



Lifestyle Changes That Make a Difference

Nutrition and Physical Activity Guidelines
for Cancer Survivors

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Cancer survivors often ask questions about food choices, physical activity, and dietary supplements. They want to know whether nutrition and physical activity can help them live longer or feel better. The information here is meant to answer some of those questions. We hope to give you as a cancer survivor and your family the information you need to make informed choices about your food and physical activity choices. This information is based on the American Cancer Society Nutrition and Physical Activity Guidelines for Survivors, developed by the Society and a panel of experts in nutrition, physical activity, and cancer survivorship.

Your nutrition and physical activity needs will vary for a number of reasons, including where you are in your cancer experience. Here we use three phases to describe cancer survivorship as we talk about nutrition and physical activity. They are: active treatment and recovery, disease-free living or living with stable disease, and living with advanced cancer.

Nutrition and Physical Activity During Cancer Treatment and Recovery

During cancer treatment, surgery, radiation therapy, and chemotherapy can affect your body's needs for nutrients. These treatments can also affect your eating habits and how your body digests, absorbs, and uses food. Your main nutrition goals during this time are:

- To make certain your body's nutrient and calorie needs are met
- To maintain a healthy weight
- To avoid losing muscle mass
- To assure that any nutrition-related side effects, such as decreased appetite, mouth sores, difficulty swallowing, etc., are being prevented or managed as best they can
- To improve the quality of your life as you go through treatment

To help you meet these goals, your health care team will look at your current nutrition status.

If you are likely to have nutrition-related problems during treatment, your team will do one of two things: they will have the registered dietitian on the team see you, or they will help you find a qualified nutrition professional for dietary counseling. Getting help from a registered dietitian during cancer treatment can help reduce treatment-related symptoms, improve your quality of life, and improve your eating. If a registered dietitian is not available, be sure to bring your nutrition-related questions and concerns to your health care team for them to address. Table 1 gives you suggestions about how to find a qualified nutrition expert who works with cancer patients and survivors.

Table 1. Suggestions for Finding a Nutrition Professional

- Ask your health care team for a referral to see a registered dietitian (RD) if you have any nutrition-related challenges. It would be best if the RD is also a certified specialist in oncology (CSO).
- If an oncology dietitian is not available where you receive your cancer treatment and care, ask about an appointment with a dietitian at your primary care provider's office, a clinic, or in your community.
- Visit the Academy of Nutrition and Dietetics' Web site (www.eatright.org), using the "Find a Nutrition Professional" feature, type "Oncology Nutrition" in the expertise/specialty tab, or call the academy at 1-800-877-1600 to ask about a private practice dietitian in your area.

When You Are Unable to Eat Enough to Meet Your Body's Needs

Nutrition supplements such as high-protein/high-calorie beverages and foods can be helpful if you can't eat or drink enough to keep up with your body's needs. Some people think that tube-feedings or intravenous (IV) feedings will help them while they undergo and recover from cancer treatment. If you are thinking about these kinds of nutrition support, talk with your doctor or registered dietitian about whether these types of feedings are right for you. Ask about the benefits and possible risks of these feedings, too. As you make decisions about your nutrition, keep in mind what your goals are for your cancer treatment.



Vitamin and Mineral Supplements

You may be thinking about using dietary supplements such as vitamins and minerals during your cancer treatment. In fact, you may already be taking some supplements. Doctors do not agree on their use, so if you are taking any, discuss this with your doctor. Many dietary supplements contain levels that are higher than the amount found in food. Some may also be higher than what is recommended for good health. In addition, some contain substances that may affect some chemotherapy drugs, radiation therapy, and even surgeries related to your cancer treatment.

Many cancer experts advise their patients not to take supplements during treatment; or they may suggest using a dietary supplement only when it is needed to treat a deficiency such as osteoporosis or anemia, or to promote another aspect of health.

There is no evidence today that taking supplements after a cancer diagnosis reduces the risk of recurrence. But if you are thinking about taking a vitamin or mineral supplement after treatment, check with your health care team first. You will want to know if there might be any harm to you or if the supplements will help you in any way.

Some supplements can be useful if you have a specific deficiency, but most studies have found that the risks of high-dose supplements usually outweigh the benefits. Unless your health care team recommends a supplement for a specific reason, do not take ones that contain higher amounts than 100% of the Daily Value (DV). Your first line of defense should be to strive to get the nutrients you need from nutrient-rich foods and beverages.

Physical Activity During Cancer Treatment

Exercise is safe during cancer treatment, and it has many benefits, too. It improves bone health, muscle strength, and other quality of life measures.

Ways regular exercise may help you during cancer treatment

- Keep or improve your physical abilities.
- Improve balance, and lower risk of falls and broken bones.
- Keep muscles from wasting due to inactivity.
- Lower the risk of heart disease.
- Lessen the risk of osteoporosis (weak bones that are more likely to break).
- Improve blood flow to legs, and lower risk of blood clots.
- Make you less dependent on others to do normal activities of daily living.
- Improve your self-esteem.
- Lower the risk of anxiety and depression.
- Lessen nausea.
- Lessen symptoms of tiredness (fatigue).
- Help control your weight.
- Improve your quality of life.

Goals of an exercise program

While there are many reasons for being physically active during cancer treatment, each person's exercise program should be based on what is safe, effective, and enjoyable for them. Your exercise plan should take into account any exercise program you already follow, what you can do now, and any physical problems or limits you have.

If you are receiving chemotherapy and/or radiation therapy and already have an exercise program, you may need to exercise at a lower intensity and/or for a shorter period of time for a while. The goal should be to be active as much as possible. Some doctors may suggest that you wait to see what side effects you have with chemotherapy before starting physical activity.

If you did not exercise before diagnosis, you might start with stretching and brief, slow walks and progress slowly.

If you have bone metastases, osteoporosis, arthritis, or damage to any nerves in the hands, legs, and feet (called peripheral neuropathies), you should give careful attention to your balance and safety to reduce the risk for falls and injuries. Having a caregiver or exercise professional present during exercise sessions can be helpful.

If you are unable to exercise, you might ask about physical therapy. Having physical therapy during bed rest will help maintain strength and range of motion and can help with fatigue and depression.

Remember that what may be a low- or moderate-intensity activity for a healthy person may seem like a high-intensity activity for you. Some people can safely begin their own exercise program, but many will have better results with the help of an exercise specialist, physical therapist, or exercise physiologist. Be sure to get your doctor's OK first, and be sure that the person working with you knows about your diagnosis and limitations. These specially trained professionals can help you find the type, frequency, duration, and intensity of exercise that is right for you.

Looking for a Fitness Expert?

The American College of Sports Medicine (ACSM) offers a certification for trainers who want to work specifically with people who have been affected by cancer. A Certified Cancer Exercise Trainer (CET) is able to develop exercise programs to train clients who are going through cancer diagnosis or treatment. Visit the ACSM Web site at www.acsm.org to find an ACSM-certified professional.



Exercise safety and precautions during treatment

Always check with your doctor before starting any exercise program. This is especially important if your treatments can affect your lungs (such as the drug bleomycin or radiation to the chest), your heart (such as the drugs doxorubicin or epirubicin), or if you are at risk for lung or heart disease.

- Your cancer care team will check your blood counts during your treatment. Ask them about your counts and if it's OK for you to exercise.
- You may not be able to exercise if you have anemia (low red blood cell count). Discuss this with your doctor or nurse.
- If you have low white blood cell counts or if you take medicines that make you less able to fight infection, stay away from public gyms and other public places until your counts are at safe levels.
- You may not be able to exercise if the level of minerals in your blood, such as sodium and potassium, are not normal. This can happen if you have had a lot of vomiting or diarrhea. Discuss this with your doctor or nurse.
- If it's OK with your doctor, drink plenty of fluids to keep yourself well hydrated.
- If you feel very tired (have fatigue) and don't feel up to exercising, try to do 10 minutes of stretching exercises every day. (Later, we will discuss fatigue and exercise in more detail.)
- Avoid uneven surfaces or any weight-bearing exercises that could cause you to fall and injure yourself.



- Do not use heavy weights or do exercise that puts too much stress on your bones if you have osteoporosis, cancer that has spread to the bone, arthritis, nerve damage, poor vision, poor balance, or weakness. You may be more likely to injure yourself or break a bone.
- If you have numbness in your feet or problems with balance, you are at higher risk for falls. You might do better with a stationary reclining bicycle, for example, than a treadmill.
- Watch for swollen ankles, unexplained weight gain, or shortness of breath while at rest or with a small amount of exertion. Let your doctor know if you have any of these problems.
- Watch for bleeding, especially if you are taking blood thinners.
- Avoid any activity that raises your risk for falls or injury. If you notice swelling, pain, dizziness, or blurred vision, call your doctor right away.
- To avoid irritation, don't expose skin that has had radiation to the chlorine in swimming pools.
- Do not exercise if you have unrelieved pain, nausea/vomiting, or any other symptom that causes you concern. Call your doctor or nurse.
- If you still have a catheter (tube that goes into your body), avoid water and other exposures that may cause infections. Also, avoid resistance training that uses muscles in the area of the catheter to avoid dislodging it. Talk with your cancer team about what is safe for you.



Things to think about when planning an exercise program

- Start slowly. Even if you can only do an activity for a few minutes a day it will help you. How often and how long you do a simple activity like walking can be increased slowly. Your muscles will tell you when you need to slow down and rest.
- Try short periods of exercise with frequent rest breaks. For example, walk briskly for a few minutes, slow down, and walk briskly again, until you have done 30 minutes of brisk activity. If you need to, you can divide the activity into three 10-minute sessions. You will still get the benefit of the exercise.
- Try to include physical activity that uses large muscle groups such as your thighs, abdomen (belly), chest, and back. Strength, flexibility, and aerobic fitness are all important parts of an exercise program that works.
- Try to include some exercises that will help you keep lean muscle mass and bone strength, like exercising with resistance or light weights.
- You might want to include exercises that will increase your flexibility and keep the range of motion in your joints.
- Always start with warm-up exercises for about 2 to 3 minutes. Examples of those exercises are shoulder shrugs, lifting arms overhead, toe tapping, marching, and knee lifts. End your session with stretching or flexibility exercises. Hold a stretch for about 15 to 30 seconds and relax. Remember to breathe when you stretch.
- Listen to your body and rest when you need to.

When you are too tired to exercise – fatigue and cancer

Most people with cancer notice that they have a lot less energy. During chemotherapy and radiation, about 70% of patients have fatigue. Fatigue is when your body and brain feel tired. This tiredness does not get better with rest. For many, fatigue limits their activity. Inactivity leads to muscle wasting and loss of function.

An aerobic training program can help break this cycle. In research studies, regular exercise has been linked to reduced fatigue. It is also linked to being able to do normal daily activities without major limitations. An aerobic exercise program can be prescribed as treatment for cancer-related fatigue. Talk with your doctor or nurse about this.

Tips to reduce fatigue

- Set up a daily routine that allows activity when you are feeling your best.
- Exercise regularly at light-to-moderate intensity.
- Get fresh air.
- Unless you are told otherwise, eat a balanced diet that includes protein (meat, milk, eggs, and legumes, such as peas or beans) and drink about 8 to 10 glasses of water a day.
- Keep your symptoms controlled, like pain, nausea, or depression.
- To save energy, keep things you use often within easy reach.
- Enjoy your hobbies and other activities that give you pleasure.
- Use relaxation and visualization techniques to reduce stress.
- Balance activity with rest that does not interfere with nighttime sleep.
- Ask for help when you need it.

Add physical activity to your daily routine

Here are some ways to add physical activity to the things you do every day. Remember, only do what you feel up to doing.

- Walk around your neighborhood after dinner.
- Ride your bike.
- Mow the grass, or rake the leaves instead of using the blower.
- Scrub your bathroom.
- Wash and wax the car.
- Play active games with the kids, like freeze tag, jump rope, and the games you loved to play when you were a child.
- Walk a dog (one that can be controlled so that you don't trip or get pulled off balance).
- Weed your garden.
- Take a friend dancing, or dance in your own living room.
- Use an exercise bike or treadmill, or do arm curls, squats, lunges, and sit-ups while watching TV.
- Walk to lunch.
- Park your car in the farthest parking space at work, and walk to the building.
- Use the stairs instead of the elevator or escalator.
- Get off the bus several stops early, and walk the rest of the way to work.
- Make appointments for yourself in your daily planner for 10-minute walking breaks.
- Form a walking club of co-workers to help you stay motivated to walk during the workday.
- Wear a pedometer every day, and increase your daily steps.

Keep exercise easy and fun

Keep your exercise program simple and fun. Exercise and relaxation techniques are great ways to relieve stress. Reducing your stress is an important part of getting well and staying well.



Remember that you may need to exercise less intensely and increase your workout at a slower rate than people who are not getting cancer treatment. The goal is to keep as active as possible. Keep it safe, keep it fun, and make it work for you.

For more information on fatigue, please call us at 1-800-227-2345 and ask for our document on cancer-related fatigue or visit us online at www.cancer.org.

Recovery after treatment

After you've finished your treatment, you may still have symptoms or side effects that affect your nutrition and physical well-being. It will take some time for them to go away. If you lost weight during treatment, nutrition counseling will help you regain a normal, healthy weight. If you are overweight or obese, counseling can help you get to a healthy weight. You may also need treatment for other symptoms or side effects that haven't gone away. After treatment, if you haven't started a physical activity program yet, this would be a good time to start. A program of regular physical activity will help you recover from treatment and will improve your fitness. Be sure to ask the advice of your doctor and health care team before beginning an exercise program.

Tips to enhance your interest in your exercise program

- Set short-term and long-term goals.
- Focus on having fun.
- Do something different to keep it fresh. Try yoga, dancing, or tai chi.
- Ask for support from others, or get friends, family, and co-workers to exercise with you.
- Use charts to record your exercise progress.
- Recognize and reward your achievements.

Disease-free Living or Living With Stable Disease

During this phase, setting and achieving goals for weight management, a physically active lifestyle, and a healthy diet will help your overall health and quality of life. To help you with these goals, the American Cancer Society has developed survivorship guidelines in three areas: weight management, physical activity, and dietary patterns. These guidelines appear in Table 2 and are discussed here. Following these guidelines may help reduce the risk of cancer recurrence and of developing another cancer. They are also important for your heart health, as well.

Table 2. American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Survivors

Get to and stay at a healthy weight.

- If overweight or obese, limit your intake of high-calorie foods and beverages and increase physical activity to promote weight loss.

Be active.

- Avoid being inactive and return to normal daily activities as soon as possible following diagnosis.
- Exercise at least 150 minutes per week.
- Include strength training exercises at least two days per week.

Eat a variety of healthy foods from plant sources.

- Limit the amount of processed meat and red meat you eat.
- Eat 2½ cups or more of vegetables and fruits each day.
- Choose whole grains rather than refined-grain products.



1. Get to and stay at a healthy weight.

Extra weight is linked to an increased risk of your cancer coming back and decreased survival rates among breast, prostate, and colorectal (colon) cancer survivors, and possibly others. Being overweight is a risk factor for developing cancer and other conditions such as obesity, heart disease, and osteoporosis. And many people with cancer are overweight at the time of diagnosis. If you are overweight, setting goals to get to and stay at a healthy weight are among the most important health goals that you can set for yourself.

Healthy ways to control weight include:

- Limit high-calorie foods.
- Drink fewer beverages high in fat and/or added sugar.
- Eat more low-calorie foods like vegetables and fruits.
- Add more physical activity throughout the day.

The right weight

Knowing your body mass index (BMI) can tell you if your weight is right for someone of your height. In general, the higher the number, the more body fat a person has. BMI is often used as a screening tool to decide if your weight might be putting you at risk for health problems such as heart disease, diabetes, and cancer.

BMI is used to broadly define different weight groups in adults 20 years of age or older. The same groups apply to both men and women.

- Underweight: BMI is less than 18.5.
- Normal weight: BMI is 18.5 to 24.9.
- Overweight: BMI is 25 to 29.9.
- Obese: BMI is 30 or more.

You can find your BMI by using a simple chart such as the one online at www.cancer.org (search for “bmi”).





2. Be active on a regular basis.

Many studies have shown that being physically active has an impact on the quality of life of cancer survivors. Now, studies have shown that physical activity after a cancer diagnosis is also associated with a lower risk of the cancer coming back and improved overall survival.

For example, a recent study among breast cancer survivors showed that getting exercise after diagnosis was associated with a lower risk of breast cancer deaths, a lower risk of dying from all causes, and a lower risk of breast cancer recurrence.

Among colon cancer survivors, studies suggest exercise reduces deaths from colon cancer and lowers the risk of the cancer coming back.

How much activity do I need?

The American Cancer Society guidelines, and those of the American College of Sports Medicine, encourage survivors to exercise for at least 150 minutes per week, and to include strength training exercises at least 2 days per week. If you have not been active in the past, you will want to gradually work up to this physical activity plan.



Table 3. Examples of moderate- and vigorous-intensity physical activities

	Moderate intensity	Vigorous intensity
Exercise and leisure	Walking, dancing, leisurely bicycling, ice and roller skating, horseback riding, canoeing, yoga	Jogging or running, fast bicycling, circuit weight training, aerobic dance, martial arts, jumping rope, swimming
Sports	Volleyball, golfing, softball, baseball, badminton, doubles tennis, downhill skiing	Soccer, field or ice hockey, lacrosse, singles tennis, racquetball, basketball, cross-country skiing
At home	Mowing the lawn, general yard and garden maintenance	Digging, carrying and hauling, masonry, carpentry
At work	Walking and lifting as part of the job (custodial work, farming, auto or machine repair)	Heavy manual labor (forestry, construction, fire fighting)



3. Eat a variety of healthy foods, with more foods from plant sources. This includes more vegetables, fruits, and whole grains.

Recent studies suggest that food choices may affect the risk for recurrence and survival among survivors. Most of these studies have looked at breast cancer, but more evidence is also seen for colon and prostate cancer survivors.

Similar to what has been seen for cancer prevention, it looks like it's the overall dietary pattern that is important for cancer survivorship – it's not one food, or even one food group, that makes the difference. It's likely the combination of many different nutrients coming from many different foods – working together – that offers the best protection. Studies suggest that the best protection comes from a diet that:

- Is high in fruits, vegetables, and whole grains
- Includes more fish and poultry instead of red and processed meats
- Includes non-fat and low-fat instead of full-fat dairy products
- Includes nuts and olive oil instead of less healthy sources of fat, such as butter or trans-fats found in many processed snack foods

Limit the amount of processed meat and red meat you eat.

- Lower the amount of processed meats you eat, such as bacon, sausage, luncheon meats, and hot dogs.
- Choose fish, poultry, or beans instead of red meat (beef, pork, and lamb).
- If you eat red meat, select lean cuts and eat smaller portions.
- Prepare meat, poultry, and fish by baking, broiling, or poaching rather than by frying or charbroiling.

Eat 2½ cups or more of vegetables and fruits each day.

- Include vegetables and fruits at every meal, and eat them for snacks.
- Eat a variety of vegetables and fruits each day.
- Choose whole fruits and vegetables and 100% juice if you drink vegetable or fruit juices.
- Limit use of creamy sauces, dressings, and dips with fruits and vegetables.

Choose whole grains rather than refined-grain products.

- Choose whole-grain foods such as whole-grain breads, pasta, and cereals (such as barley and oats), and brown rice over white rice, breads, cereals, and pasta made from refined grains.
- Limit how much you eat of refined carbohydrate foods, such as pastries, candy, sweetened breakfast cereals, and other high-sugar foods.





Living With Advanced Cancer

If you are living with advanced cancer, what you eat and being as physically active as you are able may help you feel better and improve your sense of well-being. Be sure to let your doctor, nurse, or registered dietitian know if you are having symptoms or side effects such as fatigue, bowel changes, and decreased sense of taste or appetite. Your health care team can provide suggestions or prescribe medicines to help you feel your best, improve your appetite, and manage your symptoms.

If you are living with advanced cancer and wonder about physical activity, please seek the advice of your doctor. There isn't enough research on the benefits of exercise for survivors with advanced cancer for the American Cancer Society to make recommendations at this time. Talk to your doctor about what level of physical activity is right for you.

Nutrition and Physical Activity Guidance for Specific Cancers

Breast Cancer. Following the nutrition and physical activity guidelines for survivors will help reduce the risks for a second primary breast cancer and heart disease. Your diet should be rich in vegetables and fruits, include dietary fiber, and have low amounts of saturated fats. You should strive to get to and stay at a healthy weight by eating a well-balanced diet and getting regular physical activity. Regular physical activity is important even if there are no weight concerns.

Colorectal Cancer. You should get to and stay at a healthy weight, take part in regular physical activity, and eat a well-balanced diet as outlined in the guidelines for cancer survivors. If you have ongoing bowel problems or surgery as a result of your cancer treatment that affects normal nutrient absorption, you should be referred to a registered dietitian to help you with your diet and nutrition needs.

Endometrial Cancer. Obesity is a major risk factor for the development of this cancer. The effect of body weight or physical activity on recurrence and survival is not known. However, being overweight or obese and having a sedentary lifestyle are associated with poorer quality of life among endometrial cancer survivors. So, to the extent possible, you should eat a healthy diet, be physically active, and watch your weight because of the other known health benefits of doing so.

Ovarian Cancer. Research suggests that diet, physical activity, and body size and weight changes may play a role in ovarian cancer survival. Further studies are needed before any recommendations can be made for ovarian cancer. However, you should eat a healthy diet, be physically active, and watch your weight because of the other known health benefits of doing so.

Lung Cancer. Guidance on nutrition and physical activity for people who are living with lung cancer should be made based on your own individual needs. Working to get to and stay at a healthy weight by adjusting food intake and physical activity is a reasonable goal. It is also important to make sure that nutritional needs are met with a well-balanced diet and a multivitamin/mineral supplement, if needed.

Prostate Cancer. You should strive to get to and stay at a healthy weight, be physically active, and eat a diet that is rich in vegetables and fruit and low in saturated fat. Get the calcium you need from your diet. If you are at increased risk for bone fractures, you may need to alter these suggestions.

Cancers of the Head and Neck and Upper Digestive System (Esophagus and Stomach). To the extent you are able, you should follow the nutrition and physical activity guidelines for cancer survivors.

Answers to Common Questions

The following section lists a review of the current evidence regarding common concerns that cancer survivors may have about diet and physical activity.

Does alcohol increase the risk of cancer recurrence (coming back)?

Studies have found a link between alcohol intake and the risk of developing a number of cancers, such as cancer of the:

- Mouth
- Throat
- Larynx (voice box)
- Esophagus (tube that connects the throat to the stomach)
- Liver
- Breast

Alcohol use may be linked to colon cancer, too. In people who have already been diagnosed with cancer, alcohol intake could affect the risk for these cancers.

Alcohol intake can also increase levels of estrogens in the blood. In theory, this could increase the risk of estrogen receptor-positive breast cancer coming back after treatment. But only a few studies have looked at alcohol use in breast cancer survivors. About half of them link it to worse outcomes, while the other half either showed no harm or a benefit. One study found that the effect of alcohol may be worse in women who are overweight or obese.

Moderate alcohol intake can have helpful effects on the heart, but those benefits need to be weighed against the risks, including the possible effects on cancer risk.



Should I avoid alcohol during cancer treatment?

The cancer type and stage (extent), as well as the type of treatment, should be taken into account when deciding whether to drink alcohol during treatment. Many of the drugs used to treat cancer are broken down by the liver, and alcohol, by causing liver inflammation, could impair drug breakdown, increasing side effects. It's a good idea to drink only a little, if any, alcohol during treatment to prevent interactions with the drugs used to treat cancer.

For people with cancers of the head and neck, alcohol, even in the small amounts used in mouthwashes, can irritate the oral cavity and make mouth sores feel even worse. If you have mouth sores, you may be advised to avoid or limit alcohol. It may also be best to avoid or limit alcohol if you are starting cancer treatment that will put you at risk for mouth sores, such as radiation therapy to the head and neck or certain types of chemotherapy.

What do antioxidants have to do with cancer?

Antioxidants include vitamin C, vitamin E, carotenoids (compounds that give vegetables and fruits their colors), and many phytochemicals (plant-based chemicals). They help prevent cell damage caused by chemical reactions with oxygen. Because this damage may play a role in cancer development, it has long been thought that antioxidants may help prevent cancer.

Studies suggest that people who eat more vegetables and fruits, which are rich sources of natural antioxidants, may have a lower risk for some types of cancer. Because cancer survivors may be at increased risk for second cancers, they should eat a variety of antioxidant-rich foods each day. (Second cancers are new, different cancers, not the same cancer coming back.)

So far, studies of antioxidant vitamin or mineral supplements have not found that they reduce cancer risk. The best advice at this time is to get antioxidants through foods rather than supplements.



Is it safe to take antioxidant supplements during cancer treatment?

Many dietary supplements contain levels of antioxidants (such as vitamins C and E) that are much higher than the recommended Dietary Reference Intakes for optimal health.

At this time, many cancer doctors advise against taking high doses of antioxidant supplements during chemotherapy or radiation therapy. There is a concern that antioxidant supplements may interfere or make cancer treatments less effective. Whether antioxidants or other supplements are helpful or harmful during chemotherapy or radiation therapy treatment is a major question without a clear science-based answer right now. Until more evidence is available, it's best for cancer survivors getting these treatments to avoid dietary supplements unless instructed by their doctor or health care team to manage a specific condition such as osteoporosis or anemia. Cancer survivors should avoid taking dietary supplements that contain more than 100% of the Daily Value.

Will eating less fat lower the risk of cancer coming back or improve survival?

Several studies have looked at the link between fat intake and survival after breast cancer. Results have been mixed. Early results of one large study of early stage breast cancer survivors suggested that a low-fat diet may lower the chance of the cancer coming back. This effect was strongest in women whose cancers were estrogen-receptor negative.

Although it's not clear that total fat intake affects cancer recurrence and survival, diets very high in fat tend to be high in calories, too. This can lead to overweight and obesity, which are linked to a higher risk of many types of cancer, a higher risk of certain cancers coming back after treatment, and worse survival for many types of cancer.



Do different types of fat affect cancer risk and survival?

There is evidence that certain types of fat, such as saturated fats, may increase cancer risk. Saturated fats are animal fats that are solid at room temperature, such as butter, lard, and the fat found in meat. There is little evidence that other types of fat, such as monounsaturated fats, omega-3 fatty acids, and other polyunsaturated fats, reduce cancer risk, although these fats have been shown to reduce the risk of cardiovascular disease. Monounsaturated fats can be found in canola and olive oil, olives, avocados, peanuts, and many other nuts and seeds; omega-3 fatty acids can be found in fish and walnuts. Polyunsaturated fats can be found in different types of liquid vegetable oils.

In one study, high saturated-fat intake reduced survival from prostate cancer. In another study, monounsaturated fat intake lowered the risk of death from prostate cancer. Excess saturated-fat intake is a known risk factor for heart disease, a major cause of death in all populations, including cancer survivors.

Although trans fats have harmful effects on the heart, such as raising blood cholesterol levels, their link to cancer risk or survival is not clear. Still, survivors (especially those at increased risk of heart disease) should eat as few trans fats as possible due to their effects on heart disease. Major sources of trans fats are margarines, baked goods, and snack foods that contain partially hydrogenated oils.

Can dietary fiber prevent cancer or improve cancer survival?

Dietary fiber includes many different plant carbohydrates that are not digested by humans. Fibers are either soluble (like oat bran) or insoluble (like wheat bran and cellulose). Soluble fiber helps lower the risk of heart disease by reducing blood cholesterol levels. The intake of fiber (both soluble and insoluble) is also linked with improved bowel function.

Good sources of fiber are beans, vegetables, whole grains, nuts, and fruits. Eating these foods is recommended because they contain other nutrients that may help reduce cancer risk. They also have other health benefits, such as reduced risk of heart disease. At this time, we don't know if fiber intake can affect cancer risk or survival.

Is flaxseed good for me?

Flaxseed is a good source of vitamins, minerals, and fiber, and is also high in omega-3-fatty acids and phytoestrogenic lignans (compounds that act like estrogen in the body).

In the lab, flaxseed (and compounds from flaxseed) seems to have slowed cancer cell growth and helped certain treatments work better. In two small studies, patients with breast or prostate cancer who were put on a flaxseed-rich diet before surgery had lower rates of cancer cell growth (in their tumors) than the patients on other diets. More research is still needed to see the effect of flaxseed on outcomes.



Are there special food safety precautions for people getting cancer treatment?

Infection is of special concern for cancer survivors, especially when the immune system has been weakened as a result of their cancer treatment. Certain cancer treatments, such as chemotherapy, can weaken the immune system. Blood tests are done often during cancer treatment to check this. When their immune systems are weak, survivors should be careful to avoid eating foods that may contain unsafe levels of germs. Food should be handled safely. For example:

- Wash your hands before eating or preparing foods.
- Wash vegetables and fruits well.
- Keep foods at the right temperatures – hot foods hot (140°F or warmer) and cold foods cold (40°F or colder).
- Use special care in handling raw meats, fish, poultry, and eggs, keeping them away from other foods.
- Thoroughly clean all utensils, countertops, cutting boards, and sponges that have contact with raw meat.
- Cook foods to proper temperatures. Meat, poultry, and seafood should be thoroughly cooked. Use a food thermometer to check the internal temperatures of meats before serving.
- Avoid raw honey, milk, and fruit juice, and choose pasteurized versions instead. Store foods in a refrigerator or freezer (below 40°F) right after buying them to limit the growth of germs.
- When eating out, avoid salad bars, sushi, and raw or undercooked meat, fish (including shellfish), poultry, and eggs. These foods are more likely to contain harmful bacteria.
- If you are concerned about the safety (purity) of the water in your home, ask your public health department to check it for bacteria.

For more on food safety and precautions, call us at 1-800-227-2345 or visit us at www.cancer.org and search for our documents called *Infections in People With Cancer and Nutrition for the Person With Cancer During Treatment*.



Should I avoid meats?

Studies have linked eating large amounts of red meat and processed meats (like bacon, hot dogs, and deli meats) with increased risk of colorectal, prostate, and stomach cancers. Some research suggests that frying, broiling, or grilling meats at very high temperatures creates chemicals that might increase the risk of some types of cancer (especially meats that are higher in fat and poultry with skin). For those reasons, the American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention recommends limiting your intake of processed and red meats and discourages cooking these and other higher-fat sources of protein at high temperatures. Cancer survivors may also want to follow this recommendation for general good health.

No studies have looked at the effect of processed meat, meat cooked at high temperature, or meat in general on cancer coming back or getting worse (progressing or growing).

Does being overweight increase the risk of cancer coming back or getting another cancer?

More and more evidence suggests that being overweight or obese raises the risk for recurrence (the cancer coming back) and reduces the odds of survival for many cancers. Increased body weight has been linked with higher death rates for all cancers combined.

Because of other proven health benefits to losing weight, people who are overweight are encouraged to get to and stay at a healthy weight. Avoiding weight gain as an adult is important, too, not only to reduce cancer risk and risk of cancer coming back, but to reduce the risk of other chronic diseases as well.

Are foods labeled organic recommended for cancer survivors?

The term “organic” is often used for foods grown without pesticides and genetic modifications (changes). It’s also used for meat, poultry, eggs, and dairy products that come from animals that are not given antibiotics or growth hormones. The use of the term organic on food labels is controlled by the United States Department of Agriculture (USDA).

It’s commonly thought that organic foods may be better for you because they reduce exposure to certain chemicals. It has also been suggested that their nutrient makeup may be better than non-organic foods. Whether this means health benefits to those who eat organic foods is being investigated.

At this time, there are no studies in humans to show whether organic foods are better than other foods in terms of reducing the risk of cancer, the risk of cancer coming back, or the risk of cancer progression.

Should I exercise during cancer treatment and recovery?

Research strongly suggests that exercise is not only safe during cancer treatment, but it can also improve physical functioning and many aspects of quality of life. Moderate exercise has been shown to improve fatigue (extreme tiredness), anxiety, and self-esteem. It also helps heart and blood vessel fitness, muscle strength, and body composition (how much of your body is made up of fat, bone, or muscle).

People getting chemotherapy and radiation therapy who already exercise may need to do so at a lower intensity and build up more slowly than people who are not getting cancer treatment. The main goal should be to stay as active as possible and slowly increase your level of activity over time after treatment.

Are there special precautions survivors should consider?

Certain issues for cancer survivors may prevent or affect their ability to exercise. Some effects of treatment may increase the risk for exercise-related problems. For instance:

- People with severe anemia (low red blood cell counts) should delay activity until the anemia is better.
- Those with weak immune systems should avoid public gyms and other public places until their white blood cell counts return to safe levels.
- People getting radiation should avoid swimming pools because chlorine may irritate the skin at the treatment area.

If you were not active before diagnosis, you should start with low-intensity activities and then slowly increase your activity level. Certain people should use extra caution to reduce their risk of falls and injuries, including:

- Older people
- Those with bone disease (cancer in the bones or thinning bones, such as osteoporosis)
- People with arthritis
- Anyone with nerve damage (peripheral neuropathy)

Can regular exercise reduce the risk of cancer coming back?

This has not been looked at for all types of cancer, but there have been studies of survivors of breast, colorectal, prostate, and ovarian cancers. In these studies, people with higher levels of physical activity after diagnosis lived longer and had less chance of the cancer coming back. Still, more studies are needed to see if exercise has a direct effect on cancer growth.

In the meantime, since physical activity is known to decrease the risk of heart and blood vessel disease, diabetes, and osteoporosis, cancer survivors should try to have a physically active lifestyle.



Is yoga helpful to cancer survivors?

Most of the studies of yoga in cancer have been in breast cancer patients. The results found that yoga can be helpful in terms of anxiety, depression, distress, and stress. It didn't seem to be as helpful for more physical outcomes, such as body composition, fitness, and muscle strength. More research is needed, but to get the most benefit, it may be best to combine yoga with aerobic exercise and resistance (weight) training.

What are phytochemicals, and do they reduce cancer risk?

Phytochemicals are a wide range of compounds made by plants. Some have either antioxidant or hormone-like actions. Studies looking at the effects that phytochemicals (or the plants that contain them) may have on cancer coming back or getting worse (progressing) are very limited – only a few studies have been done.

Eating lots of vegetables and fruits reduces the risk of some types of cancer, so researchers are looking for the specific plant compounds that might account for this. At this time, there is no evidence that phytochemicals taken as supplements are as helpful as the vegetables, fruits, beans, and grains they come from.

Should cancer survivors include soy-based foods in their diet?

Soy foods are an excellent source of protein and can be a good option for meals without meat. Soy contains many phytochemicals, some of which have weak estrogen activity and seem to protect against hormone-dependent cancers in animal studies. Other compounds in soy have antioxidant properties and may have anticancer effects.

There's a great deal of interest in the possible role of soy foods in reducing cancer risk, especially breast cancer risk. But the evidence at this time is mixed.

For the breast cancer survivor, current research finds no harmful effects from eating whole soy foods such as edamame, tofu, and soy milk.

Does eating sugar and sugar-containing foods “feed” cancer?

Sugar intake has not been shown to directly increase risk or progression of cancer. However, sugars and refined sugars (including honey, raw sugar, brown sugar, high-fructose corn syrup, and molasses) and sweetened beverages (including sodas, sports drinks, and fruit flavored beverages) containing large amounts of these sugars add substantial amounts of calories to the diet. High-calorie foods can promote weight gain and lead to obesity, which can adversely affect cancer outcomes. In addition, consuming foods and beverages high in sugars and refined sugars has been shown to lead to higher blood insulin levels. Researchers are very interested in whether over-consuming refined carbohydrates and sugars, higher insulin levels, obesity, and insulin resistance may indirectly increase the risk of certain cancers. Studies are currently being conducted to answer these questions. Most foods and beverages that are high in added sugar do not contribute many nutrients to the diet and often replace more nutritious food choices. Therefore, limiting your consumption of foods and beverages with refined sugars and carbohydrates will help reduce cancer risk.

Would survivors benefit from using vitamin and mineral supplements?

Survivors should try to get the nutrients they need through food, not supplements. Dietary supplements should be used when your doctor advises you to take them because of a deficiency of a certain nutrient. Do not take vitamins or other dietary supplements to get higher than recommended levels of nutrients – this may do more harm than good.

Can nutritional supplements lower cancer risk or the risk of cancer coming back?

There is no evidence at this time that dietary supplements can lower the chance of cancer coming back or improve survival.

There is strong evidence that a diet rich in vegetables, fruits, and other plant-based foods may reduce the risk of some types of cancer. And some recent studies suggest there may be a helpful effect on recurrence or survival for breast, prostate, and ovarian cancers. But there is no evidence at this time that supplements can provide these benefits. Many healthful compounds are found in vegetables and fruits, and it's likely that these compounds work together to create these helpful effects. Food is the best source of vitamins and minerals.

Will eating vegetables and fruits lower the risk of cancer coming back?

In most studies, eating more vegetables and fruits has been linked with a lower risk of lung, oral (mouth), esophagus (tube connecting the mouth to the stomach), stomach, and colon cancer. But few studies have been done on whether a diet that includes many vegetables and fruits can reduce the risk of cancer coming back (recurrence) or improve survival. Some recent studies suggest that a higher intake of vegetables may have a helpful effect on recurrence or survival for breast, prostate, and ovarian cancers, but this is not definite.

Still, cancer survivors should get at least 2½ cups of vegetables and fruits each day because of their other health benefits. It's not known which of the compounds in vegetables and fruits are most protective, so it's best to eat a variety of different kinds of colorful vegetables and fruits each day.



Is there a difference in the nutritional value of fresh, frozen, and canned vegetables and fruits?

Yes, but they can all be good choices. Fresh foods are usually thought to have the most nutritional value. But some frozen foods can have more nutrients than fresh foods. This is because they are often picked ripe and quickly frozen, and nutrients can be lost in the time between harvesting and eating fresh foods.

Canning is more likely to reduce the heat-sensitive and water-soluble nutrients because of the high temperatures used in the canning process. Also, be aware that some fruits are packed in heavy syrup, and some canned vegetables are high in sodium. Choose different forms of vegetables and fruits.

Does cooking affect the nutritional value of vegetables?

Cooking vegetables and fruits can help you better absorb certain nutrients, like carotenoids (compounds that give vegetables and fruits their colors). Microwaving and steaming are the best ways to preserve the nutrients, while boiling, especially for a long time, can leach out the water-soluble vitamins.

Should I be juicing my vegetables and fruits?

Juicing can add variety to your diet and can be a good way to get vegetables and fruits, especially if you have trouble chewing or swallowing. Juicing also helps the body absorb some of the nutrients in vegetables and fruits. But juices may be less filling than whole

vegetables and fruits, and they contain less fiber. Drinking a lot of fruit juice can add extra calories to a person's diet, too.

Buy juice products that are 100% vegetable or fruit juices and pasteurized to remove harmful germs. These are better for everyone, but are especially important for people who may have weak immune systems, such as those getting chemotherapy.

Do vegetarian diets reduce risk of cancer coming back?

No direct evidence has shown that vegetarian diets help reduce the risk of cancer coming back when compared to a diet that contains meat and is high in vegetables, fruits, and whole grains and low in red meats. But vegetarian diets can be good for you because they tend to be low in saturated fat and high in fiber, vitamins, and phytochemicals.

Vegetarian diets are in line with the American Cancer Society Nutrition Guidelines for the Prevention of Cancer. See our documents *Vegetarianism* and *American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention* for more information.

How much water and other fluids should I drink?

Symptoms like fatigue (extreme tiredness), light-headedness, dry mouth, a bad taste in the mouth, and nausea can be caused by dehydration (loss of fluids from the body). To help prevent these problems, survivors should try to take in enough fluids. This is especially important if you are losing fluids, such as through vomiting or diarrhea.

Healthy adult men need about 3.7 liters of water a day, while women need about 2.7 liters, but most of this fluid comes from foods. (Note: A liter is a little over a quart or 4 cups.)

If you are having trouble eating or drinking or are losing fluids (because of cancer or cancer treatment-related problems with vomiting or diarrhea, for instance), you may not be able to take in enough fluids. You should talk with your health care team because you may need to be treated with intravenous (IV) fluids.

Additional Resources

More information from your American Cancer Society

The following information may also be helpful to you. These materials may be ordered from our toll-free number, 1-800-227-2345, or read on our Web site, www.cancer.org.

Nutrition for the Person With Cancer During Treatment: A Guide for Patients and Families (also in Spanish)

American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention (also in Spanish)

Infections in People With Cancer

Vegetarianism

Please contact us anytime, day or night, for information and support. Call us at 1-800-227-2345 or visit www.cancer.org.

References

Rock CL, Doyle C, Demark-Wahnefried W, et al. Nutrition and Physical Activity Guidelines for Cancer Survivors. *CA Cancer J Clin*. 2012;62:242-274.



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