



# Nutrition and Aging throughout the Cancer Journey

Wendy Demark-Wahnefried, PhD, RD  
Professor and Webb Chair of Nutrition Sciences  
Associate Director, UAB Comprehensive Cancer Center

NIH Award 1R25CA183723-01A1



# 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

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



# Nutrition Red Flags

- Body Mass Index ( $\text{kg}/\text{m}^2$ )  $<22$
- Weight loss  $>2\%$  in 1 month,  $>5\%$  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:

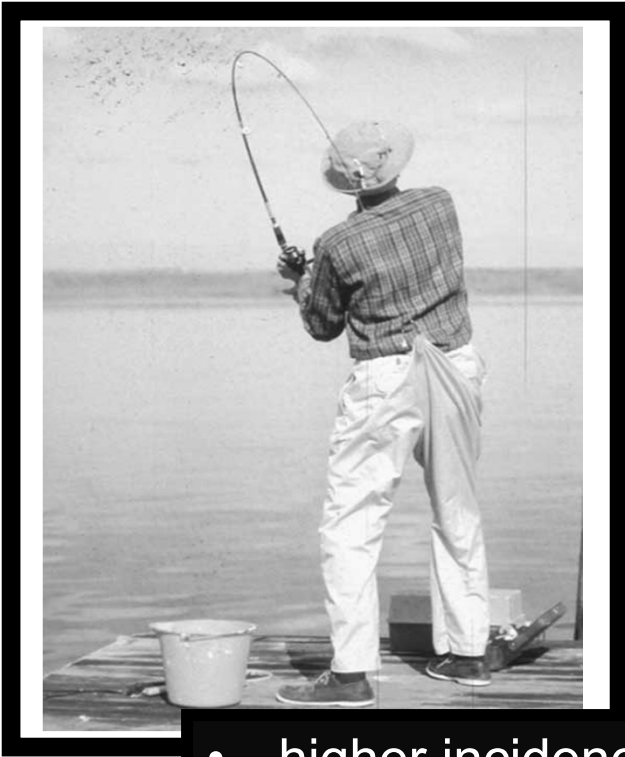
- Weight loss
- Nutritional supplements



# Midway on Cancer Journey: Survivorship

- Goal: To prolong this phase as long as possible and prevent recurrence or comorbid illness
- Over 32.6 M Cancer Survivors Worldwide (>15.5 M in the US)
- 62% 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  $\geq 150$  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  $\geq 2.5$  cups of vegetables & fruits/day
  - Choose whole grains instead of refined grain products
  - If you drink ETOH, drink  $\leq 1$  drink/day for ♀ & 2 drinks/day for ♂

## Supplements

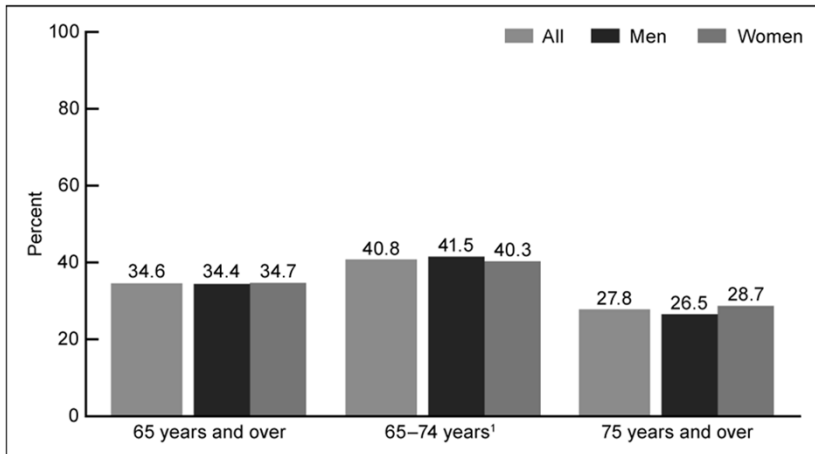
- Try to obtain nutrients through diet, first.
- Consider only if a nutrient deficiency is biochemically or clinically observed, or if intakes fall persistently below recommended levels as assessed by an RD.

# Justification for Lifestyle 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



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



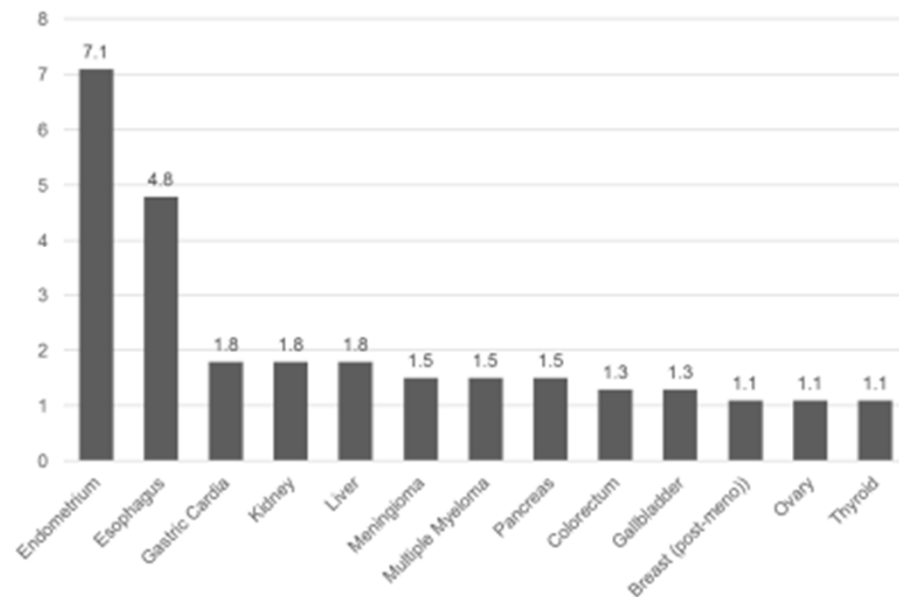
<sup>1</sup>Significantly different from 75 years and over.  
SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 2007–2010.

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

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

### Obesity and Relative Risk of Cancer

More limited data on male breast cancer, fatal prostate cancer and diffuse large B-cell lymphoma



WHO: IARC :  
Zhao et al J

Lauby-Secretan et al. NEJM 2016

# More cancer survivors look like this



**Not this**

# Prognostic Effects of Weight Gain Among Individuals with Breast and Prostate Cancer: Results of 2 Meta-Analyses

Group (year)	# of studies	Sample	RR (95% CI) for every 5 kg/m <sup>2</sup> increase in BMI from pre- to post-dx
Chan et al. (2014)	82	213,075 women with breast cancer	<u>Breast CA Specific Mortality</u> 1.29 (0.97-1.72) <u>Total Mortality</u> 1.08 (1.01-1.15)
Cao & Ma (2011)	6 cohort	18,203 men with prostate cancer	<u>Biochemical Recurrence</u> 1.21 (1.11-1.31) <u>Prostate CA Specific Mortality</u> 1.20 (0.99-1.46)

# Getting Beyond the Stigma



**June 18, 2013 AMA declared obesity a disease**

# The "5 A's"

## Ask:

- Have you heard about the relationship between body weight and cancer?
- Have you tried to lose weight recently?

## Advise:

- Orient to BMI chart, show where they are currently, assess weight goals

## Assess:

- Readiness to pursue weight loss

## Assist:

- Set a start date and incremental goals
- Provide brochures, point to select websites
- Promote foods low in kcal and high in nutrients (raw vegetables); limit foods high in kcal and low in nutrients (high sugar or fat) - regular soft drinks, fried foods, added fats and sugars, chips, desserts.
- Environmental control/Behavioral modification: minimize food cues, purposeful eating, etc.

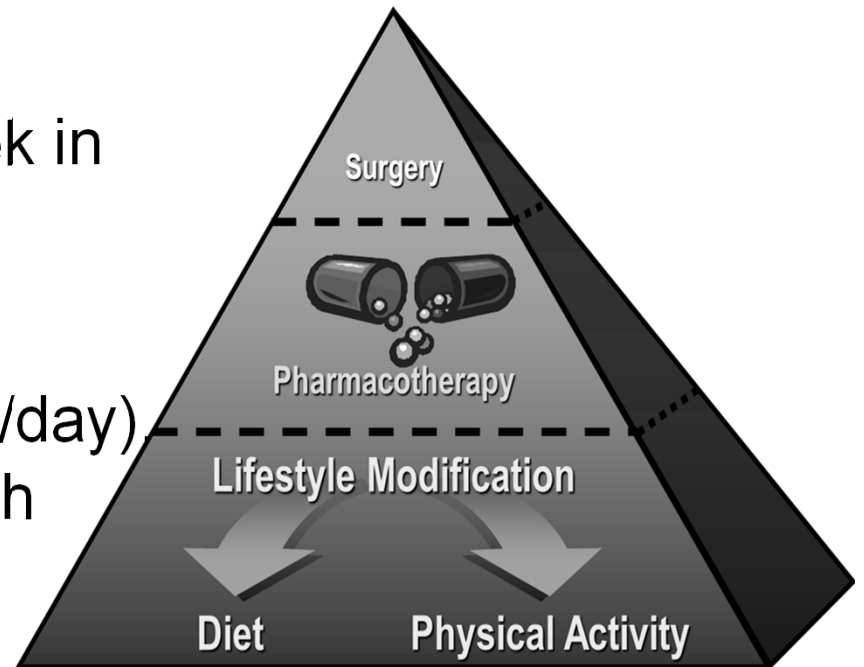


## Arrange:

- Refer to registered dietitian, primary care physician, or specialist (bariatric medicine if Class II/III obese)

# General Guidelines

- Loss of as little as 3% of body weight associated with health benefit
- Weight loss of up to 2 pounds/week in adults (go slower in younger AND older populations)
- Energy restriction(1200–1800 kcal/day) increased physical activity (strength training), behavior modification
- No recommendation regarding distribution of carbohydrate, fat and protein (Thomson C et al. *Nutr Cancer* 2010; Thompson H et al. *Breast Cancer Res* 2012).
- Self-monitoring: Weighing everyday, keeping a food and exercise log/journal, electronic devices





# Physical Activity

Avoid inactivity

PA of  $\geq 150$  min MVPA/week

Resistance Training 2 x week

Adaptations to Treatment and Common Comorbidities

Clearance/Training Certification

ACMS Guidelines for Physical Activity for Cancer Survivors

Schmitz KM et al. MSSE 2010

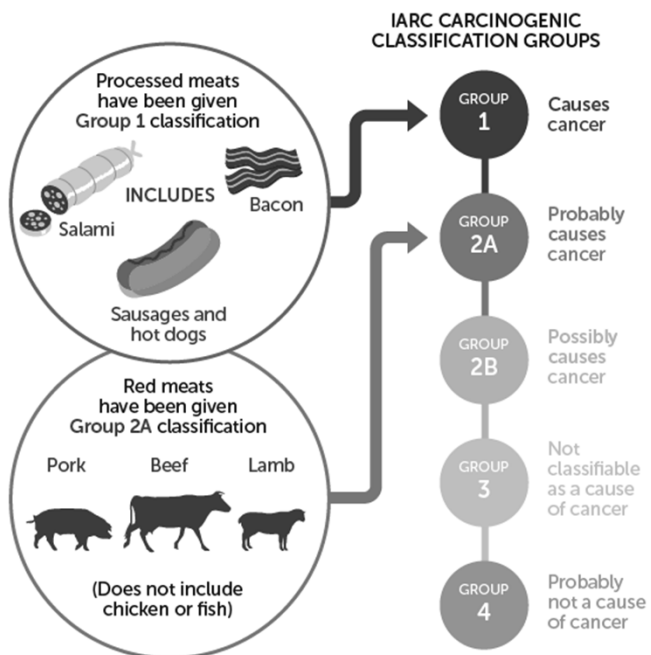
ACS Guidelines 2012

## Older Adults

- ACSM Guidelines for Older Adults Endorse Strength Training 2-3/week
- Light physical activity increases physical function Blair et al. MSSE 46:1375, 2014
- Review shows PA safe, effective in improving strength and function

Klepin HD Interdiscip Gerontol 2013

## MEAT AND CANCER HOW STRONG IS THE EVIDENCE?



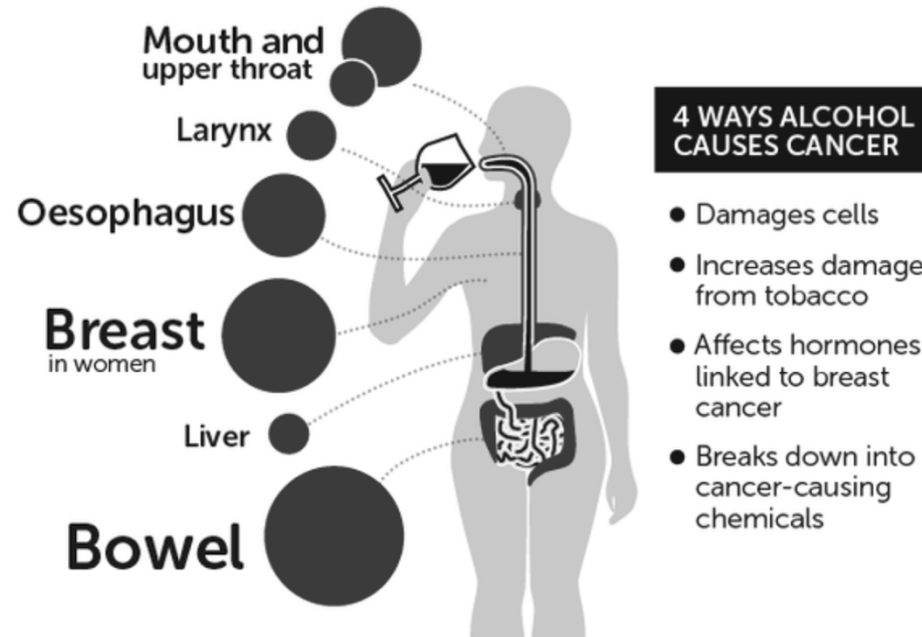
These categories represent how likely something is to cause cancer in humans, not how many cancers it causes.

## October 26, 2015 IARC declared: “Red meat is a carcinogen”

- Pooled analysis of 37,698 men from the Health Professionals Follow-up Study and 83,644 women from the Nurses' Health Study
- 9464 cancer deaths during 2.96 million person-years of follow-up.
- If substitute fish, poultry, nuts, legumes, low-fat dairy for red meat would equate with a 7% to 19% lower mortality risk.
- RX: No more than 18 oz/week

	Q1 (ref)	Q2	Q3	Q4	Q5	$P_{Trend}$	HR (95% CI) for 1 svg day <sup>-1</sup> increase
Not Processed	1	1.03 0.97-1.10	1.03 0.96-1.10	1.09 1.02-1.16	1.17 1.10-1.26	<.001	1.10 (1.06-1.14)
Processed	1	1.03 0.97-1.10	1.08 1.01-1.15	1.08 1.01-1.15	1.14 1.07-1.22	<.001	1.16 (1.09-1.23)

# Association between Alcohol and Cancer is Linear no amount is “safe”



- Head & Neck survivors should NOT drink; it increases complications and reduces survival. Meta-analysis on upper aerodigestive cancers of 19 studies (RR 2.97; 95% CI, 1.96-4.50). Druesne-Pecollo et al. CEBP 23: 324-31, 2014
- Choice less clear for other survivors.
- Studies in breast CA, largest in 22,890 survivors with 135M follow-up 7-9 drinks/week vs none Newcomb PA et al. JCO 2013  
Breast CA Mortality: 1.01 [95% CI, 0.55 to 1.87]  
All Cause Mortality: 0.85 [95% CI, 0.77 to 0.93]

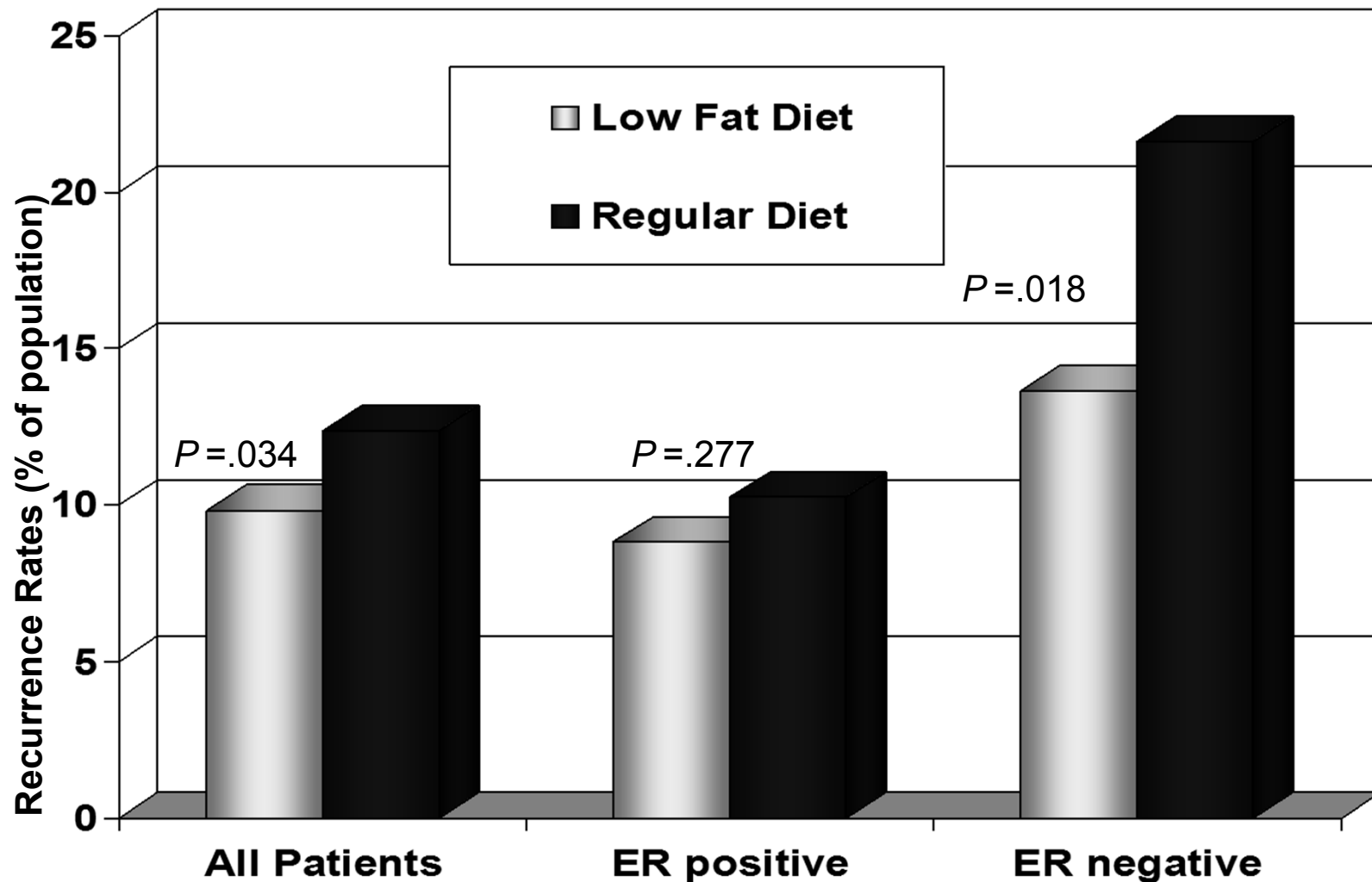


# Dietary Patterns Prudent vs. Western

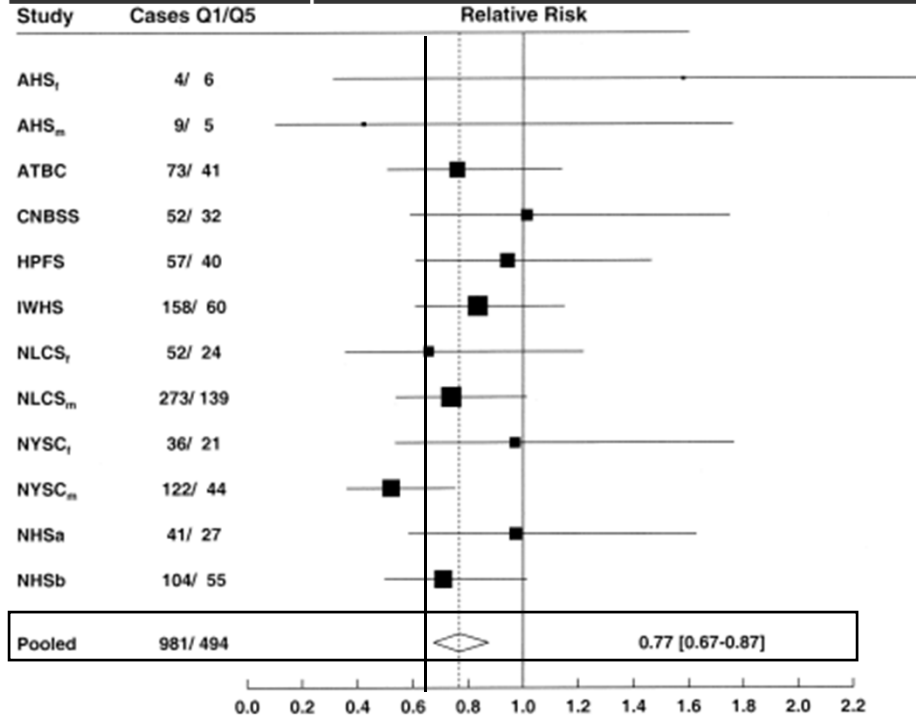


Team (year)	Sample	Diet	CA Mortality HR (95% CI)	All Cause Mortality HR (95% CI)
Kroenke (2005)	2619 Breast CA	Prudent	1.07 (0.66-1.73)	0.54 (0.31-0.95)
		Western	1.01 (0.60-1.70)	2.31 (1.23-4.32)
Kwan (2009)	1901 Breast CA	Prudent	0.79 (0.43-1.43)	0.35 (0.17-0.73)
		Western	1.20 (0.62-2.32)	2.15 (0.97-4.77)
Vrieling (2013)	2522 Breast CA (post)	Prudent	0.89 (0.59-1.35)	0.81 (0.40-1.61)
		Western	3.69 (1.66-8.17)	0.99 (0.64-1.52)
Meyerhardt (2007)	1009 Stage III CRC	Prudent	1.13 (0.77-1.67)	1.32 (0.86-2.04)
		Western	2.85 (1.75-4.63)	2.32 (1.36-3.96)
Schwedhelm (2016)	Meta-analysis	Prudent		0.77 (0.60-0.99)
		Western		1.51 (1.24-1.85)

# Results of the Women's Intervention Nutrition Study (WINS) Show Reduced Rates of Recurrence in Patients Assigned to a Low Fat Diet (n=2,437)



## Vegetables & Lung Cancer Prospective Cohort Studies



## Beta Carotene Supplementation & Lung Cancer

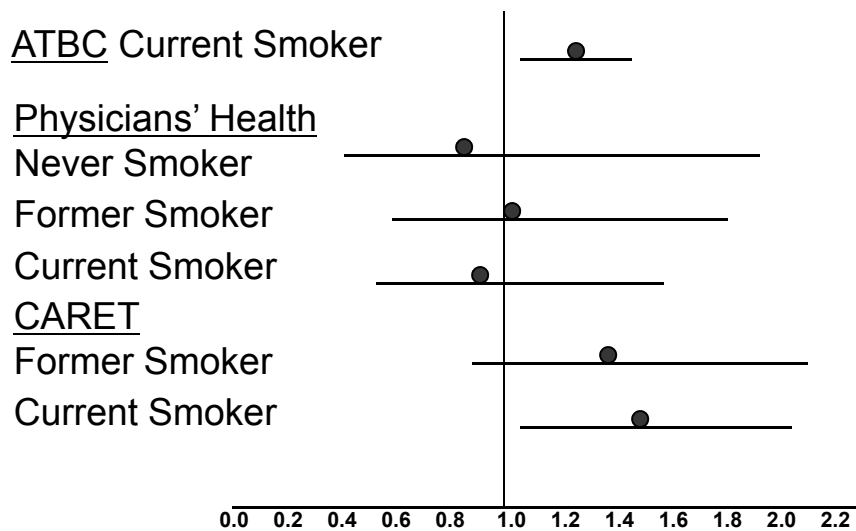
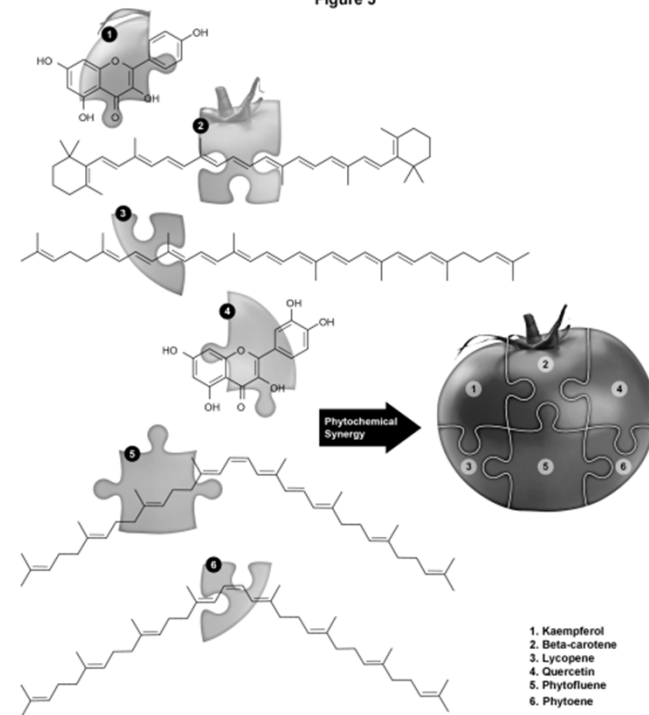


Figure 3



***When we try to pick out anything by itself, we find it hitched to everything in the universe – John Muir***

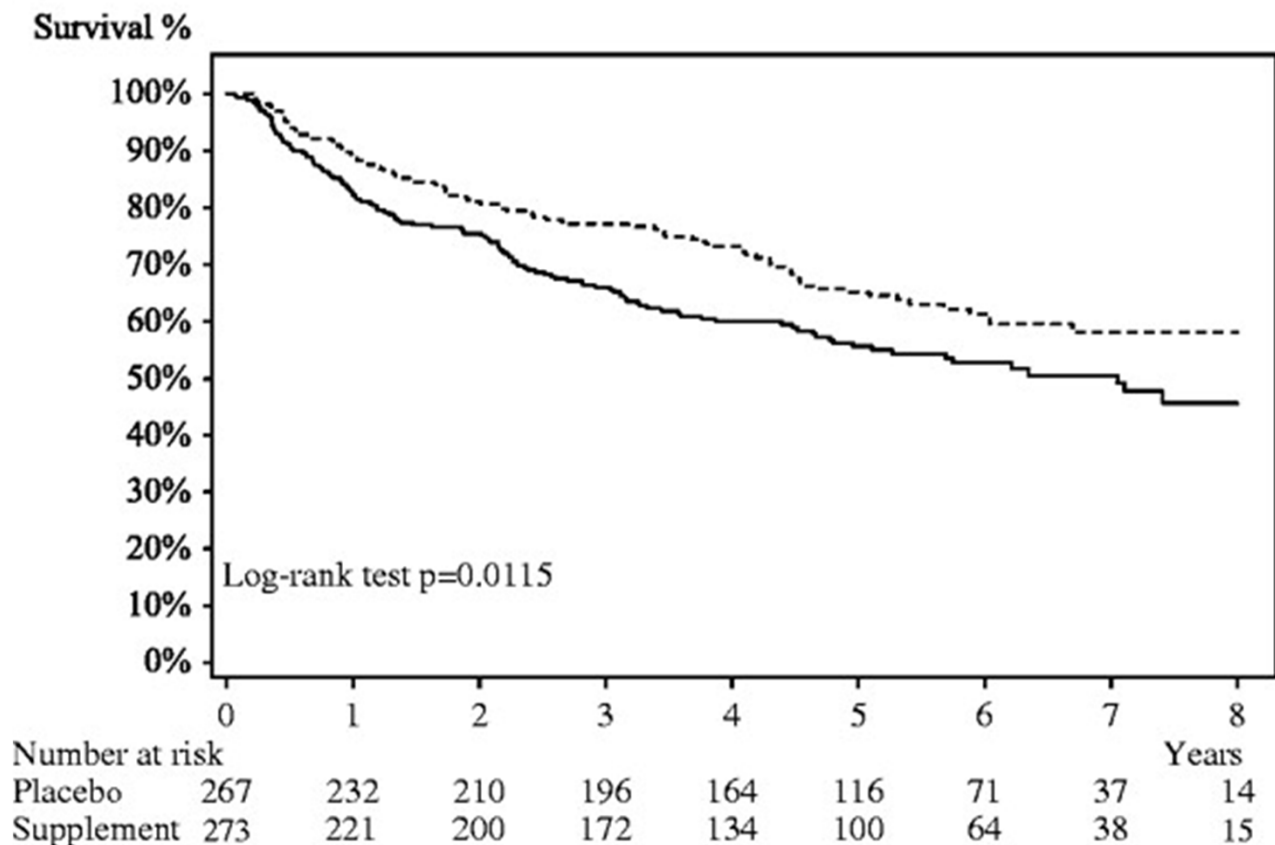
# RCT of $\alpha$ -Tocopherol + $\beta$ -Carotene vs. Placebo (52M median follow-up)

## 540 Cases w/ Stage I/II Head & Neck Squamous Cell Cancer

Cancer-free survival (no recurrence & no SPT among participants randomly assigned to the supplement arm (solid line) or to the placebo arm (dotted line))

**Second Primary HR 2.88 (95%CI 1.56-5.31)**

A



# Bottom Line on Supplements

## Rely on Food as a Source of Nutrients

But , if considering supplements

- Have dietitian analyze diet for deficiency
- Check blood levels of nutrients
- Consider lowest dosage & most complex preparation
- If currently on supplements wean off slowly.



V.S.

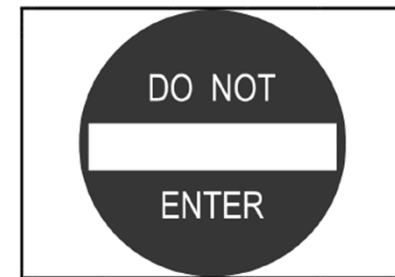


# End of the Cancer Journey: Advanced Disease – End of Life

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



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

## Case study

Henry is a 74-year old man recently dx'd with metastatic prostate cancer. Ht: 6'0" Wt: 240; sedentary. Meds: Lovastatin, Coumadin, HCTZ, and Rosiglitazone. Scheduled for ADT. He has been online and started taking "Prostate Health" (contains zinc, selenium, copper, cranberry powder, saw palmetto, beta sitosterol, and lycopene), and calcium and vitamin D. He is very anxious and wants to know what else he should take.

<b>Food</b>	<b>CAL</b>	<b>CHO (g)</b>	<b>PRO (g)</b>	<b>FAT (g)</b>
McDonald's Sausage & Egg Biscuit	510	35	17	33
Large Coffee (16 oz)	4	0	0	0
Creamers (4)	82	7	1	6
Splenda	3	1	0	0
Tuna (6 oz can)	144	0	32	2
Lettuce, Tomatoes, Cucumbers, Carrot Sticks (2 c)	29	6	2	0
Olive Oil and Vinegar Dressing (4T)	141	7	0	12
Boost Optimum™	220	19	22	6
Raw Almonds (1 cup)	953	28	33	87
Green Tea (16 oz)	5	1	0	0
Honey (2T)	128	35	0	0
Salmon (8 oz) with olive oil (2T)	395 (239)	1	55	18 (27)
Roasted Peppers, Onions & Eggplant (1 each) in oil (2T)	152 (239)	37	4	0 (27)
Sliced Tomatoes (2)	44	5	1	0
Olive Oil and Vinegar Dressing (4T)	141	7	0	12
Pomegranate Juice (16 oz)	270	66	1	1
Green Tea (16 oz)	5	1	0	0
Honey (2T)	128	35	0	0
Tofutti (1 pint)	840	80	12	52

# Diet Summary

- 4,682 Calories (Needs:  $[106 + (6 \times 12)] \times 15 = 2,670$ ) = He will gain roughly 2 lb/week if he keeps going
- 53% Fat/32% CHO/15% PRO (180 g/Need 67 g)
- Other Concerns: Green Tea

Food	CAL	CHO	PRO	FAT
McDonald's Egg Mc Muffin	510 (300)	35 (29)	17 (17)	33 (12)
Large Coffee (16 oz)	4	0	0	0
Creamers (4)/(2)	82 (41)	7 (3)	1	6 (3)
Splenda	3	1	0	0
Tuna (6 oz can)	144	0	32	2
Lettuce, Tomatoes, Cucumbers, Carrot Sticks (2 c)	29	6	2	0
Olive Oil and Vinegar Dressing (4T) (Lite)	141(57)	7 (6)	0	12 (4)
Boost Optimum (8 oz) Skim Milk	220 (80)	19 (12)	22 (9)	6 (0)
Raw Almonds (1 cup) ½ cup Roasted Almonds and Popcorn (100 kcal bag)	953 (477+100)	28 (22)	33 (20)	87 (44)
Green Tea (16 oz)	5	1	0	0
Honey (2T) Stevia	128 (0)	35 (0)	0	0
Salmon (8 oz) w/ olive oil (2T) 4 oz. w/olive oil spray	395/198(239/20)	1 (0)	55 (27)	18 (27/3)
Roasted Peppers, Onions & Eggplant (1 each) in oil (2T)	152 (239/20)	37	4	0 (27/3)
Sliced Tomatoes (2)	44	5	1	0
Olive Oil and Vinegar Dressing (4T) (Lite)	141(57)	7(6)	0	12 (4)
Pomegranate Juice (8 oz) Spritzer w/club soda	270 (135)	66 (33)	1(0)	1(0)
Green Tea (16 oz)	5	1	0	0
Honey (2T) Stevia	128(0)	35(0)	0	0
Tofu (1 pint) (Non-fat frozen soy curd)	840 (240)	80 (62)	12 (14)	50 (6)

# New Summary

- 2,188 Calories (Needs:  $[106 + (6 \times 12)] \times 15 = 2,670$ ) Lose ~1 pound/week
- 39% Fat/41% CHO/20% PRO (107 g/Need 67 g)