



Nutrition and Aging throughout the Cancer Journey

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Objectives

- To review reasons why nutrition is important from diagnosis and treatment, throughout survivorship, and in advanced disease
- To identify conditions that signal poor nutritional status
- To review interventions that address nutritional concerns
- To identify extant gaps in knowledge

Nutrition also is Important since it is an Independent Predictor for...

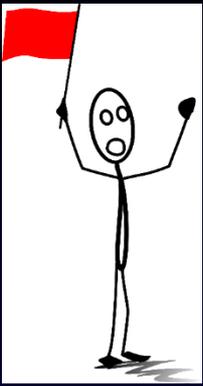
- Overall Quality of Life
- Treatment Toxicity and Outcomes
- Common Conditions: Sarcopenia
- Overall Survival

Prevalance of Malnutrition is High among Older Cancer Populations: Under and Overnutrition

- Undernourished: 13.3% (non-GI newly diagnosed outpatients) to 71% (in patients with advanced cancers)
- Overweight and Obesity 50-71% among older patients with early stage non-GI cancers.

Nutrition Screening Instruments

| | |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mini Nutritional Assessment (MNA) | <ul style="list-style-type: none"> A. Decline in food intake over the past 3 months due to appetite, digestive problems, chewing, or swallowing difficulties B. Weight loss during the last 3 months C. Mobility D. Psychological stress or acute disease in the past 3 months E. Neuropsychological problems <p>Body mass index or calf circumference</p> |
| Malnutrition Screening Tool (MST) | <p>Have you been eating poorly because of decreased appetite? Have you lost weight recently without trying?</p> |
| Simplified nutritional appetite questionnaire (SNAQ) | <p>Patient ranks 4 items: appetite, satiety, taste, daily meals</p> |
| SCREEN II | <p>17-item tool with an 8 question abbreviated version</p> |
| Malnutrition Universal Screening Tool (MUST) | <p>BMI Weight loss over 3-6 months Anorexia for periods of 5 days or longer due to disease</p> |
| Nutritional Risk Screening (NRS) | <p>BMI % weight loss Change in food intake Disease severity rating</p> |



Nutrition Red Flags

- Body Mass Index (kg/m^2) outside of range: 20-29.9
- Weight loss $>2\%$ in 1 month, $>5\%$ in 3 months or $>10\%$ in 6 months
- Hemoglobin <12 g/dl or albumin <3.2 g/dl
- Changes in appetite, ability to eat (physiologic or access)

Start of the Cancer Journey: Time at Diagnosis and Treatment

1: Screen

2: Set Goals:

- Maintain a healthy weight
- Preserve lean body mass
- Minimize nutrition-related side effects: mucositis, nausea, diarrhea.

3. Address common misperceptions:

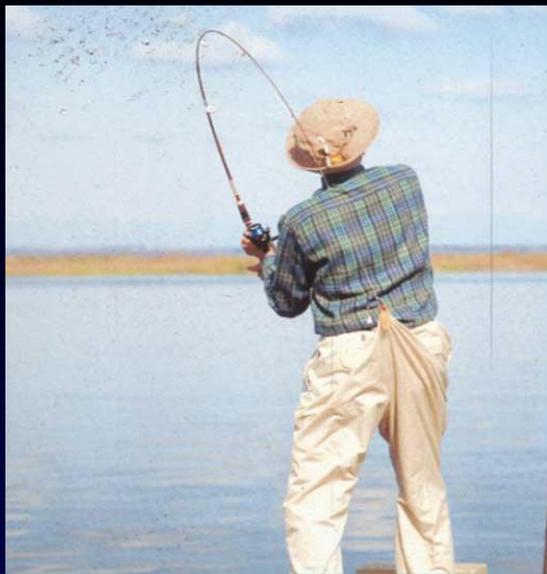
- Weight loss
- Nutritional supplements



Midway on Cancer Journey: Survivorship

- Goal: To prolong this phase as long as possible and prevent recurrence or comorbid illness
- Over 32 M Cancer Survivors Worldwide (~15 M in the US)
- 61% are age 65+





Cancer Survivorship: The Bad News!

- higher incidence of depression
- higher incidence of fatigue
- increased risk for osteoporosis, diabetes, cardiovascular disease & other cancers. Increased risk of death (cancer specific & all cause mortality – Hazards Ratio 1.37)
- adverse body composition change (osteoporosis & sarcopenia)
- increased risk for functional decline – threat to independence
- are high health care utilizers

Possible Solutions

| | Diet | Exercise |
|----------------------------------------|-----------------------|-----------------------|
| Depression | ✓ | ✓✓ |
| Fatigue | ✓ | ✓✓ |
| Adverse Body Composition Change | ✓ | ✓✓✓ |
| Functional Decline | ✓ | ✓✓✓ |
| Comorbidity | ✓✓✓ | ✓✓✓ |
| Recurrent/Progressive Disease | ✓✓ <i>Growing!</i> | ✓✓ <i>Growing!</i> |

✓ Possible benefit ✓✓ Probable benefit ✓✓✓ Convincing benefit

2012 American Cancer Society (ACS) Nutrition & Physical Activity Guidelines for Cancer Survivors

Achieve and maintain a healthy weight

If overweight or obese, limit high calorie foods & beverages increase physical activity to promote weight loss

Engage in regular physical activity

- Avoid inactivity; resume normal activities as soon as possible following dx
- Exercise ≥ 150 minutes/week
- Include strength training exercises at least 2 days/week

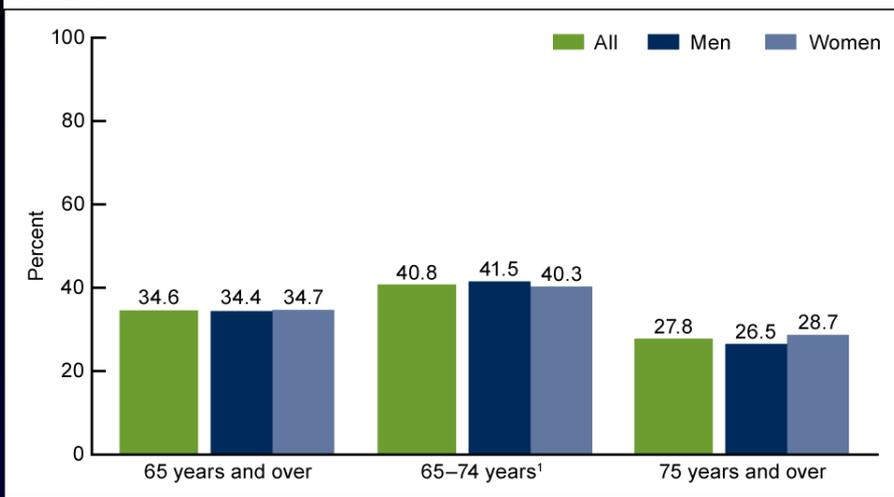
Achieve a dietary pattern that is high in vegetables, fruits and whole grains

- Follow ACS Guidelines on Nutrition & Physical Activity for Cancer Prevention
 - Choose foods & beverages in amounts that achieve/maintain a healthy weight
 - Limit processed and red meat
 - Eat ≥ 2.5 cups of vegetables & fruits/day
 - Choose whole grains instead of refined grain products
 - If you drink ETOH, drink ≤ 1 drink/day for ♀ & 2 drinks/day for ♂

Supplements

- Try to obtain nutrients through diet, first.
- Consider only if a nutrient deficiency is biochemically or clinically observed, or if intakes fall persistently below recommended levels as assessed by an RD.

Figure 1. Prevalence of obesity among adults aged 65 and over, by sex: United States, 2007–2010

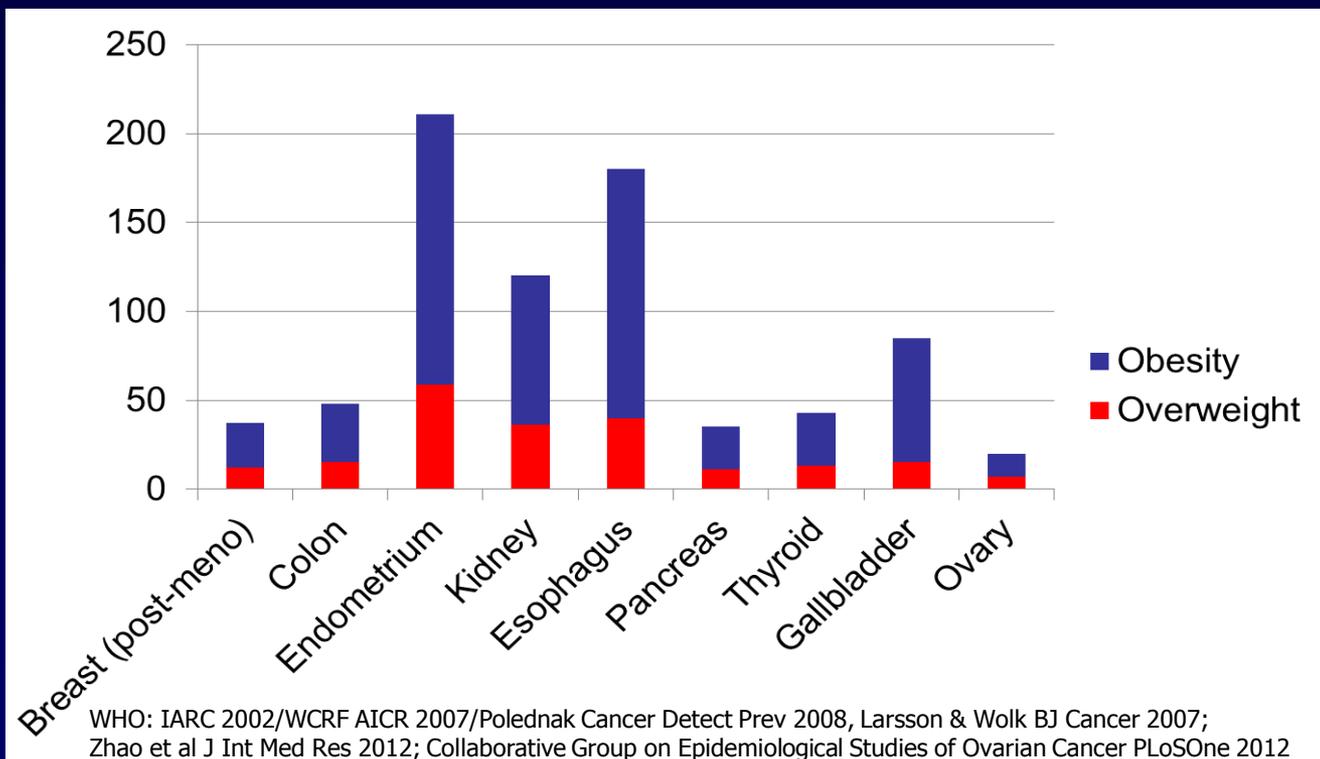


¹Significantly different from 75 years and over.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 2007–2010.

Because of the obesity epidemic across all age groups...

... and, because overweight and obesity are risk factors for many cancers



WHO: IARC 2002/WCRF AICR 2007/Polednak Cancer Detect Prev 2008, Larsson & Wolk BJ Cancer 2007; Zhao et al J Int Med Res 2012; Collaborative Group on Epidemiological Studies of Ovarian Cancer PLoSOne 2012

More cancer survivors look like this



Not this

Estimated associations between health behaviors & physical function

| Health Behavior | Point increase in SF36 Physical Function Subscale | P-value |
|----------------------------------------------------------------------|---------------------------------------------------|---------|
| Affirmative response to vigorous exercise 20 min at least 3 x weekly | 15.4 | P<.0001 |
| One daily serving increase in F&V | 0.9 | P=.0049 |
| 1% decrease in total energy from fat | 0.2 | P<.0001 |

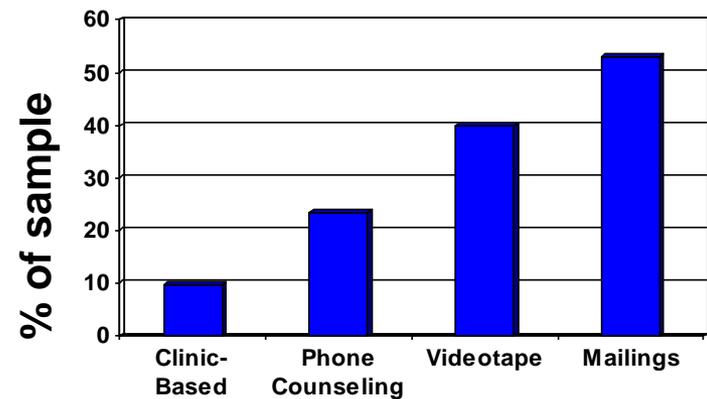
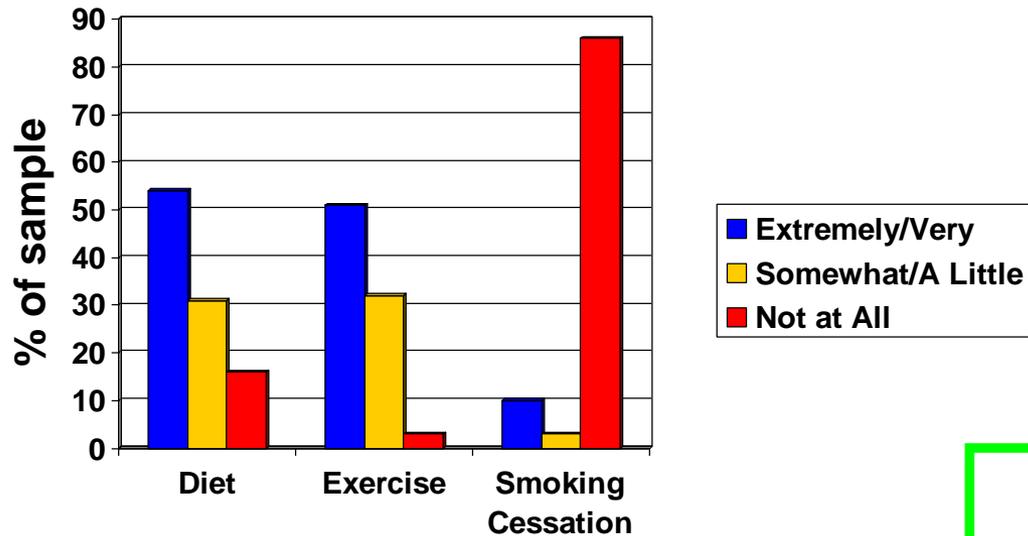
Justification for Dietary Interventions that Target Older Cancer Survivors

- 11.1% of older adults (n = 15,425) adhere to US guidelines for alcohol, tobacco, dietary fat and fruits & vegetables (F&V), and exercise. Most common lifestyle pattern among elderly is adherence to alcohol & tobacco guidelines, but not those for F&V, dietary fat, and exercise.
Berrigan et al. Prev Med 36:615,2003
- In a mixed sample of 190 older survivors, 60% reported distress due to weight change, 64% due to balance or mobility issues & 79% due to fatigue
Schlairet & Benton J Cancer Educ. 27:21, 2012
- In 753 older breast, prostate & CRC survivors, diet quality associated with ↑Physical QoL & higher BMI associated with ↓ QoL
Mosher et al. Cancer. 115:4001, 2009.
- Older female survivors (n=2,017) who practice 6-8 vs 0-4 WCRF/AICR Recommendations have 33% lower all cause mortality
Inoue-Choi et al. CEBP 22:792, 2013
- Higher BMI ↑ odds of frailty by 12% (p=.003); higher PA ↓ odds of frailty by 10% (p <0.001) in 261 older BCS.
Bennett et al. Oncol Nurs Forum 40:E126, 2013



What Do We Know About Delivering Lifestyle Interventions to Cancer Survivors?

Mailed Survey Study 988 Breast & Prostate Cancer Survivors

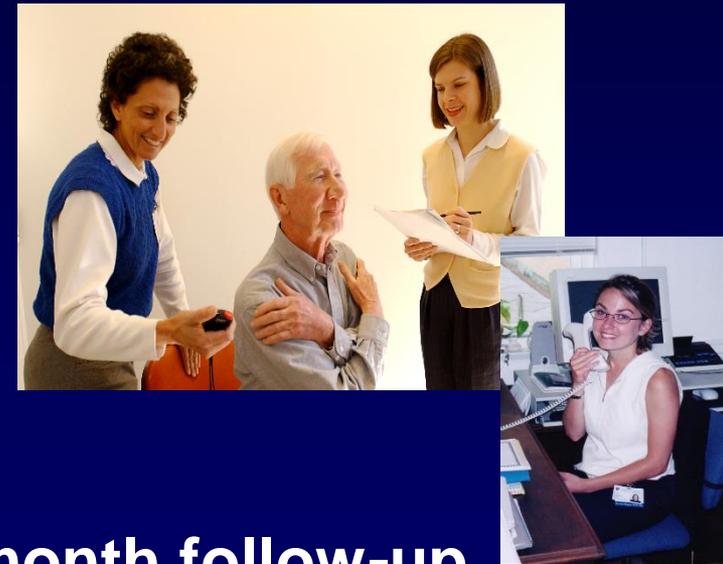




Project LEAD:

Leading the way in Exercise And Diet

- Can a Diet & Exercise Intervention of mailed materials + telephone counseling reorient the trajectory of functional decline among newly diagnosed breast & prostate cancer survivors age 65+?
- 182 Survivors Randomized to General Health Counseling (Attention Control) or Tailored Diet-Exercise Arms
- Study period 6 months with 12 month follow-up

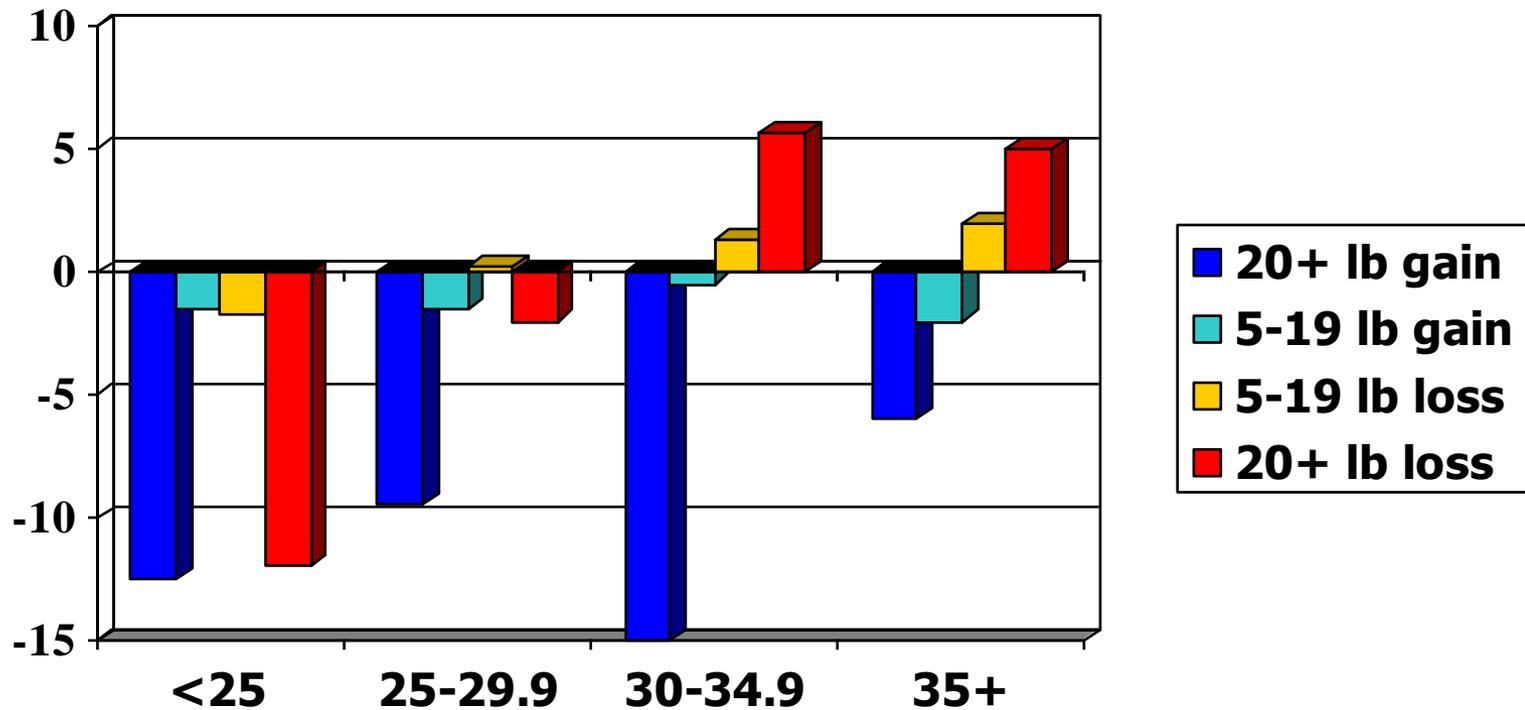




Project LEAD: Conclusions

- **There are several barriers to conducting lifestyle interventions among older cancer survivors.**
- **Despite challenges, home-based diet and exercise interventions show promise**
 - **Significant improvements in diet quality +2.2 vs -2.9 (p=.003)**
 - **Trends toward improvements in exercise and physical function**
 - **Intervention successful in sustaining weight (control group gained) – none of the individuals screened had a BMI <18.5**
- **More research needed to reduce recidivism and weight control appears important**

Effect of Weight Change on Physical Function in Women Age 65+

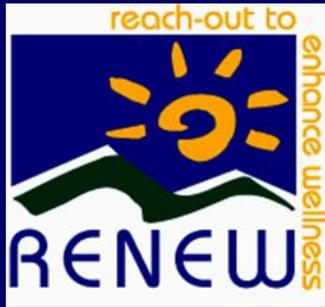


RENEW

(Reach-out to ENhance Wellness in Older Survivors)

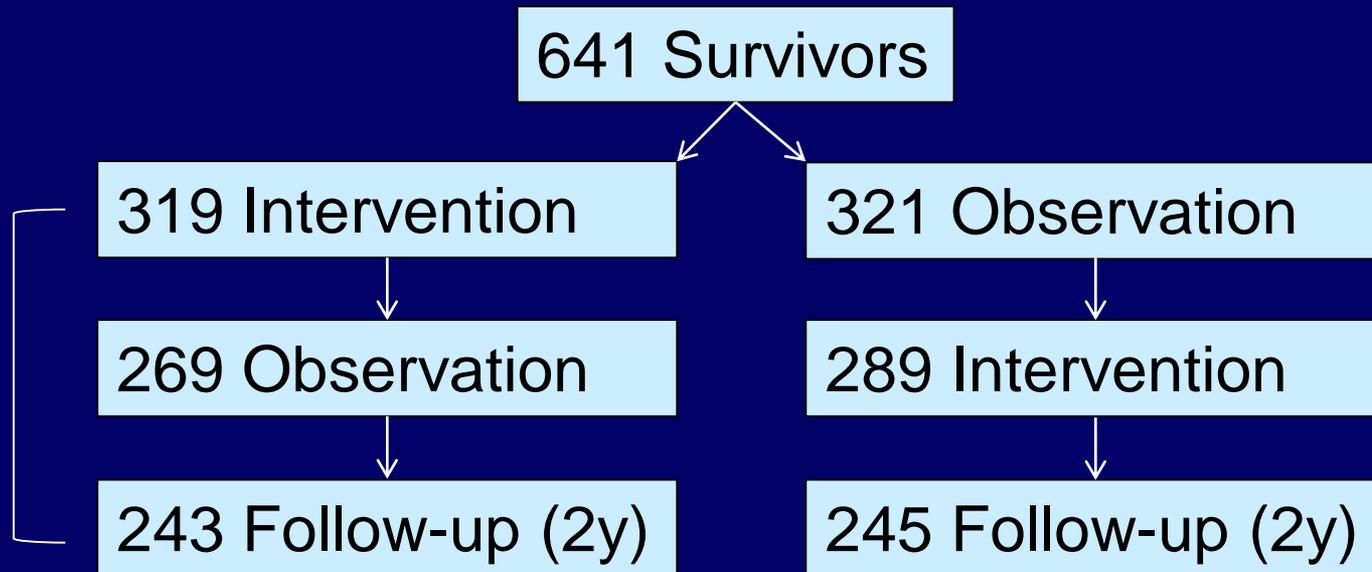


- RENEW (R01-CA106919)
- N=640
- Long-term Survivors of Breast, Prostate & Colorectal Cancers
- 11M Intervention Period – 2 year long-term follow-up
- 5 Tailored Mailings
- 15 Telephone Counseling Sessions
- 8 Telephone Prompts



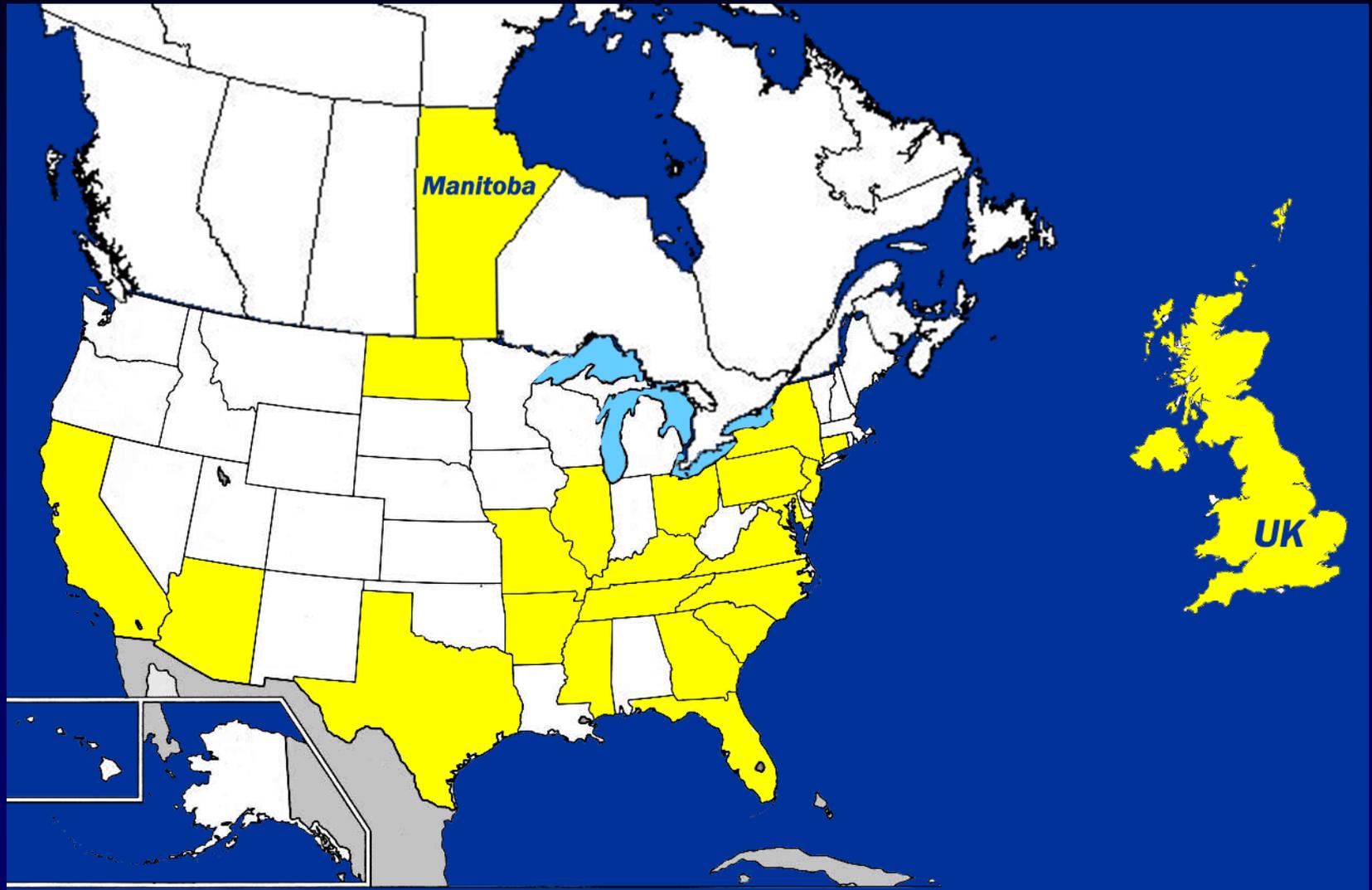
Study Schema

Recruited Survivors through Self-Referral and Cancer Registries



intent to treat analysis

Geographic Distribution of Participants Accrued for the RENEW Trail (n=641)



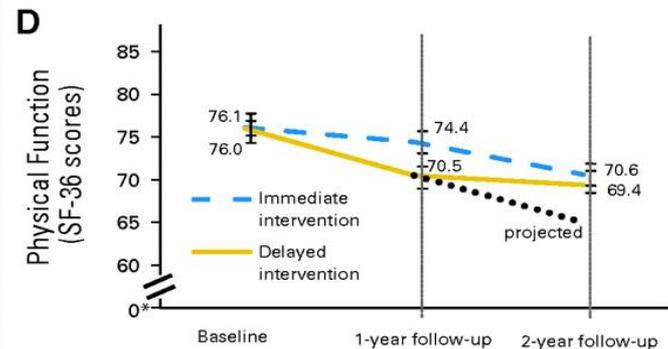
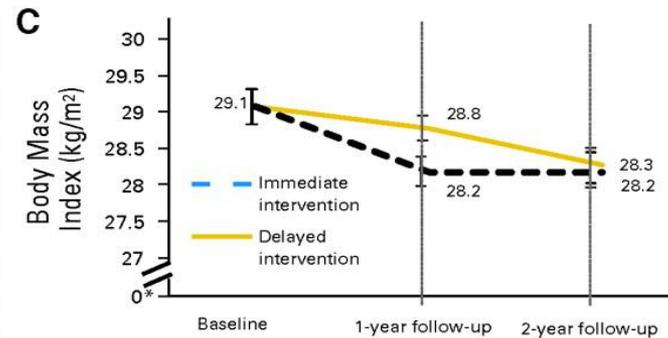
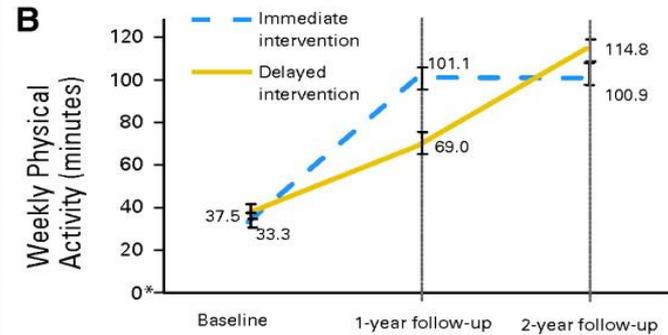
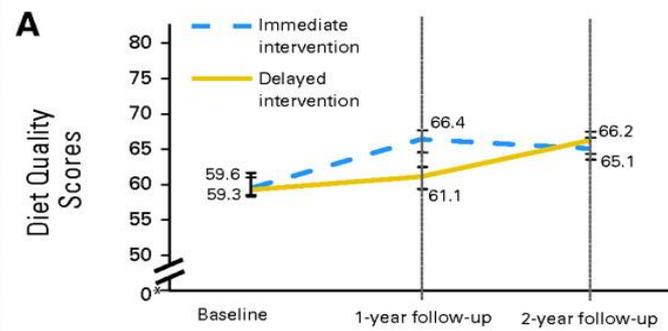
RENEW Study Sample Characteristics (n=641)

| | |
|---------------------------|--------------------------------------------------------------|
| Age | 73.1 (5.1) (range 65-87) |
| % Male | 45% |
| % Caucasian | 89% |
| Education | 33% \leq HS 30% Some College 37% \geq College Grad |
| Type of Cancer | 45% Breast 41% Prostate 14% Colorectal |
| % Cancer Registry | 92% |
| Years since Dx | 8.6 (2.7) (range 5-26) |
| # of Comorbidities | 2 (1.2) |
| Current Smoker | 6% |
| Physical Function (SF 36) | 75.7 (18.9) (range 10-100) |

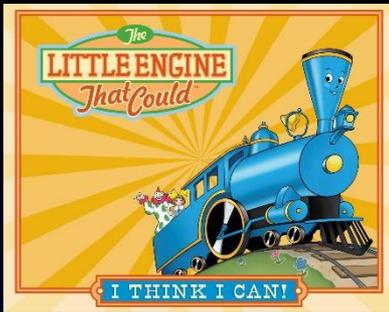
Results

| | Δ Intervention Arm Mean (SE) | Δ Wait List Control Arm Mean (SE) | P-value |
|-------------------------------|-------------------------------------|------------------------------------------|---------|
| SF-36 Physical Function | -2.55 (1.07) | -5.39 (1.01) | .034 |
| Basic Lower Extremity – LLF | +0.41 (0.71) | -2.11 (0.67) | .005 |
| Adv. Lower Extremity – LLF | +0.44 (0.60) | -2.55 (0.61) | .015 |
| Strength Exercise (min/w) | +22.2 (2.8) | +0.5 (3.0) | <.0001 |
| Strength Exercise (session/w) | +1.4 (2.6) | +0.2 (2.5) | <.0001 |
| Endurance Exercise (min/w) | +43.1 (5.7) | +26.1 (6.3) | <.0001 |
| Endur. Exercise (session/w) | +1.6 (3.9) | +0.5 (4.1) | .005 |
| F&V Intake (servings/d) | +1.48 (0.16) | +0.15 (0.12) | <.0001 |
| Saturated Fat Intake (g/d) | -3.64 (0.61) | -1.19 (0.55) | .002 |
| Healthy Eating Index | +7.1 (0.9) | +1.4 (0.8) | <.0001 |
| Weight (kg) | -2.45 (0.22) | -1.03 (0.2) | <.0001 |
| BMI | -0.82 (0.07) | -0.035 (0.08) | .0002 |
| Quality-of-Life (Total SF-36) | +0.91 (0.86) | -2.17 (0.90) | .025 |

Baseline to 2-year changes in the immediate- vs delayed-intervention arms



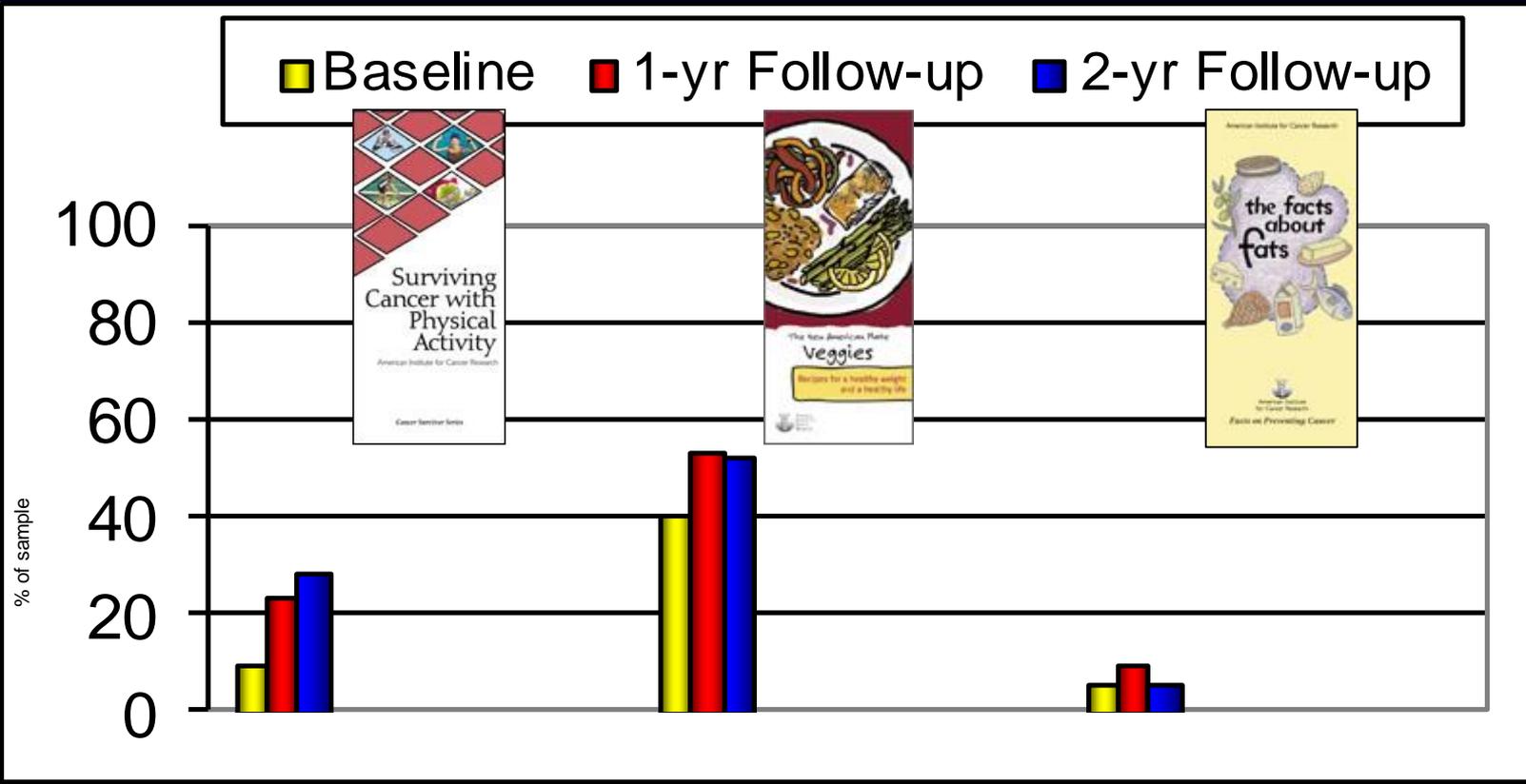
Intervention is Replicable and Durable



Other Lessons Learned

- Mediation analyses suggest that self-efficacy is a robust mediator of behavior change Mosher CE et al. Psycho-Oncol 2008;17:1014
- Participation in telephone counseling significantly related to improvements in physical function, mental health, and weight loss Winger JG et al. Ann Behav Med 2014;48:235
- Latent class analyses show that less obese survivors with physical function scores of 65+ and higher self-efficacy for exercise show greatest gains in physical functioning Morey M et al. Cancer 2015;121:4433
- Structural equation modeling shows that improvements in physical functioning are negatively impacted by symptom burden, but also are significantly related to weight loss, increased physical activity and diet quality Kenzik KM et al. J Geriatr Oncol 2015; 6: 424

FRESH START (Breast & Prostate Cancer Survivors): Attainment of Goal Behavior of Attention Control Arm (n=272)



**150+ minutes
Exercise/week**

**5+ Servings Fruit
& Vegetables/day**

**Lowfat Diet (<30% & <10%
kcal from fat & saturated fat)**

Christy et al. J Am Diet Assoc 111:1844, 2011
Ottenbacher et al Support Cancer Care 20: 2483, 2012

* <30% total, <10% sat. fat

Other Nutrition-Related Interventions during Survivorship



Holistic interventions, e.g., R21 pilot pair 46 older survivors with Master Gardeners from the state Cooperative Extension and lead through 1-year home-based vegetable gardening intervention

- increased fruit and vegetable intake
- increased physical activity
improvements in physical functioning
physical performance
- decreased salivary and nail cortisol
- increased telomerase

End of the Cancer Journey: Advanced Disease – End of Life

1: Screen

2: Set Goals:

- Maintain a healthy weight
- Preserve lean body mass
- Minimize nutrition-related side effects: nausea, diarrhea
- Manage Cachexia
 - NSAIDS, Megestrol Acetate
 - Diet-related Interventions
 - Physical Activity



Acknowledgments

LEAD/RENEW

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Conclusions

- Nutritional screening and intervention are important throughout the cancer journey and can positively influence clinical outcomes, and quality and quantity of life
- Nurses can play an important role in assessing and intervening to improve the nutritional status of the older cancer survivor. Several resources are available.

Resources

- American Cancer Society: www.cancer.org
- American Dietetic Association: www.eatright.org
- American Institute for Cancer Research: www.aicr.org
- Centers for Disease Control: www.cdc.gov/HealthyLiving
- LIVESTRONG <http://www.livestrong.com/myplate/>
- National Center for Complementary & Integrative Health: <https://nccih.nih.gov/health>