



HEAL

Healthy Eating and Activity for Living

WELL

A Cancer Nutrition Guide

HEAL Well: A Cancer Nutrition Guide

HEAL Well: A Cancer Nutrition Guide was created through a joint project of the American Institute for Cancer Research (AICR), the LIVESTRONG Foundation, and Savor Health™. This guide provides general information regarding nutrition and cancer, addresses common questions people have about diet, nutrition, and physical activity during and after cancer treatment, and offers suggestions for common cancer or cancer treatment-related symptom management. Nutrition problems that may come with cancer and cancer treatment are also covered, including suggestions to help manage possible eating-related difficulties.

The information is evidence-based. This means that it is based in scientific research. However, it is not intended to offer medical advice or replace advice given by your healthcare team. It is important to address all medical questions and concerns about your care with your healthcare team.



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Introduction

Eating a healthy diet and being physically active are very important for people diagnosed with cancer, both during and after cancer treatment. *HEAL Well: A Cancer Nutrition Guide* offers practical suggestions for achieving the following goals after a cancer diagnosis:

1. Achieve and maintain a healthy weight.
2. Be physically active.
3. Select and eat healthy foods and beverages that supply you with nutrients to nourish, repair, and heal your body.
4. Reduce your risk of cancer coming back, the development of another cancer, and other chronic diseases such as heart disease, Type 2 diabetes, and osteoporosis.

Evaluate Nutrition Information

People who have been diagnosed with cancer or a pre-cancerous lesion tend to be highly motivated to improve or maintain their health. Concerned individuals often search for information by reaching out to experts, talking to friends and family, and searching the internet. They want to find ways to reduce the risk of cancer coming back. They may read widely and ask questions in an effort to make healthy changes. However, cancer survivorship research is still in its early stages. Dependable, science-based advice can be hard to find. To separate fact from fiction, there are some things to keep in mind the next time you hear or read about something related to cancer that sounds too good to be true.

Read nutrition information closely.

Science progresses slowly and carefully. That is why when you see health products and diet plans using words like “breakthrough,” “miracle,” or even “discovery,” red flags should appear. Another warning sign is the use of anecdotal evidence (“testimonials” or “case histories”) rather than published scientific research based on results of studies done with many people with cancer.

Maintain a healthy skepticism.

That does not mean you have to cross check each and every scientific study that comes along. Luckily you have already got the most important thing you will need—common sense. If something sounds too good to be true, it probably is. It is also important to realize that science usually moves ahead by consensus—meaning the results of a single study are often not enough to prove a new idea. Medical researchers often accept a new idea as fact only after more than one study has obtained similar results.

Get the whole story.

Reports about science that appear in the media are often too brief to include important details. Refer to published articles from reputable sources and your healthcare team for more complete information. Look for scientific agreement based on a number of studies, and not just the results of one study.

Here are some things to think about:

- Where was the study published? Was the journal peer-reviewed by healthcare professionals or was it published in a magazine?

- Who paid for the study to be conducted?
- How many people were studied?
- How does the study relate to other research in the same field?
- Did the study prove a cause or just establish an association?

Be wary of easy answers.

It is human nature to look for quick fixes that solve health problems, but cancer is complex. There are more than 100 related, but separate, diseases that are called cancer. This is a disease with no single cause, and each individual's experience with cancer is unique.

Go to a reputable source.

These days, everyone has something to say about cancer, nutrition, physical activity, and health. Be sure to talk with your healthcare team before trying any new “cancer-fighting” strategy. For example, certain dietary or herbal supplements, even if labeled “all natural,” may interact with medications being used to treat your cancer.

Healthcare professionals have many years of training and experience, and they work hard to keep up with new developments. Ask to speak to a registered dietitian (RD) or a registered dietitian nutritionist (RDN), preferably one who is also a

certified specialist in oncology nutrition (CSO), about your diet and nutrition questions. Healthcare professionals with these credentials—RD, RDN, and CSO—are certified by the Commission on Dietetic Registration, the credentialing agency of the Academy of Nutrition and Dietetics. In addition, there are board-certified physicians in surgical oncology, medical oncology (chemotherapy), and radiation oncology. There are also board certified oncology healthcare professionals in nursing, pharmacy, social work, occupational therapy, and physical therapy. Talk to general healthcare providers if you need a referral or a place to start. Oncology specialists are found in large academic centers, medical centers, community cancer centers, and individual clinics and medical practices.

Your oncology healthcare team can provide valuable insights and direction in your efforts for healthy eating and ways to become more physically active during and after your cancer treatment. However, it is important to keep them informed about what you are taking and what diet plans you are following.

The human body is composed of many intricate systems that work together. Foods contain hundreds, perhaps thousands, of components such as nutrients, vitamins, and minerals. The most healthful strategy will always be one that addresses the overall diet, not single foods or dietary supplements.



Diet and the Development of Cancer

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The Link between Nutrition and Diet and the Development of Cancer

How Does Diet Affect Cancer?

Many factors influence the development of cancer. Over the last 25 years, science has shown that diet, physical activity, and body weight—especially being overweight or obese—are major risk factors for developing certain types of cancer. Your body’s ability to resist cancer may be helped by following a healthy diet, staying physically active, and avoiding excess body fat.

Study after study suggests that a healthful diet—one rich in a variety of vegetables, fruits, whole grains, and legumes (beans), and low in red and (especially) processed meat—can fight cancer. Researchers have known for some time that this general pattern of eating provides vitamins, minerals, and protective and naturally-occurring plant substances known as phytochemicals (phyto = plant) and can help to defend the body against cancer and other diseases.

The scientific community has identified many naturally occurring substances in plant foods with the power to defuse potential carcinogens. Some of these nutrients and natural phytochemicals seek out toxins and usher them from the body before they can cause cell damage that may lead to cancer. Others seem to make it easier for the body to make repairs at the cellular level. Still others may help stop cancer cells from reproducing. Even after a cell begins to experience damage that can lead to

cancer, what you eat and drink, and how you live can still help short-circuit the cancer process.

What Contributes to Chronic Inflammation?

Inflammation is the body’s first response to infection and injury. This process is essential to healing, but too much inflammation or inflammation that goes on for too long can damage cells and their deoxyribonucleic acid (DNA) or cellular genetic material. This damage can lead to higher risk for the development of cancer and other diseases.

Scientists have found that a constant state of low-level inflammation—called “chronic inflammation”—can be caused by being overweight or obese (carrying too much body fat). That is because fat cells constantly make inflammatory cytokines (protein molecules that activate immune cells).

Does Sugar Feed Cancer?

The belief that white sugar in the diet somehow “feeds” cancer is very common, but the truth is more complicated. All cells, including cancer cells, in the body use sugar (glucose) from the bloodstream for fuel. Glucose is the primary fuel for our bodies and our brains. Blood glucose comes from foods containing carbohydrates, including healthful fruits, vegetables, whole grains, and low-fat dairy products. When there is not enough carbohydrate in the diet, some glucose is even produced by the body from protein-containing foods through a special process.

The connection between sugar and cancer is indirect. Eating a lot of high-sugar foods may mean

more calories in your diet than you need, which can lead to excess weight and body fat. It is excess body fat that has been convincingly linked to greater risk of several types of cancer.

Highly refined foods and foods with added sugars, such as sugary drinks and sweets, are also low in fiber and low in nutrients. They add little to the diet except calories. These foods may also increase insulin resistance, and this has been linked to an increased risk of developing diabetes, heart disease, and overweight and obesity.

Should I Only Eat Organically Grown Foods?

There are many reasons why people may prefer to eat foods grown organically with fewer pesticide residues. Eating foods that contain pesticides could increase cancer risk slightly. However, studies clearly affirm that consuming a diet rich in fruits and vegetables, whether grown conventionally or organically, is an important part of a diet that lowers overall cancer risk. If you decide to purchase organic produce, information from the Environmental Working Group (EWG) may be helpful. The EWG has published *The Shopper's Guide to Pesticides in Produce*™ that lists certain foods they call the “dirty dozen plus two” (non-organic fruits and vegetables with the highest amount of pesticides) and the “clean fifteen” (non-organic fruits and vegetables with the least amount of pesticides). The EWG’s



Guide is available at <http://www.ewg.org/foodnews/summary.php/>. According to the EWG, you can use this list to reduce your exposure to pesticide residues, but they say “eating conventionally-grown produce is far better than not eating fruits and vegetables at all.” The bottom line is to eat plenty of vegetables and fruits, whole grains and beans, whether fresh, frozen, dried, cooked, or canned.

Body Weight and Its Link to Cancer Development

The link between excess body fat and cancer was one of the strongest findings from AICR’s report and its continuous updates. These comprehensive reviews of cancer research worldwide calculated that approximately 117,000 cancer cases in the United States each year are linked to excess body fat. Specifically, AICR found that obesity increases risk for at least seven types of cancer: colorectal, postmenopausal breast, kidney, pancreatic, endometrial, gallbladder, and a common variety of esophageal cancer called adenocarcinoma.

How Fat Cells Work and Body Shapes

Fat cells grow when people gain weight and shrink when they lose it. Studies suggest that location of fat cells in the body matters. Fat that accumulates in the abdominal area—lending the body an “apple shape”—is often visceral fat. That means it lies deep inside the abdomen and surrounds vital organs. People with too much visceral fat have been shown to be at greater risk for developing obesity-related diseases and cancer. Another type of fat tissue, subcutaneous fat, is located directly beneath the skin. Sometimes subcutaneous fat is deposited at the waist, but it’s often in the thighs and buttocks, and gives some people a “pear shape.” Studies show that visceral fat tissue (like belly fat) pumps out more inflammatory cytokines and hormones like insulin, leptin, and estrogen. Elevated levels of all these substances are associated with higher cancer risk.

There are two easy methods for assessing body fat. While these methods are not perfect, they can help people assess whether their weight and waist size fall within the healthy range.

BMI Chart

Height	Weight in Pounds (without clothes)													
4'11"	94<	99	104	109	114	119	124	128	133	138	143	148	173	198
5'	97	102	107	112	118	123	128	133	138	143	148	153	179	204
5'1"	100	106	111	116	122	127	132	137	143	148	153	158	185	211
5'2"	104	109	115	120	126	131	136	142	147	153	158	164	191	218
5'3"	107	113	118	124	130	135	141	146	152	158	163	169	197	225
5'4"	110	116	122	128	134	140	145	151	157	163	169	174	204	232
5'5"	114	120	126	132	138	144	150	156	162	168	174	180	210	240
5'6"	118	124	130	136	142	148	155	161	167	173	179	186	216	247
5'7"	121	127	134	140	146	153	159	166	172	178	185	191	223	255
5'8"	125	131	138	144	151	158	164	171	177	184	190	197	230	262
5'9"	128	135	142	149	155	162	169	176	182	189	196	203	236	270
5'10"	132	139	146	153	160	167	174	181	188	195	202	207	243	278
5'11"	136	143	150	157	165	172	179	186	193	200	208	215	250	286
6'	140	147	154	162	169	177	184	191	199	206	213	221	258	294
6'1"	144	151	159	166	174	182	189	197	204	212	219	227	265	302
6'2"	148	155	163	171	179	186	194	202	210	218	225	233	272	311
BMI	19	20	21	22	23	24	25	26	27	28	29	30	35	40

BMI may not be an accurate measure for everyone—including people who have more muscle mass (like athletes), older adults with less muscle mass, or people under 5 feet tall.

To use the table, find your height in the left-hand column. Locate your weight (in pounds) to the right. The number at the bottom of that weight column is the BMI for your height and weight.

Body Mass Index (BMI)

Body Mass Index is a way to measure overweight and obesity. BMI is a measure of body fat based on a person's weight and height. Staying within the healthy range throughout life is important for lowering cancer risk.

There are five BMI categories:

- Underweight: Below 18.5
- Healthy Weight: 18.5 to 24.9
- Overweight: 25.0 to 29.9
- Obese: 30.0 to 39.9
- Extremely Obese: 40.0 and above

Waist Circumference

Waist circumference is another method of assessing body weight and is particularly sensitive to accumulation of visceral fat. Use a measuring tape and follow these easy steps:

Place a tape measure around the waist above the tip of the hipbone.

1. Measure the waist after exhaling.
2. Use the following measurements to determine health risk.
 - For women, a waist measurement of 31.5 inches or more indicates **increased health risk**.
 - For men, a waist measurement of 37 inches or more indicates **increased health risk**.

For Cancer Prevention AICR Recommends:

Be as lean as possible within the normal range of body weight:

- Maintain body weight range within the normal BMI range, starting from the age of 21.
- Avoid weight gain and increases in waist circumference through adulthood.

Avoid foods and drinks that promote weight gain:

- Consume energy-dense foods sparingly (high calories for amount and few nutrients). See Box: *What Are Energy Dense Foods?*
- Avoid sugary drinks.
- Consume “fast-foods” sparingly, if at all.

What Are Energy-Dense Foods?*

- Sugary drinks—soft drinks, sweetened ice tea, juice flavored drinks
- Baked goods such as desserts, cookies, pastries, and cakes
- Candy
- Chips such as potato and corn
- Ice cream, milkshakes
- Processed meat—hotdogs, salami, pepperoni
- Fast food such as French fries, fried chicken, and burgers
- Packaged and processed foods high in added sugars and fats

**Foods containing more than 225–275 calories per 100 grams (3 ½ ounces)*

Diet and Nutrition’s Impact at the Molecular Level

Phytochemicals and Antioxidants

Phytochemicals have the potential to stimulate the immune system, slow the growth rate of cancer cells, and prevent DNA damage that can lead to cancer. The word “phytochemical” means a naturally occurring plant (phyto, in Greek) chemical. Phytochemicals provide a plant with color, aroma, and flavor as well as protection from infection and predators. The colors, fragrances, and taste of the plant hint at the phytochemicals it contains. In the human diet, some phytochemicals work together to protect the body from cancer and other diseases.

Many phytochemicals work as antioxidants. Antioxidants are compounds that protect the body’s cells from oxidative damage—which can come from the water we drink, the food we eat, and the air we breathe. Preventing this type of damage might help protect us from cancer and other diseases. A steady supply of antioxidants from our food is needed to provide protection because of the body’s continuous production of oxidative damage. The best way to provide the body with phytochemicals is to eat a balanced diet that includes whole grains, legumes, nuts, seeds, and a variety of colorful fruits and vegetables.

AICR Recommends:

Eat mostly foods of plant origin:

- Eat at least five portions/servings of a variety of non-starchy vegetables and fruits every day. Examples of a serving: 1 cup raw or cooked vegetables or 1 medium apple.
- Eat whole grains and/or legumes (beans and lentils) with every meal.

Colorful Fruits, Vegetables, and Phytochemicals

Color	Phytochemicals	Fruits and Vegetables
White and green	Allyl sulphides	Onions, garlic, chives, leeks 
Green	Sulforaphanes, indoles	Broccoli, Brussels sprouts, cabbage, cauliflower 
Yellow and green	Lutein, zeaxanthin	Asparagus, collard greens, spinach, winter squash 
Orange and yellow	Cryptoxanthin, flavonoids	Cantaloupe, nectarines, oranges, papaya, peaches 
Orange	Alpha and beta carotenes	Carrots, mangos, pumpkin 
Red and purple	Anthocyanins, polyphenols	Berries, grapes, plums 
Red	Lycopene	Tomatoes, pink grapefruit, watermelon 

Colorful Fruit and Vegetable Recipes

Acorn Squash and Apple Soup

1 medium acorn squash
1 Tbsp. canola oil
1 medium onion, chopped
1 leek (white part only), rinsed well and chopped
1 tart apple (such as Granny Smith), peeled, cored, and chopped
3 cups fat-free, reduced-sodium chicken broth
Milk or additional broth to thin soup (optional)
Salt and freshly ground black pepper, to taste
3 Tbsp. minced fresh mint leaves, as garnish

Preheat oven to 375 degrees. Cut acorn squash in half length-wise, remove seeds. Set on a rimmed baking sheet. Bake until the flesh is tender when pierced, roughly 45 to 90 minutes (depending on size). Remove squash from oven and allow to cool.

While the squash is cooling, in a large, heavy pan heat the canola oil over medium-high heat. Add the onion and leek and sauté for about 4 minutes, until the onion is translucent. Add the apple and cook over medium heat for 1 minute.

Scrape out the squash pulp and combine with the apple mixture. Reduce heat to medium-low, cover and cook for 5 minutes, stirring often. Add the broth to the pan, cover and bring to a boil over high heat. Reduce the heat to low and simmer for about 30 minutes. Remove the pan from heat and set the soup aside to cool slightly.

In a blender or food processor, purée the soup in batches until smooth. Return soup to pan and heat just before serving. Add milk or additional broth to thin soup, as desired. Season to taste with salt and pepper. Garnish each serving with mint and serve.

Makes 5 servings.

Per serving: 103 calories, 3 g total fat (<1 g saturated fat), 18 g carbohydrate, 3 g protein, 3 g dietary fiber, 330 mg sodium.

Holiday Quinoa Salad with Pomegranate and Fresh Herbs

$\frac{3}{4}$ cup quinoa
 $1\frac{3}{4}$ cups water
 $\frac{3}{4}$ tsp. kosher or sea salt, divided
 $\frac{1}{2}$ medium Fuji apple, cored and finely chopped
 $\frac{1}{2}$ cup fresh pomegranate seeds
 $\frac{1}{3}$ cup finely chopped cilantro
 $\frac{1}{4}$ cup finely chopped fresh mint
 $\frac{1}{4}$ cup finely chopped flat-leaf parsley
 $\frac{1}{3}$ cup finely chopped scallions, green and white parts
 $\frac{1}{4}$ cup blood orange juice or orange juice plus 1 teaspoon lemon juice
Freshly ground pepper
2 tsp. extra virgin olive oil

Rinse quinoa in strainer, drain well, and place moist grain in heavy, medium saucepan. Cook over medium-high heat, stirring constantly with wooden spatula until grains stick to bottom of pot and then start to move freely and smell toasty, about 5 minutes. When grains of quinoa start to pop, move pot off heat and pour in $1\frac{3}{4}$ cups water, standing back as it will splatter. Immediately return pot to heat and reduce heat to medium. Add $\frac{1}{4}$ teaspoon salt, cover, and simmer for 15 minutes, or until quinoa is almost tender. Off heat, let grain sit, covered, for 10 minutes. Using fork, fluff quinoa, and transfer it to mixing bowl. There will be about $2\frac{1}{4}$ cups cooked quinoa.

Let quinoa sit until it is room temperature. Add apple, pomegranate seeds, cilantro, mint, parsley, and scallions to grain and, using a fork, mix to combine them.

In small bowl, whisk blood orange juice, or two citrus juices, with remaining $\frac{1}{2}$ teaspoon salt until it dissolves. Add 4-5 grinds pepper, then whisk in oil. Pour dressing over salad and toss with fork to distribute it evenly. Serve within 2 hours. The quinoa and dressing parts of this salad can be made up to 8 hours ahead, then covered and refrigerated separately and combined shortly before serving.

Makes 4 servings.

Per serving: 179 calories, 4 g total fat (<1 g saturated fat), 32 g carbohydrate, 5 g protein, 3 g dietary fiber, 366 mg sodium.

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Diet and Nutrition during Cancer Treatment

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Good Nutrition During Cancer Treatment

Cancer treatment can place a lot of nutritional demand on your body. It is important to try to consistently consume a healthy diet and to drink nourishing beverages. The main nutritional goals during this time are to maintain a healthy weight and eat healthy foods that supply your body with calories and nutrients for energy, repair, recovery, and healing. A healthful eating pattern includes plenty of vegetables and fruit, moderate amounts of whole grains, and plant protein sources like nuts, beans, lentils, tofu, and tempeh, along with modest portions of fish, poultry, lean meats, and nonfat or low-fat dairy foods.

See pages 21-22 for AICR's specific recommendations for healthy eating and physical activity for reducing risk of new and recurrent cancers.

Choose My Plate

The United States Department of Agriculture's "ChooseMyPlate" is another easy-to-use resource to help people plan their own healthy diet. Use the following link to learn more about this website: <http://www.choosemyplate.gov/>.



2/3 (or more) vegetables, fruits, whole grains and beans

1/3 (or less) animal protein

The New American Plate

AICR's "The New American Plate" is a valuable resource that shows how to eat in a way to lower cancer risk and to manage body weight. More information is available at <http://www.aicr.org/new-american-plate/> or by calling 800-843-8114.

Treatment Side Effects That Can Impact Nutritional Well-Being

Side effects of cancer therapy may affect your eating habits and nutritional status. The following pages contain suggestions for managing common eating difficulties during and after treatment.

Changes in Appetite and Unwanted Weight Loss

Loss of appetite is common in people with cancer and can lead to weight loss and undernutrition (malnutrition). Poor nutrition can slow the body's ability to heal. Severe malnutrition can interfere with proper functioning of the heart, liver, kidneys, and immune system.

Try these ideas for improving your appetite and maintaining calorie and protein intake during cancer treatment:

- Eat five or six smaller meals per day.
- Eat the largest meal when you are hungriest.
- Start with high-protein foods while your appetite is strongest.
- Keep favorite high-calorie foods and beverages within easy reach.
- Try to be as physically active as you are able to be to help stimulate your appetite.
- Enlist the help of your loved ones and caregivers to help with purchasing and preparing food.
- Ask to talk with a registered dietitian for personalized help.
- In certain situations, your doctor may prescribe a medication to help improve your appetite.



Nausea and Vomiting

Nausea and vomiting can be caused by chemotherapy or from radiation therapy to the stomach, abdomen, or brain. Being nauseated or vomiting because of cancer treatment can make it difficult for a person to eat and drink.

Try these ideas for managing nausea and vomiting:

- Eat small amounts of food more often.
- Small portions of meals and snacks are often more easy to tolerate than large.
- Eating foods and sipping on clear liquids at room temperature or cooler may be easier to tolerate.
- Avoid high-fat, greasy, spicy, or overly sweet foods.
- Avoid foods with strong odors.
- Sip on beverages between meals rather than with meals.
- Eat sitting up and keep head raised for about an hour after eating.
- For vomiting, avoid eating or drinking until vomiting is controlled—then try sipping on small amounts of clear liquids such as cranberry juice or broth. Nibbling on plain foods such as pretzels or crackers may also help.
- Take anti-nausea medicine as prescribed. If it is not controlling symptoms, contact the healthcare professional that prescribed the anti-nausea medicine, and let him or her know what is happening.

Evaluate if you are feeling indigestion or reflux versus nausea. Discuss your symptoms with your healthcare professional as treatment options for each condition vary.

Fatigue

Fatigue is the most common side effect for those diagnosed with cancer. It can be related to the cancer itself or can be one of the effects of cancer treatment. Eating regularly and being as physically active as you are able may help to relieve your fatigue and enhance your mood.



Try to drink plenty of fluids. Being dehydrated can make fatigue worse.

Try these ideas for managing fatigue:

- Temporarily rely on ready-to-eat foods like frozen dinners, fruits, and vegetables.
- Prepare food when you feel your best and freeze leftovers in meal-size portions.
- Try to drink plenty of fluids. Being dehydrated can make fatigue worse. Aim for at least 8 cups of hydrating fluid each day unless advised to restrict fluids for another medical condition. Hydrating fluids include water, clear juices, sports drinks, broth, or weak tea.
- Accept help with meals from friends and family members. Check for delivery services like Meals on Wheels™ (available at <http://www.meals-on-wheels.com/>) or a home delivery meal service such as Savor Health™ (available at <http://www.savorhealth.com> or 888-721-1041).

Bowel Changes: Diarrhea and Constipation

Diarrhea can be caused by the cancer itself, certain chemotherapy agents and medicines, or because of radiation therapy to the abdomen and pelvis. Diarrhea is having frequent and loose watery stools.

Try these ideas for managing diarrhea:

- Drink plenty of liquids such as water, clear juices, sports drinks, broth, weak tea, or oral rehydration solutions (available over-the-counter at most pharmacies).
- Eat small amounts of soft, bland foods. Consider a diet that consists of water soluble fiber-containing foods such as bananas, white rice, applesauce, and white toast.
- Decrease intake of high fiber foods during this time. These include foods containing nuts and seeds, raw vegetables and fruits, and whole grain breads and cereals.
- Eat small amounts of food throughout the day rather than fewer large meals.
- Take anti-diarrhea medicine as prescribed. If the medicine is not controlling the diarrhea, call the healthcare professional that prescribed the medicine.

Constipation can be a symptom of the cancer itself or it can be caused by medicines used to treat cancer or manage pain. Constipation is when bowels do not move regularly and when stools become hard and difficult to pass.

Try these ideas for managing constipation:

- Drink more healthy beverages to help keep your digestive system moving, especially water, prune juice, warm juices, decaffeinated teas, and hot lemonade.
- Increase intake of high fiber foods such as whole grains, fresh and cooked vegetables, fresh and dried fruits, and foods containing peels, nuts, and seeds.
- Work with your healthcare team to set up an individualized bowel regimen. This program may include stool softeners and gentle, non-habit forming laxatives.
- Increase your physical activity as you are able, such as taking a walk or doing limited exercise every day. Ask your healthcare team how much exercise is right for you.

Changes in Taste and Smell

Changes in taste and reactions to smells are common problems that can happen while undergoing and recovering from cancer treatment. These changes can affect your desire to eat.

Try these ideas for managing taste and smell changes:

- Choose foods that appeal to you. Often, moist and naturally sweet foods such as frozen melon balls, grapes, or oranges work well. Some find tart foods and beverages appealing.
- Try eating cooler temperature foods, rather than hotter temperature foods, as they have less aroma and taste.
- Try marinades and spices to mask strange tastes.
- Red meat often becomes less appealing, so try poultry, fish, beans, nut butters, or eggs.
- If foods taste bitter or salty, try adding small amounts of sugar.
- Brush your teeth and tongue and rinse your mouth regularly, especially before eating.
- Rinse your mouth several times a day with 1 to 2 ounces of a homemade salt and baking soda solution (one quart of water combined with one teaspoon of salt and one teaspoon of baking soda) or an alcohol-free mouth rinse.

Sore Mouth or Throat

A common side effect of certain chemotherapy agents or radiation therapy to the mouth and throat is an inflammation of the mucus membranes that line the mouth and throat. This condition is called *mucositis* and it can make it difficult to eat and swallow.

Try these ideas for managing a sore mouth or throat:

- Eat soft, moist foods with extra sauces, dressings, or gravies.
- Avoid dry, coarse or rough foods.
- Avoid alcohol, citrus, caffeine, vinegar, spicy foods, and acidic foods (like tomatoes).

- Experiment with temperatures of foods (warm, cool, or icy) to find which temperature is the most soothing.
- Drink plenty of fluids. Focus on warm or cool milk-based beverages, non-acidic fruit drinks (diluted if necessary), “flat” carbonated beverages, and cream or broth-based soups.
- Rinse your mouth several times a day with 1 to 2 ounces of a homemade salt and baking soda solution (one quart of water combined with one teaspoon of salt and one teaspoon of baking soda). Sip, swish, and then spit the solution to rinse and clean your mouth. Do not swallow.
- Speak with your healthcare professional about medications that can numb or soothe your mouth or throat.

Unwanted Weight Gain

Weight gain can occur during or after treatment for hormone-sensitive cancers such as breast or prostate cancers. Inactivity can also cause weight gain. In addition, medicines such as steroids used as a part of some cancer treatments can contribute to increased weight.

Try these ideas for managing unwanted weight gain:

- Try to focus on foods naturally low in calories and high in fiber to help you feel full, such as vegetables, fruits, whole grains, and beans. Include small amounts of higher calorie foods that you enjoy most, and be sure to savor them for the most satisfaction.
- Pay attention to portion sizes and fill most of your plate with lower calorie plant foods.
- Eat only when you are physically hungry.

Try to get regular physical activity to help you reduce fatigue, control weight gain, and improve mood.

Low White Blood Cell Counts and Infection

Cancer and cancer treatment can weaken the immune system and increase the risk of infection. White blood cells are an essential part of the body's defense against infection because they attack and destroy germs after they enter the body. The risk of infection increases as the number of white blood cells decreases as the result of some cancer treatments. This condition is called neutropenia. If you develop neutropenia it is very important to protect yourself against infection. Contact your healthcare team right away if you think an infection is developing.

The following may be signs of infection:

- A temperature greater than 100.5° F.
- Fever

- Shaking, chills
- Swelling or redness of any part of the body

If you experience a period of time when your white blood cell counts are low, eat a “safe food” diet to avoid harmful bacteria and food-borne illness.

Follow these “safe food” suggestions when your white blood cell counts are low:

- Do not eat raw or undercooked animal products, including meat, pork, game, poultry, eggs, and fish.
- Wash all fresh fruits and vegetables.
- Avoid eating foods from salad bars, delicatessens, buffets, and smorgasbords.
- Do not drink untested well water or water directly from lakes, rivers, streams, or springs.
- If using filtered water, change the filter regularly.



Food Safety Tips

These food safety tips are especially important for people undergoing and recovering from cancer treatment:

- Wash hands frequently. Use plenty of soap and hot, running water for at least twenty seconds. Use hand sanitizer for cleaning hands when soap and water are not available. Wash or sanitize hands:
 - After using the restroom.
 - Before eating.
 - Before and after each step of food preparation.
 - After handling garbage.
 - After touching pets.
 - After sweeping the floor or wiping down the counters.
- Keep cutting boards, countertops, and utensils thoroughly cleaned. Change, launder, and discard sponges and dish towels often.
- Separate and do not cross-contaminate.
 - Keep raw meat, poultry, seafood, and eggs away from ready-to-eat foods.
 - Always use separate cutting boards for raw meat, poultry, and fish.
- Cook food thoroughly at proper temperatures. Use a food thermometer to make sure foods are safely cooked. Cook foods to the following internal temperatures:
 - Steaks and roasts—145° F.
 - Fish—145° F.
 - Pork—160° F.
 - Ground beef—160° F.
 - Egg dishes—160° F.
 - Chicken breast—165° F.
 - Whole poultry—165° F.
 - Reheat hotdogs until steaming hot or 165° F.
- Properly wrap and refrigerate foods promptly. Refrigerate or freeze leftover foods within one hour to limit growth of bacteria.
 - Set the refrigerator between 34° F and 40° F.
 - Keep the freezer set to 0–2° F or below.
- Thaw frozen meat and poultry in the refrigerator, microwave, or cold water. Do not leave it out on the kitchen counter. Pay attention to food product expiration dates. If in doubt, throw it out.



Wash hands frequently. Use plenty of soap and hot, running water for at least twenty seconds. Use hand sanitizer for cleaning hands when soap and water are not available.



Dietary Supplements

3

Dietary Supplements

Although the vast majority of people in the United States have access to a healthy diet, dietary supplement use is common among Americans. Studies report that over 50 percent of all American adults use dietary supplements. In addition, between 60 percent and 80 percent of people with cancer have taken supplements before, during, and/or after their diagnosis and treatment. Cancer survivors take dietary supplements for a variety of reasons: in hopes of stopping cancer; on the advice of family, friends, and healthcare providers; in order to strengthen their immune system; and to take care of symptoms and side effects of cancer and its treatment.

The Dietary Supplement Health and Education Act (DSHEA) of 1994 defines dietary supplements as products taken by mouth that contain “dietary ingredients” used to supplement the diet. Dietary ingredients are vitamins, minerals, herbs, botanicals, and substances like amino acids, enzymes, metabolites, or organ tissues. These supplements come in many forms such as tablets, capsules, softgels, gelcaps, liquids, tinctures, teas, extracts, concentrates, or powders.

There is much controversy concerning the use of dietary supplements during cancer treatment—especially antioxidants. Of concern is the possibility that dietary supplements may interact with a person’s cancer treatment and perhaps make the treatment less effective. Some research shows that large doses of nutrients from dietary supplements may actually keep cancer cells from being destroyed by interfering



with conventional therapy. Other studies show the opposite. In general, the protective nutrients and compounds in whole foods are far preferable to those in large dose supplements.

Cancer Experts Suggest the Following Regarding Dietary Supplement Use:

- Dietary supplements should not replace nutrient-rich foods in the diet. Eat a wide variety of plant-based foods, including at least five servings per day of non-starchy vegetables and fruits.
- Dietary supplements are not recommended for cancer prevention.

- If you are considering starting to take dietary supplements or if you are already using them, review all products with your cancer healthcare team.
- Dietary supplementation may be recommended and prescribed for you by your healthcare team for specific medical conditions, such as osteoporosis and iron-deficiency anemia.
- Supplementation should be directed and supervised by your cancer healthcare team.



Reliable sources for evaluating dietary supplements and possible benefits and concerns are available at:

- Natural Medicines Comprehensive Database: Available at <http://naturaldatabase.therapeuticresearch.com/home>
- National Institutes of Health: Available at <http://www.nlm.nih.gov/medlineplus/dietarysupplements>
- Memorial Sloan-Kettering Cancer Center: About Herbs, Botanicals, and Other Products available at <http://www.mskcc.org/cancer-care/integrative-medicine/about-herbs-botanicals-other-products>

Providing references to other organizations or links to other websites does not imply endorsement of the information or services provided by the resource organization. Those organizations are solely responsible for the information they provide.



Physical Activity for People with Cancer

4

The Importance of Physical Activity

A growing number of studies suggest that physical activity may help to reduce the risk of some secondary cancers and recurrence of certain cancers. Physical activity may also help improve tolerance of cancer treatment and the quality of life during and after cancer treatment. The old advice to “just get plenty of rest” during cancer treatment has been updated. An expert panel convened by the American College of Sports Medicine (ACSM) concluded that exercise training is safe and beneficial for cancer survivors after—and even during—treatment. Studies have demonstrated that exercise, when carefully monitored by the healthcare team, is a powerful tool to improve endurance, sense of well-being, and self esteem, while lessening fatigue and depression. Most experts now recommend that people with cancer become and stay as physically active as they safely can.

Carefully supervised, moderate physical activity has been shown to benefit people with cancer both during and after cancer treatment.

Physical activity can help improve the following areas:

- Quality of life
- Maximum walking distance
- Muscle mass
- Muscle strength and power
- Aerobic fitness
- Flexibility

Physical activity may help decrease these common side effects of cancer and cancer treatment:

- Nausea
- Fatigue
- Stress
- Anxiety
- Depression
- Body fat
- Resting blood pressure
- Length of hospitalization

The Role of Physical Activity in Managing Cancer Treatment Side Effects

Fatigue

Physical activity can help manage fatigue, one of the most common side effects of cancer treatment. Fatigue can impact many aspects of life. The idea that being more active can make an already tired person feel less tired might seem surprising. But that is exactly what a consistent body of research conducted among cancer survivors now shows. Light exercise can help people in cancer treatment feel more rested and energetic.

Weight Loss

People who lose weight during cancer treatment can often end up losing both fat and muscle mass.

Regular exercise, particularly resistance exercise, can help restore and even prevent loss of muscle mass during treatment.

Weight Gain

Some people undergoing cancer treatment may gain weight rather than lose it—and the weight gain often comes with a loss of muscle. A possible side effect of certain types of cancer treatments is a gain of fat mass. Endurance exercise such as walking and biking may help with weight maintenance activities during treatment. To keep from losing muscle mass, try to combine cardiovascular exercises with resistance exercises.

Cardiovascular Concerns

Some cancer treatments can lead to heart problems (cardiotoxicity) and damage to surrounding blood vessels either during treatment or after treatment. This damage may increase the risk of cardiovascular disease later on. There is now emerging evidence that exercise can help to lessen treatment-related cardiotoxicity and help restore cardiovascular function, even years after cancer therapy is completed.

Physical Activity and Its Role in Survivorship

You may not feel like exercising because of fatigue and other side effects. But becoming physically active can help you feel more energetic. The long-term benefits include enhanced bone and muscle strength, better circulation, and improved mood. In addition, physical activity seems to protect against cancer and promote health both directly and indirectly.

Directly, getting regular activity may:

- Reduce the body's levels of estrogen and other hormones that could promote cancer.
- Help to reduce inflammation.

Indirectly, physical activity may:

- Reduce the risk of unwanted weight gain when combined with a sensible, healthy diet. That is important because carrying excess fat is itself a risk factor for postmenopausal breast cancer, colorectal cancer, esophageal cancer, endometrial cancer, kidney cancer, pancreatic cancer, and gallbladder cancer.

Getting Regular Physical Activity Every Day Can Help People with Cancer to:

- Recover more quickly.
- Have a better quality of life, including getting support from peers and instructors in physical activity classes.
- Improve mood and thinking.
- Help to reduce joint pain associated with some breast cancer treatment medications (such as aromatase inhibitors).

How to Get Started Being Physically Active:

- Talk with the healthcare team providing your cancer care before beginning any exercise program.
- If not exercising regularly, start slowly and gradually increase physical activity intensity and duration.
- Ask your healthcare team about having a cancer rehabilitation assessment (many insurers now cover a certain amount of rehabilitation for individuals with cancer).

The American Cancer Society in Their 2012 Nutrition and Physical Activity Guidelines for Cancer Survivors Recommends People Diagnosed With Cancer:

- Check with your healthcare provider regarding the right physical activity for you.
- Engage in regular physical activity.

- Avoid inactivity and return to normal daily activities as soon as possible following diagnosis.
- Aim to exercise at least 150 minutes per week.
- Include strength training exercises at least 2 days per week (exercises in which you work against resistance such as weights), with your healthcare provider’s approval.

Suggestions for Creating an Exercise Program That Is Right for You

1. Talk with your healthcare team before beginning a physical activity program. Check your physical activity plan with your cancer healthcare professional. Ask for advice about the type of exercise program that will be best for you. A cancer rehabilitation assessment before you begin physical activity can help define the best exercise program for you.
2. Do very easy movements for short periods of time each day, even if just a few minutes. If you can, get started under the guidance of a physical therapist or certified fitness trainer.
3. Make sure you have exercise shoes that are comfortable and fit you well.
4. Start very slowly—a few minutes of a recommended activity such as walking or riding a stationary bike each day is a good way to get started.
5. Take short walks in a safe, low-stress environment.
6. If you need encouragement, find an exercise class with a certified fitness instructor, personal trainer, or physical therapist who can help you get started. Certified fitness professionals are trained in CPR and first aid and are familiar with exercises that can safely help different parts of the body. They can help you customize activities to your needs. If your insurance does not cover a certified fitness professional or physical therapist, call the local hospital, YMCA, or county recreation department to find a class that is very easy and gentle.
7. Do what is best for you as an individual, even if it is light exercise that seems like very little. Start by lifting half-pound weights three times

As outlined by the Centers for Disease Control and Prevention, examples of moderate and vigorous activities include:

Moderate Activities (“I can talk while I do them, but I can’t sing”):	
Canoeing	Biking on level ground or with a few hills
Water aerobics	Ballroom or line dancing
Walking briskly	General gardening (raking or trimming shrubs)
Tennis (doubles)	Sports where you can catch and throw (softball, volleyball)
Using a manual wheelchair	

Vigorous Activities (“I can only say a few words without stopping to catch my breath”):	
Aerobic dance	Biking faster than 10 miles per hour
Fast dancing	Heavy gardening (digging, hoeing)
Hiking uphill	Race walking, jogging, or running
Tennis (singles)	Sports with a lot of running (basketball, hockey, soccer)
Martial arts	Swimming fast or swimming laps
Jumping rope	

a week for the first week or two, and then move up to one-pound weights, 1 1/2 pounds, etc.

8. As you get stronger, think about adding more physical activity to your schedule. Think about getting F.I.T.T. (see box). Using these four letters, you can remember the key components of a physical activity program: frequency, intensity, time, and type.

Resources to Help You with Your Physical Activity

- Specially trained oncology rehabilitation experts are available to help cancer survivors with concerns about lingering cancer and cancer treatment-related side effects. These healthcare professionals include physiatrists (doctors that specialize in rehabilitation medicine), physical therapists, occupational therapists, and speech-language pathologists. They can help to treat and manage medical conditions such as arm or neck pain, lymphedema, post-surgery concerns, and difficulty with swallowing. To find a cancer rehabilitation program or specially trained clinician visit the Oncology Rehab Partner's STAR Program® (Survivorship Training and Rehabilitation) website at: <http://www.oncologyrehabpartners.com/>. If there is not a STAR Program in your area, ask your healthcare professional for a referral to your hospital's rehabilitation program.
- You can seek help with physical activity planning from a specially trained fitness expert. For example, the American College of Sports Medicine (ACSM) certifies athletic trainers. Certified Cancer Exercise Trainers (CETs) work with people affected by cancer to develop individualized exercise programs. To learn more about CETs and how to find a certified professional visit the ACSM website at: <http://www.acsm.org>.

Suggestions for Becoming F.I.T.T.



Frequency: refers to how often you are physically active and is usually measured in days per week.



Intensity: describes how hard your body is working during physical activity, and it is often described as light, moderate or vigorous.



Time: measures how long you spend being physically active during your daily routine.



Type: describes what kind of activity you choose such as walking, gardening, hiking, biking, weight training, household chores or playing golf.

- Together, the LIVESTRONG Foundation and the YMCA of the USA have created a free, 12-week YMCA-managed program for adult cancer survivors. This group-based physical activity and well-being program is offered at more than 270 YMCAs across the country with more than 13,000 cancer survivors completing the program since 2008. To learn more about the LIVESTRONG at the YMCA program and where you can find one, visit: <http://livestrong.org/ymca>.



Cancer Survivorship and Beyond

5

The Role of Diet and Lifestyle in Reducing the Risk of Cancer Recurrence

Research on nutrition and physical activity recommendations for cancer survivors to prevent or reduce the risk of cancer recurrence, secondary cancers, and other chronic diseases is still in an early stage. There are no guarantees. Yet results from recent population studies show health benefits for cancer survivors who maintain a healthy weight, follow a healthy diet, and engage in physical activity on a regular basis.

AICR Guidelines for Cancer Prevention and Risk Reduction

AICR's report and its continuous updates found evidence that cancer survivors should follow the

same diet and physical activity recommendations for reducing risk of cancer.

Body Weight

Research conducted over the last few years has established the central importance for cancer survivors to maintain a healthy weight—and *to be as lean as possible without being underweight*. Having a healthy weight seems to establish a biochemical status or “anti-cancer” environment that discourages cancer growth. The research clearly shows that carrying extra body fat—particularly excess abdominal body fat—means a higher risk for certain cancers.

Eat a Plant-based Diet

Evidence suggests that dietary patterns emphasizing plant-based foods promote health and may reduce cancer risk for survivors. A practical way to do this is to make a habit of filling at least 2/3 of your plate



Many cancer survivors find that they feel better if they incorporate healthy behaviors into their daily routine. Eating right for your health needs and including some exercise that relates to your recovery needs may improve how you feel. It may also reduce your risk for cancer and other major health problems. Ask your healthcare team about your particular risk factors so you know what things you should avoid.

with vegetables, fruits, whole grains, legumes, and nuts, while apportioning 1/3 or less of your plate to poultry, fish, lean meats, and low-fat dairy and plant-based proteins. (see page 9 for AICR's New American Plate graphic).

Be Physically Active as Part of Everyday Life

Be moderately physically active for at least 30 minutes every day, and as you become more fit, work toward 60 minutes. Aim to build more activity, like brisk walking, into your daily routine. In addition, limit how much time you are sedentary, like sitting in front of the TV or computer. A sedentary way of life is a cause of weight gain, overweight, and obesity that increases risk for several types of cancer.

Limit Consumption of Red and Processed Meats

Limiting cooked red meat (e.g., beef, pork, lamb, and game) to 18 oz. or less per week and avoiding processed meat like cold cuts, bacon, sausage, and ham helps lower risk for colorectal cancer. Because cancer survivors are at greater risk for other chronic diseases such as heart disease, eating less red and processed meat can help improve overall health. Try to go meatless several times a week. Opt for meatless meals such as a vegetable stir-fry, hearty bean soups, or black bean burritos.

Limit Alcoholic Beverages

Despite some evidence linking moderate alcohol consumption to lower risk for heart disease, this protective effect does not apply to some cancers. AICR recommends avoiding even small amounts of alcohol. Alcohol increases risk for cancers of the colon and rectum, breast, esophagus, mouth, and liver. If cancer survivors choose to drink, limit intake to one drink a day for women and two for men.

In this case, one drink is defined as:

- 12 ounces of beer
- 1.5 ounces of 80-proof distilled spirits
- 5 ounces of wine

Avoid Sugary Drinks and Energy-dense Foods

Research links sugary drinks like regular sodas, and energy-dense foods, including many fast foods and

foods with added fat and sugar, with weight gain, overweight, and obesity. And excess body fat is a cause of several types of cancer.

Energy-dense foods are defined as:

- High-fat, high calorie snack foods
- “Fast foods”—or prepared baked goods, desserts, and sweets
- Convenience foods or “on the go foods” not requiring cutlery (spoons, forks, or knives) such as hotdogs, hamburgers, French fries, corn chips, or potato chips.

Do Not Use Tobacco Products

Tobacco in any form is a major cause of cancer and the use of tobacco products should be entirely avoided. If you are currently smoking, using chewing tobacco, smoking from a hookah, or using tobacco in any form, ask your healthcare team for help to find a way to quit.

Limit Consumption of Salty Foods and Foods Processed with Salt (Sodium)

Consuming too much salt can be harmful to our health, increasing risk of stomach cancer as well as high blood pressure. Most salt in Americans' diets comes from processed foods, such as boxed, canned, and frozen prepared items, as well as from fast foods and other restaurant foods.

Additional AICR Recommendations:

Aim to Meet Nutritional Needs through Diet Alone

To reduce your risk of cancer, choose a balanced diet with a variety of foods rather than taking supplements.

In general, the best source of nourishment is food and drink, not dietary supplements. Nutrient-rich whole foods contain substances that are necessary for good health, like fiber, vitamins, minerals, and phytochemicals. Plant-based foods are the source of many cancer-fighting compounds.



Answers to Common Questions about Diet, Nutrition, and Cancer

6

Answers to Common Questions about Diet, Nutrition, and Cancer

Q **Macrobiotic Diet: Is It True That Following a Macrobiotic Diet Can Cure Cancer?**

There is no evidence that a macrobiotic diet can cure or prevent disease. The diet was designed to help promote health in already healthy people. Because it is based on grains, vegetables, seaweed, beans, and various soups, a macrobiotic diet requires care and planning, and can be expensive. When undergoing and recovering from cancer treatment, survivors may find macrobiotic dietary



recommendations challenging and restrictive, thus limiting in terms of needed calories and protein required for maintaining body weight, strength, and energy.

Q **Juicing: Is It Okay to Juice During Cancer Treatment?**

Juicing can be a great way to add a variety of fruit and vegetables and naturally-occurring phytochemicals to the diet. However, relying only on juices for nutrition while undergoing or recovering from cancer treatment is not recommended. Cancer survivors should strive to eat a diet containing enough protein and calories for maintaining body weight during cancer treatment. It is important to thoroughly wash all fruits and vegetables before adding them to the juicer.

Q **Vegetarian Diets: Does Following a Vegetarian Diet Reduce the Risk of Cancer Recurrence?**

A vegetarian diet may be a healthier alternative to Western diets in general, but there is no clear evidence that a vegetarian diet is more protective against cancer than a mostly plant-based diet containing small amounts of lower fat meat and dairy foods. A vegetarian meal plan should include a variety of foods, including many different colorful vegetables and fruits, whole grains, and protein alternatives to meat (such as beans, eggs, tofu, fish, or small amounts of reduced-fat cheeses).

Q Soy Foods and Soy Products: Can Women with Breast Cancer Eat Soy or Soy- Containing Foods?

Soy foods contain several key nutrients and phytochemicals studied for their cancer prevention properties. Many soy foods also contain dietary fiber, which may lower risk of colorectal cancer. Soy foods contain isoflavones, which are phytoestrogens that in some ways mimic the action of estrogen but are very weak. Because high levels of estrogen link to increased breast cancer risk, there was a fear that soy foods—and the isoflavones in them—could increase risk. Yet overall, human studies show soy foods do not increase risk and in some cases, research suggests soy may lower risk. For breast cancer survivors, population studies do not show any harmful interactions between soy foods and anti-estrogen medications. A small number of studies even suggest soy foods may be most

protective for women who take anti-estrogen agents or aromatase inhibitors, but more research is needed before experts do more than encourage moderate consumption of whole soy foods (1 to 2 servings per day) as a low-fat protein.

Q Organic Foods: Are Organic Foods Better, Healthier Cancer Fighting Foods?

The term “organic” is defined as foods grown on contaminant-free land without pesticides or herbicides. There are many reasons why people choose organic foods, but at this time it is not known whether organic foods help reduce cancer risk more than non-organic counterparts. If you do opt for organic, remember that organic cookies, chips, and other snacks can contain exactly the same amount of calories, fat, and sugar as conventional brands and are not deemed “healthy” simply because they are organic.





Resources

7

AICR's Standard Serving Size Guide

http://preventcancer.aicr.org/site/PageServer?pagename=elements_serving_size

Savor Health's Dining Out Guide

http://www.savorhealth.com/assets/files/Savor_Health_Eating_Out_Guide.pdf

LIVESTRONG's Communicating with Your Healthcare Team

<http://livestrong.org/Get-Help/Learn-About-Cancer/Cancer-Support-Topics/Practical-Effects-of-Cancer/Communicate-With-Your-Health-Care-Team>

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