

Nutrition & Wellness for Pediatric Cancer Survivorship

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October 3rd, 2026

Presentation Topics

Survivorship Facts

- Vit D, Calcium & Bone Health
- Microbiome & Gut health
- Anti-Inflammatory Diet
- Weight Balance & Meal Patterns

Summary of goals, ideas, tips, resources & [recipes](#)

Pediatric Cancer Survivorship

- Childhood cancer is not one disease - there are 12 major types of pediatric cancers and over 200 subtypes
- Improvements in cancer care means 5 year survival rates are over 85%
- As of 2022, more than 521,000 pediatric cancer survivors were living in the United States, a number projected to exceed 580,000 by 2040.
- Survivors experience nearly twice as many chronic conditions (an average of 17 over time, by age 50) as their peers without a history of cancer
- Children with cancer are treated while still growing and developing. They are particularly susceptible to late effects and therefore require long term follow up care to monitor for and manage these late effects

Late Effects & Risk Depends

- **Cancer**
 - Type of cancer and organs / tissues affected
- **Treatment**
 - Type of radiation, chemo, stem cell transplant , surgery
- **Patient**
 - Survivors age and sex at diagnosis, pre-diagnosis health problems and / or developed during treatment
 - Length of time since diagnosis and end of treatment
 - Ability of health tissue affected by treatment to repair itself
 - Genetics, socioeconomic status and health habits

Pediatric Cancer Survivorship

- Individualized care with multidisciplinary follow up clinic is important in making sure the survivors' health and wellness is appropriately monitored
- Nutrition intervention and education can play a significant role in both primary and secondary prevention of chronic disease

Pediatric Cancer Survivorship

- Many survivors report unhealthy lifestyle habits:
 - Almost 80% of survivors not meeting RDI for fruits/vegetables
 - Over 80% consume 1/3 of their diet from fat sources
 - 50% do not meet exercise guidelines
- Possible Reasons Why
 - Too tired and/or too busy
 - Lack of access to gym
 - Fatty foods have visual appeal
 - High fat foods consumed socially
 - Lack of knowledge about choosing healthier foods
 - Lack of access to food options

Survivorship Guidelines

- Eat 5 or more servings of fruits + vegetables
- Include high-**fiber** food in the diet (whole grains, legumes, vegetables, fruits)
 - **Fiber** serves so many important roles in the body including contributing to satiation to help avoid overeating
 - bulking up but softening the stool to help keep bowel movements regular
 - decreasing lipid levels in the blood
- Limit red meat (beef, pork, lamb) and processed meats
 - When eating meat, choose leaner cuts prepared by broiling, boiling, or baking
- Limit added / refined sugars
- Be physically active often
- Maintain a healthy weight for your body





Bone Health and Diet

Cancer survivors are at increased risk for osteopenia and osteoporosis, as a result of too little bone formation or too much bone loss

Bone Health, Calcium and Vitamin D

Causes

- Corticosteroids
- Endocrine dysfunction
- Gonadal insufficiency
- Transplant history
- Low physical activity
- Low body weight
- Inadequate nutrient intake

Assessment

- Calcium-rich food intake
- Vitamin D intake
- Protein adequacy
- Supplement use
- Fracture history
- Relevant laboratory or imaging results

Intervention

- Weight-bearing and resistance activity when medically appropriate;
- Coordinate with endocrinology and bone-health specialists for low BMD, fractures, or hormonal insufficiency
- Increase calcium and vitamin D intake through food and/or supplementation



Source: Academy of Nutrition and Dietetics

Suggestions for Improving Bone Health

- Get adequate calcium
 - Generally 1000-1500 mg elemental calcium, but may vary by age, history and results of DEXA scan
- Get adequate **VITAMIN D** levels can be decreased as compared to peers at diagnosis and can persist into survivorship
 - Adults: 2000-4000 IU/day (50-100 mcg)
 - Children over 1 year: 1000-3000 IU/day (25 -75 mcg)
- Engage in activity with weight-bearing
 - Walking, jogging, hiking, climbing stairs, yoga, tennis, dancing, martial arts
- Engage in resistance exercises → weight lifting, start with your own body weight and increase safely, ideally with guidance

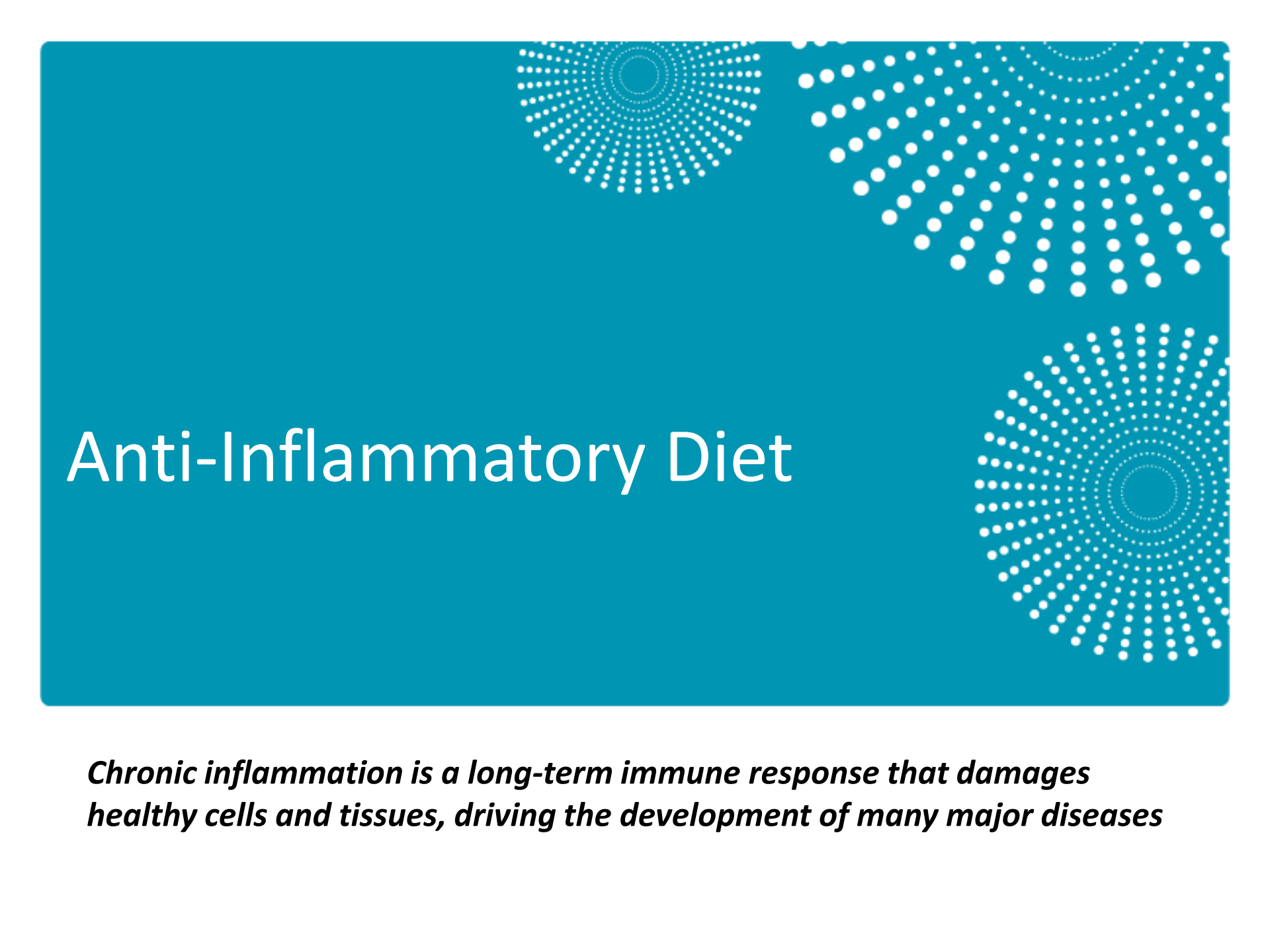
Calcium

Food sources of calcium

- Dairy (milk, cheese, yogurt)
- Non-dairy (salmon, tofu, collards, broccoli, white beans, fortified foods: orange juice, fortified rice/soy/nut milks, and some cereal)

Supplements

- Bound to salt: carbonate, gluconate, citrate, lactate
- Recommendations are based on elemental calcium (the amount available for absorption)
- Calcium carbonate
 - Most prevalent and provides more elemental calcium (less tablets required)
 - Requires stomach acid → take after meals
- Calcium citrate
 - Best absorbed (does not require stomach acid → take any time)
 - Requires more tablets



Anti-Inflammatory Diet

Chronic inflammation is a long-term immune response that damages healthy cells and tissues, driving the development of many major diseases

Anti-Inflammatory Diet

- Inflammation is a component of the immune response to tissue injury
- Uncontrolled or prolonged inflammation can cause damage to tissues and have effects contributing to disease states
- Fat plays a major role in inflammation, and there are both pro-inflammatory fats (saturated, trans, hydrogenated fats) and anti-inflammatory fats

Anti-Inflammatory Foods

FOODS THAT FIGHT INFLAMMATION

Chronic inflammation has been linked to cancer, heart disease, diabetes, arthritis, depression, and Alzheimer's. Fight inflammation with a healthy diet.



ANTI-INFLAMMATION FOODS



Tomatoes



Fruits

Strawberries, blueberries, oranges and cherries.



Nuts

Almonds, walnuts, and other nuts.



Olive oil



Leafy greens

Spinach, kale, collards, and more.



Fatty fish

Salmon, mackerel, tuna, and sardines.

INFLAMMATION FOODS



Fried foods



Sodas



Refined carbs



Lard



Processed meats

Research shows the foods we eat and lifestyle choices we make can lower inflammatory markers and reduce the risks of chronic disease, such as diabetes, cardiovascular disease, and some types of cancer



Maximize plant-based foods

- **Phytochemicals & Polyphenols** are biologically active compounds from plants and are proven to be a major factor in reducing the risk of cancer and preventing different diseases
 - Promote cellular repair
 - Boost the immune system
 - Have antioxidant effects
 - Stops DNA damage to cells and tissues → protects against cancer and chronic disease
 - Have anti-inflammatory, antiviral, and antibacterial activity
 - Inhibit harmful pathways activated during the inflammatory process

Examples for Everyday

High amounts found in:

- Citrus, apples
- Cherries, pomegranates, berries, grapes
- Vegetables (onions, artichokes, spinach)
- Cocoa products and dark chocolate
- Whole grain (Oats)
- Plant Extracts (green tea, red wine, olive oil, curcumin)
- Beans, Nuts, Soy



Anti-Inflammatory Diet

Omega-3 fatty acids

Omega-3s help control inflammation, improve heart health and brain function and decrease the risk of cancer and other diseases

Sources of omega-3 fatty acids

Fish/fish oil

Omega-3 eggs

Plant sources: nuts/seeds/oats/avocado

- Especially walnuts, flaxseed, pumpkin seed, chia seed, canola oil, and soybean oil



Sources of Omega-3 Fatty Acids

Per 3 oz serving– cooked

	<u>Omega-3 (mg)</u>
• Herring	2300
• Salmon	2300
• Trout	2000
• Mackerel	1571
• Tuna	900
• Halibut	800
• Cod	200

Best choices: wild seafood has higher Omega-3 value than farm raised



Foods Influencing Inflammation



Pro-Inflammatory Foods:

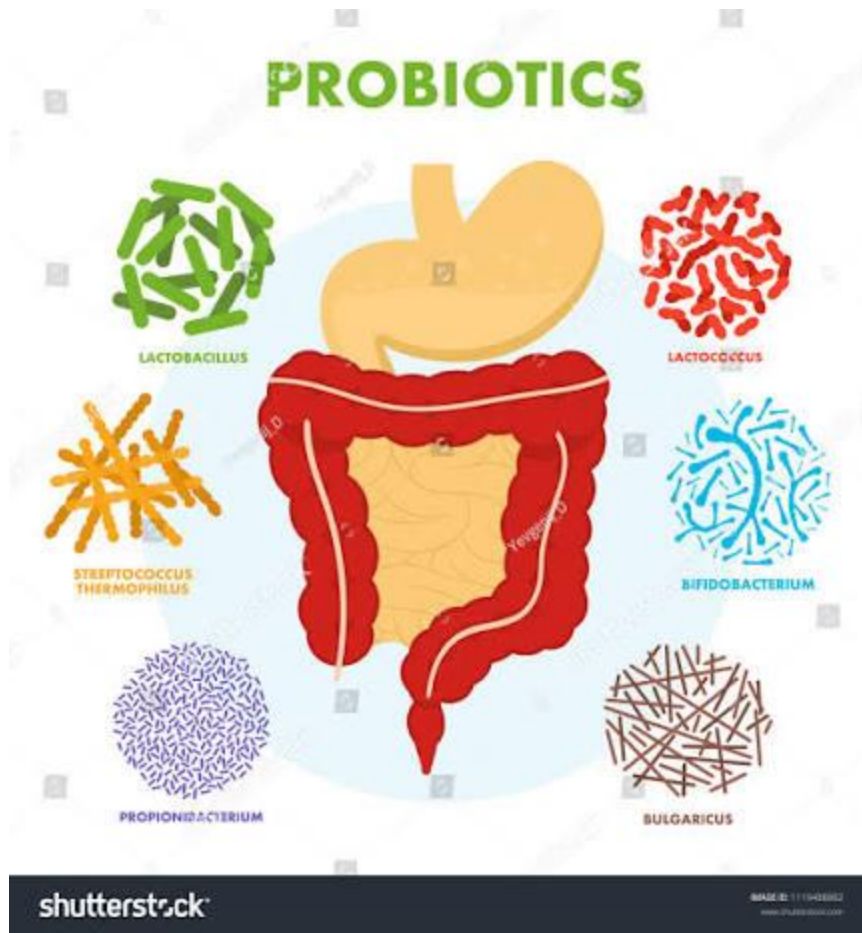
- High intakes of red meat (beef, pork, lamb) choose grass-fed, higher in omega-3's
- High fat diets, especially those high in trans-fats, hydrogenated fats and saturated fats
- Fried foods
- Refined carbohydrates/grains
- Sugar, drinks with sugar and high fructose corn syrup
- Processed foods
- Charred foods (pro-oxidative effects)
- Alcohol
- margarine, shortening, and lard



Gut Health & Microbiome

Treatment for childhood cancer can result in chronic problems of the gastrointestinal tract

Microbiota and Gut Health



G.I. tract contains
bacteria species called
Microbiota

“normal flora”

- Different types of bacteria inhabit different areas of the GI tract
- The human gut contains 2-3 pounds of bacteria
- **Microbial Diversity matters!**

What is the Gut Microbiome?

- **Microbiota:** All microorganisms (bacteria, fungi, viruses) living in the gut
 - can be both good and harmful both preventing and causing infection and disease
 - produce nutrients that nourish your colon cells and they play a crucial role in human health by preventing disease
- **Microbiome:** Collective community of microorganisms, their genetic information (DNA), plus their environmental conditions and functional activity
- **Example:**
 - **microbiota:** “workers” in the gut
 - **microbiome:** “workplace”

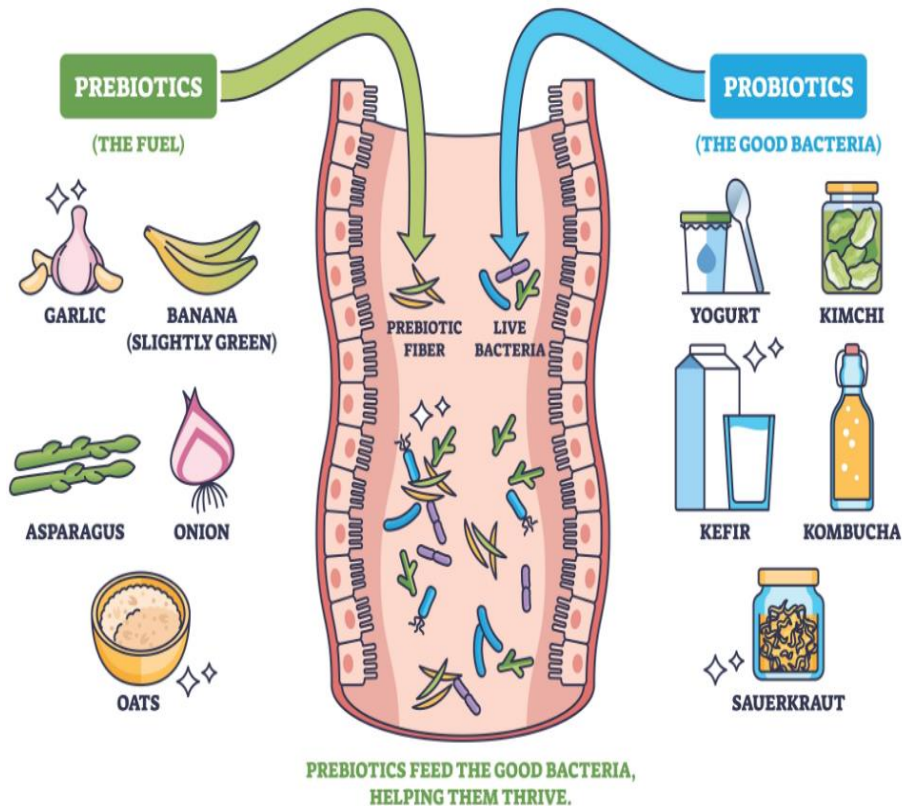
How & Why Microbiota Play an Important Role

Main functions: structural, protective, and metabolic

- Help keep the digestive tract healthy so allergens and bacteria cannot cross into the blood stream
- Play a role in the development of healthy cells and tissue
- Production of short-chain fatty acids (SCFA)
- Synthesis of enzymes, vitamins, and amino acids
- Aid in fermentation of non digestible substrates like fibers and mucus
- Help absorb fatty acids, salts and water
- Help prevent harmful bacteria from living in our GI tract and support our immune system (example of Dysbiosis)
- Diet changes have the potential to prevent intestinal inflammatory process therefore your gut microbiome can be reshaped by dietary intervention

Microbiota and Gut Health

PREBIOTICS AND PROBIOTICS



Probiotics: “Live microorganisms” which, when administered in adequate amounts, provide a health benefit to the host by:

- Competing with pathogens to prevent their adhesion to the intestinal wall , nurture GI mucosa
- Prevent bacteria from invading the GI tract

Prebiotics: Nondigestible carbohydrates (fiber) that positively promote GI homeostasis by feeding the friendly bacteria in the gut, so that they can produce nutrients for you colon cells

Fermented Food Benefits and Examples



- Transport Probiotics into the GI tract/digestive system
- Enhance absorption of food by producing helpful enzymes
- Promote immunity (healthy bacteria fight illness and infection)

**Note: Use of probiotics and raw, unpasteurized food during active cancer treatment is not recommended as they may cause infection in immunocompromised patients*

Prebiotics: Foods that nourish “good” bacteria

- Chicory root, Jicama root, Yacon root
- Dandelion greens, asparagus
- Jerusalem artichoke
- Garlic, onion and leeks
- Bananas (under-ripe better)
- Barley and oats
- Cocoa
- Flaxseeds
- Apples

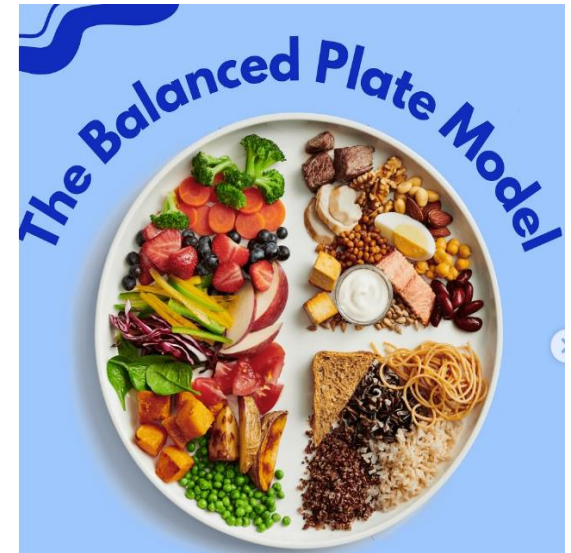
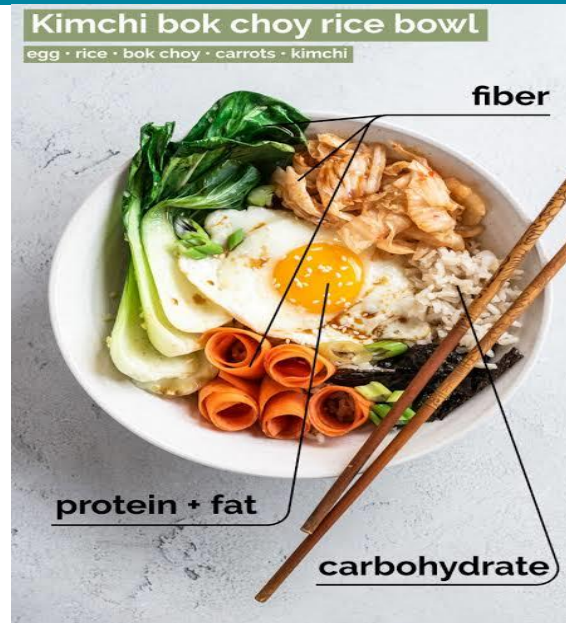
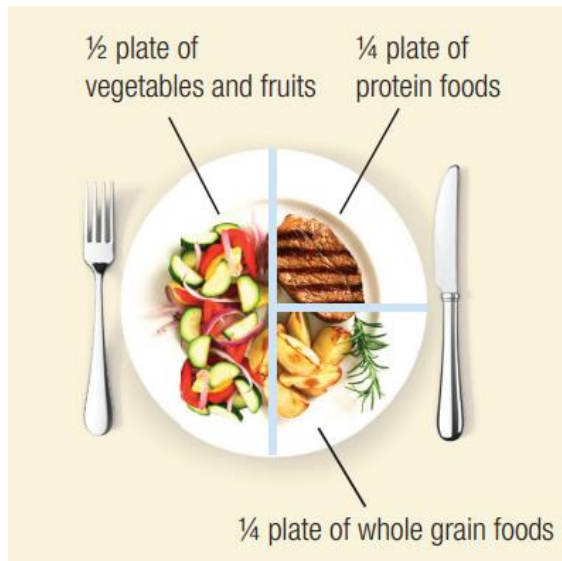




Weight Balance & Meal Patterns

Getting to and staying at a healthy weight matters for your long-term health and chronic disease risk

Ratio, Balance and Patterns



- Be “mindful” when eating. We tend to eat more calories, and to eat food with fewer nutrients when we are engaged in other activities such as watching TV, driving, or reading while eating
- Prevent and/or resolve malnutrition
- Talk to your healthcare professional about what would be a healthy weight for you
- If you have experienced unintentional weight gain, talk to your healthcare team about a healthy way to lose the extra pounds

Ideas for a Balanced Plate

Healthy Snacks = Protein + Carbohydrate

Protein	Carbohydrate
Yogurt	Berries or Canned Fruit
Peanut/Nut Butter	Apple Slices
Cottage Cheese	Sliced Pears or Peaches
String Cheese	Rye crackers or Low fat whole wheat crackers
Tuna Salad/Egg Salad, Chicken Salad	In half a sandwich, pita bread; on crackers
Hummus Dip	Raw vegetables
Split Pea, Bean or Minestrone Soup	Multigrain Bread/Toast
Vegetarian Refried Beans/Salsa	Baked Chips
Soy Milk	Fruit (Try them together in a smoothie)
Chili Beans	Baked Potato
Sunflower Seeds, Nuts	Dried Fruit, Salad
Meats, fish, poultry	Cereal

Habits to Develop

Choose a variety of foods from all the food groups. Try to eat at least 1½ to 2½ cups of vegetables and 1 to 2 cups of fruit each day

Include citrus fruits and dark-green and deep yellow vegetables in your diet regularly. Fruits and vegetables can be fresh, frozen, or canned without added salt or sugar

Fill your plate with more plant foods and less animal foods. Plant foods such as vegetables, fruits, whole grains and beans should fill at least ¾th of the plate. Fish, poultry, or lean red meat should fill no more than ¼ the of the plate

Eat plenty of high-fiber foods, such as wholegrain breads, high fiber, low sugar, cereals, and beans. Goal = 25 g fiber per day

Decrease the amount of fat in your meals by baking or broiling foods. Limit or avoid salt-cured, smoked, and pickled foods (including bacon, sausage, and deli meats

Limit fried, processed foods, limit drinks with added sugar

No amount of alcohol is recommended

If you choose to drink alcohol, limit the amount



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Review

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Healthy living after treatment of childhood, adolescent, and young adult cancer

- Does your plan include foods that you will enjoy eating for the rest of your life, not just a few weeks or months?
- Does your plan include a variety of foods?
- Are foods on your plan easily available at your supermarket?
- Does your plan fit into your lifestyle, daily schedule and budget?
- Does your plan include lifestyle changes that will help you maintain a healthy weight for your body?

Survivorship Wellness

Benefits of regular exercise and good nutrition for childhood cancer survivors include:

- promoting healing of tissues/organs damaged by cancer and treatment
- building strength and endurance
- reducing risk of certain adult cancers and diseases (diabetes, heart disease)
- decreasing stress
- providing a feeling of well-being

Putting it into Practice...

- Have a meat-free meal one day/week
- Vary your vegetables, change up the color and preparation
- Aim to have no tech distractions for one meal/day
- Explore a new physical activity or movement that feels good
- Try a new fermented food
- Reduce sitting time, move on the hour
- Avoid overly restrictive diets

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<https://www.cookforyourlife.org/>

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Oncology Nutrition: Free Nutrition Resources

<https://community.eatrightpro.org/community-home/librarydocuments?LibraryKey=a53c060d-ecb3-43a7-8f94-018a67b3b8f7&folder=afd0d934-21e5-41eb-8768-01910a805468>

Cook Through Cancer: Meals that Matter <https://www.wcrf.org/living-well/health-guides-cookbooks/cook-through-cancer-meals-that-matter/>

WCRF All recipes <https://www.wcrf.org/living-well/eating-well/recipes/>

Budget Bites: <https://www.wcrf.org/living-well/health-guides-cookbooks/budget-bites-cookbook/>

Diversified Table Recipes: <https://community.eatrightpro.org/community-home/librarydocuments?LibraryKey=a53c060d-ecb3-43a7-8f94-018a67b3b8f7&folder=5eff9362-c2b3-482f-ac58-01987649b68f&5a583082-7c67-452b-9777-e4bdf7e1c729=eyJwYWdlYW5kZXgiOjAsImxpYnJhcnllbnRyeSI6bnVsbH0%3D>

THANK YOU!



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