Program

Once all possible adaptations have been identified and planned for, you are ready to begin implementing the program in your location.

Study 3: Active Living After Cancer

Dr. Karen Basen-Engquist

THE UNIVERSITY OF TEXAS
MD Anderson Cancer Center
Making Cancer History®

Active Living After Cancer: Community Implementation

Karen Basen-Engquist, PhD, MPH

Director, Center for Energy Balance in Cancer Prevention and Survivorship
Annie Laurie Howard Research Distinguished Professor
Dept of Behavioral Science

Active Living after Cancer: Initial trials

Evidence-Based Intervention:

6 month Lifestyle Physical Activity intervention adapted from Project Active (Dunn AL et al, MSSE, 1998)

Cognitive and behavioral skills taught in group sessions, once/week for 16 weeks, bi-weekly for 8 weeks

Evidence in Cancer Survivors:

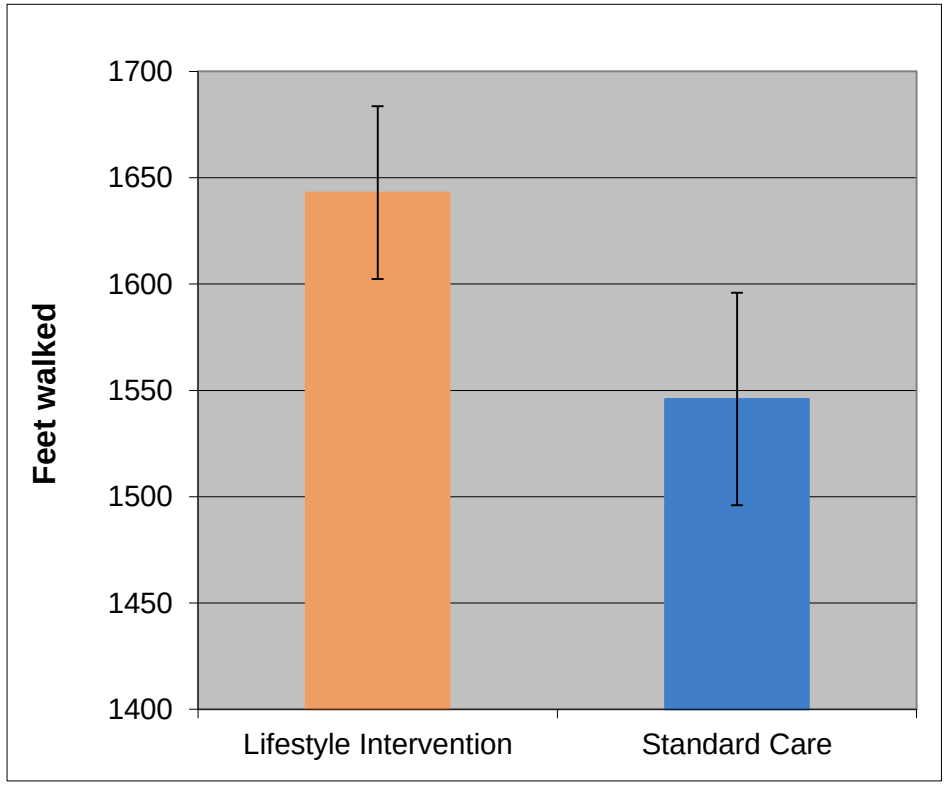
First trial with prostate cancer survivors on androgen deprivation therapy – negative trial

Second trial - 60 sedentary breast cancer survivors randomized to AFL or control

QOL benefits: Increased physical functioning, improvements in general health, pain, & role limitations

Intervention group had higher self-efficacy, lower cons, increased use of some changes processes

Intervention groups progressed in stage of change, but standard care did not. No difference in physical activity.

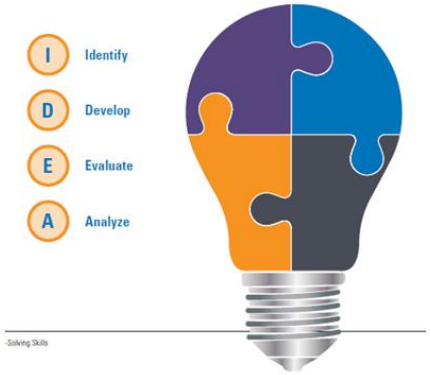


Basen-Engquist et al, Pat Ed & Couns, 2006

Adaptations made for community implementation of ALAC

Adaptation type (Stirman SW, 2013)	Original program	Adapted program	Rationale
Context	-Taught by MD Anderson staff	-Taught by health educators in a community organization	More potential for sustainability; better outreach to community
Training	-Taught by Masters' level staff -Brief training in curriculum	-Taught by staff with high school or 2- or 4-year college degree -20 hour structured training developed -Later used Project ECHO for ongoing support	Staff of original program familiar with teaching techniques provided by curriculum; health educators needed more training to ensure consistency
Length	-20 sessions	-12 sessions – eliminated activities with redundancy	Feedback from community partners indicated a 20 session program would not be feasible
Content – language and cultural relevance	-High reading level -Substantial text -Few photos of Latinas -English only	-Applied methods to address low health literacy (simplified text, increased white space, reduced reading level). -Increased diversity in photos, cultural relevance of stories -Translated into Spanish	Need to make program materials more accessible to participants with a range of health literacy and to Spanish speakers
Evaluation	-Lengthy questionnaire battery -Physical functioning assessment battery administered by physical therapists	-Brief questionnaires -Selected 2 physical functioning assessments and trained health educators to administer	Need to shorten evaluation and simplify, reduce participant and educator burden

Active Living After Cancer Program



- Funded by CPRIT, offered in Houston for the past 7 years
- 12 weekly group sessions, each session includes skill training, exercise, and survivorship discussion
- Currently offered via Zoom
- Over 1000 survivors and caregivers have enrolled in the program

Week	Cognitive and Behavioral Skill (~45 min)	Activity (~10 min)	Survivorship Topic (~30 min)
1	Identifying Moderate Intensity	Walking	None
2	Readiness to Change, Goal Setting	Walking	Nutrition
3	Benefits and Barriers	Zumba	Treatment side effects
4	Problem Solving Skills	Walking	Talking to Your Doctor
5	Goal Setting	Resistance Bands	Spirituality
6	Rewarding Yourself	Zumba	Emotional Distress/ Fear of Recurrence
7	Time Management	Resistance Bands	Fatigue
8	Getting Confident	Zumba	Cancer Screening
9	Finding Social Support	Resistance Bands	Relationships
10	Cognitive Restructuring	Balloon Volleyball	Body Image
11	Relapse Prevention	Walking, Resistance bands	Nutrition Revisited
12	Identifying places to be physically active in your community	Zumba	Final Party

Active Living After Cancer increased physical activity and improved physical function in a diverse group of survivors

Enrollment - Phase 1 (2013-16): **211**; Phase 2 (2017-2019): **710**; Phase 3 (2020 –present): **118**

Phase 2 Results

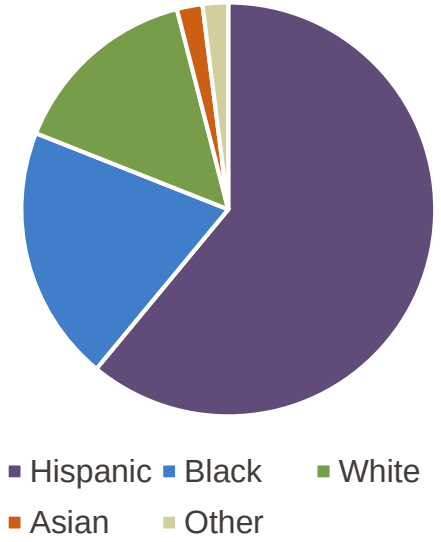
Mean age: 61 years (range 20-91)

40% speak Spanish primarily

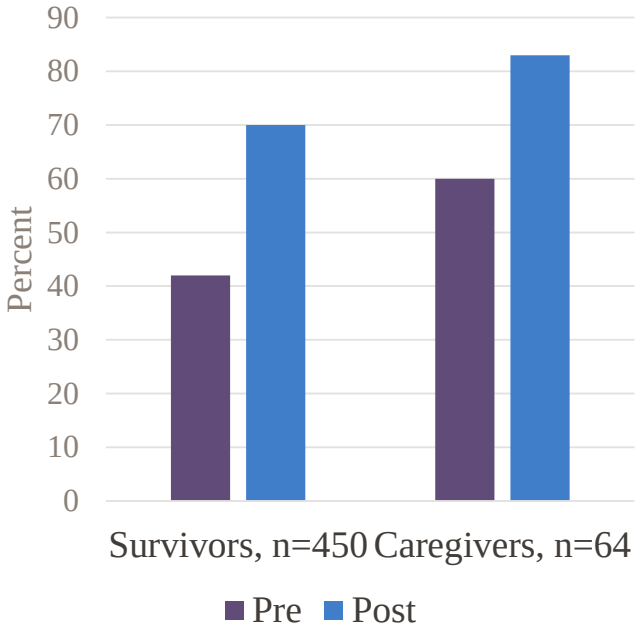
48% have a high school education or less

87% were survivors, 13% were caregivers

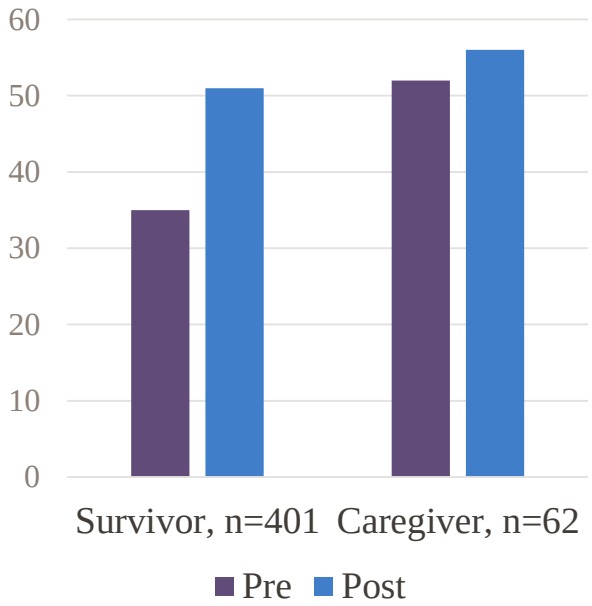
Race/ethnicity



% with 150+ weekly min of MVPA



% above the 50th percentile on the sit-to-stand test



Implementation strategies

Exploration

Identify funding

Develop relationships with community partners

Preparation

Formal commitments

Adapt intervention/ training

Train educators

Pilot test

Implementation

Promote program, inform opinion leaders

Distribute materials

Centralize technical assistance

Ongoing training/support

CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

The University of Texas MD Anderson Cancer Center

Project ECHO®

Implementation Take-away

Critical processes

-Establishing relationships

-Adapting the intervention

-Providing support to implementers

NOT "One-and-done" strategies

Knowing is not enough; we must apply.
Willing is not enough; we must do.

-Johann Wolfgang von Goethe

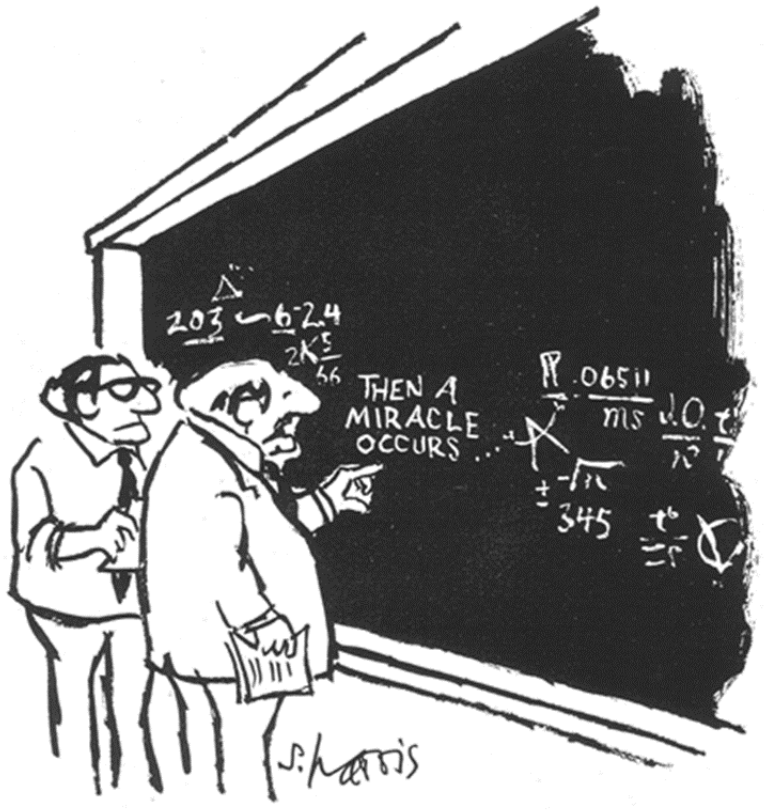
Role of Implementation Science

Dr. Prajakta Adsul

Evidence is only as good as how and whether:

- It is adopted
- Providers are trained to deliver it
- Trained providers actually deliver it
- Eligible patients receive it

It takes 17 years to turn 14 percent of original research to the benefit of patient care!



"I THINK YOU SHOULD BE MORE EXPLICIT HERE IN STEP TWO."

Balas EA, Boren SA. Managing Clinical Knowledge for Health Care Improvement. Yearb Med Inform. 2000;(1):65-70. PMID: 27699347.

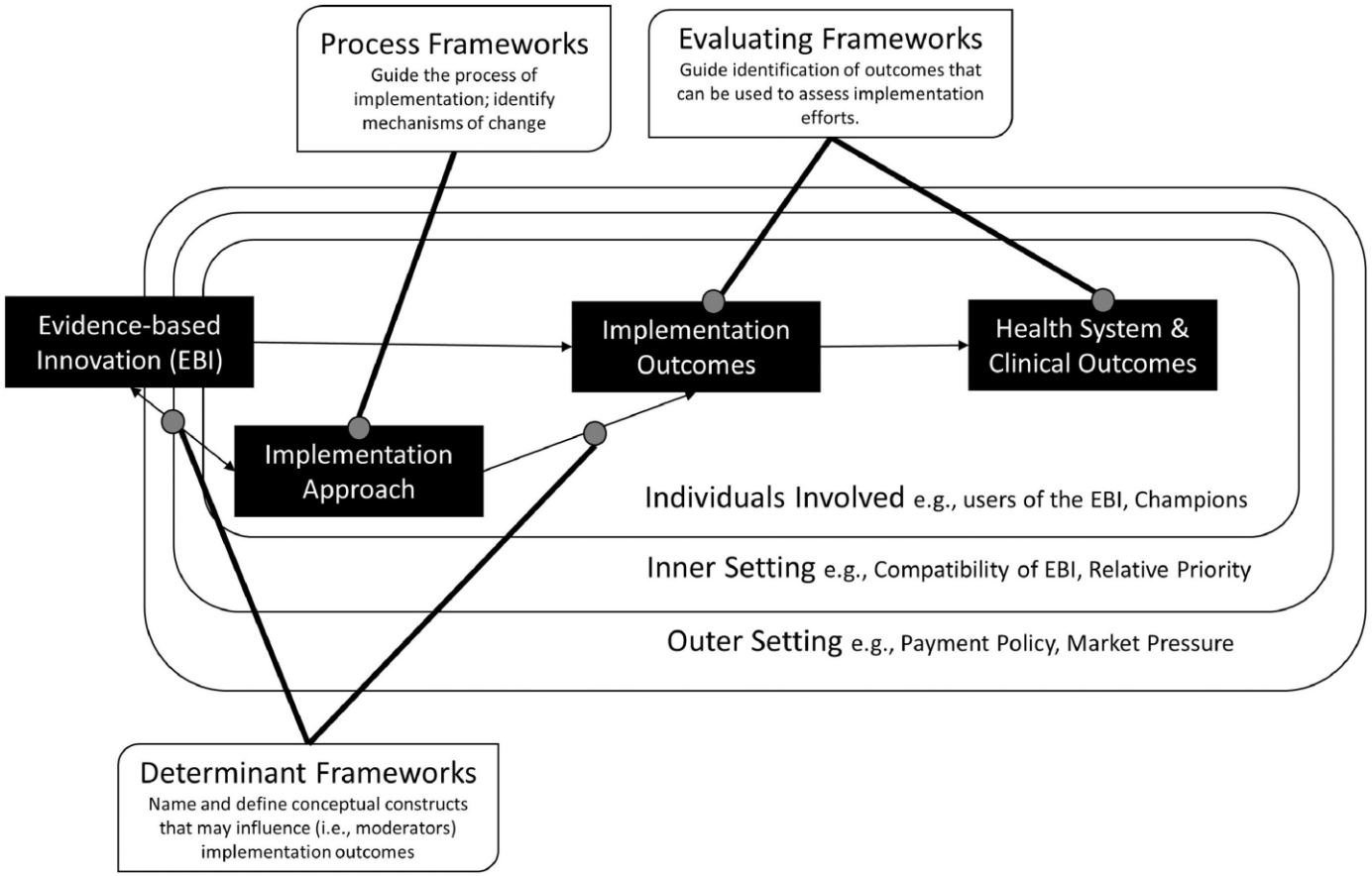
What is implementation science?

- "the study of methods to promote the integration of research findings and evidence into healthcare policy and practice"
- Consider context, previous research, need for adaptations to fit different settings and populations, sustainability, and scaling-up
- Limited information, change is constant, implementation is complex

Theories, models and frameworks in implementation science

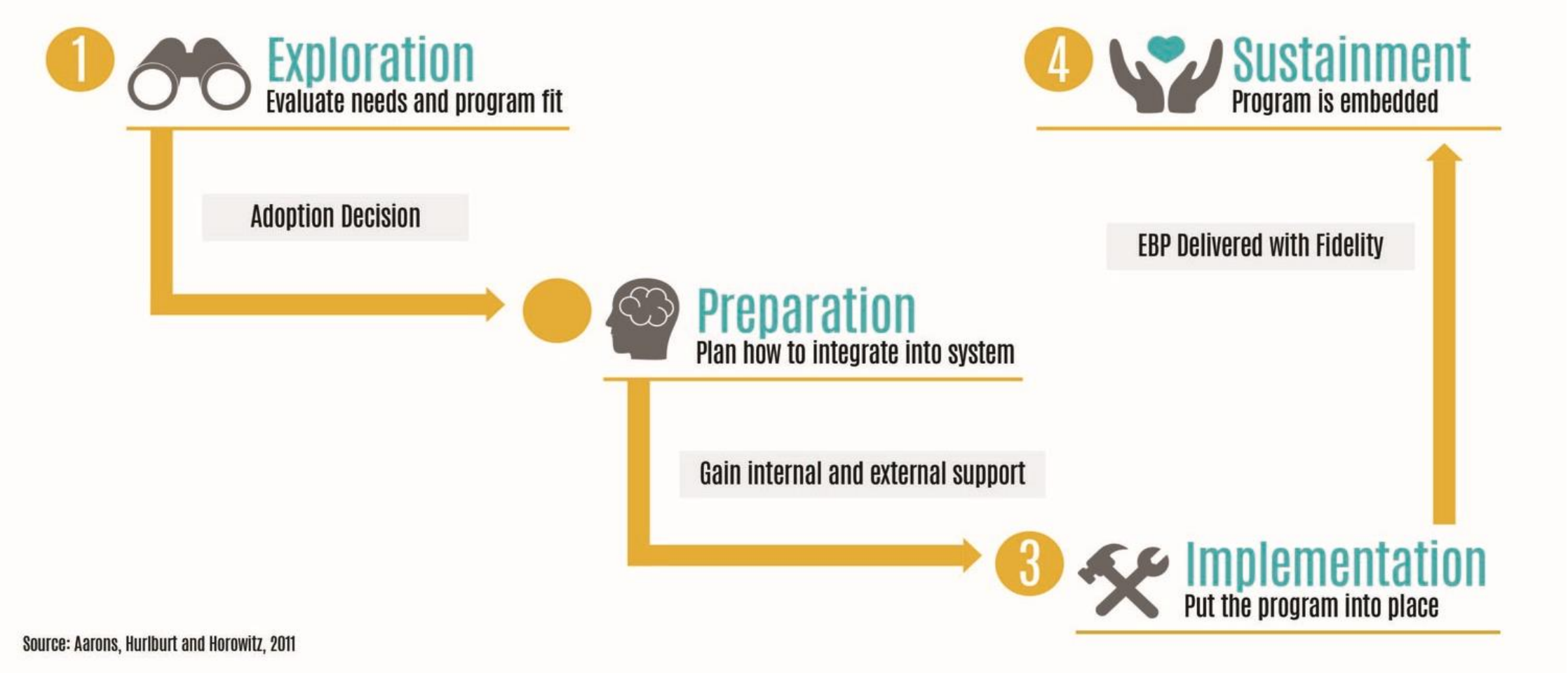
Over 100+ models on the **D&I Models Webtool**

(https://dissemination-implementation.org/)



Damschroder, L., 2020, Clarity out of Chaos

An example, EPIS Framework…



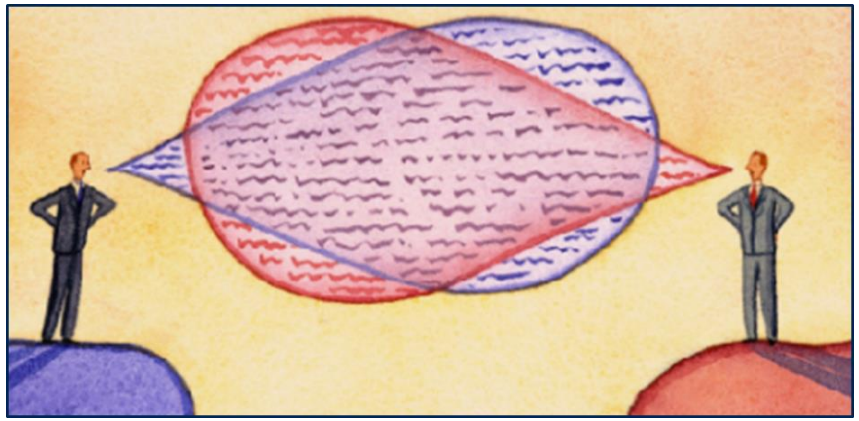
EBP- Evidence based practice; More info on EPIS here - https://episframework.com/what-is-epis

Implementation strategies

- “methods or techniques used to enhance the adoption, implementation, sustainment, and scale-up of a program or practice"

- Several terms and inconsistent usage

- The Expert Recommendations for Implementing Change (ERIC study)
  - Taxonomy of 73 strategies, under 9 domains



ERIC strategies

1. Evaluation and iterative strategies
- ❿ Assess for readiness
- ❿ Identify barriers and facilitators
- ❿ Audit & feedback

2. Interactive assistance
- ❿ Facilitation
- ❿ Technical assistance
- ❿ Clinical supervision

3. Adapting and tailoring to context
- ❿ Tailor strategies
- ❿ Promote adaptability
- ❿ Use data experts

4. Develop stakeholder relationships
- ❿ Identify and prepare champions
- ❿ Inform local opinion leaders
- ❿ Build coalitions

5. Train/educate stakeholders
- ❿ Conduct ongoing training
- ❿ Develop educational materials
- ❿ Create learning collaborative

6. Supporting clinicians
- ❿ Remind clinicians
- ❿ Develop resource sharing agreements
- ❿ Revise professional roles

7. Engage consumers
- ❿ Involve consumers and family members
- ❿ Intervene to enhance uptake and adherence
- ❿ Use mass media

8. Use financial strategies
- ❿ Access new funding
- ❿ Alter incentive/ allowance structures
- ❿ Develop disincentives

9. Change infrastructure
- ❿ Mandate change
- ❿ Change physical structures
- ❿ Start dissemination organization

How does this apply to exercise oncology?

- Tertiary benefits for cancer survivors and yet infrequently translated for broader use
- Limited information in peer-reviewed literature on what works? How does it works? Where and under what conditions does “it” work? For who does it work?
- Where do we begin?

Bringing together years of efforts from intervention to implementation…

- Three studies:
  - What is the evidence for the specific intervention?
  - What is the EBI? Where? Who?
  - What are the key implementation questions?
  - What methods and strategies were used?
- Mapped them on to the EPIS phases
- Operationalized each strategy per the ERIC study

EPIS + ERIC in Exercise Oncology

COMPREHENSIVE CANCER CENTER

NCI Designated Comprehensive Cancer Center

Exploration

- Access new funding
- Build a coalition

Preparation

- Obtain formal commitments
- Identify and prepare champions
- Assess readiness &implementation barriers and facilitators
- Develop educational materials
- Develop implementation blue print

Implementation

- Inform local opinion leaders
- Change service sites
- Conduct ongoing training
- Centralize technical assistance
- Intervene to enhance uptake and adherence
- Distribute educational materials

Sustainment

- Develop educational materials

How can IS help moving forward? (pun intended)

- Focusing efforts on the systematic study of implementation strategies
- Considering strategies that might be particularly relevant for promoting health equity (i.e. stakeholder engagement, advisory boards)
- Generating evidence for implementation but also on sustainment and scale-up

Q & A for the panel

Audience questions in the chat

At what point did you become focused on “implementation” for your interventions?

How did you choose/select the specific strategies to focus on when thinking about implementation?

Audience questions?

How did you pragmatically assess readiness of organizations for implementation?

What are some ongoing focus areas in continuing to focus on implementation for your interventions?

Closing

Dr. Kathryn Schmitz

Closing

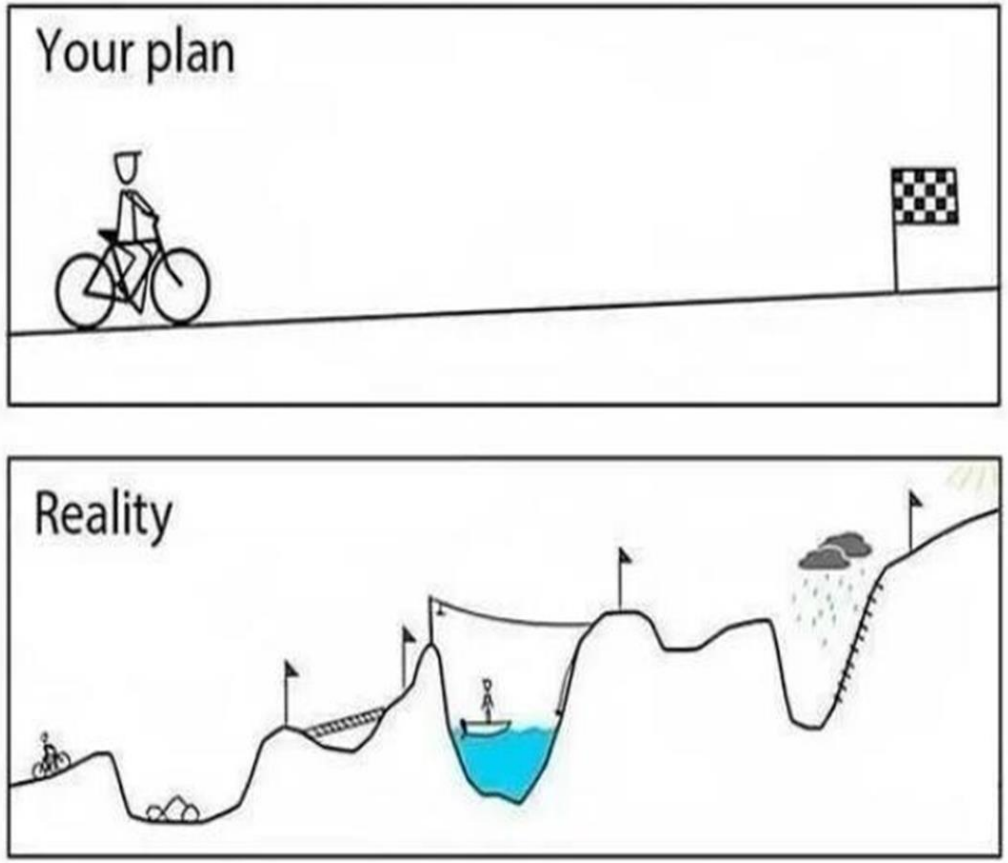
Lessons Learned

Key domains for future research

Application to other lifestyle interventions

Lessons learned

- Implementation has to be an intentional process
- Key considerations:
  - Setting
    - Location
    - Training
  - Cost
  - Referrals
- Missed opportunities
  - Advisory boards
  - Systematic testing of all implementation strategies



Slide obtained from Dr. David Chambers & Dr. Christine Hunter of TIDIRH

Key domains for future research

- Effectiveness of strategies across phases of implementation
- Creativity regarding sustainable funding
  - New payment models in healthcare
  - PA interventions as marketing tool
- Further evaluation of the non-linear nature of implementation
  - Return to earlier phases as barriers arise
- Systematic, rigorous evaluation of implementation strategies

Application to other lifestyle interventions

- Nutrition, Physical Activity, and other Lifestyle interventions share characteristics relevant to implementation
  - Physical activity is not a covered benefit
  - Strong evidence base supporting implementation
  - No space designated for these activities at cancer centers
  - Key challenges
    - Referrals
    - Cost
    - Location