# Exercise Oncology Update from SABCS

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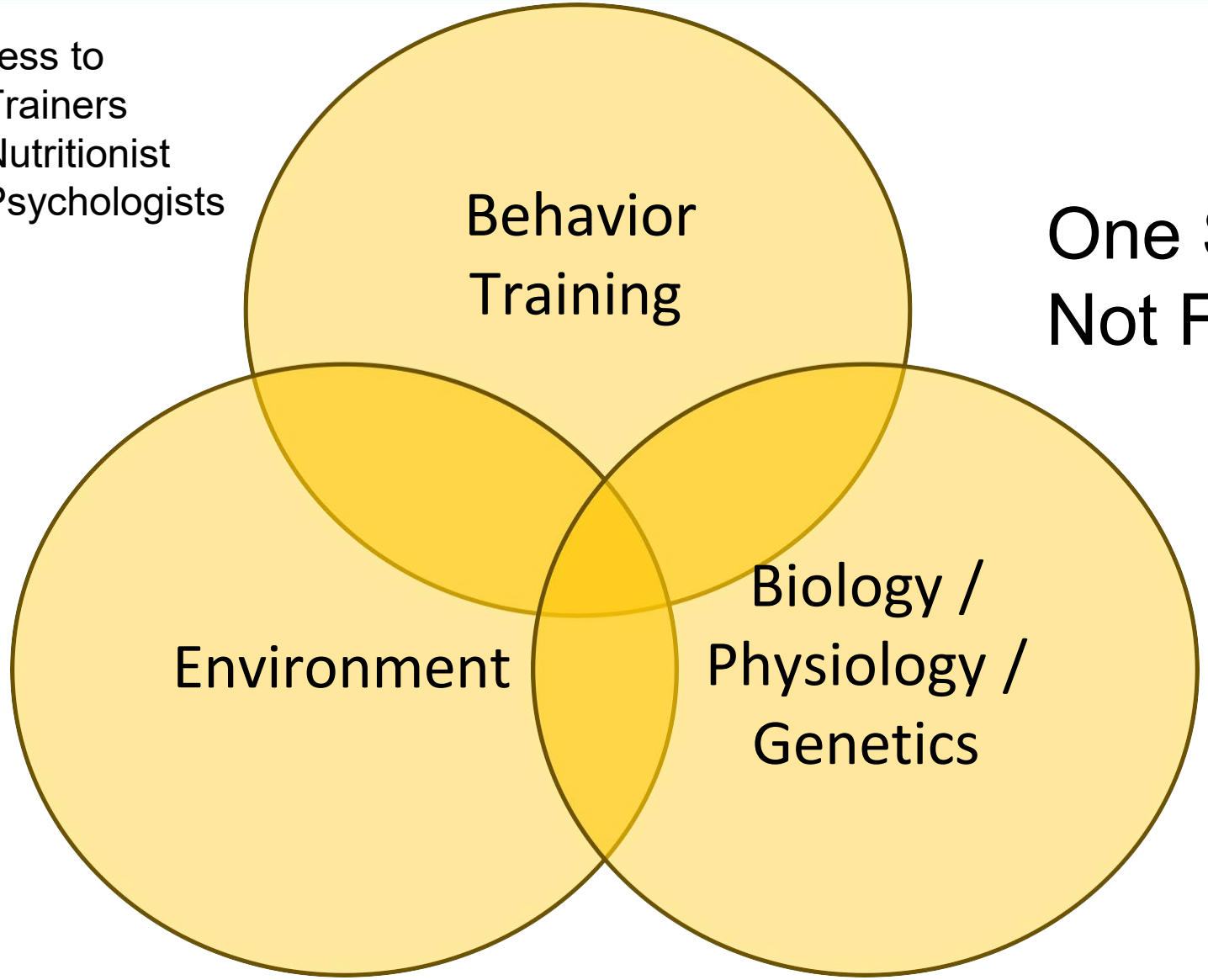
# Various Factors that Impact Exercise Capabilities

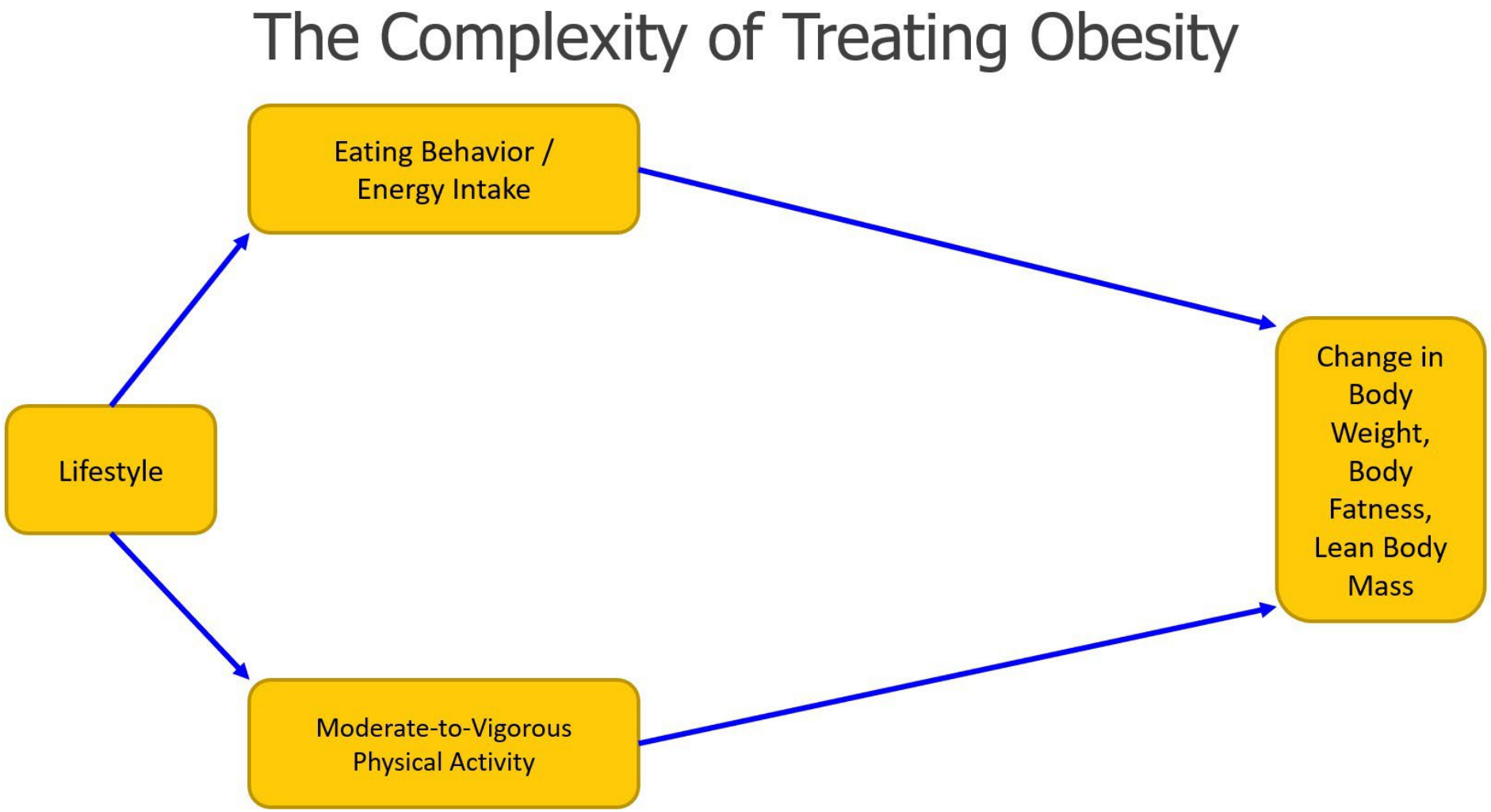
Access to
- Trainers
- Nutritionist
- Psychologists



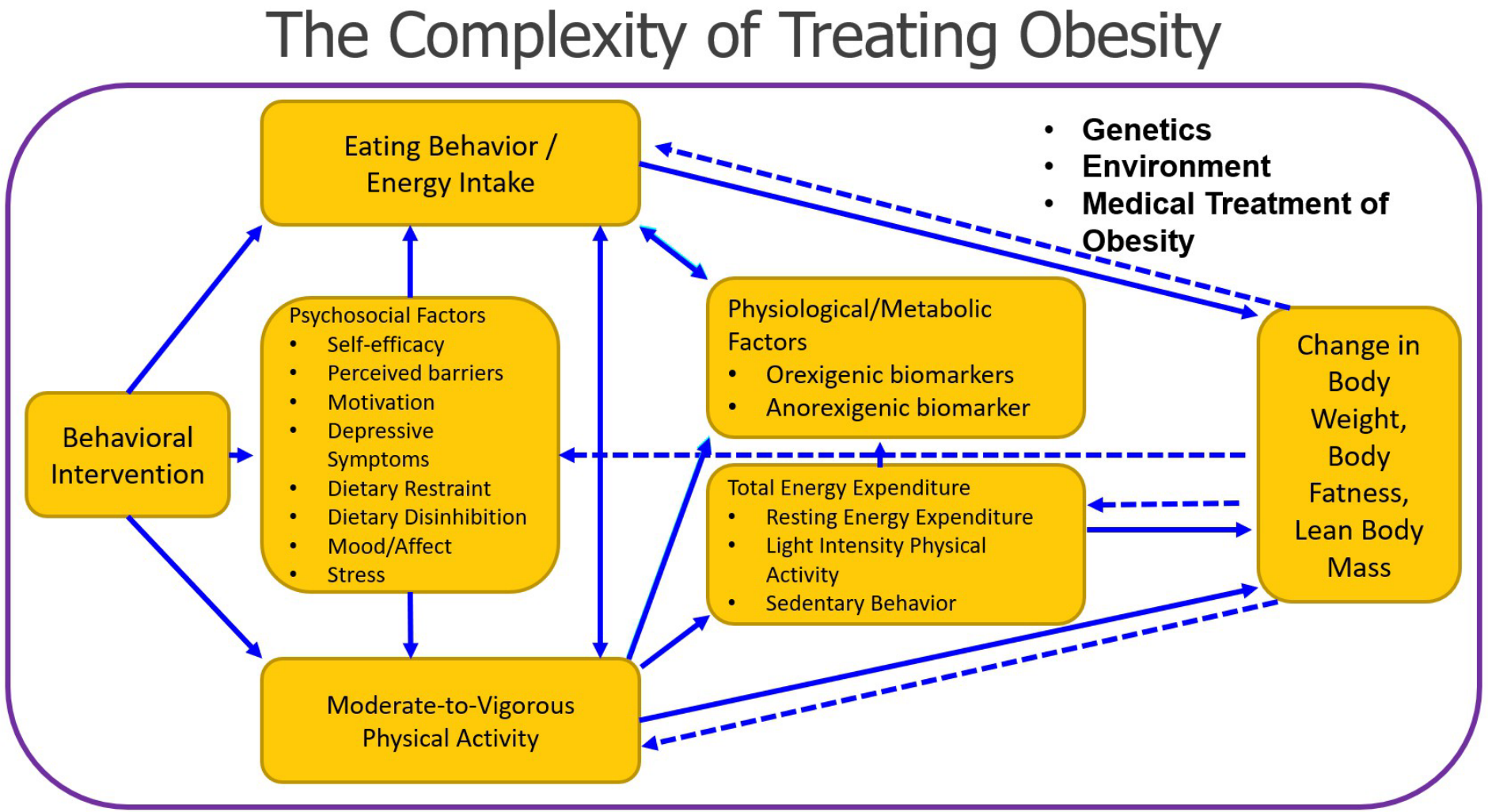

One Size Does Not Fit All!

- Work Stress
- Life Responsibilities
- Peer Group
- Financial Constraints

# Ideal World Scenario

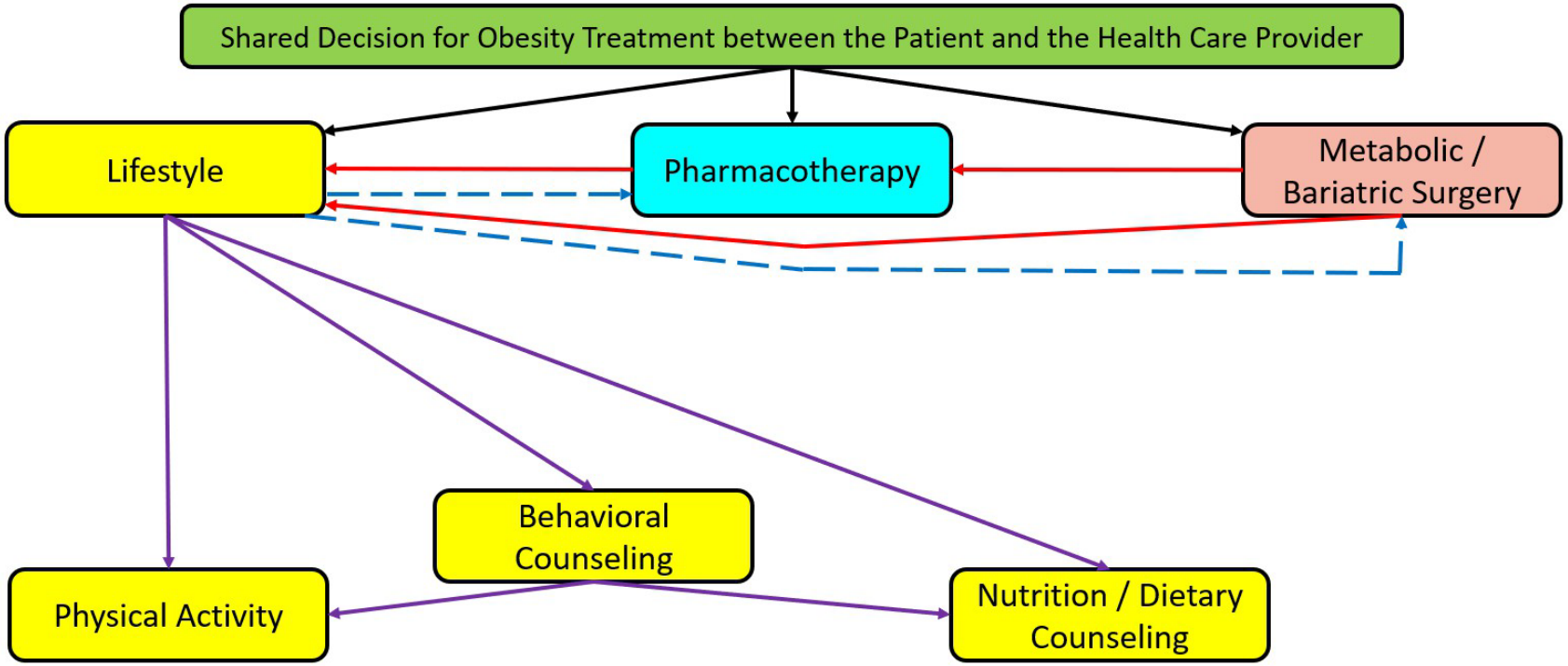


# Unfortunate, Real World Scenario



# Pillars Of Treatment

## Obesity Treatment Options




Jakicic JM, Rogers RJ, Apovian CM. Contemporary treatments for obesity: Physical activity in the context of anti-obesity medications. *Translational Journal of the American College of Sports Medicine*.

# Purpose of Exercise

## What Should Be the Focus?

- Maximize weight loss?
- Achieve a clinically meaningful and sustainable weight loss?
- Prevention of excess weight gain?

# Purpose of Exercise

## What Should Be the Focus?

- Maximize weight loss?
- Achieve a clinically meaningful and sustainable weight loss?
- Prevention of excessive weight gain?

# Shift of Focus from Number on Scale to Body Composition & Overall Health

## What Should Be the Focus?

**Weight Focused** → **Adiposity Focused** → **Health Focused**

- Maximize loss of excessive adiposity?
- Achieve a clinically meaningful and sustainable loss of adiposity?
- Prevention of excess adiposity gain?
- **Focus on physiological adaptations to enhance health?**

Physical Activity is Key!

# Why Should We Shift Our Focus?

**Lessons Learned from Exercise in Other Treatment Approaches for Obesity**

# What the Data Shows Us

**Lessons Learned from Exercise in Other Treatment Approaches for Obesity**

## Very-Low Energy Diets

+/- Exercise

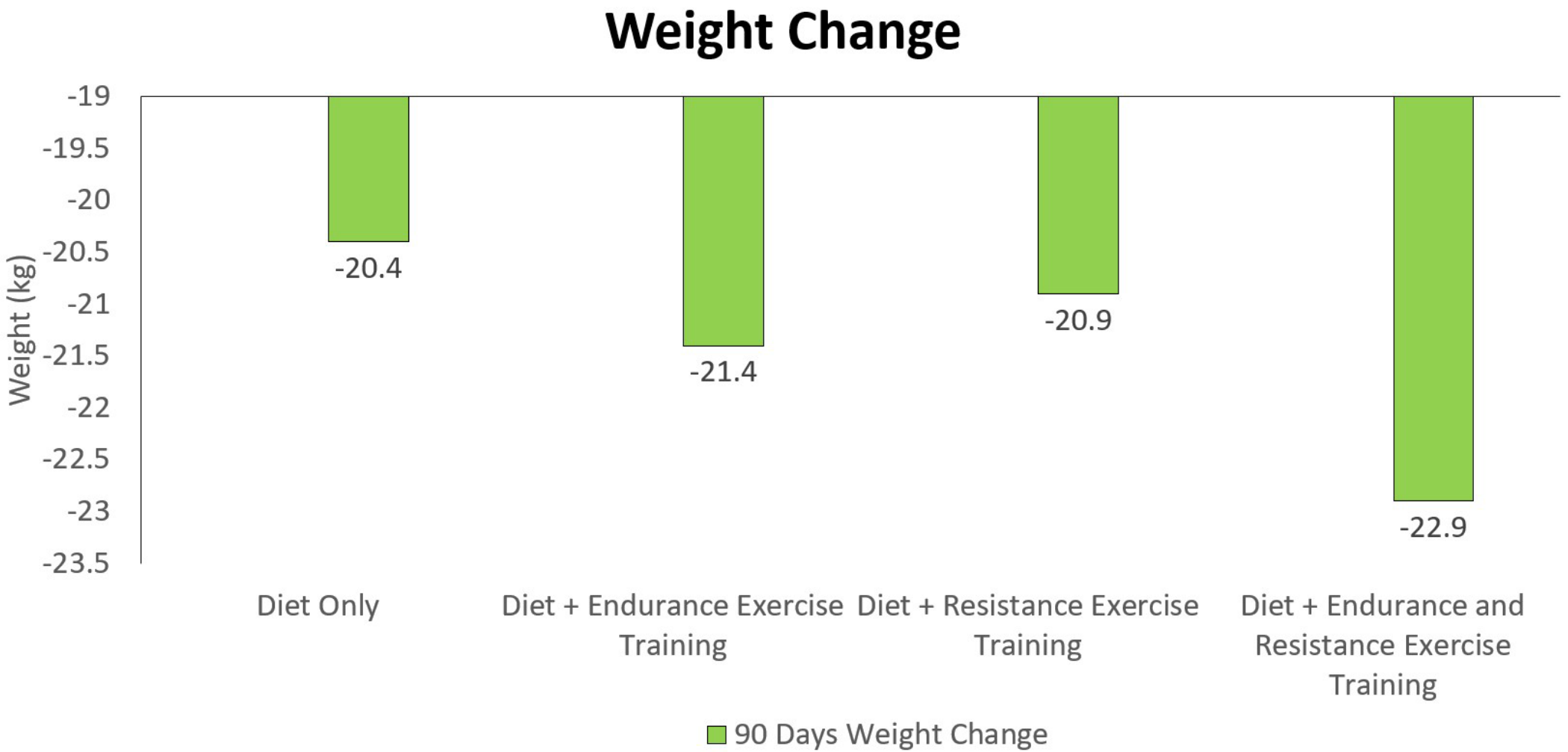
# Comparison Populations

**Lessons Learned from Treatment Approached**

| | Diet | Endurance Exercise Training | Resistance Exercise Training |
|---|---|---|---|
| Diet (VLED) | X | | |
| Diet + Endurance Exercise Training | X | X | |
| Diet + Resistance Exercise Training | X | | X |
| Diet + Endurance + Resistance Exercise Training | X | X | X |

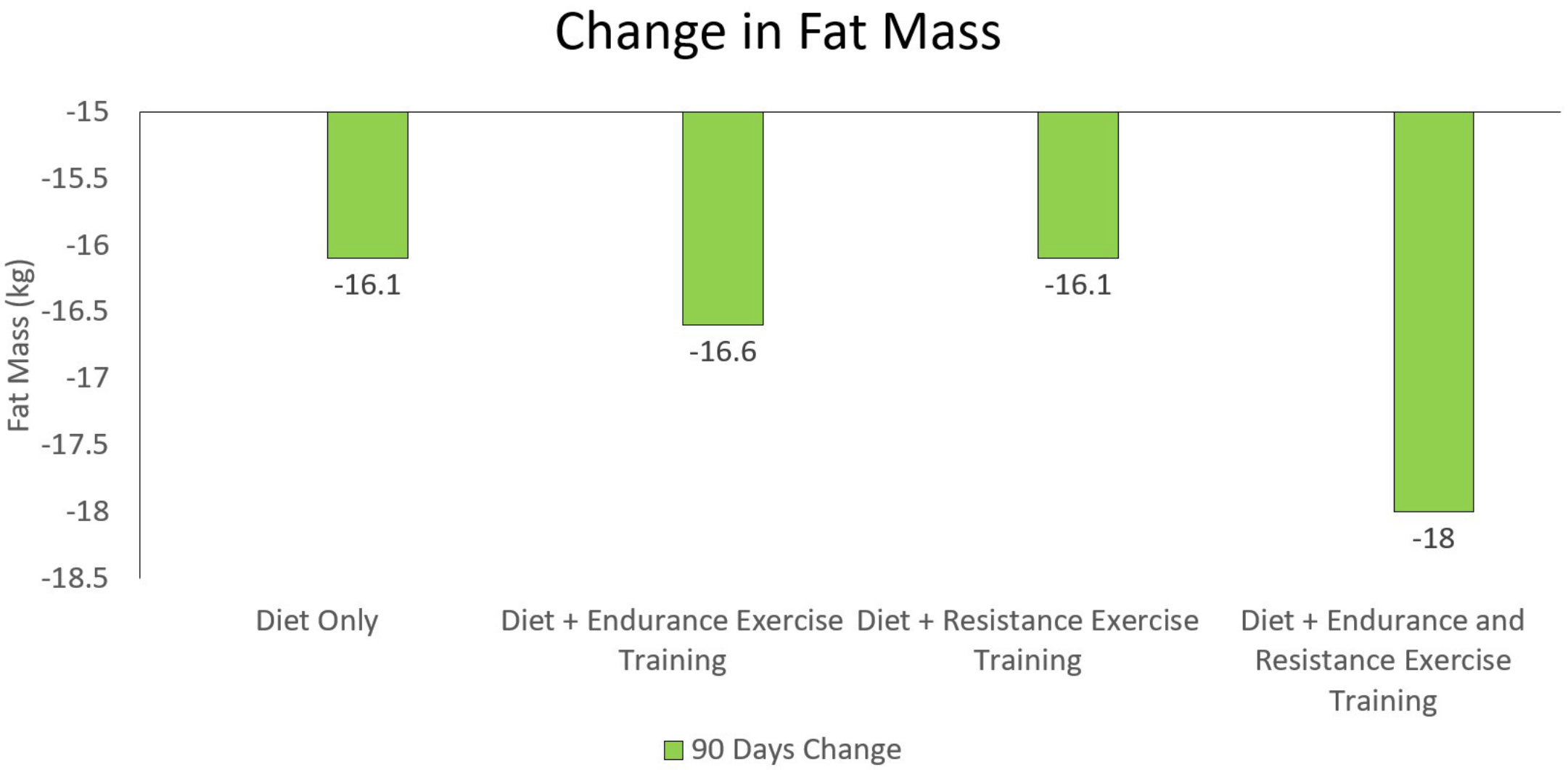
Donnelly et al. Am J Clin Nutr. 1991; 54:56-61.

# Weight loss : No statistically significant reduction



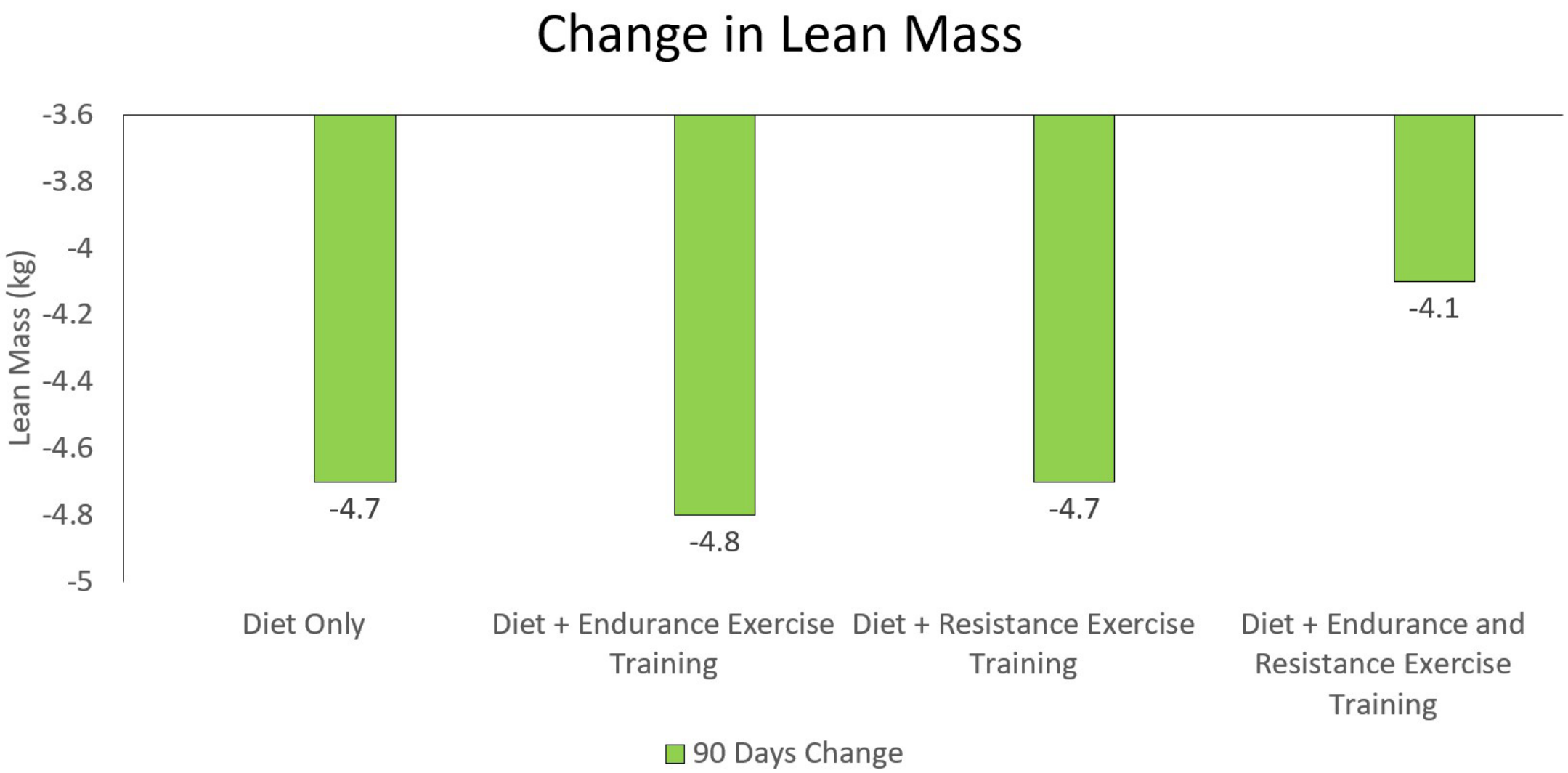

Donnelly et al. Am J Clin Nutr. 1991; 54:56-61.

# Fat Mass : No statistically significant reduction



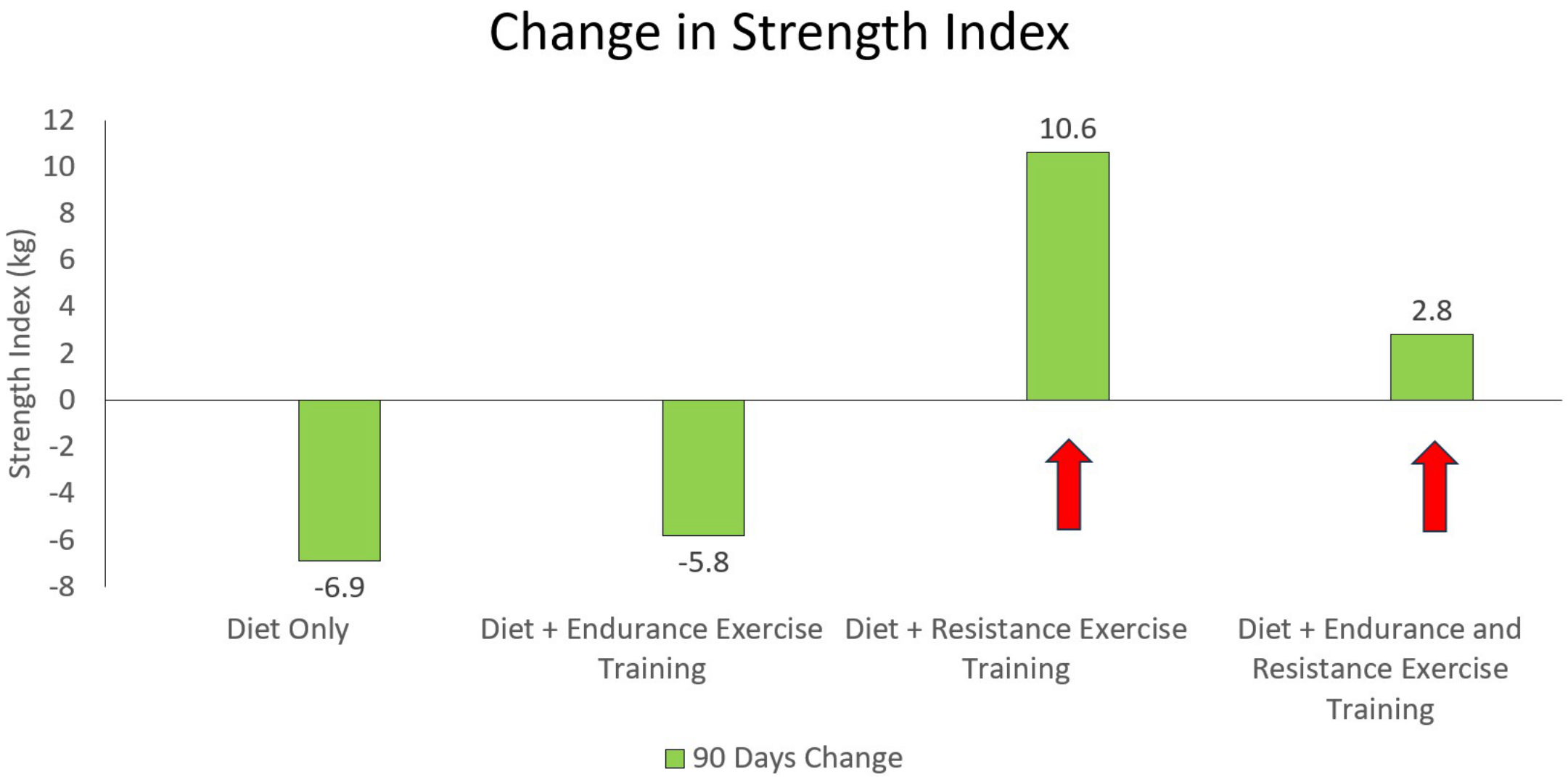

Donnelly et al. Am J Clin Nutr. 1991; 54:56-61.

# Protection of Lean Mass : No statistically significant preservation



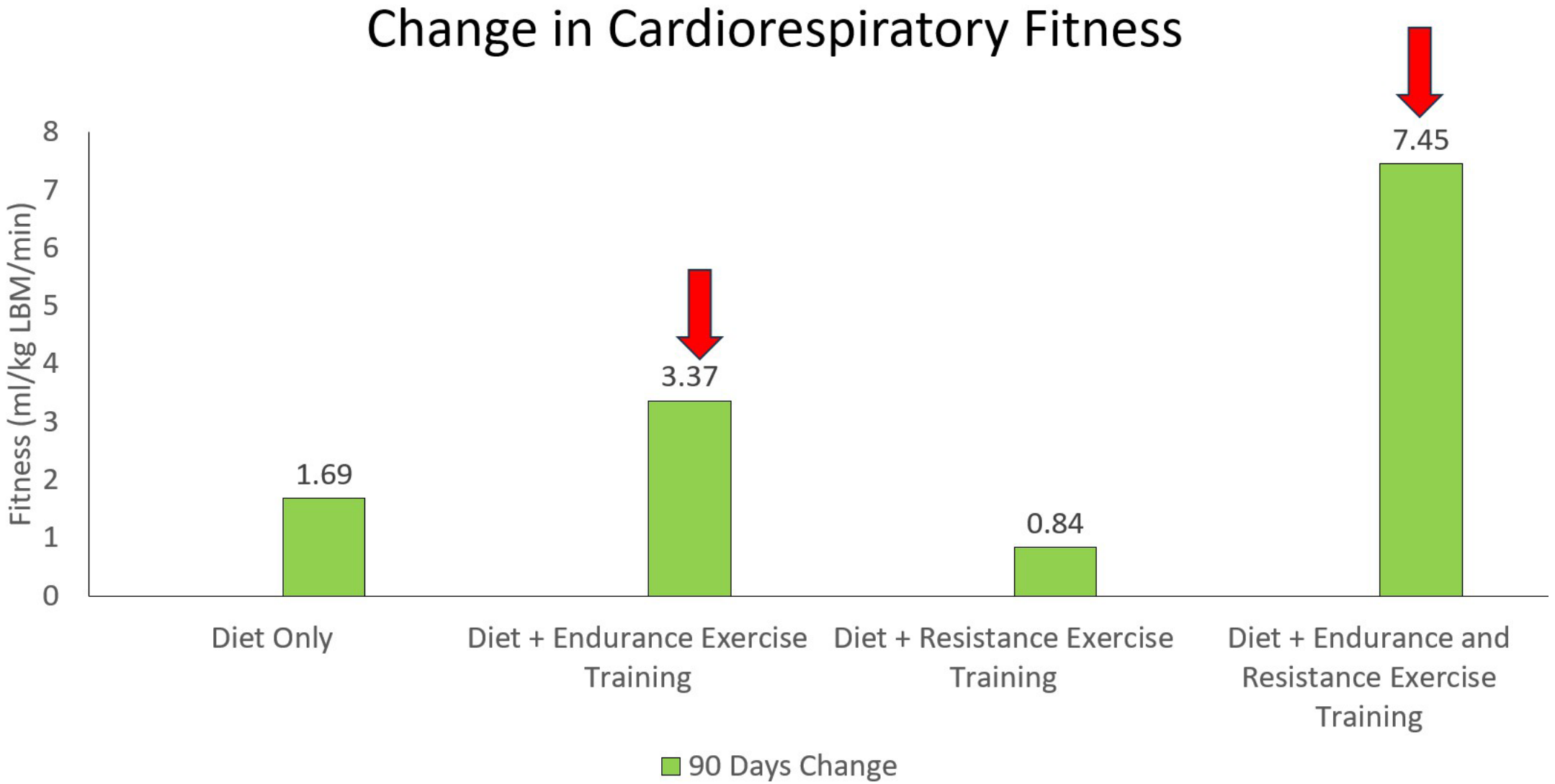

Donnelly et al. Am J Clin Nutr. 1991; 54:56-61.

# Tissue Quality Marker : Improved Strength




Donnelly et al. Am J Clin Nutr. 1991; 54:56-61.

# Tissue Quality Marker : Improved Cardiovascular Fitness




Donnelly et al. Am J Clin Nutr. 1991; 54:56-61.

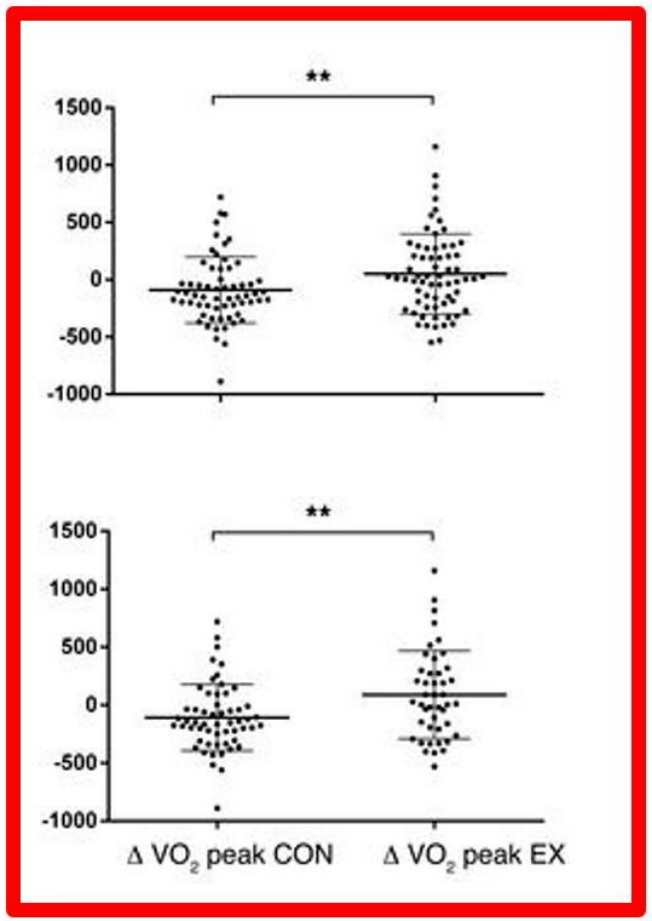
# Lessons Learned from Exercise in Other Treatment Approaches for Obesity

Bariatric Surgery

+/- Exercise

# 6 Month Change in Cardiorespiratory Fitness in Response to Bariatric Surgery – With and Without Exercise.

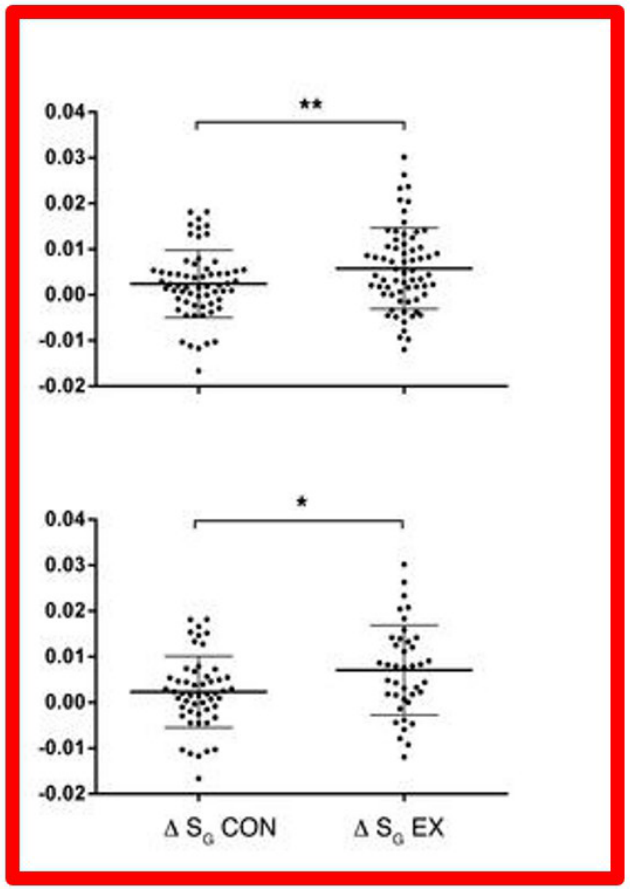
**Exercise added to Bariatric Surgery ENHANCED Cardiorespiratory Fitness compared to Bariatric Surgery without Exercise**




Coen et al. J Clin Invest. 2014. DOI: 10.1172/JCI78016

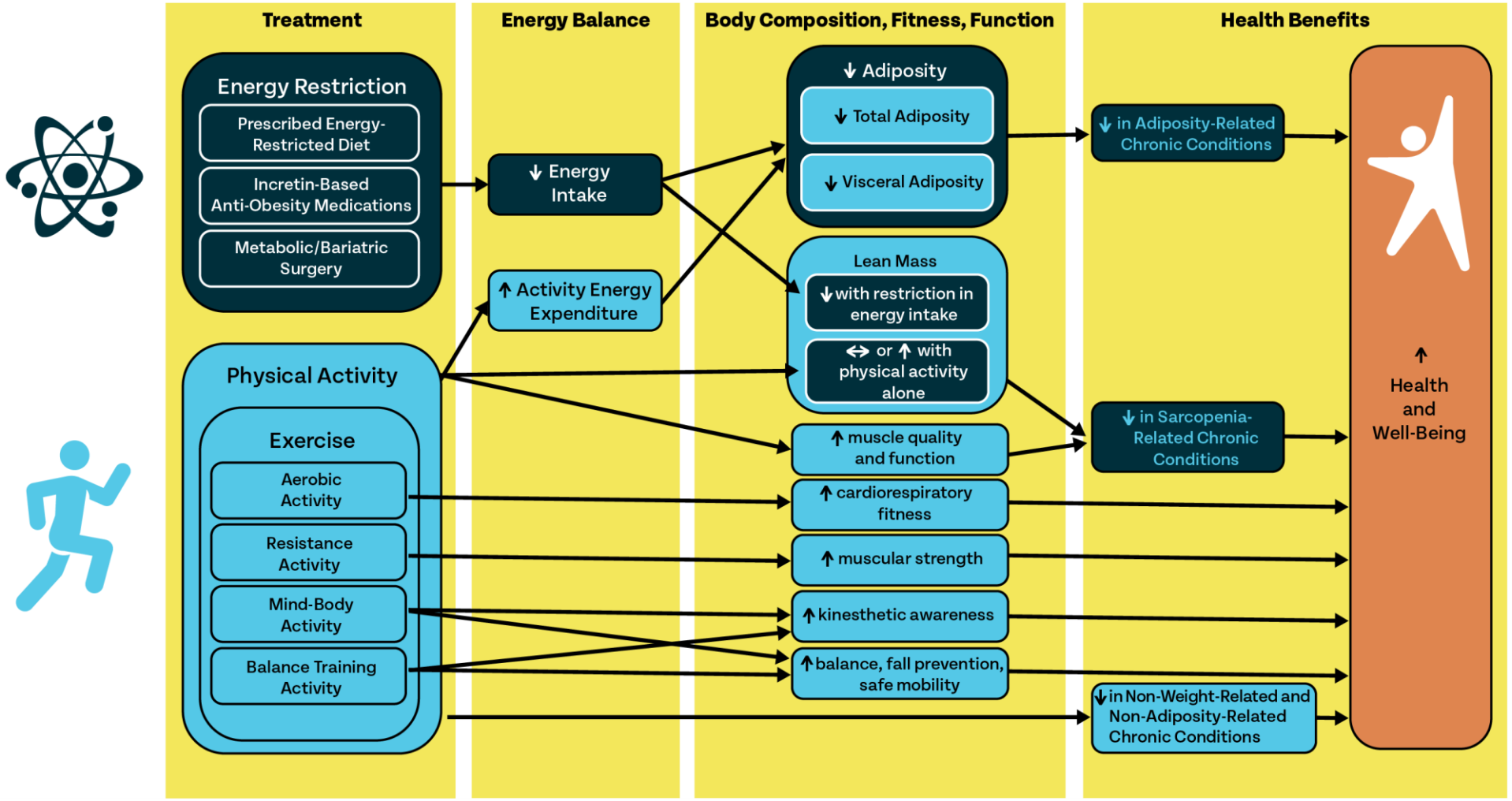
# 6 Month Change in Insulin Sensitivity in Response to Bariatric Surgery – With and Without Exercise.

**Exercise added to Bariatric Surgery ENHANCED Insulin Sensitivity compared to Bariatric Surgery without Exercise**




Coen et al. J Clin Invest. 2014. DOI: 10.1172/JCI78016

# Summary : Physical Activity is Independently Important for Health, Beyond Weight Loss




Jakicic JM, Apovian CM, Barr-Anderson DJ, Courcoulas AP, Donnelly JE, Ekkekakis P, Hopkins M, Lambert EV, Napolitano MA, Volpe SL. Physical Activity and Excess Body Weight and Adiposity for Adults. American College of Sports Medicine Consensus Statement. Translational Journal of the American College of Sports Medicine; Medicine and Science in Sports and Exercise

# CDC: Well-Established Benefits of Physical Activity

- Lower risk of all-cause mortality
- Lower risk of cardiovascular disease mortality
- Lower risk of cardiovascular disease (including heart disease and stroke)
- Lower risk of hypertension
- Lower risk of type 2 diabetes
- Lower risk of adverse blood lipid profile
- Lower risk of cancers of the bladder,* breast, colon, endometrium,* esophagus,* kidney,* lung,* and stomach*
- Improved cognition*
- Reduced risk of dementia (including Alzheimer's disease)*
- Improved quality of life
- Reduced anxiety
- Reduced risk of depression
- Improved sleep
- Slowed or reduced weight gain
- Weight loss, particularly when combined with reduced calorie intake
- Prevention of weight regain following initial weight loss
- Improved bone health
- Improved physical function
- Lower risk of falls (older adults)
- Lower risk of fall-related injuries (older adults)*

**New health benefit*

Information adapted from the Physical Activity Guidelines for Americans, 2nd edition. Available at health.gov/PAGuidelines.

# Physical Activity : Federal Recommendations

## ACSM Consensus Statements (Specific to Medications for the Treatment of Obesity

- **Include both aerobic and resistance modes of physical activity** with anti-obesity medications.
  - This combination of physical activity will enhance cardiorespiratory fitness, muscle strength and function, muscle quality, and potentially attenuate the loss of lean body mass and muscle that may occur with weight loss.
  - To sustain these benefits, physical activity needs to be maintained long-term.
- The inclusion of **physical activity** for individuals undergoing treatment with an anti-obesity medication should **extend beyond its potential effects on body weight or body composition**.
  - **Holistic health and well-being**.
  - Need to also include balance training to **enhance kinesthetic awareness**, which may change with weight loss, to facilitate safe mobility and physical activity.

Jakicic JM, Apovian CM, Barr-Anderson DJ, Courcoulas AP, Donnelly JE, Ekkekakis P, Hopkins M, Lambert EV, Napolitano MA, Volpe SL. Physical Activity and Excess Body Weight and Adiposity for Adults. American College of Sports Medicine Consensus Statement. Translational Journal of the American College of Sports Medicine; Medicine and Science in Sports and Exercise

# Physical Activity : Federal Recommendations

## ACSM Consensus Statements (Specific to Medications for the Treatment of Obesity

- The initiation and **progression** of physical activity, which includes mode and dose (intensity, duration, frequency).
  - Should consider an **individual's capacity and physical abilities**.
  - Warrants **appropriate medical clearance** by the anti-obesity medication prescribing provider and other providers as indicated by the medical status of the individual.
- The **comprehensive treatment team** should consist of:
  - A professional with the appropriate training and professional certifications, such as an **ACSM Certified Clinical Exercise Physiologist**.
    - Applies physical activity to the treatment of individuals receiving treatment with an anti-obesity medication.

Jakicic JM, Apovian CM, Barr-Anderson DJ, Courcoulas AP, Donnelly JE, Ekkekakis P, Hopkins M, Lambert EV, Napolitano MA, Volpe SL. Physical Activity and Excess Body Weight and Adiposity for Adults. American College of Sports Medicine Consensus Statement. Translational Journal of the American College of Sports Medicine; Medicine and Science in Sports and Exercise

# Give Me The Numbers

## Physical Activity Guidelines for Americans

- ✓ **Move more, sit less** throughout the day.
- ✓ All adults, including those with chronic disease, should aim do at least **150-300 minutes** a week of **moderate-intensity**, or **75-150 minutes a week of vigorous-intensity** aerobic physical activity (PA), or an equivalent combination of moderate- and vigorous-intensity aerobic activity (MVPA).
- ✓ Additional benefits are gained by engaging in PA beyond the 300 minutes (5 hours) of moderate-intensity physical activity a week.
- ✓ Adults should do **muscle-strengthening activities involving all major muscle groups on 2 or more days a week**


JAMA | Special Communication

The Physical Activity Guidelines for Americans

Katrina L. Piercy, PhD, RD; Richard P. Troiano, PhD; Rachel M. Ballard, MD, MPH; Susan A. Carlson, PhD, MPH; Janet E. Fulton, PhD; Deborah A. Galuska, PhD, MPH; Stephanie M. George, PhD, MPH; Richard D. Olson, MD, MPH

Information adapted from the Physical Activity Guidelines for Americans, 2nd edition. Available at health.gov/PAGuidelines.

Now let us Talk about Exercise & Physical Activity in Cancer Patients…..

…And Specifically Breast Cancer Patients

…… Because this IS SABCS Review Conference Afterall

# So, what are the Recommendations for Cancer Patients?

SAN ANTONIO BREAST CANCER SYMPOSIUM®
UT Health San Antonio Mays Cancer Center
AACR American Association for Cancer Research

**Meeting the Federal Physical Activity Guidelines is recommended by Most National Cancer societies**

American Institute for Cancer Research

**The World Cancer Research Fund/American Institute for Cancer Research Third Expert Report on Diet, Nutrition, Physical Activity, and Cancer: Impact and Future Directions**

Steven K Clinton,[1] Edward L Giovannucci,[2,3,4] and Stephen D Hursting[5]

ASCO
AMERICAN SOCIETY OF CLINICAL ONCOLOGY
KNOWLEDGE CONQUERS CANCER

**Exercise, Diet, and Weight Management During Cancer Treatment: ASCO Guideline**

Jennifer A. Ligibel, MD[1]; Kari Bohlke, ScD[2]; Anne M. May, PhD[3]; Steven K. Clinton, MD, PhD[4]; Wendy Demark-Wahnefried, PhD, RD[5]; Susan C. Gilchrist, MD, MS[6]; Melinda L. Irwin, PhD, MPH[7]; Michele Late[8]; Sami Mansfield, BA[9]; Timothy F. Marshall, PhD, MS[10]; Jeffrey A. Meyerhardt, MD, MPH[1]; Cynthia A. Thomson, PhD, RD[11]; William A. Wood, MD, MPH[12]; and Catherine M. Alfano, PhD[13]

CA CANCER J CLIN 2022;72:230-262

American Cancer Society

American Cancer Society nutrition and physical activity guideline for cancer survivors

Cheryl L. Rock, PhD, RD[1]; Cynthia A. Thomson, PhD, RD[2]; Kristen R. Sullivan, MS, MPH[3]; Carol L. Howe, MD, MLS[4,5]; Lawrence H. Kushi, ScD[6]; Bette J. Caan, DrPH[6]; Marian L. Neuhouser, PhD, RD[7]; Elisa V. Bandera, MD, PhD[8]; Ying Wang, PhD[3]; Kimberly Robien, PhD, RD[9,10]; Karen M. Basen-Engquist, PhD, MPH[11]; Justin C. Brown, PhD[12]; Kerry S. Courneya, PhD[13]; Tracy E. Crane, PhD, RDN[2,14]; David O. Garcia, PhD, FACSM[2]; Barbara L. Grant, MS, RDN, CSO, FAND[15]; Kathryn K. Hamilton, MA, RDN, CSO, CDN, FAND[16]; Sheri J. Hartman, PhD[17]; Stacey A. Kenfield, ScD[18]; Maria Elena Martinez, PhD[17,19]; Jeffrey A. Meyerhardt, MD, MPH[20]; Larissa Nekhlyudov, MD, MPH[21]; Linda Overholser, MD[22]; Alpa V. Patel, PhD[3]; Bernardine M. Pinto, PhD[23]; Mary E. Platek, PhD, RD, CDN[24,25]; Erika Rees-Punia, PhD, MPH[3]; Colleen K. Spees, PhD, MEd, RD, LD, FAND[26]; Susan M. Gapstur, PhD[27]; Marjorie L. McCullough, ScD, RD[3]

ACSM
AMERICAN COLLEGE OF SPORTS MEDICINE

**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]

SPECIAL COMMUNICATIONS

# 2022 ASCO Guidelines on Exercise During Treatment

ASCO
AMERICAN SOCIETY OF CLINICAL ONCOLOGY
KNOWLEDGE CONQUERS CANCER

## Exercise, Diet, and Weight Management During Cancer Treatment: ASCO Guideline

Jennifer A. Ligibel, MD[1]; Kari Bohlke, ScD[2]; Anne M. May, PhD[3]; Steven K. Clinton, MD, PhD[4]; Wendy Demark-Wahnefried, PhD, RD[5]; Susan C. Gilchrist, MD, MS[6]; Melinda L. Irwin, PhD, MPH[7]; Michele Late[8]; Sami Mansfield, BA[9]; Timothy F. Marshall, PhD, MS[10]; Jeffrey A. Meyerhardt, MD, MPH[1]; Cynthia A. Thomson, PhD, RD[11]; William A. Wood, MD, MPH[12]; and Catherine M. Alfano, PhD[13]

## The Recommendation:

Oncology providers should recommend aerobic and resistance exercise during active treatment with curative intent

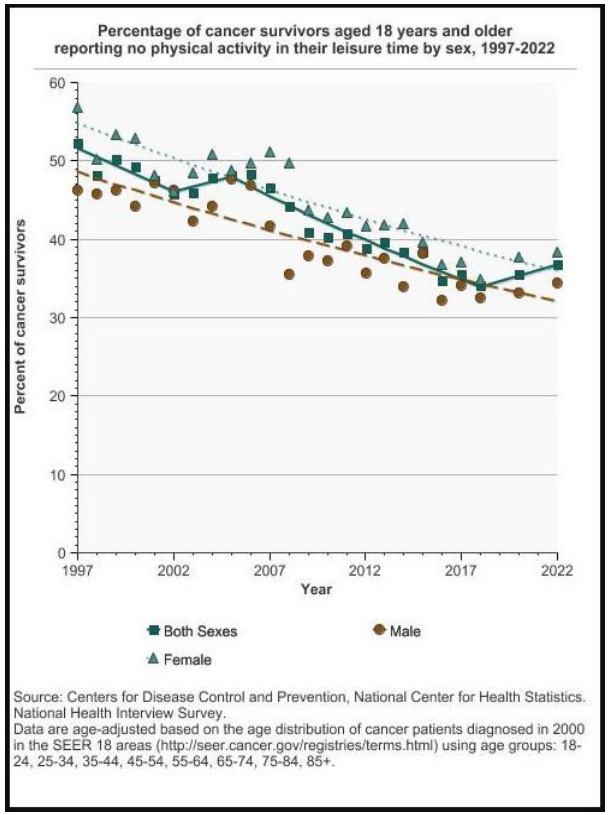
## Key Conclusions from the 2022 ASCO Guideline:

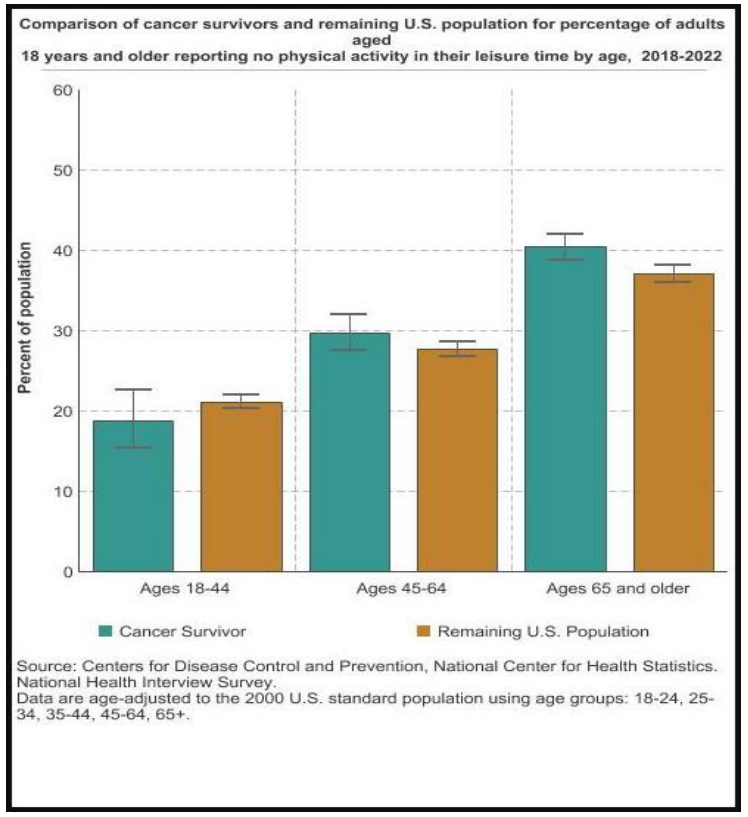
Exercise interventions during treatment :

- Reduce fatigue
- mitigate side effects of cancer treatment
- improve cardiorespiratory fitness,
- preserve physical functioning and strength,
- improve QoL
- reduce anxiety and depression.

# Unfortunate Realities : What does the National Data Show?

Most Cancer Survivors (40-60%) do not meet these Physical Activity Guideline recommendations




Cancer Trends Progress Report
National Cancer Institute, NIH, DHHS, Bethesda, MD,
March 2024, https://progressreport.cancer.gov.

**Key Points Regarding Inactivity:**

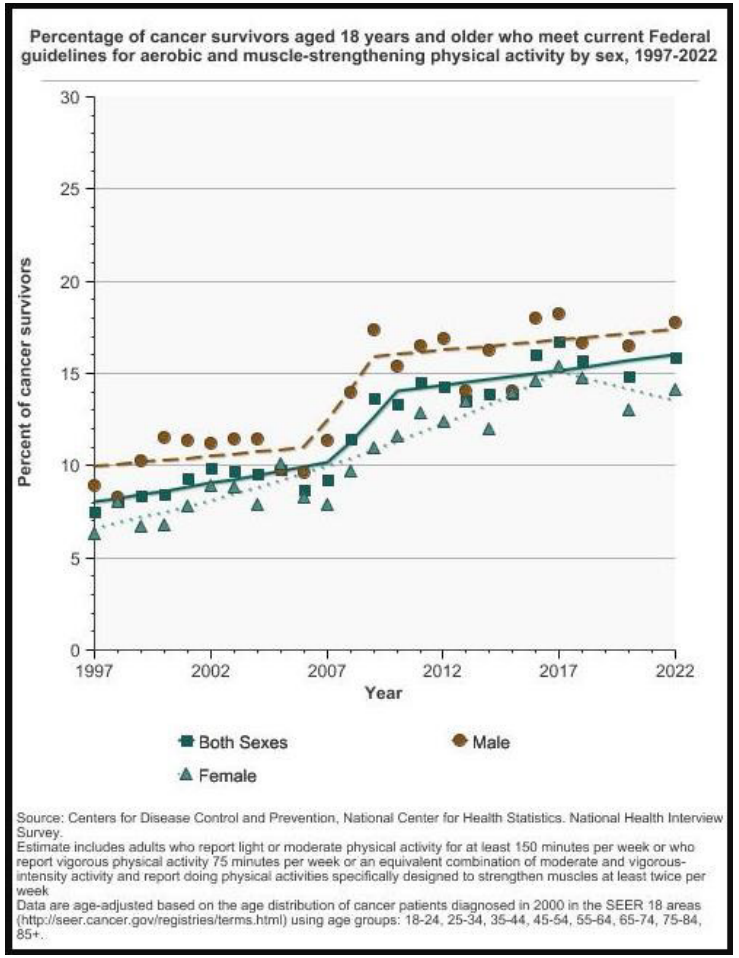
- 40 – 60 % of Patients report exercise levels below the federal recommendation

- Women are more likely to be inactive than men

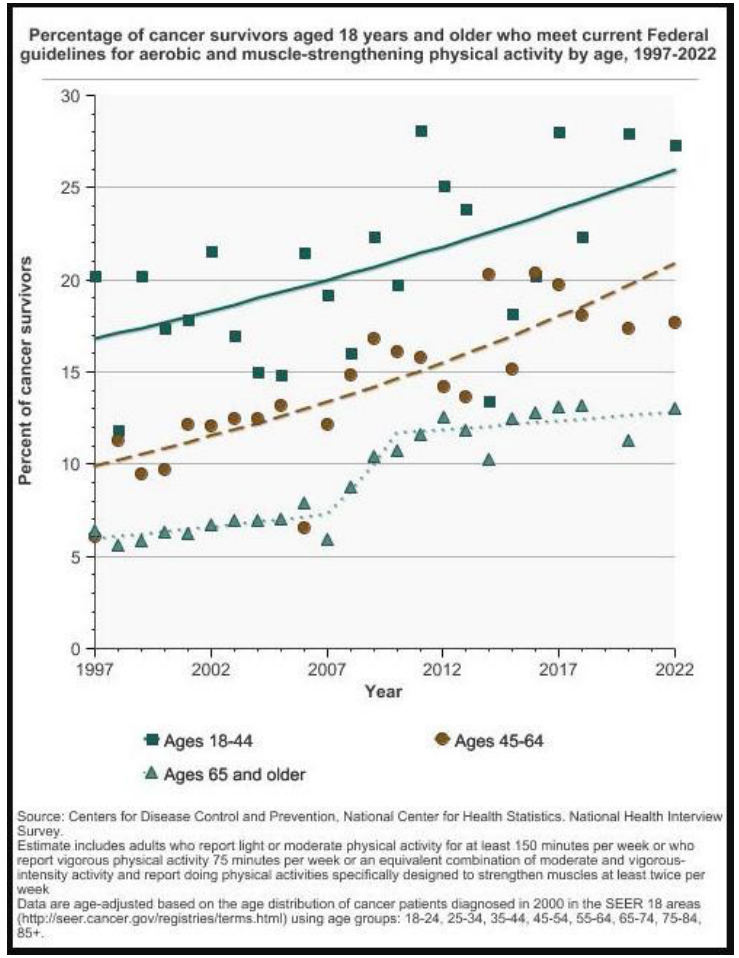
- Survivors aged 45 and above are more likely to be inactive in comparison to the general population;

JAMA Oncology March 2022 8(3)

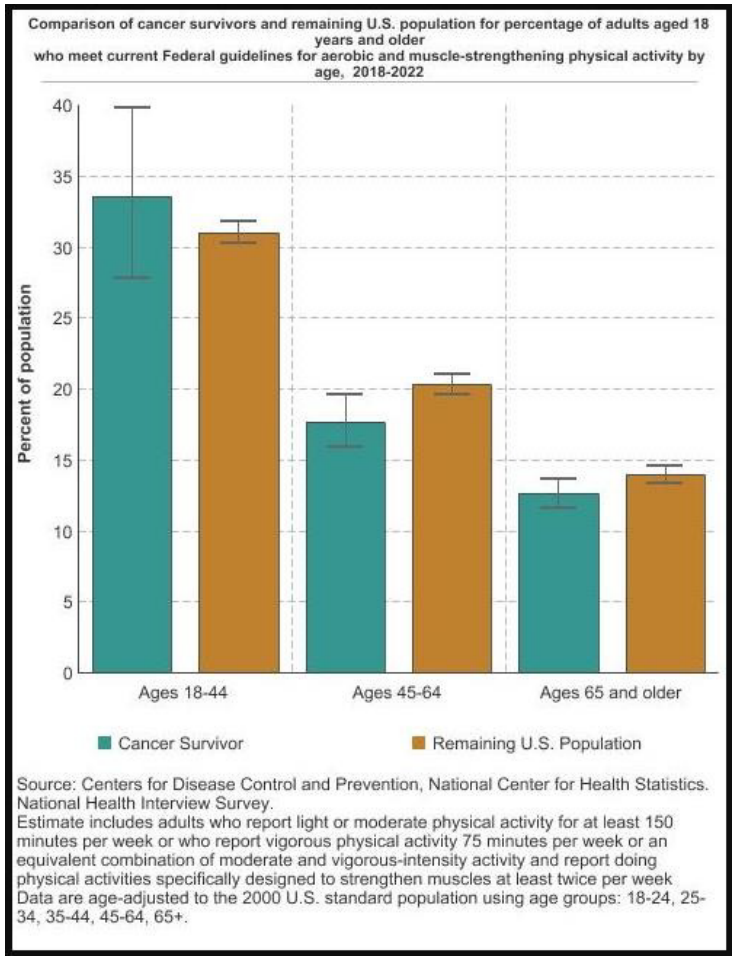
# The Prevalence of Cancer Survivors Meeting the PAGs is Lowest in Women and Older Adults




14% of women




13% of older adults




Cancer Trends Progress Report
National Cancer Institute, NIH, DHHS, Bethesda, MD, March 2024, https://progressreport.cancer.gov.

# How does meeting the PAGS associate with outcomes in 6,165 Breast Cancer Patients?

## The DELCaP Study (Ambrosone)

Study population:
1345 high-risk breast cancer patients (2005-2010)

PA Exposure:
before, during, after treatment

Outcomes: All-cause mortality & disease recurrence

Events and follow-up:
222 deaths (16.6%);
7.7 (2.1) years

- Cannioto et al. JNCI, 2021; 113(1), 54-63
- Cannioto et al. JAMA Network Open, 2023; 6(5)

## Roswell Park DBBR/BLS (Johnson)

Study population:
1170 primary invasive breast cancer patients (2003-2016)

PA Exposure:
10 years before diagnosis AND in the peri-diagnosis period

Outcomes: All-cause mortality & disease recurrence

Events & follow-up :
227 deaths (19.4);
9.6 (5.8) years

- Davis et al. JCO 2023; 41 (16_suppl), 10582
- Cannioto et al. Cancer Causes & Control 2019; 30 (1), 1-12

## The Pathways Study (Kushi & Ambrosone)

Study population:
3,650 women diagnosed with primary invasive breast cancer (2005-2013)

PA Exposure:
before, during, after treatment

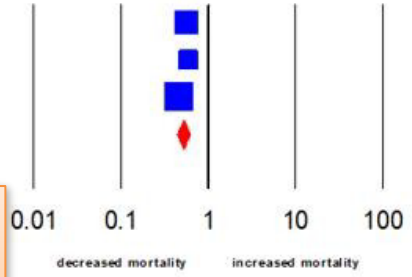
Outcomes: All-cause mortality & disease recurrence

Events & follow-up time:
874 deaths (23.9);
7.1 (0.3,15.4)

*manuscript in progress

# Mortality Benefit in **ALL** Breast Cancer Subtypes

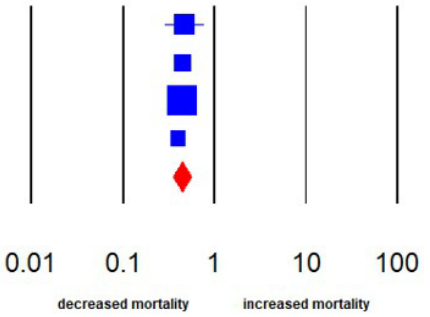
| Study name | Hazard ratio | Lower limit | Upper limit | Z-Value | p-Value |
|---|---|---|---|---|---|
| DELCaP | 0.560 | 0.411 | 0.763 | -3.682 | 0.000 |
| DBBR | 0.590 | 0.407 | 0.854 | -2.792 | 0.005 |
| PATHWAYS | 0.460 | 0.359 | 0.589 | -6.148 | 0.000 |
| Pooled | 0.515 | 0.434 | 0.612 | -7.586 | 0.000 |




**BC overall (N=6165)** – **48.5% ↓ mortality**
(HR=0.52, 95% CI: 0.43, 0.61, p<0.0001)

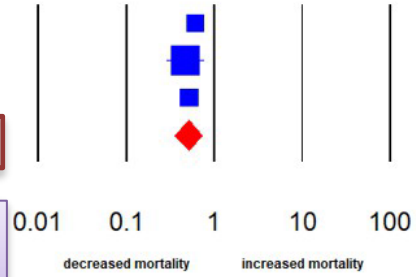
**HR approximates recent CUP report comparing high to low RPA (HR=0.56, 0.49-0.64)*

| Study name | Hazard ratio | Lower limit | Upper limit | Z-Value | p-Value |
|---|---|---|---|---|---|
| DBBR | 0.470 | 0.290 | 0.761 | -3.068 | 0.002 |
| DELCAP | 0.450 | 0.257 | 0.788 | -2.791 | 0.005 |
| PATHWAYS A | 0.443 | 0.321 | 0.612 | -4.946 | 0.000 |
| PATHWAYS B | 0.404 | 0.215 | 0.760 | -2.811 | 0.005 |
| Pooled | 0.445 | 0.355 | 0.557 | -7.030 | 0.000 |



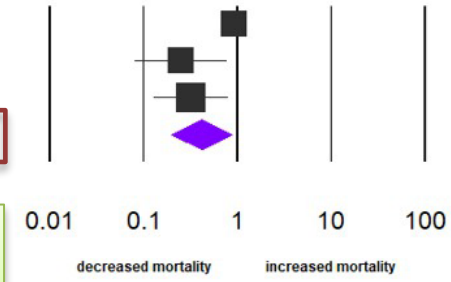

**HR+ Tumors - 55% ↓ mortality**
(HR=0.45, 95% CI: 0.36, 0.56, p<0.0001)

| Study name | Hazard ratio | Lower limit | Upper limit | Z-Value | p-Value |
|---|---|---|---|---|---|
| DBBR | 0.610 | 0.271 | 1.374 | -1.194 | 0.233 |
| DELCAP | 0.470 | 0.290 | 0.761 | -3.068 | 0.002 |
| PATHWAYS | 0.520 | 0.236 | 1.147 | -1.619 | 0.105 |
| Pooled | 0.507 | 0.351 | 0.732 | -3.628 | 0.000 |



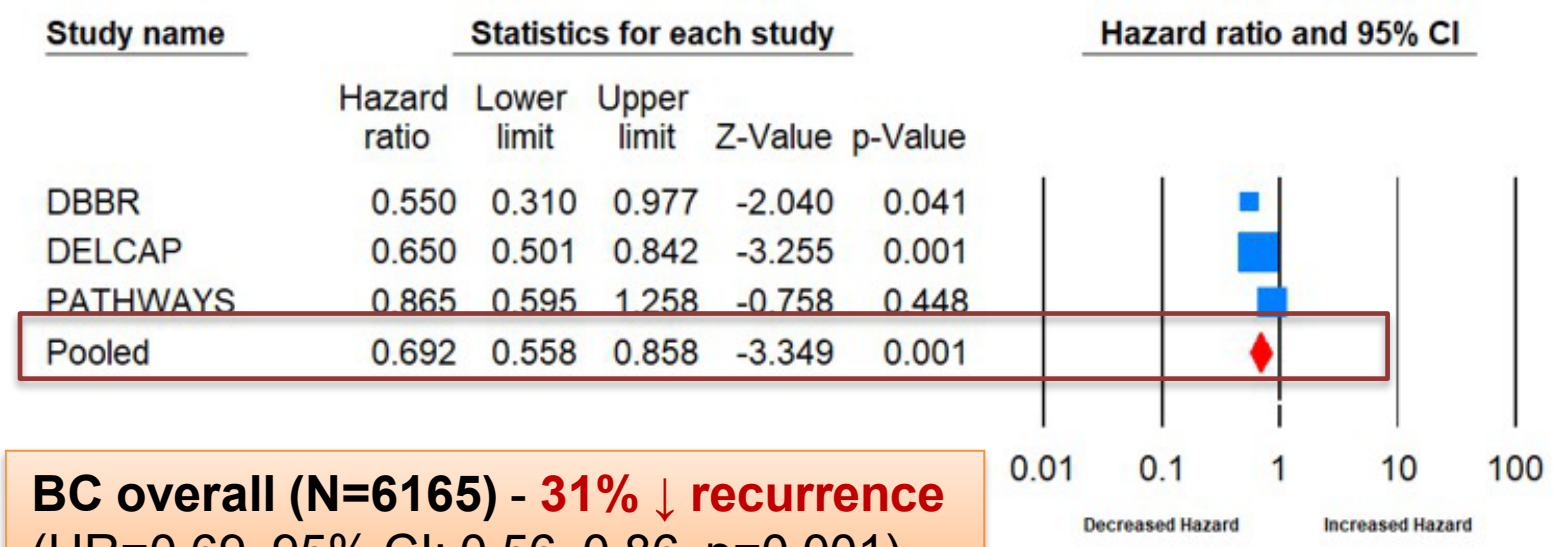

**HER2 + Tumors - 49% ↓ mortality**
(HR=0.51, 95% CI: 0.35, 0.73, p<0.0001)

| Study name | Hazard ratio | Lower limit | Upper limit | Z-Value | p-Value |
|---|---|---|---|---|---|
| DBBR | 0.920 | 0.310 | 2.730 | -0.150 | 0.881 |
| DELCAP | 0.250 | 0.081 | 0.771 | -2.412 | 0.016 |
| PATHWAYS | 0.321 | 0.129 | 0.798 | -2.446 | 0.014 |
| Pooled | 0.414 | 0.196 | 0.876 | -2.306 | 0.021 |




**TN Tumors- 59% ↓ mortality**
(HR=0.41, 95% CI: 0.20, 0.88, p=0.021)

# Physical Activity is Also Associated with **Reduced Risk of Recurrence**




**BC overall (N=6165) - 31% ↓ recurrence**
(HR=0.69, 95% CI: 0.56, 0.86, p=0.001)

Meeting the PAGS Before, During and After Treatment for BC

## Key Findings and Significance:

- Meeting the PAGs (versus inactivity) before, during, and/or after treatment is associated with a **31% reduction in BC recurrence and a 48.5% reduction in mortality,** independent of subtype

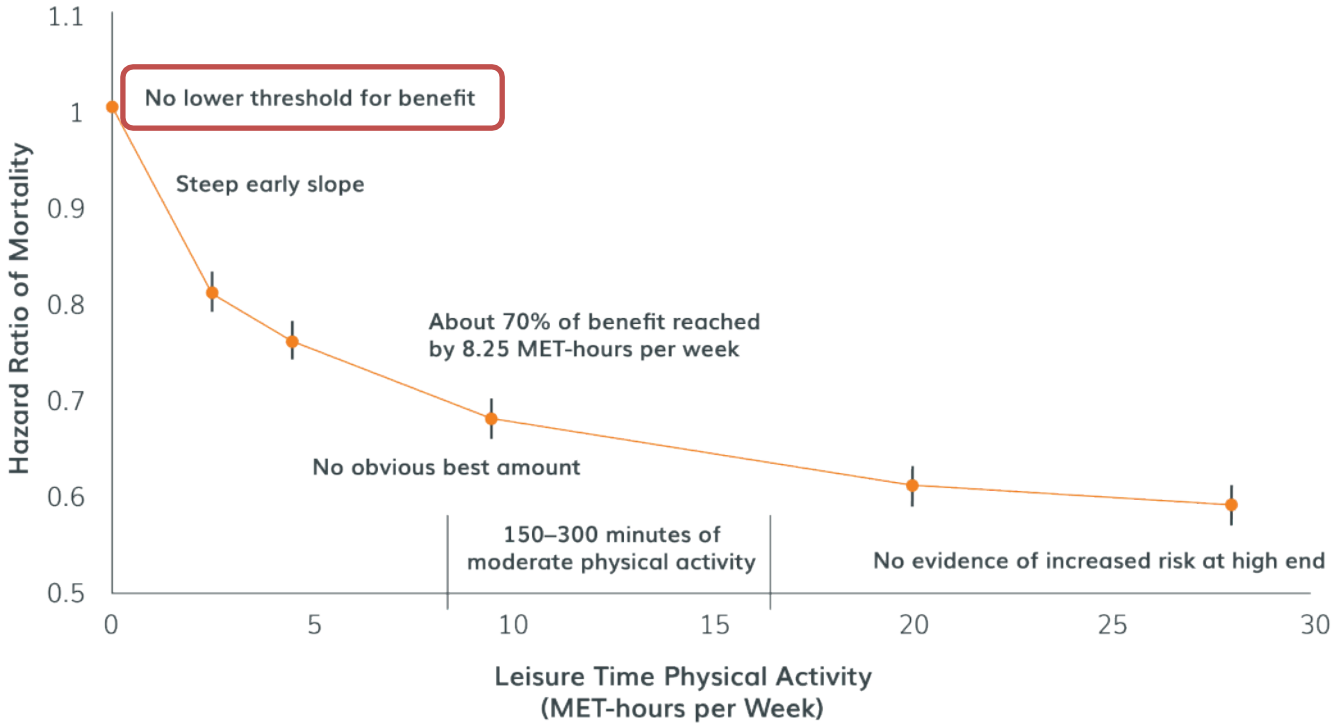
- To date, an association of post-diagnosis PA with BC recurrence has not been established in the literature and few studies report how meeting the PAGs associates with outcomes.

Okay but

300 minutes a week.

That’s a lot.

# Can not meet the Federal physical activity Guidelines. Now What?

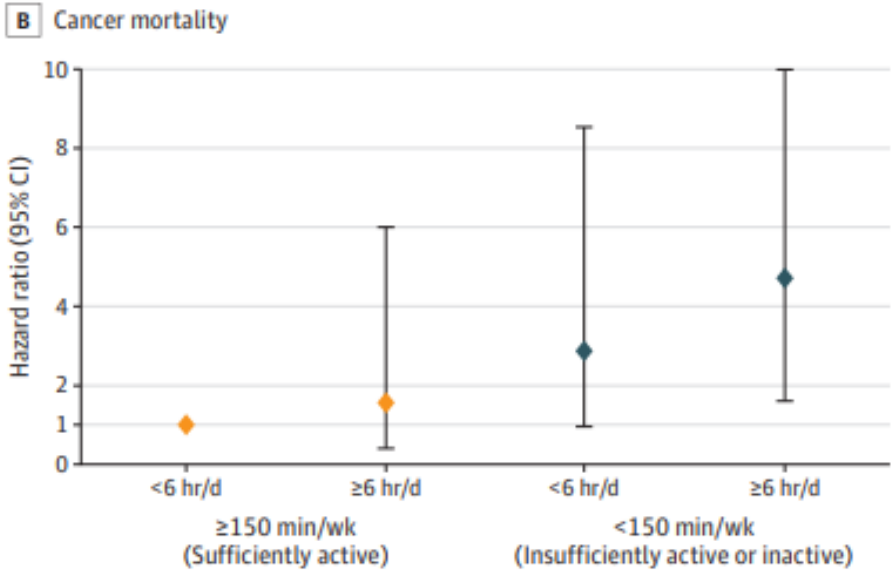



- ✓ Any physical activity is better than none.
- ✓ Mortality benefits seen even with small amounts of physical activity
- ✓ If you can't exercise – at least move around! Less sedentary behavior also associated with mortality benefits

JAMA Oncology | Original Investigation

**Association of Daily Sitting Time and Leisure-Time Physical Activity With Survival Among US Cancer Survivors**

Chao Cao, MPH; Christine M. Friedenreich, PhD; Lin Yang, PhD



# Moving through Cancer Initiative : What Oncology Providers Can Do Now

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

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### Oncology Clinician's Guide to Referring Patients to Exercise

**Step 1: ASSESS**

**Question #1:** *How many days during the past week have you performed physical activity where your heart beats faster 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:
    - Moderate intensity aerobic exercise (talk but not sing ) for up to 30 min, 3 times/wk
    - Resistance exercise 2x weekly 20-30 min
- **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

## Three Steps for Engaging Cancer Patients in Exercise (ASCO & ACSM)

- develop a process to incorporate assessment of patients physical activity
- advisement to move more and sit less
- referral to appropriate programs as a part of standard of care during oncology
- Remember – Not one shoe fits all!

# Still More to be Discovered: The How and Why

- The benefits of exercise on treatment efficacy and completion
- The biological mechanisms underpinning associations of PA with improved patient- reported and clinical outcomes (body composition and anti-tumor immunity)

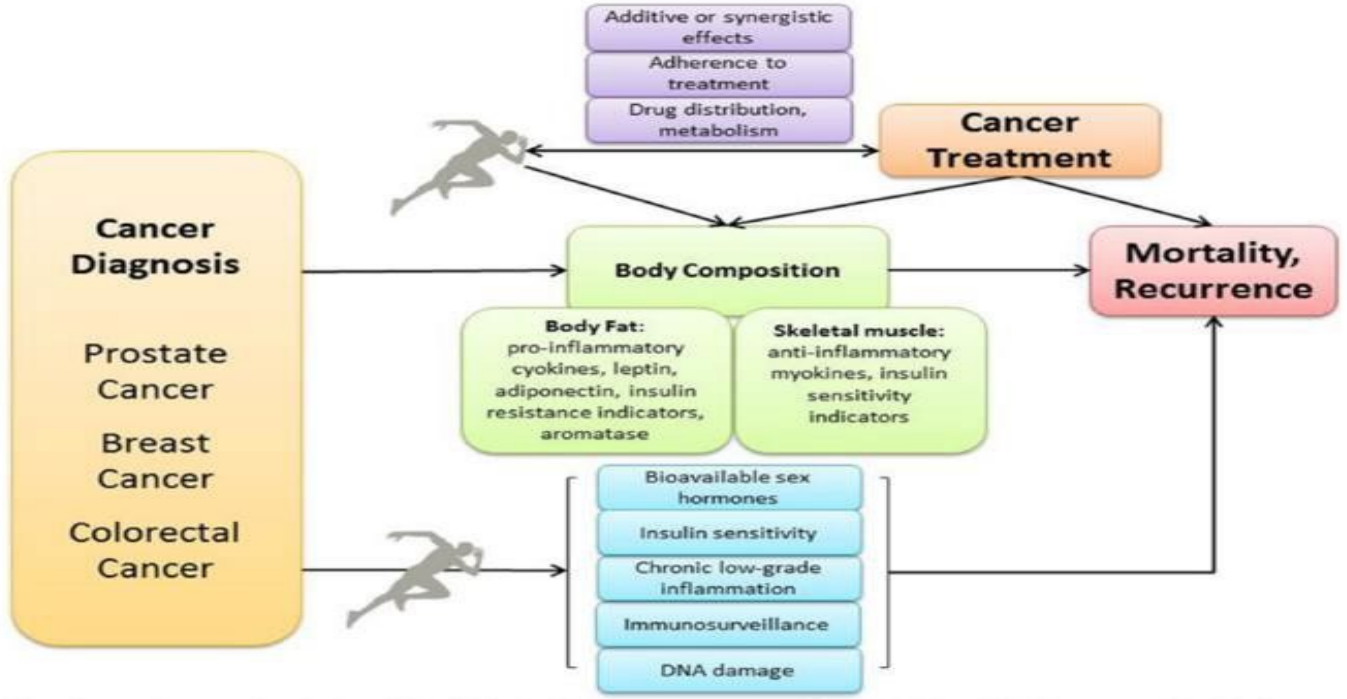


Fig. 1 Commonly proposed mechanisms relating physical activity to cancer recurrence and/or survival. Potential additive or synergistic effects between physical activity and cancer treatment are possible

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# CREDITS:

Slides have been repurposed from the following presentations :

**Impact and Types of Exercise and Pharmacotherapy in Weight Loss ,** Dr John M. Jakicic, PhD

**Exercise During Cancer Treatment: The Evidence and the Message,** Dr Rikki Cannioto, PhD, EdD, MS