



NUTRITION DURING CANCER TREATMENT

CANCER SURVIVOR SERIES



AICR Research Grants 2015 (partial list)

Women's interventional Nutrition Study (WINS) long-term survival analysis

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Targeted disruption of cancer cell metabolism and growth through modification of diet quality

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A mail- and video-based weight loss trial in breast cancer survivors

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Kana Wu, MD, MPH, PhD, Harvard University School of Public Health

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Introduction

A healthy diet is very important when you are undergoing treatment for cancer. This is a time when there is much demand on your body. The two main nutritional goals for someone during cancer treatment are to:

- 1) work with your oncology care providers to achieve and maintain the best weight for you;
- 2) select and eat healthy foods and drinks that are tolerated best during cancer treatment; and that supply the body with fuel and nutrients for repair and healing.

This booklet discusses eating for good nutrition throughout cancer therapy. Nutritional problems associated with cancer and cancer treatment are presented, along with tips to help minimize these eating difficulties.



How Cancer Affects Nutritional Needs

Not only do eating habits and behaviors often change when you are having cancer treatment, but the way your body uses nutrients changes as well.

CHANGES IN EATING HABITS AND EATING BEHAVIOR

Eating the same type and amount of food you enjoyed before your diagnosis of cancer may sometimes be difficult.

Side effects of cancer therapy may affect your eating habits. Some foods may taste less appealing to you and, as a result, you may eat less of them. Nutrition problems you had before your diagnosis may be aggravated by cancer and its treatment. For example, people who are diabetic may need to modify their medication as well as their diet to manage their blood sugar.



Coping with changes in your eating habits may seem overwhelming. You may feel anxious about eating enough of certain foods. Or you may become afraid of eating the “wrong” foods and eat very little at all. These reactions are normal.

Some cancer patients may have trouble consuming a wide enough variety of foods to satisfy nutritional needs. If you’re concerned about your nutritional status, talk to your health care provider or registered dietitian (RD or RDN).

You can find tips for dealing with nutritional problems in Section Four of this booklet.

EAT HEALTHY FOODS INSTEAD OF TAKING SUPPLEMENTS

When you are undergoing cancer treatment, it’s best to try to meet your nutritional needs by eating healthy whole foods. Research indicates that getting protective nutrients and fiber from healthy plant foods like vegetables, fruits, whole grains and beans is preferable to supplements, which do not supply the full array of compounds that come along with nutrients from whole, minimally processed foods.

A registered dietitian (RD or RDN) who specializes in oncology can provide an individualized dietary plan and suggestions for managing your treatment-related side effects and help you eat a healthy diet during your recovery.



**Eat at least
3½ cups of
vegetables and
fruits every day
for overall good
health.**

Some supplements have been shown to interfere with cancer treatment and medications.

Always be sure to tell your doctor which supplements or herbal preparations you are taking (if any) and/or which ones you are considering taking and in what amounts.

In some instances, there may be benefits to taking a multivitamin supplement with no more than 100 percent of the Dietary Reference Intakes (DRI). Check with your health care provider or a registered dietitian.

Also, if you cannot eat enough solid food to meet your body's needs, you may need powdered or liquid meal replacement beverages (some may also provide vitamins and minerals equal to a multivitamin supplement). Protein and calories are both essential to maintain body strength.

If you are concerned about whether you are getting the right amount of a specific vitamin or mineral, speak with your health care provider or registered dietitian.

In general, aim to meet the following recommendations as part of a healthy eating pattern while staying within your calorie needs.

- Eat at least 3½ cups of vegetables and fruits every day for overall good health. Try cooked and puréed fruits and vegetables if needed to aid eating and digestion.
- Eat a variety of vegetables, especially dark green and red and orange vegetables, beans and peas.
- Make at least half of all your grains whole. Unless you need to follow a low-fiber diet, replace some refined grains (including white bread and white rice) with whole grains (such as whole-wheat breads and pasta, brown rice and oats).

- Choose fat-free or low-fat dairy products (such as milk, yogurt and cheese or alternatives like fortified soy beverages).
- Choose a variety of foods high in protein including seafood; lean meat and poultry; eggs, beans and peas; soy products; and unsalted nuts and seeds.
- Replace high-fat red meats with choices that are lower in saturated fat and calories, such as poultry, fish or lean red meat.
- Use oils to replace solid fats where possible.
- Choose foods that provide more potassium, dietary fiber, calcium and vitamin D. These are all nutrients that are low in many Americans' diets. You can get them in vegetables, fruits, whole grains and milk (or milk alternative) products.



How Treatment May Affect Nutrition

There are several different methods for treating cancer. Each may affect your nutritional needs and eating habits.

RADIATION THERAPY

Radiation therapy uses high-energy rays to damage cancer cells so they are unable to multiply. It may be used either alone or in combination with surgery or chemotherapy.

Radiation therapy also may be used before surgery to shrink a tumor or after surgery to destroy any cancer cells that may remain in the area.

Side effects from radiation therapy treatments depend upon the specific site of the body receiving therapy and the dose. In addition to fatigue (the most common side effect), radiation therapy can lead to nutritional problems. These usually occur when the gastrointestinal tract, from mouth to rectum, is in the treatment area.

Some problems occur early in treatment and last only a short time, such as irritation of the mouth, tongue and throat, dairy intolerance, nausea, vomiting or diarrhea. Other problems may appear months after therapy and are longer lasting, such as dry mouth, stricture or narrowing of the esophagus, poor absorption of nutrients, abdominal discomfort, diarrhea or constipation.

You can find help in dealing with these problems in Section Four of this booklet.

Radiation Therapy and Nutrition-related Side Effects

Location of Cancer	Area of Treatment
Brain, Mouth, Esophagus, Thyroid	Head and neck
Stomach, Liver, Pancreas, Gallbladder, Kidney	Abdomen
Breast, Lung	Upper torso
Colon, Rectum	Lower torso
Prostate, Uterus, Ovaries, Cervix, Bladder	Pelvis

	Short-term Effects	Long-term Effects
	<ul style="list-style-type: none"> • Fatigue & loss of appetite • Irritation of mouth, tongue, esophagus • Alteration in taste & smell 	<ul style="list-style-type: none"> • Dry mouth, tooth decay, stricture of esophagus, loss of taste • Alteration in taste & smell
	<ul style="list-style-type: none"> • Irritation of stomach, diarrhea, milk intolerance, nausea & vomiting • Fatigue & loss of appetite 	<ul style="list-style-type: none"> • Some of these symptoms may continue in some patients
	<ul style="list-style-type: none"> • Irritation of stomach & esophagus • Fatigue & loss of appetite 	<ul style="list-style-type: none"> • Some of these symptoms may continue in some patients
	<ul style="list-style-type: none"> • Diarrhea • Fatigue & loss of appetite 	<ul style="list-style-type: none"> • Some of these symptoms may continue in some patients
	<ul style="list-style-type: none"> • Diarrhea, malabsorption of nutrients 	<ul style="list-style-type: none"> • Some of these symptoms may continue in some patients

SURGERY

Surgery is often the preferred treatment for tumors that have not spread. Through surgery, the tumor and any nearby tissue that may contain cancer cells are removed.

Whether or not surgery is used depends on the type of cancer, its location and how much it has spread to other parts of the body.

Surgery can cause temporary or permanent nutritional challenges. The operation itself will increase your body's need for calories and protein

Cancer Surgery and Nutrition-related Side Effects

Location of Cancer	Surgical Procedure
Head area, Neck, Tongue	Removal of all or part of the affected area
Jaw	Removal of jaw bone
Esophagus	Removal (esophagectomy) with reconstruction using muscle from the intestine
Stomach	Removal (gastrectomy) or partial removal
Small Intestine	Opening created outside the body (jejunostomy or ileostomy) or removal
Pancreas	Removal (pancreatectomy)
Large Intestine	Removal (colectomy) with or without an opening created outside the body (colostomy)

in order to heal. You may be advised to eat more calories and protein to provide enough nutrients for healing. Long-term nutritional problems may result when parts of the digestive system or gastrointestinal tract are removed or altered through surgery.

Difficulty with chewing and swallowing and poor absorption of nutrients in the intestine may occur. You can find help dealing with these problems in Section Four of this booklet.

Possible Nutritional Problems	
	Makes chewing and swallowing difficult
	Requires tube feeding
	Food may leak into the lungs; the new esophagus may narrow
	Food may travel to the intestines too quickly; high blood sugar may develop; vitamin B-12 deficiency
	Poor absorption of nutrients; salt and water imbalance; blocked bowels; vitamin B-12 deficiency
	Poor absorption of nutrients, diabetes
	Poor absorption of nutrients and water, leading to diarrhea

CHEMOTHERAPY

Chemotherapy is the use of drugs to destroy cancer cells by disrupting their ability to grow and multiply. Chemotherapy can be an infusion or injection given by a nurse at the cancer center or hospital, or it can be in pill form, taken at home. It may be used alone or combined with radiation and/or surgery. Unlike surgery or radiation, chemotherapy is “systemic.” This means it can affect the entire body.

The drugs used in chemotherapy interfere with cells as they divide and reproduce. Cancer cells are affected most because they divide and reproduce more often than normal cells. But normal cells can also be affected, particularly cells that reproduce very rapidly, such as in the lining of the gastrointestinal tract. When this happens side effects may occur.

The severity of the side effects is related to the chemotherapy regimen, the individual’s response, supportive medications given and physical status. The most common side effects of chemotherapy include low blood counts of platelets, red blood cells and white blood cells.

In addition to low blood counts, side effects of chemotherapy may include nausea, vomiting, hair loss and fatigue. Other side effects may include infection, bleeding and anemia. Some chemotherapy drugs or supportive care medication (such as anti-nausea medication) can cause constipation or diarrhea. Others may cause a strange taste (or lack of taste), making eating unpleasant. Still other drugs can cause water retention and bloating. These effects may lead to weight loss, weight gain or other nutritional problems.

Timely, aggressive and thorough management of nutrition-related side effects throughout the course of treatment can help with your nutritional status and make you feel better overall. You can find help

dealing with nutritional problems in Section Four of this booklet. Ask your oncologist for a consultation with a registered dietitian who can provide individualized nutrition plans and suggestions for managing treatment-related side effects.

Chemotherapy Side Effects May Include:

- Irritation and inflammation of mouth, tongue, throat
- Diarrhea
- Constipation
- Nausea
- Vomiting
- Taste changes
- Appetite changes (increased, decreased)
- Weight changes (increased, decreased)
- Dairy intolerance
- Food aversions
- Fatigue
- Anemia
- Acid reflux



HORMONE THERAPY

Hormone therapy may include the use of drugs to block the body's production of hormones or surgery to remove hormone-producing organs. Hormone therapy is most commonly used to treat cancers of the breast, prostate, ovary and endometrium (the lining of the uterus).

Hormone therapy can cause a number of side effects including nausea, vomiting, swelling, weight gain, bone loss and hot flashes. Some hormones increase appetite and some may lead to rapid loss of muscle and increase in body fat.

Bone loss may result from taking anti-hormone medications, including androgen deprivation therapy for prostate cancer and aromatase inhibitors for breast cancer treatment. These drugs cause drastically reduced blood levels of testosterone and estrogen. When hormone levels plummet, bone loss quickly accelerates. Bone loss seems to increase with ongoing use of hormone therapy medications. High-dose corticosteroids can also promote bone loss.

With any hormone treatments, talk with your health care provider and registered dietitian about ways to eat healthy, increase physical activity and possibly add bone-supporting medications to help maintain bone health.



BIOLOGICAL THERAPY

Biological therapy, also called immunotherapy, uses the body's immune system to help fight cancer or help control side effects from other cancer treatments like chemotherapy.

Biological therapy and chemotherapy are both treatments that fight cancer, but they work in different ways. Biological therapy helps your immune system fight cancer. Chemotherapy attacks the cancer cells directly.

According to the National Cancer Institute, doctors continue to study how biological therapy helps your immune system fight cancer. They think it may:

- stop or slow the growth of cancer cells;
- make it easier for your immune system to destroy, or get rid of, cancer cells; and/or
- keep cancer from spreading to other parts of your body.

For example, drugs like interferon and interleukin-2 are used to enhance the ability of white blood cells to fight cancer. Side effects of these new forms of treatment can include:

- rash or swelling where the treatment is injected;
- flu-like symptoms such as fever, chills, nausea, vomiting, loss of appetite, fatigue;
- bone pain and muscle aches; and/or
- low blood pressure (blood pressure goes down);

To find out more about biological therapy, visit: **www.cancer.gov/cancertopics/factsheet/therapy/biological**.

TARGETED THERAPIES

Other emerging treatments are called “targeted therapies.” Unlike standard chemotherapy, targeted therapies are designed to interact with specific molecules or processes in order to interfere with a cancer’s ability to grow and spread or to trigger destruction of cancer cells. Targeted cancer therapies are able to reduce harm to normal cells, thus lessening side effects, and improving quality of life.

Some targeted therapies are able to get inside cancer cells and block specific molecules that signal cancer cells to grow, divide and spread throughout the body. Other targeted therapies work outside of cancer cells or on the cell surface, helping the immune system to kill cancer cells by delivering toxic substances directly to the cells.

To find out more about targeted therapies for specific cancers, visit: www.cancer.gov/cancertopics/treatment/types-of-treatment.



COMPLEMENTARY AND ALTERNATIVE MEDICINE

Complementary and alternative medicine (CAM) is any medical system, practice, or product that is not thought of as standard medical care in Western countries. Complementary medicine is used along with standard medical care. Alternative medicine is used in place of standard medical care.

Integrative medicine combines treatments from standard medical care and CAM for which there is some strong evidence of safety and effectiveness.

Examples of CAM treatments include herbal treatments, supplements, homeopathy, acupuncture, touch therapy (including massage), dietary regimens, spirituality-focused care and mind-body therapies (such as yoga, meditation, guided imagery and relaxation techniques).

Although certain complementary and alternative therapies for cancer may appear to help in some instances, scientific evidence proving their effectiveness is often lacking. These unproven therapies should therefore be approached with great caution.

It is important to have an open discussion with your doctor about any integrative therapies that you are considering.

To find out more about CAM therapies, visit:
cam.cancer.gov.

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Tips for Handling Problems Related to Nutrition

So far we've described what kinds of challenges you may encounter, depending on the type of cancer treatment you receive. Now we'll discuss what you can do about them.

Not eating enough can weaken the body and delay healing. So speak with your doctor about any changes in your eating patterns and any problems you may have with appetite, eating or digestion. You can ask your doctor for a referral to a registered dietitian who specializes in caring for people who have cancer.



LOSS OF APPETITE

Appetite loss is very common in cancer patients. It can be caused by many factors, including:

- side effects of cancer and cancer treatment;
- changes in the way the body processes and absorbs food;
- physical difficulty in eating due to surgery; and/or
- feelings of anxiety or depression.

Loss of appetite that results in weight loss can have serious consequences (see below).

FEELING FULL QUICKLY

Feeling full quickly after eating a small amount of food is common, especially if you've had upper abdominal surgery.

To avoid feeling full quickly:

- Eat small meals throughout the day. Keep nutritious snacks on hand to eat between meals.
- Fortify your meals with foods that are rich in calories and nutrients. Try adding nonfat dry milk, wheat germ, nut butter, avocado (slices or purée) or ground meat to soups, hot cereals, casseroles or other dishes.
- Avoid foods and beverages that give you gas.
- Drink most of your beverages between rather than during meals. Drinking a beverage during a meal can fill you up more quickly.
- Rest with your head elevated after meals.
- Engage in light physical activity to encourage food to move through your digestive system.
- Ask a health professional about liquid or powdered meal replacement beverages to provide needed calories and nutrients.

TASTE CHANGES

Changes in how foods taste can result from chemotherapy, radiation therapy or the cancer itself. Dental problems or a fungal infection (candida or thrush) may also cause taste changes.

Some patients complain of bitter or metallic tastes, especially when eating foods high in protein such as meat. Each person's sense of taste can be affected differently. Depending on how your tastes have changed, the following ideas for improving flavor may work for you.

To improve flavor:

- Choose and prepare foods that look and smell good to you. Foods may taste better if served cold or at room temperature.
- Frozen fruits such as melon balls, grapes or orange wedges that are moist and naturally tart and sweet may be appealing.
- If red meat tastes different, try chicken, turkey, fish, tofu, beans, eggs or dairy products that don't have a strong odor.
- Marinate meats in juice, barbecue sauce, Italian dressing or other flavorful liquid you find appetizing.



- Adding small amounts of sugar, honey or maple syrup to some foods can help decrease salty, bitter or unpleasant tastes.
- Tart foods and beverages such as lime- or lemonade or lemon yogurt may be appealing. (Do not eat these foods if your mouth is sore.)
- Rinse your mouth and brush your teeth and tongue regularly, especially before eating, to help clean your taste buds.
- Avoid commercial mouthwashes if your mouth is sore. Some contain alcohol that is too harsh for a tender mouth. Alcohol-free mouthwashes are sold in pharmacies.
- See your dentist to be certain that you aren't developing any new infections in your mouth. (More information about oral care is on page 40.)

CHANGES IN WEIGHT

Weight Loss

Severe weight loss and inadequate nutrition can interfere with the work of the heart, liver, kidneys and other important organs. Also, when a patient is undernourished, the ability to heal and to fight off infections is weakened. Significant weight loss could limit your cancer treatment.

Your health care provider and registered dietitian can help you determine your healthy weight goal and your individual calorie and nutrient needs. Here are some tips for getting back on the road to a healthy weight.

To maintain your weight during treatment and to regain lost weight:

- Eat several small meals a day instead of just three larger meals.
- Drink beverages between meals instead of with meals.

- When eating a meal, eat high-protein foods first, when your appetite is strongest. Some examples of high-protein foods are beans, peas, tofu, chicken, fish, meat, yogurt, eggs and nuts.
- Try a protein-rich powder to mix into foods or liquids.
- Eat the most when you feel hungriest. If you are very hungry at breakfast or lunch, make that your largest meal of the day.
- If odors of hot food bother you, try eating things cold or at room temperature.
- Take an interest in food by trying new recipes and products or occasionally eating in a favorite restaurant.



- Experiment with new or different seasonings. You can perk up flavor without making a food hot and spicy by adding herbs, cooking with broth instead of water, and using cooking methods like oven roasting that intensify natural flavors.
- Keep favorite foods around the house to help you eat more often.
- Sip higher-calorie beverages during the day such as juice, nectar, milk or a fruit-and-yogurt smoothie.
- Ask your registered dietitian about liquid or powdered oral nutritional supplements. They come in a variety of calorie levels and flavors and are easy to swallow and digest. Some products may taste better than others to you, so you may want to try several brands or recipes. Some items can be mixed into food and liquids to increase caloric density and protein content without increasing the volume or changing the taste.
- Go for a walk before mealtime to stimulate your appetite.
- Make mealtimes more leisurely—take your time at the table.
- Talk with your doctor about trying a medication that may improve your appetite.

Weight Gain

Weight gain is a common side effect in some cancer types, such as breast, prostate and lymphoma. Weight gain may occur while undergoing treatment due to decreased physical activity, fatigue or as a side effect of some medications.

Chemotherapy may induce early menopause, which is commonly accompanied by weight gain. For other patients, a change in eating behavior, due to stress, fear or depression, may mean an increase in food intake and subsequent weight gain.

Some patients with nausea feel better when they eat more frequently or if they have something in their mouth most of the time. Calorie consumption



may unintentionally increase in people who try to reduce nausea by eating frequently.

Fluid retention, which causes swelling (edema), may be another reason your weight may increase. Tell your doctor about any excess weight so he or she can determine the cause, especially if the weight gain occurs rapidly over a few days.

If you have gained weight during treatment for reasons other than fluid retention, the following tips may help:

- **Pay attention to your portion sizes.** Try measuring out the serving size listed on the label of the foods you eat most often. Remember what this portion looks like on a plate the next time you serve yourself or eat out. Taking this step can help you get a handle on how much you're eating. Serve foods, including snacks, on a plate rather than eating from the package so you don't lose track of how much you're eating.
- **Eat only when you are physically hungry.** Avoid eating because of stress, fear or depression, as it will not alleviate those emotions. Speak to your doctor about psychological counseling or medication to cope with these feelings. If you eat out of boredom, make a list of other things you can do besides eating to occupy your time.

Eating to relieve fatigue won't help once you've met your calorie needs; instead, discuss possible physical activities with your doctor or ask a registered dietitian what food choices provide long-lasting energy.

CHANGES IN FLUID STATUS

Dehydration can occur when oral intake is decreased or from loss of fluid from diarrhea or fever. If you are experiencing dehydration, see the steps to take for diarrhea.

Diarrhea

Diarrhea can result from many causes, including surgery, chemotherapy, radiation therapy to the abdomen, certain medications, infection, food sensitivity or emotional upset. Diarrhea may cause dehydration, nutrient loss and other health problems. Call your doctor if you have diarrhea.

If you have diarrhea:

- Aim for a minimum of eight glasses of liquid each day. Drinking enough is especially important while you have diarrhea to prevent dehydration.
- Good choices of fluids include water, diluted juices, broth or decaffeinated coffee or tea.
- Liquids at room temperature are easier to tolerate than those that are very hot or very cold.
- Eat small amounts of food throughout the day instead of three large meals.
- Ask your doctor about medications that may be helpful for diarrhea.



Foods to try if you have diarrhea

- low-fiber foods like white rice, noodles, white bread and mashed potatoes
- soft, cooked or puréed vegetables
- soft, canned or cooked fruit without skins, such as bananas and applesauce
- skinless turkey or chicken, lean ground beef, cooked fish and thoroughly cooked eggs

Foods to avoid

The following foods may worsen diarrhea:

- foods and beverages that cause gas such as beans, onions, carbonated drinks and chewing gum
- high-fiber foods including vegetables such as broccoli, cauliflower, corn, beans, cabbage or peas
- large amounts of milk and dairy products
- raw vegetables and fruits; nuts
- greasy, fatty, fried, very sweet or very spicy foods
- alcoholic beverages and caffeinated beverages
- sugar-free candies and gums that contain sorbitol, mannitol, xylitol or other sugar substitute, as these have a mild laxative effect

Note: If diarrhea has an oily appearance, it could be that you are not absorbing dietary fat due to lack of enough digestive enzymes from the pancreas. Be sure to talk with your health care team about this. If pancreatic enzymes are recommended, work with your team to find the choice of enzymes, dose and methods of use that work for you.

Fluid Retention

Fluid retention can also occur. If you are retaining fluid (water weight), the cause needs to be carefully evaluated by your medical treatment team. Certain drugs, such as prednisone, can cause the body to retain too much fluid, as can a nutritional deficiency. If you notice rapid weight gain, tell your doctor right away so he or she can determine the cause. The opposite problem, dehydration, can also occur during cancer treatment.

If you experience fluid retention:

- Drink fluids during the day, even if you are retaining fluids. Restricting your fluid consumption will not help unless specifically advised by a doctor.
- Ask a registered dietitian to suggest alternatives to high-sodium processed foods.
- Stay as physically active as possible.
- Elevate your legs when resting.
- Your health care provider may prescribe medication to help minimize fluid retention.

FATIGUE

Fatigue is very common among cancer patients. Feeling tired can certainly make it harder to prepare and eat nourishing meals.

If you experience fatigue:

- Consider asking friends and relatives for help with grocery shopping and meal preparation.
- Try frozen dinners. Many healthy varieties are now available.
- Convenience products such as frozen or canned fruits and vegetables, canned beans, prepared pasta sauces and instant brown rice make meal preparation easier.

- Have healthy snacks on hand. Keep foods like dried fruit (raisins, dates, apricots), cheese and whole-grain crackers, graham crackers and snack-size puddings in the house.
- Prepare blended fruit and yogurt shakes and keep them in the refrigerator for snacks.
- When you're feeling better, prepare extra portions of your favorite dishes and freeze them in meal-size portions.
- Consider buying prepared meals from your grocery store, phoning for carryout or delivery, or having meals delivered from "Meals on Wheels" or another meal delivery service in your area.

No matter what stage of cancer you have, research shows that some physical activity can improve your daily functioning and appetite and enhance your mood.

Studies also show that some physical activity may actually increase your energy level. Check with your doctor about gradually adding light- to moderate-intensity activities like walking.

CONSTIPATION

Constipation can be the result of certain cancer drugs, pain medications, a diet without enough fluid or fiber or a lack of physical activity.

Constipation should not be confused with an intestinal obstruction. If you cannot pass stools and are experiencing nausea, vomiting, abdominal pain or swelling of the abdomen, report this to your doctor immediately.

If you have constipation:

- Drink more liquids, aiming for eight glasses a day. Drinking enough is especially important when you have constipation to help keep stools soft. Good choices are water, prune juice, warm juices, decaffeinated teas and hot lemonade.

- Drink a hot beverage about 30 minutes before your usual time for a bowel movement.
- If you develop gas, limit broccoli, cabbage, cauliflower, cucumbers, onions, carbonated drinks and beans. Over-the-counter anti-gas products containing simethicone may allow you to keep eating high-fiber foods without discomfort.
- Eat a large breakfast, including a hot drink and high-fiber foods like hot or cold cereal, whole-wheat toast and fruit.
- If you have a feeding tube, drink plenty of water. Talk with your registered dietitian about your hydration.
- Increase your physical activity. Try to get some exercise, such as taking a walk, every day. Avoid inactivity by getting up and moving around for a few minutes every hour or so. Talk to your health care provider before starting a new exercise program.
- Ask your health care provider about using a fiber supplement. Be sure to drink plenty of fluids if you use a fiber supplement.
- Ask about a daily bowel regimen. Laxatives and stool softeners may be necessary. Your doctor can make specific suggestions.



Increase your physical activity. Try to get some exercise, such as taking a walk, every day.

NAUSEA

Nausea is a common side effect of cancer surgery, chemotherapy, radiation therapy, immunotherapy and some medications. Vomiting may or may not accompany the queasy feeling of nausea. Nausea can prevent you from eating enough.

If you experience nausea:

- Eat small amounts of food often and slowly. Eat six or more small meals during the day rather than three large meals.
- Keep the room well ventilated, as odors of food can produce nausea.
- Drink beverages between meals rather than with a meal.
- Drink beverages cool or chilled and sip through a straw.
- Use cups with a lid if the smell of beverages is bothersome.
- Choose cold plates or eat foods at room temperature; hot dishes produce more odors that can aggravate nausea.
- Eat sitting upright. Avoid lying flat for about an hour after eating. If you need to rest after eating, recline with your head elevated.
- Rinse out your mouth before and after eating with warm water or a baking soda and salt rinse (see page 32) to cleanse your palate.
- If there is a bad taste in your mouth, suck on hard candy such as peppermint or lemon.
- Don't force yourself to eat favorite foods when you feel nauseated. It may cause you to permanently dislike them.
- If nausea is a problem in the morning, keep crackers at your bedside to nibble on before you get up.
- Keep food out of sight until it is time to eat.

- If nausea occurs during radiation therapy or chemotherapy, avoid eating for one or two hours before treatment. Try eating bland, soft foods on treatment days.
- Try to recognize patterns such as time of day, particular types of food, smells or events that trigger your nausea to prevent it from occurring.
- Talk to your health care provider about medication to help relieve your nausea.
- Take anti-nausea medications as directed and if your nausea is not controlled, contact your doctor for guidance.

Make a Daily Mouth Rinse

Mix together well:

4 cups of warm water

1 tsp. salt

1 tsp. baking soda

Swish a mouthful (for about 15 seconds) and then spit out the mouth rinse. Do this at least 3–5 times a day, rewarming as needed. Makes 1 day's worth of rinse.



Foods to try if you have nausea

- toast, saltine crackers, dry cereal or breadsticks
- clear liquids, such as water, broth, cranberry juice and flat soda
- yogurt
- sherbet, sorbet and popsicles
- canned peaches, pears, fruit cocktail
- skinless chicken (not fried)
- hot cereal, such as oatmeal
- candied dried ginger
- ice chips

Foods to avoid

These foods may make your nausea worse:

- fatty, greasy, fried or spicy foods
- candy, cake and rich desserts
- foods with strong odors

Food Odors and Nausea

If the smell of food cooking or cooling nauseates you:

- Open windows when preparing foods and eating.
- Prepare meals that don't need heating; for example, a chicken salad sandwich and fruit.
- Heat frozen dinners in the oven or microwave.
- Ask others to cook your meals for you or have meals delivered from "Meals on Wheels" or another meal delivery service in your area.

When you're feeling better, cook your favorite foods in large batches and freeze meal-size portions for times when you don't feel like cooking.

“Anticipatory Nausea”

Sometimes nausea can occur even before a treatment session or other event begins. Your brain remembers how you felt after previous sessions and anticipates feeling that way again. You can do several things to prevent it from happening or to lessen the discomfort.

- Try to distract yourself during the activities you associate with your treatment.
- Practice relaxation or meditation techniques to take your mind off the treatment.
- Sometimes changing something in the environment or in the routine can help. For example, if the smell from the alcohol wipe used to clean your skin before an injection makes you feel nauseated, another kind of skin cleanser might be substituted.
- Ask your health care provider about medication to manage this type of nausea.



VOMITING

People receiving radiation therapy to their lower esophagus, stomach or abdomen may also experience vomiting. It can be brought on by treatments, food, odors or even motion. Contact your health care provider if you are vomiting for more than 24 hours.

If you experience vomiting:

- Do not eat or drink until you have the vomiting under control.
- Sit upright after vomiting and bend forward.
- Try sipping small amounts of clear liquids, such as cranberry juice, apple juice, pear or peach nectar, cool broth, popsicles or flat soda. (Carbonated beverages may cause burping that can stimulate vomiting in some people.)
- When you are able to keep down clear liquids, try eating small amounts of soft foods, such as Cream of Wheat, pudding, frozen yogurt or gelatin.
- Once you can tolerate soft foods, gradually work your way back to your regular diet.
- If your doctor has prescribed medicine to relieve vomiting but it is not working when taken as prescribed, contact your doctor.

SORE MOUTH, TONGUE AND THROAT

Soreness of the mouth, tongue and throat can result from some chemotherapy drugs and radiation to the head and neck area. To prevent dental problems, arrange to see your dentist before you begin cancer treatment or between treatments. Preventive dentistry is crucial before you begin chemotherapy or radiation.

Foods to try if your mouth, tongue or throat is sore

Bland, soft foods, including:

- bananas, applesauce, watermelon, canned fruits
- peach, pear and apricot nectars
- puréed or mashed vegetables such as mashed potatoes and mashed sweet potatoes
- oatmeal or other cooked cereal
- cottage cheese, yogurt, milkshakes
- custards, puddings, gelatin
- macaroni and cheese, scrambled eggs, ground meats

Foods to avoid

Avoid foods that can irritate your mouth, including:

- citrus fruits or juices such as grapefruit, orange, lemon and lime
- spicy or salty foods
- pickled or vinegary foods
- tomato-based foods such as chili, salsa, spaghetti sauce and pizza
- rough, coarse or dry foods
- hot spices, such as pepper, chili powder, nutmeg, cloves, curry and horseradish

If you have a sore mouth, tongue or throat:

- Cook foods until they are very soft and tender.
- Cut foods into very small pieces or grind or purée them. Make moist stews and casseroles, or mix foods with thin gravies or sauces to make them easier to swallow.
- Serve foods cold or at room temperature. Cold foods such as sherbet or popsicles may soothe soreness.
- Use a straw for drinking fluids.
- Avoid alcohol. It can irritate the delicate membranes in your mouth.
- Rinse your mouth several times a day with water or a baking soda mixture (see page 32) to remove food and promote healing. Avoid commercial mouthwash; some contain alcohol that is too harsh for a tender mouth. Alcohol-free mouth rinses are sold in pharmacies and other stores.
- Use a toothbrush with soft bristles.
- Do not smoke or use tobacco products.
- Remove your dentures (except during eating) if your gums are sore. Keep your dentures clean.
- Ask your doctor about special mouth rinses to soothe your mouth or medications to numb your mouth and throat long enough for you to eat and drink without pain.
- If you see small, white patches in your mouth, or have painful or difficult swallowing, tell your physician. This may be evidence of an infection that requires special attention.

DRY MOUTH

A dry mouth may occur after radiation therapy to the head or neck area. Chemotherapy and pain medications may also cause dry mouth.

A reduced flow of saliva may make it difficult to chew and swallow. It may also change the way foods taste.

To relieve a dry mouth:

- Sip water or other beverages through a straw throughout the day to make it easier for you to talk and swallow. Aim for eight cups of liquid a day as a minimum.
- Try thick drinks, such as fruit nectars, at room temperature or cold.



- Avoid salty foods.
- If your mouth is not sore, try tart foods and beverages, such as lemonade, in small amounts, which may help your mouth produce more saliva.
- Suck on ice cubes or ice chips, especially prior to radiation of head and neck areas.
- Suck on lemon-flavored, sugar-free candies, frozen grapes or sugarless popsicles or chew sugarless gum to help stimulate saliva.
- Eat foods moistened with broth, gravy, sauces and salad dressings. Moist foods, including soups, are easier to swallow.
- Avoid alcohol. This includes avoiding commercial mouthwash, which may contain alcohol, because it will dry your mouth.
- Keep your lips moist with lip balms.
- Try using a cool mist humidifier at night and while napping.
- If your dry mouth is severe, ask your doctor, dentist or pharmacist about products that coat and protect your mouth. There are a variety of saliva substitutes, mouth moisturizers and saliva stimulants available.
- If you see small, white patches in your mouth, tell your physician. This may be evidence of an infection that may require special attention.
- Do not smoke or use tobacco products.

ORAL CARE

Before starting treatment, see your dentist—especially if you have a history of tooth or gum problems. Some cancer treatments can cause tooth decay and other problems. Some changes to your eating habits may make the problem worse.

To avoid infections or other problems, practice good oral hygiene:

- Rinse your mouth several times a day, especially after you eat, with water or try the baking soda mixture on page 32. Avoid commercial mouthwashes, which may contain alcohol that is too harsh for a tender mouth. Your doctor can suggest an alcohol-free mouth rinse sold in pharmacies and other stores.
- Use a toothbrush with soft bristles. Clean or replace your toothbrush routinely.
- Keep dentures and oral appliances clean.
- Limit excess sugar and sticky/sweet foods in your diet unless you are experiencing poor appetite or difficulty maintaining a healthy weight. These foods may contribute to dental cavities. If these foods are the only foods that you can tolerate, be sure to practice good oral care after consuming them.
- If you experience bleeding of the gums during treatment, tell your doctor immediately and arrange to see your dentist or a periodontist.
- See your dentist more often than usual if you're receiving treatment that affects your mouth (such as radiation to the head and neck). Inform your dentist about all medications you are taking.

DIFFICULTY SWALLOWING

Problems with swallowing can result from cancer treatments such as surgery or radiation therapy to the head and neck. Talk to your doctor if you are experiencing difficulty swallowing. Effective swallowing techniques can be taught by a speech and language pathologist (SLP).

To help manage difficulty with swallowing:

- Aim for eight cups of liquids each day as a minimum. Drink beverages between rather than during meals so you don't feel full too quickly. Liquids at room temperature may be easier to swallow.
- Avoid very hot or very cold foods.
- Eat small, frequent meals.
- Modify the consistency of food and liquid as needed. Thin foods using broth, gravy, milk or water. Thicken foods using commercial thickening products, mashed potato flakes or gels.
- Thicken liquids to the consistency suggested by your speech therapist.
- Purée foods so they are easier to swallow using a blender or food processor.
- Add gelatin to cakes, cookies, crackers, sandwiches, puréed fruits and other cold foods to make them easier to tolerate.
- Eat with a spoon; it is easier to control than a fork.
- Ask your speech and language therapist to show you how to properly place food in your mouth to avoid choking.
- Exercise your tongue and your jaw. Try to move them through the usual range of motion—stick your tongue out and back, yawn and move your jawbone from side to side.

- Liquid diets can be either high or low in fiber, so you need not experience constipation or diarrhea. Speak with a registered dietitian about adjusting the fiber in your diet to meet your needs.
- Report any choking or coughing while eating to your doctor, especially if accompanied by a fever.

LACTOSE INTOLERANCE

If you were able to digest milk and milk products easily before you began radiation or chemotherapy treatment, but now develop gas, cramps and diarrhea after you drink milk or eat dairy foods, then you may be experiencing acquired milk or lactose intolerance. The cancer therapy may have temporarily inhibited the growth of cells in your intestinal tract that make enzymes that digest lactose, which is the main carbohydrate (or sugar) in milk. In most patients, the condition is temporary.

The following measures may be helpful in the meantime:

- Avoid the milk or dairy products that give you problems. Yogurts, aged cheeses and non-dairy products like soy or almond may be easier to tolerate.
- Lactaid and other enzyme products are available over the counter in capsule, pill or liquid drop form at pharmacies.
- Try calcium-fortified drinks or foods. Read food labels to find fortified selections. Speak with your doctor or registered dietitian about whether you could benefit from taking a calcium supplement.

Handle Food Safely

Food safety is particularly important during and after cancer treatment. People who have weakened immune systems are at an increased risk for food-borne illness. To keep your food safe:

Wash hands and surfaces often. Bacteria can spread throughout the kitchen and get onto cutting boards, utensils, countertops and food. Thoroughly wash fruits and vegetables. Change sponges and dishtowels often.

Separate, don't cross-contaminate. Take steps to prevent bacteria from spreading. When handling raw meat, poultry, seafood and eggs, keep these foods—and their juices—away from ready-to-eat foods.



Cook thoroughly and to proper temperatures. Use a food thermometer, inserted into the center part of the food, to check when food is safely cooked. Food must be heated to USDA-recommended safe minimum internal temperatures:

- Fish (145 °F)
- Egg Dishes (160 °F)
- Chicken Breast (165 °F)
- Whole Poultry (165 °F)
- Leftovers and Casseroles (165 °F)
- Steaks and Roasts (145 °F)
- Ground Beef (160 °F)
- Pork (145 °F)

Refrigerate food promptly. Refrigerate or freeze leftover foods within 1 hour. Cold temperatures slow the growth of harmful bacteria. To reduce risk of food-borne illness, use an appliance thermometer to be sure the refrigerator temperature is consistently 40 °F or below and the freezer temperature is 0 °F or below.

Thaw frozen meat and poultry in the refrigerator, microwave or cold water, not by leaving out on the kitchen counter.

Read expiration dates on food products and look for signs of spoilage. Some food may be unsafe to eat although it looks and smells fine. If in doubt, throw it out.

Need More Help?

■ American Institute for Cancer Research

1759 R Street, NW
Washington, DC 20009
1-800-843-8114 or 202-328-7744
www.aicr.org

Call the Nutrition Hotline toll-free at 1-800-843-8114. Leave a message for a registered dietitian (who will return your call), Monday–Friday, 9 a.m.–5 p.m. Eastern Time. Or visit the AICR Hotline online at www.aicr.org.

Request additional brochures (up to 3 individual copies free):

- *Nutrition and the Cancer Survivor*
- *Physical Activity and Cancer Survivors*
- *Reach Your Healthy Weight to Reduce Your Cancer Risk*
- *Eat Well to Reduce Your Cancer Risk*
- *Move More to Reduce Your Cancer Risk*
- *The New American Plate*
- *More Food, Fewer Calories*

CancerResource™ is a free information package offered for breast, colorectal, lung and prostate cancers. Each package includes a general resource guide and information related to the specific cancer, including treatment options, questions to ask the doctor. Call 1-800-843-8114 or visit www.aicr.org to order these AICR resources.

Cancer Information: Where to Find Help, a free brochure, lists organizations that provide trustworthy, authoritative and mainly free information and services on treating and living with cancer.

Food for the Fight DVD

This two-part DVD for cancer survivors features experts and practical strategies to help patients through diagnosis, treatment and living for good health after cancer. It features advice from experts,

plus cooking demonstrations and testimonials from patients and survivors on healthy eating and physical activity.

Part I: During Treatment (Running Time 32:14)

Part II: After Treatment (Running Time 24:55)

\$9.95 includes shipping.

A Dietitian's Cancer Story: Information and Inspiration for Recovery and Healing from a 3-Time Cancer Survivor

by Diana Dyer, MS, RD

Offers practical, carefully researched nutrition advice and guidelines for evaluating complementary and alternative therapies. Proceeds go to The Diana Dyer Cancer Survivors' Nutrition and Cancer Research Endowment, which Dyer established at AICR to raise money for research studies relevant to survivor issues. You can also access her website and blog at www.cancerrd.com.

Each book costs \$12.25 plus \$4.00 for shipping. To order, call AICR at 1-800-843-8114 or mail a check payable to AICR. When ordering by mail, write Attn: DCS book on the envelope.

National Cancer Institute (NCI), Office of Cancer Survivorship

NCI is part of the federal government's National Institutes of Health, an agency of the U.S. Department of Health and Human Services. NCI coordinates the federal government's research program on cancer and makes this information available to the public. NCI offers information about cancer treatments and side effects. Visit www.cancer.gov/cancertopics/coping/survivorship; or call 1-800-4-CANCER (1-800-422-6237); TTY 1-800-332-8615.

ABOUT AICR

OUR VISION: We want to live in a world where no one develops a preventable cancer.

OUR MISSION: We champion the latest and most authoritative scientific research from around the world on cancer prevention and survival through diet, weight and physical activity, so that we can help people make informed lifestyle choices to reduce their cancer risk.

We have contributed over \$105 million for innovative research conducted at universities, hospitals and research centers across the country. Find evidence-based tools and information for lowering cancer risk, including AICR's Recommendations for Cancer Prevention, at www.aicr.org.

ABOUT THE CONTINUOUS UPDATE PROJECT

As the U.S. charity in the World Cancer Research Fund network, we contribute to the Continuous Update Project (CUP), an ongoing analysis of global scientific research into the link between diet, physical activity, weight and cancer.

The CUP produces periodic reports on the state of the evidence linking various lifestyle factors to risk of specific cancers. These reports will inform a major update of our Recommendations for Cancer Prevention scheduled for 2017.

So far, CUP reports include:

- 2015 Gallbladder Cancer
- 2015 Liver Cancer
- 2014 Prostate Cancer
- 2014 Breast Cancer Survivors
- 2014 Ovarian Cancer
- 2013 Endometrial Cancer
- 2012 Pancreatic Cancer
- 2011 Colorectal Cancer
- 2010 Breast Cancer



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