



A GUIDE TO EXTERNAL RADIATION THERAPY

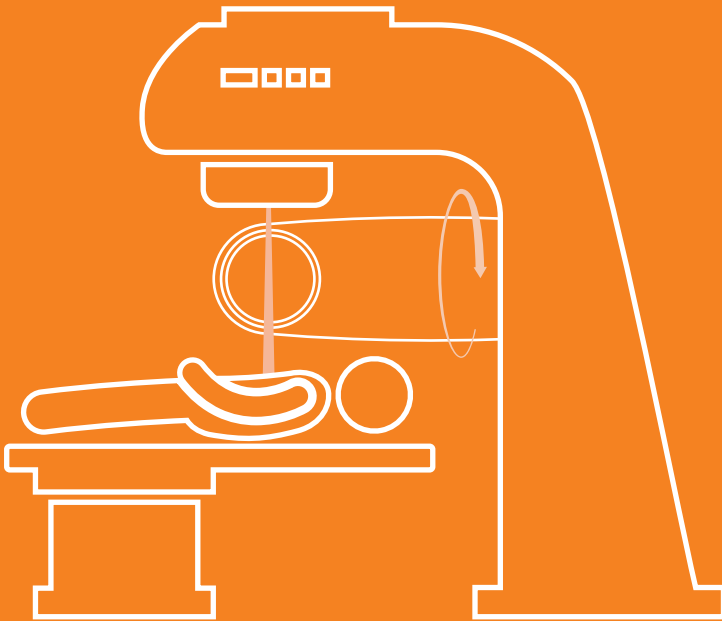


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ALL ABOUT RADIATION THERAPY

This booklet has been written for you – someone who is about to undergo or is already undergoing external radiation therapy (RT). This is to help you understand more about your treatment and prepare you for the side effects that may happen and how to manage it. Your loved ones might also find this guide helpful.

Every individual undergoing radiation treatment may experience similar or different side effects. There are some who may experience severe side effects, while others may not. This booklet is not intended to help you decide on the type of treatment you should seek; those questions are for your oncologist to assist you with.

However, should you have any doubts throughout the course of your treatment, please do not hesitate to seek advice from your oncologist or any of our trained professionals.

Radiation therapy may seem strange and complicated at first, but rest assured that the professional staff here at Sunway Medical Centre will always put you, the patient, as our number one priority.

UNDERSTANDING RADIATION THERAPY



What is radiation therapy?

Radiation therapy (radiotherapy) is a cancer treatment that uses high doses of radiation to kill cancer cells and stop them from spreading. At low doses, radiation is used as an x-ray to see inside your body and take images.

What does radiation do to cancer cells?

Curative intent: Given in high doses, radiation can be used to cure, stop, or slow the growth of cancer.

Palliation: When a cure is not possible, radiation may be used to shrink cancer tumors in order to reduce pain.

How does radiation therapy work?

Radiation therapy does not kill cancer cells immediately. It takes days or weeks of treatment before cancer cells start to die. After that, cancer cells keep dying for weeks or months after radiation therapy ends.

How is radiation therapy given?

Radiation therapy can be external beam (when a machine outside your body aims radiation at cancer cells) or internal (when radiation is put inside your body, in or near the cancer cells).

Does radiation therapy hurt?

No, radiation therapy does not hurt while it is being administered. But the side effects that people may get from radiation therapy can cause pain or discomfort.



Which health professionals will I see?

Clinical Oncologist: a doctor who prescribes and coordinates the course of treatment and advices about side effects management.

Radiation Therapist: operates the Linear Accelerator (LINAC) and administers your daily radiation treatments. Provides patient care and supports you before, during and after your radiation treatment.

Medical Physicist: this person is responsible for the planning and calculation of your treatment. He or she also ensures that the machines and equipment are all functioning optimally and doses administered to you are always accurate.

Staff Nurse: provides nursing care, support and assistance throughout your treatment.

How do I know if the treatment is working?

Once you have completed your course of radiation therapy, the effects of the radiation continue. The effects of radiation are cumulative and it is difficult to tell how well the therapy is working until after all the treatments have ended. However, your scheduled follow-ups with your oncologist will keep you up-to-date on how effectively your treatment has worked on you.

EXTERNAL RADIATION THERAPY

In external radiation therapy, a machine called a linear accelerator (LINAC) directs a beam of radiation through the skin to the tumor. The machine does not touch you but rotates around you, sending radiation to your body from many directions. With the use of state-of-the-art treatment techniques and equipment, high doses of radiation is aimed and shaped according to the contour of your tumor while ensuring doses to your surrounding healthy tissues are kept at a minimum.



Radiation therapy is highly accurate and specific where the radiation is aimed only at the intended treatment area. For example, if you are diagnosed with early stage left breast cancer with a course of radiation treatment prescribed by your oncologist, the radiation will only be directed to the left breast and not at the rest of your body. Additionally, the radiation can also be tailored for treatment of superficial or deep-seated tumors.

Having courage does not mean that we are unafraid. Having courage and showing courage mean we face our fears. We are able to say, "I have fallen but i will get up."

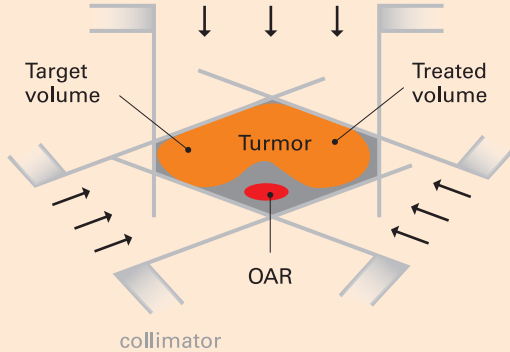
Source: www.butterfliesbeautyandblossoms.com



TYPES OF RADIATION THERAPY

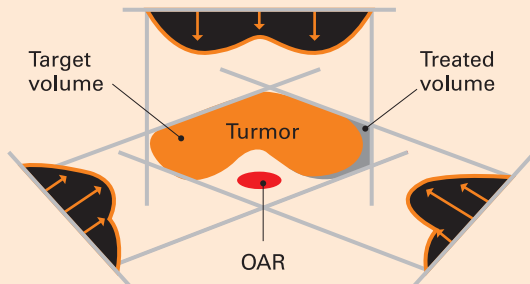
3-DIMENSIONAL CONFORMAL RADIATION THERAPY (3D-CRT)

3-dimensional conformal radiotherapy delivers a conformal radiation dose from different directions to the tumor, while sparing surrounding normal structures.



INTENSITY MODULATED RADIATION THERAPY (IMRT)

This is a form of 3-dimensional conformal radiotherapy that focuses multiple radiation beams onto the tumor. The beam intensities can be varied, so that the highest possible dose can be used to destroy cancerous tissue with relative sparing of normal structures. Sophisticated planning is required to determine the most accurate treatment plan. IMRT may give a higher chance of cure with a lower risk of side effects from the radiation treatment.

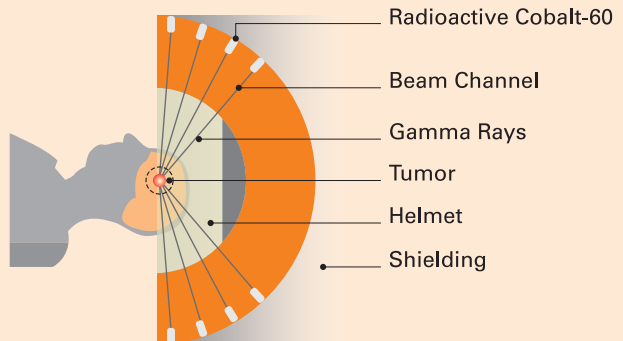


VOLUMETRIC MODULATED ARC THERAPY (VMAT)

Volumetric Modulated Arc Therapy (RapidArc) refers to the delivery of IMRT in a volumetric arc fashion. Treatment is delivered as the machine rotates 360 degrees around the patient through one or more arcs whilst continuously keeping the radiation beam on. The shape of the beam varies as the machine rotates to achieve a complex high dose volume in 3D which encompasses the tumor. This technique is advantageous in comparison to conventional step-and-shoot IMRT as the treatment duration is significantly shorter. This reduces patient discomfort and also the patients' frequency of movement due to prolonged treatment times in the former technique.

STEREOTACTIC RADIOLOGY (SRS)

Despite its name, radiosurgery procedure does not involve actual surgery. It is called "surgery" because a result similar to an actual surgical procedure is created by one-session radiation therapy. Several radiation beams are precisely aimed to converge upon a small tumor within the head and treatments are administered in fewer high-dose treatments than traditional therapy, which can help preserve healthy tissue. This form of radiotherapy is used to treat functional abnormalities, brain tumors and other tumors inside the head region. A device is usually used to stabilize the head so that it does not move during the treatment.



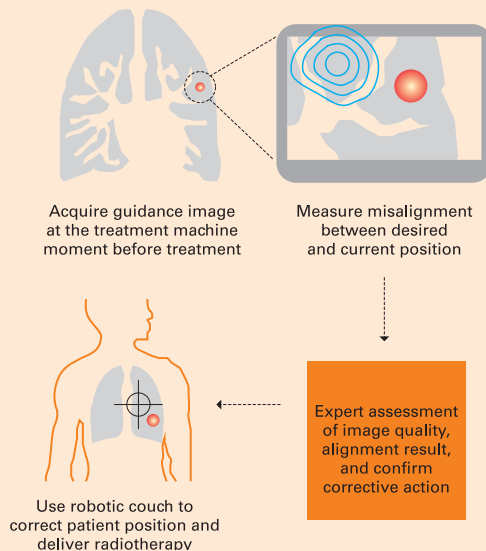
TYPES OF RADIATION THERAPY

STEREOTACTIC BODY RADIOTHERAPY (SBRT)

This is the equivalent of radiosurgery in the brain for other anatomical sites. SBRT can deliver very high doses of radiation over a relatively short total treatment time resulting in an increased probability of local tumor control. This advanced technology can be applied for the curative treatment of small lung cancers and control of liver tumors and selected spinal metastases.

IMAGE-GUIDED RADIATION THERAPY (IGRT)

Image-guided radiation therapy (IGRT) is a process of using various imaging technologies to locate a tumor target prior to a radiation therapy treatment. This process is aimed to improve the treatment accuracy by reducing the need for large target margins which have traditionally been used to compensate for errors in localization.





**“There is no hope unmingled with fear,
no fear unmingled with hope.”**

– Baruch Spinoza

Source: www.beseengetscreened.com/

How often will I get external beam radiation therapy?

Most people get external beam radiation therapy once a day, 5 days a week. Treatment lasts for 1 to 10 weeks, depending on the type of cancer you have and the goal of your treatment.

Where will I have my external beam radiation therapy?

Most of the time, you will get external beam radiation therapy on an outpatient basis. This means that you will have your treatment at the radiation oncology department and will not have to stay in the hospital.

What happens before my first external beam radiation treatment?

Once you agree to have external beam radiation therapy, you will be scheduled for a treatment planning session called a CT simulation. This involves taking a CT scan of the areas of your body to be treated with radiation. The radiation therapist will then put small marks on your skin to mark the treatment area. You will need these marks throughout the course of radiation therapy as the therapist will be using them daily to ensure that you are in the correct position. If you are getting radiation to the head/neck region, you may also need a mask. This mask helps keep your head from moving so that you are in the exact same position for each treatment session.

How is treatment planned?

After CT simulation, you may have to wait up to 1 week before start your first treatment. During this time, your oncologist and the medical physicist will use advanced software to generate an extremely precise treatment plan for you.

Will I be radioactive during or after treatment?

External radiation therapy affects cells in your body only for a moment. Because there's no radiation source in your body, you are not radioactive at any time during or after treatment.

What happens during each treatment visit?

The treatment itself is painless and takes only a few minutes. However, each session can last 10 - 15 minutes depending on the time it takes to set up. You'll be asked to lie on a treatment table and the radiation therapist will put you into your specific treatment position. Once you're in the right position, the radiation therapist will exit the room and monitor you from a close circuit TV while operating the machine. You'll be asked to lie still during the treatment. However, should you feel any discomfort throughout the treatment process, do notify the therapist and help should be with you shortly.

MANAGING RADIATION THERAPY SIDE EFFECTS

Radiation therapy is an effective treatment for many types of cancer, but it can cause side effects. Do inform any of the trained professionals in the radiation therapy team if you experience any side effects. The team will monitor you closely. Do not worry as there are ways to reduce any discomfort you experience. For example, your doctor may prescribe medication to help you feel better.

Radiation therapy side effects depend on the part of your body being treated and radiation therapy dosage. You can use the chart on page 13 to determine which side effects might affect you. First, locate the part of your body being treated on the first row, and then read across the column to see the side effects. A checkmark illustrates that you may experience this side effect during the course of treatment.



RADIATION THERAPY

SIDE EFFECTS AT-A-GLANCE

	Brain	Head & Neck	Breast	Chest	Abdomen	Pelvic
Diarrhoea					●	●
Fatigue	●	●	●	●	●	●
Hair loss	●	●	●	●		●
Mouth changes		●				
Nausea, vomiting and loss of appetite	●			●	●	
Sexual dysfunction						●
Skin changes	●	●	●	●	●	●
Throat changes		●		●		
Urinary and bladder changes						●
Other side effects	Vision changes	Taste and voice changes, vision changes. Thyroid problems, dental problem	Shoulder stiffness	Cough		

DIARRHOEA

Diarrhoea is frequent bowel movements which may be soft, formed, loose, or watery. **Diarrhoea** can occur at any time during radiation therapy to the pelvis, stomach, and abdomen. 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

- Drink 8 – 12 cups of clear liquid per day
- Eat frequent but small meals
- Avoid eating fiber-rich foods such as breads
- Avoid spicy foods, milk and dairy foods and caffeinated beverages
- Stay away from foods or drinks that cause gas, such as broccoli
- Anti-diarrhoea medication

FATIGUE

Fatigue is a common side effect, and there is a high probability that you will feel some level of fatigue from radiation therapy. Fatigue can include feeling exhausted, tired, sleepy, drowsy, confused or impatient. This can last from 6 weeks to 12 months after your last radiation therapy session.

Ways to manage

- Try to get more sleep at night.
- Rest more during the day if you can.
- Do not overwork yourself for example, you may go to work but not do housework.
- Do light exercise 15 - 30minutes walk
- Let others help you at home



HAIR LOSS



Radiation therapy may 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. You may start losing hair in your treatment area 2 to 3 weeks after your first radiation therapy session. Your hair may grow back 3 to 6 months after treatment is over.

Ways to manage

- Use a mild shampoo, such as a baby shampoo.
- Dry your hair by patting (not rubbing) with a soft towel
- Do not use products that are harsh on your hair, for example hair colors, perms, gels, mousse, oil, grease, or pomade
- Avoid exposing your scalp to sunlight, while you are on treatment.
- Use an umbrella, a hat or scarf to protect your scalp when you are outdoors

MOUTH CHANGES



Radiation therapy kills cancer cells and can also damage healthy cells such as those in the glands that make saliva and the soft, lining of your mouth. Radiation therapy to the head or neck can cause changes such as:

- Mouth sores
- Dry mouth
- Tooth decay
- Changes in taste (such as a metallic taste when you eat meat)
- Jaw stiffness
- Thick, rope-like saliva
- Mouth sores, may go away after the treatment ends. Other symptoms such as taste changes, may last for months or even years.

Ways to manage

- Check and observe changes in your mouth every day. This way, you can see or feel problems as soon as they start.
- Keep your mouth moist. You can do this by sipping cool drinks and sucking ice chips
- Brush your teeth, gums, and tongue after every meal and at bedtime
- Do not use mouthwashes that contain alcohol
- Rinse (swill and spit) with a teaspoon of salt in a glass of warm water at least four times a day.
- If you have dentures, limit how long you wear them each day.
- Try to have more liquids or soft food if chewing is painful. Stay away from things that can hurt, scrape, or burn your mouth, such as drinks that contain alcohol and all tobacco products,
- Exercise your jaw muscles. Practice this by opening and closing your mouth 20 times as far as you can without feeling pain.
- If your sense of taste changes during radiotherapy, try different ways of preparing food. For example, lemon juice makes dishes, including meat and vegetables, tastier.

SEXUAL AND FERTILITY CHANGES

Pelvic 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. Sexual and fertility changes differ for men and women.

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 symptoms, such as fatigue, pain, anxiety, or depression, can affect your interest in having sex.



Ways to manage

- For both men and women, it is important to be open and honest with your spouse or partner about your feelings, concerns, and how you prefer to be intimate while you are getting radiation therapy.
- For women, here are some issues to discuss with your doctor or nurse:

Fertility

Before radiation therapy starts, let your doctor know if you want to get pregnant after your treatment ends. Radiation therapy to the pelvic region can affect ovarian function (You may develop menopausal symptoms or will not be able to have children). You may need and ovarian transposition (moving the ovaries out of the treatment field) to preserve fertility. Make sure to tell your doctor or nurse if you are already pregnant.

Sexual activity

- Vaginal stenosis is a common problem for women who have radiation therapy to the pelvic. 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. If sexual activity is painful, try use vaginal lubricant (such as K-Y Jelly®)
- For men, here are some issues to discuss with your doctor or nurse:

Fertility

Before you start radiation therapy, let your doctor know if you think you might want to father children in the future. He or she may talk with you about ways to preserve your fertility before treatment starts, such as banking your sperm. Your sperm will need to be collected before you begin radiation therapy.

Sexual activity

Men may have problems getting and maintaining erections. Your doctor can let you know whether you are likely to become impotent and how long it might last. Your doctor can prescribe medicine or other treatments that may help .

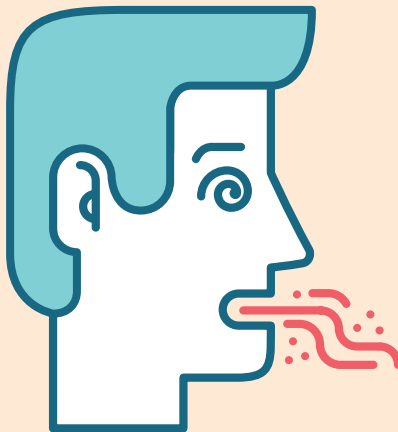
NAUSEA, VOMITING AND LOSS OF APPETITE

Radiation therapy can cause nausea, vomiting, or both. You may also lose interest in food during radiotherapy. 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.

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

- Have bland, easy-to-digest foods and drinks that do not upset your stomach. These include toast and apple juice
- Try to relax before treatment. You may feel less nausea if you relax before each radiation therapy treatment
- Eat frequent but small meals
- Have foods and drinks that are warm (not hot or cold)



SKIN CHANGES



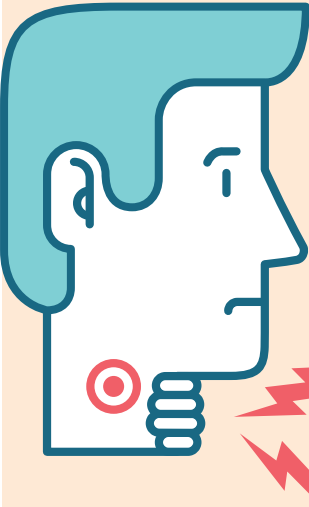
Radiation therapy can cause skin changes in your treatment area. Here are some common skin changes: treatment area may look as if you have a mild to severe sunburn, may itch, dry peeling skin and moist reaction. Skin changes can happen on any part of the body that gets radiation.

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.

Ways to manage

- Wear soft clothing, like cotton. Avoid wearing rough and tight fabrics near your treatment area
- Be gentle and do not rub, scrub, or scratch in the treatment area.
- Use creams that your doctor prescribes
- Bathe in lukewarm water. Pat skin dry with a soft towel
- Avoid using any soaps, creams, deodorants, medicines, perfumes or cosmetics and powder on the treatment area.
- Protect the treatment area from the sun
- 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

THROAT CHANGES



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 throat. You may also have trouble swallowing.

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

- Choose foods that are easy to swallow
- Eat moist, soft foods such as mashed potatoes, and scrambled eggs
- Drink cool drinks and sip drinks through a straw
- Eat foods that are cool or at room temperature, such as sandwiches
- Eat frequent but small meals
- Choose foods and drinks that are high in calories and protein.
- Don't have things that can burn or scrape your throat, such as:
 - Δ Hot foods and drinks
 - Δ Spicy foods
 - Δ Foods and juices that are high in acid, such as tomatoes and oranges
 - Δ Sharp, crunchy foods such as potato or corn chips
 - Δ All tobacco products, such as cigarettes, pipes, cigars, and chewing tobacco
 - Δ Drinks that contain alcohol
- Talk with our dietitian. He or she can help to 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

BLADDER CHANGES

Bladder problems often start 3 to 5 weeks after radiation therapy begins. Most problems go away 2 to 8 weeks after treatment is over. Bladder problems, which can include:

- Burning or pain when you begin to urinate or after you empty your bladder
- Trouble starting to urinate and emptying your bladder
- Frequent, urgent need to urinate
- Cystitis, inflammation of the bladder
- Incontinence, when you cannot control the flow of urine from your bladder, especially when coughing or sneezing
- Bladder spasms, which are like painful muscle cramps

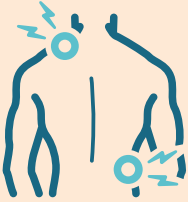
Ways to manage

- Drink a lot of fluids. This means 6 to 8 cups of fluids each day.
- Avoid coffee, black tea, alcohol, spices, and all tobacco products
- Your doctor may prescribe antibiotics if your problems are caused by an infection and/or other medicines that can help you urinate, reduce burning or pain, and ease bladder spasms



OTHER SIDE EFFECTS

Shoulder stiffness



You may experience some stiffness in your shoulder following breast surgery and/or radiation where the upper arms may be involved.

Do daily gentle exercises, such as lifting your arm above your head. This will prevent permanent stiffness to the shoulder joint.

Dental problems



If you have radiotherapy to your mouth, your teeth will be more likely to decay. You may need to have some dental work before treatment begins.

Cough



You may cough more and experience some breathlessness during or after chest radiation therapy.

The cough might be due to an infection, rather than the treatment. Therefore, please consult your doctor. Some medication may be required to remedy these problems.

Earaches or difficulty hearing



Do not try to clean or clear out your ear

Voice changes



These changes are caused by swelling and inflammation of the vocal cords. Avoid straining to speak if hoarseness becomes severe. You should also avoid alcohol and tobacco.

Thyroid problems



Radiation to the neck can cause hypothyroidism (a decrease in thyroid function). Hypothyroidism usually develops 3–4 years after treatment, but can also occur several years later.

Thyroid function is checked and daily medications (thyroid hormone replacement) may be needed to regulate the thyroid.

Vision changes



Vision changes can occur when radiation damages the blood vessels of the eye or the optic nerve. Radiation can cause dry eyes and cataracts (the lens of the eye becomes cloudy).

Vision changes most often occur long after radiation therapy is finished and are more likely to happen when high doses of radiation are given.

Regular eye exams can detect changes to vision or cataracts.

WEEKLY **REVIEWS AND FOLLOW-UP CARE**

During the course of radiation treatment, your oncologist will review you at least once a week to help manage treatment related side effects. Your radiation therapist will inform you of your date for review. Additionally, once you have completed your course of treatment, you will be required to come for follow-up at the Cancer Centre.

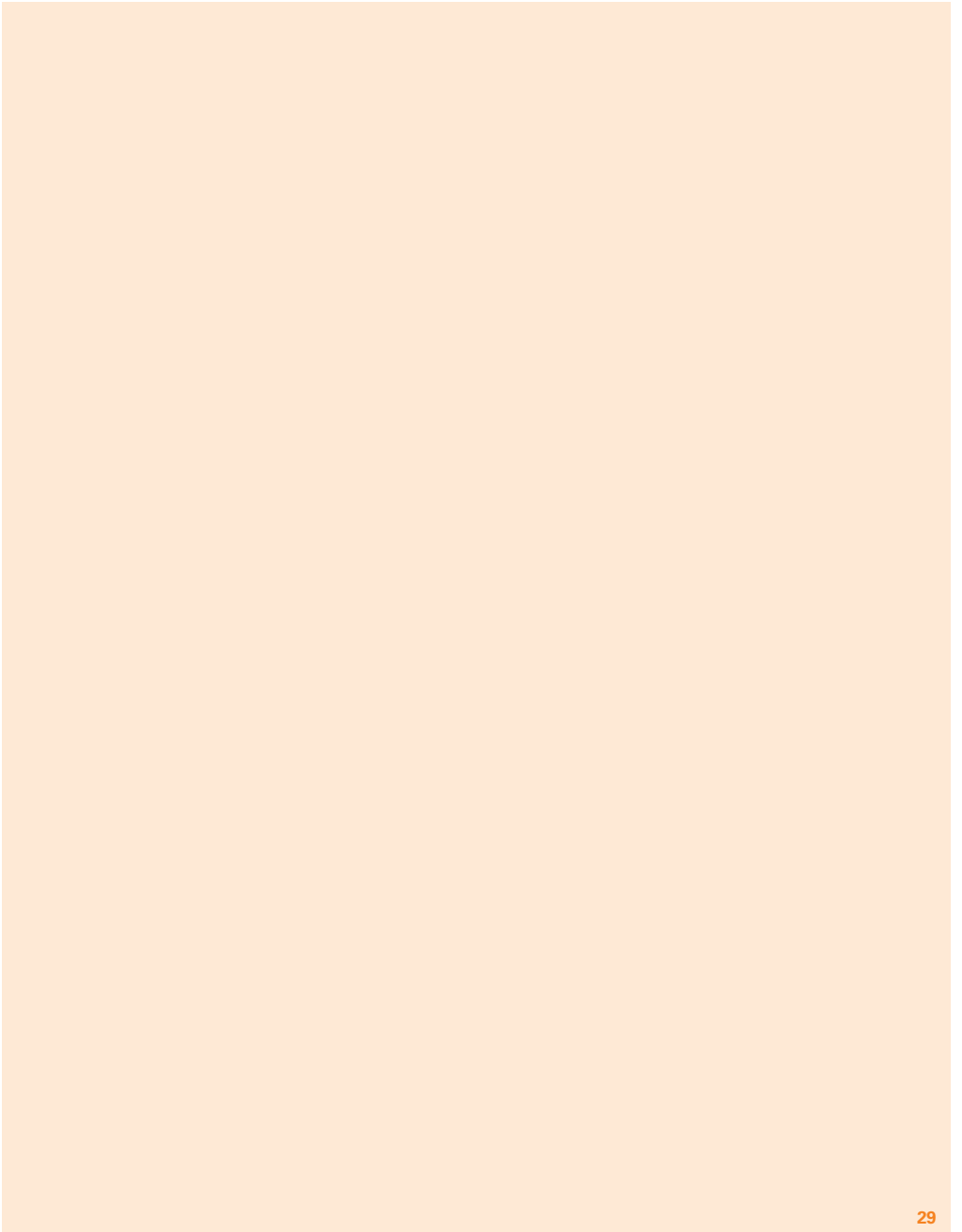
No matter what type of cancer you have had, you will need regular doctor visits to check your progress after treatment ends. This process is called follow up and will continue for a few years. This is an important part to your recovery. Your follow-up care may include x-rays, blood tests and other physical examinations to look for signs that may indicate that the cancer may have returned. You may feel quite anxious at these times. This can make it difficult to put the experience of cancer behind you. Therefore, you have to find a good support and balance during these times especially when coping with this disease. If you have any concerns or suspicions about your health between check-ups, do not wait for the next appointment. Make an earlier appointment to see your doctor.

It is important that you continue to take good care of yourself. Eat a well-balanced diet and drink plenty of fluids to keep hydrated. Exercise regularly and keep fit and active. However, do inform your doctor before you commence on any exercise program. You can also return to work between treatments if you feel well and comfortable. Discuss with your doctor about this as well.



NOTES

NOTES



For more information, kindly contact us at

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Our Cancer & Radiosurgery Centre is
located on Lower Ground, Tower C

Operation Hours

Monday-Friday 8.30am–5.30pm

Saturday 8.30am–1.00pm

Public Holidays & Sundays Closed

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