



# DEFINING MED

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## Blood Cancer

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What GPs Should Look Out For**

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Cancer Treatment**

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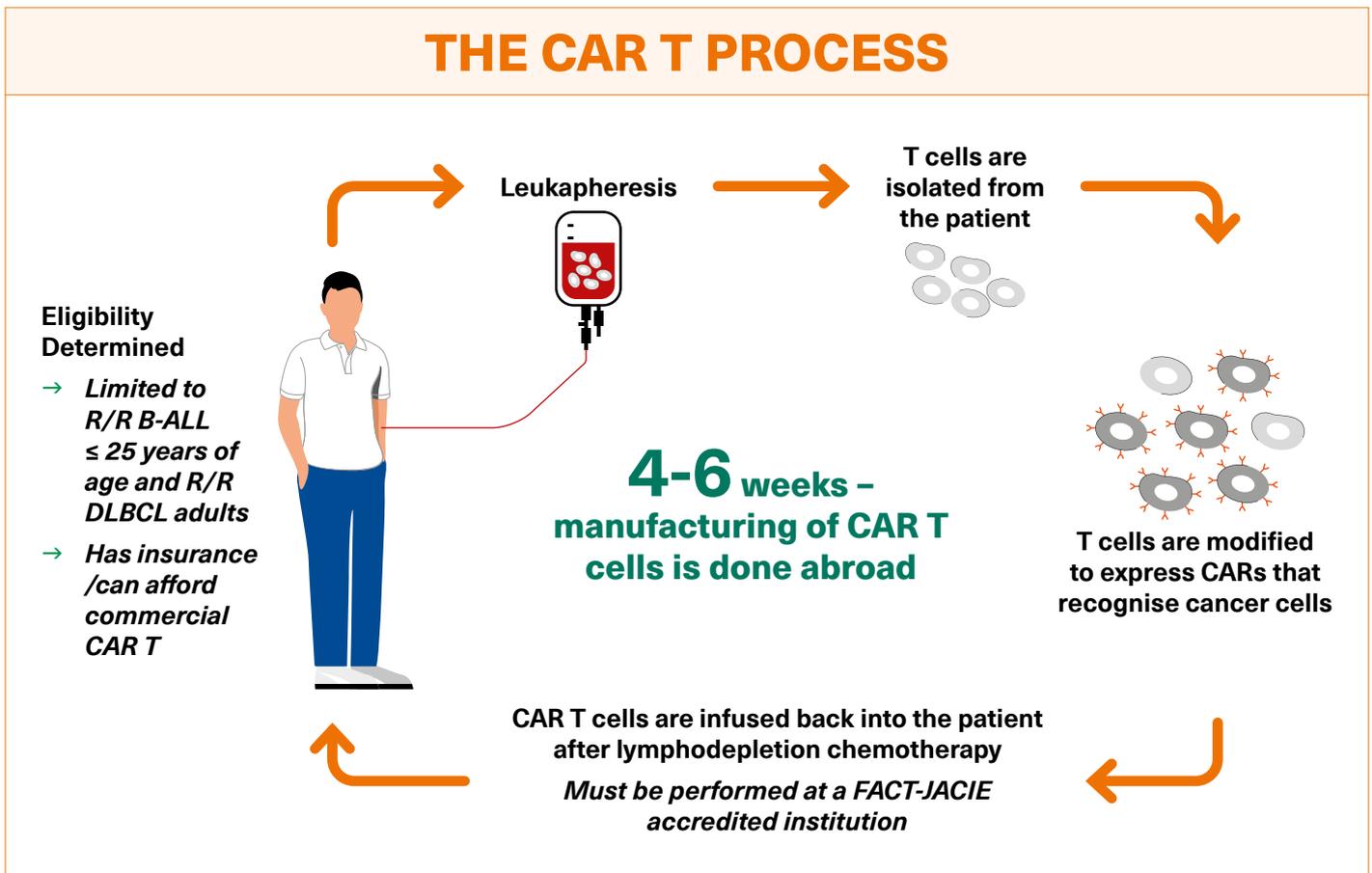
# Supporting CAR T-Cell Recipients – What to Look Out For in Primary Care

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With the increased survival rates following CAR T-cell therapy, more patients are returning to the care of their general practitioner (GP). The SingHealth Duke-NUS Blood Cancer Centre lays out the potential late effects of treatment, and how GPs can effectively support and co-manage these patients, with timely referral where necessary.

## INTRODUCTION TO CAR T-CELL THERAPY

A growing population of patients with B-cell haematological malignancies have undergone **chimeric antigen receptor (CAR) T-cell therapy** following the approval of two CAR T-cell therapies (tisagenlecleucel and axicabtagene ciloleucel) in Singapore.



**Figure 1** CAR T-cell therapy uses T cells that are genetically altered to have a specific target against cancer cells

### Positive patient outcomes

#### Adults with relapsed and/or refractory (R/R) lymphoma

- Complete response (CR) rates of 40-54% and durable response rates of 30-40% have been reported at four-year follow-up.<sup>1,2</sup>
- These outcomes are noteworthy considering that data from patients with R/R diffuse large B-cell lymphoma treated with conventional chemotherapy and autologous transplant showed CR rates of 7%, and median overall survival of only 6.3 months.<sup>3</sup>

#### Young adult patients with R/R B-acute lymphoblastic leukaemia

- Improved responses were noted with CR rates of 81% and durable responses of 76% at 12 months.<sup>4</sup>

### Expanding knowledge of side effects

While the acute toxicities of CAR T-cell therapy including cytokine release syndrome (CRS) and immune effector cell-associated neurotoxicity syndrome (ICANS) are well defined, data regarding late adverse effects are also now increasingly recognised.

Aside from the notable late side effects including cytopenia, B-cell aplasia and hypogammaglobulinemia, others including neuropsychological impact and secondary malignancies are recognised more and more today.

In this article, we will describe the established and potential late effects of CAR T-cell therapy and discuss management from the primary care perspective.

**As more CAR T-cell recipients transition back to the community, continued close communication between general practitioners (GPs) and specialist CAR T centres will be important to improve understanding of treatment late effects and optimise co-management.**



## Long-Term Late Effects of CAR T-Cell Therapy

### 1. B-CELL DEPLETION AND HYPOGAMMAGLOBULINEMIA

Long-lasting B-cell depletion following anti-CD19 CAR T-cell therapy is common, related to the on-target, off-tumour effects of CAR T-cell therapy, and is associated with an increased risk of infection.

Hypogammaglobulinemia occurs due to impaired B-cell and plasma cell activity and can persist several years after infusion.

#### Risk factors

The risk of hypogammaglobulinemia is higher in patients with acute lymphoblastic leukaemia who are treated with tisagenlecleucel, but lower in non-Hodgkin lymphoma.<sup>4</sup>

#### Management

**Immunoglobulin replacement** is commonly continued in patients with immunoglobulin G (IgG) concentration of less than 400 mg/dL or recurrent infections until B-cell recovery.

While an impaired response to vaccines has been observed, we **continue to recommend vaccinations** after CAR T-cell therapy to reduce

infection risk and treatment-related morbidity and mortality.

- At three months post-therapy, CAR T-cell recipients will begin the recommended schedule for vaccinations, including for COVID-19.
- Despite completing COVID-19 vaccinations, patients should be advised to continue exercising precautions to reduce their risk of SARS-CoV-2 exposure and infection (e.g., mask wearing, physical distancing, avoiding crowds and poorly ventilated spaces).
- While intravenous immunoglobulin (IVIg) therapy does not inhibit immune responses for inactivated vaccines, MMR and varicella vaccines should be administered at least two weeks before receipt of IVIg, and should be delayed by eight months after receipt of IVIg.
- Live and non-live adjuvant vaccines can be considered one year after CAR T-cell therapy.<sup>5</sup>

### 2. LATE INFECTIONS

Patients treated with CAR T-cell therapy are at **increased risk for infections**. In approval trials for tisagenlecleucel and axicabtagene ciloleucel (JULIET and ZUMA-1 respectively), grade three or higher infections occurred at a rate of 18% beyond eight weeks, and at 8% beyond six months.<sup>1,2</sup>

Due to continued B-cell aplasia and hypogammaglobulinemia, infection remains the leading cause of non-relapse mortality after CAR T-cell therapy.<sup>7</sup>

#### Risk factors

Factors associated with infection include the occurrence of severe acute toxicities such as CRS and ICANS, which require the use of high-dose

steroids, anti-interleukin-6 (tocilizumab) and anti-interleukin-1 (anakinra) treatment during the first month after CAR T-cell infusion.<sup>8</sup>

#### Management

The most common site of late infection is respiratory, and the most common aetiology is viral, followed by bacterial and fungal.<sup>9</sup> Late reactivation of herpetic and zoster infection have also been reported and **extended-duration acyclovir prophylaxis** is recommended.

Similarly, **pneumocystis jirovecii pneumonia prophylaxis** is recommended for six to 12 months or until the CD4 count is greater than 400 cells/ $\mu$ L5.

### 3. PROLONGED CYTOPENIA

Chronic cytopenias, including anaemia, thrombocytopaenia and neutropaenia, can last more than three months after CAR T-cell infusion in about 15% of CAR T-cell recipients.<sup>6</sup>

#### Risk factors

The risk of cytopenias is associated with:

- Higher-grade CRS
- Multiple previous lines of therapy
- Receipt of allogeneic transplant within a year prior to CAR T-cell infusion
- Baseline cytopenia
- The presence of lymphoma or leukaemia in the bone marrow affecting marrow reserves

#### Management

Chronic cytopenias may need:

- Transfusion support
- Filgrastim
- Thrombopoietin receptor agonists (eltrombopag)
- Epoetin support

In general, prolonged cytopenia is **expected to gradually recover even without intervention**. Vigilance should be maintained for alternative explanations for cytopenia, such as relapsed disease in the marrow and secondary myeloid malignancies. The underlying mechanism of prolonged cytopenia after CAR T-cell therapy remains elusive and active research is ongoing, which may lead to more specific treatments in the future.

### 4. POTENTIAL ORGAN-SPECIFIC TOXICITIES

**Cardiac toxicities** including cardiomyopathy, arrhythmias and heart failure have been reported after CAR T-cell trials at rates of 29-39%.<sup>15</sup> Cardiac effects are likely related to interleukin 6.

Among patients with grade two or higher CRS, arrhythmias occurred in 12% and new-onset heart failure occurred in 11%, with death occurring in 6%. In patients with grade three or higher CRS, the rates of major adverse cardiovascular events and new-onset cardiomyopathy incidence were even higher.

#### Risk factors

This risk of cardiac toxicities is increased in patients with high disease burden, older age and pre-existing cardiovascular disease.

#### Management

In patients who present to primary care with new onset breathlessness and decreased effort tolerance, **proper referral for formal cardiac evaluation should be considered**.

### 5. FATIGUE

Fatigue was common among patients in the ZUMA-1 trial and was found to be difficult to manage.<sup>16</sup> While fatigue generally improves between four to six weeks after CAR T-cell infusion, some patients continue to be affected for months post-treatment.

#### Management

**Steroids should be avoided** in these patients. Some patients may need **physical therapy** to regain strength, stamina and stability. Daily exercises

such as walks can help build stamina and strength. Other interventions to manage fatigue may include exercise, yoga, meditation, pilates and massages.

Patients should be reminded that driving a car or operating heavy machinery is not recommended for eight weeks after CAR T-cell therapy due to the risk of sleepiness, confusion, weakness or temporary memory and coordination problems after CAR T-cell therapy.

## 6. NEUROLOGICAL TOXICITIES

### Neuropsychological late effects

The long-term neurocognitive effects in patients experiencing neurotoxicity have yet to be established fully and is an active area of research.<sup>7</sup>

In a retrospective study of 86 patients, late-onset neurologic findings occurred in 10% of patients. These neuropsychological late effects included:

- Cerebrovascular accidents
- Transient ischaemic attacks
- Peripheral neuropathy
- Alzheimer's disease
- Depression
- Anxiety

### ICANS – A Common Toxicity

ICANS is the second-most commonly observed toxicity after CAR T-cell treatment (after CRS), and usually starts at five to 10 days post-infusion, but delayed onset after three weeks has been described in up to 10% of patients.<sup>10</sup>

#### Symptoms

ICANS can present with a diverse spectrum of symptoms, however many patients have a stereotypic evolution initially involving:

- Tremors
- Dysgraphia
- Expressive aphasia
- Impaired attention
- Apraxia
- Mild lethargy

Additionally, ongoing memory impairment three weeks post-infusion has also been reported in 4–5% of CAR T-cell recipients.<sup>4</sup>

#### Risk factors

Young age, pre-existing anxiety and depression, and acute neurotoxicity were associated with an increased likelihood of long-term neurocognitive effects.<sup>14</sup>

#### Management

In view of the risk of long-term neurocognitive effects after CAR T-cell therapy, especially for those who had acute neurotoxicity, long-term follow-up care needs to continue to **focus on mental health and wellness**.

Across multiple studies, expressive aphasia appears to be a highly specific symptom of ICANS.<sup>11,12</sup>

Patients can have rapid progression and deterioration to:<sup>13</sup>

- Global aphasia
- Delirium
- Seizures
- Cerebral oedema
- Weakness
- Coma in severe cases

#### Management

Patients with suspicion of delayed ICANS need to be **referred urgently back to the hospital and specialist care** for specific management.

## 7. SECONDARY MALIGNANCIES

While more studies are needed to evaluate the risk of secondary malignancies after CAR T-cell therapy, a small retrospective analysis of 86 patients at a median follow-up of 28 months post-treatment found that 15% of patients developed subsequent malignancy. These included non-melanoma skin cancer, myelodysplastic syndrome, melanoma, non-invasive bladder cancer and multiple myeloma.<sup>7</sup>

The United States Food and Drug Administration (FDA) and European Medicines Agency have stipulated that CAR T-cell recipients need to be followed up for 15 years following treatment to capture these events.

## KEY TAKEAWAYS FOR GPs



- ★ The benefit of increased survival for recipients of CAR T-cell therapy is met with the challenge of potential long-term toxicities related to treatment remaining unclear for these recently approved therapies.
- ★ There are currently no specific guidelines on long-term survivorship care, and continued communication between primary care and the hospital is necessary to jointly understand the late effects of treatment.
- ★ Late-onset events of interest should be promptly reported to the CAR T treatment centre, including whether patients develop a secondary malignancy, new autoimmune disease, new neurologic disorder or new blood disorder.
- ★ Management recommendations are still evolving for the late effects of CAR T-cell therapy, and emerging data from longer-term follow-up will continue to inform best practice.

## REFERENCES

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3. Crump M, Neelapu SS, Farooq U, et al. Outcomes in refractory diffuse large B-cell lymphoma: results from the international SCHOLAR-1 study. *Blood*. 2017;130(16):1800-1808. doi:10.1182/blood-2017-03-769620
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To view all references, please refer to the online version of *Defining Med* by scanning the QR code on the cover page.



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Dr Ong Shin Yeu is a haematologist at Singapore General Hospital. She has a keen interest in immunotherapy for lymphoma and recently returned from a year-long fellowship at the City of Hope cancer centre in Duarte, United States of America. Back in Singapore, she contributes actively to clinical trials and research to bring immunotherapy treatment to patients.



GPs can call the **SingHealth Duke-NUS Blood Cancer Centre** for appointments at the following hotlines, or scan the QR code for more information:

**Singapore General Hospital**  
6326 6060

**Sengkang General Hospital**  
6930 6000

**KK Women's and Children's Hospital**  
6692 2984

**National Cancer Centre Singapore**  
6436 8288



# Late Effects of Cancer Treatment: A Guide to Primary Care Management

**Asst Prof Poon  
Yi Ling Eileen**

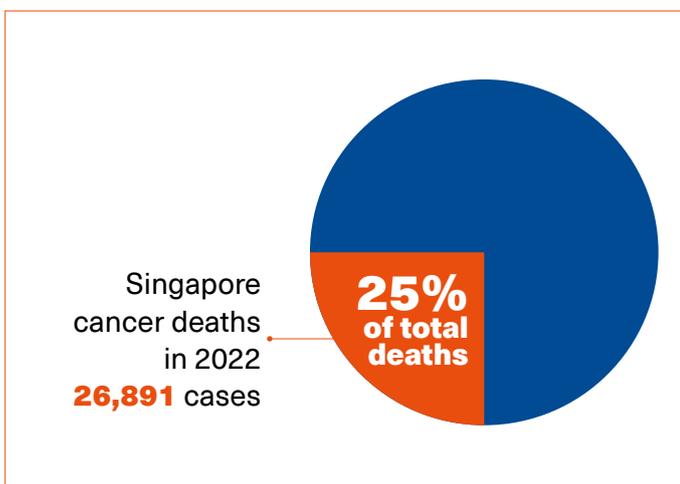
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Systemic cancer treatments have increased tremendously in the last decade and with high survival rates general practitioners are more than likely to have cancer survivors as patients, as such knowledge of the common side late effects and management measures will help GPs optimise their care for these patients.

## BASIC STATISTICS OF CANCER IN SINGAPORE

Cancer has ranked consistently as the principal cause of death in Singapore, with 26,891 deaths reported in 2022, attributing up to a 25% of total deaths. The number of cancer cases have been increasing annually and is expected to continue to increase.

Between 2017-2021, 84,002 cancer cases were reported in Singapore. Between 2018 – 2021, the National Cancer Centre Singapore (NCCS) has seen more than 6,000 young adults with cancer. Out of this, 80-85% of cancer patients, especially in the younger adults, is expected to have long-term survival. There is a difference in the types of cancers seen across the age groups, and across genders.



## TYPES OF TREATMENTS AVAILABLE IN SINGAPORE FOR CANCER TREATMENT

Cancer treatment can be broadly divided into systemic treatment, surgical treatment and radiotherapy. We will focus on systemic treatment in this article. The types of systemic cancer treatment have increased tremendously in the last decade. Beyond the usual chemotherapy that is usually cancer-agnostic, there is now a whole host of different kinds of anti-cancer treatment available.

This includes immunotherapy, targeted therapy, hormone therapy, stem cell transplants, CAR-T (Chimeric Antigen Receptor T-Cell) Therapy, monoclonal antibodies, checkpoint inhibitors, cytokines, angiogenesis inhibitors and PARP (Poly ADP-ribose polymerase) therapies. There are also increasingly more clinical trial drugs that are available to our patients.

### Impact on patients

With each treatment, there exists certain specific side effects and also some general toxicities. For some patients, these toxicities are slight and do not affect their overall quality of life. They will likely be able to return to regular life. However, for others, the toxicities can be debilitating and can even be permanent.

These toxicities can be divided into early, medium-term and late effects. This article will specifically focus on late effects.

## WHAT ARE LATE EFFECTS?

**In general, late effects (also known as long-term or delayed effects) can occur months or years after cancer treatment has completed.**

The extent of toxicities is dependent on:

- Exact type of treatment received
- Duration and dose of the treatment and
- The patient's co-morbidities

This can occur in almost any organ or system and can include:

- Neurological and cognitive impairments
- Endocrine derangements
- Cardiovascular complications
- Subfertility
- Osteopenia and osteoporosis
- Nephropathies
- Gastro-intestinal and hepatotoxicities
- Respiratory complications
- Psychosocial
- Sexuality
- Psychosocial distresses

The reversibility of these toxicities is dependent on:

- The extent
- Timely detection and
- The patient's willingness to try methods to reverse or mitigate them

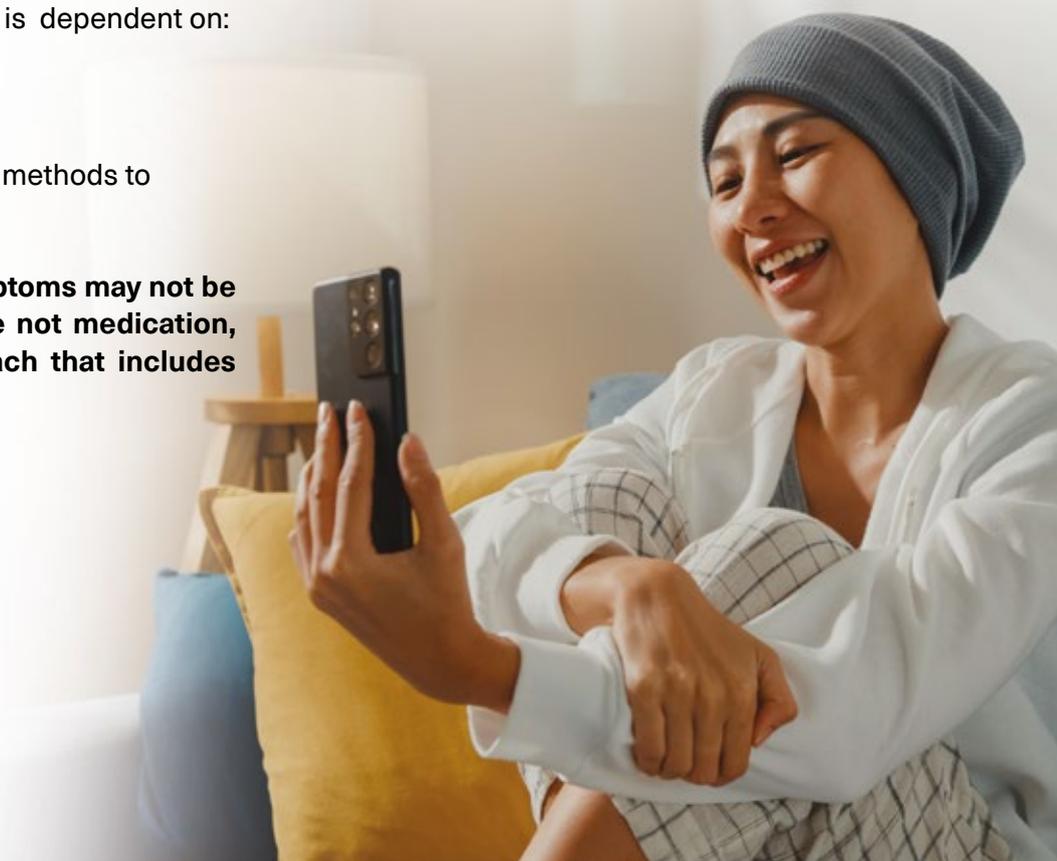
**The methods to treat these symptoms may not be straightforward and may involve not medication, but also a more holistic approach that includes lifestyle changes.**

## WHAT IS A CANCER SURVIVOR?

Cancer survivors are defined as any cancer patient from the point of diagnosis. Broadly, this can refer to any cancer patient who is cured, in remission or has stable chronic cancer expected over a period of time.

Caring of the cancer survivors should include:

- Screening and prevention of long-term side effects from a holistic standpoint
- Surveillance for the original cancer to detect recurrence
- Screening for secondary cancers
- Care co-ordination between primary care providers and other specialists
- General health management including management of risk factors and adoption of a healthy lifestyle such as regular exercise and practicing sun safety.
- Concerns with reintegration into work/school/ community
- Psychosocial and mental health concerns



Below is a general table on some of the common late effects and the advised management.

Suggested relevant investigations	Severity & Management	Specialties to consider referring to
<p><b>1.  PERIPHERAL NEUROPATHY/PAIN</b> Can be in the form of numbness, paresthesias, allodynia or shooting electrical pains</p>		
<ol style="list-style-type: none"> <li>1. Consider X-rays or MRI scans</li> <li>2. Consider nerve conduction studies/ electromyography</li> </ol>	<ol style="list-style-type: none"> <li>1. Non-pharmacologic treatments such as physiotherapy, heat/ice therapy, acupuncture/transcutaneous electrical nerve stimulation unit</li> <li>2. Pharmacologic treatment with non-opioids/adjuvant analgesics, topicals, vit Bs</li> <li>3. Pharmacologic treatments with opioids</li> </ol>	<ol style="list-style-type: none"> <li>1. Neurology</li> <li>2. Orthopaedics</li> <li>3. Pain services</li> <li>4. Interventional radiologist if there is radiculopathy</li> <li>5. Rehabilitation medicine</li> <li>6. Palliative care</li> <li>7. Consider physiotherapy</li> </ol>
<p><b>2.  MYALGIAS/ARTHRALGIAS</b>  <ul style="list-style-type: none"> <li>• Muscle aches</li> <li>• Joint aches</li> </ul> </p>		
<ol style="list-style-type: none"> <li>1. X-rays of affected joints/limbs to rule out fractures/avascular necrosis</li> <li>2. DEXA scan to check bone density</li> <li>3. Bone scans if bone metastases suspected</li> <li>4. Screen for hormonal/endocrine/ vitamin deficiencies</li> <li>5. Screen through medication/treatment history</li> </ol>	<ol style="list-style-type: none"> <li>1. Non-pharmacologic treatments such as physiotherapy, heat/ice therapy, acupuncture/ultrasonic stimulation</li> <li>2. Braces or orthoses</li> <li>3. Pharmacologic treatment from simple analgesics such as paracetamol/ anarex, non-opioids/adjuvant analgesics to opioids</li> <li>4. Joint replacements may be necessary</li> </ol>	<ol style="list-style-type: none"> <li>1. Pain Team</li> <li>2. Physiotherapy</li> <li>3. Orthopaedics</li> <li>4. Rehabilitation medicine</li> <li>5. Refer back to oncologist should there be suspicion of recurrence</li> </ol>
<p><b>3.  POOR BONE HEALTH/UNEXPECTED FRACTURES</b>  <ul style="list-style-type: none"> <li>• Unexpected/multiple fractures, especially at an unexpected age</li> <li>• Osteopenia</li> <li>• Osteoporosis</li> </ul> </p>		
<ol style="list-style-type: none"> <li>1. X-rays of affected joints/limbs to rule out fractures</li> <li>2. DEXA scan to check bone density annually</li> <li>3. Screen for hormonal/endocrine/ vitamin deficiencies</li> <li>4. Check for calcium, vitamin D, PTH levels</li> <li>5. Check renal function</li> <li>6. Go through medication list and treatment history</li> </ol>	<ol style="list-style-type: none"> <li>1. Calcium supplements</li> <li>2. Replete vitamin D levels</li> <li>3. Bisphosphonates/RANK-ligand inhibitors</li> </ol>	<ol style="list-style-type: none"> <li>1. Endocrinologist</li> <li>2. Orthopaedics</li> <li>3. Referral to dentists before initiating bisphosphonates</li> <li>4. Should hormonal replacement therapy be considered, please refer back to primary oncologist to ensure this is acceptable</li> </ol>

Suggested relevant investigations	Severity & Management	Specialties to consider referring to
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#### 4. EARLY MENOPAUSE

- Symptoms may occur regardless of ovarian function
- Menopause is defined as no menses for 1 year, in the absence of prior chemotherapy or tamoxifen use OR no menses after surgical removal of all ovarian tissue

<ol style="list-style-type: none"> <li>1. Screen for reversible causes (e.g., anaemia, severe weight loss)</li> <li>2. Screen for menopausal symptoms</li> <li>3. Assess for contributing factors (e.g., medications, emotional distress, alcohol)</li> <li>4. Assess for endocrine/vitamin deficiencies/hormonal imbalances (e.g., FSH, LH, prolactin, estradiol levels, AMH levels for females; morning total testosterone, free testosterone in males)</li> <li>5. Review oncologic history and treatment history</li> </ol>	<ol style="list-style-type: none"> <li>1. Management of menopausal symptoms</li> <li>2. Consider non-hormonal pharmacologic treatment of hot flushes such as anti-depressants, anti-convulsants, neuropathic pain relievers, some anti-hypertensives</li> <li>3. Non-pharmacologic treatments include acupuncture, exercise, lifestyle modifications, weight management and cognitive behavioural therapy</li> <li>4. Limit triggers, such as alcohol</li> <li>5. Hormonal replacement therapies or pharmacologic therapies</li> </ol>	<ol style="list-style-type: none"> <li>1. Consider referral to gynaecologist</li> <li>2. Should hormonal replacement therapy be considered, please refer back to primary oncologist to ensure this is acceptable.</li> <li>3. Consider referral to counsellor, social worker, psychiatrist</li> </ol>
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#### 5. SUBFERTILITY

- Evaluation should be undertaken for couples who have not conceived 6-12 months of unprotected intercourse
- Can be earlier should prior history be expected to affect fertility

<ol style="list-style-type: none"> <li>1. Screen for reversible causes such as anaemia, endocrine, vitamin deficiencies, hormonal imbalances</li> <li>2. Assess for contributing factors such as medications, emotional distress, alcohol</li> <li>3. Assess for structural causes</li> </ol>	<ol style="list-style-type: none"> <li>1. Review oncologic history and treatment history to assess what is realistically available to patient (e.g., female with hysterectomy will not be able to physically carry a child)</li> <li>2. General recommendations is to be disease-free for 2 years before attempting to conceive, be it either naturally or via assisted reproductive technologies</li> </ol>	<ol style="list-style-type: none"> <li>1. Consider referral to gynaecologist or urologist</li> <li>2. Consider referral to assisted reproduction centres with fertility specialists such as CARE</li> <li>3. Should hormonal replacement therapy be considered, please refer back to primary oncologist to ensure this is acceptable</li> </ol>
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#### 6. SEXUAL HEALTH

- Important aspect of Quality of Life. Needs to be sensitively asked/broached.
- This would be applicable regardless of sexual orientation

<ol style="list-style-type: none"> <li>1. Screen for reversible causes such as anaemia, endocrine, vitamin deficiencies/hormonal imbalances</li> <li>2. Assess for contributing factors such as medications, emotional distress, alcohol</li> </ol>	<ol style="list-style-type: none"> <li>1. Review oncologic history and treatment history</li> <li>2. Can screen with Sexual Health Inventory for Men/Brief Sexual Symptom Checklist for Women</li> <li>3. Assess issues concerning sexual health and see if etiology can be managed (e.g., vaginal dryness may benefit from lubricants)</li> </ol>	<ol style="list-style-type: none"> <li>1. Sexual health specialist</li> <li>2. Endocrinologist</li> <li>3. Gynaecologist or urologist</li> <li>4. Social worker</li> <li>5. Counsellor</li> <li>6. Marriage counsellor if appropriate</li> </ol>
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Suggested relevant investigations	Severity & Management	Specialties to consider referring to
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## 7. CHRONIC FATIGUE

- Distressing, persistent and subjective sense of physical/emotional/cognitive tiredness or exhaustion that is out of proportion to activity. It affects usual functioning.
- This is related to cancer or cancer treatment

<ol style="list-style-type: none"> <li>1. Screen for reversible causes such as anaemia, insomnia, obstructive sleep apnoea</li> <li>2. Assess for contributing factors (e.g., medications, emotional distress, alcohol)</li> <li>3. Assess for endocrine/vitamin deficiencies/hormonal imbalances</li> <li>4. Consider 2D Echo</li> <li>5. Consider sleep study</li> </ol>	<ol style="list-style-type: none"> <li>1. Screen for fatigue regularly</li> <li>2. Treat any reversible causes or medical causes</li> <li>3. Sleep hygiene as appropriate</li> </ol>	<ol style="list-style-type: none"> <li>1. Physiotherapist as appropriate</li> <li>2. Respiratory physician as appropriate</li> <li>3. Endocrinologist as appropriate</li> </ol>
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## 8. CHEMO BRAIN/BRAIN FOG

- Cognitive dysfunction related to cancer and/or
- Cancer treatments

<ol style="list-style-type: none"> <li>1. Screen for reversible causes (e.g., insomnia/endocrine/vitamin deficiencies/hormonal imbalances)</li> <li>2. Assess for contributing factors (e.g., medications, emotional distress, alcohol)</li> <li>3. Consider brain imaging if brain metastases suspected</li> </ol>	<ol style="list-style-type: none"> <li>1. Offer validation of symptom experience</li> <li>2. Treat any reversible causes or medical causes</li> <li>3. Sleep hygiene as appropriate</li> <li>4. Practical advice on coping such as taking notes, forming routines</li> <li>5. Cognitive training such as brain games</li> </ol>	<ol style="list-style-type: none"> <li>1. Social worker</li> <li>2. Counsellor</li> <li>3. Referral to neurologist</li> <li>4. Referral to geriatrician or early dementia clinic or equivalent as appropriate</li> <li>5. Speech therapist or occupational therapist as appropriate</li> </ol>
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## 9. METABOLIC SYNDROME/HYPERTENSION/HYPERLIPIDAEMIA

- Co-occurrence of metabolic risk factors for T2 DM and cardiovascular disease (CVD)
- CVD = Hypertension, hyperglycaemia, dyslipidaemia

<ol style="list-style-type: none"> <li>1. Review medical history medication/ treatment history</li> <li>2. Check blood pressure, pulse rates, height and weight</li> <li>3. Screen for cardiovascular disease risk assessment and counselling</li> <li>4. Consider ECG and 2D Echo assessment</li> <li>5. Screen for diabetes and high cholesterol</li> </ol>	<ol style="list-style-type: none"> <li>1. Advocate for healthy range BMI 18.5 – 24.9 kg/m<sup>2</sup></li> <li>2. Advocate for healthy lifestyle habits (e.g., physical activity, balanced diet)                             <ul style="list-style-type: none"> <li>• 2-3 sessions/week of resistance training</li> <li>• at least 150-300 minutes of moderate-intensity activity or 75 minutes of vigorous-intensity activity; or equivalent</li> </ul> </li> <li>3. Advocate for quitting smoking</li> </ol>	<ol style="list-style-type: none"> <li>1. Refer dietitian/nutritionist</li> <li>2. Refer physiotherapist</li> <li>3. Consider referral to endocrinologist/ cardiologist as indicated</li> </ol>
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Suggested relevant investigations	Severity & Management	Specialties to consider referring to
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## 10. ANXIETY/PANIC/DYSTHMYIA/DEPRESSION

### Anxiety

Difficult to control excessive anxiety & worry and  $\geq 3$  of following:

Restlessness/on edge, easily fatigued, difficulty concentrating, mind going blank, irritability, muscle tension, sleep disturbance

### Panic

Sudden intense fear/discomfort with accompanying symptoms of palpitations, sweating, trembling, breathlessness, nausea, diarrhoea, vasovagal symptoms, chills or heat sensations, paresthesia, loosing sense of reality, fear of losing control/dying

### Depression

Having  $\geq 5$  of the following for at least 2 weeks:

- Depressed, sad, empty, hopeless mood or appearance
- Loss of interest or pleasure in activities
- Weight loss or gain
- Sleep disturbances
- Psychomotor agitation or retardation
- Lack of energy
- Feeling worthless or excessive guilt
- Diminished concentration or indecisiveness
- Thoughts of death or suicidal ideation

<ol style="list-style-type: none"> <li>1. Assess for suicide risk and manage accordingly</li> <li>2. Screen for depression/PTSD/mania/psychosis</li> <li>3. Screen with GAD-7/Brief Patient Health Questionnaire</li> <li>4. Assess for endocrine/hormonal imbalances</li> <li>5. Review diet, and consider reducing stimulants such as caffeine</li> <li>6. Consider brain imaging if brain metastases suspected</li> </ol>	<ol style="list-style-type: none"> <li>1. Non-pharmacologic stress-relieving techniques (e.g., yoga and meditation)</li> <li>2. Address root cause (e.g., pain)</li> <li>3. Encourage exercise and physical activity</li> <li>4. Cognitive behavioral therapy</li> <li>5. Pharmacologic techniques if the above cannot help</li> <li>6. Suicide precautions/managements as appropriate</li> </ol>	<ol style="list-style-type: none"> <li>1. Psychologist</li> <li>2. Psychiatrist</li> <li>3. Social worker</li> <li>4. If there is active suicidal ideation, there is a need to actively intervene</li> </ol>
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## 11. INSOMNIA

Difficulty falling asleep OR staying asleep OR waking up too early

- Usually for  $\geq 3$  months
- Occurs at least 3 times per week

<ol style="list-style-type: none"> <li>1. Assess for sleep practices and advise sleep hygiene</li> <li>2. Sleep journal</li> <li>3. Assess for medications that may affect sleep</li> </ol>	<ol style="list-style-type: none"> <li>1. Non-pharmacologic interventions by addressing root cause (such as pain)</li> <li>2. Sleep hygiene advice</li> <li>3. Pharmacology interventions as per guidelines                             <ul style="list-style-type: none"> <li>• antihistamines</li> <li>• benzodiazepines</li> </ul> </li> <li>4. Cognitive behavioral therapy</li> </ol>	<ol style="list-style-type: none"> <li>1. Psychologist</li> <li>2. Psychiatrist</li> <li>3. Social worker</li> <li>4. Consider referral to sleep specialist</li> </ol>
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## 12. NUTRITION (EITHER OVER OR UNDER) & WEIGHT MANAGEMENT

Can use BMI as a target

<p>Consider referral to nutritionist/dietitian</p>	<ol style="list-style-type: none"> <li>1. Healthy lifestyle</li> <li>2. Maintenance of adequate physical activity</li> <li>3. Healthy balanced diet</li> </ol>	<ol style="list-style-type: none"> <li>1. Gastroenterologist if there is concern of dysmotility/absorption</li> <li>2. Psychiatrist/psychologist should there be a concern of body dysmorphia/eating disorder</li> <li>3. Refer back to oncologist should there be a concern with anatomy, possibly relating to cancer history</li> </ol>
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Suggested relevant investigations	Severity & Management	Specialties to consider referring to
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### 13. **CARDIAC TOXICITY**

Cardiac dysfunction that occurs as a result of cancer treatment (including chemotherapy, targeted therapy, radiotherapy etc)

<ol style="list-style-type: none"> <li>1. Screen through oncological history and treatment</li> <li>2. Screen for cardiovascular risk factors and treat accordingly</li> <li>3. ECG, 2D Echo, CK/CKMB/Troponins/BNP</li> <li>4. Chest X-ray</li> <li>5. Blood tests screening for hormonal/ endocrine abnormalities</li> </ol>	<ol style="list-style-type: none"> <li>1. Advocate for healthy lifestyle including physical activity and balanced diet</li> <li>2. Stop smoking</li> <li>3. Maintain healthy BMI</li> </ol>	<ol style="list-style-type: none"> <li>1. Cardiologist</li> <li>2. Endocrinologist</li> <li>3. Dietitian/nutritionist</li> <li>4. Consider respiratory physician referral if no evidence of structural heart disease found, but patient is symptomatic</li> <li>5. Refer back to oncologist if symptoms persist</li> </ol>
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### 14. **LYMPHOEDEMA**

- Occurs when fluid accumulates in the interstitial tissue, resulting in limb swelling or swelling in other areas such as neck/trunk, or genitals
- Reports of feeling heavy/limb fatigue

<ol style="list-style-type: none"> <li>1. Screen for BMI</li> <li>2. Screen for haemodynamic circulation</li> <li>3. Regular screening via limb volume measurements</li> </ol>	<ol style="list-style-type: none"> <li>1. Weight control</li> <li>2. Elevation of affected limb</li> <li>3. Regular exercises that help with motion/mobility and flexibility</li> <li>4. Survivor lymphoedema education</li> <li>5. Self-care management, skin care, self-bandage</li> <li>6. Compression garments</li> <li>7. Medical procedures such as venepuncture/blood pressure measurement to avoid on affected limb if possible</li> </ol>	<ol style="list-style-type: none"> <li>1. Referral to physiotherapist</li> <li>2. Referral to occupational therapist</li> <li>3. Consider referral back to lymphoedema therapists at tertiary hospitals</li> <li>4. Consider referral to lymphoedema surgeon</li> <li>5. Refer back to oncologists if new lymphadenopathy</li> </ol>
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### 15. **CHRONIC PAIN**

Pain can be related or unrelated to underlying cancer (e.g., Pain can be due to previous zoster infection as a result of poor immunity while on chemotherapy)

<ol style="list-style-type: none"> <li>1. Comprehensive pain assessments to evaluate if this is new or old</li> <li>2. Consider specific pain syndromes</li> <li>3. Consider multi-modality approach to pain management</li> <li>4. If pain is acute, rule out oncologic emergency or other acute non-cancer emergencies such as appendicitis</li> </ol>	<ol style="list-style-type: none"> <li>1. Treat etiology of pain</li> <li>2. Non-opioid adjuvant analgesics</li> <li>3. Non-pharmacologic interventions such as heat/cold massage, acupuncture, physical/occupational therapies</li> <li>4. Opioid treatment if necessary</li> </ol>	<ol style="list-style-type: none"> <li>1. Consider chronic pain team</li> <li>2. Consider rehabilitation medicine</li> <li>3. Consider interventional radiologist if necessary (such as for nerve blocks)</li> <li>4. Consider palliative care referral</li> <li>5. Consider other referrals as appropriate, depending on site and etiology of pain</li> </ol>
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### 16. **SECONDARY CANCERS**

A development of a new cancer

<ol style="list-style-type: none"> <li>1. Consider a repeat of CT scans and basic end-organ blood tests if suspicion is low</li> <li>2. However, if suspicion is high it would be better to get these investigations done with the oncologist</li> </ol>	<p>Review through cancer history and also treatment history</p>	<p>Should there be a suspicion of cancer relapse or a development of a new cancer, it is always best to refer back to the primary oncologist for an evaluation within 2 weeks</p>
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\* Definitions as adapted/taken from NCCN Guidelines Version 1.2023: Survivorship\*

## WHEN SHOULD A REFERRAL BACK TO THE ONCOLOGIST BE NECESSARY?

**Ideally, when a patient is discharged from a cancer centre, this should be accompanied with an individualised care plan.** This care plan should include details of the cancer and treatment, including what needs to be monitored at what intervals. There should also be clear guidelines on when to refer back, with clear points of contact to reduce the difficulties in referring back to the oncologist.

**Should there be no such care plans given,** it would be a good idea to get in touch with the primary oncologist for a full report. This will definitely help in the long-term holistic management of the patient, and aid to keep the patient in primary care. It would also be helpful to consider referring young adults cancer survivors to cancer survivorship clinic dedicated for young adult cancer survivors.

## FINAL NOTES

A patient's cancer journey does not start and stop with a cancer diagnosis and treatment. Once a person has been diagnosed with cancer, it will likely result in a lifelong change. It will inevitably lead to a lifetime heightened risk of anxiety and fear, with the need to be more prudent/cautious with health. Inevitably, survivors are also at heightened risks of long-term toxicities and secondary malignancies.

We would want to be able to return our survivors back into community well and be able to function. This need to be able to right-site them is imperative, helping the country to move towards its goal of HealthierSG.

## REFERENCES

1. NCCN Guidelines Version 1.2023 Survivorship
2. NCCN Guidelines for Adolescent and Young Adult (AYA) Oncology
3. Cancer Statistics article from NCCS website (<https://www.nccs.com.sg/patient-care/cancer-types/cancer-statistics>)
4. UpToDate – Metabolic Syndrome (insulin resistance syndrome or syndrome X)



**Asst Prof Poon Yi Ling Eileen**

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Asst Prof Eileen Poon is a consultant with Medical Oncology at NCCS. She sees lymphoma, sarcoma and melanoma patients.

Her passion is in working with Adolescents and Young Adults (AYAs) with cancer. This is a field in its infancy, especially in Asia and combines both the science and art of Oncology and Medicine. Dr Eileen is looking to revolutionise the care that AYAs receive to empower them to live well through a cancer diagnosis.



GPs can call the **SingHealth Duke-NUS Blood Cancer Centre** for appointments at the following hotlines, or scan the QR code for more information:

**Singapore  
General Hospital**  
6326 6060

**Sengkang  
General Hospital**  
6930 6000

**KK Women's and  
Children's Hospital**  
6692 2984

**National Cancer  
Centre Singapore**  
6436 8288



# Primary Care Support for Patients with Blood Cancers

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When it comes to blood cancer patients, general practitioners (GPs) play a major role in all aspects of care – from preventative measures to early detection, shared care during treatment and health screening post-survivorship. Through an in-depth patient case study, find out how GPs can best support this group through the patient journey.

## INTRODUCTION TO BLOOD CANCERS

Blood cancers are the malignant proliferation of blood cells, which encompass conditions such as leukaemia, lymphoma and myeloma.

### Epidemiology

According to the Singapore Cancer Registry, between 2017 to 2021, blood cancers were among the 10 most common cancers in Singapore, with incidences of 5.2% to 7.3% per annum for lymphoid neoplasms and 3.5% per annum for myeloid neoplasms.<sup>1</sup>

Blood cancers can occur at any age group, although there are some types that occur more commonly in the paediatric population, such as acute lymphoblastic leukaemia (ALL), and some that occur more commonly in the elderly, such as acute myeloid leukaemia (AML).

**Primary care support is essential in all aspects of care: from the prevention of cancer, to detection, symptom management, shared care during chemotherapy and survivorship.**



## PREVENTION

The World Health Organization declares that between 30% to 50% of cancers could be preventable, and advocates increasing awareness through screening, reducing exposure to risk factors and lifestyle changes.<sup>2</sup>

### Screening, symptom recognition and prompt referral

The implementation of **screening** the full blood count and early referrals for unexplained cytopenias or cytosis has at times picked up the early stages of blood cancers.

Additionally, **recognising the presentation of constitutional symptoms** of fever, night sweats, loss of appetite or loss of weight with a prompt investigation including a full blood count, liver panel or kidney panel has also picked up blood cancers.

**Referrals to hospital** upon recognition of these symptoms has allowed for timely targeted investigations.

### Lifestyle changes

Encouraging the reduction of exposure to tobacco and alcohol, and advocating a balanced diet and physical activity during routine consultation are general measures to reduce cancer risk factors.



## SIGNS AND SYMPTOMS

Below are some of the symptoms of blood cancer that patients may experience due to the disease, and their causes.

Symptom	Cause(s)
Prolonged or abnormal bleeding	Coagulopathy related to acute promyelocytic leukaemia (APL)
Numbness or weakness	Central nervous system bleed or thrombosis in disseminated intravascular coagulopathy from APL
Easy bruising	Thrombocytopenia from bone marrow infiltration
Lethargy	Anaemia from bone marrow infiltration
Weight loss / loss of appetite	Hypermetabolic symptoms of malignancy
Fever	Increased risk of infection or from malignancy
Bone pains	Pathological fractures from myelomas or lymphomas
Lymphadenopathy	Or organomegaly from lymphoma involvement
Vomiting	Renal failure or hypercalcaemia from myeloma

Table 1

**SIGNS AND SYMPTOMS** (Cont'd)**CASE STUDY****Background**

Mr M, a 57-year-old man, was seen at the polyclinic for symptoms of **persistent fever**. He had previously gone on holiday and had intermittent fevers during the vacation. When he returned, he was seen at the polyclinic and examined.

There were no overt signs of infection and general examination was normal. He was given paracetamol and asked to rest at home.

**Reassessment and investigations**

A few days later, he went back to the polyclinic with persistent fever which abated with paracetamol,

but returned after four to six hours. This was associated with **unintentional weight loss and loss of appetite**.

**Blood tests** were performed which showed the presence of **pancytopenia**. His haemoglobin level was  $8.6 \times 10^{-9}$ , total white was  $1.35 \times 10^{-9}$  and platelets were  $3.4 \times 10^{-9}$ .

The patient was referred to the emergency department for further work-up of pancytopenia with constitutional symptoms.

**INVESTIGATIONS AND STAGING**

Usually, patients with pancytopenia and unexplained constitutional symptoms will first undergo **biochemical and radiological investigations to rule out infection**.

If these are all negative, they would be advised to undergo **bone marrow studies**, in which we send the blood in the bone marrow for examination under a microscope to look for abnormal or malignant cells.

We would also send this blood sample for flow cytometry, molecular testing, next-generation sequencing and genetic testing, and the bone fragment would be sent for pathological examination.

All these tests are done to confirm the diagnosis of haematological malignancies and determine the prognosis.

**CASE STUDY** (Cont'd)**Diagnosis through investigations**

During his inpatient stay, Mr M continued to have unrelenting fevers at a maximum of 40 degrees Celsius. His initial blood works confirmed pancytopenia. He was initiated on antibiotic treatment to treat neutropenic sepsis.

For his persistent pancytopenia, Mr M underwent a bone marrow investigation. This showed the presence of lymphoblasts. Further molecular testing confirmed that he had ALL.

## TREATMENT

Treatment of blood cancers is based on **combination chemotherapy**. These regimes incorporate a variety of agents that target different aspects of the malignant blood cell.

The type of treatment can include cytotoxic agents, biologic agents, small molecule inhibitors or immunotherapy.

### Aggressive blood cancers

With aggressive cancers like acute leukaemia or certain types of lymphoma, the regime is administered during **inpatient stay** as the complications of infection, tumour lysis syndrome or severe cytopenia are expected. Immediate treatment would need to be given at short notice.

### Less aggressive blood cancers

However, the less aggressive blood cancers like chronic leukaemia, indolent lymphomas and multiple myeloma all have **outpatient treatment**.

These patients visit our ambulatory treatment unit at regular intervals for their treatment and blood count monitoring. They may also require adjunctive treatment such as bisphosphonates, red cell boosters, white cell boosters or intravenous immunoglobulin as outpatients.

**Table 2** shows some of the treatments that the patient may be expected to have in the polyclinic.

**ADJUNCTIVE OUTPATIENT TREATMENT PERFORMED AT CLINICS**

Medication	Usage	Frequency
<b>Recormon</b> Red cell booster	To increase red cells during chemotherapy. The frequency changes depending on the haemoglobin level.	Weekly, fortnightly or monthly
<b>Pegylated granulocyte colony-stimulating factor (G-CSF)</b> White cell booster	To increase white cells. Usually given at least 24 hours after the last dose of chemotherapy per month.	Monthly
<b>G-CSF</b> White cell booster	To increase white cells. Dosage per dose is less than pegylated G-CSF, and is used when only a short boost is needed.	Daily for a specified period of time (such as three to five days)

**Table 2**

## CASE STUDY (Cont'd)

Mr M was counselled on his diagnosis of ALL and seen by a multidisciplinary inpatient team – consisting of the social worker, dietitian, specialist nurse and medical team.

He was offered a course of **chemotherapy HCVAD** which consists of high-dose cyclophosphamide, vincristine, doxorubicin, dexamethasone and high-dose methotrexate, along with **intrathecal chemotherapy**.

## THE GP'S ROLE IN MANAGING TREATMENT SIDE EFFECTS

During chemotherapy, the GP may be asked to help to monitor some of the side effects of chemotherapy. These are listed in *Table 3* below.

CONCURRENT CONDITIONS THAT CAN BE CO-MANAGED IN POLYCLINIC	
Condition	Recommendation
<b>Diabetes</b>	<ul style="list-style-type: none"> <li>Some patients may develop steroid-induced diabetes as prednisolone plays a large part in the treatment of lymphomas, myelomas and ALL.</li> <li>Those who already have diabetes may need to have their dosage altered after starting regular steroids.</li> </ul>
<b>Hypertension</b>	<ul style="list-style-type: none"> <li>Steroid-induced or recommon-induced hypertension is frequently reported, and would need to be monitored.</li> </ul>
<b>Pain</b>	<ul style="list-style-type: none"> <li>Some patients may have pain from pathological fractures or mucositis due to chemotherapy or radiotherapy.</li> <li>They would mostly need some opioids such as tramadol in conjunction with paracetamol to provide basal pain relief.</li> </ul>
<b>Cardiac arrhythmia</b>	<ul style="list-style-type: none"> <li>Some chemotherapy agents such as retinoid acid can cause electrolyte abnormalities which lead to cardiac complications.</li> <li>Patients may be asked to have electrolytes monitored or replaced.</li> </ul>
<b>Vomiting</b>	<ul style="list-style-type: none"> <li>This is a common side effect of chemotherapy and patients should have antiemetics such as ondansetron or granisetron on standby.</li> <li>Should vomiting still persist, they could be given metoclopramide.</li> <li>If there are any signs of dehydration, renal failure or electrolyte abnormalities, they should be referred back to the hospital.</li> </ul>
<b>Anaemia/bleeding</b>	<ul style="list-style-type: none"> <li>The full blood count is monitored regularly by the haematologist in the outpatient setting.</li> <li>Should they develop symptomatic anaemia or bleeding in between these appointments and go to the polyclinic, they should be referred back to the hospital for transfusions.</li> </ul>
<b>Fever</b>	<ul style="list-style-type: none"> <li>All patients on chemotherapy should already be on prophylactic antimicrobials.</li> <li>Should they develop any infections despite this, they would need hospitalisation for intravenous antimicrobials.</li> </ul>

*Table 3*

### Advising patients with persistent side effects

Patients should be advised that should they continue to have these symptoms after treatment has been given, they should go back to the hospital for further investigation and treatment.

They can see the haematologist either as a walk-in case at the National Cancer Centre Singapore, or an admission through the emergency department.

## SURVIVORSHIP

Patients who previously had chemotherapy or stem cell transplants are known to be at a higher risk of developing early metabolic syndrome, early cardiac disease, secondary malignancies or myelodysplastic syndrome.

As blood cancer patients who have responded well are achieving good remission post-chemotherapy and living longer, there is an ongoing plan to **transition their care back to the community.**

We are currently devising a protocol to actively screen late effects of chemotherapy after hospital survivorship follow-up. In addition to the Healthier SG initiative, this may also include doing yearly full blood counts, early detection and management of metabolic syndrome and yearly screening of endocrinopathies such as hypothyroidism and osteoporosis.

### CASE STUDY (Cont'd)

#### Post-treatment outcomes

Five years after chemotherapy, Mr M was still in remission and had done well post-treatment.

#### Survivorship vaccination and screening programme

He underwent the survivorship vaccination and screening programme at the survivorship clinic for five years.

In these clinic settings, the long-term effects of chemotherapy were monitored. These included assessing for:

- Cardiomyopathy
- Osteoporosis
- Endocrine abnormalities

- Metabolic syndrome
- Surveillance for secondary malignancies

This programme also screens for psychological sequelae of chemotherapy and hospitalisation, promotes regular dental checks, and advises a healthy lifestyle of maintaining a balanced diet, adequate rest, reducing the stressful environment, maintaining exercise and cutting down alcohol and smoking.

#### Transition back to primary care

As Mr M remained well at the end of this programme, he was transferred to the polyclinic for continued monitoring.

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Doctor  
9AM

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## CONCLUSION

With ongoing advances in treatment options for blood cancers, the hope to achieve long-lasting remission remains high. Therefore, it becomes increasingly important to garner early support from GPs for these blood cancer patients.

GPs play a major role in all aspects of care, from preventative measures to early detection, shared care during the treatment phase and health screening post-survivorship. In the future, we hope to continue this partnership in our fight against blood cancers.



## REFERENCES

1. Singapore Cancer Registry Annual Report 2023. National Registry of Diseases Office. Health Promotion Board.
2. 'World Health Organisation. Preventing cancer.' Online [cited 28 September 2023]. Available from: <https://www.who.int/activities/preventing-cancer>.



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Dr Esmeralda Teo Chi Yuan was educated in the United Kingdom and graduated from the Imperial College School of Medicine. She did her foundation training at the North London Deanery and her Internal Medicine training at Singapore General Hospital. She completed her fellowship in haematology with a special interest in acute leukaemia and cancer survivorship.

Dr Teo was awarded the National Medical Research Council Clinician Scientist Award to investigate the interplay of synergistic mechanisms in combination chemotherapy for lymphoma and myeloma at the MD Anderson Cancer Centre in Houston, United States. She has been published in several peer-reviewed journals. During this time, she also completed a chaplaincy course and was awarded the Lay Chaplain of the Year Award.



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6326 6060

**Sengkang General Hospital**  
6930 6000

**KK Women's and Children's Hospital**  
6692 2984

**National Cancer Centre Singapore**  
6436 8288



# Emerging Interventions in Sports Medicine: All You Need to Know

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In the ever-evolving field of sports medicine, three treatment modalities have made their mark as promising interventions for musculoskeletal conditions: platelet-rich plasma injection, viscosupplementation and extracorporeal shockwave therapy.

Here, the SingHealth Duke-NUS Sport & Exercise Medicine Centre breaks down all the essential information for general practitioners to stay in-the-know – a handy tool in the arsenal with the rising prevalence of such conditions.



# 1. PLATELET-RICH PLASMA INJECTION

## WHAT IT IS

Platelet-rich plasma (PRP) injection, classified under a group of therapeutic agents known as 'orthobiologics', has emerged as a promising treatment option within the realm of musculo-skeletal (MSK) medicine. This innovative approach **utilises the patient's own blood components to promote healing and alleviate pain** in various MSK conditions.

### What is platelet-rich plasma?

PRP is a concentrated solution derived from the patient's own blood, containing a higher concentration of platelets and growth factors than what is typically found in whole blood.

Platelets play a crucial role in tissue healing due to their ability to release growth factors that promote cell proliferation and recruitment of stem cells to the injured area (*Figure 1*).

By concentrating these healing factors and delivering them precisely to the site of pathology, PRP therapy aims to harness the body's natural healing abilities to accelerate the recovery process and improve outcomes.

## Treatment process

The PRP procedure involves drawing a small amount of the patient's blood and centrifuging it to separate the platelet-rich component from other blood components (*Figure 2*). The platelet-rich component is then isolated and concentrated. The resulting PRP solution is injected directly into the target region under image guidance (*Figure 3*).

## Safety

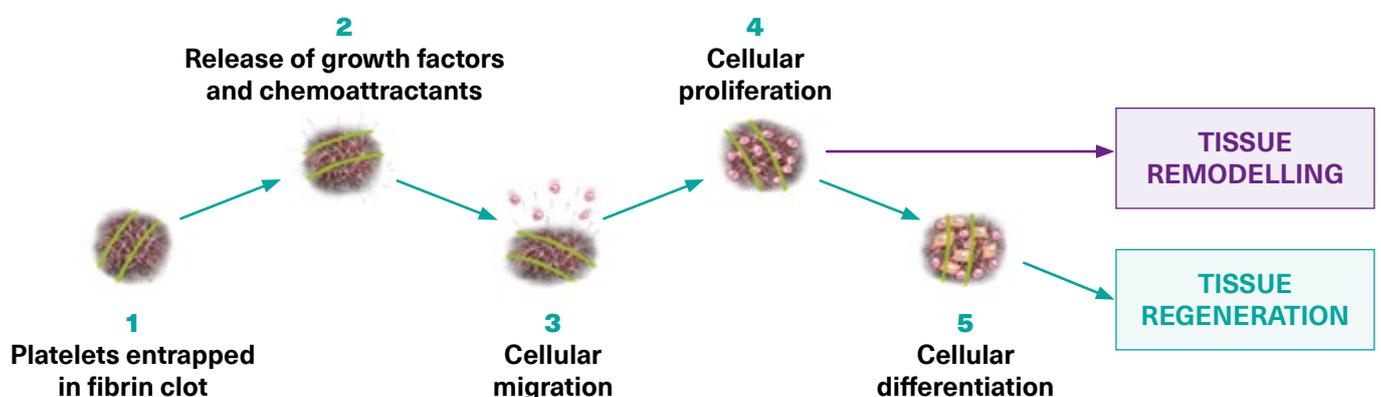
As PRP therapy is autologous in nature, it is generally considered safe, minimising the risk of adverse drug reactions.



*Figure 2* The platelet-rich component is separated from other blood components after centrifugation



*Figure 3* PRP extraction for injection



*Figure 1* PRP mimics the normal healing process that occurs with tissue injury

Images are reproduced with permission from Regenlab

## 1. PLATELET-RICH PLASMA INJECTION (Cont'd)

### BENEFITS

In general, the potential benefits of PRP therapy include:

- Promotion of tissue repair
- Decreased pain
- Improved functional outcomes
- A potential reduction in the need for more invasive interventions like surgery

However, it is important to note that the effectiveness of PRP can vary based on patient and injury characteristics, PRP preparation methods and injection techniques.

### CONDITIONS TREATED WITH PRP

#### Tendon and ligament injuries

Tendinopathies and ligament sprains are common MSK problems seen in primary care and are often the result of gradual overuse and microtrauma.

On their own, these injuries may be challenging to heal due to limited local blood supply. The growth factors in PRP can stimulate repair of degenerate tissue, enhance collagen production and reduce pain.

PRP has been utilised to successfully treat various tendon and ligament injuries, such as patellar tendinopathy<sup>1</sup> (jumper's knee), lateral epicondylitis<sup>2</sup> (tennis elbow), plantar fasciitis<sup>3</sup> and rotator cuff injuries<sup>2</sup>.

#### Muscle injuries

Muscle injuries, such as strains and tears, usually develop from actions involving sudden eccentric muscle contractions.

By promoting the regeneration of muscle fibres and reducing inflammation, PRP therapy may accelerate healing and minimise scar tissue formation.<sup>4</sup> This can potentially enable athletes and active individuals to return to their sporting activities sooner.

#### Osteoarthritis

PRP therapy has been explored as a minimally invasive, conservative approach to managing osteoarthritis (OA).

Preclinical studies suggest that PRP has some disease-modifying effects, with positive changes on cartilage tissue and synovial membrane.

Clinical evidence also supports the safety and effectiveness of PRP in the treatment of knee OA, which has been shown to be superior when compared to both placebo (saline) and control treatments such as hyaluronic acid (HA) and corticosteroids. PRP can be indicated in mild and moderate cases of knee OA (Kellgren-Lawrence grade  $\leq 3$ ).<sup>5</sup>

While cognisant that the present Ministry of Health (MOH) guidelines, dated 24 October 2013, do not list OA as an indication for PRP therapy, the 2022 European Society of Sports Traumatology, Knee Surgery and Arthroscopy (ESSKA) consensus on the use of injectable orthobiologics reaffirms the efficacy of PRP in the treatment of knee OA.<sup>5</sup>

### WHEN IT SHOULD BE CONSIDERED

Most doctors generally accept that PRP therapy is usually not first-line treatment for the management of MSK conditions. However, should the patient's condition be **resistant to regular conservative treatment**, next-level interventions such as PRP may be considered.

Alternatively, if the patient is a competitive athlete or a high-demand active individual, and **would benefit from an expedited return to physical activity**, PRP may be suitable at an earlier stage of treatment.

## 2. VISCOSUPPLEMENTATION

### WHAT IT IS

Viscosupplementation involves **introducing exogenous HA into the affected joints**, aiming to restore the natural viscoelasticity properties of the joint and promote joint homeostasis while mitigating inflammation-related factors.

### BENEFITS

Studies have demonstrated that HA has shock absorption properties and the capacity to reduce the levels of pro-inflammatory agents such as PGE2 and NF-kB, along with enzymes that contribute to the breakdown of joint tissue.

The therapeutic effect of HA has been shown to peak at around eight weeks and persist for at least six months. In addition, there is evidence that HA supplementation can delay the need for total joint replacement surgery.

### PATIENT ELIGIBILITY

#### Current guidelines

According to MOH, viscosupplementation can be used for the **treatment of knee OA where general measures or systemic therapies have failed or are contraindicated** (Grade B, Level 1+).

International guidelines recommend viscosupplementation in the management of symptomatic mild-to-moderate knee OA as a second-line conservative treatment in non-responders, or in patients who have contraindications to nonsteroidal anti-inflammatory drugs (NSAIDs).

#### Other indications

Viscosupplementation is also appropriate in cases where comorbidities, contraindications or other concerns limit treatment options. It may also be preferred by patients with more advanced OA, who wish to avoid joint replacement surgery for as long as possible.<sup>7</sup>

HA is also recognised as a non-doping drug, making it a suitable adjuvant option for athletes with knee OA. When possible, schedule the treatment out of season and adapt to the patient's sporting activity.

### TREATMENT PROCESS

The general viscosupplementation procedure includes:

1. Relevant patient evaluation and patient consent
2. Ensuring aseptic joint infiltration
3. The choice of appropriate injection approach according to the joint
4. The choice of appropriate needle calibre
5. Aspiration of excess synovial fluid
6. Injection without resistance to pain
7. Joint mobilisation following injection
8. Post-viscosupplementation advice

### CLINICAL EFFICACY

The efficacy of viscosupplementation may vary among individuals, depending on the severity of OA, baseline function and the specific viscosupplementation product used.

Many studies have reported overall positive results in pain relief and function outcomes among patients with knee OA treated with viscosupplementation. The response can vary among individuals, but most found a moderate efficacy of around 20% versus placebo.



## 2. VISCOSUPPLEMENTATION (Cont'd)

### SIDE EFFECTS AND SAFETY

General tolerance for HA injection is good with acceptable local tolerance. Main adverse effects may include painful or inflammatory local reactions, but they are usually mild and temporary.

More rarely, pseudosepsis may occur, with early onset one to 24 hours post-injection. Fine-needle aspiration and bacteriological analysis should be performed to exclude septic arthritis in case of any doubt.



### ALTERNATIVE TREATMENTS FOR KNEE OA

The goal of knee OA treatment is to reduce pain, enhance joint function and improve the individual's quality of life. It requires a multimodal approach including non-pharmacological, pharmacological and surgical interventions, individualised for each patient's symptoms and disease severity.

Conservative management approaches include weight reduction, physical activity and utilisation of both non-steroidal and steroidal anti-inflammatory drugs and opioids.

Among other injection treatments, intra-articular injection with corticosteroids and PRP has been reported as a valid therapeutic strategy for the treatment of knee OA.

## 3. EXTRACORPOREAL SHOCKWAVE THERAPY

### WHAT IT IS

Extracorporeal shockwave therapy (ESWT) is a procedure which **uses shockwaves to stimulate healing of the problematic tissue** in a number of MSK conditions.

Although relatively novel, it has gained traction worldwide due to its efficacy and minimal adverse effects. This procedure has broadened our choices when it comes to effective non-invasive treatment modalities for such conditions.

### Clinical origins

ESWT was first used clinically in the 1980s for the treatment of renal calculi. Its effects on bones were first investigated due to the apprehension that shockwaves may damage the pelvic bone inadvertently during its use in the treatment of renal calculi.

Surprisingly, it was found that whilst shockwaves had no considerable effects on intact bone, it may stimulate osteogenesis in fractures on animal

models. This led to the first studies into the effects of ESWT on the MSK system.

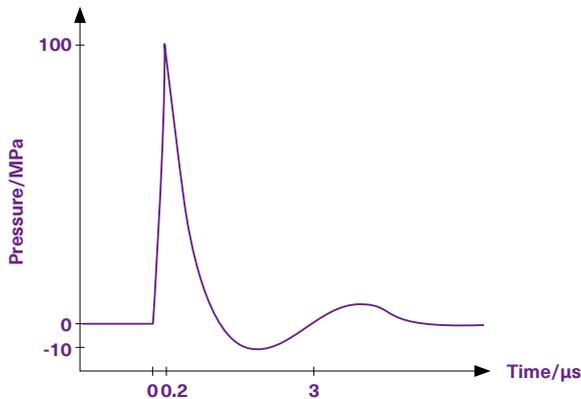
The use of ESWT has since been expanded to treat many other conditions including plantar fasciitis, lateral epicondylitis of the elbow, calcific tendinopathies of the shoulder and patella tendinopathy.

### TYPES OF SHOCKWAVES

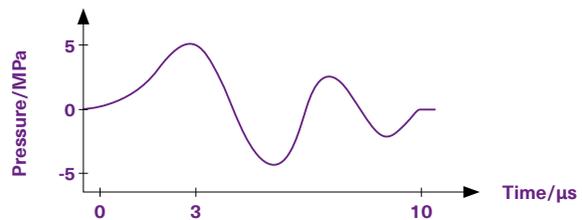
There are currently two major types of shockwaves used in ESWT: focused shockwaves and radial shockwaves.

- **Focused shockwaves** have a single pulse, with an abrupt and nearly discontinuous change in pressure, travelling faster than the speed of sound through the medium it is propagating through (*Figure 4*).
- **Radial waves** are sound waves whose physical properties significantly differ from those of focused shockwaves, with a slower rise time and a lower energy level (*Figure 5*).

### 3. EXTRACORPOREAL SHOCKWAVE THERAPY (Cont'd)



**Figure 4** Schematic pressure profile of focal shockwave (ISMST Basic Physical Principles of Shockwave)



**Figure 5** Schematic pressure profile of radial shockwave (ISMST Basic Physical Principles of Shockwave)

The use of focused shockwaves, especially at high energy levels, requires accurate identification of the area to be treated with radiographic or ultrasound guidance to avoid damage to the surrounding tissue and optimise treatment efficacy.

#### CONDITIONS TREATED WITH ESWT

##### Plantar fasciitis

The most common condition treated with ESWT within the SingHealth cluster is plantar fasciitis.

Studies have shown that ESWT has a success rate ranging from 34 to 88%, depending on the treatment protocol, devices used and methodology. In an internal audit done at Changi General Hospital, two ESWT treatments with focused shockwave therapy done one week apart had a success rate of about 70%.

##### Tendinopathies

The second most common use of ESWT in the cluster is in the treatment of tendinopathies, including:

- Tennis elbow
- Patellar tendinopathy
- Calcific tendinopathy of the rotator cuff muscles in the shoulder

In vitro studies have shown an increase in the gene expression of collagen types I and III and TGF- $\beta$ , followed by the production of nitrous oxide

and collagen synthesis in tendons subjected to shockwave therapy. It has been postulated that these mechanisms may play a part in the therapeutic effects seen by ESWT on tendinopathies.

Studies have shown treatment success rates ranging from 68 to 91% depending on the area treated, treatment protocol and device used.

**ESWT can be considered in plantar fasciitis or select tendinopathies when initial therapy with eccentric loading exercises and strength and conditioning have failed.**

#### SIDE EFFECTS AND CONTRAINDICATIONS

##### Side effects

There have been very minimal adverse effects reported for ESWT treatment, with the most common being transient pain after the treatment, ecchymosis/petechiae and dysesthesia. However, it should be noted that this procedure can be painful during application of the shockwave.

##### Contraindications

Some contraindications for the use of ESWT are:

1. Malignant tumour in the treatment area (not as underlying disease)
2. Epiphyseal plate in the treatment area
3. Severe coagulopathy

## CONCLUSION

As primary care clinics are often the first port of call for patients with musculoskeletal conditions, keeping abreast of the latest treatment modalities is crucial. With a good understanding of the options available, we are better able to advise patients and help optimise their outcomes.

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**Clin Asst Prof Mandy Zhang** | Consultant, SingHealth Duke-NUS Sport & Exercise Medicine Centre; Department of Sport & Exercise Medicine, Changi General Hospital

Clinical Assistant Professor Mandy Zhang holds postgraduate qualifications in the Membership of the Royal College of Surgeons (Edinburgh), Masters of Family Medicine (Singapore), Masters of Sports Medicine (Australia), American College of Sports Medicine (USA) as an Exercise Physiologist and a FIFA Diploma in Football Medicine.

She is the Dance Lead for the Performing Arts Medicine Centre (PAMC) and Education Deputy Director for Exercise Is Medicine Singapore. Her clinical interests include sports injury prevention, musculoskeletal sonography and performing arts medicine.



**Adj Asst Prof Lim Ang Tee** | Consultant, SingHealth Duke-NUS Sport & Exercise Medicine Centre; Department of Sport & Exercise Medicine, Changi General Hospital

Adjunct Assistant Professor Lim Ang Tee is a Sports Physician at Changi General Hospital. He has a keen interest not only in sports medicine but also in community health, chronic disease management and disability sports. Prof Lim is a designated workplace doctor, a Lasting Powers of Attorney certificate issuer and also on the panel of assessors for disability assessment for EldersShield application.



**Dr Joshua Li** | Associate Consultant, SingHealth Duke-NUS Sport & Exercise Medicine Centre; Department of Sport & Exercise Medicine, Changi General Hospital

Dr Joshua Li is an Associate Consultant Sports Physician. He currently practices at Changi General Hospital, Singapore General Hospital and the Singapore Sports Institute. His clinical interests include endurance sports and ultrasound-guided injection therapies. An avid athlete, Dr Joshua is a member of Singapore's national triathlon team and a competitive marathoner.

GPs who would like more information about platelet-rich plasma therapy can contact Dr Joshua at [joshua.li@singhealth.com.sg](mailto:joshua.li@singhealth.com.sg).



GPs can call the **SingHealth Duke-NUS Sport & Exercise Medicine Centre** for appointments at the following hotlines, or scan the QR code for more information:

**Singapore  
General Hospital**  
6326 6060

**Changi  
General Hospital**  
6788 3003

**Sengkang  
General Hospital**  
6930 6000

**KK Women's and  
Children's Hospital**  
6692 2984



# Cochlear Implantation: When Hearing Aids Are Not Enough

**Dr Joyce Tang** | Consultant, Department of Otorhinolaryngology – Head & Neck Surgery,  
 Singapore General Hospital;  
 Division of Surgery & Surgical Oncology, National Cancer Centre Singapore

Not all patients with sensorineural hearing loss may benefit adequately from hearing aids. In such cases, cochlear implantation may be a good alternative to improve hearing outcomes and boost quality of life for patients both young and old. Learn about its indications, uses and when to refer patients.

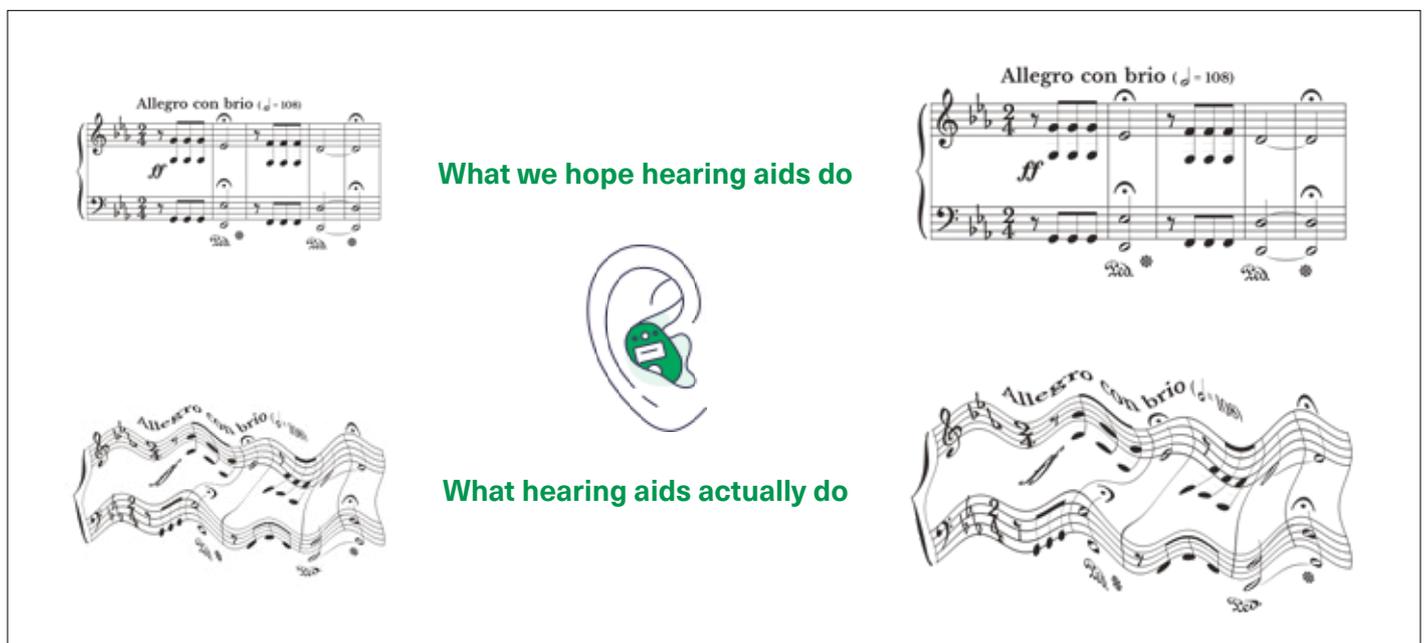
## WHAT IS SENSORINEURAL HEARING LOSS?

Sensorineural hearing loss (SNHL) is a condition in which hearing loss is due to pathology in the sensory organ of the cochlea, or in the neural pathway between the cochlea and the brain.

Unfortunately, there is no medication or surgery that can repair the damaged inner ear hair cells or the dysfunctional cochlear nerve. Hearing aids are usually prescribed.

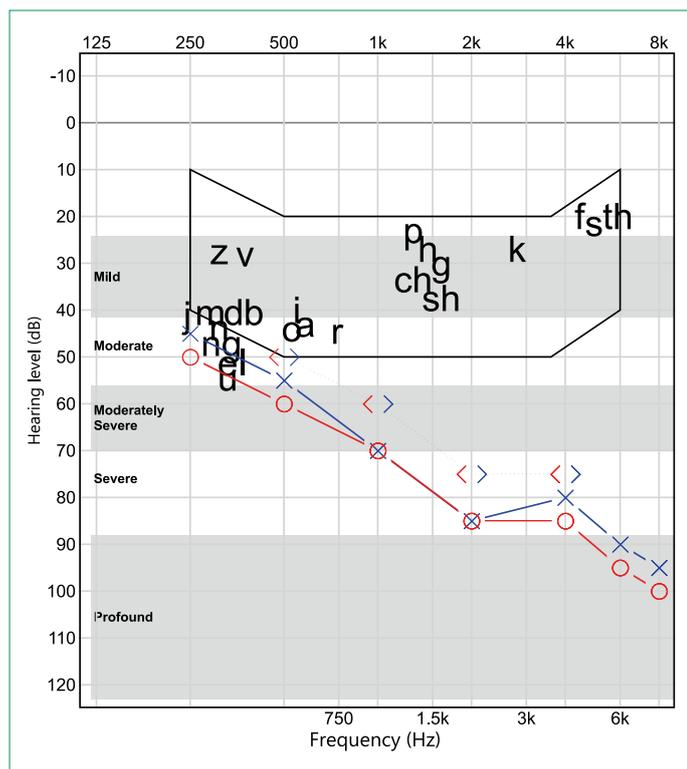
## LIMITATIONS OF HEARING AIDS

However, as demonstrated in *Figure 1*, the amplification of sound in SNHL is not straightforward. The more severe the SNHL, the more likely it is to hear significant distortion, and the more likely it is that hearing aids **amplify the presenting sound without improving the clarity of the sound**.



**Figure 1** Amplification of sound in SNHL

While someone with severe to profound hearing loss is clearly expected to have reduced clarity, someone with the below audiogram (*Figure 2*) demonstrating moderate to profound hearing loss may have similarly reduced clarity. This is due to the high-frequency hearing loss interfering with important consonants in the speech banana (superimposed in *Figure 2*).



**Figure 2** Audiogram showing moderate to profound hearing loss

While hearing aids do help in many cases of SNHL, some may not derive adequate benefit from them.

With optimised hearing aids, if the patient’s speech discrimination (in a quiet listening environment) is less than 50%, it means they have a less than 50% chance of hearing any given word correctly. Indeed, these patients would struggle even more with background noise.

**This usually indicates that the hearing aids do not provide adequate benefit and may indicate that these patients are candidates for cochlear implantation.**

## WHAT IS COCHLEAR IMPLANTATION?

Cochlear implants consist of two components: an external microphone and a speech processor, which connects transcutaneously via a magnet to the internal receiver stimulator under the skin.

This receiver stimulator converts the sound signals to electrical impulses travelling through an electrode array coiled within the cochlea. These electric impulses stimulate the auditory nerve endings in the modiolus of the cochlea, bypassing damaged hair cells.

## THE EVOLUTION OF COCHLEAR IMPLANTATION

Cochlear implants were conceived in the 1950s<sup>1</sup> and have come a long way since, from simple single-channel devices (which still managed to improve the quality of life for patients<sup>2</sup> despite not supporting speech understanding), to multi-channel devices in 1984<sup>3,4</sup>.

Current iterations of cochlear implants are slimmer than ever, and have between 12- to 22-channel electrode arrays, with receiver stimulator magnets under the skin that **permit MRIs with minimal precautions** from 1.5 to 3 Tesla. This is certainly a far cry from 10 years ago when a minor surgery would have been required to remove the magnet prior to an MRI, or MRIs were even completely prohibited.

Cochlear implantation surgery has also evolved to value **preservation of remnant cochlear reserves** if present (‘soft surgery’), leading to **improved patient hearing outcomes** especially for music appreciation.

It is an approximately two-hour surgery, and patients can opt to go home the same day or stay one night for observation.

## INDICATIONS FOR COCHLEAR IMPLANTATION

All these advancements have led to an expanding range of indications for cochlear implantation.

The primary indication would be having **bilateral profound SNHL not improved with hearing aids**. However, other valid indications currently are **bilateral severe to profound SNHL**, or even **select cases of moderate to profound SNHL with poor speech discrimination**.

## USES OF COCHLEAR IMPLANTATION

More recently, more studies have been published demonstrating the efficacy of cochlear implantations in **single-sided deafness**<sup>5</sup> (with one normal hearing ear), or **asymmetrical hearing loss** (where the contralateral ear also requires a hearing aid).

### In children

This is especially crucial in children. Previously, it was thought that with one normal hearing ear, the child develops speech and language normally and hence it was not critical to have binaural hearing. However, studies have shown that whilst some children do cope well, others struggle academically because so much cognitive effort goes into listening in noisy environments and sound localisation<sup>6</sup>.

### In adults

In adults, single-sided deafness also affects quality of life<sup>7,8</sup> and work performance<sup>9</sup>. For some, the accompanying tinnitus is worse than the hearing loss. Thankfully, this can be improved with cochlear implantation<sup>10-12</sup>.

Another impetus for cochlear implantation in single-sided deafness is the possibility of losing hearing in the contralateral ear.

With an ageing population with increased emphasis on quality of life, it is also more common now to see cochlear implantations in the older age group (over 80 years old).



## CASE STUDY

### Patient background

Mr T is a 63-year-old male with a past medical history of hypertension, dyslipidaemia, gout and neovascular macular degeneration.

He had sudden sensorineural hearing loss SNHL in his left ear in 2013 and presented in 2021 with sudden SNHL in his right ear. He had right severe SNHL and left profound SNHL.

### Evaluation and work-up

Back in 2013, MRI and blood tests performed did not reveal any abnormalities. Despite treatment, he did not recover usable hearing in his left ear but did not use a hearing aid because he had normal hearing in his right ear.

In 2021, further work-up revealed undiagnosed diabetes, but otherwise the MRI did not reveal causative brain pathology. Unfortunately, there was minimal recovery in his right ear with maximum medical therapy including transtympanic steroid injections. Additionally, he suffered from severe bilateral tinnitus.

### Hearing aid use

Mr T purchased a hearing aid which helped a little, but he was still severely disabled and found it extremely frustrating to communicate with family and colleagues.

### Cochlear implantation

He was eligible for cochlear implantation bilaterally.

In his left ear, there was a fairly long period of auditory deprivation of eight years (without hearing aid use), which would affect eventual maximum rehabilitation potential.

For the right ear, surgery would have had to be delayed till at least six months after the onset of hearing loss to await spontaneous recovery, but it would have had a much better outcome than implanting the left ear.

In the end, Mr T decided to proceed with left cochlear implantation because he felt that he still had some usable hearing on the right.

### Patient outcome

One year on, Mr T's **tinnitus is improved** when the implant is switched on, and he **hears well in quiet environments**. He has stopped using the right hearing aid because of perceived lack of benefit.

## KEY TAKEAWAYS FOR GPs

- ★ As cochlear implant technology improves and implantation become more accessible, it is important that the medical community stays updated so that we can counsel patients on its potential benefits on their quality of life.
- ★ Indeed, we should avoid thinking that sensory deprivation and deterioration is an inevitable consequence of growing older.
- ★ The next time you have a patient you find yourself shouting at to communicate (or likely just speaking to the accompanying person to avoid the trouble of communicating with a hearing-impaired person), think of whether they would benefit from hearing aids.
- ★ **If the patient says that they have tried hearing aids but they do not seem to work, they may benefit from cochlear implantation and should be referred on to a specialist.**

## THE SGH CENTRE FOR HEARING AND EAR IMPLANTS

“ The SGH Centre for Hearing and Ear Implants has the largest team of otologists, audiologists and certified auditory-verbal therapists which provides holistic care to our patients with hearing loss and balance disorders. Our team enjoys giving the joy of hearing to all patients, from babies to the elderly.

We have vast experience in hearing implants since our service began more than twenty years ago in 1997. To date, we have performed more than 600 cochlear implants, from ages seven months to 86 years.

We look forward to helping patients be proactive in their hearing health and have clear hearing – an essential ingredient to a happy and socially connected life! ”



**Dr Vanessa Tan, Director,**  
SGH Centre for Hearing and Ear Implants

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Dr Joyce Tang is an Otorhinolaryngology Consultant at Singapore General Hospital with a subspecialty interest in otology and neurotology. She regularly treats patients with hearing loss and did a fellowship with a strong focus on cochlear implants. As a keen musician herself, she is particularly interested in music appreciation for the hearing-impaired.



GP Appointment Hotline: **6326 6060**

GPs can scan the QR code for more information about the department.



# New Menopause Centre at KKH Provides One-Stop Care for Menopausal Women

Menopause is a natural biological process where the ovarian function gradually declines and permanently stops due to ageing, or when both ovaries are surgically removed.

Most women become menopausal naturally between the ages of 45 and 55 years, with the average age of onset at around 50 years.

## ABOUT THE KK MENOPAUSE CENTRE

KK Women’s and Children’s Hospital (KKH) has expanded and enhanced its menopause service to include a multi-specialty practice comprising gynaecology, family medicine, dermatology and mental health specialists, to better support the needs of the mature female population in Singapore.

The KK Menopause Centre aims to offer women easy access to effective holistic treatment, the most up-to-date information, and emotional and psycho-social support in the community. The Centre look at various aspects of a woman’s health – physical, emotional, psychological, sexual as well as chronic disease screening and prevention.

Early assessment, detection, and intervention, alongside group support, will enable all women to receive the best possible care during menopause, and continue to lead a healthy quality of life beyond this transformative phase of a woman’s life.



## OUR SERVICES

- Perimenopause
- Early menopause
- Premature ovarian insufficiency
- Menopause
- Iatrogenic menopause (medically/surgically-induced menopause)
- Cancer survivors with menopausal symptoms
- Menopausal vaginal atrophy (thinning, drying and inflammation of vaginal walls)
- Menopausal sexual dysfunction
- Osteopenia and osteoporosis
- Advice on management of menopause in patients with complex medical problems such as autoimmune conditions, blood clotting, breast cancer or high-risk breast cancer gene

## PERSONALISING CARE FOR EVERY WOMAN

Every woman's menopause experience is unique. While some go through this period with little or no issues, some women may experience hormonal changes that result in common symptoms such as:

- Hot flushes and night sweats
- Body aches and pains
- Dry skin
- Sexual dysfunction
- Urinary frequency
- Sleeping disturbance
- Mood disorder

Primary care doctors can play a critical role in recognising these symptoms and their association with menopause. Conversations can be initiated with women during clinic visits to keep them informed about potential symptoms that may present during menopause. Should the symptoms be affecting their quality of life, women are encouraged to seek medical attention.

Additionally, identifying women with early menopause is crucial. This group of women will benefit from evaluation and treatment with hormone replacement therapy until the age of natural menopause to prevent conditions such as osteoporosis and early cardiovascular disease in women.

At the KK Menopause Centre, treatments and management plans will be discussed and personalised to a woman's health needs as they journey through this transitional phase, and support their health and lifestyle in the years following menopause.

### HOW GPs CAN REFER

**KKH GP Hotline**  
**6692 2984**

**Website: [www.kkh.com.sg/menopause](http://www.kkh.com.sg/menopause)**

## OUR CARE TEAM - KK MENOPAUSE CENTRE



1

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3

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7

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**1. Associate Professor Rukshini Puvanendran**  
Co-Director & Senior Consultant

**2. Associate Professor Sadhana Nadarajah**  
Co-Director & Senior Consultant

**3. Associate Professor Ang Seng Bin**  
Advisor & Senior Consultant

**4. Dr Chuah Theng Theng**  
Consultant

**5. Dr Jean Jasmin Lee Mi Li**  
Consultant

**6. Dr Farah Safdar Husain**  
Consultant

**7. Dr Stella Sugianto**  
Associate Consultant

**8. Dr Teoh Mei Lin**  
Associate Consultant

# Helping Patients Walk Again - Restoration of Gait and Innovation (ReGAIIn) Service

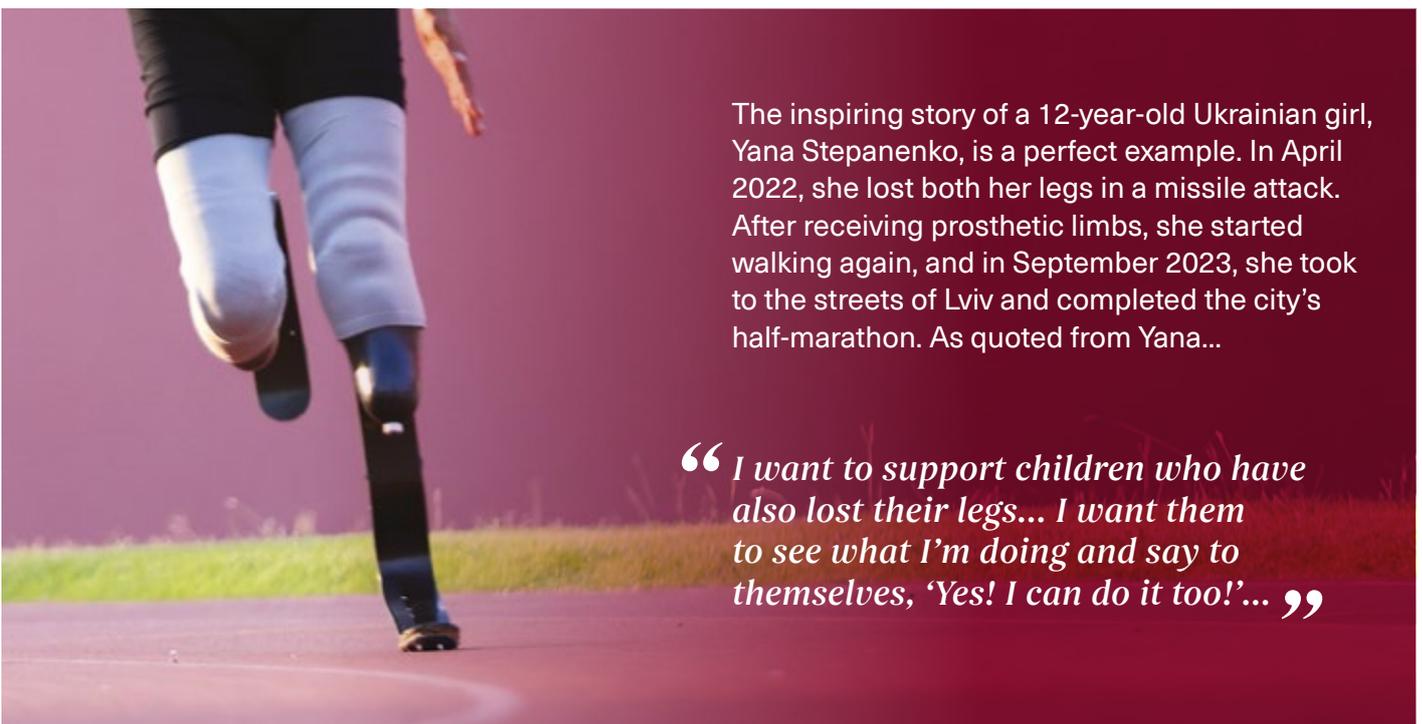
An outpatient service aimed at delivering comprehensive and one-stop inter-disciplinary care for major lower limb amputees - ReGAIIn, as the name suggests, aspires to provide the support needed to help our patients restore their walking ability and functional independence and in doing so improve their quality of life.

Changi General Hospital's (CGH) Department of Rehabilitation Medicine, in close collaboration with various allied health groups including physiotherapy, prosthetic, medical social service and nursing, launched the ReGAIIn (Restoration of Gait and Innovation) amputee rehabilitation service in September 2022.

## SERVICES OFFERED INCLUDE

- Medical assessment and prognostication
- Wound management
- Provision of customised lower limb prosthesis
- Amputee-specific physical therapy and gait training
- Social support

There is a significant number of patients from CGH who undergo major lower limb amputations. Faced suddenly with the blow of loss of limb and physical independence, it can certainly be an emotionally overwhelming experience. However, many of these patients have the potential to walk again with the aid of a prosthetic limb, and this could be a key step in them taking control of their lives again.



The inspiring story of a 12-year-old Ukrainian girl, Yana Stepanenko, is a perfect example. In April 2022, she lost both her legs in a missile attack. After receiving prosthetic limbs, she started walking again, and in September 2023, she took to the streets of Lviv and completed the city's half-marathon. As quoted from Yana...

*“I want to support children who have also lost their legs... I want them to see what I'm doing and say to themselves, 'Yes! I can do it too!'...”*

## HOW REGAIN WORKS

ReGAIN embraces proven and advanced prosthetic technology. We adopt the modular socket system (MSS) which has a fast production time and allows our patients to receive their prosthesis early – in two to four weeks from time of casting.

The lower limb prosthesis is produced from resin and fiberglass material and hand molded to a customised fit. The components of the MSS can be also individualised to cater to each patient's specific functional needs and physical abilities.

After prosthesis casting and production, the CGH care team follows up with patients for prosthesis usage assessments, and carries out further fine tuning and re-alignment of their prosthesis are offered if deemed necessary.

## TAKING A MULTIDISCIPLINARY APPROACH

Since the launch of ReGAIN, our surgical and orthopaedic colleagues have actively referred suitable patients for post amputation rehabilitation and prosthetic assessment. Many of these patients have already been fitted with prosthesis and undergone physical therapy.

## FUTURE PLANS

Heading into the future, CGH plans to introduce an individualised, step-by-step home-based exercise program to supplement the existing hospital-based physical therapy service. This will empower patients and enhance their rehabilitation journey towards physical independence and walking.

## PATIENTS THAT MAY BENEFIT FROM A REFERRAL

- Lower limb amputee
- Premorbid functional ambulators
- Prosthetic users who would like to renew their prosthesis

## HOW TO MAKE A REFERRAL

ReGAIN welcomes referrals from general practitioners, referrals can be directed to CGH, Department of Rehabilitation Medicine – ReGAIN-Amputee Rehabilitation.

The clinic is run by Dr Li Yiding and Dr Nicole Chen Hui, who are rehabilitation medicine specialists practicing in CGH.

Medical professionals who would like more information about the clinic may contact the department directly at 6936 6455.

**Appointments can be made through our GP Hotline at 6788 3003.**



# Optimising Dedicated, Multidisciplinary Care for Blood Cancers

## The SingHealth Duke-NUS Blood Cancer Centre

### ABOUT THE CENTRE

The SingHealth Duke-NUS Blood Cancer Centre (SDBCC) was formed to bring together the expertise of over forty specialists from Singapore General Hospital, KK Women's and Children's Hospital, National Cancer Centre Singapore and Sengkang General Hospital to unify the delivery of care for patients with blood cancers, conduct cutting edge research and provide professional education. This allows the centre to offer high-quality, holistic patient-centric care provided by experts trained at some of the best centres in the world.

### BLOOD CANCERS IN SINGAPORE

In Singapore, there has been a steady increase in the number of patients with blood cancers such as leukaemia, lymphoma, and myeloma.

According to the National Registry of Diseases Office, the incidence of lymphomas between 1998 to 2012 has increased by four cases per 100,000 population among males, and 2.2 cases per 100,000 population among females.

There has been a similar increase in the incidence of leukaemia and an associated group of bone marrow cancers called myeloproliferative neoplasms.

### MULTIDISCIPLINARY, INDIVIDUALISED MANAGEMENT

Many of these blood cancers are now **curable or manageable** by keeping them at bay with medications over long periods of time, such that they have become somewhat similar to chronic diseases.

Blood cancer treatment is also on its way to becoming **individualised**, such that each patient may require a carefully thought-out treatment approach based on factors specific to the individual and their cancer.

This requires good lab infrastructure and a team of lab scientists to capture and integrate this information, as well as a **dedicated and experienced team** of physicians, specialists, nurses and allied health professionals to manage and help navigate the patient through treatment.



## OUR VISION AND MISSION

Our vision is to be an international leader in blood cancer care that delivers optimal outcomes for patients.

Our mission and strategic goals are as follows:

### Clinical services

To provide a single referral channel for all blood cancers for the delivery of consistent, compassionate and advanced clinical care.

### Education

To attract and retain top-calibre talent while developing our clinicians into world-class medical leaders through lifelong continuing education in blood cancers.

### Research

To be at the forefront of translational and clinical research in order to provide innovative strategies for the diagnosis, stratification and treatment of patients with blood cancers.

## Our Services

- **Blood Cancer Diagnostics**
- **Cancer-Associated Thrombosis and Haemostasis**
- **Acute Leukaemia**
  - Acute Lymphoblastic Leukaemia
  - Acute Myeloid Leukaemia
- **Myeloid Malignancies**
  - Myelodysplastic Syndrome
  - Myeloproliferative Neoplasm
  - Chronic Myeloid Leukaemia
- **Lymphoid Malignancies**
  - Lymphoma
  - Myeloma
- **Paediatric Blood Cancers**
- **Cellular Therapy and Transplant**
  - Clinical
  - Cell Processing
  - Collection Facility
- **Blood Cancer Supportive Care and Transfusion**

**For GP referrals, please contact the SingHealth Duke-NUS Blood Cancer Centre:**

**Singapore  
General Hospital**  
6326 6060

**Sengkang  
General Hospital**  
6930 6000

**KK Women's and  
Children's Hospital**  
6692 2984

**National Cancer  
Centre Singapore**  
6436 8288

Website: [www.singhealth.com.sg/blood-cancer-centre](http://www.singhealth.com.sg/blood-cancer-centre)

## Care Team

**Head**  
**SingHealth Duke-NUS Blood Cancer Centre**

- **Assoc Prof Aloysius Ho**

**Singapore General Hospital & National Cancer Centre Singapore**  
*Department of Haematology*

- **Clin Prof Goh Yeow Tee**
- **Prof William Hwang**
- **Clin Prof Lee Lai Heng**
- **Clin Prof Ng Heng Joo**
- **Clin Assoc Prof Ang Ai Leen**
- **Assoc Prof Charles Chuah**
- **Clin Assoc Prof Linn Yeh Ching**
- **Clin Assoc Prof Tien Sim Leng**
- **Clin Assoc Prof Wong Gee Chuan**
- **Dr Chen Yunxin**
- **Dr Nicholas Grigoropoulos**
- **Dr Than Hein**
- **Dr Ho Liam Pock**
- **Dr Lao Zhentang**
- **Dr Francesca Lorraine Lim**
- **Dr Chandramouli Nagarajan**
- **Dr Tan Chuen Wen**
- **Dr Nurul Aidah**
- **Dr Cheong May Anne**
- **Dr Hartirathpal Kaur D/O Juspal Singh**
- **Dr Lawrence Ng Cheng Kiat**
- **Dr Ong Shin Yeu**
- **Dr Jeffrey Quek**
- **Dr Melinda Tan**
- **Dr Esmeralda Teo Chi Yuan**
- **Dr Tay Hui Ming**

**National Cancer Centre Singapore**  
*Department of Medical Oncology*

- **Prof Lim Soon Thye**
- **Clin Assoc Prof Miriam Tao**
- **Clin Asst Prof Mohamad Farid Bin Harunal Rashid**
- **Asst Prof Chan Yong Sheng Jason**
- **Clin Asst Prof Chiang Jianbang**
- **Clin Asst Prof Nagavalli Somasundaram**
- **Dr Chang Wei Yin Esther**
- **Dr Poon Yi Ling Eileen**
- **Dr Tan Ya Hwee**

**KK Women's and Children's Hospital**  
*Department of Paediatric Haematology/Oncology*

- **Clin Assoc Prof Chan Mei Yoke**
- **Clin Assoc Prof Joyce Lam Ching Mei**
- **Clin Assoc Prof Tan Ah Moy**
- **Adj Asst Prof Prasad Iyer**
- **Dr Michaela Seng Su-Fern**
- **Dr Soh Shui Yen**
- **Dr Enrica Tan**

**Sengkang General Hospital**  
*Department of Haematology*

- **Dr Richard Yiu**
- **Dr Denise Tan Yan**
- **Dr Tan Yan Chin**
- **Dr Ian Wu**

# Specialist Promotions & Appointments



Singapore  
General Hospital  
SingHealth

Appointments: 6326 6060 | Email: [gpnetwork@sgh.com.sg](mailto:gpnetwork@sgh.com.sg)

## Promoted to Senior Consultants



**Dr Koh Li Ying**  
*Senior Consultant*  
Dept  
**Anaesthesiology**



**Dr Phoon Hui Yi Priscilla**  
*Senior Consultant*  
Dept  
**Anaesthesiology**



**Dr Tan Yan Ru**  
*Senior Consultant*  
Dept  
**Anaesthesiology**



**Dr Teo Miqi Mavis**  
*Senior Consultant*  
Dept  
**Anaesthesiology**



**Dr Thay Yu Jia**  
*Senior Consultant*  
Dept  
**Anaesthesiology**



**Dr Xing Jieyin**  
*Senior Consultant*  
Dept  
**Anaesthesiology**



**Dr Zeng Ling, Antonia**  
*Senior Consultant*  
Dept  
**Anaesthesiology**



**Dr Lim Kok Hing**  
*Senior Consultant*  
Dept  
**Anatomical Pathology**



**Dr Chang Meihuan**  
*Senior Consultant*  
Dept  
**Colorectal Surgery**



**Dr Chidambaram Viswanath Anand**  
*Senior Consultant*  
Dept  
**Diagnostic Radiology**



**Dr Tham Wei Ping**  
*Senior Consultant*  
Dept  
**Diagnostic Radiology**



**Dr Chua Si Yong, Ivan**  
*Senior Consultant*  
Dept  
**Emergency Medicine**



**Dr Rama Chandran Suresh**  
*Senior Consultant*  
Dept  
**Endocrinology**



**Dr Ravishankar Asokkumar**  
*Senior Consultant*  
Dept  
**Gastroenterology & Hepatology**



**Dr Ong Ming Liang, Andrew**  
*Senior Consultant*  
Dept  
**Gastroenterology & Hepatology**



**Dr Ennaliza Salazar**  
*Senior Consultant*  
Dept  
**Gastroenterology & Hepatology**



**Dr Yip King Fan**  
*Senior Consultant*  
Dept  
**Geriatric Medicine**



**Dr Yap Tze Jin Robert**  
*Senior Consultant*  
Dept  
**Hand & Reconstructive Microsurgery**

# Specialist Promotions & Appointments



Singapore  
General Hospital  
SingHealth

Appointments: 6326 6060 | Email: [gpnetwork@sgh.com.sg](mailto:gpnetwork@sgh.com.sg)

## Promoted to Senior Consultants



## Promoted to Consultants





## Promoted to Consultants



**Dr Chen Hui, Lionel Raphael**  
Consultant  
Dept  
Colorectal Surgery



**Dr Koo Chee Hoe**  
Consultant  
Dept  
Colorectal Surgery



**Dr Hui Li Yao, Laura**  
Consultant  
Dept  
Dermatology



**Dr Choong Chu Ming, Mindy**  
Consultant  
Dept  
Diagnostic Radiology



**Dr Hou Wenlu**  
Consultant  
Dept  
Diagnostic Radiology



**Dr Sivashankar Subramaniam**  
Consultant  
Dept  
Diagnostic Radiology



**Dr Tan Jin Rong**  
Consultant  
Dept  
Diagnostic Radiology



**Dr Tran Nguyen Tuan Anh**  
Consultant  
Dept  
Diagnostic Radiology



**Dr Wong Chen Pong**  
Consultant  
Dept  
Diagnostic Radiology



**Dr Wong Hui Lin**  
Consultant  
Dept  
Diagnostic Radiology



**Dr Ho Fu Wah Andrew**  
Consultant  
Dept  
Emergency Medicine



**Dr Marcus Lee Aik Beng**  
Consultant  
Dept  
Emergency Medicine



**Dr Lim Kim Wei**  
Consultant  
Dept  
Gastroenterology & Hepatology



**Dr Tay Shu Wen**  
Consultant  
Dept  
Gastroenterology & Hepatology



**Dr Teh Kim Jun, Kevin**  
Consultant  
Dept  
Gastroenterology & Hepatology



**Dr Wu Chun Ho, Clement**  
Consultant  
Dept  
Gastroenterology & Hepatology



**Dr Benjamin Poh Ruimin**  
Consultant  
Dept  
General Surgery



**Dr Eliza Sin I-Lin**  
Consultant  
Dept  
General Surgery



**Dr Fong Sheng**  
Consultant  
Dept  
Geriatric Medicine



**Dr Tay Yu Ling**  
Consultant  
Dept  
Geriatric Medicine



**Dr Joyce Tie Lin**  
Consultant  
Dept  
Hand & Reconstructive Microsurgery

# Specialist Promotions & Appointments



Singapore  
General Hospital  
SingHealth

Appointments: 6326 6060 | Email: [gpnetwork@sgh.com.sg](mailto:gpnetwork@sgh.com.sg)

## Promoted to Consultants



**Dr Tan Hwee Leong**  
*Consultant*  
Dept  
**Hepato-pancreato-  
biliary & Transplant  
Surgery**



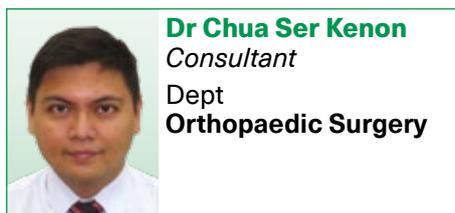
**Dr Dorothy Ng Hui Lin**  
*Consultant*  
Dept  
**Infectious Diseases**



**Dr Wee Liang En, Ian**  
*Consultant*  
Dept  
**Infectious Diseases**



**Dr Lai Chooi Mun,  
Deborah**  
*Consultant*  
Dept  
**Molecular Pathology**



**Dr Chua Ser Kenon**  
*Consultant*  
Dept  
**Orthopaedic Surgery**



**Dr Kiang Lei**  
*Consultant*  
Dept  
**Orthopaedic Surgery**



**Dr Liu Xuan**  
*Consultant*  
Dept  
**Orthopaedic Surgery**



**Dr Bryon Teo Jun  
Xiong**  
*Consultant*  
Dept  
**Orthopaedic Surgery**



**Dr Leong Zhou Hao**  
*Consultant*  
Dept  
**Otorhinolaryngology -  
Head & Neck Surgery**



**Dr Henry Chua Wenjie**  
*Consultant*  
Dept  
**Pain Medicine**



**Dr Tan Sein Jieh,  
Elizabeth**  
*Consultant*  
Dept  
**Pain Medicine**



**Dr Zhang Qianpian**  
*Consultant*  
Dept  
**Pain Medicine**



**Dr Liew Zhong Hong**  
*Consultant*  
Dept  
**Renal Medicine**



**Dr Tan Chee Wooi**  
*Consultant*  
Dept  
**Renal Medicine**



**Dr Koh Siew Hui,  
Michelle**  
*Consultant*  
Dept  
**Respiratory & Critical  
Care Medicine**



**Dr Cheng Ming Hua**  
*Consultant*  
Dept  
**Surgical Intensive Care**



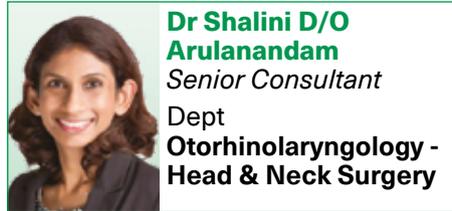
**Dr Yong Jin**  
*Consultant*  
Dept  
**Urology**



**Dr Tan Zehao**  
*Consultant*  
Dept  
**Vascular &  
Interventional  
Radiology**



## Appointed as Senior Consultants



## Appointed as Consultant



## Appointed as Associate Consultants



# Specialist Promotions & Appointments



Singapore  
General Hospital  
SingHealth

Appointments: 6326 6060 | Email: gpnetwork@sgh.com.sg

## Appointed as Associate Consultants



**Dr Tan Yu Guang**  
*Associate Consultant*  
Dept  
**Urology**



Changi  
General Hospital  
SingHealth

Appointments: 6788 3003

## New Appointments



**Clin Assoc Prof How Choon How**  
*Senior Consultant;*  
*Deputy Chairman,*  
*Medical Board*  
*(Continuity Care Disciplines)*



**Dr Chow Weien**  
*Chief &*  
*Senior Consultant*  
Dept  
**Cardiology**



**Dr Chang Ngai Kin, Christopher**  
*Head &*  
*Senior Consultant*  
**Division of Care &**  
**Health Integration**



**Dr Anindita Santosa**  
*Head & Consultant*  
**Division of**  
**Rheumatology**

## Promoted to Senior Consultants



**Dr Crystal Wong Shie Lyeen**  
*Senior Consultant*  
Dept  
**Laboratory Medicine**



**Dr Lim Chau Sian**  
*Senior Consultant*  
Dept  
**Psychological**  
**Medicine**



**Dr David Teo Choon Liang**  
*Senior Consultant*  
Dept  
**Psychological**  
**Medicine**



**Dr Aza Abdulmawjood Taha Taha**  
*Senior Consultant*  
Dept  
**Respiratory & Critical**  
**Care Medicine**



**Dr Loh Chee Hong (Lu Zhihong)**  
*Senior Consultant*  
Dept  
**Respiratory & Critical**  
**Care Medicine**



**Dr Quah Lishan Jessica**  
*Senior Consultant*  
Dept  
**Respiratory & Critical**  
**Care Medicine**



## Promoted to Consultants



**Dr Lim Ang Tee**  
*Senior Consultant*  
Dept  
**Sport & Exercise  
Medicine**



**Dr Ching Siok Siong**  
*Senior Consultant*  
Dept  
**Surgery**



**Dr Lin Jinlin**  
*Senior Consultant*  
Dept  
**Surgery**



**Dr Lee Man Xin**  
*Consultant*  
Dept  
**Accident &  
Emergency**



**Dr Chan Wan Fen**  
*Consultant*  
Dept  
**Anaesthesia &  
Surgical Intensive Care**



**Dr Ling Xi Wern**  
*Consultant*  
Dept  
**Anaesthesia &  
Surgical Intensive Care**



**Dr Jessica Eleanor  
Malanjum**  
*Consultant*  
Dept  
**Anaesthesia &  
Surgical Intensive Care**



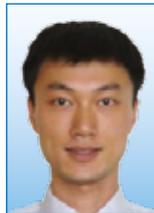
**Dr Tan Chun Lei**  
*Consultant*  
Dept  
**Anaesthesia &  
Surgical Intensive Care**



**Dr Zhang Xinyan**  
*Consultant*  
Dept  
**Anaesthesia &  
Surgical Intensive Care**



**Dr Seet Yert Li  
Melissa**  
*Consultant*  
Division of Breast  
**Surgery**



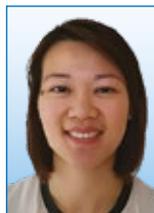
**Dr Zhang Han**  
*Consultant*  
Dept  
**Diagnostic Radiology**



**Dr Zeng Wanling**  
*Consultant*  
Dept  
**Endocrinology**



**Dr Lin Weicong,  
Kenneth**  
*Consultant*  
Dept  
**Gastroenterology &  
Hepatology**



**Dr Chau Shi Min  
Christine (Zhou  
Shimin Christine)**  
*Consultant*  
Dept  
**Geriatric Medicine**



**Dr Sng Chong Yu  
Edwin (Sun Chongyu)**  
*Consultant*  
Dept  
**Infectious Diseases**



**Dr John Loh Ming Ren**  
*Consultant*  
Dept  
**Otorhinolaryngology -  
Head & Neck Surgery**



**Dr Pang Cui-Ying,  
Maria Judith**  
*Consultant*  
Dept  
**Otorhinolaryngology -  
Head & Neck Surgery**



**Dr Li Yiding**  
*Consultant*  
Dept  
**Rehabilitation  
Medicine**



**Dr Sieow Yu-Fang,  
Nicole**  
*Consultant*  
Dept  
**Respiratory & Critical  
Care Medicine**



**Dr Andrew Khor Yu  
Keat**  
*Consultant*  
Division of  
**Rheumatology**



**Dr Tan Aik Khien,  
Victor (Chen Yiqin,  
Victor)**  
*Consultant*  
Dept  
**Sport & Exercise  
Medicine**

# Specialist Promotions & Appointments



Changi  
General Hospital  
SingHealth

Appointments: 6788 3003

## Appointed as Associate Consultants



**Dr Gan Zhi-Wei  
Jonathan**  
*Associate Consultant*  
Dept  
**Orthopaedic Surgery**



**Dr Ong King Jane  
(Wang Qing'en)**  
*Associate Consultant*  
**Division of Palliative  
Medicine**



**Dr Lim Baoying**  
*Associate Consultant*  
Dept  
**Sport & Exercise  
Medicine**



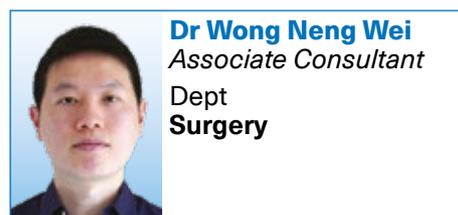
**Dr Ong Tze Hui  
Stephanie**  
*Associate Consultant*  
Dept  
**Sport & Exercise  
Medicine**



**Dr Xu Cunzhi**  
*Associate Consultant*  
Dept  
**Sport & Exercise  
Medicine**



**Dr Tan Hiang Jin**  
*Associate Consultant*  
Dept  
**Surgery**



**Dr Wong Neng Wei**  
*Associate Consultant*  
Dept  
**Surgery**



Sengkang  
General Hospital  
SingHealth

Appointments: 6930 6000 | Email: [appointments@skh.com.sg](mailto:appointments@skh.com.sg)

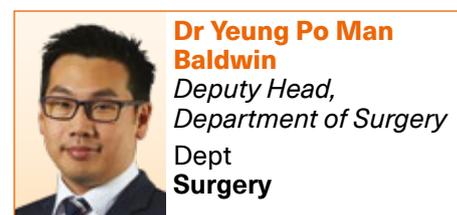
## New Appointment



**Dr Kiran Sharma**  
*Head & Consultant*  
Dept  
**Intensive Care  
Medicine**



**A/Prof Tan Jianhong  
Winson**  
*Head, Colorectal  
Surgery Service*  
Dept  
**Surgery**



**Dr Yeung Po Man  
Baldwin**  
*Deputy Head,  
Department of Surgery*  
Dept  
**Surgery**

## Promoted to Senior Consultants



**Dr Pek Jen Heng**  
*Senior Consultant*  
Dept  
**Emergency Medicine**



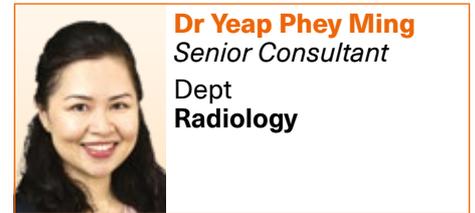
**Dr Pooja Sachdeva**  
*Senior Consultant*  
Dept  
**Internal Medicine**



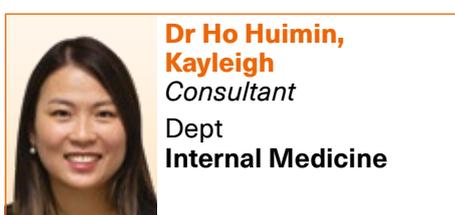
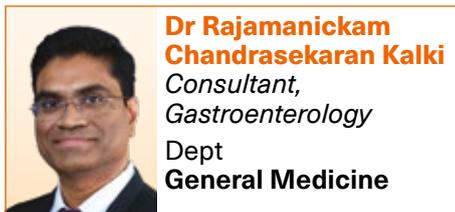
**Dr Siow Wei Ming**  
*Senior Consultant*  
Dept  
**Orthopaedic Surgery**



## Promoted to Senior Consultants



## Promoted to Consultants



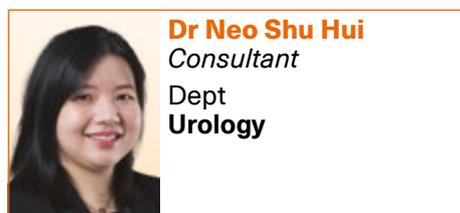
# Specialist Promotions & Appointments



Sengkang  
General Hospital  
SingHealth

Appointments: 6930 6000 | Email: [appointments@skh.com.sg](mailto:appointments@skh.com.sg)

## Promoted to Consultants



## Appointed as Associate Consultants





## Appointed as Associate Consultants



**Dr Tan Shao Ern,  
Timothy**  
*Associate Consultant*  
Dept  
**Diagnostic and  
Interventional Imaging**



**Dr Chua Cherie**  
*Associate Consultant*  
**Endocrinology Service**



**Dr Sarah Chong Xin**  
*Associate Consultant*  
**Haematology/  
Oncology Service**



**Dr Li Mingyue**  
*Associate Consultant*  
Dept  
**Maternal Fetal  
Medicine**



**Dr Han Youxiang  
Jonathan**  
*Associate Consultant*  
**Minimally Invasive  
Surgery Unit**



**Dr Sandhya G  
Krishnan**  
*Associate Consultant*  
Dept  
**Neonatology**



**Dr Cassandra Cheong  
Pei Shan**  
*Associate Consultant*  
Dept  
**Obstetrics and  
Gynaecology**



**Dr He Song**  
*Associate Consultant*  
Dept  
**Obstetrics and  
Gynaecology**



**Dr Lim Poh Ting**  
*Associate Consultant*  
Dept  
**Obstetrics and  
Gynaecology**



**Dr Yong Xiaoqi**  
*Associate Consultant*  
Dept  
**Obstetrics and  
Gynaecology**



**Dr Chou Andrew Chia  
Chen**  
*Associate Consultant*  
Dept  
**Orthopaedic Surgery**



**Dr Hsieh Ku-Hung  
Michael**  
*Associate Consultant*  
Dept  
**Plastic, Reconstructive  
and Aesthetic Surgery**



**Dr Loh Hong Yan,  
Abigail**  
*Associate Consultant*  
Dept  
**Psychological  
Medicine**



**Dr Chen Ning, Lynn**  
*Associate Consultant*  
Dept  
**Women's Anaesthesia**

# Specialist Promotions & Appointments



National Dental  
Centre Singapore  
SingHealth

Appointments: 6324 8798 | Email: [appointment@ndcs.com.sg](mailto:appointment@ndcs.com.sg)

## Promoted to Senior Consultants



## Promoted to Consultants



## Appointed as Associate Consultants





National Heart  
Centre Singapore  
SingHealth

**Appointments: 6704 2222 | Email: [central.appt@nhcs.com.sg](mailto:central.appt@nhcs.com.sg)**

## Appointed as Associate Consultant



**Dr Ong Wei Sheng,  
Jonathan**  
*Associate Consultant*  
Dept  
**Cardiology**



National  
Neuroscience Institute  
SingHealth

**Appointments:**  
**(SGH Campus) 6326 6060**  
**(TTSH Campus) 6330 6363**

**Email:**  
**[gpnetwork@sgh.com.sg](mailto:gpnetwork@sgh.com.sg)**  
**[appointments@nni.com.sg](mailto:appointments@nni.com.sg)**

## New Appointments



**Assoc Prof Sitoh  
Yih Yian**  
*Chief Risk Officer, NNI;  
Senior Consultant*  
Dept  
**Neuroradiology**



**Dr Thomas Tan Choo  
Heng**  
*Head & Consultant*  
**Neurosurgery Service  
(NNI@SKH)**

## Promoted to Senior Consultants



**Dr Pang Yee Hau**  
*Senior Consultant*  
Dept  
**Neurology**



**Dr Ling Ji Min**  
*Head & Senior  
Consultant*  
**Neurosurgery Service  
(NNI@CGH)**

## Promoted to Consultants



**Dr Chiew Yi Rong**  
*Consultant*  
Dept  
**Neurology**



**Dr Chuang Ding Fang**  
*Consultant*  
Dept  
**Neurology**



**Dr Sarah Hasnor Binti  
Abu Hassan**  
*Consultant*  
Dept  
**Neurology**

# Specialist Promotions & Appointments



National  
Neuroscience Institute  
SingHealth

**Appointments:**  
(SGH Campus) 6326 6060  
(TTSH Campus) 6330 6363

**Email:**  
gpnetwork@sgh.com.sg  
appointments@nni.com.sg

## Promoted to Consultants



**Dr Kong Yongyao**  
*Consultant*  
Dept  
**Neurology**



**Dr Lai Yexian,  
Jonathan**  
*Consultant*  
Dept  
**Neurology**



**Dr Ng Chai Ching**  
*Consultant*  
Dept  
**Neurology**



**Dr Ong Chiew Sern**  
*Consultant*  
Dept  
**Neurology**



**Dr Sumit Kumar Sonu**  
*Consultant*  
Dept  
**Neurology**



**Dr Ang Ya Lyn  
Samantha**  
*Consultant*  
Dept  
**Neurosurgery**

## Appointed as Associate Consultant



**Dr Jinesh Mukesh  
Shah**  
*Associate Consultant*  
Dept  
**Neurology**



Singapore National  
Eye Centre  
SingHealth

**Appointments:** 6322 9399 | **Email:** appointments@snecc.com.sg

## Promoted to Senior Consultants



**Dr Kelvin Teo Yi Chung**  
*Senior Consultant*  
Dept  
**Medical Retina  
Department**  
Sub-specialty  
**Ophthalmology**



**Dr Yong Kailing**  
*Senior Consultant*  
Dept  
**Oculoplastic  
Department**  
Sub-specialty  
**Ophthalmology**



**Dr Daniel Chua  
Kai Peng**  
*Senior Consultant*  
Dept  
**Refractive Surgery  
Department**  
Sub-specialty  
**Ophthalmology**



## Promoted to Senior Consultants



**Dr Cheung Ning Danny**  
*Senior Consultant*  
Dept  
**Surgical Retina Department**  
Sub-specialty  
**Ophthalmology**



**Dr Andrew Tsai Shih Hsiang**  
*Senior Consultant*  
Dept  
**Surgical Retina Department**  
Sub-specialty  
**Ophthalmology**

## Promoted to Consultants



**Dr Chan Hiok Hong**  
*Consultant*  
Dept  
**Cataract & Comprehensive Ophthalmology Department**  
Sub-specialty  
**Ophthalmology**



**Dr Milton Chew Cher Yong**  
*Consultant*  
Dept  
**Cataract & Comprehensive Ophthalmology Department**  
Sub-specialty  
**Ophthalmology**



**Dr Jane Lim Sujuan**  
*Consultant*  
Dept  
**Cataract & Comprehensive Ophthalmology Department**  
Sub-specialty  
**Ophthalmology**



**Dr Bryan Sim Xiangrong**  
*Consultant*  
Dept  
**Cataract & Comprehensive Ophthalmology Department**  
Sub-specialty  
**Ophthalmology**



**Dr Seshasai Sudarshan**  
*Consultant*  
Dept  
**Cataract & Comprehensive Ophthalmology Department**  
Sub-specialty  
**Ophthalmology**



**Dr Lee Yi Fang**  
*Consultant*  
Dept  
**Glaucoma Department**  
Sub-specialty  
**Ophthalmology**

## Embark on a Life-Changing Journey with a Career at SingHealth

If you are a qualified doctor, a challenging career awaits you at SingHealth. We seek suitably qualified candidates to join us as:

- SENIOR CONSULTANTS/CONSULTANTS/ASSOCIATE CONSULTANTS
- RESIDENT PHYSICIANS
- STAFF REGISTRARS/SERVICE REGISTRARS

Interested applicants are to email your CV with full personal particulars, educational and professional qualifications (including housemanship details), career history, present and expected salary, names of at least two professional references, contact numbers and email address together with a non-returnable photograph.

Please email your CV to the respective institutions' email addresses/online career portals with the Reference Number DM2310.



The SingHealth Duke-NUS Academic Medical Centre draws on the collective strengths of SingHealth and Duke-NUS Medical School to drive the transformation of healthcare and provide affordable, accessible, quality healthcare.

With 42 clinical specialties, a network of 4 Hospitals, 5 National Specialty Centres, 8 Polyclinics and 3 Community Hospitals, it delivers comprehensive, multidisciplinary and integrated care.

### ■ Singapore General Hospital

#### Departments seeking:

##### Resident Physicians and Staff Registrars

- Anaesthesiology
- Breast Surgery
- Colorectal Surgery
- Diagnostic Radiology
- Emergency Medicine
- ENT- Head & Neck Surgery
- Family Medicine & Continuing Care (Health Assessment Centre)
- Gastroenterology & Hepatology
- General Surgery
- Haematology
- Hand & Reconstructive Microsurgery
- Infectious Diseases
- Orthopaedic Surgery (Sport & Exercise Medicine Centre)
- Plastic, Reconstructive & Aesthetic Surgery
- Rehabilitation Medicine
- Renal Medicine
- Rheumatology & Immunology
- SPRinT (Sarcoma, Peritoneal & Rare Tumours)
- Staff Clinic
- Vascular Surgery
- Urology

##### Associate Consultant/Consultant/ Senior Consultant

- Anatomical Pathology
- Occupational & Environmental Medicine
- SPRinT (Sarcoma, Peritoneal & Rare Tumours)
- Clinical Epidemiologist
- Microbiology (Diagnostic Bacteriology Section)

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

Career Portal: [www.sgh.com.sg/careers](http://www.sgh.com.sg/careers)

Email: [careers.medical@sgh.com.sg](mailto:careers.medical@sgh.com.sg)

### ■ Changi General Hospital

#### Departments seeking:

##### Resident Physicians and Staff Registrars

- General Medicine
- Palliative Medicine
- Cardiology
- Endocrinology
- Geriatric Medicine
- Rehabilitation Medicine
- Gastroenterology & Hepatology
- Infectious Diseases
- Plastic, Reconstructive & Aesthetic Surgery Service
- Surgery
- Breast Surgery
- Orthopaedic Surgery
- Otorhinolaryngology-Head & Neck Surgery
- Ophthalmology (Eye)
- Anaesthesia and Surgical Intensive Care
- Neurosurgery
- Urology
- Accident & Emergency
- Care & Health Integration
- Diagnostic Radiology
- Home Medical Service
- Aviation Medicine

##### Associate Consultants/Consultant/Specialist

- Infectious Diseases
- Accident & Emergency
- Rheumatology
- Laboratory Medicine
- Aviation Medicine
- Anaesthesia and Surgical Intensive Care
- Surgery
- Orthopaedic Surgery
- Otorhinolaryngology - Head & Neck Surgery
- Urology
- Neurosurgery
- Ophthalmology (Eye)

#### Dental Surgeon

- Oral & Maxillofacial

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

Email: [medical\\_hr@cgh.com.sg](mailto:medical_hr@cgh.com.sg)

### ■ Sengkang General Hospital

#### Departments seeking:

##### Resident Physicians and Staff Registrars

- Anaesthesiology
- Breast Surgery Service
- Cardiology
- Emergency Medicine
- Surgery
- General Medicine
- Intensive Care Medicine
- Orthopaedic Surgery (with interest in Hand Surgery and Orthopaedic Surgery)
- Otorhinolaryngology - Head & Neck Surgery
- Plastic, Reconstructive & Aesthetic Surgery Service
- Psychiatry
- Radiology
- Urology
- Vascular Surgery Service

##### Senior Consultant, Consultant, Associate Consultant

- Emergency Medicine
- Otorhinolaryngology - Head & Neck Surgery
- Pathology
- Radiology

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

Career Portal: [www.skh.com.sg/careers/Pages/careers.aspx](http://www.skh.com.sg/careers/Pages/careers.aspx)

Email: [careers@skh.com.sg](mailto:careers@skh.com.sg)

### ■ KK Women's and Children's Hospital

#### Departments seeking:

##### Associate Consultants/Consultants/ Senior Consultants

- Pathology & Laboratory Medicine (Gynaecologic & Breast Pathologist, Microbiologist and Chemical Pathologist)
- Diagnostic & Interventional Imaging
- Child Development
- Dermatology
- Paediatric Anaesthesia
- Otolaryngology
- Maternal Fetal Medicine
- Gynae Oncology
- Orthopaedic Surgery

##### Consultants

- Psychological Medicine
- Women's Anaesthesia

##### Staff Physician

- Maternal Fetal Medicine

##### Staff Registrars

- Child Development
- Diagnostic & Interventional Imaging
- Urogynaecology

##### Family Physician

- Family Medicine

##### Resident Physicians

- Diagnostic & Interventional Imaging
- Emergency Medicine
- Obstetrics & Gynaecology
- Paediatric Medicine
- Paediatric Surgery
- Psychological Medicine
- Women's Anaesthesia
- Neonatology
- Urogynaecology

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

Email: [medical.hr@kkh.com.sg](mailto:medical.hr@kkh.com.sg)

### ■ National Cancer Centre Singapore

#### Departments seeking Resident Physicians:

- Radiation Oncology
- Supportive & Palliative Care

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

Email: [HR-Clinical@nccs.com.sg](mailto:HR-Clinical@nccs.com.sg)

### ■ National Dental Centre Singapore

#### Departments seeking:

- Consultant, Geriatric Special Dentistry Care
- Dental Surgeon, Oral & Maxillofacial Surgery
- Dental Officer, Dental Officers Advanced Practice Programme

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

Career Portal: [www.ndcs.com.sg/careers/dentists](http://www.ndcs.com.sg/careers/dentists)

Email: [chen.si.fan@ndcs.com.sg](mailto:chen.si.fan@ndcs.com.sg)

### ■ National Heart Centre Singapore

#### Departments seeking:

##### Consultant (Electrophysiology & Pacing)

- Cardiology

##### Resident Physicians and Staff Registrars

- Cardiology
- Cardiothoracic Surgery

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

Email: [goh.bing.xue@nhcs.com.sg](mailto:goh.bing.xue@nhcs.com.sg)

[felicia.lim.s.h@nhcs.com.sg](mailto:felicia.lim.s.h@nhcs.com.sg)

### ■ National Neuroscience Institute

#### Departments seeking:

##### Resident Physicians and Service Registrars

- Neurology
- Neuroradiology
- Neurosurgery

##### Associate Consultant, Consultant, Senior Consultant

- Neurology
- Neuroradiology
- Neurosurgery

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

Email: [nni\\_hr@nni.com.sg](mailto:nni_hr@nni.com.sg)

### ■ Singapore National Eye Centre

#### Departments seeking

- Clinical Associate
- Resident Physician, Ophthalmology
- Staff Registrar, Ophthalmology

##### Senior Consultant, Consultant, Associate Consultant

- Oculoplastic
- Ocular Inflammation and Immunology

For more information, please visit the Career Opportunities section on the Singapore National Eye Centre website.

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

Email: [recruitment@snec.com.sg](mailto:recruitment@snec.com.sg)

### ■ SingHealth Community Hospitals (Sengkang Community Hospital and Outram Community Hospital)

#### Department seeking:

##### Staff Registrars, Resident Physicians

- Family Medicine

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

Career Portal: [www.singhealth.com.sg/sch/careers](http://www.singhealth.com.sg/sch/careers)

Email: [schrecruitment@singhealthch.com.sg](mailto:schrecruitment@singhealthch.com.sg)

## SGH Lunchtime GP Q+A Session

Meet our specialists as they address your questions on the latest updates in their specialty area, patient care and the referral process.

<b>Date</b> Wednesdays	<b>Time</b> 1pm to 2pm	<b>Hosted via</b> Zoom Webinar	<b>Free Admission</b>
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Date	Session 1 (1pm to 1.30pm)	Session 2 (1.30pm to 2pm)
07 Feb	<b>Dept of Otorhinolaryngology- Head and Neck Surgery</b> Dr Brenda Sim Ling Hui (Consultant)	<b>Dept of Upper Gastrointestinal &amp; Bariatric Surgery</b> Dr Eugene Lim Kee Wee (Senior Consultant)
06 Mar	<b>National Dental Centre Singapore, Dept of Orthodontics</b> Dr Low Yuxuan (Associate Consultant)	<b>Dept of Orthopaedic Surgery</b> Dr Kenon Chua (Consultant)
13 Mar	<b>Dept of Head &amp; Neck Surgery</b> Dr Shannon Nicholas Brian (Associate Consultant)	<b>Dept of Renal Medicine</b> Dr Irene Mok Yanjia (Senior Consultant)
17 Apr	<b>Dept of Urology</b> Dr Tan Yu Guang (Associate Consultant)	<b>Dept of Pain Medicine</b> Dr Lim Zhen Wei (Consultant)
08 May	<b>Dept of Rheumatology &amp; Immunology</b> A/Prof Katy Leung Ying Ying (Senior Consultant)	<b>National Heart Centre Singapore</b>
29 May	<b>Dept of Infectious Diseases</b>	<b>Dept of Orthopaedic Surgery</b>
12 June	<b>Dept of Hepatopancreatobiliary and Transplant Surgery</b> Dr Tan Hwee Leong (Consultant)	<b>Dept of Plastic, Reconstructive &amp; Aesthetic Surgery</b> Dr Fong Hui Chai (Associate Consultant)
03 Jul	<b>Dept of Neurology</b> Dr Sonu Sumit Kumar (Consultant)	<b>Dept of Neurosurgery</b> Dr Lester Lee Chee Hoe (Consultant)
10 Jul	<b>Dept of Gastroenterology and Hepatology</b> Clin Asst Prof Ravishankar Asokkumar (Senior Consultant)	<b>Dept of Colorectal Surgery</b> Dr Ernest Eu Wencong (Service Senior Resident)
14 Aug	<b>Dept of Respiratory and Critical Care Medicine</b> Dr Carrie Leong Kah Lai (Consultant)	<b>Dept of Hand and Reconstructive Microsurgery</b> Dr Chung Sze Ryn (Consultant)
11 Sep	<b>Dept of Vascular Surgery</b> Dr Chng Siew Ping (Senior Consultant)	<b>Dept of Haematology</b> Dr Marvin Raden Torres De Guzman (Associate Consultant)
09 Oct	<b>Dept of Breast Surgery</b> Dr Sim Yirong (Senior Consultant)	<b>Dept of Psychiatry</b> Dr Ng Kah Wee (Senior Consultant)
16 Oct	<b>Dept of Endocrinology</b>	<b>Dept of Dermatology</b> A/Prof Lee Haur Yueh (Head & Senior Consultant) and Dr Karen Choo Jui Lin (Consultant)
13 Nov	<b>Dept of Obstetrics &amp; Gynaecology</b> Dr Rajesh Hemashree (Senior Consultant)	<b>Dept of Nuclear Medicine and Molecular Imaging</b> Dr Charlene Tang Yu Lin (Consultant)



Scan the QR code to register.

For enquiries and to submit questions, please email to [gpnetwork@sgh.com.sg](mailto:gpnetwork@sgh.com.sg).



# Discover The Latest in Sleep Medicine Singapore Sleep Conference 2024



<b>Date</b> 22 and 23 March 2024 (Friday and Saturday)	<b>Time</b> 2.30pm to 4.40pm	<b>Venue</b> Academia, 20 College Road, Singapore 169856	<b>8 points</b> <b>(Pending approval)</b>
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Join us for an insightful two-day conference which will cover various topics in sleep medicine, including:

- Alternatives to continuous positive airway pressure treatment
- Technological innovation in sleep medicine
- The latest in obstructive sleep apnoea surgery and research
- Managing complex sleep issues in children

Consisting of lectures, discussions and workshops, the two-day conference aims to share evidence-based knowledge to enhance physicians' understanding of sleep medicine for better patient outcomes.



**Scan the QR code to register and for more information.**  
Registration closes 7 March 2024 (Thursday).



## HOTLINES



### GP Fast Track Appointment Hotlines

 Singapore General Hospital <b>6326 6060</b>	 KK Women's and Children's Hospital <b>6692 2984</b>	 National Heart Centre Singapore <b>6704 2222</b>
 Changi General Hospital <b>6788 3003</b>	 National Cancer Centre Singapore <b>6436 8288</b>	 National Neuroscience Institute <b>6330 6363</b>
 Sengkang General Hospital <b>6930 6000</b>	 National Dental Centre Singapore <b>6324 8798</b>	 Singapore National Eye Centre <b>6322 9399</b>