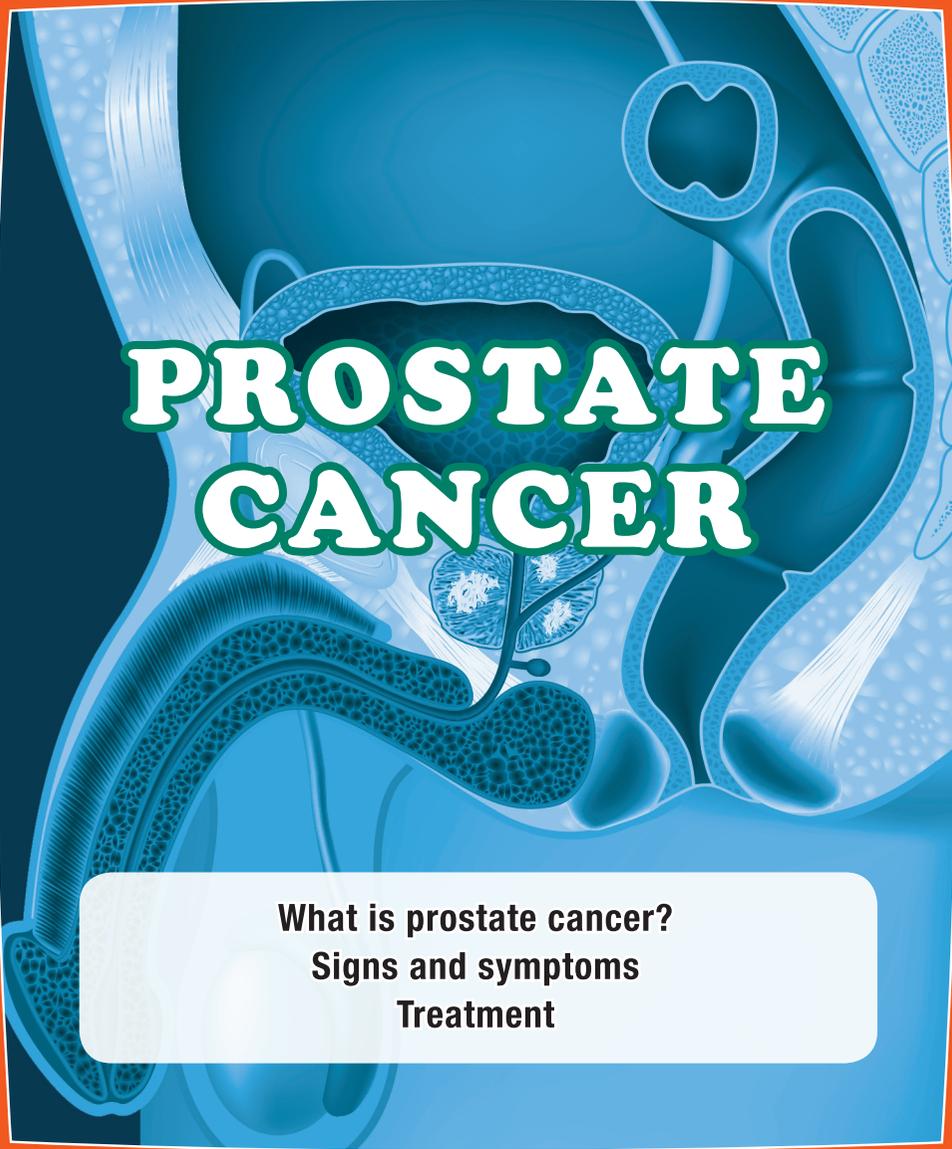


Inspired by Hope  
Committed to Care



National Cancer  
Centre Singapore

SingHealth



# PROSTATE CANCER

**What is prostate cancer?**  
**Signs and symptoms**  
**Treatment**

## Contents

Introduction .....	3
What is prostate cancer? .....	4
Causes and risk factors of prostate cancer .....	5
Signs and symptoms of prostate cancer .....	5
Diagnosing prostate cancer .....	6
Staging and grading of prostate cancer .....	7
Treatment of prostate cancer .....	8
Prognosis .....	11
Radiotherapy for prostate cancer .....	11
Patient pathway for radiotherapy .....	13
Preparing for radiotherapy .....	14
What happens during external beam radiotherapy? .....	16
Possible side effects of radiotherapy .....	17
What happens after radiotherapy? .....	19
Questions you can ask your doctor .....	20
Supportive care .....	21
Treatment and support units at NCCS .....	22
Internet resources .....	22

**Special thanks to the following members who have contributed to the development of this booklet:**

**Content:**

**Ms Poon Kee Lee** | Senior Radiation Therapist, Division of Radiation Oncology

**Ms Yusnita Omar** | Assistant Manager (Allied Health), Division of Radiation Oncology

**Dr Jeffrey Tuan** | Consultant, Division of Radiation Oncology

**Dr Terence Tan** | Senior Consultant, Division of Radiation Oncology

**Dr Weber Lau** | Senior Consultant, Department of Urology, Singapore General Hospital

**Text:**

**Ms Jenna Teo** | Senior Nurse Manager, Cancer Education & Information Service

Document No. CEIS-EDU-PEM-032/0815

**Disclaimer**

The National Cancer Centre Singapore does not endorse or promote the use of any product mentioned in this booklet. The information is presented in a summary to provide an understanding and knowledge only. It does not recommend the self-management of health problems or replace consultation with your doctor. You should never disregard medical advice or delay seeking it because of something you have read here.

First edition September 2015.

**Copyright © National Cancer Centre Singapore**

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior written permission from the publisher.

# Introduction

Prostate Cancer is the third most common cancer for men in Singapore, with more than 700 cases diagnosed every year in the last five years here. (Singapore Cancer Registry, Interim Report 2010 to 2014). It usually occurs after the age of 50 years and is seen mostly in those over 70 years of age.

This information booklet is intended for patients who are about to receive radiotherapy treatment for prostate cancer. It contains some general information on prostate cancer and outlines the treatment options with particular attention to radiotherapy treatment. It will describe how radiotherapy treatment is planned and given, the possible side effects during and after radiotherapy and how to best cope with them. Your doctor will discuss with you in more detail, giving you information specific to your condition and treatment.

We hope you will find this booklet helpful. However, it is intended to serve only as a guide and is not a substitute for medical advice. If you have any further questions or concerns, please do not hesitate to ask a member of your healthcare team.

If you find this booklet useful, share it with your family and friends. If you have any questions about the issues raised in this booklet, or if there is any information you are seeking that is not covered here, please contact the Cancer Helpline by calling 6225 5655 to speak with a nurse counsellor. You can also reach them by email: [cancerhelpline@nccs.com.sg](mailto:cancerhelpline@nccs.com.sg).

Other cancer information booklets are available from the National Cancer Centre Singapore's Cancer Education and Information Service department. You can contact the Cancer Helpline to request for a copy. For the electronic version of this booklet, please visit: <http://www.nccs.com.sg/publications> or scan here:



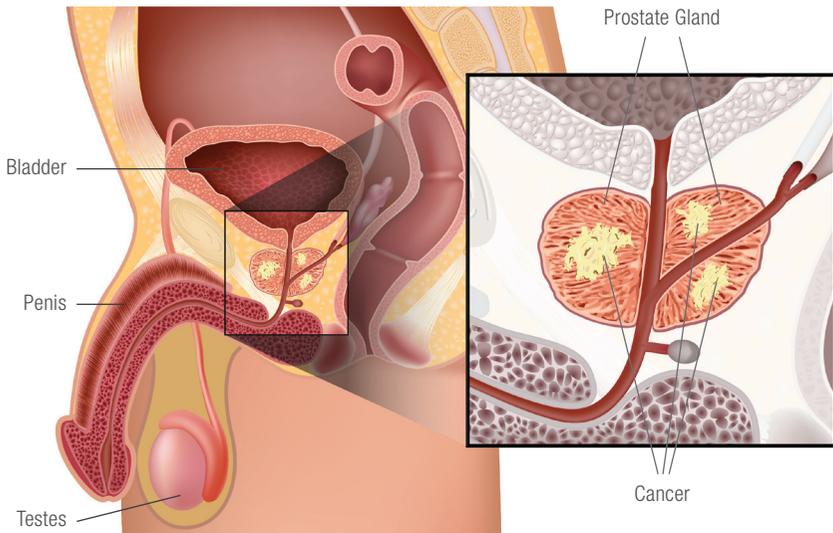
# WHAT IS PROSTATE CANCER?

Prostate cancer is a disease in which cancer cells develop from the tissues of the prostate – a gland located below the bladder and in front of the rectum (see diagram below). The prostate gland is found only in males and is part of the male reproductive system.

Normal cells grow, divide and replace themselves in an orderly manner. Your body relies on this orderly activity to repair injuries and replace worn-out tissues. Cancer develops when cells divide too quickly and grow in an uncontrollable fashion. A cancerous growth can invade surrounding tissues and may even spread to other parts of the body.

Prostate cancer is the uncontrolled (or malignant) growth of abnormal cells of the prostate. In most cases, prostate cancer is relatively slow-growing, such that it typically takes a number of years to become large enough to be detectable, and even longer to spread beyond the prostate. However, a small percentage of men do experience more rapidly growing and aggressive forms of prostate cancer.

## The Prostate



It is about the size of a walnut and it encircles the upper part of the urethra, which is the tube that empties urine from the bladder. The prostate makes the seminal fluid, which is a thick and white fluid that mixes with the sperm produced by the testicles to form semen.

# CAUSES AND RISK FACTORS OF PROSTATE CANCER

The exact causes of prostate cancer is still unknown. Research is being carried out to find out more about the causes of prostate cancer. However, there are some factors that are known to increase a man's risk of developing this disease:

- **Age** – This is the strongest risk factor for prostate cancer. It mainly affects men above the age of 50, and the risk increases with age.
- **Ethnicity** – In Singapore, Chinese men have double the risk of getting prostate cancer compared to Malays and Indians (National Registry of Diseases Office, 2011).
- **Family history** – A man that has a father or brother with prostate cancer is 2 to 3 times more likely to get this disease, compared to the average man. (The risk is higher for men who have a brother with prostate cancer than for those with an affected father.) The risk is also much higher for men with several affected relatives, particularly if their relatives were young at the time the cancer was detected.
- **Diet** – Men who consume large amounts of fat, particularly from red meat and other sources of animal fat (including dairy products), appear to have a slightly higher chance of getting prostate cancer.

# SIGNS AND SYMPTOMS OF PROSTATE CANCER

There are usually no symptoms in the early stages of prostate cancer. As most prostate cancers are slow-growing, many men actually die of other ailments of old age without ever realising that they have prostate cancer. Most men with early stages of prostate cancer discover it during routine medical check-ups or through a blood test. However, when symptoms do occur, particularly for more advanced prostate cancer, they may include:

- Difficulty passing urine
- Increased urinary frequency, especially at night
- Weak, interrupted urinary stream
- **Burning or pain during urination**
- **Blood in the urine**
- Blood in the semen
- Weight loss
- Loss of appetite
- **Pain in the back (spine), hips, chest (ribs), pelvis or other bony areas**
- **Weakness or numbness in the legs and difficulty walking**
- **Difficulty controlling bladder or bowels**

Please note that these symptoms are also common in other conditions besides cancers, and do not necessarily mean you have prostate cancer. However if they persist, it is important to see a doctor. If any of the symptoms listed above in bold is present, it is highly recommended to seek early medical advice.

# DIAGNOSING PROSTATE CANCER

Your doctor will examine you very carefully. This will consist of taking a complete medical history and performing several tests, which may include:

**Digital rectal examination (DRE)** – Your doctor inserts a gloved finger into your rectum to feel for any abnormalities in the prostate. The test only takes a few minutes to complete. You may experience slight, momentary discomfort during the procedure, but it should not be painful.

**Prostate-specific antigen (PSA) blood test** – The PSA is a substance produced by the prostate and a small amount of it is normally found in the blood. Men with prostate cancer tend to have higher levels of PSA in their blood. However, elevated PSA levels may be caused by other non-cancerous conditions. Therefore, although an elevation in the PSA level may indicate prostate cancer, it is by no means definite.

**Trans-rectal ultrasound scan (TRUS)** – This test uses high-frequency sound waves (inaudible to the human ear) to visualise the prostate. It is done by inserting a probe, which is about the size of a finger, a short distance into the rectum. Images of the prostate then appear on a screen. TRUS is often used to view the prostate when a man has an abnormal DRE or a high level of PSA. It is also commonly used during a prostate biopsy, to allow the doctor to see exactly where to pass a needle through the wall of the rectum to take small samples of tissue from the prostate.

**Biopsy** - A prostate biopsy involves taking small samples of prostate tissue for further examination under a microscope, to determine the presence of cancer cells. The procedure is performed by the urologist, and is usually done under local anaesthesia. Prostate biopsy samples can be collected in different ways, by inserting a thin needle either through the rectum (transrectal biopsy), or through the area between the anus and scrotum (transperineal biopsy).

**Computer Tomography (CT) scan** – This is a scan which takes multiple X-ray images of the body from different angles. A computer then uses these images to build up a 3-dimensional picture of the inside of the body. This scan can check the area of the cancer and to see if it has spread to nearby structures or other parts of the body.

**Magnetic resonance imaging (MRI) scan** – This scan uses magnetic fields instead of X-rays to detect the cancer and to look for any spread to the lymph nodes. It is useful in giving more detailed pictures of the pelvic area. If you have a pacemaker or other metallic objects in your body, you may not be able to have an MRI scan due to the potential harmful effects associated with metal in a magnetic field.

**Bone scan** – A bone scan uses low level radioactive substance that is injected into the patient to detect cancerous spread to the bones. Most of the radioactive material will leave the body within a few hours and it is safe to go home after the procedure.

**Positron Emission Tomography (PET-CT) scan** – A PET-CT scan combines both a CT scan and a PET scan at one sitting to give better pictures of the cancer and its extent. A CT scan uses X-rays to take pictures from the top of the head to mid-thigh to check for any unusual areas. A PET scan, on the other hand, uses a small amount of mildly radioactive drug, which is injected into your body. This helps the doctors to detect any part of your body where the cells are more active than normal, such as areas with growing cancer cells. This will help to check if the unusual areas seen on CT scan are suspicious for cancerous growth.

# STAGING AND GRADING OF PROSTATE CANCER

## Staging

The stage of a cancer describes how far it has spread, whether it is contained within its site of origin or if it has spread to surrounding tissues or even other parts of the body.

### Stage I

The cancer is very small and is confined to the prostate. It cannot be felt during a digital rectal examination (DRE) and cannot be seen in imaging scans. Thus, it is usually detected through a biopsy.

### Stage II

The cancer is more advanced than in Stage I, but is still within the prostate. The cancer can be felt as a hard lump during a DRE.

### Stage III

The cancer has extended beyond the outer capsule of the prostate and may have spread to the nearby seminal vesicles (the tubes that transport semen).

### Stage IV

The cancer has spread beyond the prostate to nearby structures (e.g. rectum, bladder, pelvic wall) and/or to more distant parts of the body (e.g. liver, lymph nodes, bones).

## Grading

The grade of prostate cancer describes how aggressive the disease is and whether it will progress quickly (months) or slowly (years). The most commonly used grading system is the Gleason system. The Gleason grade looks at the pattern of cancer cells within the prostate and ranges from 1 to 5. Grades 1 to 3 are least likely to spread, while Grades 4 and 5 are most likely.

Prostate cancers often contain areas with different grades, hence a grade is assigned to the 2 areas that constitute most of the cancer. A Gleason score is obtained by adding the Gleason grade numbers of these 2 areas, and therefore the Gleason score ranges from 2 to 10.

- Gleason score 2 to 6 – low grade cancers, slow growing and less likely to spread
- Gleason score 7 – moderate grade
- Gleason score 8 to 10 – high grade cancers (aggressive tumours), likely to grow more quickly and are more likely to spread

# TREATMENT OF PROSTATE CANCER

There are several types of treatment options available for prostate cancer (e.g. surgery, radiotherapy, hormone therapy). In some cases, the best approach involves a combination of different treatments.

Your doctors will discuss with you the most appropriate treatment, depending on your cancer profile. This profile depends on several factors, including:

- Age and expected survival
- Medical condition and risk factors
- Presence of significant illnesses, such as myocardial infarction, stroke, diabetes, etc.
- PSA (prostate-specific antigen) level
- Gleason Score
- Presence of metastasis (extensive spread of disease)
- Status of DRE (digital rectal examination)

It is important to discuss all the possible treatment choices, including what to expect and possible side effects, to help you make an informed decision. Sometime it can be difficult to come to a decision, especially when presented with a lot of information over a short space of time. While some people feel overwhelmed, others may feel that they have not been given enough information. You may feel that you want to ask for a second opinion from another specialist for reassurance. This is understandable and can be a valuable part of your decision-making process.

You may find it helpful to make a list of questions you would like to ask your doctor. Please see the section on 'Questions you may ask your doctor' for a list of suggested questions.

## ACTIVE SURVEILLANCE OR WATCHFUL WAITING

For men with low-grade, early-stage prostate cancer that is slow-growing and causing little or no symptoms, they may not need immediate treatment. In such cases, they may decide with their doctors to wait and see whether the cancer is progressing before starting any treatment.

Watchful waiting involves observing a patient's condition without providing any treatment until symptoms appear or change. In active surveillance, the disease is closely monitored through regular tests (e.g. PSA test) and treatment is not given unless there are changes in the test results.

## SURGERY

The surgical approach to treating prostate cancer is known as prostatectomy. It involves removing all or part of the prostate gland. Surgery is usually offered to men with early-stage disease or cancer that is confined to the prostate, who are well and do not have other serious health problems.

In radical prostatectomy, the entire prostate gland and other nearby tissues (e.g. surrounding structures and lymph nodes) are surgically removed. The urologist can perform a radical prostatectomy using different techniques. An open radical retropubic prostatectomy involves removing the prostate gland with the attached seminal vesicles and vas deferens through an incision in the lower abdomen.

A newer approach is the robotic-assisted laparoscopic radical prostatectomy, where the urologist makes several small incisions in the lower abdomen and uses instruments attached to a mechanical device (“robotic arms”) to perform the surgery. The tissues that have been surgically removed can then be examined by the pathologists. This histological assessment will indicate how advanced the cancer is, the risk of cancer recurrence and if additional treatment is necessary.



## HORMONE THERAPY

Hormone therapy for prostate cancer is also known as androgen deprivation therapy. The aim of hormone therapy is to reduce the testosterone hormone in the body to very low levels. Approximately 90% of testosterone is produced by the testicles. Most prostate cancer cells depend on testosterone to help them grow. Hormone therapy for prostate cancer works by preventing the cancer cells from receiving testosterone, thus causing the cancer cells to die or grow more slowly.

Hormone therapy for prostate cancer usually involves the use of pharmacologic agents (drugs), given as injections or tablets. Another less common form of hormone therapy involves the surgical removal of the testicles (orchidectomy) or the parts of the testicles that make testosterone.

## CHEMOTHERAPY

Chemotherapy is the use of anti-cancer drugs to destroy cancer cells and/or to impede their growth. The goal of chemotherapy is to cause the prostate cancer to shrink. Chemotherapy can sometimes help to relieve or delay symptoms (e.g. pain).

These anti-cancer drugs are given either intravenously (injected into the vein) or orally (taken by mouth). The drugs then enter the bloodstream and circulate throughout the body, making this treatment particularly useful for cancers that have spread to distant sites (e.g. lymph nodes, bones, liver, lungs). Thus, chemotherapy is mostly offered to men with advanced or metastatic prostate cancer (i.e. cancer has spread beyond the prostate to other parts of the body), especially those that have not responded to hormone therapy. Early stage prostate cancer is not usually treated with chemotherapy.

Chemotherapy is given in cycles, with each period of treatment followed by a rest period to allow the body time to recover. Each cycle typically lasts for a few weeks.

## RADIOTHERAPY

Radiotherapy, also known as radiation therapy, is the use of high-energy radiation (rays or particles) to kill or damage the prostate cancer cells. This reduces the size of the tumours, and ideally, eradicates them. For early-stage prostate cancer that is confined to the prostate gland, radiotherapy can be used with the aim of curing the cancer (radical radiotherapy). This type of treatment involves giving a high dose of radiation to the prostate, where the radiation can be delivered through either external beam radiotherapy (EBRT) or internal radiotherapy.

In EBRT, radiation beams are generated from a machine outside the body and directed at the prostate. For internal radiotherapy, also known as brachytherapy, radiation is delivered to the prostate by placing radioactive materials in the prostate. EBRT and brachytherapy are described in more detail in the subsequent section titled “Radiotherapy for prostate cancer” in this booklet. Radiotherapy may also be used in advanced prostate cancer that has spread to other parts of the body. In such cases, EBRT is given to the secondary tumours at other sites to shrink them or control their growth, in order to provide relief from symptoms (e.g. bone pain if the cancer has spread to a specific area of bone). This type of treatment is known as palliative radiotherapy.

Radiation affects both normal and cancer cells. Generally, cancer cells are more sensitive to radiation and therefore more cancer cells are killed. On the other hand, normal cells are better able to repair themselves. Hence, damage to normal cells is usually temporary. This is also the reason why radiotherapy has side effects.

## CLINICAL TRIALS

Some patients may be invited to take part in a clinical trial. New treatments are being developed all the time, and the only reliable way to know if a new treatment is more effective than an existing treatment is to carry out a clinical trial. A trial may be done to test new treatments (such as new drugs or new radiotherapy techniques), test new combinations of existing treatments or change the way in which existing treatments are given.

If you decide not to take part in a clinical trial, your decision will be respected and you do not have to give a reason. Your care and treatment will not be affected. However, it is helpful to discuss with your healthcare team if you have any particular concerns or questions.

For more information about Clinical Trials, please scan this QR Code to download the electronic version of the booklet:



## TREATMENT BASED ON EXTENT OF SPREAD AND RECURRENCE RISK

Some patients may be invited to take part in a clinical trial. New treatments are being developed all the time, and the only reliable way to know if a new treatment is more effective than an existing treatment is to carry out a clinical trial. A trial may be done to test new treatments (such as new drugs or new radiotherapy techniques), test new combinations of existing treatments or change the way in which existing treatments are given.

Extent of Spread	Recurrence Risk	Treatment Options
Localised prostate cancer	Very low risk	<ul style="list-style-type: none"> <li>• Active Surveillance</li> <li>• Radical Prostatectomy</li> <li>• Radiotherapy</li> </ul>
	Low risk	<ul style="list-style-type: none"> <li>• Active Surveillance</li> <li>• Radical Prostatectomy</li> <li>• Radiotherapy</li> </ul>
	Intermediate risk	<ul style="list-style-type: none"> <li>• Active Surveillance</li> <li>• Radical Prostatectomy</li> <li>• Radiotherapy + Short-Term Androgen Deprivation</li> </ul>
	High risk	<ul style="list-style-type: none"> <li>• Radiotherapy + Long-Term Androgen Deprivation</li> </ul>
Metastatic prostate cancer		<ul style="list-style-type: none"> <li>• Long-Term Androgen Deprivation</li> <li>• Chemotherapy + Palliative Radiotherapy</li> </ul>

## PROGNOSIS

A patient's outlook for recovery depends on many factors such as the stage of his cancer, his age and general health at the time of diagnosis. It also depends whether he responds to the treatment.

Because so many prostate tumours are low-grade and slow growing, survival rates are excellent when prostate cancer is detected in its early stages. 99% of men with the most common types of prostate cancer overall will survive more than 5 years after diagnosis. Many men with prostate cancer actually will live much longer than 5 years after diagnosis. The relative 10-year survival rate is 91%.

Your doctor will be able to discuss this in greater detail with you.

## RADIOTHERAPY FOR PROSTATE CANCER

### Types of radiotherapy

Before you can receive radiotherapy treatment, you must be seen by a Radiation Oncologist, who is a doctor specially trained to give this type of treatment. Your Radiation Oncologist will assess your condition to see if radiotherapy is indeed required or appropriate. Radiotherapy can be given in two ways. The most common is called External Beam Radiation Therapy, where the radiation is directed from the treatment machine to the pelvis area of your body, where your prostate is. The other form is Internal Radiation Therapy or Brachytherapy, where radioactive materials are placed in the prostate gland close to the cancer cells. Depending on the type of cancer, you may be given just one form of radiation therapy or even a combination of both.

### External Beam Radiation Therapy

External beam radiation therapy (EBRT) is usually given to five days a week (i.e. Mondays to Fridays). The total dose of radiation and the number of treatments you need depends on the size of your prostate cancer, your general health, and other medical treatments you have had or need to have. It is very important that you have all of your scheduled radiotherapy sessions. If you miss or put off your radiotherapy sessions, it might reduce the effectiveness of your radiation treatment.

In EBRT, beams of radiation are focused on the prostate gland from a machine outside the body. There are several types of EBRT, such as Intensity Modulated Radiation Therapy, Image Guided Radiation Therapy, Volumetric Intensity Modulated Arc Therapy, Stereotactic Body Radiotherapy and Tomotherapy. The one that is most suitable for your treatment will be chosen.

### Intensity Modulated Radiation Therapy

Intensity modulated radiation therapy (IMRT) conforms the radiation dose to the shape of the target tissues in three dimensions, increasing it to areas where cancer cells reside, and decreasing it to areas that need to be protected. This allows for maximum radiation to be delivered to the prostate and the surrounding areas potentially harbouring cancer cells, while minimizing radiation to nearby normal tissues, such as the rectum and bladder. 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.

## Image-Guided Radiation Therapy

With Image-guided radiation therapy (IGRT), various imaging technologies (e.g. Cone-beam CT scan) are used to locate the tumour target immediately prior to radiation treatment. By performing advanced imaging before every radiotherapy session, the radiation target is precisely adjusted for each session of treatment. Such adjustments are needed because the position of the prostate may change from day to day due to differences in the amount of air in the rectum and urine in the bladder. This process is aimed at improving treatment accuracy by reducing the need for large target margins, which have traditionally been used to compensate for errors in localization. IGRT is complementary to IMRT. IMRT is used to improve the radiation delivery precision and IGRT is used to improve the radiation delivery accuracy.



## Volumetric Intensity Modulated Arc Therapy

Volumetric Intensity Modulated Arc Therapy (VMAT) 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, while continuously keeping the radiation beam on. Three-dimensional CT imaging technology aids in the precision of delivering the radiation treatment. VMAT technology greatly decreases treatment time, which is beneficial in reducing patient discomfort and the effects of motion.

## Stereotactic Body Radiotherapy

In Stereotactic Body Radiotherapy (SBRT), a specially designed coordinate-system is used for the exact localization of the prostate in order to treat it with limited but highly precise treatment fields. SBRT can deliver very high doses of radiation over a relatively short treatment course (hypofraction), resulting in an increased probability of local tumour control.

## Tomotherapy

In Tomotherapy, an advanced form of IMRT is combined with the accuracy of CT scanning technology. Before every treatment, a three-dimensional image of the treatment area is obtained using CT scanning, so that the radiation beams can be targeted according to the exact shape and location of the prostate tumour on that specific day. During treatment, the intensity and direction of the radiation beams are adjusted in real time. This way, radiation exposure to the nearby healthy tissues and organs are reduced, thus minimizing side effects.

## Brachytherapy (Internal Radiation Therapy)

Brachytherapy, also known as Internal Radiation Therapy, is another form of radiation therapy, where prostate cancer is treated with radiation from inside the prostate gland. There are two types of brachytherapy – low dose rate (LDR) brachytherapy, and high dose rate (HDR) brachytherapy. Brachytherapy can be given alone or in combination with external beam radiation therapy.

In LDR brachytherapy, tiny radioactive seeds are implanted into the prostate gland, using a fine needle inserted through the area of skin between the scrotum and the anus (the perineum). The seeds stay in the prostate and release low levels of radiation slowly for a few months. Over this time, the prostate receives a high dose of radiation, while the healthy tissues around the prostate gland receive a much smaller dose

than the prostate itself. After a few months, the radiation in the seeds fades away, and the harmless seeds are left in the prostate gland permanently.

In HDR brachytherapy, devices containing radiation are placed in the prostate gland close to the cancer cells. Thin tubes are inserted into the prostate through the skin behind the testicles, while under anaesthetic. Radioactive pellets are then inserted into the tubes to give a high dose of radiation to the prostate gland in a short time, such that the radiation can kill the cancer cells while causing less damage to healthy tissues nearby. The tubes and pellets are removed at the end of the brachytherapy treatment session. No radioactive materials are left in the prostate.

## Who will I meet?

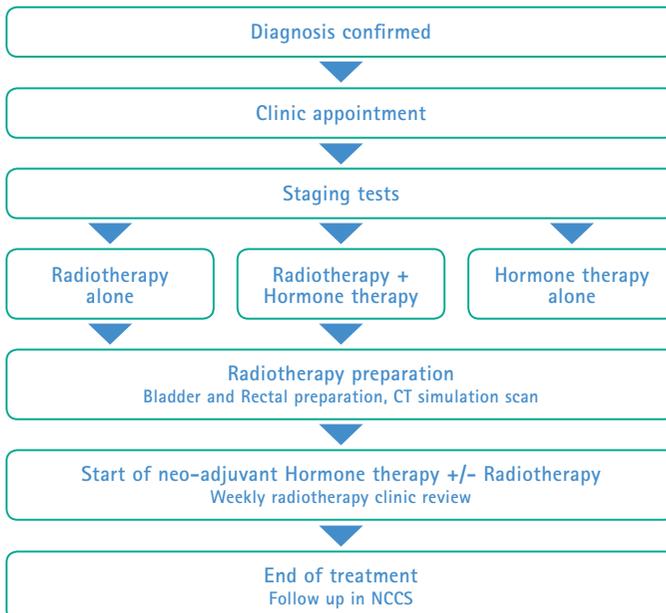
During your radiotherapy treatment, you will meet many health care professionals who specialise in different aspects of your treatment as part of a multidisciplinary team. They include the following:

**Radiation Oncologist** - The doctor in charge of your radiotherapy treatment is called a Radiation Oncologist. You will see your Radiation Oncologist or a member of his team each week during your treatment in order to monitor your side effects.

**Radiation Therapists** - The Radiation Therapists (also known as radiation therapy technologists) are the main group of people you will meet during your treatment. They are specially trained in radiotherapy and will operate the machine which delivers the radiation treatment. You will first meet them when you attend your planning appointments. They will help position you for treatment each day, and will provide information and advice throughout the course of your treatment.

**Radiotherapy Nurses** - The nurses in our department are experienced in looking after patients who are undergoing radiotherapy treatment. They also assist the Radiation Oncologists during consultations.

## PATIENT PATHWAY FOR RADIOTHERAPY



## PREPARING FOR RADIOTHERAPY

Before you have any treatment, your Radiation Oncologist will discuss with you what radiotherapy will involve, as well as its benefits and risks. You will be asked to sign a consent form, which is a written record that you understand and have agreed to undergo a course of radiotherapy treatment.

Each patient's radiotherapy treatment has to be carefully and individually planned so that the radiation is targeted precisely at the cancer and do as little harm as possible to the surrounding healthy tissues. You will therefore have a few planning appointments and procedures prior to starting radiotherapy treatment. Further explanation will be given to you at each appointment, so please do not hesitate to ask if you have any questions or concerns.

### CT-SIMULATION SCAN

You may have already gone through a CT scan as part of your diagnosis. However, you will still need a CT-simulation scan of the pelvis area. This CT-simulation scan is required to generate your radiotherapy treatment plan. During this CT-simulation scan, you will be positioned lying face-up on the CT machine bed, using special pillows, leg-rests, and/or other devices to help ensure that your body remains still. The same position and devices will be used for your daily radiotherapy sessions. The CT images acquired during this scan will be used to design the most optimum treatment plan for you.

During the CT-simulation scan, some patients will be given an injection of contrast (liquid dye) that allows clearer visualization of the area that needs to be treated. These patients will be asked to fast for 4 hours before the procedure and to stop taking their diabetes medications (if any). If contrast is required for your CT-simulation scan, you will be given the relevant instructions prior to this scan to ensure safe administration of the contrast.



### PERMANENT SKIN MARKS

During your CT-simulation scan, we will draw on the skin of your torso and pelvic area with marker pens. These markings will fade and wash away. Therefore, at the end of the CT-simulation procedure, you will be given small permanent markings, in the form of 4 tiny black dots (also known as tattoos). Each dot is about 1 millimetre. These permanent dots are done with a very small needle and a few drops of black ink. Some people may feel a small pinch, like a pin-prick, while the dots are being created.

These tiny permanent dots will serve as a guide for your Radiation Therapists to correctly position your body for the daily treatments throughout your entire course of radiotherapy, while allowing you to shower without worrying about losing the marks that indicate where the radiation will be delivered.

## BLADDER AND RECTUM PREPARATION

Some prostate radiotherapy patients may be required to have a comfortably full bladder and a relatively empty rectum for the CT-simulation scan and daily treatments. This bladder and rectum preparation serves to reduce side effects, as well as improve accuracy of treatment by maintaining a similar bladder and rectum size for each treatment. Only certain prostate radiotherapy patients are required to this bladder and rectum preparation, therefore please check with your Radiation Oncologist or Radiation Therapists if it applies to you.

To be able to achieve a comfortably full bladder for your CT-simulation scan and treatment appointments, it would be useful to practice at home a few days in advance. We suggest that you empty your bladder (i.e. pass urine) and then drink 400mls of water (2 standard Styrofoam cups of water). See if you are still comfortable after one hour. Ideally, you should still be reasonably comfortable for another 30 to 60 minutes (in addition to the one hour after drinking). This allows extra time for any delays and will lessen any anxiety that you may experience.

If you are not comfortable at the end of an hour from the time you drank, we suggest that you try again on another day. This time, see if you can hold 400mls for 45 minutes. Remember to empty your bladder before you start drinking. If you are still not comfortable after 45 minutes, then try for 30 minutes. Your ability to hold fluid will depend on how often you go to the toilet to pass urine. If you need to pass urine more often than two hourly, please let your Radiation Oncologist know. He will need to assess your bladder function and may prescribe medication to reduce the frequency of passing urine.

For rectum preparation, try to have a bowel movement (i.e. pass motion) in the mornings of your CT-simulation scan and daily treatment appointments. If you have irregular bowel movements, your Radiation Oncologist may prescribe some medication to help you.

If you are required to undergo this bladder and rectum preparation, further instructions will be given to you when you go for your CT-simulation scan and daily radiotherapy treatments. When you arrive at our department for these appointments, check with the Radiation Therapists before you proceed to drink the 400mls of water.

## TREATMENT PLANNING

After your CT-Simulation scan is completed, the scan images are forwarded to the planning computer system. Your Radiation Oncologist works closely with a Dosimetrist, who uses sophisticated computer software to design the details of the exact radiation plan for your treatment. The treatment plan is designed to maximize the dose of radiation to the area that needs to be treated, while minimizing the dose to the normal surrounding tissues. After your Radiation Oncologist has approved the treatment plan, the plan will then go through an extensive checking procedure. Many checks are performed by different specialists to ensure that all the plan data is correct and that the treatments are being delivered exactly the way they were planned. This complicated treatment planning and checking process usually takes up to 2 weeks, which is why there is a gap between your CT-Simulation day and your treatment start date.

## WHAT HAPPENS DURING EXTERNAL BEAM RADIOTHERAPY?

On your first day of radiotherapy treatment, a Radiation Therapist will first give you a short briefing to explain the matters about your treatment that you need to know. You will then be taken into the treatment room and asked to lie down on the machine bed in the same way as during your CT-Simulation scan. The Radiation Therapists will adjust your body to the correct treatment position. You will be asked to keep still throughout the entire treatment, so as to avoid moving out of the correct position.

Following this, the Radiation Therapists will leave to control the machine from outside the room. Although they are not in the room, they can see you all the time via the closed-circuit television (CCTV) and talk to you through the intercom. If you require any urgent assistance, please raise your hand and they will come in. Please do not try to sit up or get off the machine bed by yourself.

The radiotherapy machine may seem big, but you will not feel anything (no pain) when the radiation is turned on. The machine moves around you to deliver radiation from different angles and it may come close to you, but it will not touch you. Radiotherapy will not make you radioactive, and it is perfectly safe for you to go home and spend time with your loved ones as usual.

Radiotherapy is usually an outpatient treatment, given once a day, from Mondays to Fridays. It may range from just one treatment to a course of treatment that lasts up to 7 weeks. Each treatment session can last from around 15 minutes up to an hour, depending on the type of radiotherapy that you are undergoing. Most of this time is spent getting you into the right position and verifying your treatment positioning.

It is important to attend for your treatment as scheduled and to avoid any unnecessary breaks during your course of radiotherapy treatment. Missing treatment sessions may make the radiotherapy less effective.



## PORTAL IMAGING

Portal imaging refers to the process of obtaining images with a radiotherapy beam. During the course of your treatment, the Radiation Therapists will take either X-rays or computer-based pictures (e.g. Cone Beam CT) of the area being treated. These are done inside the treatment room, using the radiotherapy treatment machine. The purpose is to check that the radiation treatment beams are still delivered to where they are meant to according to your treatment plan. The number and frequency of images that are taken depends on the type of radiotherapy that you are undergoing.

Through portal imaging, minor adjustments may be made to ensure continued safety and effectiveness of your treatment. You may find yourself lying on the machine bed for a little longer than usual on the days that the portal images are being taken.

## WEEKLY REVIEW CLINIC

During the course of your treatment, you will see the Radiation Oncologist at least once a week to check that you are progressing as expected through treatment. The Radiation Therapists will inform you of your review day. During the weekly review, the Radiation Oncologist will check on how you are coping with the radiotherapy treatment, and whether you are experiencing any symptoms or side effects. You will be given advice and medications as needed.

## POSSIBLE SIDE EFFECTS OF RADIOTHERAPY

Side effects can vary from patient to patient. They depend on the exact area being treated, the total dose received and the duration of treatment. Every individual is unique and you may not have the same side effects as another patient who is also receiving radiotherapy for prostate cancer.

Side effects generally only affect the area of the body that we are treating, i.e. the pelvis region for prostate cancer. Not all the side effects listed below may be applicable to you. Your Radiation Oncologist will discuss these in greater detail with you..

### EARLY SIDE EFFECTS

Early side effects are those that occur during your course of radiotherapy or within the first 3 months after starting radiotherapy. Normally, you will not experience side effects straight away after the first treatment, as side effects tend to appear gradually over your course of radiotherapy. Early side effects usually appear after about 2 weeks of treatment. Most are temporary and noticeably better within 8 weeks after the end of radiotherapy, although some may last for longer, or may not completely return to normal. Side effects may range from mild to very troublesome for some.

### TIREDFNESS

You may feel more tired than usual once you have started treatment. There are many reasons for this, including the physical stress of being ill, not eating and drinking normally, and the daily commute from home to NCCS for treatment. You should listen to your body and rest if you need to, but continue your normal activities if you feel able. If you need to more rest than usual, do not hesitate to ask for, and accept help from family and friends. It is important not to miss any treatments. Therefore, if you have difficulty coming for your treatment due to tiredness, please let your Radiation Oncologist know.

## **BLADDER IRRITATION**

You may find yourself experiencing some discomfort, irritation and difficulty when passing urine. You may also feel the urge to go more often than usual. Increase your intake of fluids as it will help to relieve this uncomfortable symptom. If it worsens and you experience pain or a burning sensation when you pass urine, or notice small amounts of blood in your urine, please inform your Radiation Oncologist or Radiation Therapists.

## **BOWEL CHANGES**

You may feel the need to have bowel movements more frequently and with a greater urgency than usual. You may also find yourself experiencing some diarrhoea, stomach cramps and wind. It may become uncomfortable to pass motion and you may also notice some blood. If diarrhoea does occur, you can try reducing your intake of vegetables, fruits, milk and milk products in order to avoid aggravating the condition. Please inform your Radiation Oncologist if the diarrhoea worsens.

## **SKIN REACTIONS**

The skin of your pelvis area may become pink, dry or itchy. Sometimes it may become red, moist, sensitive and painful, especially where the skin folds are (e.g. around your scrotum and anus). The hair on the pubic area may gradually fall if it is within the treatment area.

We recommend that you wash your pelvis by showering or gentle hand-washing. Use a non-perfumed soap when washing your pelvis. When drying, avoid vigorously rubbing your skin with a towel. Gently press the towel around your pelvic area. If your skin between your legs becomes sore, it may be advisable to avoid wearing tight-fitting pants or underwear. You can ask your Radiation Oncologist to prescribe some topical cream to soothe the skin discomfort. Do not apply your own cream, lotion or powder on the treatment area.

## **LATE SIDE EFFECTS**

As you recover from your radiotherapy treatment, you will notice that most of the earlier side effects have subsided. There are some late side effects that may occur months to years after your radiotherapy treatment has finished. Your Radiation Oncologist will discuss these with you. These late effects tend to be permanent.

The possible late side effects listed here may seem alarming, however, please remember that only a small number of patients develop any severe side effects. Some of these may be treated with medication or other interventions.

Please speak to your Radiation Oncologist if you have any worries. There may also be other rare side effects not listed here that your Radiation Oncologist will also discuss with you.

## **BOWEL TOXICITY**

A small number of patients may find their diarrhoea persisting even after their radiotherapy treatment has finished for some time. Bowel movements may also become more frequent. When opening bowels, it may feel uncomfortable or blood may be evident. These problems can be treated with medication or other interventions, if necessary.

## **BLADDER PROBLEMS**

A few patients may find that urinary frequency persists even after their radiotherapy treatment has finished for some time. While passing urine, it may feel painful or blood may be evident. Very rarely, some men also find it more difficult to control their bladder or may experience leakage of urine. These problems can be treated with medication or other interventions, if necessary.

## FERTILITY PROBLEMS

Having radiation therapy in areas near your reproductive organs can affect your fertility or your ability to have children. This can either be temporary or permanent. Radiation to the pelvic area may affect the testicles, which may reduce sperm production either temporarily or permanently. This may be distressing for you if you have not yet had children or have yet to complete your family. If you have any concerns about your fertility, speak to your Radiation Oncologist before you start your treatment.

## INTIMACY AND SEXUAL CONCERNS

After having radiotherapy to the pelvis region, some patients may find it more difficult to have or maintain an erection. Some men may experience discomfort during sexual intercourse, and/or a lower desire to have intercourse. A small number of men may also feel pain when they ejaculate, or notice a smaller amount of fluid in their ejaculate. These effects can be very distressing for some patients, but there are a number of ways to manage such issues. Do speak to your Radiation Oncologist if you have any concerns.

## WHAT HAPPENS AFTER RADIOTHERAPY?

Once you have completed your radiotherapy treatment, you will be required to come for regular follow-up with your Radiation Oncologist at the outpatient clinic. You will be given the details of your first follow-up appointment on the last day of your radiotherapy treatment. This appointment is usually scheduled to be approximately 4 weeks after your radiotherapy treatment has finished. Follow-up will continue for a few years, usually according to this frequency:

- First 2 years ⇒ Once every 3 months
- After 2 years ⇒ Once every 6 months
- 5th year and beyond ⇒ Once a year

At each follow-up appointment, you will be asked to do a blood test to check your level of Prostate-Specific Antigen (PSA). Your Radiation Oncologist may ask for other diagnostic tests if necessary.

If you have any concerns or suspicions about your health in between the follow-up appointments, do not wait for the next appointment date. Make an earlier appointment to see your Radiation Oncologist. You may contact our Call Centre at 6436 8088 (during office hours) to change your appointment.

# QUESTIONS YOU CAN ASK YOUR DOCTOR

You may find the following list of questions helpful when thinking about what to ask your doctor.

## About your illness

1. What type of cancer do I have?
2. What is the stage of my cancer?
3. Is my type of cancer hereditary?

## About tests

1. What are these tests for?
2. What will these investigations involve?
3. What are the risks for doing this test?
4. Will the results of this test make any difference to the treatment you provide?
5. How much will these tests cost?

## About treatment

1. What are the treatments available for my type of cancer?
2. What treatment would you recommend and why?
3. What is the aim of the treatment?
  - Is it for a cure?
  - Is it for temporary control?
  - Is it to reduce symptoms?
4. What are the benefits of this treatment?
5. What are the possible side effects of this treatment?
6. Can these be prevented or controlled?
7. Are the side effects temporary or permanent?
8. How long is the treatment?
9. How does the treatment work and how is it given?
10. Can I take any herbal medicine or supplements during my treatment?
11. What will happen if I choose not to have any treatment?
12. Can I go back to work while I am on treatment?
13. Will I receive treatment as an outpatient or be admitted to the hospital?
14. What difference will this treatment make to my quality of life, e.g. work, social, physical and sexual activity?

## About follow-up

1. How often must I come back for a doctor's check-up?
2. Whom should I contact if I want to change my appointments?

If you have other questions, you may want to add on to the list. Feel comfortable to ask the doctor to explain the answers to you again if you do not understand them. It is also useful to write down the points you have discussed to act as a reference and reminder when you need them.



## SUPPORTIVE CARE

A diagnosis of cancer often leads to a variety of emotions such as shock, anger, sadness, and possibly even depression. You do not have to struggle with your illness alone. Help is available to support you and your loved ones through your cancer journey. Apart from the team of doctors and health care professionals looking after you, there are other information and support services you may find useful.

### Medical Social Services/ Department of Psychosocial Oncology

The Department of Psychosocial Oncology at NCCS comprises of a team of Medical Social Workers who are additionally qualified as Clinical Psychologist, Groupwork Facilitator, Counsellor, etc. They attend to patients and their families who need emotional support, financial aid, home care, transportation or rehabilitation. You will need a doctor's referral letter to be seen by a Medical Social Worker.

### NCCS Cancer Helpline

The Cancer Helpline is a private, confidential and anonymous one-to-one information and counselling service manned by nurse counsellors. Their aim is to help you through your cancer experience. They are able to speak to you in English, Chinese or Malay. They provide information, emotional and psychological support, counselling, and linkage to health, welfare and cancer support services available in Singapore.

The nurse counsellors do not give medical advice and treatment recommendations, but may be able to assist you in clarifying your doubts and help in putting into perspective the information you may have received from your doctors. They may be contacted via telephone number 6225 5655 or via email [cancerhelpline@nccs.com.sg](mailto:cancerhelpline@nccs.com.sg).

### Walnut Warriors

Organised by the Singapore Cancer Society (SCS), the Walnut Warriors is a support group for prostate cancer. It is open to all prostate cancer patients at any stage in their cancer journey, as well as spouses or caregivers. The Walnut Warriors provides psychosocial support and encouragement to its members. It aims to help those affected by prostate cancer, by enhancing their well-being through therapeutic and enrichment programmes. Membership is voluntary and free. To join the Walnut Warriors or to find out more, please contact SCS at 6499 9132 or email [supportgroup@singaporecancersociety.org.sg](mailto:supportgroup@singaporecancersociety.org.sg).



# TREATMENT AND SUPPORT UNITS AT NCCS

## Department of Radiation Oncology, National Cancer Centre Singapore

Basement 2, NCCS or Basement 1, Block 2 SGH

- For enquiries regarding radiation treatment appointments: 6321 4210

### Useful Contact Details

- Appointment Scheduling Unit : 6436 8088
- General Enquiries : 6436 8000
- Dept of Psychosocial Oncology : 6436 8126
- Outpatient Pharmacy Helpdesk : 6436 8091
- Cancer Helpline : 6225 5655

## INTERNET RESOURCES

You may find more information on cancer in general, prostate cancer and radiotherapy treatment on the internet resources listed below. Please take note that health information on the internet may not be applicable to you, and you are encouraged to discuss the information with your health care team.

### American Cancer Society

[www.cancer.org](http://www.cancer.org)

### National Cancer Institute

[www.cancer.gov/cancertopics](http://www.cancer.gov/cancertopics)

### Macmillan Cancer Support

[www.macmillan.org.uk](http://www.macmillan.org.uk)

### CancerHelp UK

[www.cancerresearchuk.org/cancer-help/](http://www.cancerresearchuk.org/cancer-help/)



# HOW YOU CAN HELP US HELP OTHERS

The Cancer Education Department is an integral part of the National Cancer Centre Singapore support services for everyone in Singapore. The two arms of Cancer Education Department are:

- Cancer Education and Information Service (CEIS)
- Patient Education and Support Programmes

CEIS provides the vital link for anyone affected by cancer. It is probably the first stop for someone who wants to know more about the disease. We offer telephone information, support, counselling and linkage to health professionals, volunteers or cancer support groups and organisations. Trained nurses handle the telephone counselling. They can share their skills and discuss options available to help the callers cope with a diagnosis of cancer.

Also available free to the public is a wide selection of publications regarding specific types of cancer, cancer prevention and cancer treatment.

Patient Education and Support Programmes offer a comprehensive range of educational and therapeutic programmes at different phases of the patients' cancer journey. These are done through support and self-help groups, retreats, orientation programmes and befriending services. Family support programmes on the other hand provide support to caregivers and children of cancer patients.

We are just a telephone call away, and we offer help when help is needed most. However, what we have currently achieved would not have been possible without the support and encouragement from our kind donors. Funding is key to ensure that we can meet the demand for our services.

If you wish to make a contribution to these initiatives, you can mail us a crossed cheque payable to "Community Cancer Fund". On the back of the cheque, please provide:

- Your name & NRIC no.
- Email address & your contact number.

Details are needed for tax exemption. Please mail the cheque to:

## Community Cancer Fund

Division of Community Outreach & Philanthropy  
National Cancer Centre Singapore,  
11, Hospital Drive,  
Singapore 169610



For enquiries, please call 6236 9440. Alternatively, you can email us at [donate@nccs.com.sg](mailto:donate@nccs.com.sg).

No amount is too small. If each of us can do our little bit, we can go a long way in helping the cancer sufferers.

Thank you in advance for your act of kindness.

For more information on cancer, please call the  
**Cancer Helpline at Tel: 6225 5655**  
**or email [cancerhelpline@nccs.com.sg](mailto:cancerhelpline@nccs.com.sg)**

MONDAYS - FRIDAYS : 8.30am to 5.30pm

SATURDAYS, SUNDAYS : CLOSED (Please leave a message)  
& PUBLIC HOLIDAYS

---

THIS IS A PUBLIC EDUCATION INITIATIVE BY:

## **National Cancer Centre Singapore**

Division of Community Outreach & Philanthropy  
Cancer Education & Information Service

11 Hospital Drive

Singapore 169610

Tel: 6225 5655 Fax: 6324 5664

Website: [www.nccs.com.sg](http://www.nccs.com.sg)

