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.

Presley C et al. J Geriatr Oncol 2016:7, 281

Nutrition Screening Instruments

Mini Nutritional Assessment (MNA)	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 F. Body mass index or calf circumference
Malnutrition Screening Tool (MST)	Have you been eating poorly because of decreased appetite? Have you lost weight recently without trying?
Simplified nutritional appetite questionnaire (SNAQ)	Patient ranks 4 items: appetite, satiety, taste, daily meals
SCREEN II	17-item tool with an 8 question abbreviated version
Malnutrition Universal Screening Tool (MUST)	BMI Weight loss over 3-6 months Anorexia for periods of 5 days or longer due to disease
Nutritional Risk Screening (NRS)	BMI % Weight Loss Change in food intake Disease severity rating
Geriatric Assessment	BMI % Weight Loss Difficulty chewing, impaired smell, inability to obtain or prepare food, decreased food intake

Nutrition Red Flags

- Body Mass Index (kg/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.
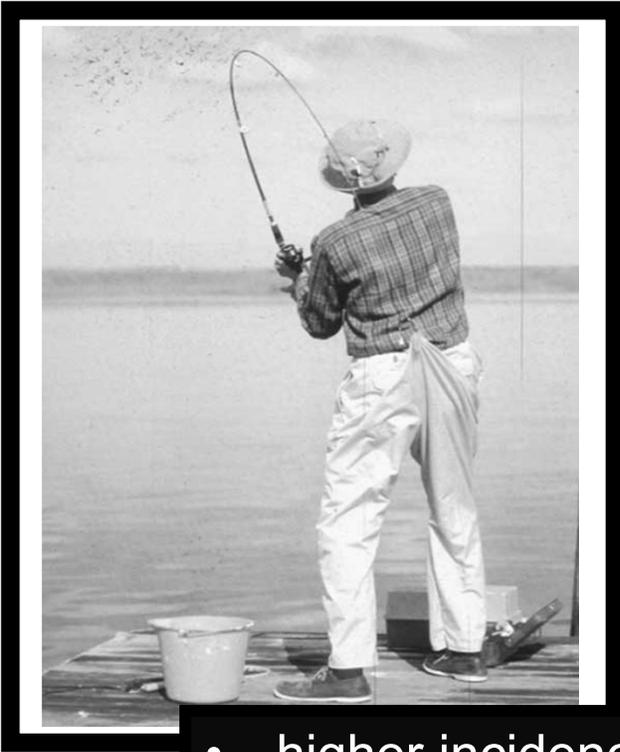
3. Address common misperceptions:

– 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	✓✓ *Growing!*	✓✓ *Growing!*

✓ **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.

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
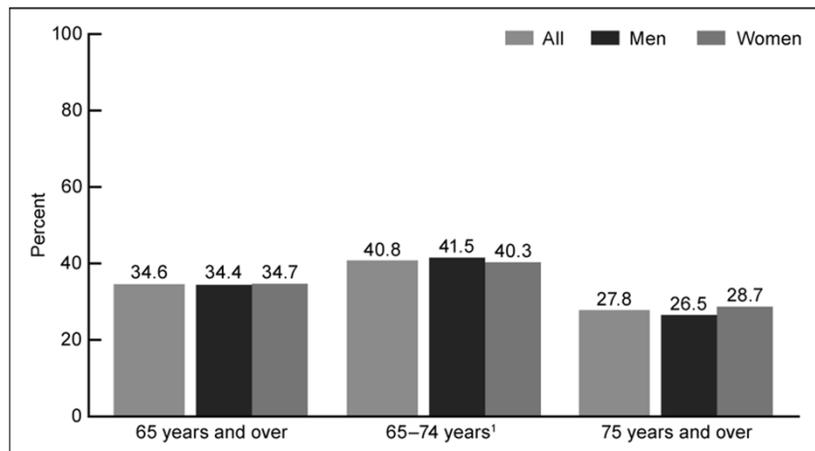 Inoue-Choi et al. CEBP 22:792, 2013

- 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.


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

Obesity and Relative Risk of Cancer

More limited data on male breast cancer, fatal prostate cancer and diffuse large B-cell lymphoma
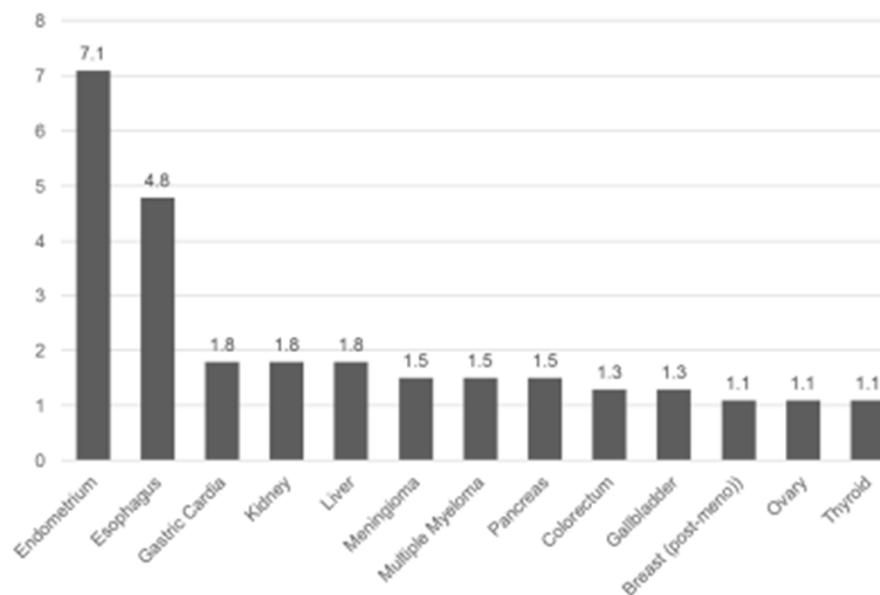
WHO: IARC
Zhao et al J

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^2 increase in BMI from pre- to post-dx
Chan et al. (2014)	82	213,075 women with breast cancer	Breast CA Specific Mortality 1.29 (0.97-1.72) Total Mortality 1.08 (1.01-1.15)
Cao & Ma (2011)	6 cohort	18,203 men with prostate cancer	Biochemical Recurrence 1.21 (1.11-1.31) Prostate CA Specific Mortality 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.
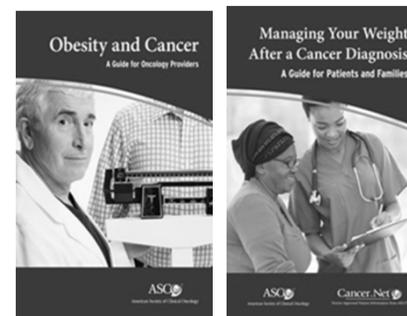
Arrange:

- 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
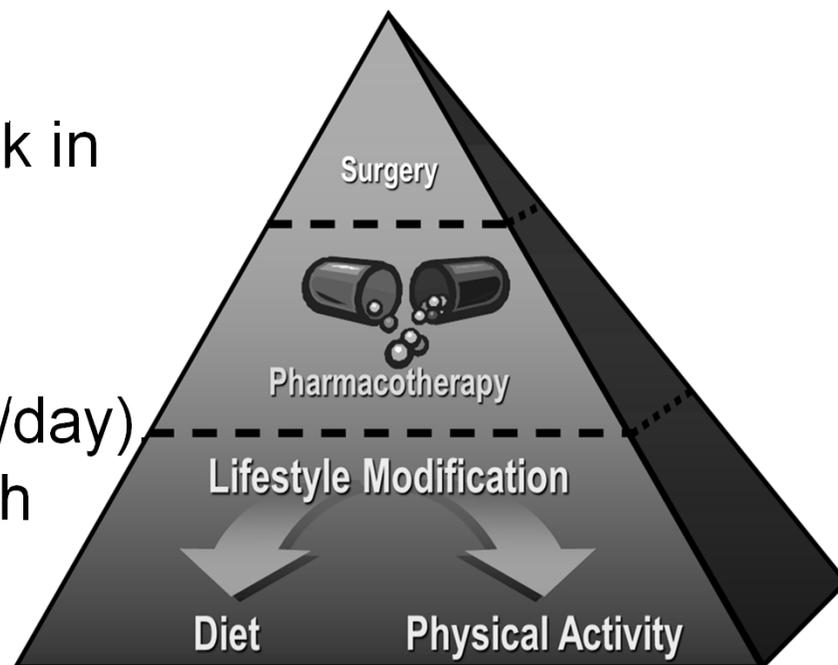
MEAT AND CANCER
HOW STRONG IS THE EVIDENCE?

IARC CARCINOGENIC CLASSIFICATION GROUPS

Processed meats have been given Group 1 classification
INCLUDES
Salami   Bacon
Sausages and hot dogs

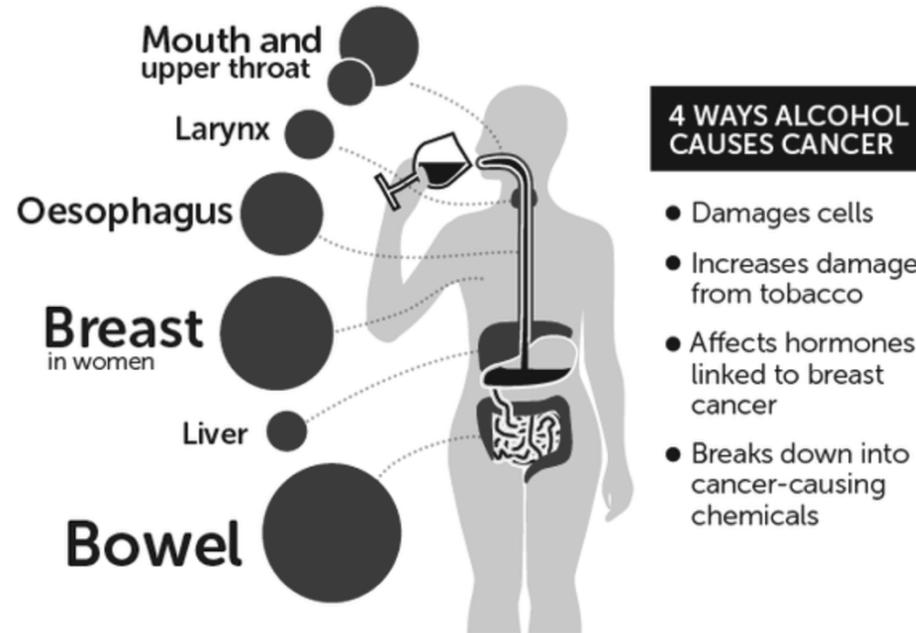Red meats have been given Group 2A classification
Pork   Beef   Lamb
(Does not include chicken or fish)

GROUP 1 — Causes cancer
GROUP 2A — Probably causes cancer
GROUP 2B — Possibly causes cancer
GROUP 3 — Not classifiable as a cause of cancer
GROUP 4 — Probably not a cause of cancer

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^{-1} 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)

Pan A et al. Arch Intern Med March 12, 2012

Association between Alcohol and Cancer is Linear no amount is "safe"

Mouth and upper throat
Larynx
Oesophagus
Breast in women
Liver
Bowel

4 WAYS ALCOHOL CAUSES CANCER

- Damages cells
- Increases damage from tobacco
- Affects hormones linked to breast cancer
- Breaks down into cancer-causing chemicals

- Head & Neck survivors should NOT drink; it increases complications and reduces survival. Meta-analysis on upper aerodigestine 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]

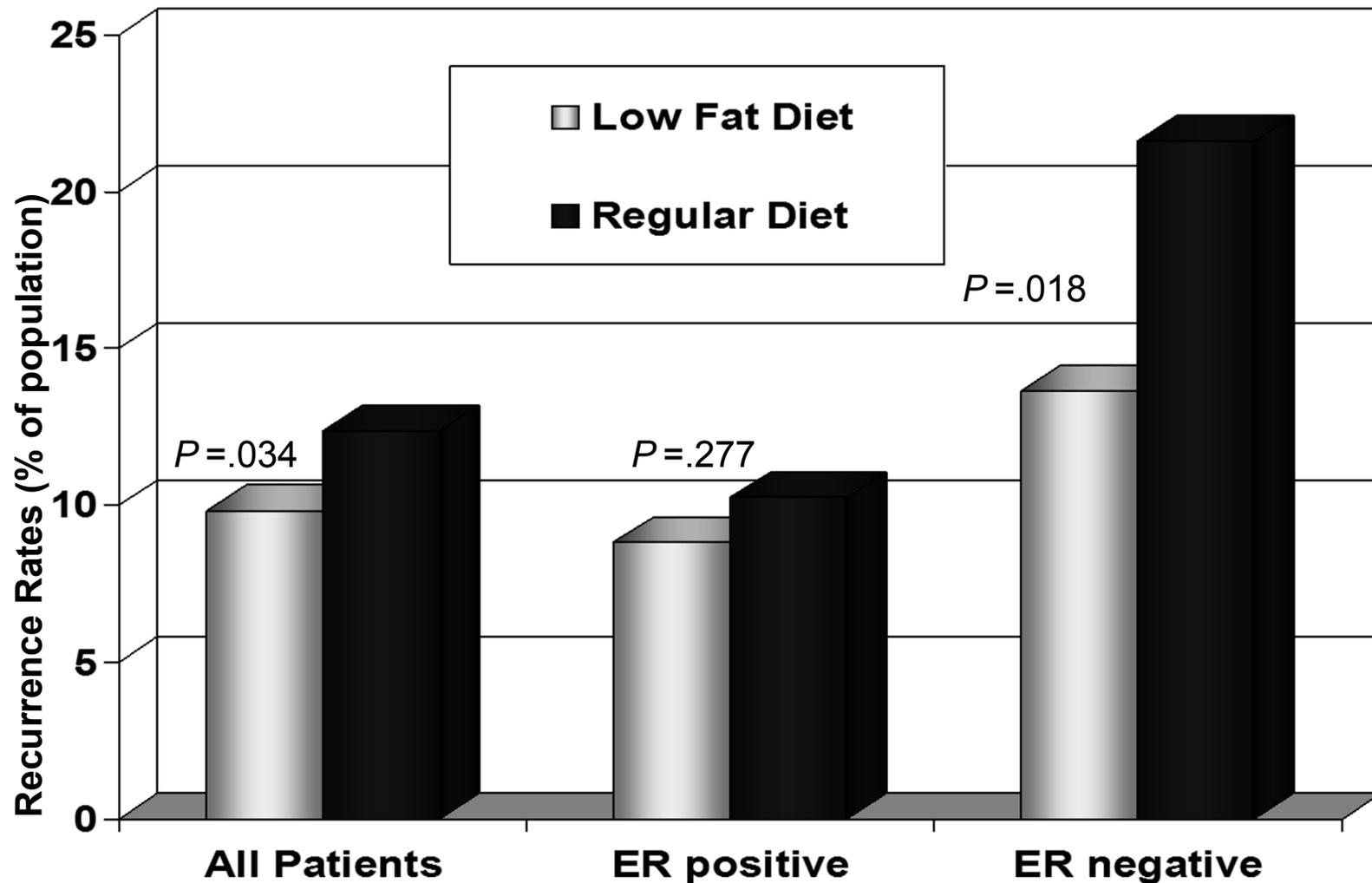   All Cause Mortality: 0.85 [95% CI, 0.77 to 0.93]
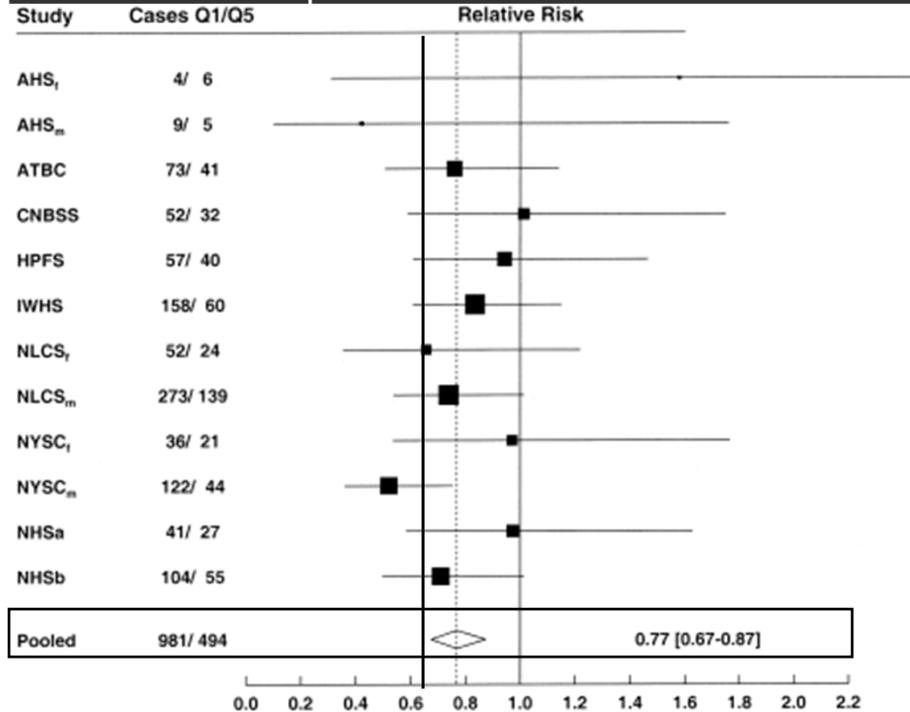
Dietary Patterns
Prudent vs. Western

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)

Chlebowski et al. JNCI 98:1767, 2006

Vegetables & Lung Cancer
Prospective Cohort Studies

Study	Cases Q1/Q5	Relative Risk
AHS_f	4/ 6	
AHS_m	9/ 5	
ATBC	73/ 41	
CNBSS	52/ 32	
HPFS	57/ 40	
IWHS	158/ 60	
NLCS_f	52/ 24	
NLCS_m	273/ 139	
NYSC_f	36/ 21	
NYSC_m	122/ 44	
NHSa	41/ 27	
NHSb	104/ 55	
Pooled	981/ 494	0.77 [0.67-0.87]

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2

Beta Carotene Supplementation & Lung Cancer

ATBC Current Smoker

Physicians' Health
Never Smoker
Former Smoker
Current Smoker
CARET
Former Smoker
Current Smoker

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2

Figure 3

Phytochemical Synergy

1. Kaempferol
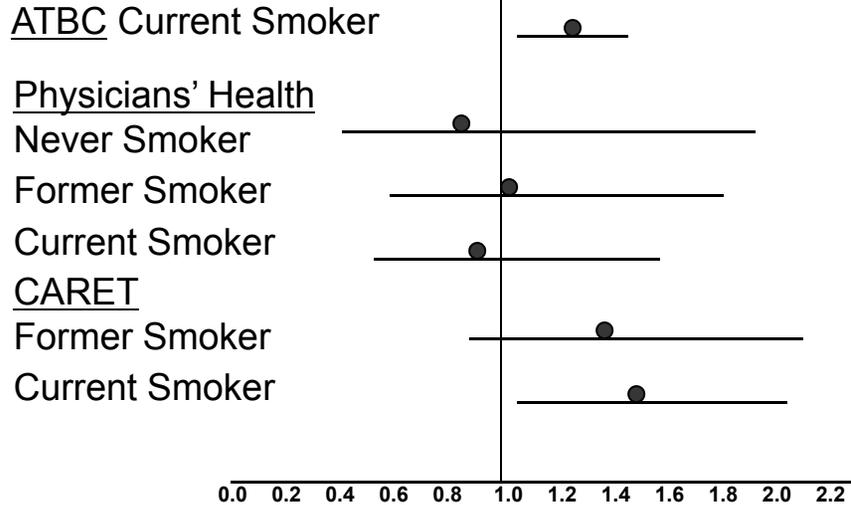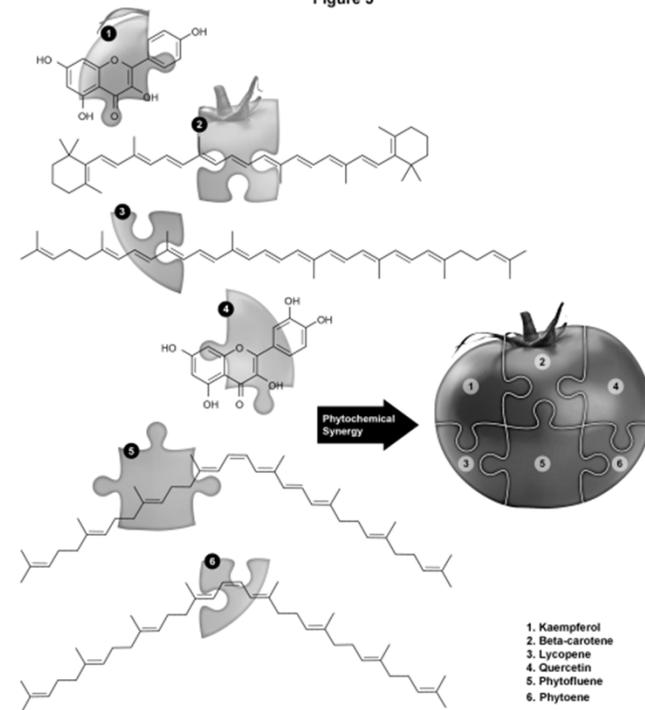2. Beta-carotene
3. Lycopene
4. Quercetin
5. Phytofluene
6. Phytoene

When we try to pick out anything by itself, we find it hitched to everything in the universe — *John Muir*
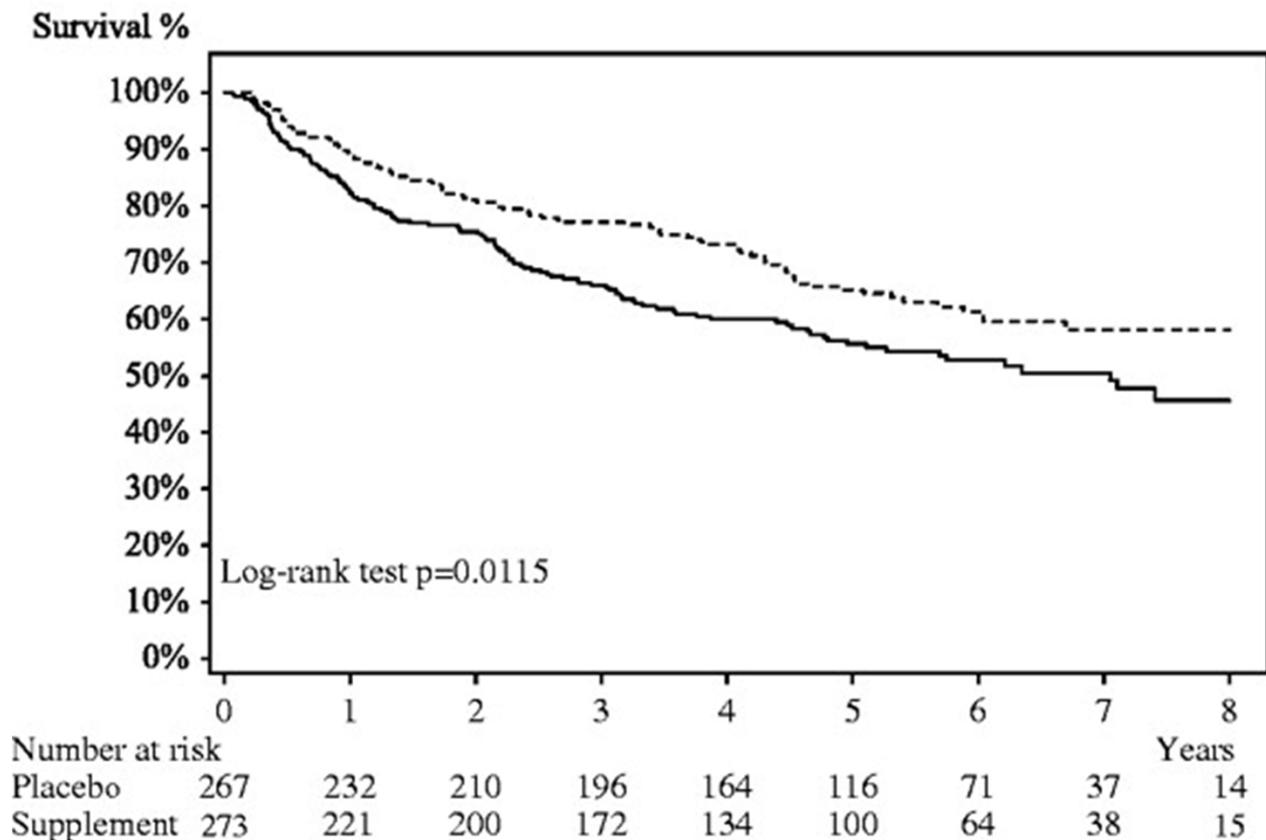
RCT of α−Tocopherol + β-Carotene vs. Placebo
(52M median follow-up)
540 Cases w/ Stage I/II Head & Neck Squamous Cell Cancer
Cancer-free survival (no recurrence & no SPT among participants randomly assigned to the supplement arm (solid line) or to the placebo arm (dotted line)
Second Primary HR 2.88 (95%CI 1.56-5.31)

A

Survival %

Log-rank test p=0.0115

Number at risk	0	1	2	3	4	5	6	7	8 (Years)
Placebo	267	232	210	196	164	116	71	37	14
Supplement	273	221	200	172	134	100	64	38	15

Bairati et al. JNCI ;97:481-8, 2005

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.
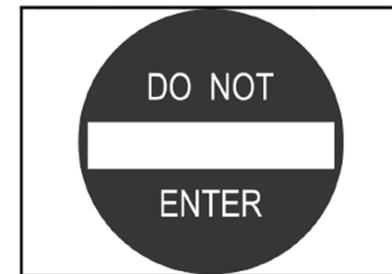
V.S.

Miracle in a Bottle

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

DO NOT ENTER

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

- 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.

Food	CAL	CHO (g)	PRO (g)	FAT (g)
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 + (6x12)] x 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
Tofutti (1 pint) (Non-fat frozen yogurt)	840 (340)	80 (63)	12 (14)	52(6)

New Summary

- 2,188 Calories (Needs: [106 + (6x12)] x 15 = 2,670) Lose ~1 pound/week

- 39% Fat/41% CHO/20% PRO (107 g/Need 67 g)