

Carolyn M. Matthews, MD October 2022

Exercise and Diet in Cancer Patients: Current Guidelines



Disclosure of Conflicts of Interest

Carolyn M. Matthews, MD, has no relevant financial relationships to disclose.

Role of Nutrition in Oncology

Community interest

Oncologist

Research

Prevention/treatment/survivorship

Overweight/obesity



Cancer causation

Ernst Wynder 1975: Overnutrition and colon cancer

Doll and Peto 1981: 35% of cancers could be attributed to diet

WCRF 2018: 18% of all US cancer cases are attributable to suboptimal diet, low activity, overweight/obesity



US Dietary Guidelines

- 2020 USDA Dietary guidelines : moderate evidence for DIET PATTERN rich in plant foods, lower in animal products and refined carbohydrates
- MAKE EVERY BITE COUNT
- Predimed trial: 68% statistically significant reduction in development of breast cancer over the 4.8 years of the study



Nutrition Research

- Observational studies
- Migrant studies
- Case control studies
- Prospective cohort studies
- Food frequency questionnaires
- Interventional trials



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Overweight, Obesity, and Mortality from Cancer in a Prospectively Studied Cohort of U.S. Adults

Eugenia E. Calle, Ph.D., Carmen Rodriguez, M.D., M.P.H., Kimberly Walker-Thurmond, B.A., and Michael J. Thun, M.D.

Increased body weight was associated with increased death rates for all cancers combined and for cancers at multiple specific sites

BACKGROUND

The influence of excess body weight on the risk of death from cancer has not been fully characterized.

METHODS

In a prospectively studied population of more than 900,000 U.S. adults (404,576 men and 495,477 women) who were free of cancer at enrollment in 1982, there were 57,145 deaths from cancer during 16 years of follow-up. We examined the relation in men and women between the body-mass index in 1982 and the risk of death from all cancers and from cancers at individual sites, while controlling for other risk factors in multivari-

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Overweight, Obesity and Mortality from Cancer

Calle, NEJM, April 2003 1625-1638

- Prospective study of 900,000 adults
- BMI \geq 40: death rate from cancer 52% higher in men, 62% higher in women
- BMI was significantly a/w higher rates of death due to cancer of esophagus, colon/rectum, liver, gallbladder, pancreas, kidney, Non-Hodgkin's lymphoma, multiple myeloma
- Significant trends of increasing risk in cancers of stomach, prostate in men
- Significant trends of increasing risk for cancers of breast, cervix, uterus, and ovary in women

Nutritional results

Meta-analysis 93 studies, 85,000 cases, 100,000 Controls, 2M individuals
(Grosso, 2017 Nutr Rev 75 (6) 405-19)

- Healthy dietary patterns reduce risk of colon and breast cancer
- Limited evidence of relation between unhealthy diet pattern and risk of UGI, pancreatic, ovarian, endometrial, prostatic cancers



Low-Fat Dietary Pattern and Breast Cancer Mortality in the Women's Health Initiative Randomized Controlled Trial

Rowan T. Chlebowski, Aaron K. Aragaki, Garnet L. Anderson, Cynthia A. Thomson, JoAnn E. Manson, Michael S. Simon, Barbara V. Howard, Thomas E. Rohan, Linda Snetselar, Dorothy Lane, Wendy Barrington, Mara Z. Vitolins, Catherine Womack, Lihong Qi, Lifang Hou, Fridtjof Thomas, and Ross L. Prentice

Author affiliations and support information

Compared with usual diet comparison group, a low fat dietary pattern led to a lower incidence of deaths after breast cancer.

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outcome-related analysis from a randomized prevention trial, we examined the long-term influence of this intervention on deaths as a result of and after breast cancer during 8.5 years (median) of dietary intervention and cumulatively for all breast cancers diagnosed during 16.1 years (median) of follow-up.

Patients and Methods

The trial randomly assigned 48,835 postmenopausal women with normal mammograms and without prior breast cancer from 1993 to 1998 at 40 US clinical centers to a dietary intervention with goals of a reduction of fat intake to 20% of energy and an increased intake of fruits, vegetables, and grains (40%; n = 19,541) or to a usual diet comparison (60%; n = 29,294).

Results

In the dietary group, fat intake and body weight decreased (all $P < .001$). During the 8.5-year dietary intervention, with 1,764 incident breast cancers, fewer deaths occurred as a result of breast cancer in the dietary group, which was not statistically significant (27 deaths [0.016% per year] v 61 deaths [0.024% per year]; hazard ratio [HR], 0.67; 95% CI, 0.43 to 1.06; $P = .08$). During the same period, deaths after breast cancer (n = 134) were significantly reduced (40

Nutritional studies

- WINS 2437 postmenopausal women with early stage breast cancer
 - Women in intervention arm aiming for lower fat intake: 24% reduction in new breast cancer events
- WHEL 3088 pre and postmenopausal early stage breast cancer survivors
 - Diet intervention of high vegs/fruit/fiber, low fat 15-20%
 - 7.3 years follow up; no significant difference in breast cancer events



Chlebowski, RT et al, J Natl Cancer Inst 2006; 98: 1767-1776

Pierce, JP et al, JAMA 2007; 298:754-764

Nutrition targets

- Inflammation
- Angiogenesis
- Mutagenesis
- Oxidative stress
- Tumor progression/metastasis
- Inhibition of proliferation
- Alterations in microbiome
- Alterations in metabolism and sex hormones



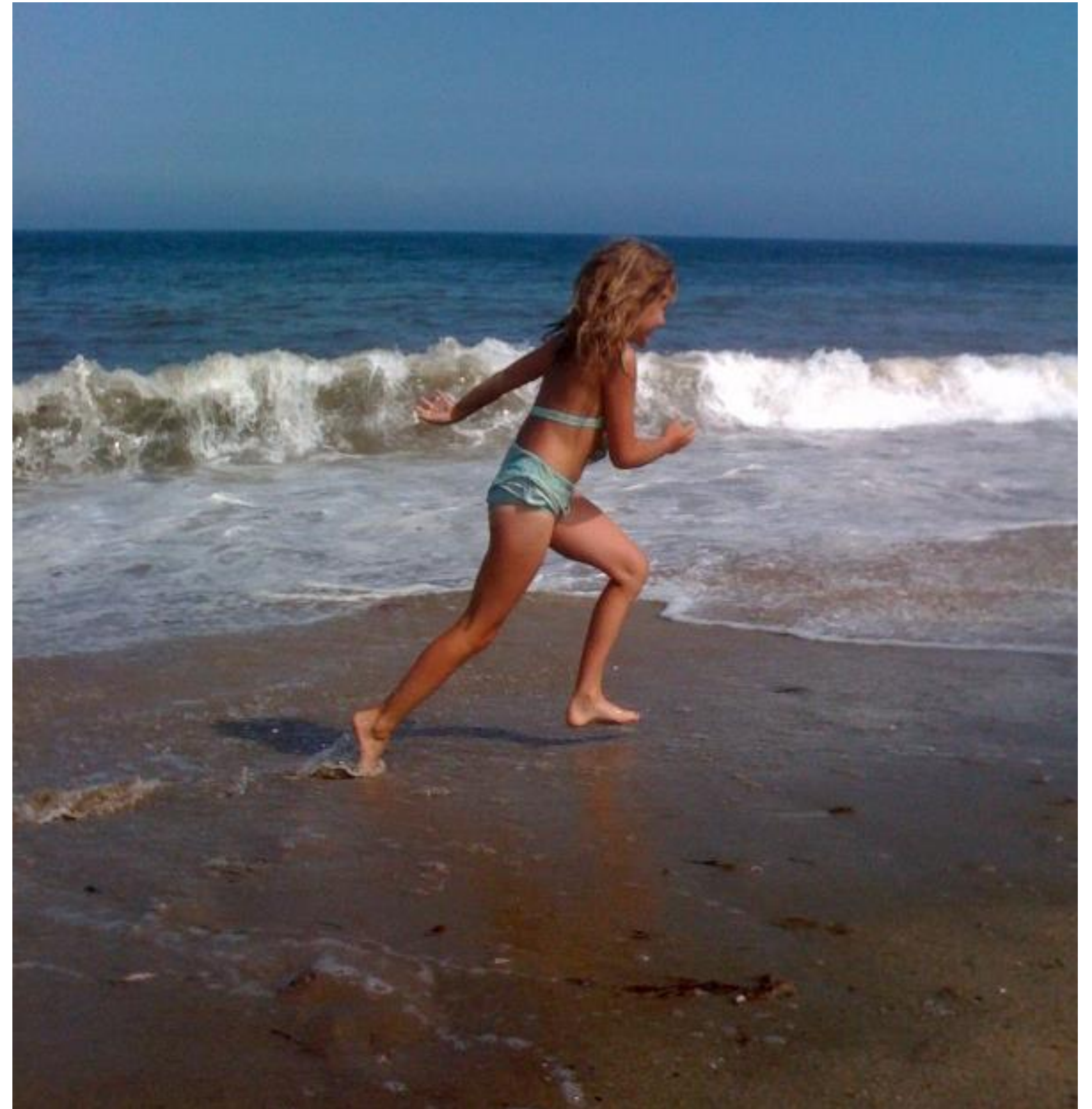
ACS weight recommendation

Achieve and maintain a healthy body weight throughout life; keep body weight within healthy range and avoid weight gain in adult life



ACS: Physical activity

- Adults: 150-300 min of moderate intensity physical activity per week; or 75-150 min of vigorous intensity physical activity
- Children/adolescents should engage in at least 1 hour of moderate or vigorous intensity activity daily
- Limit sedentary activity



Exercise

- Cardiopulmonary fitness
- Muscle strength
- Balance
- Quality of life
- Fatigue
- Depression/anxiety
- Body composition



Move more and sit less

- Activity a/w lower sex hormone levels
- Aids in prevention of weight gain, a/w lower risk of obesity
- Increased sedentary time is a/w premature mortality, increased cardiometabolic disease



ACS diet recommendations

- Follow a healthy eating pattern at all ages
- Includes
 - Foods with high nutrient density
 - Variety of vegetables and fiber rich legumes, whole grains
- Excludes
 - Red & processed meats
 - Sugar sweetened beverages
 - Highly processed foods/refined grains



ACS: Best not to drink alcohol

- May increase risk of premenopausal breast cancer, increases risk of postmenopausal breast cancer
- Increases risk of colorectal cancer
- Increases risk of gastric and liver cancer
- Increases risk of oral, pharyngeal, laryngeal and esophageal cancers



ASCO 2022 Guideline

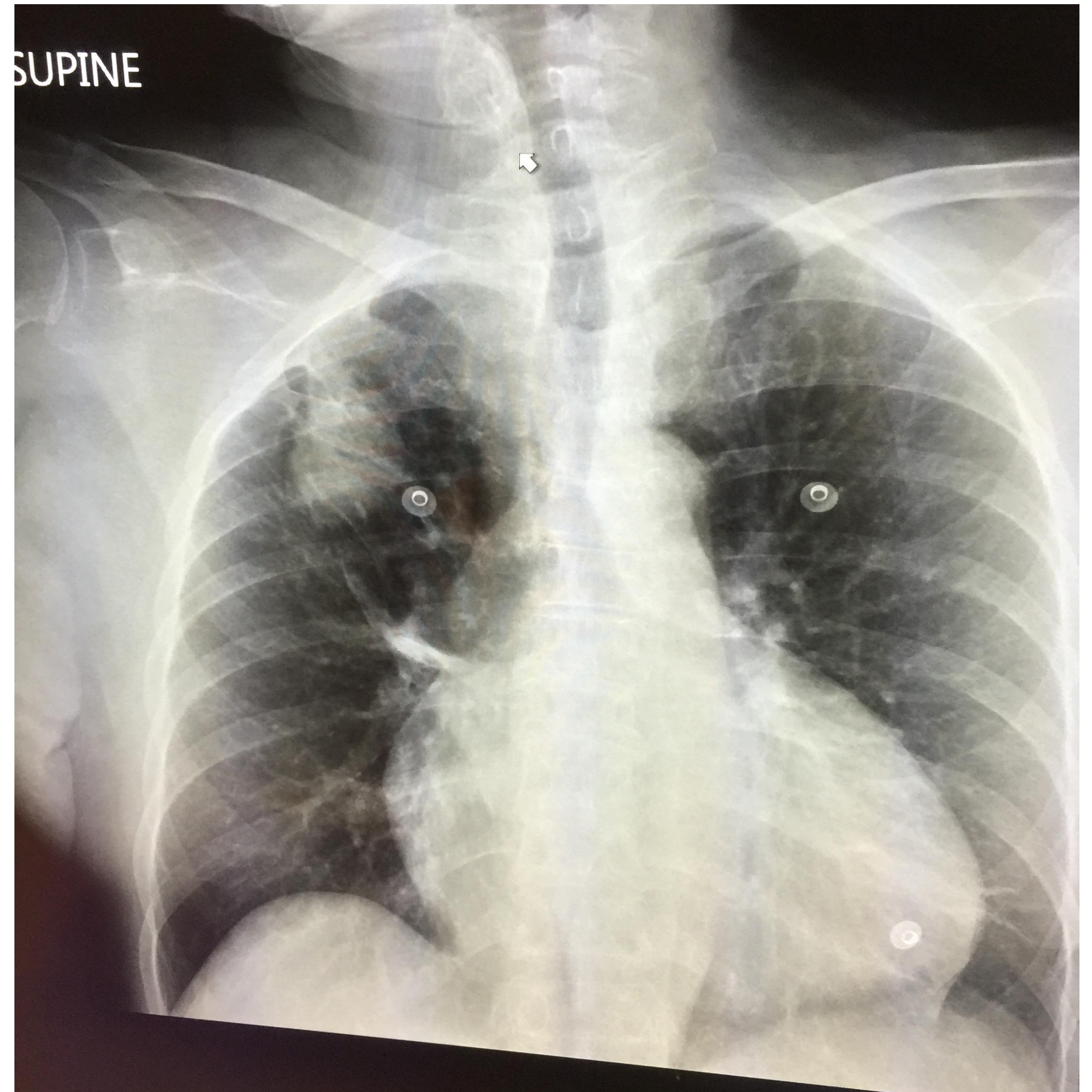
Does exercise during cancer treatment safely improve outcomes related to QOL, treatment toxicity, or cancer control?

- **Oncologists SHOULD recommend aerobic and resistance exercise during active treatment with curative intent...to mitigate side effects of cancer treatment**



ASCO 2022 Guideline

- Oncologists **MAY** recommend preoperative exercise for patients undergoing surgery for lung cancer to reduce length of hospital stay and postoperative complications



ASCO 2022 Guideline

Does consuming a particular dietary pattern or food(s) during cancer treatment safely improve outcomes related to QOL, treatment toxicity, or cancer control?

- There is insufficient evidence to recommend for or against dietary interventions such as ketogenic, low carb, low fat diets, functional foods, or fasting to improve outcomes related to QOL, treatment toxicity, or cancer control



ASCO 2022 Guideline

- Neutropenic diets (specifically diets that exclude raw fruits and vegetables) are not recommended to prevent infection in patients with cancer during active treatment



ASCO 2022 Guideline

Do interventions to promote intentional weight loss or avoidance of weight gain during cancer treatment safely improve outcomes related to QOL, treatment toxicity, or cancer control?

- There is currently insufficient evidence to recommend for or against intentional weight loss or prevention of weight gain during active treatment to improve outcomes related to QOL, treatment toxicity, or cancer control



Exercise

- 2700 men with nonmetastatic prostate cancer: men who engaged in 3 hours per week of vigorous activity had a 50% reduction in all cause mortality, 60% reduction in prostate cancer specific deaths Kenfield J Chin Oncol 2010
- Ibrahim, Med Oncol 2011: Physical activity post diagnosis breast cancer
 - 34% lower risk breast cancer death
 - 41% lower risk of all-cause mortality
 - 24% lower risk of breast cancer recurrence



Supplements

- 64-81% of cancer survivors use supplements
- Observational studies, clinical trials suggest that supplements are unlikely to improve prognosis or overall survival rate
- SELECT trial: vit E arm: higher prostate cancer
- B-carotene supplements increased risk of colorectal adenoma in smokers, alcohol drinkers or both
- Folate: a/w increased risk of multiple adenomas

JAMA | US Preventive Services Task Force | **RECOMMENDATION STATEMENT**

Vitamin, Mineral, and Multivitamin Supplementation to Prevent Cardiovascular Disease and Cancer

US Preventive Services Task Force Recommendation Statement

US Preventive Services Task Force

IMPORTANCE According to National Health and Nutrition Examination Survey data, 52% of surveyed US adults reported using at least 1 dietary supplement in the prior 30 days and 31% reported using a multivitamin-mineral supplement. The most commonly cited reason for using supplements is for overall health and wellness and to fill nutrient gaps in the diet. Cardiovascular disease and cancer are the 2 leading causes of death and combined account for approximately half of all deaths in the US annually. Inflammation and oxidative stress have been shown to have a role in both cardiovascular disease and cancer, and dietary supplements may have anti-inflammatory and antioxidative effects.

OBJECTIVE To update its 2014 recommendation, the US Preventive Services Task Force (USPSTF) commissioned a review of the evidence on the efficacy of supplementation with single nutrients, functionally related nutrient pairs, or multivitamins for reducing the risk of cardiovascular disease, cancer, and mortality in the general adult population, as well as the harms of supplementation.

POPULATION Community-dwelling, nonpregnant adults.

EVIDENCE ASSESSMENT The USPSTF concludes with moderate certainty that the harms of beta carotene supplementation outweigh the benefits for the prevention of cardiovascular disease or cancer. The USPSTF also concludes with moderate certainty that there is no net benefit of supplementation with vitamin E for the prevention of cardiovascular disease or cancer. The USPSTF concludes that the evidence is insufficient to determine the balance of

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Sugar

- High sugar intake has not been shown to increase risk of development or progression of cancer
- Replaces other nutrients
- High glycemic index
- Current dietary guidelines recommend limiting added sugars to less than 10% of energy per day



Dairy

- IGF1
- Estrogen, progesterone, growth hormone
- PCB's
- Limited/suggestive evidence that may increase risk of prostate cancer



Fiber

- Estrogen levels may be 20% higher in women on a low fiber diet
- No evidence that fiber supplements reduce risk of adenomatous polyps
- Contribute to stool mass, microbiome health



Soy

- Great source of isoflavones
genistein, daidzein
- 3 large epidemiological studies
have found no adverse effects of
soy intake on breast cancer
recurrence or total mortality
either alone or with tamoxifen



Vegetarian/Vegan?

- Vegan diet excludes all animal foods and animal products
- Protein needs: nuts, seeds, legumes
- May need supplemental B12, iron, omega 3, vit D, zinc



Limited data

- There are few well designed studies demonstrating benefit of nutrition/exercise on survival or response to treatment
- Randomized trials show improvement in endpoints such as QOL, treatment related side effects



My recommendations

- Engage in regular physical activity
 - Avoid inactivity
 - 150-300 mins/wk moderate activity
 - Strength training 2 days a week
- Achieve a dietary pattern that is high in vegetables, fruits and whole grains, high in fiber, low in sugar/dairy
- REAL food, VARIETY; colorful
- Limit alcohol, saturated fats

