

# **Radiation Therapy**

## **Side Effects**

Reference:

NCI - The website of the National Cancer Institute (<http://www.cancer.gov>)

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## **Radiation Therapy Side Effects**

Different people have different side effects with radiation. While one person might experience mild side effects, someone else might experience severe ones. The specific side effects you may have depend on the type of radiation being used, the dose of radiation, the area of the body that's being targeted, and the state of one's health.

Radiation therapy treats cancer by using high energy to kill tumour cells. The goal is to kill or damage cancer cells without hurting too many healthy cells. Side effects occur when radiation therapy damages healthy skin cells in the treatment area. These side effects commonly include skin changes and fatigue. Skin changes may include dryness, itching, peeling, or blistering. You must take special care of your skin during radiation therapy.

Depending on the part of the body being treated, side effects might also include diarrhoea, hair loss in the treatment area, mouth problems, nausea and vomiting, sexual changes, swelling, trouble swallowing, urinary and bladder changes. Most of these side effects tend to go away within a couple of months after radiation therapy ends. Late side effects may first occur six or more months after radiation therapy is over. They vary by the part of your body that was treated and the dose of radiation you received.

Late side effects may include infertility, joint problems, mouth problems. Everyone is different, so talk to your doctor or nurse about whether you might have late side effects and what signs to look for before you begin therapy.

Below is a list of side effects that radiation therapy may cause.

- Diarrhoea
- Fatigue
- Hair loss
- Mouth changes
- Nausea and vomiting
- Sexual and fertility changes
- Skin changes
- Throat changes
- Urinary and bladder changes

## Radiation Therapy Side Effects At-A-Glance

- Find the part of your body being treated in the top row.
- Read down the column.
- A checkmark means you may get the side effect listed.

	Brain	Breast	Chest	Head and Neck	Pelvic Area	Rectum	Stomach and Abdomen
<b>Diarrhoea</b>					✓	✓	✓
<b>Fatigue</b>	✓	✓	✓	✓	✓	✓	✓
<b>Hair loss</b> (on the part of the body being treated)	✓	✓	✓	✓	✓	✓	✓
<b>Mouth changes</b>				✓			
<b>Nausea and vomiting</b>	✓				✓		✓
<b>Sexual and fertility changes</b>					✓	✓	
<b>Skin changes</b>	✓	✓	✓	✓	✓	✓	✓
<b>Throat changes</b>			✓	✓			
<b>Urinary and bladder changes</b>					✓	✓	✓
<b>Other side effects</b>	Headache Blurry vision	Tenderness Swelling	Cough Shortness of breath	Ear aches Taste changes			

## Diarrhoea

### What it is and why it occurs

Diarrhoea is frequent bowel movements which may be soft, formed, loose, or watery. Diarrhoea can occur at any time during radiation therapy.

Radiation therapy to the pelvis, stomach, and abdomen can cause diarrhoea. People get diarrhoea because radiation harms the healthy cells in the large and small bowels. These areas are very sensitive to the amount of radiation needed to treat cancer.

### Ways to manage

When you have diarrhoea:

- **Drink 8 to 12 cups of clear liquid per day.**  
If you drink liquids that are high in sugar (such as fruit juice, or sweet iced tea) ask your nurse or dietician if you should mix them with water.
- **Eat many small meals and snacks.** For instance, eat 5 or 6 small meals and snacks rather than 3 large meals.
- **Eat foods that are easy on the stomach** (which means foods that are low in fibre, fat, and lactose). If your diarrhoea is severe, your doctor or nurse may suggest the BRAT diet, which stands for bananas, rice, applesauce, and toast.
- **Take care of your rectal area.** Instead of toilet paper, use a baby wipe or squirt of water from a spray bottle to clean yourself after bowel movements. Also, ask your nurse about taking sits baths, which is a warm-water bath taken in a sitting position that covers only the hips and buttocks. Be sure to tell your doctor or nurse if your rectal area gets sore.
- **Stay away from:**
  - Milk and dairy foods, such as ice cream, sour cream, and cheese
  - Spicy foods, such as hot sauce, salsa, chili, and curry dishes
  - Foods or drinks with caffeine, such as regular coffee, black tea, soda, and chocolate
  - Foods or drinks that cause gas, such as cooked dried beans, cabbage, broccoli, soy milk, and other soy products
  - Foods that are high in fibre, such as raw fruits and vegetables, cooked dried beans, and whole wheat breads and cereals
  - Fried or greasy foods
  - Food from fast food restaurants
- **Talk to your doctor or nurse.** Tell them if you are having diarrhoea. He or she will suggest ways to manage it. He or she may also suggest taking a medicine.

## Fatigue

### What it is and why it occurs

Fatigue from radiation therapy can range from a mild to an extreme feeling of being tired. Many people describe fatigue as feeling weak, weary, worn out, heavy, or slow.

Fatigue can happen for many reasons. These include:

- Anaemia
- Anxiety
- Depression
- Infection
- Lack of activity
- Medicines

Fatigue can also come from the effort of going to radiation therapy each day or from stress. Most of the time, you will not know why you feel fatigue.

### How long it lasts

When you first feel fatigue depends on a few factors, which include your age, health, level of activity, and how you felt before radiation therapy started.

Fatigue can last from 6 weeks to 12 months after your last radiation therapy session. Some people may always feel fatigue and, even after radiation therapy is over, will not have as much energy as they did before.

### Ways to manage

- **Try to sleep at least 8 hours each night.** This may be more sleep than you needed before radiation therapy. One way to sleep better at night is to be active during the day. For example, you could go for walks, do yoga, or ride a bike. Another way to sleep better at night is to relax before going to bed. You might read a book, work on a jigsaw puzzle, listen to music, or do other calming hobbies.
- **Plan time to rest.** You may need to nap during the day. Many people say that it helps to rest for just 10 to 15 minutes. If you do nap, try to sleep for less than 1 hour at a time.
- **Try not to do too much.** With fatigue, you may not have enough energy to do all the things you want to do. Stay active, but choose the activities that are most important to you. For example, you might go to work but not do housework, or watch your children's sports events but not go out to dinner.
- **Exercise.** Most people feel better when they get some exercise each day. Go for a 15- to 30-minute walk or do stretches or yoga. Talk with your doctor or nurse about how much exercise you can do while having radiation therapy.
- **Plan a work schedule that is right for you.** Fatigue may affect the amount of energy you have for your job. You may feel well enough to work your full schedule, or you may need to work less - maybe just a few hours a day or a few days each week. You may want to talk with your boss about ways to work from home so you do not have to commute. And you may want to think about going on medical leave while you have radiation therapy.

- **Plan a radiation therapy schedule that makes sense for you.** You may want to schedule your radiation therapy around your work or family schedule. For example, you might want to have radiation therapy in the morning so you can go to work in the afternoon.
- **Let others help you at home.** Check with your insurance company to see whether it covers home care services. You can also ask family members and friends to help when you feel fatigue. Home care staff, family members, and friends can assist with household chores, running errands, or driving you to and from radiation therapy visits. They might also help by cooking meals for you to eat now or freeze for later.
- **Learn from others who have cancer.** People who have cancer can help each other by sharing ways to manage fatigue. One way to meet other people with cancer is by joining a support group - either in person or online. Talk with your doctor or nurse to learn more about support groups.
- **Talk with your doctor or nurse.** If you have trouble dealing with fatigue, your doctor may prescribe medicine (called psychostimulants) that can help decrease fatigue, give you a sense of well-being, and increase your appetite. Your doctor may also suggest treatments if you have anaemia, depression, or are not able to sleep at night.

## Hair Loss

### What it is and why it occurs

Hair loss (also called alopecia) is when some or all of your hair falls out. Radiation therapy can cause hair loss because it damages cells that grow quickly, such as those in your hair roots.

Hair loss from radiation therapy only happens on the part of your body being treated. This is not the same as hair loss from chemotherapy, which happens all over your body. For instance, you may lose some or all of the hair on your head when you get radiation to your brain. But if you get radiation to your hip, you may lose pubic hair (between your legs) but not the hair on your head.

### How long it lasts

You may start losing hair in your treatment area 2 to 3 weeks after your first radiation therapy session. It takes about a week for all the hair in your treatment area to fall out. Your hair may grow back 3 to 6 months after treatment is over. Sometimes, though, the dose of radiation is so high that your hair never grows back.

Once your hair starts to grow back, it may not look or feel the way it did before. Your hair may be thinner, or curly instead of straight. Or it may be darker or lighter in colour than it was before.

### Ways to manage hair loss on your head

#### Before hair loss:

- **Decide whether to cut your hair or shave your head.** You may feel more in control of hair loss when you plan ahead. Use an electric razor to prevent nicking yourself if you decide to shave your head.
- **If you plan to buy a wig, do so while you still have hair.** The best time to select your wig is before radiation therapy begins or soon after it starts. This way, the wig will match the colour and style of your own hair. Some people take their wig to their hair stylist. You will want to have your wig fitted once you have lost your hair. Make sure to choose a wig that feels comfortable and does not hurt your scalp.
- **Check with your health insurance company to see whether it will pay for your wig.** If it does not, you can deduct the cost of your wig as a medical expense on your income taxes. Some groups also sponsor free wig banks. Ask your doctor, nurse, or social worker if he or she can refer you to a free wig bank in your area.
- **Be gentle when you wash your hair.** Use a mild shampoo, such as a baby shampoo. Dry your hair by patting (not rubbing) it with a soft towel.
- **Do not use** curling irons, electric hair dryers, curlers, hair bands, clips, or hair sprays. These can hurt your scalp or cause early hair loss.
- **Do not use** products that are harsh on your hair. These include hair colours, perms, gels, mousse, oil, grease, or pomade.

#### After hair loss:

- **Protect your scalp.** Your scalp may feel tender after hair loss. Cover your head with a hat, turban, or scarf when you are outside. Try not to be in places where the temperature is very cold or very hot. This means staying away from the direct sun, sun lamps, and very cold air.



- **Stay warm.** Your hair helps keep you warm, so you may feel colder once you lose it. You can stay warmer by wearing a hat, turban, scarf, or wig.

## Mouth Changes

### What they are and why they occur

Radiation therapy to the head or neck can cause problems such as:

- Mouth sores (little cuts or ulcers in your mouth)
- Dry mouth (also called xerostomia) and throat
- Loss of taste
- Tooth decay
- Changes in taste (such as a metallic taste when you eat meat)
- Infections of your gums, teeth, or tongue
- Jaw stiffness and bone changes
- Thick, rope-like saliva

Radiation therapy kills cancer cells and can also damage healthy cells such as those in the glands that make saliva and the soft, moist lining of your mouth.

### How long they last

Some problems, like mouth sores, may go away after treatment ends. Others, such as taste changes, may last for months or even years. Some problems, like dry mouth, may never go away.

### Ways to manage

- If you are getting radiation therapy to your head or neck, **visit a dentist at least 2 weeks before treatment starts**. At this time, your dentist will examine your teeth and mouth and do any needed dental work to make sure your mouth is as healthy as possible before radiation therapy. If you cannot get to the dentist before treatment starts, ask your doctor if you should schedule a visit soon after treatment begins.
- **Check your mouth every day**. This way, you can see or feel problems as soon as they start. Problems can include mouth sores, white patches, or infection.
- **Keep your mouth moist**. You can do this by:
  - Sipping water often during the day
  - Sucking on ice chips
  - Chewing sugar-free gum or sucking on sugar-free hard candy
  - Using a saliva substitute to help moisten your mouth
  - Asking your doctor to prescribe medicine that helps increase saliva
- **Clean your mouth, teeth, gums, and tongue**.
  - Brush your teeth, gums, and tongue after every meal and at bedtime.
  - Use an extra-soft toothbrush. You can make the bristles softer by running warm water over them just before you brush.
  - Use fluoride toothpaste.
  - Use a special fluoride gel that your dentist can prescribe.
  - Do not use mouthwashes that contain alcohol.
  - Gently floss your teeth every day. If your gums bleed or hurt, avoid those areas but floss your other teeth.
  - Rinse your mouth every 1 to 2 hours with a solution of 1/4 teaspoon baking soda and 1/8 teaspoon salt mixed in 1 cup of warm water.
  - If you have dentures, make sure they fit well and limit how long you wear them each day. If you lose weight, your dentist may need to adjust them.

- Keep your dentures clean by soaking or brushing them each day.
- **Be careful what you eat when your mouth is sore.**
  - Choose foods that are easy to chew and swallow.
  - Take small bites, chew slowly, and sip liquids with your meals.
  - Eat moist, soft foods such as cooked cereals, mashed potatoes, and scrambled eggs.
  - Wet and soften food with gravy, sauce, broth, yogurt, or other liquids.
  - Eat foods that are warm or at room temperature.
- **Stay away from things that can hurt, scrape, or burn your mouth, such as:**
  - Sharp, crunchy foods such as potato or corn chips
  - Hot foods
  - Spicy foods such as hot sauce, curry dishes, salsa, and chili
  - Fruits and juices that are high in acid such as tomatoes, oranges, lemons, and grapefruits
  - Toothpicks or other sharp objects
  - All tobacco products, including cigarettes, pipes, cigars, and chewing tobacco
  - Drinks that contain alcohol
- **Stay away from foods and drinks that are high in sugar.** Foods and drinks that have a lot of sugar (such as regular soda, gum, and candy) can cause tooth decay.
- **Exercise your jaw muscles.** Open and close your mouth 20 times as far as you can without causing pain. Do these exercises 3 times a day, even if your jaw isn't stiff.
- **Medicine.** Ask your doctor or nurse about medicines that can protect your saliva glands and the moist tissues that line your mouth.
- **Call your doctor or nurse when your mouth hurts.** There are medicines and other products, such as mouth gels, that can help control mouth pain.
- **You will need to take extra good care of your mouth for the rest of your life.** Ask your dentist how often you will need dental check-ups and how best to take care of your teeth and mouth after radiation therapy is over.

## Nausea and Vomiting

### What they are and why they occur

Radiation therapy can cause nausea, vomiting, or both. Nausea is when you feel sick to your stomach and feel like you are going to throw up. Vomiting is when you throw up food and fluids. You may also have dry heaves, which happen when your body tries to vomit even though your stomach is empty.

Nausea and vomiting can occur after radiation therapy to the stomach, small intestine, colon, or parts of the brain. Your risk for nausea and vomiting depends on how much radiation you are getting, how much of your body is in the treatment area, and whether you are also having chemotherapy.

### How long they last

Nausea and vomiting may occur 30 minutes to many hours after your radiation therapy session ends. You are likely to feel better on days that you do not have radiation therapy.

### Ways to manage

- **Prevent nausea.** The best way to keep from vomiting is to prevent nausea. One way to do this is by having bland, easy-to-digest foods and drinks that do not upset your stomach. These include toast, gelatine, and apple juice.
- **Try to relax before treatment.** You may feel less nausea if you relax before each radiation therapy treatment. You can do this by spending time doing activities you enjoy, such as reading a book, listening to music, or other hobbies.
- **Plan when to eat and drink.** Some people feel better when they eat before radiation therapy; others do not. Learn the best time for you to eat and drink. For example, you might want a snack of crackers and apple juice 1 to 2 hours before radiation therapy. Or, you might feel better if you have treatment on an empty stomach, which means not eating 2 to 3 hours before treatment.
- **Eat small meals and snacks.** Instead of eating 3 large meals each day, you may want to eat 5 or 6 small meals and snacks. Make sure to eat slowly and do not rush.
- **Have foods and drinks that are warm or cool (not hot or cold).** Before eating or drinking, let hot food and drinks cool down and cold food and drinks warm up.
- **Talk with your doctor or nurse.** He or she may suggest a special diet of foods to eat or prescribe medicine to help prevent nausea, which you can take 1 hour before each radiation therapy session. You might also ask your doctor or nurse about acupuncture, which may help relieve nausea and vomiting caused by cancer treatment.

## Sexual and Fertility Changes

### What they are and why they occur

Radiation therapy sometimes causes sexual changes, which can include hormone changes and loss of interest in or ability to have sex. It can also affect fertility during and after radiation therapy. For a woman, this means that she might not be able to get pregnant and have a baby. For a man, this means that he might not be able to get a woman pregnant. Sexual and fertility changes differ for men and women.

### Problems for women include:

- Pain or discomfort when having sex
- Vaginal itching, burning, dryness, or atrophy (when the muscles in the vagina become weak and the walls of the vagina become thin)
- Vaginal stenosis, when the vagina becomes less elastic, narrows, and gets shorter
- Symptoms of menopause for women not yet in menopause. These include hot flashes, vaginal dryness, and not having your period.
- Not being able to get pregnant after radiation therapy is over

Sexual and fertility changes can happen when people get radiation therapy to the pelvic area. For women, this includes radiation to the vagina, uterus, or ovaries. For men, this includes radiation to the testicles or prostate. Many sexual side effects are caused by scar tissue from radiation therapy. Other problems, such as fatigue, pain, anxiety, or depression, can affect your interest in having sex.

### How long they last

After radiation therapy is over, most people want to have sex as much as they did before treatment. Many sexual side effects go away after treatment ends. But you may have problems with hormone changes and fertility for the rest of your life. If you are able to get pregnant or father a child after you have finished radiation therapy, it should not affect the health of the baby.

### Ways to manage

#### For women, here are some issues to discuss with your doctor or nurse:

- **Fertility.** Before radiation therapy starts, let your doctor or nurse know if you think you might want to get pregnant after your treatment ends. He or she can talk with you about ways to preserve your fertility, such as preserving your eggs to use in the future.
- **Sexual problems.** You may or may not have sexual problems. Your doctor or nurse can tell you about side effects you can expect and suggest ways for coping with them.
- **Birth control.** It is very important that you do not get pregnant while having radiation therapy. Radiation therapy can hurt the foetus at all stages of pregnancy. If you have not yet gone through menopause, talk with your doctor or nurse about birth control and ways to keep from getting pregnant.
- **Pregnancy.** Make sure to tell your doctor or nurse if you are already pregnant.
- **Stretching your vagina.** Vaginal stenosis is a common problem for women who have radiation therapy to the pelvis. This can make it painful to have sex. You can help by stretching your vagina using a dilator (a device that gently stretches the tissues of the vagina). Ask your doctor or nurse where to find a dilator and how to use it.

- **Lubrication.** Use a special lotion for your vagina once a day to keep it moist. When you have sex, use a water- or mineral oil-based lubricant.
- **Sex.** Ask your doctor or nurse whether it is okay for you to have sex during radiation therapy. Most women can have sex, but it is a good idea to ask and be sure. If sex is painful due to vaginal dryness, you can use a water or mineral oil-based lubricant.

## Skin Changes

### What they are and why they occur

Radiation therapy can cause skin changes in your treatment area. Here are some common skin changes:

- **Redness.** Your skin in the treatment area may look as if you have a mild to severe sunburn or tan. This can occur on any part of your body where you are getting radiation.
- **Pruritus.** The skin in your treatment area may itch so much that you always feel like scratching. This causes problems because scratching too much can lead to skin breakdown and infection.
- **Dry and peeling skin.** This is when the skin in your treatment area gets very dry - much drier than normal. In fact, your skin may be so dry that it feels like it does after a sunburn.
- **Moist reaction.** Radiation kills skin cells in your treatment area, causing your skin to peel off faster than it can grow back. When this happens, you can get sores or ulcers. The skin in your treatment area can also become wet, sore, or infected. This is more common where you have skin folds, such as your buttocks, behind your ears, under your breasts. It may also occur where your skin is very thin, such as your neck.
- **Swollen skin.** The skin in your treatment area may be swollen and puffy.

Radiation therapy causes skin cells to break down and die. When people get radiation almost every day, their skin cells do not have enough time to grow back between treatments. Skin changes can happen on any part of the body that gets radiation.

### How long they last

Skin changes may start a few weeks after you begin radiation therapy. Many of these changes often go away a few weeks after treatment is over. But even after radiation therapy ends, you may still have skin changes. Your treated skin may always look darker and blotchy. It may feel very dry or thicker than before. And you may always burn quickly and be sensitive to the sun. You will always be at risk for skin cancer in the treatment area. Be sure to avoid tanning beds and protect yourself from the sun by wearing a hat, long sleeves, long pants, and sunscreen with an SPF of 30 or higher.

### Ways to manage

- **Skin care.** Take extra good care of your skin during radiation therapy. Be gentle and do not rub, scrub, or scratch in the treatment area. Also, use creams that your doctor prescribes.
- **Do not put anything on your skin that is very hot or cold.** This means not using heating pads, ice packs, or other hot or cold items on the treatment area. It also means washing with lukewarm water.
- **Be gentle when you shower or take a bath.** You can take a lukewarm shower every day. If you prefer to take a lukewarm bath, do so only every other day and soak for less than 30 minutes. Whether you take a shower or bath, make sure to use a mild soap that does not have fragrance or deodorant in it. Dry yourself with a soft towel by patting, not rubbing, your skin. Be careful not to wash off the ink markings that you need for radiation therapy.
- **Use only those lotions and skin products that your doctor or nurse suggests.** If you are using a prescribed cream for a skin problem or acne, you must tell your doctor or nurse before you begin radiation treatment. Check with your doctor or nurse before using any of the following skin products: Bubble bath, Oil, Ointment, Cream, Perfume, Deodorant, Powder, Hair removers, Soap, Makeup, Sunscreen. If you use any skin products on days you have radiation therapy, use them at least 4 hours before your treatment session.

- **Cool, humid places.** Your skin may feel much better when you are in cool, humid places. You can make rooms more humid by putting a bowl of water on the radiator or using a humidifier. If you use a humidifier, be sure to follow the directions about cleaning it to prevent bacteria.
- **Soft fabrics.** Wear clothes and use bed sheets that are soft, such as those made from cotton.
- **Do not wear clothes that are tight and do not breathe,** such as girdles and pantyhose.
- **Protect your skin from the sun every day.** The sun can burn you even on cloudy days or when you are outside for just a few minutes. Do not go to the beach or sun bathe. Wear a broad-brimmed hat, long-sleeved shirt, and long pants when you are outside. Talk with your doctor or nurse about sunscreen lotions. He or she may suggest that you use a sunscreen with an SPF of 30 or higher. You will need to protect your skin from the sun even after radiation therapy is over, since you will have an increased risk of skin cancer for the rest of your life.
- **Do not use tanning beds.** Tanning beds expose you to the same harmful effects as the sun.
- **Adhesive tape.** Do not put bandages or other types of sticky tape on your skin in the treatment area. Talk with your doctor or nurse about ways to bandage without tape.
- **Shaving.** Ask your doctor or nurse if you can shave the treated area. If you can shave, use an electric razor and do not use pre-shave lotion.
- **Rectal area.** If you have radiation therapy to the rectal area, you are likely to have skin problems. These problems are often worse after a bowel movement. Clean yourself with a baby wipe or squirt of water from a spray bottle. Also ask your nurse about sits baths (a warm-water bath taken in a sitting position that covers only the hips and buttocks.)
- **Talk with your doctor or nurse.** Some skin changes can be very serious. Your treatment team will check for skin changes each time you have radiation therapy. Make sure to report any skin changes that you notice.
- **Medicine.** Medicines can help with some skin changes. They include lotions for dry or itchy skin, antibiotics to treat infection, and other drugs to reduce swelling or itching.



## Throat Changes

### What they are and why they occur

Radiation therapy to the neck or chest can cause the lining of your throat to become inflamed and sore. This is called esophagitis. You may feel as if you have a lump in your throat or burning in your chest or throat. You may also have trouble swallowing.

Radiation therapy to the neck or chest can cause throat changes because it not only kills cancer cells, but can also damage the healthy cells that line your throat. Your risk for throat changes depends on how much radiation you are getting, whether you are also having chemotherapy, and whether you use tobacco and alcohol while you are getting radiation therapy.

### How long they last

You may notice throat changes 2 to 3 weeks after starting radiation. You will most likely feel better 4 to 6 weeks after radiation therapy has finished.

### Ways to manage

- **Be careful what you eat when your throat is sore.**
  - Choose foods that are easy to swallow.
  - Cut, blend, or shred foods to make them easier to eat.
  - Eat moist, soft foods such as cooked cereals, mashed potatoes, and scrambled eggs.
  - Wet and soften food with gravy, sauce, broth, yogurt, or other liquids.
  - Drink cool drinks.
  - Sip drinks through a straw.
  - Eat foods that are cool or at room temperature.
- **Eat small meals and snacks.** It may be easier to eat a small amount of food at one time. Instead of eating 3 large meals each day, you may want to eat 5 or 6 small meals and snacks.
- **Choose foods and drinks that are high in calories and protein.** When it hurts to swallow, you may eat less and lose weight. It is important to keep your weight the same during radiation therapy. Having foods and drinks that are high in calories and protein can help you.
- **Sit upright and bend your head slightly forward when you are eating or drinking.** Remain sitting or standing upright for at least 30 minutes after eating.
- **Don't have things that can burn or scrape your throat, such as:**
  - Hot foods and drinks
  - Spicy foods
  - Foods and juices that are high in acid, such as tomatoes and oranges
  - Sharp, crunchy foods such as potato or corn chips
  - All tobacco products, such as cigarettes, pipes, cigars, and chewing tobacco
  - Drinks that contain alcohol
- **Talk with a dietician.** He or she can help make sure you eat enough to maintain your weight. This may include choosing foods that are high in calories and protein and foods that are easy to swallow.
- **Talk with your doctor or nurse.** Let your doctor or nurse know if you notice throat changes, such as trouble swallowing, feeling as if you are choking, or coughing while eating or drinking. Also, let him or her know if you have pain or lose any weight. Your doctor can prescribe medicines that may help relieve your symptoms, such as antacids, gels that coat your throat, and pain killers.

## Urinary and Bladder Changes

### What they are and why they occur

Radiation therapy can cause urinary and bladder problems, which can include:

- Burning or pain when you begin to urinate or after you empty your bladder
- Trouble starting to urinate
- Trouble emptying your bladder
- Frequent, urgent need to urinate
- Cystitis, a swelling (inflammation) in your urinary tract
- Incontinence, when you cannot control the flow of urine from your bladder, especially when coughing or sneezing
- Frequent need to get up during sleep to urinate
- Blood in your urine
- Bladder spasms, which are like painful muscle cramps

Urinary and bladder problems may occur when people get radiation therapy to the prostate or bladder. Radiation therapy can harm the healthy cells of the bladder wall and urinary tract, which can cause inflammation, ulcers, and infection.

### How long they last

Urinary and bladder problems often start 3 to 5 weeks after radiation therapy begins. Most problems go away 2 to 8 weeks after treatment is over.

### Ways to manage

- **Drink a lot of fluids.** This means 6 to 8 cups of fluids each day. Drink enough fluids so that your urine is clear to light yellow in colour.
- **Avoid coffee, black tea, alcohol, spices, and all tobacco products.**
- **Talk with your doctor or nurse** if you think you have urinary or bladder problems. He or she may ask for a urine sample to make sure that you do not have an infection.
- **Talk to your doctor or nurse** if you have incontinence. He or she may refer you to a physical therapist who will assess your problem. The therapist can give you exercises to improve bladder control.
- **Medicine.** Your doctor may prescribe antibiotics if your problems are caused by an infection. Other medicines can help you urinate, reduce burning or pain, and ease bladder spasms.

## **Late Radiation Therapy Side Effects**

Brain Changes

Infertility

Joint Changes

Lymphedema

Mouth Changes

Secondary Cancer

Late side effects are those that first occur at least 6 months after radiation therapy is over. Late side effects are rare, but they do happen. It is important to have follow-up care with a radiation oncologist or nurse practitioner for the rest of your life.

Whether you get late side effects will depend on:

- The part of your body that was treated
- The dose and length of your radiation therapy
- If you received chemotherapy before, during, or after radiation therapy

Your doctor or nurse will talk with you about late side effects and discuss ways to help prevent them, symptoms to look for, and how to treat them if they occur.

Some late side effects are brain problems, infertility, joint problems, lymphedema, mouth problems, and secondary cancers.

## **Brain Changes**

### **What they are**

Radiation therapy to the brain can cause problems months or years after treatment ends. Side effects can include memory loss, problems doing math, movement problems, incontinence, trouble thinking, or personality changes. Sometimes, dead tumour cells can form a mass in the brain, which is called radiation necrosis.

### **Ways to manage**

You will need to have check-ups with your doctor or nurse for the rest of your life. If you have symptoms, you will have tests to see whether they are due to the cancer or late side effects.

If you have late side effects, your doctor or nurse practitioner:

- Will talk with you about ways to manage late side effects
- May refer you to a physical, occupational, or speech therapist who can help with problems caused by late side effects
- May prescribe medicine or suggest surgery to help with the symptoms

## **Infertility**

### **What it is**

For men, infertility means not being able to get a woman pregnant. For women, it means not being able to get pregnant.

### **Ways women with infertility can become a parent:**

- **Donor embryos.** Another couple donates a fertilized egg that your doctor implants in your uterus to carry until birth.
- **Donor eggs.** An egg (donated by someone else) is fertilized by your partner's sperm. Your doctor implants the fertilized egg in your uterus to carry until birth.
- **Surrogacy.** Another woman carries and gives birth to your child. She can also donate her egg, which is fertilized by your partner's sperm.
- **Adoption.** Taking on legal responsibility for someone else's child and raising the child as your own.

## **Joint Changes**

### **What they are**

Radiation therapy can cause scar tissue and weakness in the part of the body that was treated. This can lead to loss of motion in your joints, such as your jaw, shoulders, or hips. Joint problems can show up months or years after radiation therapy is over.

### **Ways to manage**

Notice early signs of joint problems. These signs include:

- Trouble getting your mouth to open wide
- Pain when you make certain movements, such as reaching over your head or putting your hand in a back pocket

Talk with your doctor or nurse. He or she may refer you to a physical therapist who will assess your joint problems. The therapist can give you exercises to decrease pain, increase strength, and improve movement.

## Lymphedema

### What it is

Swelling in an arm or a leg caused by a build-up of lymph fluid. Lymphedema can happen if your lymph nodes were removed during surgery or damaged by radiation therapy. Tell your doctor or nurse if you notice swelling in the arm or leg on the side where you had radiation.

### Ways to manage

- **Meet with your doctor or nurse.** Ask about your risk of lymphedema and ways to prevent it. Your doctor or nurse may suggest exercises, medicines, or compression garments (special wraps to put on your legs or arms). You might also want to ask for a referral to a physical therapist.
- **Be active.** Exercise can help prevent and treat lymphedema. Ask your doctor, nurse, or physical therapist which exercises are safe for you to do.
- **Take care of your arm or leg.**
  - Use skin lotion at least once a day.
  - Avoid sunburn. Use sunscreen with an SPF of 30 or higher and wear long sleeves and long pants if you need to be in the sun.
  - Wear gloves when you garden or cook.
  - Clip your toenails straight across, file your fingernails, and do not cut your cuticles.
  - Keep your feet clean and wear dry, cotton socks.
  - Clean cuts with soap and water and then use antibacterial ointment.
  - Avoid extreme hot or cold, such as ice packs or heating pads.
  - Do not put pressure on your arm or leg. For example, do not cross your legs when sitting or carry your purse on the side that had radiation.
  - Wear loose clothes that do not have tight elastic cuffs or waistbands.
- **Notice early signs of lymphedema.** Let your doctor or nurse know if you have:
  - Pain or a sense of heaviness in your arm or leg
  - A feeling of tightness in your arm or leg
  - Trouble putting on your shoes or rings
  - Weakness in your arm or leg
  - Redness, swelling, or other signs of infection

## **Mouth Changes**

### **What they are**

Radiation therapy to your head and neck can cause late side effects in your mouth. Problems may include dry mouth, cavities, or bone loss in the jaw.

### **Ways to manage**

- **Visit your dentist.** You may be asked to have your teeth checked every 1 to 2 months for at least 6 months after radiation treatment ends. During this time, your dentist will look for changes in your mouth, teeth, and jaw.
- **Exercise your jaw.** Open and close your mouth 20 times as far as you can without causing pain. Do this exercise 3 times a day, even if your jaw isn't stiff.
- **Take good care of your teeth and gums.** This means flossing, using daily fluoride treatments, and brushing your teeth after meals and before you go to bed.
- **Have your dentist contact your radiation oncologist before you have dental or gum surgery.** This includes not having teeth pulled from the part of your mouth that received radiation. There may be other options than surgery.



## **Secondary Cancer**

### **What it is**

Radiation therapy can cause a new cancer many years after you have finished treatment.

**This does not happen very often.**

### **Ways to manage**

You will need to have check-ups with your radiation oncologist or nurse practitioner for the rest of your life to check for cancer - the one you were treated for and any new cancer that may occur.

## Lists of Foods and Liquids

Clear Liquids

Foods and Drinks That Are High in Calories or Protein

Foods and Drinks That Are Easy on the Stomach

### Clear Liquids

This list may help if you have diarrhoea.

Types of Liquids	Includes . . .
<b>Soups</b>	Clear, fat-free broth Consommé Strained vegetable broth
<b>Drinks</b>	Apple juice Clear carbonated beverages Cranberry or grape juice Fruit-flavoured drinks Fruit punch Sports drinks Tea Water
<b>Sweets</b>	Fruit ices without fruit pieces Fruit ices without milk Honey Jelly Plain gelatine dessert Popsicles

### Foods and Drinks That Are High in Calories or Protein

This list may help if you need ideas for keeping your weight the same.

Types of Foods and Drinks	Includes . . .
<b>Soups</b>	Cream soups
<b>Drinks</b>	Instant breakfast shakes Milkshakes Whole milk (instead of low-fat or skim)

<b>Main meals and other foods</b>	Beans, legumes Butter, margarine, or oil Cheese Chicken, fish, or beef Cottage cheese Cream cheese on crackers or celery Eggs, such as scrambled Muffins Nuts, seeds, wheat germ Peanut butter
<b>Desserts and other sweets</b>	Custards Frozen yogurt Ice cream Puddings Yogurt
<b>Replacements and other supplements</b>	Powdered milk added to foods (pudding, milkshakes, or scrambled eggs)  High-protein supplements

### **Foods and Drinks That Are Easy on the Stomach**

This list may help if you have diarrhoea or nausea and vomiting.

<b>Types of Foods and Drinks</b>	<b>Includes . . .</b>
<b>Soups</b>	Clear broth, such as chicken or beef
<b>Drinks</b>	Clear carbonated beverages Cranberry or grape juice Fruit-flavoured drinks Fruit punch Sports drinks Tea Water
<b>Main meals and snacks</b>	Boiled potatoes Chicken, broiled or baked without the skin Crackers Cream of wheat Noodles Oatmeal

	Pretzels Rice Toast
<b>Sweets</b>	Angel food cake Canned peaches Gelatine Sherbet Yogurt