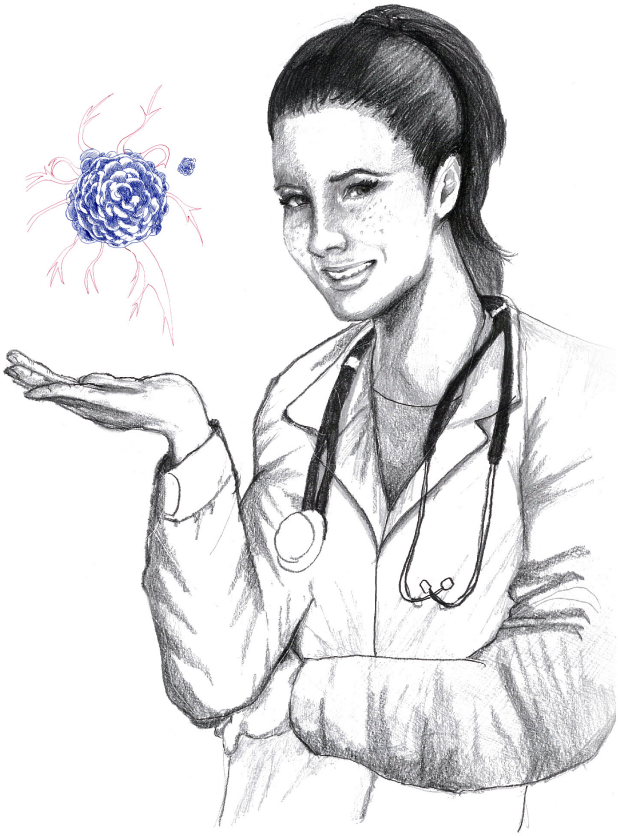
SUNWAY
MEDICAL CENTRE



# MANAGING
# CANCER

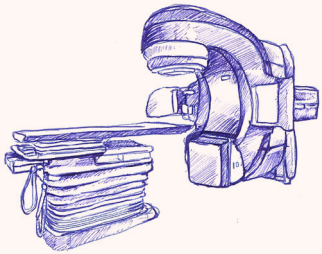
# Managing
# CANCER

# Managing Cancer

**Among the many contributions of innovation and technology is the ability to provide better treatment options in the healthcare industry. One of the key areas technology has made an impact is in the treatment of cancer. Although the cause of cancer is uncertain, with technology today, managing cancer has become less challenging.**

# Technology in Cancer Treatment

**Today, the healthcare service is well-equipped in the battle to manage cancer. Moving away from the conventional treatment, depending on the type of cancer and the stage it is in, the current technology available in hand can treat most cancer cases.**

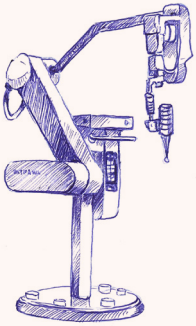


## Varian TrueBeam STx

The Varian TrueBeam™ STx technology is a revolutionary innovation in cancer treatment. It expands radiotherapy treatment options for even the most challenging cancer cases in the lung, breast, head and neck, abdomen, liver, and other regions.

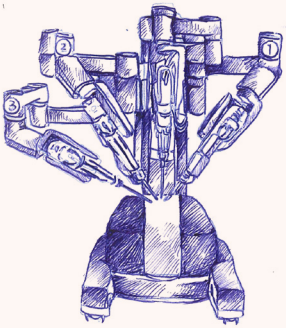
The system uses sophisticated 3D imaging to target and treat tumours of all shapes, sizes, and locations with pinpoint accuracy. Images can be generated using 25% less X-ray dose. These images are used to fine-tune a patient's position prior to and during the treatment process.

The precision of the system is measured in increments of less than a millimetre. This accuracy is made possible by the system's sophisticated architecture, which synchronises imaging, patient positioning, motion management, beam shaping and dose delivery. The system performs accuracy checks every ten milliseconds throughout the entire treatment.



## INTRABEAM Intraoperative Radiation Therapy (IORT)

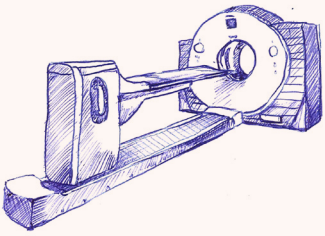
This innovative therapy is administered at the time of lumpectomy, following cancer removal. INTRABEAM IORT is delivered using a miniaturised radiation device which is inserted into the lumpectomy incision. Therapeutic radiation is then directed immediately and precisely right where it is needed most – the location where the cancer was removed. Localising the radiation inside the breast is effective because studies show that this is where cancer is most likely to recur.



## The da Vinci Surgical System

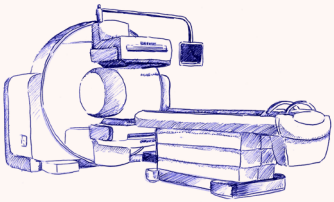
The da Vinci Surgical System is a surgical platform designed to enable complex surgery using a minimally invasive approach. The da Vinci Surgical System consists of an ergonomic surgeon console or consoles, a patient-side cart with three or four interactive arms, a high-performance vision system and proprietary EndoWrist® instruments. Powered by state-of-the-art technology, the da Vinci Surgical System is designed to scale, filter and seamlessly translate the surgeon's hand movements into more precise movements of the EndoWrist instruments.

The net result is an intuitive interface with advanced surgical capabilities. By providing surgeons with superior visualisation, enhanced dexterity, greater precision and ergonomic comfort compared to other surgical approaches, the da Vinci Surgical System makes it possible for skilled surgeons to perform minimally invasive procedures involving complex dissection or reconstruction.



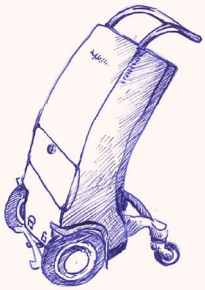
## PET/CT

FDG PET/CT (Positron Emission Tomography/ Computed Tomography) is a powerful imaging technique that combines both CT scan and PET scan using radioactive sugar (FDG – 18F-fluorodeoxyglucose) as the tracer. It provides comprehensive information on the abnormal activity and function of cells (obtained by PET) as well as the precise location of these abnormalities in the body (obtained by CT). This leads to more accurate assessment of your current medical condition especially cancer, brain disorder, heart disease, and infective/inflammatory disease.



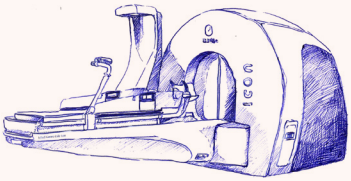
## SPECT-CT

SPECT-CT is a fusion of two different types of scans; single photon emission computed tomography (SPECT) and computed tomography (CT). The fused scan can provides more precise information about the anatomy and function of the area being scanned.



## Brachytherapy

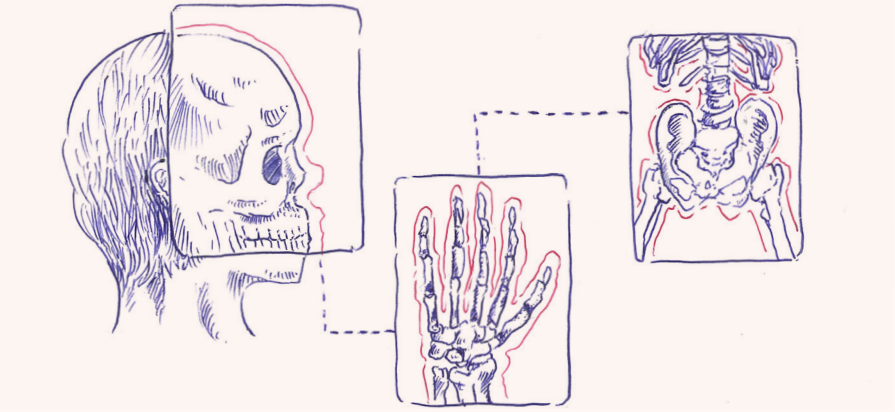
Brachytherapy is a procedure that involves placing radioactive material inside your body to treat cancer. It allows your doctor to use a higher total dose of radiation to treat a smaller area in shorter time than conventional external beam radiation therapy (EBRT).



# Gamma Knife

Gamma Knife surgery is a clinically proven method to treat intracranial (within the skull) locations – such as the brain, brain stem, or the trigeminal nerve. Despite its name, Gamma Knife does not involve a surgical incision or opening of the skull, but highly sophisticated non-invasive treatment that uses a beam of radiation to damage targeted tissue in a very precise manner while minimising exposure to healthy surrounding tissues and critical structures. This highly precise and focused treatment is called stereotactic radiosurgery (SRS). SRS reduces the risk of potential side effects that might impact normal brain function and your quality of life.

Your neurosurgeon or clinical oncologist will determine the type of treatment you receive, based on your diagnosis and your specific treatment needs. For many indications, Gamma Knife treatment is delivered in a single session. For others, you may be offered fractionated stereotactic radiosurgery, which divides the total radiation dose over several treatment sessions. Fractionation extends Gamma Knife precision and accuracy to previously challenging tumours, including large lesions or those abutting very sensitive areas such as the optic chiasm (where the left and right optic nerves partially cross to the opposite side of the brain).



# Radiology

**Diagnostic Imaging in Cancer Services**

**Imaging procedures may be performed to help your doctor to diagnose or stage a cancerous growth, or to determine how well a tumour is responding to treatment. We offer a variety of diagnostic imaging services in a single convenient location from basic digital radiography to advanced modalities that can detect even the smallest abnormalities; we offer the latest technologies for tumour detection and staging.**

## CT Scan

Computed tomography (CT) is a diagnostic imaging test used to create detailed images of internal organs, bones, soft tissue, and blood vessels. The cross-sectional images generated during a CT scan can be reformatted in multiple planes, and can even generate three-dimensional images. CT scanning is often the best method for detecting many different cancers since the images allow your doctor to confirm the presence of a tumour and determine its size and location. It can monitor changes in tumour size and assess patient response to cancer therapy as well.

## General X-Ray

General X-ray uses a very small dose of ionizing radiation to produce pictures of the body's internal structures. X-rays are the oldest and most frequently used form of medical imaging. An X-ray may detect a tumour in an organ such as the lung, and diagnosed fractured bones, look for injury or infection and to locate foreign objects in soft tissue.

## MRI Scan

Magnetic resonance imaging (MRI) uses a powerful magnetic field, radio waves, and a computer to obtain cross-sectional images of organs, soft tissues, bone and virtually all other internal body structures. It is used to evaluate for a variety of conditions, including tumours and diseases of the liver, heart, and bowel.

## Mammography

Mammography is a specific type of breast imaging that uses low-dose X-rays to detect cancer early—before women experience symptoms.

## Ultrasound

Ultrasound is a non-invasive method of obtaining images of organs and tissues of the body using high frequency sound waves. It is also very useful to provide imaging guidance to needle biopsies or to see and evaluate conditions related to blood flow.

## Fluoroscopy

A fluoroscopy is an imaging procedure in which a continuous, real-time X-ray image is projected onto a monitor.

Fluoroscopy use to examine the gastrointestinal tract if a gastrointestinal cancer is suspected and guide the placement of a PICC (peripherally inserted central catheter) for chemotherapy.

## Radiofrequency Ablation (RFA)

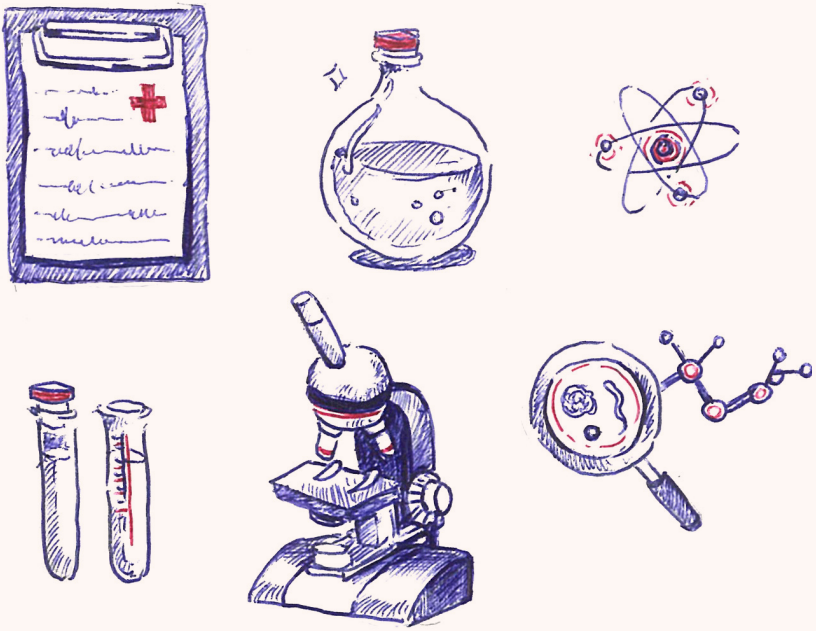
Radiofrequency ablation (RFA) is a treatment that uses imaging guidance to place a needle electrode through the skin into a liver tumour. High-frequency electrical currents are passed through the electrode, creating heat that destroys the cancer cells. RFA is an effective treatment option for patients who might have difficulty with surgery or those whose tumours are less than one and a half inches in diameter.

## Microwave Ablation (MWA)

Microwave ablation is an image-guided, minimally-invasive cancer treatment. It uses electromagnetic waves in the microwave energy spectrum to produce tissue-heating effects. Microwave ablation is used for the same indications as for RFA. Microwave ablation has advantages over radiofrequency ablation (RFA), including the ability to treat tumours that are larger and those that are close to major arteries and veins. It can also be used to treat multiple tumours simultaneously.

## Transarterial Chemo-embolisation (TACE)

TACE is an image-guided, non-surgical procedure that is used to treat malignant lesions in the liver. The procedure uses a catheter to deliver s small embolic particles coated with chemotherapeutic drugs catheter into an artery directly supplying the tumour. These particles restrict a tumour's blood supply.



# SunMed Laboratory

## Tumour Markers

Documented in "Global Cancer Facts & Figures 3rd Edition" by the American Cancer Society, there was an alarming record of 14.1 million new cancer cases in 2012 worldwide, according to the International Agency for Research on Cancer (IARC). Zooming in further, more than half of those cases, about 8 million in fact, were found in economically developing countries that harbour 82% of the world's population. This number game clearly warns us off that despite the advancement of knowledge and technologies in healthcare, cancer catches up equally well unfortunately.

Today, study of cancer or oncology constitutes a cardinal role in the medical field and continues to be an interesting research subject globally. Results of many research studies have started to shed some light on the biology of cancer. Cancerous cells or collectively known as tumours are found to produce certain substances that are otherwise less common in normal body cells. Termed "tumour markers", these substances (mostly in the form of proteins) tend to be overproduced in the cancerous cells. To date, various tumour markers have been characterised and put into clinical use for cancer screening, diagnosis, prognosis, treatment and cancer management. Examples of tumour markers include alpha-fetoprotein (AFP), carcino-embryonic antigen (CEA), prostate-specific antigen (PSA), beta human chorionic gonadotropin (b-HCG), cancer antigen 125 (CA125), cancer antigen 15-3 (CA15-3), cancer antigen 19-9 (CA19-9), calcitonin, thyroglobulin, beta-2-microglobulin (B2M) and the list will continue to expand accordingly.

## Alpha-Fetoprotein (AFP)

AFP is normally produced by a developing foetus. AFP begins to decrease after birth and usually remains undetectable in the blood of healthy adults (except during pregnancy). An elevated level of AFP strongly suggests the presence of either primary liver cancer or germ cell cancer in ovaries or testicles. Non-malignant conditions that can cause elevated AFP levels include benign liver conditions, such as cirrhosis or hepatitis, ataxia telangiectasia, Wiscott-Aldrich syndrome, and pregnancy.

## Carcino-Embryonic Antigen (CEA)

CEA is normally present in minute amount in healthy people. CEA is primarily used for colorectal cancer monitoring, especially when the disease has metastasised. However, it has been noted that CEA levels are elevated in a wide variety of other cancers such as melanoma, lymphoma, and cancers of the breast, lung, pancreas, stomach, cervix, bladder, kidney, thyroid, liver, and ovary. Non-malignant conditions that can cause elevated CEA levels include inflammatory bowel disease, pancreatitis, and liver disease. On the side note, smokers are found to have raised levels of CEA as well.

## Prostate-Specific Antigen (PSA)

PSA is present in low concentrations in all adult males as it is produced by the prostate gland. Elevated concentration of PSA may be found in the blood of men with benign prostate conditions, such as prostatitis and benign prostatic hyperplasia, or with prostate cancer. PSA cannot distinguish between benign prostate conditions (which are very common in older men) and cancer, although high values of PSA help to determine who should have further investigations.

## B-HCG

B-HCG is elevated in pregnant woman. It is not normal to be present in man or non-pregnant woman, thus it is useful as a tumour marker. When it is used as a tumour marker, an elevated level may be due to the germ cell tumour. In treatment management, a falling level generally indicates the condition is responding well to the treatment while a rising or persistent level may indicate that treatment is not working.

## CA125

A CA125 test measures the amount of the protein CA125 (cancer antigen 125) in the blood and is widely used to monitor therapeutic response when treating ovarian cancer or to check for this disease recurrence. In some cases, a CA125 test may be used to look for early signs of ovarian cancer in women with a very high risk of the disease, though it is not the best method in early detection of ovarian cancer.

## HE4

HE4 is a marker for early detection of ovarian carcinoma. It is over-expressed in patients with ovarian cancers. Normal ovarian tissue has minimal production of HE4. When combined with CA125, HE4 raises the level of sensitivity for the detection of ovarian cancer. HE4 is consistently expressed in patients with ovarian cancer and has demonstrated an increased sensitivity and specificity over that of CA125 alone.

High HE4 with High CA125 would suggest ovarian cancer, whereas an elevated CA125 and normal HE4 would indicate a benign condition. High HE4 without elevated CA125 would suggest the presence of either ovarian or possibly other type of cancer. Studies show the benefit of CA125 and HE4 and their combined use as a diagnostic test for discrimination between benign and malignant ovarian tumours (Gynaecologic Oncology 117, 440 – 445, 2010).

## CA15-3

CA15-3 is useful for managing treatment and occurrence for breast cancer patient. CA15-3 is not sensitive or specific enough to be used as a screening test and it is not elevated in the majority of early cancer. It is mostly used to monitor the effectiveness of the treatment and CA15-3 concentration correlate to cancer growth.

## CA19-9

Small amounts of CA19-9 are present in the blood of healthy people. The references range of serum CA19-9 is less than 37 U/mL. CA19-9 is mainly used as management of pancreatic cancer treatment and occurrence. It is not a good screening test for pancreatic cancer as in many cases abnormally elevated in healthy patient. Elevated CA19-9 also can be seen in other conditions such as gallbladder and bile duct cancer, colorectal, gastric cancer, ovarian cancer, lung cancer, liver cancer, bile ducts obstruction, pancreatitis, cystic fibrosis, and etc.

### Uses of Tumour Markers

| Tumour marker | Relevant cancer | Other cancers in which marker may be raised |
|---|---|---|
| Alpha-fetoprotein | Germ cell tumour/ hepatocellular carcinoma | Colorectal, gastric, lung, pulmonary |
| Cancer antigen 125 (CA125) | Ovarian cancer | Breast, cervical, endometrial, hepatocellular, lung, Non-Hodgkin's lymphoma, pancreatic, peritoneal, uterus |
| Cancer antigen 15-3 (CA15-3) | Breast cancer | None known |
| Cancer antigen 19-9 (CA19-9) | Pancreatic cancer | Colorectal, gastric, hepatocellular, esophageal, ovarian |
| Carcinoembryonic antigen (CEA) | Colorectal cancer | Breast, gastric, lung, mesothelioma, esophageal, pancreatic |
| hCG | Germ cell and testicular carcinomas/gestational trophoblastic neoplasia | Lung |
| PSA | Prostate cancer | None known |

# SunMed Molecular Laboratory

Cancer has a reputation of a deadly disease all around the world that involves uncontrolled cell growth and proliferation. The best method for its prevention and control is its early diagnosis and treatment. Before molecular diagnostics, scientists relied on the results obtained from biopsies and microscopic examination of affected tissue samples. The emergence of molecular diagnostic as a tool for cancer detection has shed lights to uncover the different changes that occur during the transformation of a normal cell to a cancer cell.

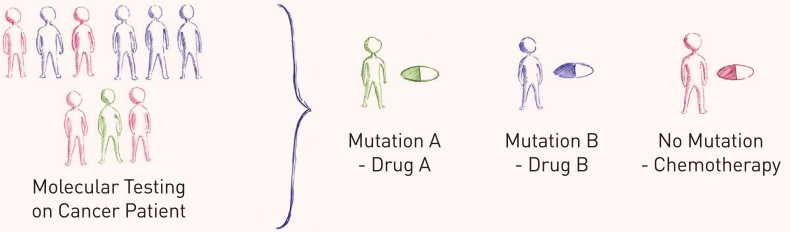
The development of biomarkers in modern anticancer drug development is a critically important challenge. For years, doctors and scientists looked at the one potentially cancer-causing mutation at a time. For example, molecular tests for genes like KRAS, NRAS and BRAF in colorectal cancer, EGFR and ALK in lung cancer and HER2 in breast cancer are widely being carried out for clinical diagnosis.

SunMed's Molecular Diagnostic Laboratory is committed in providing a quality diagnostic service with the use of the most of advanced technologies to perform molecular and genetic analyses in human. Our laboratory offers a wide range of molecular test services which includes infectious disease, molecular oncology, pharmacogenomics and genetic screening test to the hospitals and GP clinics.

**Molecular Testing: Route to Personalised Oncology**

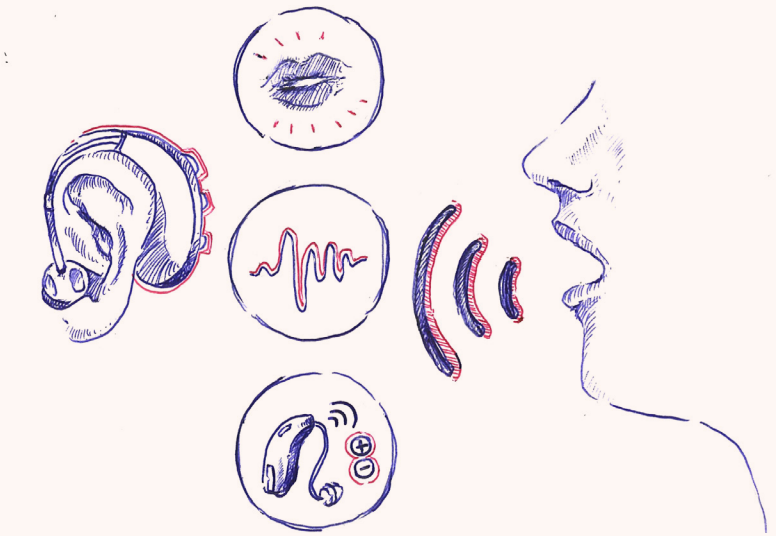
The goal of personalised oncology is to deliver the right treatment, to the right patients, at the right time. Personalised oncology aims to individualise treatments to match each patient with the therapy they are most likely to respond to by assessing the patients' unique genetic alterations. Molecular testing is widely used to detect these genetic changes for identifying the treatable mutation.

The implementation of the personalised oncology is as described in the diagram below. Firstly, patient's tumour genetic information will be obtained via molecular tests. Based on the genetic report, the consultant oncologist will tailor the cancer treatment plan. For example, patients who harbour mutation A will be prescribed with drug A, whilst patient who doesn't carry any treatable mutation will be treated with standard chemotherapy.




# SunMed Haematology Laboratory

Our Haematology Laboratory will be offering services focusing on stem cell among others, such as Hematopoietic cell collection and cryopreservation, red cell depletion, donor lymphocyte collection, and immunophenotyping.



# Speech & Hearing Centre

**Our Speech & Hearing Centre consists of qualified audiologists and speech-language pathologists providing comprehensive audiology and speech therapy services for individuals with communication disorders.**

## The Role of Audiologist

**The audiology team specialises in assessing, diagnosing and treating patients who have hearing loss as a result of cancer. The difficulties may be due to the site of disease or disease spread, changes following surgery or due to the side effects of treatment. The audiology services are equipped with the state of art equipment to assess and monitor hearing loss. We also fit the latest devices to help overcome difficulties caused by hearing loss.**

**Referral**
Referral to an audiologist may be done before the commencement of treatments to measure baseline hearing levels. This would enable the audiologist to work with the medical consultants to monitor for ototoxicity during treatment and make recommendations for early intervention if possible.

Referrals to audiology may also be necessary if the disease and/or its treatment results in the following:

- Deterioration in hearing in one or both ears
- Difficulty communicating due to reduced hearing
- Increase in tinnitus (ringing or buzzing in the ear)

**What can the Audiologist do for a patient with Hearing Loss?**

- Hearing loss causes difficulty with communication and decreases the quality of life. In long term, untreated hearing loss is linked with higher incidence of dementia and depression. An audiologist specialises in overcoming the difficulties of hearing loss by using the latest technology of amplification devices and carrying out aural rehabilitation to maximise the benefit the devices provide to you. The audiologist would also be able to suggest specific devices and strategies to cope with tinnitus.

- In a number of cases, the loss of hearing can be minimised by monitoring the effect of chemotherapy and radiotherapy on the hearing. Changes in hearing levels are highlighted to the oncologist for decision on modification of treatments if possible.

## Latest Technology in Ototoxicity Monitoring

**High Frequency Audiometry**

- Typical audiometry measures hearing between 250Hz to 8000Hz. However, early damage in ototoxicity is most often seen at higher frequencies. Specialised audiometers are needed to measure frequencies between 10000Hz to 20000Hz which allows faster detection of deterioration for early intervention to be done.

## Otoacoustic Emissions (OAE)

- OAE measures the responses from the outer hair cells in the cochlear. These cells are the ones that are most commonly damaged by chemotherapy and/or radiotherapy. Changes in OAE levels are seen even before there are changes in the measured hearing levels with audiometry. This allows faster detection of deterioration for early intervention to be taken with your oncologists.

## Latest Technology in Amplification

- Amplification devices like hearing aids, bone conduction devices, middle ear implants and cochlear implants have progressed rapidly in technology advancement. The audiologists at Sunway Medical Centre are highly experienced in fitting all this devices and providing you with options that suit your hearing loss the best.

- We provide multi brand devices and ensure that they are the most current in technology. We also ensure the options provided have good reliability and support in Malaysia and across the globe.

## The Role of Speech, Language & Swallowing Therapist

The Speech, Language & Swallowing Therapy (SLT) team specialises in assessing, diagnosing and treating patients who have communication and/or swallowing problems as a result of cancer.

The difficulties may be due to the site of disease or disease spread, changes following surgery or due to the side effects of treatment.

The overall aim of the SLT team is to maximise communication and swallowing function.

Research has shown that in head and neck cancer,
1) Prophylactic swallowing therapies may be beneficial (i.e. swallowing exercises before radiotherapy).
2) Early swallowing rehabilitation is superior to late swallowing therapy after chemo or radiotherapy.

**Referral**
Referral to Speech and Language Therapy may be necessary if the disease and/or its treatment results in the following:

**Communication:**
- Difficulties understanding or using language
- Speech is slurred and difficult to decipher
- Voice is sometimes or always hoarse
- Loss of voice following surgical removal of the larynx (laryngectomy)
- Voice difficulties resulting from having a tracheostomy inserted
- Preparation prior to treatments (radiotherapy or chemo)

**Swallowing:**

- Eating or drinking causes choking or coughing or a wet voice which requires throat clearing
- A sensation that food/drink feels is going the wrong way
- Food/drink has been coughed up after eating
- Food gets stuck and needs several swallows before it clears
- Certain foods are now more difficult to swallow or are avoided altogether
- Difficulty moving the food to the back of the mouth in order to be swallowed
- Food or liquid comes down the nose
- Chewing is difficult due to jaw stiffness
- Loss of appetite due to the effort taken to eat and drink
- Risk of food and drink entering the lungs or windpipe
- Risk of developing a chest infection secondary to reduced oral hygiene.
- Swallowing difficulties due to tracheostomy inserted. A swallow and voice assessment is required to assist the team wean the patient off the tracheostomy and/or to advise the safety of swallowing.

**What can the SLT do for a patient with Communication Disorders?**

The SLT will carry out assessment with standardised tools to evaluate the area of speech, voice or language that the patient has difficulties with. Based on the outcome, the SLT will work on activities to improve specific skills that are affecting the patient. The SLP also helps the person to develop and use strategies to improve overall communication in a variety of situations. In some cases, the SLT may suggest the usage of Augmentative and Alternative Communication (AAC). This includes using signs, devices that help to produce speech and others.

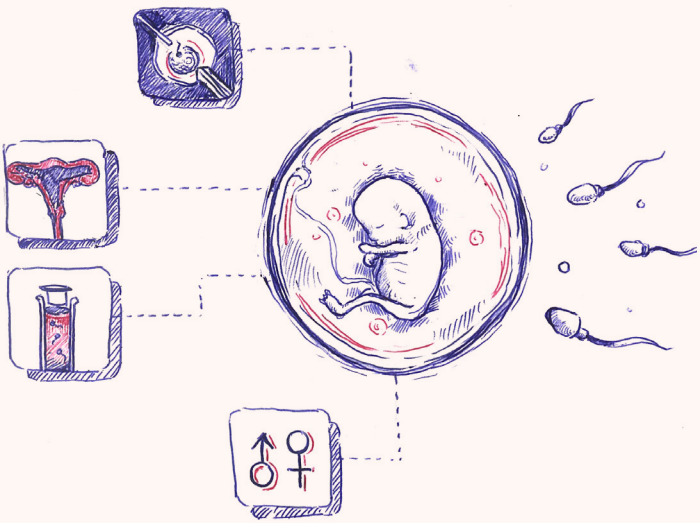
**What can the SLT do for a patient with Swallowing Disorders?**

For many individuals suffering from swallowing disorders, the effort of chewing and swallowing can turn a pleasurable experience into a burden or chore. These individuals may need their food and drinks prepared in a special way (modified consistency) to make them safer and easier to swallow. In more severe cases, the SLT will advise for the patient to be tube fed either through the nose (NGT, which is usually for short term) or stomach (PEG, which is usually for long term) after the swallowing assessment. In some cases, the SLT may teach the patient strategies and exercises to improve the swallow function. The SLT will normally conduct a clinical bedside swallow assessment in order to evaluate a patient's swallow function. In the event of extra information being required to make a clinical decision, the SLT might advise for instrumental assessment.

# Instrumental Assessment of Dysphagia

**Videofluoroscopic Swallowing Study (VFSS)**
Videofluoroscopic Swallowing Studies (VFSS) is another useful procedure to assess swallowing disorders. In this radiographic study, the patient is fed with different food and fluid consistencies. As the patient swallows, X-ray video is captured and recorded. The SLT will observe the patient's swallowing ability to confirm the diagnosis and make suitable recommendations.

**Fiberoptic Endoscopic Evaluation of Swallowing (FEES)**
Fiberoptic Endoscopic Evaluation of Swallowing (FEES) is another useful procedure to assess swallowing disorders. The SLT will work closely with the Otorhinolaryngology (ORL) specialist in administering this procedure. The ORL specialist will insert a fiberoptic endoscope through the patient's nose into his/her throat. Then the patient is fed with different food and fluid consistencies. As the patient swallows, images will appear on the monitor. The SLT will study the patient's swallowing function to confirm if the patient can swallow safely.



# Fertility Centre

**Fertility Preservation Before Cancer Treatment**

**The following is a guide to give you a better understanding of the potential effect of cancer on fertility and how various treatments can affect the reproductive system, as concerns about sexuality and fertility are very important to anyone diagnosed with cancer. There is a short period of time after cancer diagnosis when the most effective fertility preservation treatment can take place, which is why it is critical that anyone diagnosed with cancer is able to access timely and accurate information about fertility preservation treatment options.**

## Fertility Preservation

Fertility preservation is becoming increasingly important to improve the quality of life in cancer survivors. Both chemotherapy and radiotherapy have a major impact on the reproductive potential hence fertility preservation procedures should be carried out prior to these treatments. The need for fertility preservation has to be weighed against morbidity and mortality associated with cancer.

Not all cancers or cancer treatments will affect your ability to have a baby, but many do. The best course of action is to ask your oncologist about the effects your cancer or treatments are likely to have on your fertility, and to meet with a fertility specialist to discuss the fertility preservation options that are available for you. Generally, the earlier you consult with a fertility specialist, the broader the range of treatment options you will be able to consider.

## How Does Cancer Treatment Affect Fertility?

Certain cancer treatments can harm your fertility or cause sterility. The effects might be temporary or permanent. The likelihood that cancer treatment will harm your fertility depends on the type and stage of cancer, cancer treatment, and your age at the time of treatment.

Male fertility can be harmed by the surgical removal of the testicles or by chemotherapy or radiation that damages sperm quantity, quality or DNA.

Female fertility can be compromised by cancer treatments that involve the surgical removal of the uterus or ovaries. Cancer treatment can also affect eggs, hormone levels, or the functioning of the ovaries, uterus or cervix. The risk of developing premature menopause after certain cancer treatments increases as you age. Older women also are more susceptible to permanent ovarian damage.

The effects of chemotherapy and radiation therapy also depend on the drug or size and location of the radiation field. The most severe damage is caused when radiation is applied to the ovaries or testicles and by chemotherapy drugs called alkylating agents.

# How Can Women Preserve Fertility Before Cancer Treatment?

Women who are about to undergo cancer treatment have various options when it comes to fertility preservation. For example:

**Embryo cryopreservation**
Ideal option for women who have a male partner. In this procedure, eggs are harvested from your ovaries, fertilized through in vitro fertilisation (IVF), frozen and stored. Typically at the start of your menstrual cycle, you'll be treated with synthetic hormones to stimulate your ovaries to produce multiple eggs. Mature eggs are removed, combined with sperm — provided by your partner— and frozen. This method has the highest chance of success. Timing ovarian stimulation can delay cancer treatment by two to three weeks, but research suggests that random ovarian stimulation can be successful. Alternative methods of stimulation can be used if exposure to high estrogen levels is a concern (as in breast cancer patients)

**Egg freezing (oocyte cryopreservation)**
Ideal option for women who do not have a male partner. Similar to embryo cryopreservation, you'll be treated with synthetic hormones and have your eggs harvested. Then your unfertilised eggs are frozen. Recent technological advances have resulted in dramatic improvements in egg survival and pregnancy rates after egg freezing, and as of 2012, egg freezing is no longer considered experimental.

**Gonadal shielding**
If you're having radiation applied to an area far from your pelvis, carefully placed shields can reduce your reproductive organs' exposure to scatter radiation.

**Ovarian transposition (oophoropexy)**
During this procedure — recommended if you're having radiation applied to a non-pelvic tumour and no chemotherapy — one or both ovaries are surgically repositioned, so they're protected from the planned radiation field. However, because of scatter radiation, ovaries aren't always protected. After treatment, you might need to have your ovaries repositioned again or use IVF to conceive.

**Surgical removal of the cervix (radical trachelectomy)**
If you have early-stage cervical cancer, this procedure can help preserve your uterus.

**Other methods of fertility preservation for women still being researched include:**

**Ovarian tissue cryopreservation**
During this procedure ovarian tissue is surgically removed, frozen and later re-implanted.

**Ovarian suppression before cancer therapy**
In this treatment, hormonal therapy is used to suppress ovarian function and protect eggs during cancer treatment.

***General information***
*Patient will need to be screened for infectious diseases, including HIV, Hepatitis B & C and VRDL. The patient will need to give written consent for the storage of the oocytes/ embryos. The standard storage period for oocyte is normally 10 years. This period can be exceeded only in certain circumstances, up to a maximum of 55 years. Please take note that oocyte/embryo storage fee is applicable on a yearly basis.*

*In general, the survival rate of oocytes, which is ranging from 50-75% and the live birth rate from egg freezing is only 24% and below. The survival rate of the embryos are higher, which is ranging from 70-90% and the live birth rate from embryo freezing is 40% and above. Depending on your age, 1-2 cycles of stimulations are necessary in order to have a good number of oocytes/embryos being frozen.*

## Cancers that Could Cause Male Infertility

Some types of cancer temporarily lower a man's fertility. Infertility is most likely to happen before cancer treatment and just after treatment is finished. An initial analysis may show infertility, but the results could change over the next month or even years.

For those who will recover sperm production, semen analysis will usually improve within one to three years after finishing cancer treatment. However, some men improve many years later. Men should use effective means of birth control even if there is possibility of infertility.

**Testicular cancer**
Fertility may be poor during the two years before testicular cancer is discovered. Although only one to three percent of men with testicular cancer get cancer in both testicles, the cancer-free testicle may not function normally. On the other hand, men treated for testicular cancer often end up with improved semen quality within several years.

**Newly-diagnosed Hodgkin's disease, lymphoma or leukaemia**
Recent surgery, fever or physical stress experienced by survivors may affect the quality of semen.

# Treatments that Could Cause Male Infertility

Cancer treatment, not cancer itself, is often what damages fertility. Here are some common treatments and their possible effects on fertility.

**Radiation therapy** can slow down or stop sperm cell production if the testicle is in or near the target area for the radiation. A lead shield can help protect the testicles, but radiation "scatters" within the body, so it's impossible to shield the testicles completely. Total body irradiation used before some bone marrow transplants often causes permanent infertility. If the testicles get a mild dose of radiation, a man's fertility may drop but can then recover over the next one to four years. If the radiation dose to the testicles is high, sperm production may stop forever. Some boys treated for acute leukaemia need to have radiation directly to the testicles. This can permanently damage their sperm production and hormones. Radiation damage to the part of the brain that controls hormone production can sometimes interfere with the hormone messages that control sperm production in the testicles.

The **alkylating chemotherapy** group does the most damage to fertility. These drugs include cyclophosphamide (Cytoxan), chlorambucil (Leukeran), busulfan (Myleran), procarbazine (Natulan, Matulane), nitrosoureas (Carmustine, Lomustine), nitrogen mustard (Mustargen), and L-phenylalanine mustard (Alkeran). In high doses, platinum-based chemotherapy (Cisplatin, Oxaliplatin) or drugs like bleomycin (Blenoxane, Bleomycin), often used to treat testicular cancer, can also damage fertility.

**Surgery** to treat prostate or bladder cancer removes the prostate and seminal vesicles. These glands make the liquid part of a man's semen. They also cut the pathway for sperm cells to be included in the semen. Men with testicular cancer or colon cancer sometimes have surgery that can damage nerves involved in orgasm. The result may be a "dry orgasm" or the sensation of pleasure, but without ejaculating any semen.

A man is at higher risk for infertility if he gets two or more alkylating chemotherapy drugs, has higher doses of chemotherapy (for example before a stem cell or bone marrow transplant), or has a combination of chemotherapy and pelvic or whole body radiation. High doses of chemotherapy can damage sperm cell production and the testicles' ability to make testosterone. This hormone is crucial in a man's fertility.

# Fertility Preservation Options

**Sperm Banking**

**How It Works:**
Before beginning chemotherapy or radiation, a man produces a semen sample at a fertility laboratory or sperm bank or from home. Masturbation is the preferred method, since even using a condom during intercourse could leave the semen contaminated with bacteria. Samples produced at home need to be kept at body temperature and delivered to the lab within an hour. A semen analysis is done. As long as the sample contains some live sperm cells, it can be frozen and stored for future use in infertility treatment. Once frozen, samples can be kept for at least 20 to 30 years (possibly longer) without further damage.

**Who Can Do It:**
Males who have reached puberty (even as young as age 12 or 13) can bank/keep the sperm for as long as the semen contains enough live and healthy sperm.

**Freezing Tissue From the Testicle**

**How It Works:**
If a boy is too young to produce sperm cells but will have a high risk of infertility after his cancer treatment, an experimental option is to put him under anesthesia for an outpatient surgery, remove several areas of tissue from his testicles, and freeze that tissue for future use. Once he is an adult and free of cancer, if he is indeed infertile he could use the tissue in one of several ways. However, none of these methods has yet produced the birth of a live baby. The tissue pieces could be thawed and put back into his testicle in the hope that they would begin to produce sperm. This is a delicate process that would only work if his hormones were normal and his testicles were at a good temperature with a good supply of blood circulation.

**Who Can Do It:**
Only a few infertility and cancer centers offer testicular tissue freezing. Most boys who have cancer treatment do not try to preserve their fertility. Until tissue freezing produces successful births, it should be offered as a research option, with the parents signing an informed consent form.

***General information***
*Patient will need to be screened for infectious diseases, including HIV, Hepatitis B & C and VRDL. The patient will need to give written consent for semen freezing/sperm banking. The standard storage period for semen sample is normally 10 years. This period can be exceeded only in certain circumstances, up to a maximum of 55 years. Please note that yearly semen storage fee is applicable. The survival rate of the frozen sperm after thawed will be ranging from 45-80% depending on the sperm count.*

## What You Need to Know

**Can fertility preservation interfere with successful cancer therapy or increase the risk of recurring cancer?**
Research in these areas is limited. There's no evidence that current fertility preservation methods can directly compromise the success of cancer treatments. However, you could compromise the success of your treatment if you delay surgery or chemotherapy to pursue fertility preservation.

There appears to be no increased risk of cancer recurrence associated with most fertility preservation methods. While there is a concern that re-implanting cryopreserved ovarian tissue could reintroduce cancer cells — depending on the type and stage of cancer — no such problems have occurred in humans.

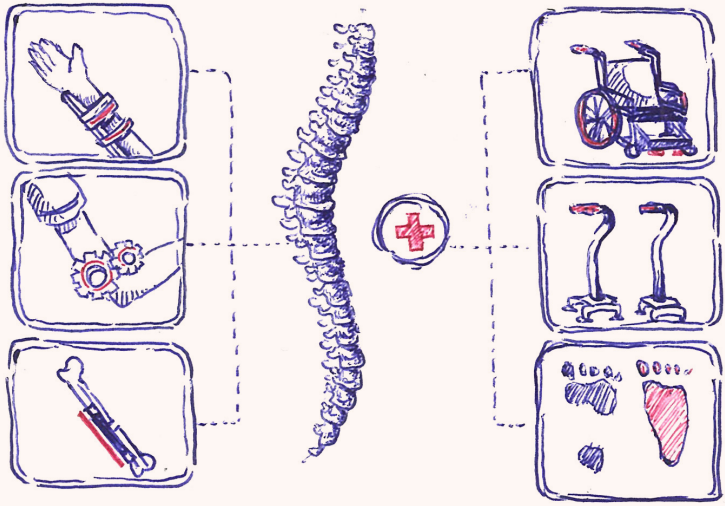
**Can cancer treatment increase the risk of health problems in children conceived afterward?**
As long as you don't expose your baby to cancer treatments in utero, cancer treatments don't appear to increase the risk of congenital disorders or other health problems for future children.

However, if you receive a cancer treatment that affects the functioning of your heart or lungs or if you receive radiation in your pelvic area, talk to a specialist before becoming pregnant to prepare for possible pregnancy complications.

**What can parents do to preserve the fertility of a child who has cancer?**
Taking steps to preserve the fertility of a child who has cancer can be difficult because he or she might not understand the consequences of impaired fertility. If your child has begun puberty, options might include oocyte or sperm cryopreservation. Your consent and your child's might be required. However, efforts to preserve the fertility of a child who hasn't begun puberty are considered experimental.

**How do I determine the best fertility preservation option for me?**
If you want to preserve your fertility before cancer treatment, talk to your doctor, oncologist or a reproductive specialist. Your medical team will consider the type of cancer you have, your treatment plan and the amount of time you have before treatment begins to help determine the best approach for you.

The diagnosis of cancer and the treatment process can be overwhelming. However, if you're concerned about how cancer treatment might affect your fertility, you have options. Don't wait. Getting information about fertility preservation methods before you begin cancer treatment can help you make an informed choice.



# Rehabilitation Medicine Department

*"The Road to Survivorship"*

**Cancer Rehabilitation is defined as "medical care that diagnoses and treats patients' physical, psychological and cognitive impairment in an effort to maintain or restore function, reduce symptoms burden, maximise independence and improve quality of life".**

**Cancer rehabilitation incorporates both a comprehensive and interdisciplinary team approach led by a rehabilitation physician that addresses this complex clinical care.**

**Key Messages**

After cancer treatment, patients may notice a difference in their physical, social, psychological, and work-related abilities.

Rehabilitation often helps patients regain strength, physical functioning, and independence that they may have lost due to cancer or its treatment.

The goal of rehabilitation is to help a person remain as independent and productive as possible.

## How Cancer Rehabilitation Can Help

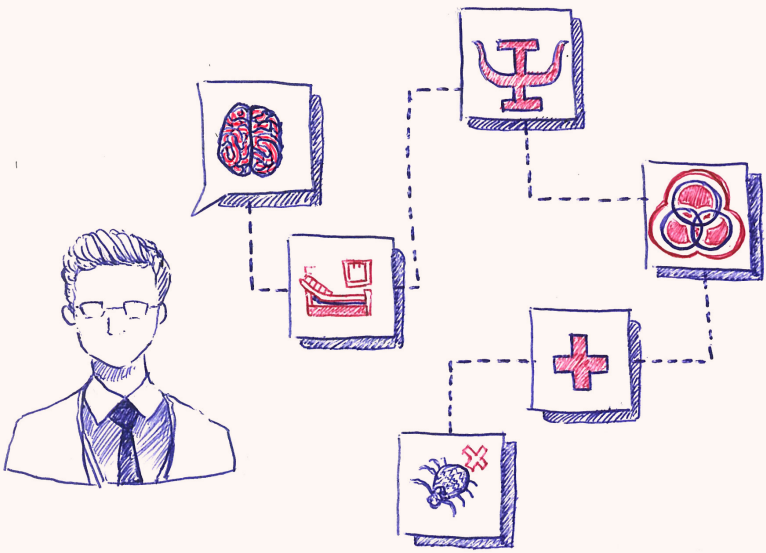
**Rehabilitation can improve the quality of life for people with cancer by reaching the following goals:**

- Improving physical strength to help offset limitations caused by cancer and cancer treatment
- Increasing a person's ability to care for himself or herself and reducing support needed from caregivers
- Managing post cancer treatment symptoms: fatigue, sleep problems, and pain
- Reduce hospitalisation

# The Cancer Rehabilitation Team and Services

A team of health care professionals works closely to provide cancer rehabilitation. The team members help a person adapt to his or her situation, whether the changes are temporary or permanent. These professionals may include any of the following:

| **Signs that you may need rehabilitation services** | **Profession** | **What they do** | **Services** |
|---|---|---|---|
| Experiencing pain that is not caused by cancer. Feeling more tired than you were before you were diagnosed. | Rehabilitation Physician | This doctor is a medical specialist specialises in prevention and treatment of physical, psychological and cognitive impairment related to cancer and its treatment with focus on improvement of symptoms, independence and quality of life of the cancer survivor. | Patient and family education and counselling |
| Feeling weaker now than when you were initially diagnosed. Having muscular or orthopaedic concerns. Uncertain about how much to exercise or how to best exercise. | Physiotherapist | Helps patients improve their physical strength and ability to move. This is especially important for people who notice physical changes after cancer treatment especially in their movements. People experiencing the following challenges can benefit from physical therapy. | • Lymphedema Management with compression garments, specialised massage and bandaging methods, and exercises<br>• Pain management<br>• Exercise programs<br>• To build strength, and improve balance and promote mobility<br>• To enhance sleep, cope with anxiety |
| Having difficulty recovering from treatment and doing the things you used to do. Struggling with memory problems or difficulty concentrating. | Occupational Therapist | Helps patients perform activities important to them with methods and tools to increase function, comfort, and safety. Occupational therapists design a tailored therapy plan based on the layout of a person's home, school, or work place. | • Help with activities of daily living, such as eating, drinking, dressing, bathing, using the toilet, cooking, and basic chores<br>• Home/Work site visits and assessment<br>• Assistive device prescription or modification<br>• Energy reservation training – Fatigue management: to help reduce the effort needed to do certain tasks<br>• Carer training |



# Clinical Psychology Services

# What Kind of Problems Can a Clinical Psychologist Help with?

Following a diagnosis of cancer, individuals can experience a range of emotions including shock, anxiety, worry, sadness, relief, and uncertainty. Although most people will find their reactions manageable, some may find that their emotions become uncontrollable, persistent and significantly affect their daily lives.

For these individuals, a referral to a clinical psychologist may be beneficial. Clinical psychologists are trained to have expert understanding of how people think, feel and behave, and can help people to cope with their difficulties and problems in a different way.

**Here is a list of some of the problems for which clinical psychologists can help. It shows some of the common reasons for referrals:**

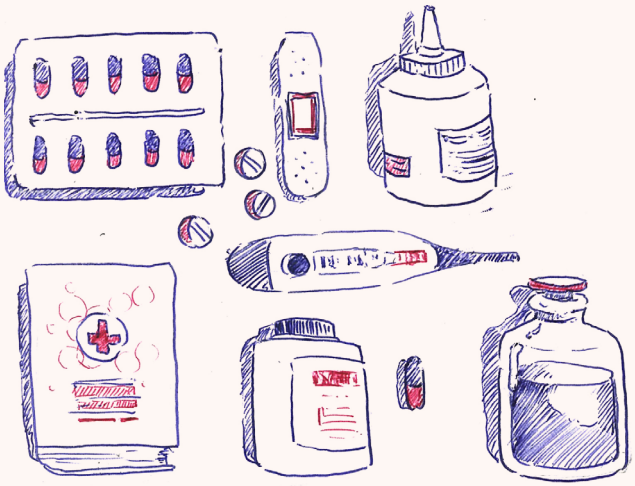
- Difficulties coping with the diagnosis and treatment of cancer
- Experiencing difficulty with the experience of being ill or in hospital
- Feeling depressed or angry about your illness or treatment
- Anxiety, panic and phobias (e.g. needles, medical procedures)
- Difficulties coping with chronic pain
- Stress-related difficulties e.g. related to your health or future
- Feeling unable to 'move on' with life
- Problems with body image/how you feel about yourself
- Difficulty coping with major life events, for example grief and bereavement
- Difficulties in coping with disability
- Difficulties with family or personal relationships related to having a serious illness

## What Will Happen if I am Referred to a Clinical Psychologist?

If you are referred to a clinical psychologist, you will first be offered an assessment appointment. This will give you an opportunity to discuss your concerns and help you to understand how your problems are affecting you. At the end of the assessment, the psychologist can then discuss with you what the options might be to help you manage your problems. This might involve further sessions with the psychologist. You can decide with the psychologist how often these sessions will take place and when.

## What Kind of Help Can Clinical Psychologists Offer?

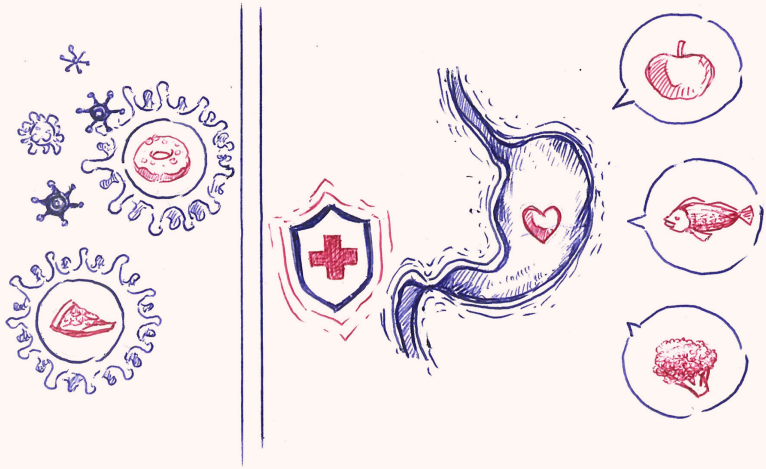
Clinical psychologists can help you to better understand your problems and feelings. They are trained in a variety of different "talking therapies" which can help you to learn new ways of managing your problems. Psychologists are not medically trained and so will not prescribe medication. They may however discuss this with you if they feel that you should speak to your doctor about taking tablets to help with sleep, depression, pain for example.



# SunMed Pharmacy

**The core functions of our Pharmacy include dispensing medications to outpatients, managing medication supply to the various departments in the hospital including inpatients, as well as to provide pharmaceutical care to patients in our wards.**

**In Cancer Centre, we have a dedicated, skilled team to prepare chemotherapy to ensure these specialised medicines are handled and delivered in a safe manner to our patients. Our clinical pharmacists work with the oncology team to deliver a wide variety of services, such as providing medication counselling, review medication therapy including chemotherapy to ensure our patients receive safe and effective treatment, monitoring adverse events, evaluating drug–drug and drug–disease interactions, and participating in supportive care.**



# Dietetics & Nutrition Services

**Eating Well with Cancer**

**Cancer itself and cancer treatment can affect the way your body tolerates certain foods and uses nutrients. When the body is depleted of essential nutrients, it becomes malnourished and further compromises the immune system in the body. The prevalence of malnutrition in cancer patients ranges from 8-84% depending on tumour site, stage and treatment. Considering the implications of malnutrition, it is important to initiate early dietary intervention to help prevent or reverse malnutrition.**

## Role of Dietitian in Cancer Care

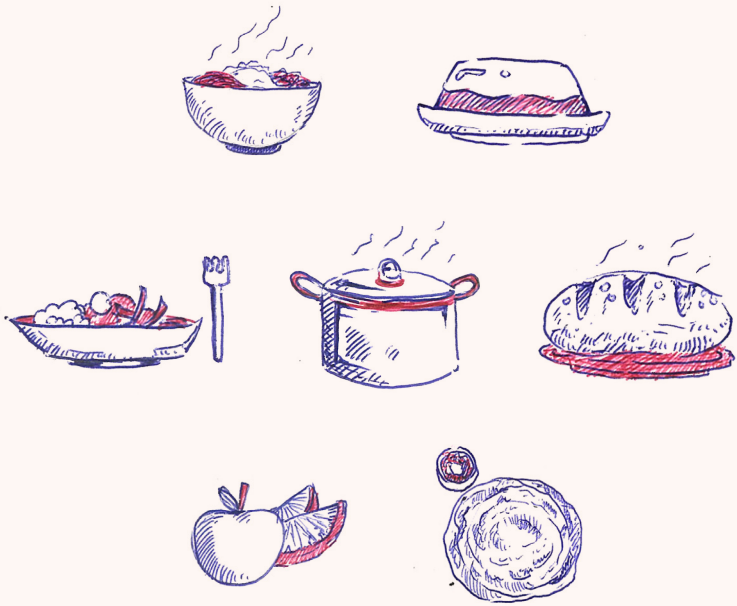
Dietitians provide evidence based, expert advice on the diet needed to help in optimising nutritional wellbeing and quality of life of the cancer patients.

Dietitians help in meal planning and supplementation when needed for patients with specific eating problems as a result of the cancer and/or its treatment e.g. loss of appetite, sore or dry mouth, taste changes, weight loss, nausea, vomiting etc.

Dietitians provide practical information to patients and their family members on foods to choose, portion sizes, meal patterns, cooking, and recipe ideas to support patients at diagnosis, during and after cancer treatment.

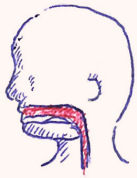
## High Energy and High Protein Diet

High energy and high protein diet can help you in reducing fatigue and prevent or slow down weight loss. You can boost energy and protein in your meal by:



## Managing Eating Problems During Treatment

Not everyone gets eating problem during cancer treatment. Some people don't have any problems. Below are some tips to manage:



## After Cancer Treatment

Healthy eating after cancer treatment helps you regain strength, rebuild tissue, and improve how you feel. Your diet will include lots of fruits, vegetables, wholegrain, lean protein, and healthy fats. Maintaining a healthy diet and lifestyle will help in reducing the risk of cancer recurrent.

**If you are concerned about eating with cancer, talk to your dietitian for more personalised dietary information.**

***References:***
Malaysian Dietitians' Association. Medical Nutrition Therapy Guidelines for Cancer in Adults Cancer Council Australia. Nutrition and Cancer: A guide for people with cancer, family and friends. 2013 Medical Nutrition Therapy Guidelines for Cancer in Adults 2013

## Palliative Care

Palliative Care focuses on management of the symptoms and stress of serious and chronic illness. They work with patients and their families to identify and alleviate physical and emotional pain and other symptoms associated with a serious health condition.

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**Sunway Medical Centre Sdn Bhd**
No.5, Jalan Lagoon Selatan,
Bandar Sunway,
47500 Selangor Darul Ehsan,
Malaysia.

**T**: +603-7491 9191 / 5566 9191
**F**: +603-7491 1409
**E**: smc@sunway.com.my