

## The Role of Nutrition in Cancer Prevention, Treatment, and Survivorship

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## The Importance of Nutrition During Treatment

- Maintenance of adequate nutrient stores and muscle mass
- Improved strength and energy
- Management of side effects
- Improved quality of life
- Fewer complications, infections, hospitalizations, treatment breaks
- Improved survival and outcome



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## Weight Loss by the Numbers

- 40% of patients experience anorexia and weight loss **prior** to diagnosis
  - 80% of upper GI cancer patients and 60% of lung cancer patients have already experienced significant weight loss at time of diagnosis
- 40-80% of patients are expected to experience malnutrition **during** treatment
  - As little as a 6% weight loss predicts a reduced response to treatment, reduced survival, and a reduced quality of life

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## Unintentional Weight Loss

- In one study, 13% of renal cell cancer patients had dose reductions, while 21% had treatment termination due to unintentional weight loss
- Body weight & lean body mass are considered risk factors for chemotherapy tolerance & survival in gastric cancer.
- Toxicity from radiation can lead to unplanned treatment breaks that result in lower loco-regional control and survival rates in patients with head and neck cancer

Antoun et al. Low body mass index and sarcopenia associated with dose-limiting toxicity of sorafenib in patients with renal cell carcinoma. *Annals of Oncology*. 2010.

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## Prevalence of Malnutrition

Tumor Site	Prevalence of Malnutrition
Pancreas	80-85%
Stomach	65-85%
Head & Neck	65-75%
Esophagus	60-80%
Lung	45-60%
Colon/Rectum	30-60%
Gynecological	15%
Urological	10%

Stratton et al, eds. Disease-Related Malnutrition: An Evidence-Based Approach to Treatment. CABI Publishing, Wallingford; 2003.

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## Prevalence of Treatment-Related Side Effects

Treatment	Weight Loss	Fatigue	Nausea/Vomiting	Oral Mucositis	Taste Alterations	Constipation
Overall % of patients	50%-90%	70%-100%	30%-90%	40%-100%	35%-70%	40%-50%
Chemotherapy	✓	✓	✓	✓	✓	✓
Radiation	✓	✓	✓	✓	✓	
Surgery	✓	✓	✓			
Immunotherapy	✓	✓		✓		

In one study, 62% of patients were experiencing one or more symptom prior to the start of treatment.

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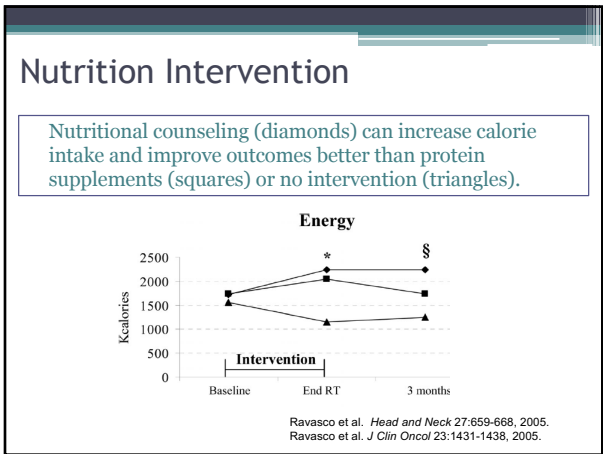
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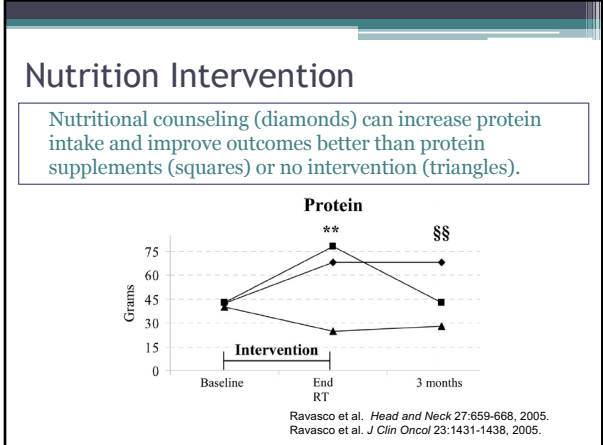
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### Nausea and Vomiting

- Ginger
- Avoid eating favorite foods
- Suck on tart hard candies
- Cold/room temp foods to avoid strong smells
- Bland/dry foods
- Small frequent meals
- Sip on calorie containing liquids between meals



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### Poor Appetite

- Small, frequent meals
- Choose calorie rich foods
- Choose liquids with calories
- Nutritional supplements



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### Fatigue

- Light physical activity
- Prepare frozen meals on goods days
- Ask friends and family for help
- Convenience foods
- Crock pot "fix it and forget it"
- Nutritional Supplements



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### Sore Mouth or Throat

- Drink through a straw
- Avoid mouthwash containing alcohol
- Rinse your mouth with water/salt/baking soda solution
- Soft foods
  - Pureed fruits/veggies
  - Cream soups
  - Cooked cereal
  - Mashed potatoes
  - Scrambled eggs
  - Mac and Cheese
  - Yogurt/applesauce/puddings
  - Ice cream/milk shakes



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## Taste Changes

- Rinse mouth before meals with water/baking soda/salt
- Use plastic utensils
- Try sucking on hard candies
- Experiment with herbs/spices
- Too salty → add sweetener
- Too sweet → add salt



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## Diarrhea

- Drink at least 1 cup (8 oz) of liquid after each loose bowel movement
- Eat small frequent meals throughout the day
- Avoid greasy, fried, spicy, sweet foods
- Avoid caffeine and alcohol
- Avoid foods, gum, and candies made with sorbitol, xylitol, or mannitol
- Limit drinks and foods that cause gas
  - Vegetables in the cabbage family
  - Peas
  - Dried beans
  - Carbonated beverages
    - Stir or pour it into a glass to lessen the bubbles
- Eat foods high in pectin
  - Applesauce, bananas

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## Constipation

- Eat at about the same times each day
- Drink a hot beverage or eat hot cereal to stimulate a bowel movement
  - Warm fruit or vegetable juices
  - Decaffeinated teas
  - Hot Cocoa
  - Hot water with added lemon juice and honey
- Drink at least 64 oz (8 cups) of liquid each day
  - Water
  - Prune juice
  - Foods that are liquid at room temp: popsicles, Jell-O, Ice cream
- Eat more fiber
  - Whole grain breads and cereals
  - Fruits and vegetables
  - Popcorn
  - Dried beans
- Move!

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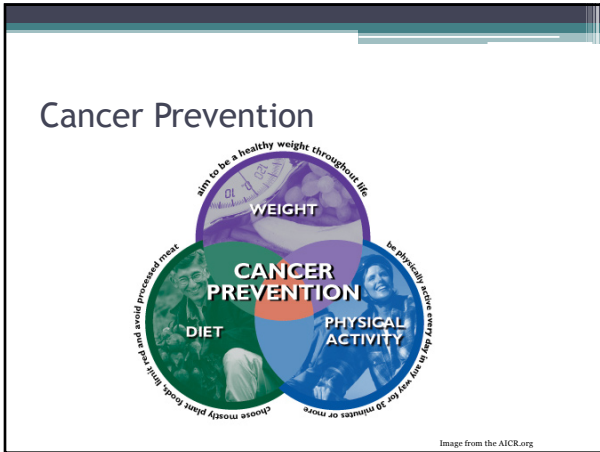
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### Diet and Cancer Risk

- 1/3 of cancer deaths are related to dietary factors or physical inactivity
- Approximately 50% of all cancers could be prevented with the adoption of a healthy lifestyle
  - Reduction in alcohol consumption
  - Healthy body weight
  - Physical activity
  - Plant-based diet

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### Strength of Evidence of Associations Between Nutrition-Related Factors and Cancer

Hypothesis	Lung	Rectum and Colon	Breast	Prostate	Head and Neck	Endometrial
Diet rich in plant-based foods decrease risk	Probable	Probable	Possible	Possible	Probable	Possible
Moderate Physical Activity decreases risk	Lacking	<b>Convincing</b>	<b>Convincing</b>	Weak	Weak	Probable
Obesity increases risk	Lacking	<b>Convincing</b>	<b>Convincing</b>	<b>Convincing</b>	Probable	<b>Convincing</b>
Alcohol increases risk	Lacking	Possible	Probable	Lacking	<b>Convincing</b>	Weak

The clinical guide to oncology nutrition/Oncology Nutrition Dietetic Practice Group; Elliot et al. 2nd edition

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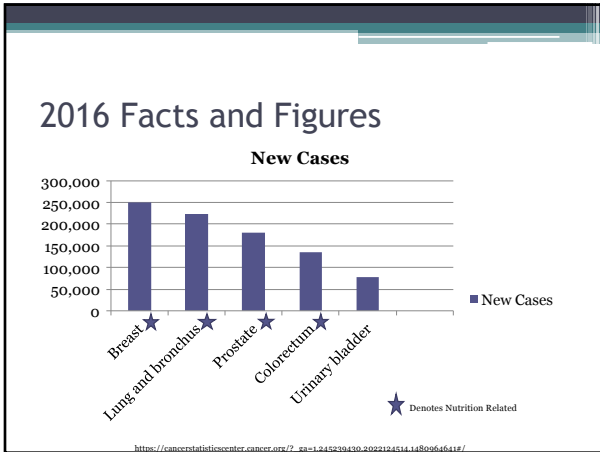
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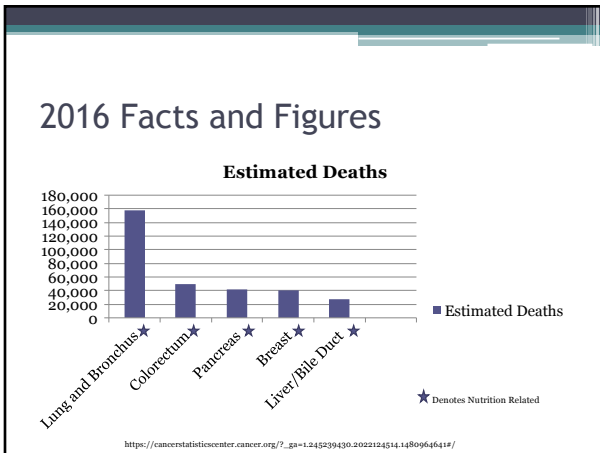
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### Cancer Risk and Body Weight

- Maintaining a healthy body weight throughout life may be the most important lifestyle factor to reduce cancer risk.
- When BMI >40
  - 52% higher risk for all cancers in men
  - 62% higher risk for all cancers in women

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## Waist Circumference

- Waist circumference is a measure of abdominal fatness including both subcutaneous and the metabolically active visceral fat stores
- The AICR recommends waist circumference to be no more than 37" in men and 31.5" in women



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## Waist Circumference

- Even within the normal range of BMI, both large waist size and excessive adult weight gain are associated with unhealthy metabolic changes and increased risk of cancer
- For people already overweight/obese, there are benefits from even a modest reduction in weight



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## Foods and Drinks that Regulate Weight

- Low Energy-Density
  - Vegetables, fruits, legumes, whole grains, broth based soups
  - High water content and high fiber
- High Energy-Density
  - Oils, fats, chips, crackers, cookies
  - High fat and added sugars

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### Energy Density

- Not all high energy-dense foods should be avoided
- Low energy-dense foods help people feel full on less calories.

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### Caloric Density

400 Calories of Oil      400 Calories of Beef      400 Calories of Vegetables

Stretch receptors are located throughout the stomach. When they are triggered by food, they send signals to your brain to tell you to stop eating. With high fiber, whole plant foods, you can eat the most quantity for the least amount of calories.

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Illustration by Sherri Nezcovitch • www.sherriestx.com/art

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### Dietary Supplements

- The AICR/WCRF Expert Panel concluded that the overall body of evidence does not support the use of dietary supplements as an effective strategy to reduce cancer risk; but recognized that dietary supplements may be beneficial for specific populations for reasons not related to cancer.

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### Dietary Supplements

- Evidence indicates dietary supplements can be protective OR can cause cancer.
  - Calcium supplements probably protect against colorectal cancer, but at levels above 1,500 mg daily have been linked to increased risk for prostate cancer.



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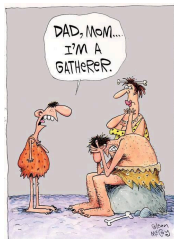
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### Plant Based Diet

- Plant foods are rich in phytochemicals, vitamins, and minerals that protect against cancer



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Colors	Foods	Colorful Protective Substances and Possible Actions
Red	Tomato and tomato products, watermelon, guava	Lycopene: antioxidant, cuts prostate cancer risk
Orange	Carrot, yam, sweet potato, mango, pumpkin	Beta-carotene: supports immune system; powerful antioxidant
Yellow-orange	Citrus fruits—orange, lemon, grapefruit, papaya, peach	Vitamin C, flavonoids: inhibit tumor cell growth, detoxify harmful substances
Green	Spinach, kale, collard, and other greens	Folate: builds healthy cells and genetic material
Green-white	Broccoli, brussels sprouts, cabbage, cauliflower	Indoles, lutein: eliminate excess estrogen and carcinogens
White-green	Garlic, onion, chive, asparagus	Allyl sulfides: destroy cancer cells, reduce cell division, support immune system
Blue	Blueberries, purple grapes, plums	Anthocyanins: destroy free radicals
Red-purple	Grapes, berries, plums	Resveratrol: may decrease estrogen production
Brown	Whole grains, legumes	Fiber: carcinogen removal

<http://www.ajcm.org/show/cancerproject/nutrition-rainbow-poster>

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### Red and Processed Meats

- Limit consumption of red meat (beef, pork, lamb)
  - < 18 oz per week
  - Risk of colorectal cancer increases by 17% for every 100g of red meat consumed daily
- Avoid consumption of processed meats
  - Meat that is preserved by smoking, curing, salting, or addition of chemical preservatives
  - Risk of colorectal cancer increases by 18% for every 50g of processed meat consumed daily

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### Alcohol

- Ethanol in alcoholic beverages is classified as a carcinogen
- Acetaldehyde (metabolized form of ethanol) is classified as a carcinogen
- Alcohol metabolism damages DNA
- Alcohol causes tissue damage, inflammation, interactions with folate, and interference with estrogen pathways

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### Sodium

- Limit consumption of salt and processed foods with added salt
- Aim for < 2,400 mg sodium daily
- Use herbs and spices to enhance flavors and reduce the need for salt



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**HELLO**  
I AM...

**A SURVIVOR!**

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### Cancer Survivors

- Early survival period (~12 months) eating may still be difficult due to persistent issues from treatment
  - Nausea, xerostomia, loss of dentition, radiation enteritis

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## Cancer Survivors

- After a patient's symptoms have improved and they are able to tolerate most foods, nutrition therapy shifts toward health promotion and cancer prevention.
- The recommendations for survivors are the same as cancer prevention.

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## Cancer Survivors

- Overweight/obesity increases risk of disease recurrence or developing new primaries
- Intentional weight loss post-treatment for overweight or obese survivors may reduce cancer recurrence and also their risk for other health-related conditions such as cardiovascular disease, diabetes, and hypertension.

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Recommendation	Details	Benefits
Be as lean as possible without becoming underweight	Avoid weight gain and increased waist circumference throughout adulthood. Healthy BMI 18.5-24.9	Protects against colon, pancreatic, endometrium, and postmenopausal breast cancer
Be physically active for at least 30 minutes daily. Avoid sedentary habits like watching TV.	30 min of mod. intense activity daily and as fitness improve, 60 min of mod or 30 min of vigorous activity daily.	Strengthens immune system, keeps GI tract healthy, maintains weight
Avoid sugary drinks and energy dense foods	Limit added sugars, foods low in fiber, and high in fat. Water is best alternative.	Avoids weight gain, thereby reducing cancer risk
Follow a plant based diet	Consume 5-7 servings of fruits and veggies daily. Aim to fill at least 2/3 of your plate with vegetables, fruits, whole grains and beans.	Protects mouth, pharynx, larynx, esophagus and lung cancer. Contains vit and minerals, which strengthen immune system. Fiber increases gut transit time to reduce risk of cancer.
Limit Consumption of Red Meat (beef, pork, lamb) and processed meats (ham, bacon, hot dogs, salami)	Limit intake of red meat to <18 oz/wk. Avoid processed meats.	Red meat is linked to colon cancer and processed meat has been linked to stomach cancer

<http://www.aicr.org/reduce-your-cancer-risk/recommendations-for-cancer-prevention/>

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Recommendation	Details	Benefits
<b>Avoid Alcohol</b>	If consumed at all, limit intake to no more than 2 drinks for men and 1 drink for women	Alcohol increases risk of mouth, pharynx, larynx, esophagus, liver, breast, colorectal & stomach cancer
<b>Limit consumption of salty foods and foods processed with salt</b>	Limit salt (sodium) intake to less than 2,400mg/day	High salt intake damages the lining of the stomach, potentially causing stomach cancer.
<b>Don't use supplements to protect against cancer</b>	Aim to meet nutritional needs through diet alone	Supplements can upset the balance of nutrients and some have been linked to cancers.
<b>Breastfeed</b>	It is best for mothers to breastfeed exclusively for up to 6 months	Breastfeeding can protect moms from breast cancer & protect babies from excess weight gain leading to obesity in adulthood.
<b>Cancer survivors should follow the recommendations for cancer prevention</b>	Once treatment has been completed and unless otherwise advised, aim to follow cancer prevention recommendations for diet, physical activity and healthy weight	Physical activity, healthy weight, and balanced diet, may help to prevent cancer recurrence.

<http://www.aicr.org/reduce-your-cancer-risk/recommendations-for-cancer-prevention/>

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**Portion Recommendations**




3 oz of red meat

**"1-Drink" Equivalents**



1 12-oz beer    5 oz wine    1 oz spirits

1 tsp salt  
≈  
2,300 mg sodium



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