

## Highlights

- Many nutrition professionals agree that eating different foods rich in nutrients is important to maintain and improve good health.
- Patients who eat well and keep or achieve a healthy weight usually manage treatment side effects better.
- Certain foods may cause a bad reaction with some of the drugs that are used to treat cancer. Members of your treatment team will tell you which foods to avoid.
- You may want to ask your doctor to refer you to a registered dietitian for specific nutrition advice and guidance.
- Cancer research related to nutrition is still in its early stages. It may be hard to find truthful, honest advice because of the myths and misinformation about this subject.

## Introduction

Eating well is important for everyone. The types and amounts of foods that we eat affect our energy levels, our moods and how we feel about ourselves. A healthy lifestyle plays a key role in keeping the body strong, supporting the immune system (the cells and proteins that defend the body against infection) and reducing risk for some diseases, such as certain kinds of heart disease and some types of cancer.

## Food Safety

Handling food safely is important for everyone. People who are being treated for cancer can have weakened immune systems, which increases their risk for illness caused by food. Safe food handling includes the following guidelines:

- Keep your hands, counters, dishes, cutting boards, sinks, knives and utensils clean.
- Wash dishtowels often.
- Wash sponges in the dishwasher regularly along with your dishes or boil the sponges for five minutes to remove bacteria.
- Rinse fruits and vegetables well, BEFORE peeling, so dirt and bacteria are not transferred onto the fruit or vegetable. Cut away any damaged or bruised areas before preparing or eating. Throw away the outside leaves of a head of lettuce or cabbage.
- Use separate dishes, cutting boards or utensils when preparing raw or cooked meat, fish or poultry. Do not use the same serving dishes and utensils for meat, fish and poultry after they are cooked.
- Do not rinse raw meat and poultry before cooking because bacteria can spread to the sink or countertops.
- Keep raw eggs, meat, poultry, seafood, and the juices of all food that will be cooked away from foods that won't be cooked.
- Thaw frozen items in the microwave or refrigerator, not on the kitchen counter. Thaw foods by using one of the following methods:
  - Put the food item in the refrigerator 1 day before cooking
  - Use the defrost setting on a microwave. Cook right away.
- Marinate food in the refrigerator.
- Use a food thermometer to make sure that meat is fully cooked.
- Read the expiration dates on food products and look for signs of food spoilage. If in doubt, throw it out. Don't taste food that looks or smells "funny" or bad. Leftovers should be used within one to four days depending on the food product. Refrigerate or freeze all cooked and perishable food within two hours of purchasing and preparing. Refrigerate ready-to-eat food and leftovers right after you eat. Take special care to quickly store rice and pasta below 40°F if you plan to re-use it. Grains, such as rice and pasta, can contain bacterial spores that may lead to food poisoning. Ideally use cooked rice and pasta within 24 hours.
- After grocery shopping, go directly home and put perishable food into the refrigerator or freezer right away.
- If you need to make a stop after grocery shopping, place perishable foods in an insulated bag or cooler with gel packs.

Here is an easy way to remember food safety basics.

**Clean** – wash hands and surfaces often.

**Separate** – keep different types of foods apart.

**Cook** – ensure food is cooked to proper temperatures.

Cooked food should be steaming hot all the way through.

Food can also be tested by a thermometer and should maintain a temperature of 160°F for 2 minutes in the center of the thickest area.

**Chill** – refrigerate promptly.

The Partnership for Food Safety Education (PFSE) educates the public about safe food-handling practices. The PFSE website offers additional information and also has fun ideas for children regarding food safety.

### Partnership for Food Safety Education (PFSE)

(202) 220-0651

[www.fightbac.org](http://www.fightbac.org)

## Nutrition During and After Cancer Treatment

Eating well helps people living with cancer feel better and stay stronger during and after cancer treatment. If you eat well and keep or achieve a healthy weight, you will usually manage the side effects of treatment better. Good nutrition also helps the body replace blood cells and healthy tissues that are damaged as a result of cancer treatment.

Many nutritionists agree that eating a variety of foods is the best method to ensure intake of all the nutrients that the body requires. A healthy eating pattern includes a combination of the following food groups to a calorie intake level that maintains a healthy body weight.

A healthy diet includes

- A variety of vegetables including legumes (beans and peas). Approximately 50 percent of your plate should be vegetables not including potatoes.
- Fruits, especially whole fruits.
- Grains, half of which should be whole grains. Limit refined grains like white rice and white bread.
- Fat-free or low-fat dairy (e.g. milk, yogurt, cheese and/or fortified soy beverages).
- A variety of protein foods including seafood, lean meats, poultry, eggs, beans, nuts, seeds and soy products.
- Oils. Use healthy oils like olive oil and canola oil for cooking and in salad dressings.

A healthy diet limits saturated fats and trans fats (e.g. butter) to less than 10 percent of all calories consumed each day. Consume less than 10 percent of calories per day from added sugars. Consume less than 2,300 mg of sodium (salt) per day.

Drink water, tea and coffee to maintain hydration. Consider decaffeinated beverages if you are experiencing diarrhea or reflux, as caffeine may make these symptoms worse. Avoid sugary drinks such as soda.

Discuss drinking alcohol with your doctor before consumption. If you do drink, do so in moderation. This means having no more than 1 drink a day if you are a woman and no more than 2 drinks a day if you are a man. One drink equals:

- 12 ounces of beer
- 5 ounces of wine
- 1.5 ounces of 80-proof liquor.

For more information and resources to help plan a healthy diet see: [www.cancer.gov/publications/patient-education/eating-hints](http://www.cancer.gov/publications/patient-education/eating-hints) or [www.choosemyplate.gov](http://www.choosemyplate.gov).

In addition to good nutrition, a healthy lifestyle includes

- Maintaining or achieving a healthy weight
- Drinking enough fluid
- Exercise. This is an important part of a healthy lifestyle and can reduce anxiety, fatigue and improve heart function and feelings of self-esteem. Consult your doctor before beginning a new exercise program. Gradually increasing exercise levels, through low risk activities like short daily walks, can be the best method to start an exercise program.
- Relaxation (managing stress)
- Getting enough sleep (for adults 7 to 9 hours sleep per night is recommended)
- Not using tobacco or abusing drugs, and limiting or not drinking alcohol.

Foods cannot be used to treat cancer, but some things you eat or drink and some actions you avoid can make a difference in your health and how you feel. For example, it's important to know if what you eat is causing a bad reaction with your medication. It's also important to know how much you should eat to achieve or maintain a healthy weight and also be aware of how much water you are drinking.

## Cancer Drug Treatment and Nutrition

Certain foods may cause a bad reaction with some of the drugs that are used to treat cancer. Members of your treatment team will tell you which foods to avoid.

When you begin a new treatment or start using a new drug, it is a good idea to tell your doctor about any food allergies you have and all vitamin and herbal supplements you are taking.

You should also ask the following questions:

- Will I have any special nutritional needs while taking this medication?
- Do I need to take this medication with food or should I take it without food?
- Are there any known vitamins or drug supplements that I shouldn't take while undergoing this treatment?
- Are there any foods or beverages I should avoid during this treatment?
- Do I need to drink extra water or other fluids while in treatment or while taking this medication?
- Can I drink alcoholic beverages, including beer and wine, while in treatment or while taking this medication?
- What if I vomit immediately after taking my medication?

For other questions to ask your doctor about side effects, see the free LLS publication *Understanding Side Effects of Drug Therapy*.

## Your Appetite

People living with cancer may have different nutrition goals and challenges, depending on their

- Age
- Type of cancer
- Stage of cancer
- Type of treatment
- Other medical conditions such as high blood pressure, heart disease, diabetes or depression.

Your cancer and the treatment for it may increase your body's need for calories and protein. Chemotherapy, certain other drug therapies and radiation therapy create a need for more calories and protein. Side effects of your treatment, such as loss of appetite, nausea, mouth sores and taste changes, may also make it a challenge for you to take in enough calories and protein.

Decreased appetite can be very challenging and distressing especially when it results in weight loss. It can be difficult for patients and families to cope with changes in food likes and dislikes and eating behavior that is caused by decreased or changed appetite. If appetite continues to be poor, your doctor may wish to try an appetite stimulant.

The following nutrition tips can help you to get the most nutrition out of each bite of food when decreased appetite is a problem:

- Eat small meals or snacks frequently throughout the day.
- Keep prepared snacks or small meals on hand and be sure to take them with you when you will be away from home.
- Try high calorie liquids such as juices, soups or shakes if eating solid foods is a problem.
- For extra calories, add gravy, milk, butter or cream to your food whenever possible.
- Use healthy fats like olive oil, avocado, and nut butters to boost calories.
- Choose soft foods or foods that can be cooked until tender.
- Try new foods and recipes to accommodate changes in taste or smell.
- When possible, take a walk before meals to improve appetite.
- Eat with friends or family members when possible.
- Make a list of your favorite foods and be sure to have these foods on hand.
- Try over the counter high calorie, high protein drinks like Carnation Breakfast Essentials, Ensure, Boost, or Orgain.
- Keep snacks and desserts handy and visible.
- Keep a bottle of water with you and sip it throughout the day to prevent dehydration.
- Accept help with food shopping and meal preparation.
- Sign up for cooking classes for people with cancer, which are offered in many areas. Your LLS chapter may know of classes that you can attend if you are interested.
- If water tastes unpleasant, try taking in liquids through food, such as watermelon; flavor water with fresh cut fruit; or try sports drinks, tea or milk.
- If food tastes bland try seasoning it with spices.
- If your mouth is sore, try non-acidic, non-spicy foods.
- If meat is not enjoyable try getting protein from other sources, such as eggs, cheese, nuts or high-protein smoothies.

## Weight Gain

For some patients, weight gain may occur as a result of increased appetite or fluid retention (“bloating”) associated with certain drug therapies. Weight-loss diets are not recommended without proper medical guidance. For help, ask your oncologist to refer you to a dietitian who can design an appropriate diet for you.

Obesity has been associated with an increased risk of being diagnosed with different types of cancer including blood cancers. Further research is required to assess whether obesity has a clear effect on treatment outcomes for cancer. More information about diet in relation to cancer risk and prevention can be found at the National Cancer Institute ([www.cancer.gov/about-cancer/causes-prevention/risk/obesity/obesity-fact-sheet](http://www.cancer.gov/about-cancer/causes-prevention/risk/obesity/obesity-fact-sheet)).

## Get Enough to Drink

Certain cancer therapies, including chemotherapy, other drug therapies and radiation therapy can increase risk for dehydration. Some side effects of treatment, such as diarrhea and vomiting, increase the need for more fluids. Fever can also increase the risk for dehydration. Signs of dehydration include:

- Thirst
- Dry or sticky mouth and/or swollen tongue
- Dizziness and/or headaches
- Nausea
- Constipation
- Dry skin
- Weight loss
- Dark urine.

If you are taking medications by mouth, drink plenty of fluids throughout the day. Sipping even small amounts of liquids at regular intervals will help if that is all you can manage. Drinking large amounts of fluid at once may cause vomiting. Do not wait until you feel dehydrated and thirsty to drink. Try and maintain your fluid levels before you become dehydrated. If you feel fatigued, make sure fluids are within easy reach. Fluid requirements are based on several factors such as age (infants, children and older adults have a greater risk of dehydration), activity level, climate and medical treatment. Women and overweight or obese individuals are at greater risk for dehydration. Check with your treatment team for guidance on the amount of fluid you should have each day.

Your treatment team may recommend liquids, such as broths or sports drinks—these can restore the body’s electrolyte balance. Electrolytes, such as sodium and potassium, have many important functions in the body. Vomiting and diarrhea increase your body’s loss of electrolytes. Check with your treatment team to see if you need extra help in keeping your body’s fluid in balance by drinking liquids that contain electrolytes.

If water does not appeal to you, flavored fluids are fine. It is best to avoid alcohol as this can increase your body’s fluid loss.

## Dental Health

Dental care is an important part of overall cancer care. Problems with the teeth, gums or mouth can interfere with eating well. And poor nutrition can lead to dental problems. Visit the dentist at least four weeks before treatment begins if possible, and

- Maintain good dental and oral hygiene to help prevent gum disease and infection.
- Brush teeth two to three times a day with a fluoride toothpaste with mild taste – flavorings can irritate the mouth.
- Gently floss once a day.
- Rinse the mouth with a solution of water, salt and baking soda every 2 hours.
- Use an antibacterial rinse two to four times a day to prevent gum disease. Avoid alcohol-based mouthwashes.
- Use a lip-care product to prevent your lips from drying and cracking.
- Brush dentures daily.
- Avoid hot, spicy, highly acidic and crunchy foods that may irritate your mouth.
- Try soft texture and moist foods if your mouth is dry or sore.
- Avoid sugary foods, such as candy or soda that can cause cavities.
- Avoid alcohol and tobacco products.
- Inspect your mouth daily to detect any problems with sores, ulcers or infection.
- Speak with your oncologist and dentist as soon as possible if you have any mouth, tooth or jaw pain—or any other symptom of possible dental problems.
- Ask your healthcare team for tips on how to keep your teeth and mouth clean, and for their suggestions on how to reduce dental discomfort. If needed, your oncologist may refer you to a dental oncologist (a dentist who is specially trained to treat people with cancer).

When you go to the dentist, update your medical history records to include your cancer diagnosis and treatments, and provide your dentist and your oncologist with each other's name and telephone number so they can consult with each other. You may be advised to have any necessary major dental procedures completed before beginning therapy, if possible.

For more information on dental and oral hygiene see the free LLS fact sheet *Dental and Oral Complications of Cancer Treatment Facts*.

### Diet Guidelines for Immunosuppressed Patients

Food safety is important during and after cancer treatments. The immune system is often weakened by cancer treatments making the body more susceptible to foodborne illnesses. Diet guidelines published by institutions or doctors about handling food safely recommend avoidance of foods that are more frequently associated with illness. Some common foods that should always be avoided are:

- Raw or undercooked meat and poultry. Especially ground beef and salami. All meat should be cooked well done.
- Raw or undercooked shellfish, fish and smoked fish, including sushi and sashimi which may contain uncooked fish.
- Unpasteurized beverages, such as fruit juice, milk and raw milk yogurt.
- Soft cheeses made from unpasteurized milk.
- Uncooked eggs, unpasteurized eggs and foods made from raw egg such as homemade raw cookie dough and homemade mayonnaise.
- Refrigerated pate, cold hot dogs or deli lunch meat, including dry-cured uncooked salami and deli prepared salads containing these items, eggs or seafood.
- Raw sprouts, such as alfalfa sprouts.
- Unwashed fresh fruit and vegetables. Before eating, wash all fruit and vegetables, even if you are going to peel off the skin.
- Foods from buffets and salad bars when eating out. Order all foods to be fully cooked and well done and ask the wait staff if you are not sure of the ingredients in your meal.

It is also recommended that if you have a well for your water source, a water filter should be installed on the tap or where the water enters the house. You can get your water tested at no cost. If a filter is needed and cannot be afforded, you can

boil your drinking water. To sterilize water keep it at a rolling boil for at least one minute, or three minutes at altitudes above 2000 meters (about 6,562 feet).

In your search for a diet that is designed for people who have weakened immune systems, you may come across one that is called the “neutropenic diet.” This diet was supposed to help individuals with lower-than-normal neutrophil counts (neutropenia) learn how to decrease exposure to bacteria and other harmful organisms found in some foods. However, a universally-accepted definition of what foods should be included in this diet was never developed. In a review of studies, the neutropenic diet was never proven to decrease exposure to bacteria in foods. This diet does not seem to benefit patients in any way. Safe preparation and handling of foods is more important than restricting intake of specific food groups, as balanced diet and nutrition is important for coping with chemotherapy and other cancer treatments.

Patient education regarding food safety is important. For specific instructions about your diet, consult your treatment team.

For more information, see:

[www.fda.gov/Food/FoodborneIllnessContaminants/PeopleAtRisk/ucm312565.htm](http://www.fda.gov/Food/FoodborneIllnessContaminants/PeopleAtRisk/ucm312565.htm)

### Evaluating Nutrition and Supplement Information

Nutrition and cancer research is still in its early stages. It may be hard to sort out dependable, science-based advice from misinformation and myth.

If you are interested in understanding more about nutrition news that you have seen on the Internet, read about in a magazine or newspaper, or heard on the news or from a friend or relative, it is important to speak to a member of your oncology team. Don't try a vitamin or herbal supplement on your own because it could interfere with your cancer treatment. For example:

- St. John's wort, an herbal product used to treat depression, reduces the effectiveness of imatinib (Gleevec®), a drug used to treat chronic myeloid leukemia and Philadelphia-positive acute lymphoblastic leukemia.
- Green tea supplements can interfere with the effectiveness of bortezomib (Velcade®).

Patients who are experiencing depression should talk to their doctors about safe treatment options and be sure to tell their doctors about any medications or supplements they are taking.



## Dietitians and Nutritionists

You may want to ask your doctor to refer you to a registered dietitian for specific nutrition advice and guidance. The terms “nutritionist” and “dietitian” are often used to mean the same thing, but they are not the same. Dietitians may refer to themselves as nutritionists, but not all nutritionists are dietitians. The registered dietitian (RD) credential signifies that a clinician has completed academic and accredited internship experience, has successfully passed the national credentialing exam, and maintains ongoing continuing education and professional development in accordance with the Commission on Dietetic Registration. Dietitians who are board certified specialists in oncology also have the CSO credential (Certified Specialist in Oncology) in addition to being an RD. You can find an RD through [www.eatright.org](http://www.eatright.org) and an RD-CSO through [www.oncologynutrition.org](http://www.oncologynutrition.org).

A dietitian can

- Develop an individualized eating plan that meets your needs
- Help you manage changes in appetite and weight
- Help you deal with side effects of treatment
- Advise you about foods, vitamins, herbs and supplements
- Develop a personalized cancer survivorship wellness plan.

Patients who cannot eat and drink enough for extended periods of time may be referred by their oncologists to a dietitian to help determine whether a feeding tube should be used for nutrition during treatment, and the best type of formula to use. Some patients may need to receive their nutrition through an IV. These forms of therapy may be needed to keep you as healthy and strong as possible during treatment.

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## We're Here to Help

LLS is the world's largest voluntary health organization dedicated to funding blood cancer research, education and patient services. LLS has chapters throughout the United States and in Canada. To find the chapter nearest to you, visit our Web site at [www.LLS.org/chapterfind](http://www.LLS.org/chapterfind) or contact

### The Leukemia & Lymphoma Society

3 International Drive, Suite 200

Rye Brook, NY 10573

Contact an Information Specialist at (800) 955-4572

Email: [infocenter@LLS.org](mailto:infocenter@LLS.org).

LLS offers free information and services for patients and families touched by blood cancers. The following entries list various resources available to you. Use this information to learn more, to ask questions, and to make the most of your healthcare team.

**Consult with an Information Specialist.** Information Specialists are master's level oncology social workers, nurses and health educators. They offer up-to-date disease and treatment information. Language services are available. For more information, please

- Call: (800) 955-4572 (M-F, from 9 a.m. to 9 p.m. EST)
- Email: [infocenter@LLS.org](mailto:infocenter@LLS.org)
- Live chat: [www.LLS.org/information specialists](http://www.LLS.org/information specialists)
- Visit: [www.LLS.org/information specialists](http://www.LLS.org/information specialists).

**Free Information Booklets.** LLS offers free education and support booklets that can either be read online or ordered. For more information, please visit [www.LLS.org/booklets](http://www.LLS.org/booklets).

**Información en Español (LLS information in Spanish).** For more information, please visit [www.LLS.org/espanol](http://www.LLS.org/espanol).

**Telephone/Web Education Programs.** LLS offers free telephone/Web education programs for patients, caregivers and healthcare professionals. For more information, please visit [www.LLS.org/programs](http://www.LLS.org/programs).

**LLS Community.** The one-stop virtual shop for chatting with other patients and staying up-to-date on the latest diagnosis and treatment news. Share your experiences with other patients and caregivers and get personalized support from trained LLS staff. To join, visit [www.LLS.org/community](http://www.LLS.org/community).

**Weekly Online Chats.** Moderated online chats can provide support and help cancer patients to reach out and share information. For more information, please visit [www.LLS.org/chat](http://www.LLS.org/chat).

**Sign Up for an E-Newsletter.** Read the latest disease-specific news, learn about research studies and clinical

trials, and find support for living with blood cancer. Please visit [www.LLS.org/signup](http://www.LLS.org/signup).

**LLS Chapters.** LLS offers support and services in the United States and Canada including the *Patti Robinson Kaufmann First Connection Program* (a peer-to-peer support program), in-person support groups, and other great resources. For more information about these programs or to contact your chapter, please

- Call: (800) 955-4572
- Visit: [www.LLS.org/chapterfind](http://www.LLS.org/chapterfind).

**Clinical Trials (Research Studies).** New treatments for patients are ongoing. Patients can learn about clinical trials and how to access them. For more information, please call (800) 955-4572 to speak with our LLS Information Specialist who can help conduct clinical-trial searches. When appropriate, personalized clinical trial navigation by trained nurses, is also available.

**Advocacy.** The LLS Office of Public Policy (OPP) engages volunteers in advocating for policies and laws that encourage the development of new treatments and improve access to quality medical care. For more information, please

- Call: (800) 955-4572
- Visit: [www.LLS.org/advocacy](http://www.LLS.org/advocacy).

## Resources

### American Institute for Cancer Research (AICR)

[www.aicr.org](http://www.aicr.org)

The American Institute for Cancer Research provides evidence-based answers for patients about managing diet. They offer practical, reliable advice on what to eat and how to get active again once your cancer treatment is over as well as recipes and tips for healthy, everyday changes.

### Academy of Nutrition and Dietetics

[www.eatright.org/public](http://www.eatright.org/public)

The Academy of Nutrition and Dietetics provides reliable nutrition information and other resources. You can search for a registered dietitian.

### American Society of Clinical Oncology (ASCO)

[www.cancer.net](http://www.cancer.net)  
(888) 651-3038

ASCO provides nutrition recommendations for during and after treatment.

### Food and Nutrition Information Center (FNIC)

(301) 504-5414

<http://fnic.nal.usda.gov>

FNIC, part of the US Department of Agriculture, provides information on dietary supplements, food safety and the nutritional composition of foods.

### FoodSafety.gov

[www.foodsafety.gov](http://www.foodsafety.gov)

FoodSafety.gov includes information about keeping food safe and posts food recalls.

### MedlinePlus

[www.nlm.nih.gov/medlineplus](http://www.nlm.nih.gov/medlineplus)

MedlinePlus provides links to current healthcare information. It is compiled by the National Library of Medicine at the National Institutes of Health (NIH).

### Nutrition.gov

[www.nutrition.gov](http://www.nutrition.gov)

Nutrition.gov provides information about healthy eating, physical activity and food safety.

### Oncology Nutrition

[www.oncologynutrition.org](http://www.oncologynutrition.org)

Oncology Nutrition provides a search tool to find a registered oncology dietitian in your area.

### Partnership for Food Safety Education (PFSE)

[www.fightbac.org](http://www.fightbac.org)  
(202) 220-0651

PFSE is an organization dedicated to educating the public about safe food handling practices. The website is a resource for food-safety information.

### PubMed

[www.pubmed.gov](http://www.pubmed.gov)

PubMed is a service of the National Library of Medicine that enables searches for science-based information. It includes more than 21 million citations for biomedical literature from MEDLINE, life science journals, and online books.

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