NUTRITION AND CANCER

Scripps Cancer Care Symposium

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DISCLOSURES

- PACK Health, LLC
- Nestle Nutrition

OBJECTIVES

- Identify the prevalence and risk factors for malnutrition in patients with cancer
- Identify common nutrition-related side effects
- Formulate a care plan for management of side effects that includes nutrition strategies
- Identify resources for additional oncology nutrition information

MALNUTRITION

- Malnutrition in 40-80% patients with cancer
- Negatively effects
  - PS
  - QOL
  - Morbidity
  - Response to tx
  - Tolerance of tx
  - Mortality
- Increased healthcare cost
- Malnutrition may be reversed or stabilized in 50-88% of patients with early nutrition intervention
- Nutrition gives patients or family members a way to contribute to "therapy"

Arends J. Clinical Nutrition 2017
NCI. Nutrition in Cancer Care PDQ® 2020

Malnutrition may be reversed or stabilized in

50-88%

of patients with early nutrition intervention.

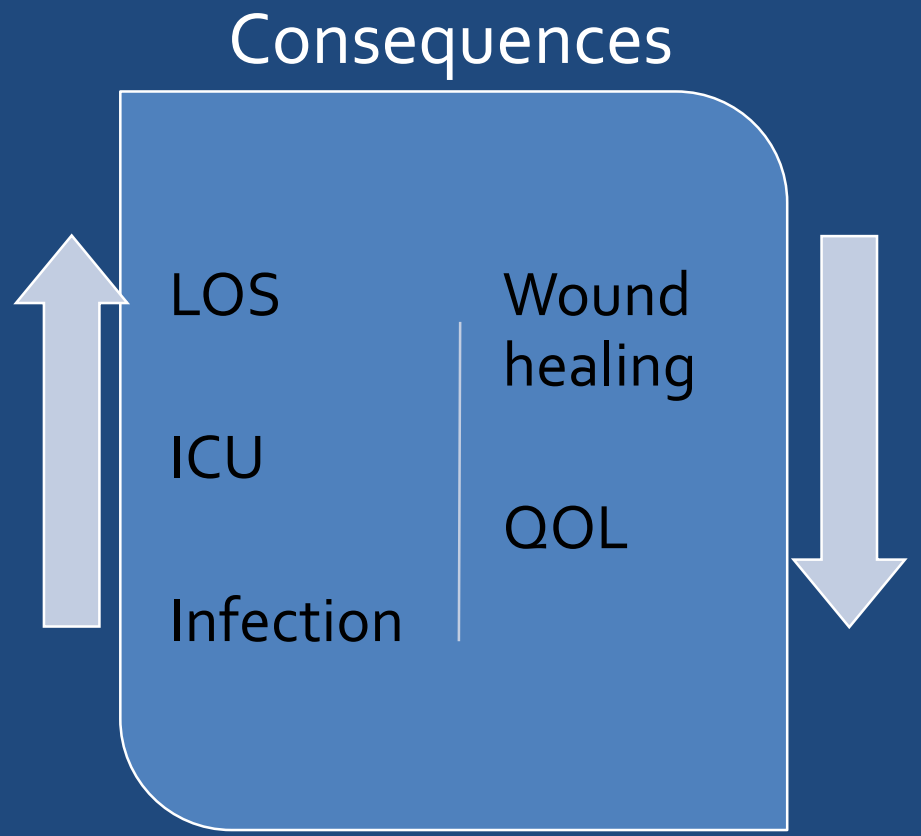
PROVEN BENEFITS OF NUTRITION

- "Nutrition intervention improves outcomes in patients with cancer cachexia receiving chemotherapy."
  - Nutrition counseling by a dietitian
  - Prescription for oral nutritional supplements
- Results after 8 weeks:
  - Increased: dietary intake, nutrition status, physical activity, quality of life, and trends in weight and muscle mass

Bauer JD. Support Cancer Care 2005

MALNUTRITION

- Etiology:
  - Metabolic changes due to dx
  - Altered nutrient utilization
  - Poor access to adequate nutrition
  - Dysfunction of GI tract



DEFINING MALNUTRITION

Academy of Nutrition and Dietetics

Identified by 2 or more of the following:

- insufficient energy intake
- weight loss
- loss of muscle mass
- loss of subcutaneous fat
- localized or generalized fluid accumulation
- diminished functional status measured by hand-grip strength

Global Leadership Initiative on Malnutrition

Criteria 1 or more of each category of the following:

- Phenotypic
  - Nonvolitional weight loss
  - Low body mass index (BMI)
  - Reduced muscle mass
- Etiologic
  - Reduced food intake or assimilation
  - Disease burden/inflammation

White JPEN 2012
Jensen JPEN 2018

MALNUTRITION

- Obese ≠ nourished:
  - 12-20% of obese patients malnourished
  - 50% of obese patients found at risk for malnutrition

BMI 30, Male

Image: presenter's personal gallery

Image: presenter's personal gallery

Gioubasanis I. Ann Onc 2015
NCI. Nutrition in Cancer Care PDQ® 2020

CACHEXIA

- Multifactorial syndrome characterized by loss of muscle mass (+/- loss of fat mass) that cannot be reversed by conventional nutrition support

- *Still no magic bullet-*
  - Optimize oral nutrition
  - Side effect management
  - Treatment

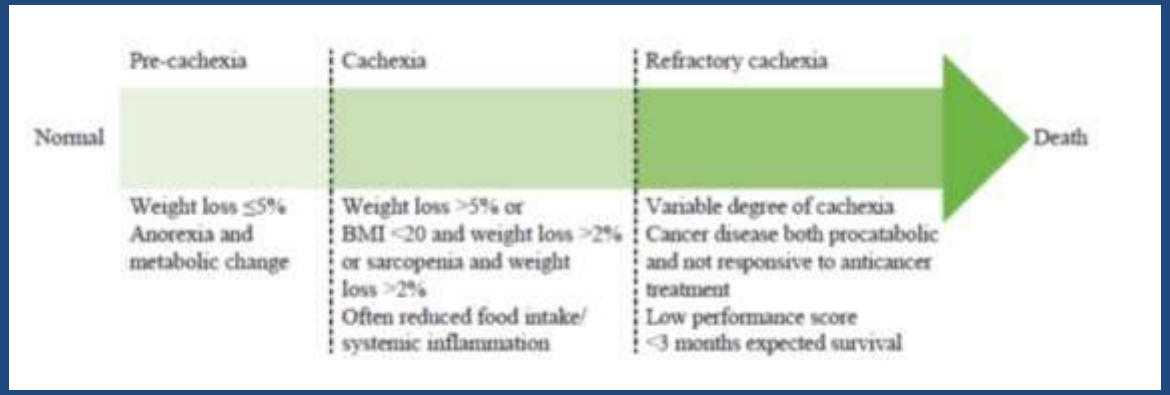
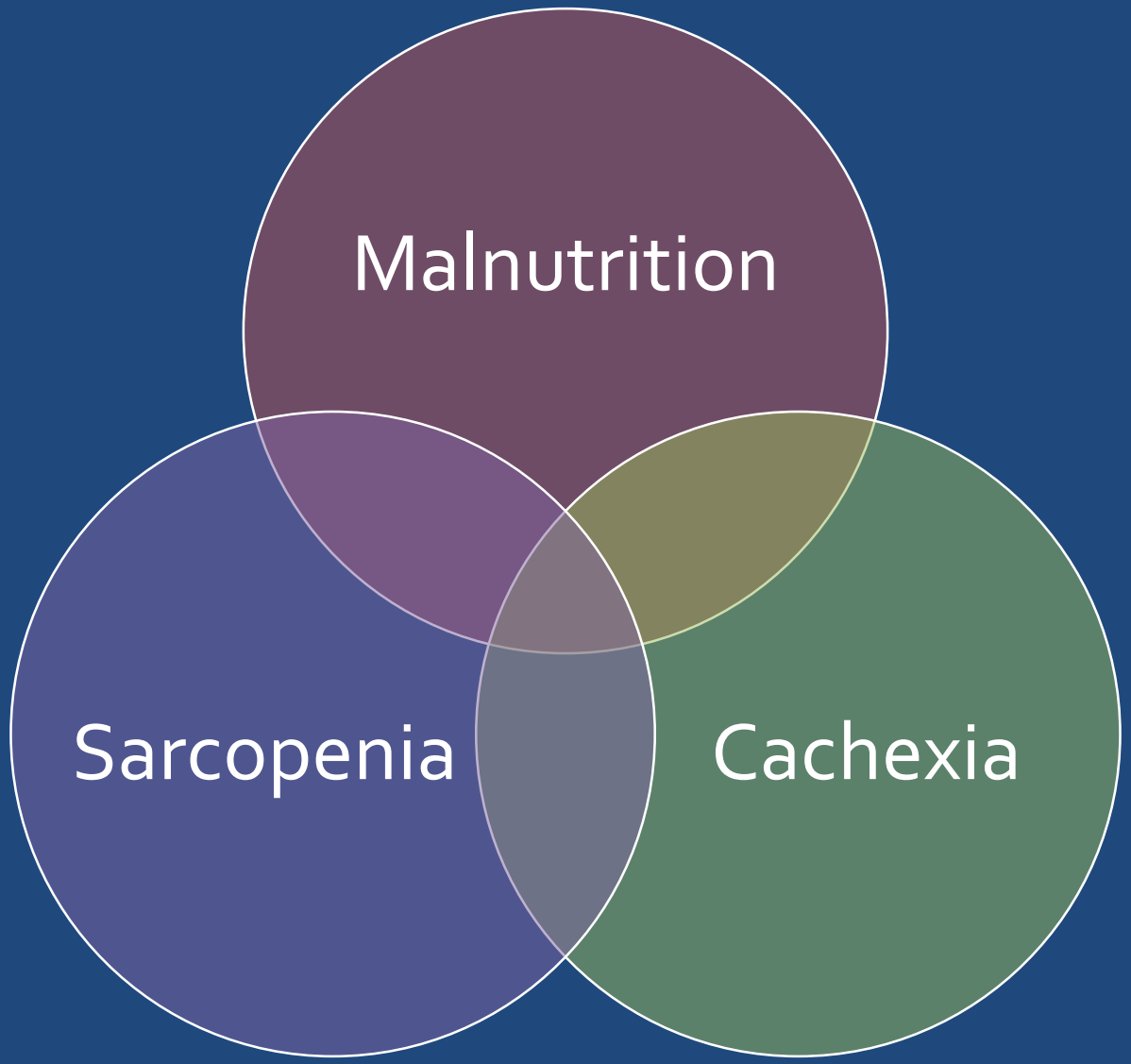
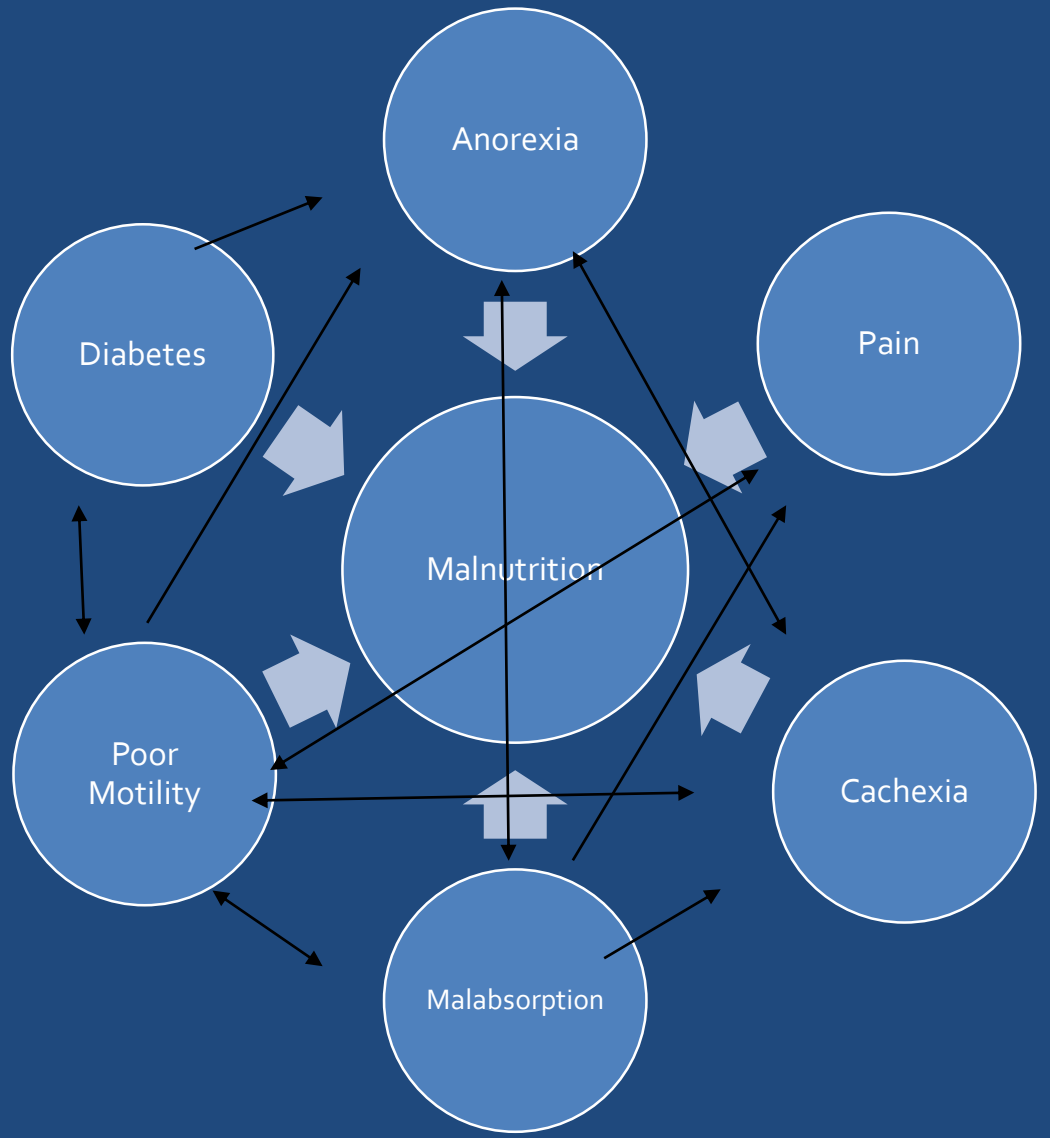


Figure: Fearon 2011

Mueller. World J Gastroenterol 2014


Malnutrition
Sarcopenia
Cachexia

FACTORS CONTRIBUTING TO MALNUTRITION



Arends J. Clinical Nutrition 2017

IMPEDIMENTS TO ADEQUATE NUTRITION

- Tumor location
  - Head/neck, esophagus, stomach, pancreas, small bowel, colon/rectum
- Treatment side effects
- Food insecurity

MALNUTRITION SCREENING

- Nutrition screening – to identify patients who should undergo more formal nutrition assessment
- Variety of tools: PG-SGA, MST, MUST, NRS-2002

Huhmann MB. Nut Clin Pra 2012

Nutritional Risk Screening (NRS 2002)

Tabl	
1	
2	
3	
4	
Yes: No: a pr	

Table 2 Final screening

Impaired nutritional status		**Severity of disease (≈ increase in requirements)**	
Absent **Score 0**	Normal nutritional status	Absent **Score 0**	Normal nutritional requirements
Mild **Score 1**	Wt loss >5% in 3 mths or Food intake below 50–75% of normal requirement in preceding week	Mild **Score 1**	Hip fracture* Chronic patients, in particular with acute complications: cirrhosis*, COPD*. *Chronic hemodialysis, diabetes, oncology*
Moderate **Score 2**	Wt loss >5% in 2 mths or BMI 18.5 – 20.5 + impaired general condition or Food intake 25–60% of normal requirement in preceding week	Moderate **Score 2**	Major abdominal surgery* Stroke* *Severe pneumonia, hematologic malignancy*
Severe **Score 3**	Wt loss >5% in 1 mth (>15% in 3 mths) or BMI <18.5 + impaired general condition or Food intake 0-25% of normal requirement in preceding week in preceding week.	Severe **Score 3**	Head injury* Bone marrow transplantation* *Intensive care patients (APACHE>10).*
Score:	+	**Score:**	**=Total score**
Age	if ≥70 years: add 1 to total score above	**=age-adjusted total score**	

Score ≥3: the patient is nutritionally at-risk and a nutritional care plan is initiated
Score <3: weekly rescreening of the patient. If the patient e.g. is scheduled for a major operation, a preventive nutritional care plan is considered to avoid the associated risk status.

NUTRITION CARE PLAN

- Adequate calories, protein, fluids, micronutrients ("what to eat")
- Liquid nutrition supplements as appropriate
- Side-effect management
- TF, PN, stent?

OPTIMAL DIET

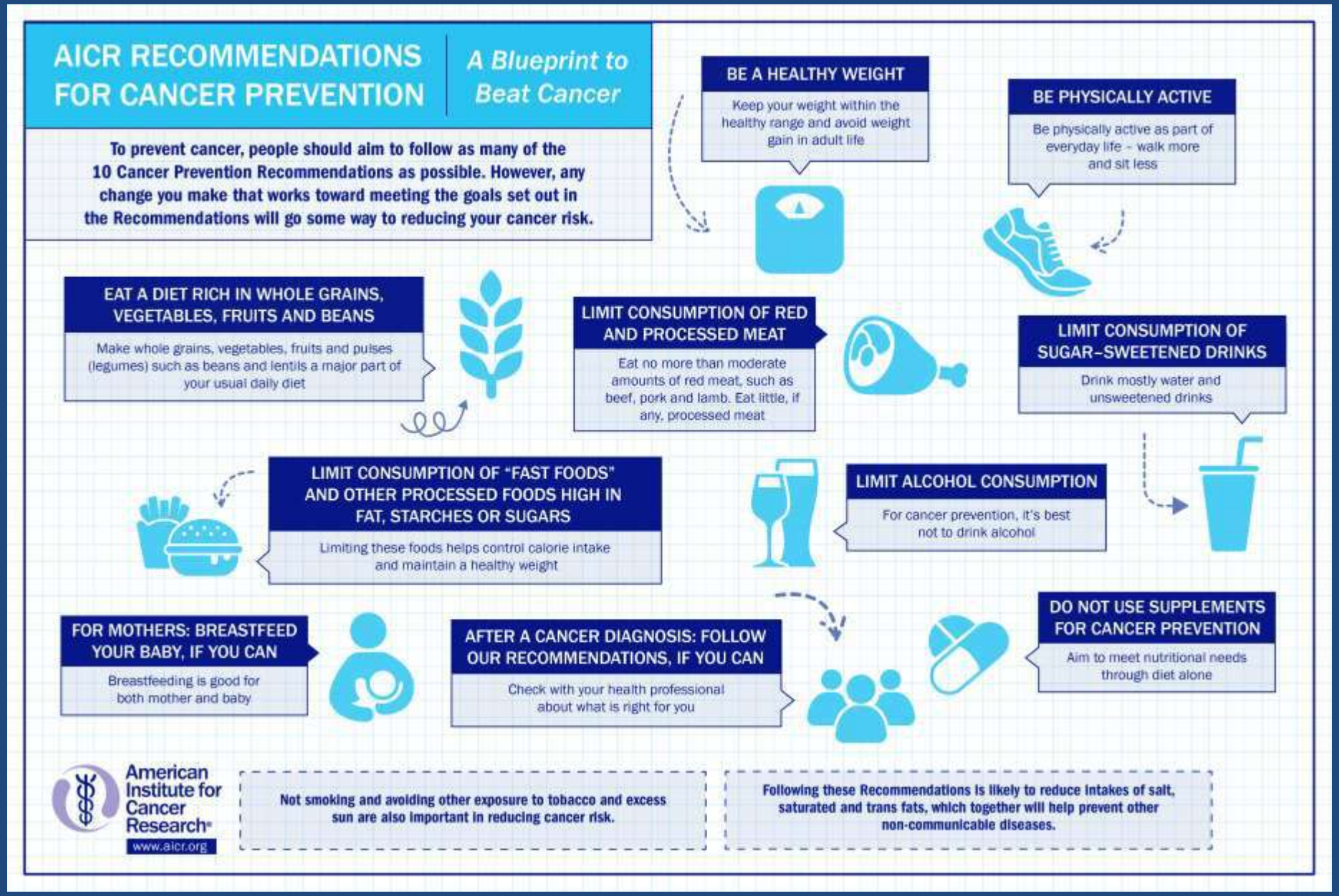
Diet for Prevention = Diet for Survivorship

- The American Institute for Cancer Research and World Cancer Research Fund –

  "After treatment, AICR recommends that cancer survivors follow our recommendations for cancer prevention when and if you are able to do so. These recommendations also reduce the risk of other chronic diseases like diabetes and heart disease."

- The American Cancer Society

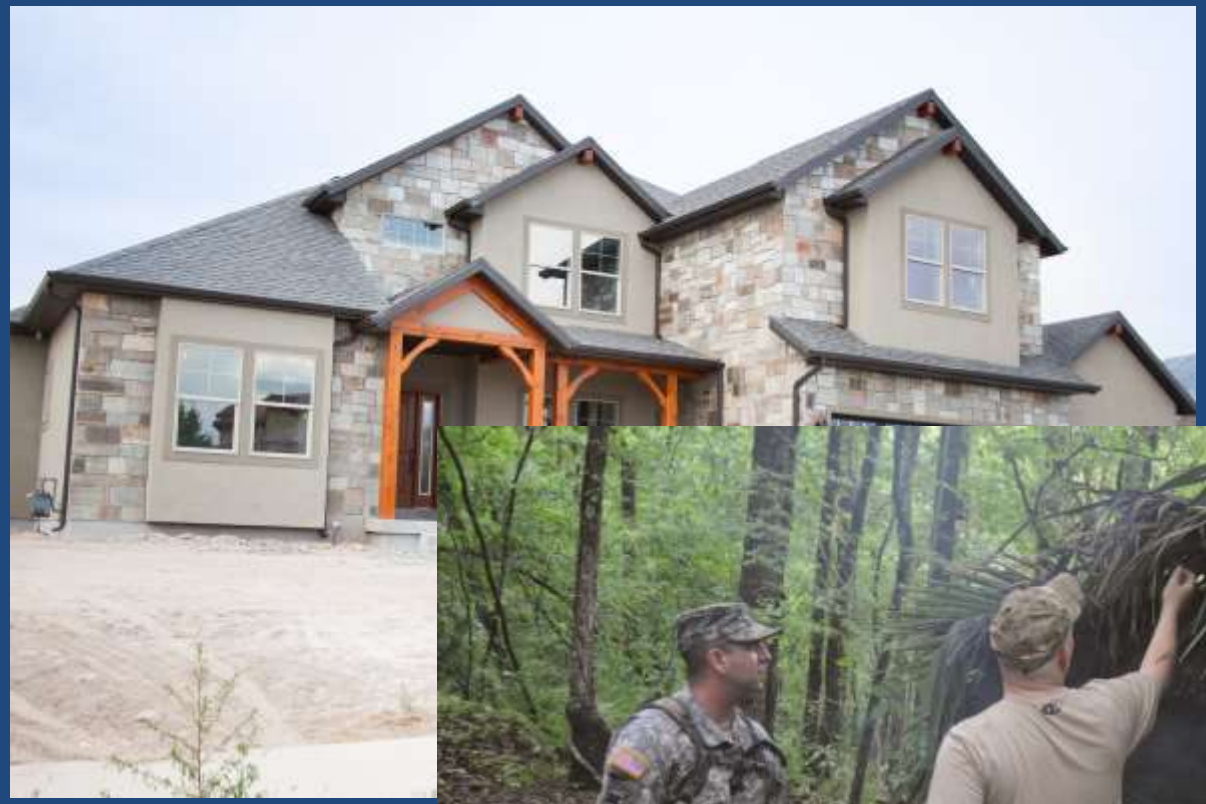
  "Follow the American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention"



Graphic: https://www.aicr.org/learn-more-about-cancer/infographics/10-recommendations-for-cancer-prevention.html accessed 10/30/19

DETERMINING NUTRITION INTERVENTION

- Tumor location (mechanical function impaired or anticipated impairment)?
- Current side effects/symptoms
- Anticipated treatment/side effects
- Anticipated duration of symptoms
- Intent of treatment



Images: Wikimedia Commons

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NUTRITION IMPACT SYMPTOMS

- Symptoms and complications of cancer, anticancer treatment, or medical co-morbidities
- May interfere with appetite and ability to eat or digest food
- GI NIS
  - Mucositis/stomatitis
  - Taste/smell changes
  - Nausea/vomiting
  - Constipation
  - Diarrhea; malabsorption
  - Abdominal pain
  - Obstruction

SIDE EFFECTS BY TREATMENT

Treatment	Effect						
	Dry mouth, sore mouth, taste changes	Early Satiety	Nausea, vomiting	Diarrhea	Constipation	Poor appetite, weight loss	Weight gain
Chemotherapy	X	X	X	X	X	X	
Radiation Therapy	X		X	X	X		
Biotherapy			X	X	X	X	
Hormone Therapy			X				X
Surgery		X	X	X	X	X	

SIDE EFFECTS BY RADIATION SITE

Treatment Site	Effect					
	Dry mouth, sore mouth, taste changes	Difficult or painful swallowing, esophagitis	Nausea, vomiting	Diarrhea	Other acute side effects	Late side effects
Brain		X	X		Loss of appetite	Dysphagia
Head and neck	X	X			Thick saliva	Trismus, dysphagia, xerostomia
Chest		X	X		Loss of appetite	Esophageal stenosis, fibrosis, or necrosis
Abdomen			X	X		Chronic enteritis/colitis, intestinal stricture or obstruction
Pelvis and rectum			X	X		

GENERAL NUTRITION TIPS

- Eat small frequent meals (6-8 per day)
- Plan meals/snacks the day before
- Get plenty of fluids
- Limit use/portions of fat containing food
- Choose nutrient dense foods
- Be active

NUTRITION THERAPY FOR TASTE CHANGES

- Rinse mouth with baking soda & water solution or water with lemon (if no mouth sores).
- Metallic taste: use plastic or glass utensils and serving ware.
- To enhance dull taste use tart flavors: pickles, lemons, vinegar, etc.
- Try new foods or foods previously disliked.

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TASTE CHANGES - THRUSH

- Thrush

(oral candidiasis)

- Treatment:
  - Nystatin: Suspension (swish and swallow orally). Swish/hold in mouth as long as possible.
  - Fluconazole

Treat for 2-3 weeks after clinical improvement

Photo: presenter's personal gallery

Lexicomp Online, accessed 11/5/20

TASTE CHANGES – ZINC DEFICIENCY

- Zinc deficiency
- Treatment:
  - Zinc sulfate: 110-220 mg zinc sulfate (25-50 mg elemental zinc)/dose 3 times/day
  - My experience: 220 mg zinc sulfate daily for 14 days

Heyneman Ann Pharmacother 1996

Lexicomp Online, accessed 11/5/20

NUTRITION THERAPY FOR DIFFICULTY CHEWING/SWALLOWING, MUCOSITIS, XEROSTOMIA

- Try soft, moist foods with extra sauce, dressings, and gravies.
- Avoid: alcohol, citrus, caffeine, tomatoes, vinegar, and hot peppers.
- Try foods at room temperature or chilled.
- Tube feeding as appropriate.

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MUCOSITIS – OTHER CONSIDERATIONS

- Lidocane solution: 5-15 mL, swish and swallow 3-6 times/day
- Cryotherapy (prevention
- Sucralfate (reduced symptom severity

- Other possibilities:
  - Oral glutamine
  - Honey
  - Curcumin
  - Aloe vera
  - Probiotics (pelvic chemo or XRT)

Bowen JM. Supp Care Cancer, 2019
Correa MEP. Supp Care Cancer, 2020
Worthington HV. Cochrane Databaxe, 2011
Lexicomp Online, accessed 11/5/2020

XEROSTOMIA, CONTINUED

- Artificial saliva:
- Saliva Stimulant:
  - Pilocarpine (for Xerostomia associated with XRT for head and neck cancer).

Lexicomp Online, accessed 11/5/20
Worthington HV. Cochrane Databaxe, 2011

NUTRITION THERAPY FOR NAUSEA/VOMITING

- Small, frequent meals/snacks
- Eliminate offending odors
- Liquids separate from meals
- Room temperature foods
- Dry foods on empty stomach
- Avoid sweet, rich, greasy, spicy foods
- Tart/tangy foods
- Ginger tea and ginger ale
- Avoid laying flat for at least 60 minutes after meals

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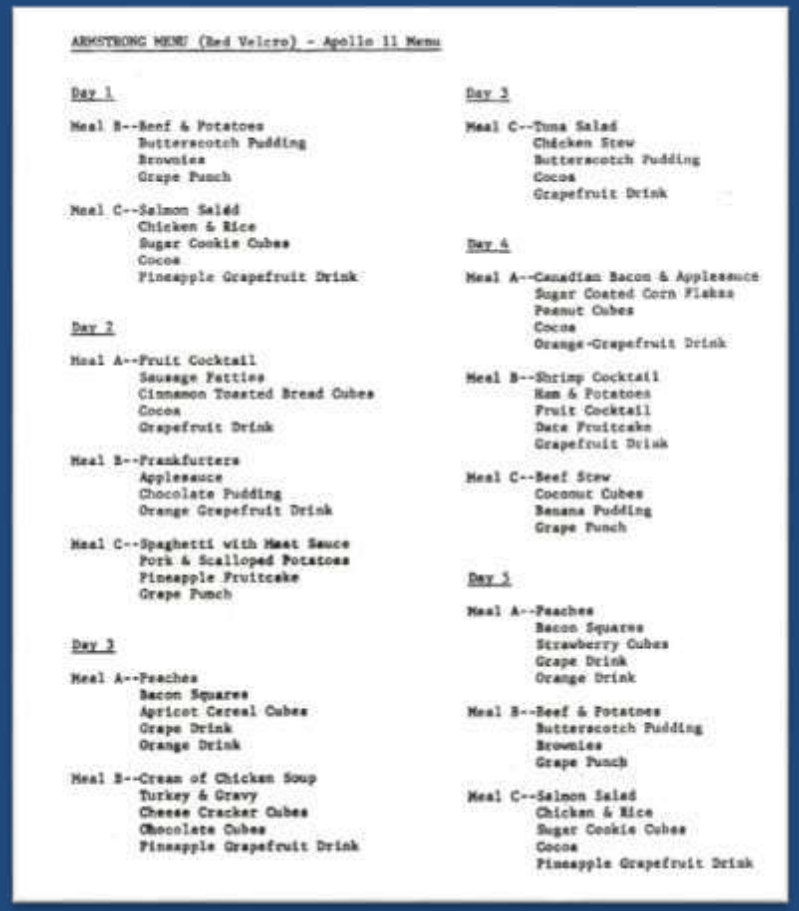
TAKE ANTIEMETICS PROACTIVELY!

- Prochlorperazine
- Promethazine
- Droperidol
- Metoclopramide
- Dolasetron
- Ondansetron
- Lorazepam
- Dronabinol
- Etc…

NUTRITION THERAPY FOR ANOREXIA

- Schedule meals and snacks
- Frequent nutrient-dense meals and snacks
- Add protein and calories to favorite foods
- Light exercise
- Liquid nutritional supplements



ARMSTRONG MENU (Red Velcro) - Apollo 11 Menu

Day 1

Meal B--Beef & Potatoes
Butterscotch Pudding
Brownies
Grape Punch

Meal C--Salmon Salad
Chicken & Rice
Sugar Cookie Cubes
Cocoa
Pineapple Grapefruit Drink

Day 2

Meal A--Fruit Cocktail
Sausage Patties
Cinnamon Toasted Bread Cubes
Cocoa
Grapefruit Drink

Meal B--Frankfurters
Applesauce
Chocolate Pudding
Orange Grapefruit Drink

Meal C--Spaghetti with Meat Sauce
Pork & Scalloped Potatoes
Pineapple Fruitcake
Grape Punch

Day 3

Meal A--Peaches
Bacon Squares
Apricot Cereal Cubes
Grape Drink
Orange Drink

Meal B--Cream of Chicken Soup
Turkey & Gravy
Cheese Cracker Cubes
Chocolate Cubes
Pineapple Grapefruit Drink

Day 3

Meal C--Tuna Salad
Chicken Stew
Butterscotch Pudding
Cocoa
Grapefruit Drink

Day 4

Meal A--Canadian Bacon & Applesauce
Sugar Coated Corn Flakes
Peanut Cubes
Cocoa
Orange-Grapefruit Drink

Meal B--Shrimp Cocktail
Ham & Potatoes
Fruit Cocktail
Date Fruitcake
Grapefruit Drink

Meal C--Beef Stew
Coconut Cubes
Banana Pudding
Grape Punch

Day 5

Meal A--Peaches
Bacon Squares
Strawberry Cubes
Grape Drink
Orange Drink

Meal B--Beef & Potatoes
Butterscotch Pudding
Brownies
Grape Punch

Meal C--Salmon Salad
Chicken & Rice
Sugar Cookie Cubes
Cocoa
Pineapple Grapefruit Drink

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ANOREXIA – APPETITE STIMULANTS

- Appetite Stimulants:
  - Megestrol acetate: SUSPENSION!!
    - Caution: Adrenal suppression, thromboembolism
  - Dronabinol
    - Start low twice daily (before lunch and dinner); titrate up
    - Consider just HS dosing if CNS side effects
  - Mirtazapine
    - HS dosing
    - inverse relationship between dose and sedation
    - This is an SSRI
  - Corticosteroids
    - Avoid prolonged use

Lexicomp Online, accessed 11/5/20
NCI. Nutrition in Cancer Care PDQ® 2020
Riechelmann Am J Hosp Pall Care. 2010

DIARRHEA

- Possible Causes of Diarrhea
  - Chemotherapy
  - Radiation Therapy
  - Surgery
  - Immunotherapy
  - Malabsorption (Pancreatic Exocrine Insufficiency)
  - Pathogenic (*Clostridium difficile)*
  - Lactose Intolerance
  - Pre-existing GI disease
  - Medications
    - Laxatives, stool softeners, sorbitol containing

NUTRITION THERAPY FOR DIARRHEA
INDEPENDENT OF ETIOLOGY

Limit or avoid:

- Lactose (or add lactase)
- Insoluble fiber*
- Foods sweetened with sugar alcohol
- Sugar sweetened beverages
- High fat foods
- High osmotic nutrition supplement drinks
- Caffeine
- Alcohol
- Spicy foods

* Except for during XRT – recommended at start of pelvic xrt for prevention of diarrhea

Bossi Ann Oncol. 2018 (European Society for Medical Oncology Guidelines)
NCI. Nutrition in Cancer Care PDQ® 2020

NUTRITION THERAPY FOR DIARRHEA
INDEPENDENT OF ETIOLOGY

Increase:

- Soluble fiber
- High potassium foods
- High sodium foods
- Fluids

Behavior modification

- Maintain adequate hydration, minimize fluid intake at meals
- Avoid hot liquids
- Limit/avoid caffeine, alcohol, carbonated beverages
- Eat smaller meals more frequently
- ORS with grade 2 or worse or with elderly patients

NCI. Nutrition in Cancer Care PDQ® 2020

HIGH POTASSIUM FOOD WHILE HAVING DIARRHEA

- Banana
- Cantaloupe
- Orange (minimal membrane)
- Papaya
- Avocado
- Potato without skin
- Milk (lactose free)
- Soy milk
- Coconut water
- Low sugar sports drinks, children's electrolyte drinks

HIGH SODIUM FOOD WHILE HAVING DIARRHEA

- Crackers
- Pretzels
- Broth (not hot)
- Low sugar sports drinks, children's electrolyte drinks

DIARRHEA – MEDICATION MANAGEMENT

- Antimotility agents:

Antimotility agents		
Medication	Common Dosing	Maximum Dose
Loperamide*	4 mg by mouth once then 2 mg after each bowel movement	16 mg per day
	2-4 mg four times a day (every 6 hours)	
Diphenoxylate/atropine*	1-2 tablets by mouth 3-4 times a day	8 tablets per day
Deodorized tincture of opium	0.3 mL – 1 mL by mouth 4 times a day	6 mL per day
Codeine	15-30 mg by mouth three or four times a day	
*May be used together, each taken every 6 hours, alternating use resulting in individual taking one or the other every 3 hours.		

- Octreotide
- Bile acid sequestrant

Bossi Ann Oncol. 2018
Bisanz Gastroenterol Nurs. 2010

DIARRHEA – MEDICINAL FIBER

- Medicinal fiber
  - Psyllium or methylcellulose (power or wafers)
  - With 2oz water
  - Take with or immediately after a meal
  - Nothing to drink for 1 hr after

Bisanz Gastroenterol Nurs. 2010

DIARRHEA - SUPPLEMENTS

- Probiotics ?
- Glutamine:
  - Studies show mixed results for chemo-induced diarrhea
  - Not effective with XRT-induced diarrhea

PROBIOTIC FOODS

- Yogurt
- Kefir
- Sauerkraut
- Kimchi
- Miso (soup)
- Sourdough bread
- Buttermilk/acidophilus milk
- Fermented foods (pickles, veggies – in brine not vinegar)
- Tempeh
- Kombucha tea

CONSTIPATION

- Possible causes of constipation:
  - decreased activity
  - decreased food and fluid intake
  - narcotic pain medication
  - fatigue

  - (obstruction)

NUTRITION THERAPY FOR CONSTIPATION

- Push fluids
- Include hot fluids
- Increase activity
- Increase fiber
- Ground flax
- When constipated limit gas forming foods, carbonated beverages, straws, chewing gum

Davies Supp Care Cancer 2020
NCI. Nutrition in Cancer Care PDQ® 2020

WHAT SHOULD PATIENTS EAT?

- Protein:
  - Poultry, fish, meat
  - Beans, peas, lentils
  - Milk, yogurt, cheese
  - Eggs
  - Meat alternatives (tofu, veggie burgers, etc.)
  - Protein powder
  - Nuts, seeds, and nut butters
- Calories:
  - Fruits, vegetables, & complex carbohydrates
    - Bread, cereal, rice, pasta (whole grains)
  - Fats
    - Oils: olive, canola, avocado, flax, etc.
    - Avocado
    - Olives
    - Nuts and seeds

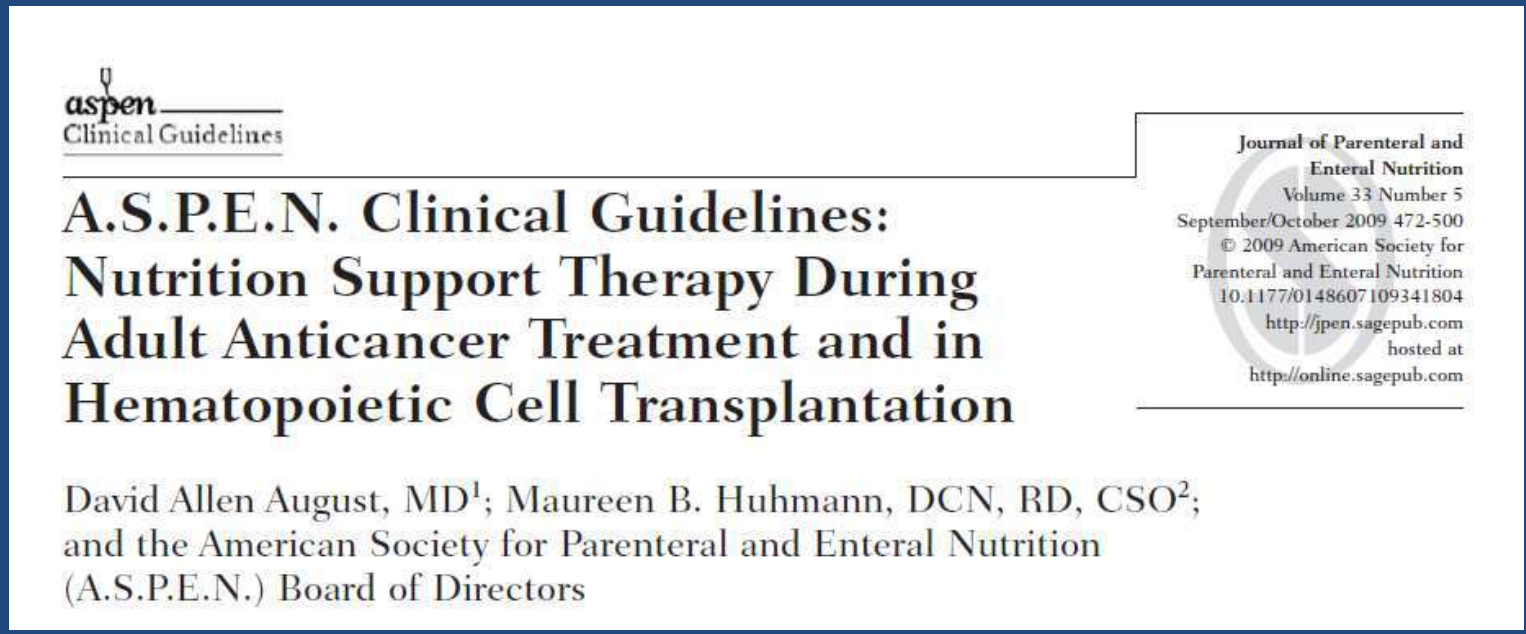
WHAT SHOULD PATIENTS DRINK?

- Most patients require 6-12 cups of fluid per day of non-alcoholic fluid per day to maintain adequate nutrition
  - Water
  - Tea/coffee
  - Broth/soup
  - Juice (100%)
  - Gelatin
  - Sports drinks, children's electrolyte drinks
  - Liquid nutritional supplements

ORAL NUTRITION SUPPLEMENTS

	Standard (1 cal/mL)	"Plus" (1.5 cal/mL)	Powder mix (whole milk)	Snack (1/2 PB sand, 1/2 c whole milk)
Calories	240-250	350-360	280	350
Protein	9-10	13-14	13	12

Home-made
Smoothies: - Liquid: juice, yogurt, milk, soy milk - Fruit/vegetable - Protein: powder, tofu, cottage cheese, Greek yogurt



aspen Clinical Guidelines

A.S.P.E.N. Clinical Guidelines: Nutrition Support Therapy During Adult Anticancer Treatment and in Hematopoietic Cell Transplantation

Journal of Parenteral and Enteral Nutrition
Volume 33 Number 5
September/October 2009 472-500

10.1177/0148607109341804
http://jpen.sagepub.com
hosted at
http://online.sagepub.com

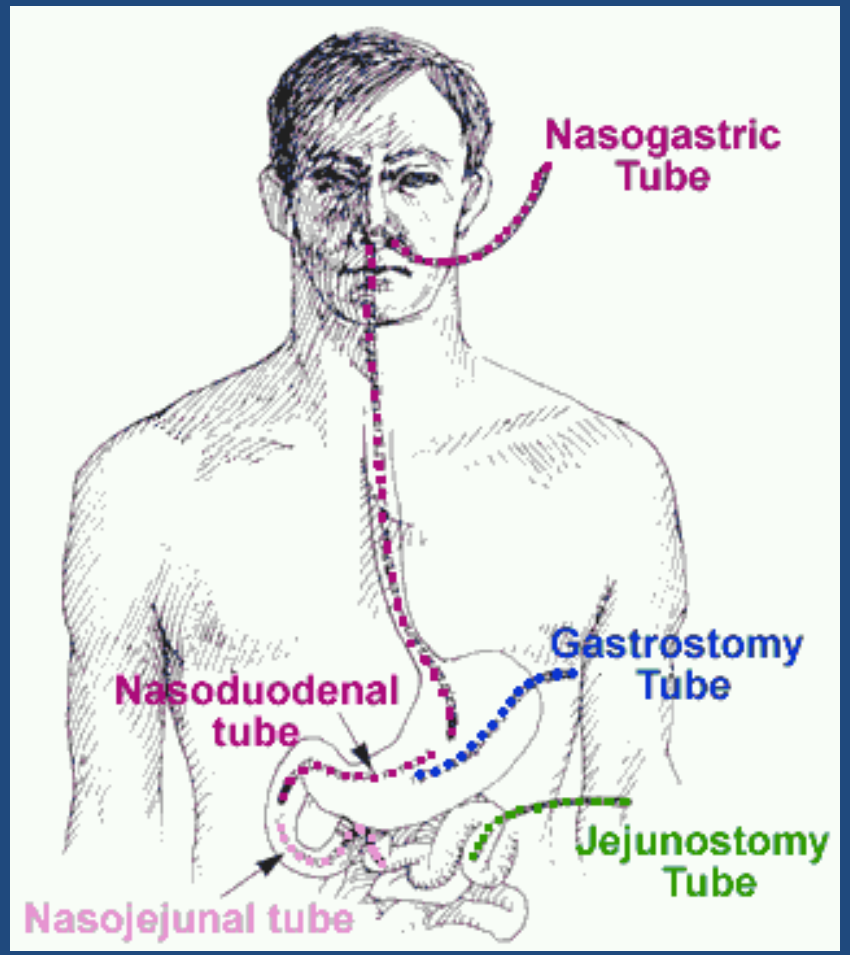
David Allen August, MD[1]; Maureen B. Huhmann, DCN, RD, CSO[2]; and the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) Board of Directors

- Not recommended for routine use.
- Appropriate in patients receiving active treatment who are malnourished and who are anticipated to be unable to ingest or absorb adequate nutrients for a prolonged period of time.

NUTRITION SUPPORT

- Type: Enteral vs. Parenteral
- Indications
  - Inability to take food orally
  - If the gut works….use it.
  - Use of enteral feeding (vs. parenteral) may reduce the risk of septic complications and length of stay

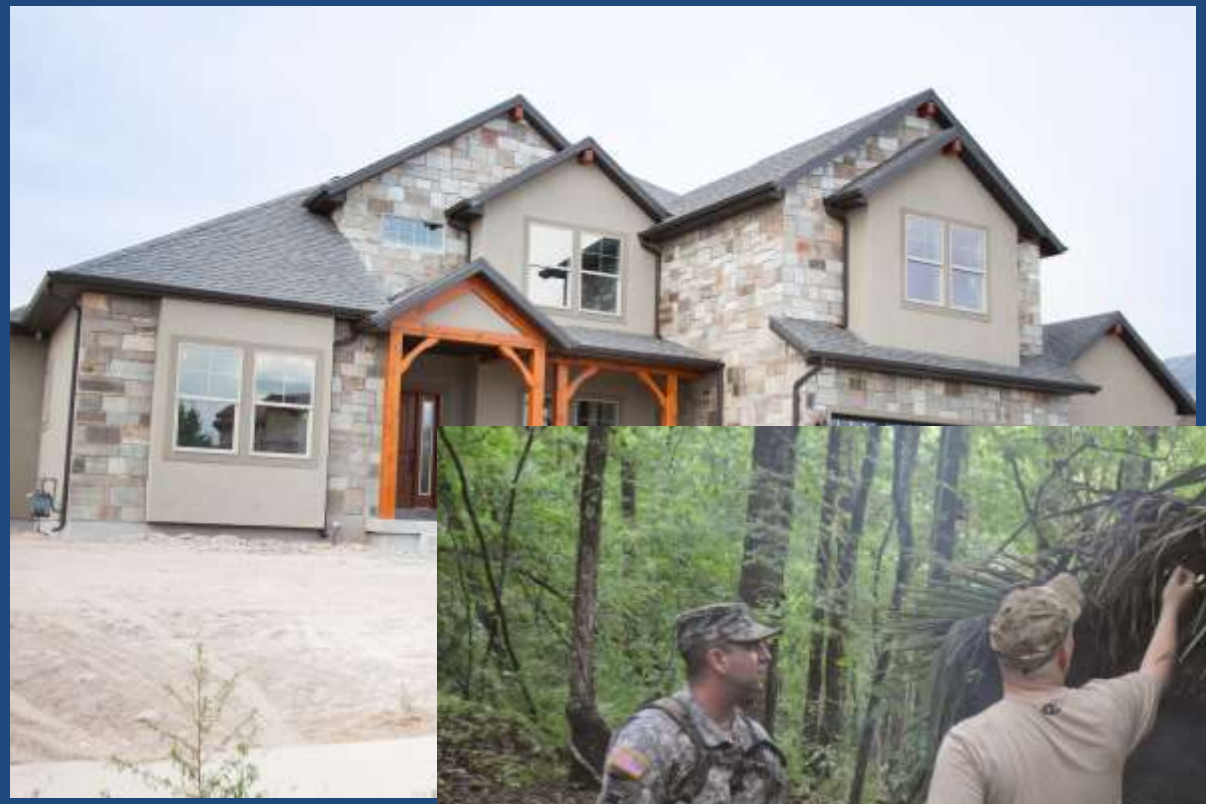
TYPES OF FEEDING TUBES



FEEDING METHOD

- Gastrostomy Tube:
  - Bolus
  - Gravity
  - If demonstrated failure of bolus or gravity then pump

- Postpyloric tube/Jejunostomy Tube
  - Pump feeding only!



Images: Wikimedia Commons

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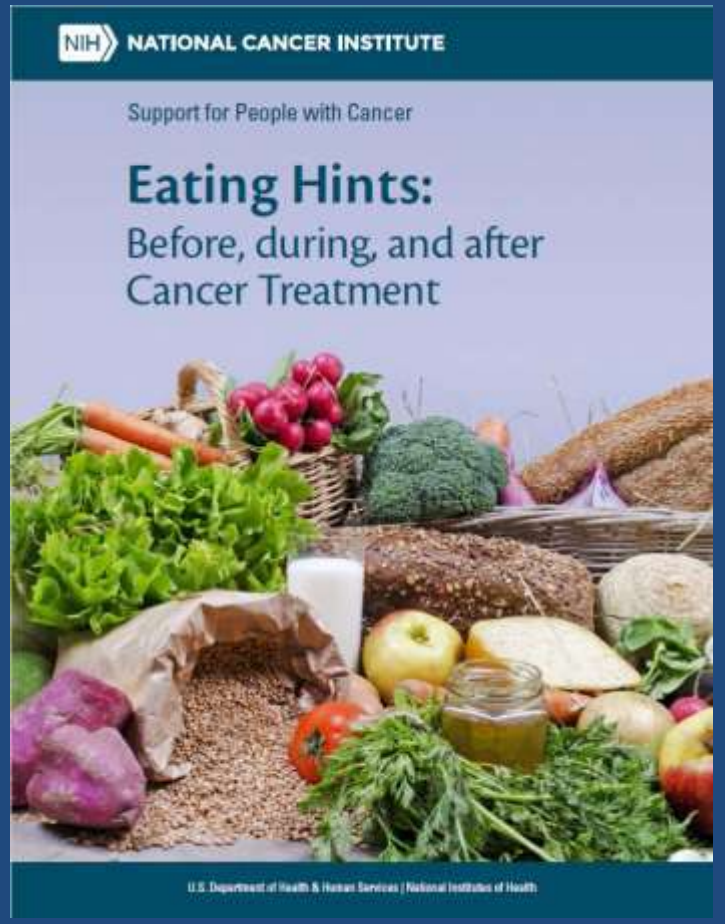
PATIENT EDUCATION RESOURCES

American Cancer Society®

cancer.org | 1.800.227.2345

Nutrition for the Person With Cancer During Treatment



BOOKS/COOKBOOKS FOR PATIENTS

- The Complete Guide to Nutrition for Cancer Survivors (American Cancer Society)
- What to Eat During Cancer Treatment (American Cancer Society)
- Eating Well Through Cancer (by Clegg and Miletello)
- The Cancer-Fighting Kitchen (by Katz and Edelson)

RESOURCES FOR THE PRACTITIONER

- Oncology Nutrition for Clinical Practice (via the Academy of Nutrition and Dietetics)
- Clinical Nutrition for Oncology Patients (Mary Marian)

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PRESENTATION REFERENCES

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QUESTIONS?

Thank you!

PATIENT FAQS

1. What foods should I avoid?
2. What foods should I eat to fight [insert cancer type here]?
3. My neighbor said her uncle followed a _____ diet and he's cured, can I follow that diet?
4. Does sugar feed cancer?
5. What supplements should I take?

SOY FOODS

- (Breast Cancer) Studies show no harmful effects of whole soy foods in the diet and studies are looking at possible role of reducing cancer risk (all). May help tamoxifen work better.
- Good source of anti-cancer phytochemicals
- Several soy foods are also good sources of probiotics

- Whole soy foods:
  - Edamame
  - Soy milk
  - Tofu
  - Tempeh
  - Miso
  - Soy nuts

SUGAR AND CANCER

- Every cell in our body uses sugar (glucose) for energy
- No clear evidence that sugar in diet preferentially feeds tumors
- Excess sugar = excess calories = increase risk for obesity = increased risk for cancer

Stellar resources for patients:

AICR short video

www.oncologynutrition.org

KETOGENIC DIET

- Demonstrated benefit in glioblastoma
- What is "keto"?
- Other studies inconclusive at this time

- Recommend only in clinical trial setting

SUPPLEMENTS

Patients should:

- Know what you are taking
- Let your team know
  - Concerns:
    - Interaction with other medications, nutrients, treatment
    - Safety
    - Efficacy
    - Side effects

SUPPLEMENT RESOURCES

ConsumerLab: independent product testing
www.consumerlab.com

The National Institutes of Health Office of Dietary Supplements-
http://dietary-supplements.info.nih.gov

Memorial Sloan Kettering Cancer Center Website
www.mskcc.org/cancer-care/integrative-medicine

National Center for Complementary and Alternative Medicine
www.nccam.nih.gov/

U.S. Pharmacopeia Convention
www.quality-supplements.org