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MCI (P) 041/09/2022

## Breast Conditions

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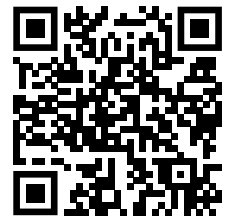
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# New Breast Imaging Modalities in the Assessment of Abnormal Breast Findings: Digital Breast Tomosynthesis and Contrast-Enhanced Spectral Mammogram

**Dr Amanda Liew Ling Fung**

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**3D mammograms and contrasted mammograms: what are they, and why do general practitioners need to know about them? Although you may not encounter these imaging techniques often in your daily practice, you may occasionally have patients asking about them, particularly given our increasingly health-conscious population.**

Patients participating in the national breast cancer screening programme who have abnormal findings on initial screening mammograms will often be recalled for further assessment, which entails usage of newer techniques such as 3D mammograms and contrasted mammograms. This article provides an overview of their indications, utility and limitations.

# 1. DIGITAL BREAST TOMOSYNTHESIS

## WHAT IS DIGITAL BREAST TOMOSYNTHESIS?

Digital breast tomosynthesis (DBT), also known as **3D mammogram**, is a type of mammography that uses X-rays to produce detailed three-dimensional images of the breast tissue.

### How does it work?

It involves multiple projections acquired across an arc that are reconstructed into a series of stacked images. The tomosynthesis data set can then be used to recreate two-dimensional images using synthetic mammography (SM), producing images almost equivalent to those of the traditional full-field digital mammography (FFDM).<sup>1</sup>

Hence, in a DBT study, you will get a series of stacked images of each breast in two views and a set of synthesised mammogram which is almost of traditional mammogram equivalence.

## WHEN AND WHY DO WE USE DBT?

The stacked images from DBT **facilitate visualisation, localisation and characterisation of a lesion.**

### Further assessment of asymmetric density on screening mammogram

Some patients may be recalled for assessment of asymmetric density present on the screening mammogram. The multiple sections and additional angles

available with DBT imaging often **allow the resolution of areas of normal superimposed tissue** that may present as summations or higher density areas in FFDM.

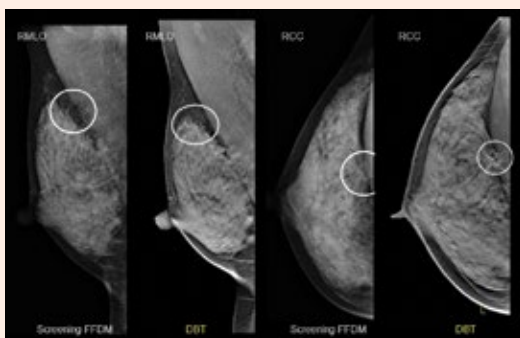
If the supplementary ultrasound also did not reveal any significant abnormalities, patients can usually be discharged back to routine rescreening without further investigation or biopsy.

### Detecting mammographic architectural distortion

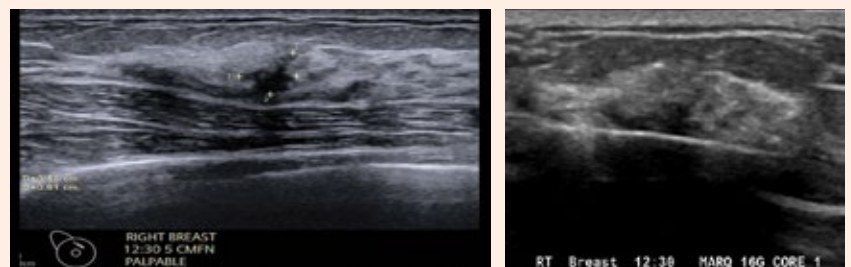
The beauty of DBT lies in its ability to **comprehensively assess mammographic architectural distortion**, the most common missed abnormality in interval cancers. It has also been shown to improve the detection of such distortion.

**Figure 1A** shows an example of a patient with extremely dense breasts, who was recalled for assessment of possible architectural distortion in the right breast. The area of distortion was incredibly subtle on the screening mammogram. In fact, it was missed by one reader, but was depicted clearly on DBT.

Supplementary ultrasound examination showed a corresponding irregular hypoechoic lesion which was suspicious in nature, and was biopsied under ultrasound guidance (**Figure 1B**). Histology yielded invasive ductal carcinoma with lobular differentiation.



**Figure 1A** Architectural distortion in the 1200 position of the right breast (indicated by the white circles) as seen on the DBT



**Figure 1B** Supplementary ultrasound examination

### Lower recall rates and increased cancer detection rates

Some countries with historically high breast cancer screening recall rates have managed to **significantly lower their recall rates and improve specificity** after replacing FFDM with DBT imaging as a first-line screening tool (FFDM remains as the first-line screening tool in Singapore).

Prospective and retrospective observational studies have reported a 15% to 63% decrease in recall rate.<sup>1-5</sup>

Other studies have demonstrated an **increase in cancer detection rate (CDR)** after employing DBT as a screening tool. In particular, there was a higher pick-up rate of both smaller as well as lower-grade malignancies.<sup>1-3</sup>

That said, its long-term impact on patient survival remains uncertain as breast cancer survival benefits

are difficult to prove without extended follow-up and/or randomised controlled trials.


### DBT use in Singapore

**DBT is not currently used as a screening tool in Singapore.** It is associated with longer acquisition and interpretation times owing to the larger image set.

There is also a slight increase in radiation dose with DBT relative to FFDM.

**Currently, it serves as an adjunct problem-solving imaging tool in the hospital setting to assess abnormal breast findings and assist in lesion-localisation for biopsy.**

Ongoing research to reduce DBT reading time and improve its imaging performance may change the status quo.<sup>1</sup>



## COMMON QUESTIONS THAT PATIENTS MAY ASK

**Q HOW MUCH MORE RADIATION DOES DBT HAVE COMPARED TO A NORMAL MAMMOGRAM?**


**A** In a review by Svahn et al., the authors concluded that while using DBT plus FFDM increases radiation dose by a factor of up to 2.25 compared with FFDM alone, using SM to replace the FFDM portion can bring the radiation dose to a level comparable to that of FFDM alone.<sup>4</sup>

According to Skaane et al., the dose with DBT plus SM is reported to be just 19% higher than that with FFDM alone. The use of SM in place of FFDM with DBT provides similar outcomes while reducing radiation dose.<sup>5</sup>

In summary, modern-day DBT imaging has a **similar or just slightly higher radiation dose** as compared to a normal mammogram.

**Q I HAVE HEARD ABOUT THIS 'SPECIAL MAMMOGRAM'. AM I ABLE TO GO FOR IT?**

**A** DBT is only indicated in certain specific cases, which first **requires an initial evaluation by a breast surgeon or radiologist.** This facility is only available in hospitals and not in government polyclinics.



## 2. CONTRAST-ENHANCED SPECTRAL MAMMOGRAM

### WHAT IS A CONTRAST-ENHANCED SPECTRAL MAMMOGRAM?

Contrast-enhanced spectral mammogram (CESM) provides additional information beyond a conventional mammogram and **may aid earlier detection of some cancers**. It is a recent development in digital mammography that utilises dual-energy exposure following the injection of an iodinated contrast agent.<sup>5-6</sup>

#### How does it work?

Typically, an iodinated contrast agent (1.5 ml/kg of body weight) will be administered to the patient via intravenous injection. Two minutes later, standard mediolateral oblique (MLO) and craniocaudal (CC) projections will be undertaken on each breast.

Each projection will receive two exposures, one with a low energy (around 30 kVp) and the other with a high energy (around 45 kVp). A specific dual-energy image recombination algorithm is used to subtract the low- and high-energy images, resulting in an 'iodine uptake map'.

Hence, there will be two sets of images in a CESM study:

1. A set of low-energy images, which looks like a conventional mammogram
2. A set of recombined images, which displays contrast medium uptake

The entire process usually takes about 30 minutes.<sup>6-7</sup>

CESM, likened to MRI breasts, leverages on tumoural neoangiogenesis.<sup>8,9</sup> It provides both morphological information, similar to a routine mammogram, and functional information about a lesion's enhancement pattern. Several studies have demonstrated the **superior sensitivity and low false positive rates** of CESM, with studies exploring its potential as an alternative to MRI breasts in breast cancer staging and problem solving.<sup>6-8</sup>

#### CESM use in Singapore

This imaging technique has been available in Singapore for the last five to eight years. We have found it

relatively easy to adopt in a hospital setting, and it has been helpful in our clinical practice.

### WHEN AND WHY DO WE USE CESM?

#### Indications

CESM is indicated:

- For the evaluation of an ultrasound-occult asymmetric density
- For delineation of tumour extent
- As a problem-solving tool in complicated cases

#### Contraindications

Contraindications for CESM are identical to contrast-enhanced CT scans, which include:

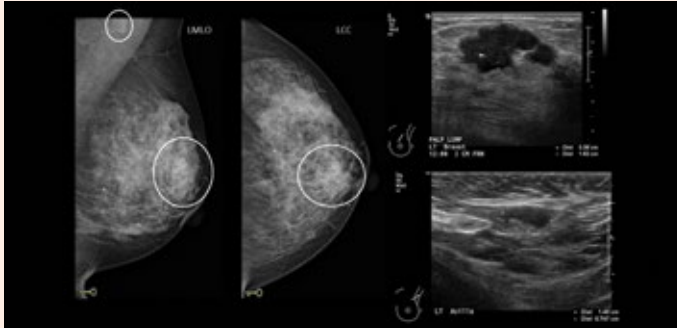
- Renal impairment
- Contrast allergy
- Asthma
- Pregnancy (due to radiation) – the radiation dose of CESM relative to mammogram reportedly ranges from 1.06 to 1.43<sup>7</sup>

#### Improving diagnostic accuracy and care

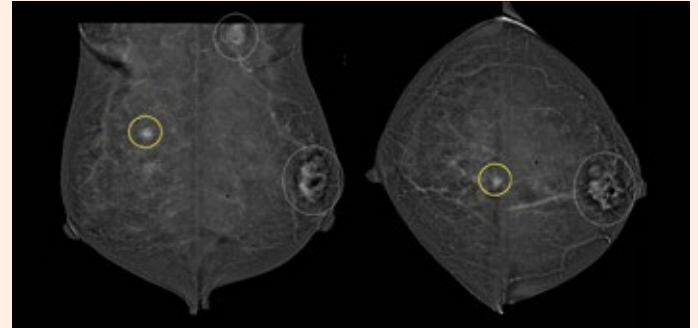
The addition of CESM to our workflow has helped improve diagnostic accuracy and patient care. As an example, the initial assessment of a patient with abnormal findings in the left breast showed a suspicious mass and an indeterminate left axillary lymph node. They were biopsied under ultrasound guidance and proven to be invasive breast cancer and metastatic left axillary adenopathy respectively (**Figure 2A**).

The addition of CESM into the workflow enabled the detection of an additional enhancing lesion in the right breast (**Figure 2B**) which was not visible on routine mammogram and ultrasound. This enhancing lesion in the right breast, detected only on CESM, was also subsequently proven to be invasive breast cancer.

According to reports, the false positive rate of CESM is comparable to or even lower than that of MRI breasts.<sup>9</sup> There is ongoing research into CESM screening and CESM-guided biopsy, with this imaging technique having generated a fair bit of excitement among the breast imaging community.



**Figure 2A** Initial assessment showing a suspicious, palpable, lobulated, and hypoechoic mass in the 1200 position of the left breast and an indeterminate left axillary lymph node with an eccentrically thickened cortex (indicated by the white circles)



**Figure 2B** CESM showing the biopsied proven left breast cancer and left axillary adenopathy (indicated by the white circles), and also an additional enhancing lesion in the 1200 position of the right breast (indicated by the yellow circle)



## COMMON QUESTIONS THAT PATIENTS MAY ASK

### Q WILL THERE BE AN ALLERGIC REACTION RELATED TO CONTRAST ADMINISTRATION IN CESM? HOW IS IT MANAGED?

- A**
- Administration of an iodinated contrast agent is essential to the examination and, like any other contrast-enhanced CT examination, carries a **small risk of allergic reactions**. These occur in less than 1% of cases and are **typically mild and self-limiting**.
  - In one of the largest studies, out of 839 women who underwent CESM, there were only five with minor reactions (0.6%). Four of these resolved without any medical intervention, and one patient experienced urticaria and breathlessness and was treated with intravenous corticosteroids with complete resolution of symptoms.<sup>10</sup>
  - Late reactions are usually self-limiting and require no specific therapy except for symptomatic treatments such as antihistamines and corticosteroids.<sup>10</sup> If symptoms persist or worsen, a referral to an allergic specialist for further management should be considered.
  - Please refer to local guidelines for the management of contrast reactions.

### Q WILL THERE BE CONTRAST-INDUCED NEPHROPATHY RELATED TO CONTRAST ADMINISTRATION IN CESM?

- A**
- The incidence of contrast-induced nephropathy (CIN) has been reported to range from **0% to 24%**. This wide range is attributed to differences in definition, background risk factors, type and dosage of the contrast medium used.<sup>12</sup>
- In a recent nationwide audit in the United Kingdom, no cases of post-contrast acute kidney injury were identified in 3,590 outpatients.<sup>6,13</sup>
- CIN is **usually transient and reversible**, and tends to improve within three to seven days.<sup>6,11-12</sup>
  - Patient eligibility for contrast administration is carefully considered. In a fit outpatient without any history of renal disease or other risk factors (e.g., advanced age or diabetes), there is likely to be a negligible risk of acute kidney injury with the administration of a contrast agent.<sup>6</sup>
  - We also typically advise our patients to maintain adequate oral hydration following the examination, as this is an important preventive measure for CIN.<sup>11-12</sup>

## CONCLUSION

DBT and CESM are relatively new breast imaging techniques that have recently cemented their places in clinical practice. They are practical tools that we use in the hospital setting, and a brief understanding of them may help in communication with your patients and for continuity of care.



## REFERENCES

1. Chong A, Weinstein SP, McDonald ES, Conant EF. Digital Breast Tomosynthesis: Concepts and Clinical Practice. *Radiology*. 2019;292(1):1-14. doi:10.1148/radiol.2019180760
2. Conant EF, Beaber EF, Sprague BL, et al. Breast cancer screening using tomosynthesis in combination with digital mammography compared to digital mammography alone: a cohort study within the PROSPR consortium. *Breast Cancer Res Treat*. 2016;156(1):109-116. doi:10.1007/s10549-016-3695-1
3. Sharpe RE, Venkataraman S, Phillips J, et al. Increased Cancer Detection Rate and Variations in the Recall Rate Resulting from Implementation of 3D Digital Breast Tomosynthesis into a Population-based Screening Program. *Radiology*. 2016;278(3):698-706. doi:10.1148/radiol.2015142036
4. Svahn TM, Houssami N, Sechopoulos I, Mattsson S. Review of radiation dose estimates in digital breast tomosynthesis relative to those in two-view full-field digital mammography. *The Breast*. 2015;24(2):93-99. doi:10.1016/j.breast.2014.12.002
5. Skaane P, Bandos AI, Gullien R, et al. Prospective trial comparing full-field digital mammography (FFDM) versus combined FFDM and tomosynthesis in a population-based screening programme using independent double reading with arbitration. *Eur Radiol*. 2013;23(8):2061-2071. doi:10.1007/s00330-013-2820-3

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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and Children's  
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Singapore**  
6322 9399





# The Most Common Breast Biopsy Questions Patients Ask

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Breast biopsies are commonly requested for, sometimes for a mass and sometimes arising from breast screening. Often, the patient may wish to discuss more with their general practitioner (GP) or breast surgeon before agreeing to the biopsy.

Understandably, the patient may be rather anxious at this point. Thus, this list of commonly asked questions and suggested answers may be useful to GPs in guiding them through the biopsy journey and alleviating their concerns.



## TOP 8 COMMONLY ASKED QUESTIONS AND SUGGESTED ANSWERS

### 1. WHY IS A BREAST BIOPSY NEEDED?

**A biopsy of the breast may be necessary if the patient has symptoms such as a solid breast lump or other signs of breast cancer.**

The biopsy may be performed freehand if it is large enough, but may also be image-guided for better accuracy in smaller lesions.

A small amount of tissue is removed to be analysed by the pathologist. If the sample is cancerous, the

hormone receptor status in the pathology report can provide information on the treatment options for the patient.

Biopsies are also recommended when:

- There are unusual findings on a mammogram, ultrasound or other breast imaging
- The surgeons or radiologists are not absolutely certain that the findings are benign

## TOP 8 COMMONLY ASKED QUESTIONS AND SUGGESTED ANSWERS (Continued)

### 2. WHAT IS THE DIFFERENCE BETWEEN A CORE VERSUS VACUUM-ASSISTED BREAST BIOPSY?

Both procedures can be performed under image guidance and are commonly done with ultrasound guidance.

- A **core biopsy** device only takes one sample at a time and will have to be reinserted into the breast each time.
- A **vacuum-assisted core biopsy** utilises vacuum assistance to help suction in the adjacent breast tissue for sampling. Thus, it can take numerous samples continuously without the need for reinsertion, and often removes the entire small lesion.

#### Core Biopsy<sup>1</sup>

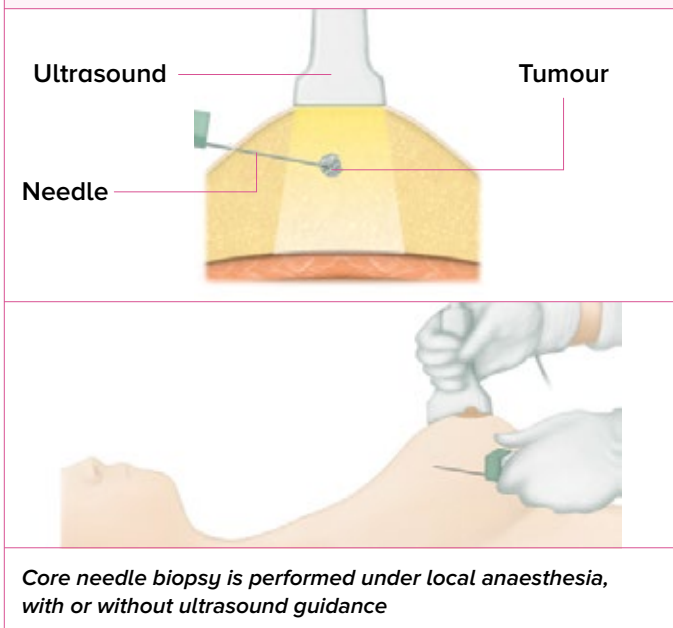
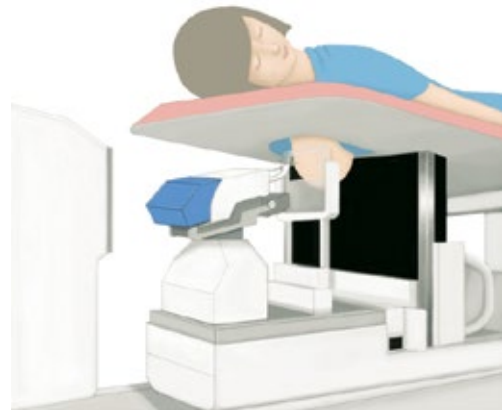


Figure 1

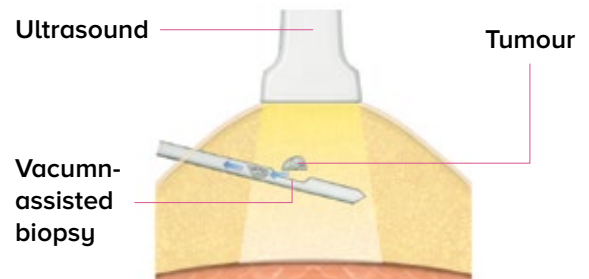
#### Vacuum-assisted Core Needle Breast Biopsy<sup>1</sup>

##### Stereotactic-guided



*Stereotactic (mammographic)-guided biopsy for mammographic lesions is performed under local anaesthesia by radiologists*

##### Ultrasound-guided



*Ultrasound-guided biopsy for lesions visible with ultrasound is performed under local anaesthesia by radiologists and surgeons*

Figure 2

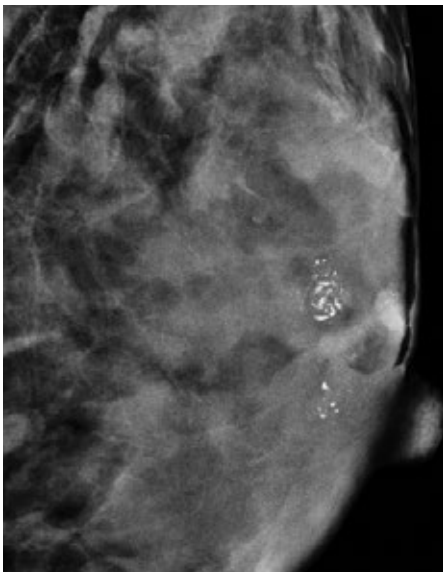
### 3. WHICH TYPE OF BREAST BIOPSY IS PERFORMED ON A PATIENT?

**This will depend on the size and imaging characteristics of the lesion to be biopsied.**

Typically, we recommend an ultrasound-guided core biopsy for a sizeable palpable mass that is visible on ultrasound. However, sometimes a vacuum-assisted biopsy is recommended if the lesion is very small.

The breast radiologist will review all the patient's prior imaging to make the appropriate biopsy recommendation.

Sometimes, a tiny breast biopsy marker made of titanium will be necessary to mark the biopsied area, which will not set off any airport alarms and is safe for future MRI scans if needed. The patient should not be able to feel the biopsy marker after it has been placed.



**Figure 3** Suspicious microcalcifications in the central breast detected on this screening mammogram would require histopathological correlation with mammographic-guided vacuum-assisted biopsy to confirm ductal carcinoma in situ

### 4. ARE BREAST BIOPSIES VERY PAINFUL?

Generally, the breast biopsy is performed under local anaesthesia which numbs the skin for the expected half hour of the biopsy, and is generally tolerable.

### 5. WHAT ARE THE POST-BIOPSY CARE INSTRUCTIONS?

The biopsy wound is normally only about 5 mm wide with either Steri-Strips or a topical skin adhesive for wound opposition, so no stitches are involved and the small scar will slowly fade away with time.

We ask patients to keep the area clean and dry for at least 24 hours. When necessary, patients are informed to keep the compression bandage on for 24 hours.

The patient should return to breast imaging for evaluation during working hours, or the emergency department after office hours, if:

- There is continued fresh bleeding through the bandage
- There are signs of infection such as fever, swelling, erythema and warmth

It is expected to have a small haematoma post-biopsy or even bruising, depending on the size of the area biopsied.

### 6. WHAT IF THE BREAST TISSUE IS VERY THIN? CAN BIOPSY BE PERFORMED?

**If the breast tissue is very thin, the patient may not be able to undergo a stereotactic biopsy safely.**

If we are able to visualise the abnormality on ultrasound, it can be sampled with ultrasound guidance. However, if it is not visible on ultrasound, the patient is referred to a breast surgeon for surgical excisional biopsy.

## TOP 8 COMMONLY ASKED QUESTIONS AND SUGGESTED ANSWERS (Continued)

### 7. WHAT IF THE MASS IS TOO CLOSE TO THE CHEST WALL OR SKIN SURFACE?

If the mass is very close to the chest wall or skin surface, we may still safely biopsy by using **hydrodissection** (injection of fluids) to create a safe plane between the skin and mass, or to lift up the mass from the chest wall to facilitate the biopsy. These preparations will be done by the experienced breast radiologist interventionist.

### 8. WHAT IF THE PATIENT IS ALLERGIC TO CONTRAST?

We do not use iodinated contrast for routine breast biopsy procedures, therefore it is generally safe for such patients to undergo biopsy.

If the patient is recommended to obtain an MRI-guided biopsy procedure, the contrast we use is gadolinium, which is different from iodinated contrast in CT imaging studies. The biopsy technique using contrast-enhanced mammogram is rather new locally and not often used.

### REFERENCE

1. SingHealth Duke-NUS Breast Centre. Your Breast Health Booklet, Making Informed Choices. Jan 2018. Accessed from: <https://www.singhealth.com.sg/patient-care/patient-education/breast-health>



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**National Cancer Centre Singapore**  
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# Breast Cancer in Young Women: The Crucial Role of Primary Care

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**Women under 40 years of age account for one in six cases of breast cancer diagnosed annually, yet diagnosis is often delayed impairing survival outcomes. General practitioners can play a crucial role including raising awareness, early detection, and referral to shared care with the oncology team to manage patients during systemic treatment.**

## INTRODUCTION

Breast cancer is the most commonly diagnosed cancer in Singaporean women with nearly six new cases diagnosed each day. It is a lethal disease, being the leading cause of cancer deaths among Singaporean women and accounting for one in six of all-cause mortality.

## RISK FACTORS OF BREAST CANCER

Typical risk factors associated with breast cancer include:

- Personal history of breast cancer or non-cancerous breast conditions
- Family history of breast cancers
- Radiation exposure
- Increasing age

However, the vast majority of four in five women diagnosed with breast cancer do not have any identifiable risk factors.

The incidence of breast cancer rises with age, with the peak incidence in the fifth to sixth decades of life.

**It is important to remember that breast cancer can also affect younger women, with one out of six cases of breast cancer diagnosed in those under 40 years old, though this is often overlooked.**



## BREAST CANCER IN YOUNG WOMEN

### More aggressive cancer biology

Breast cancer in young women is associated with more aggressive biology being enriched for triple-negative, HER2-positive and luminal B subtypes. They are of a higher grade and tend to present at a later stage. The reasons for late stage of presentation are complex and multifactorial.

### Lack of awareness and regular self-examination

Two in five young women do not do regular breast self-examinations (BSE), and a general lack of awareness

about breast cancer results in delayed presentation to healthcare providers, delayed investigations and diagnosis, and hence delayed treatment.

### Limitations of screening modalities

The current screening modalities such as mammograms are not always ideal for younger women due to differences in breast tissue density. Younger women tend to have denser breast tissue, resulting in lower sensitivity of mammography in detecting breast cancer.

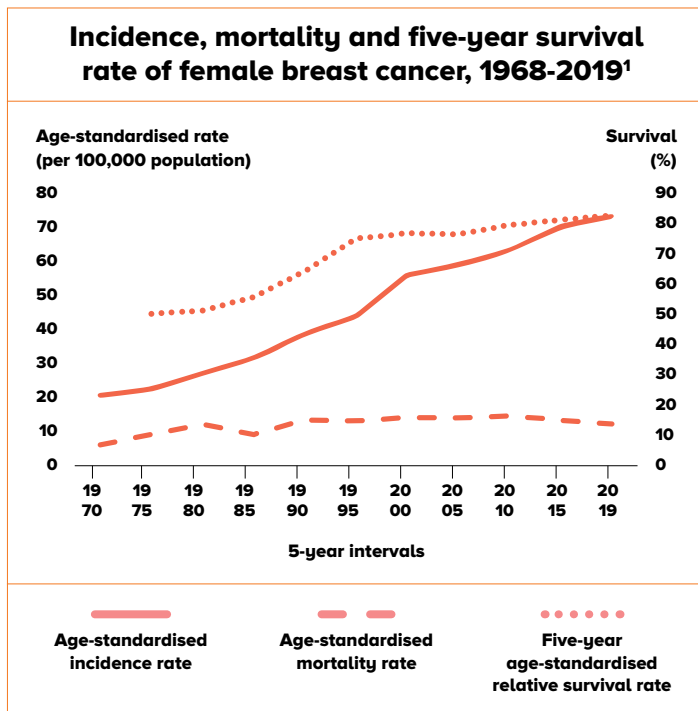


Figure 1

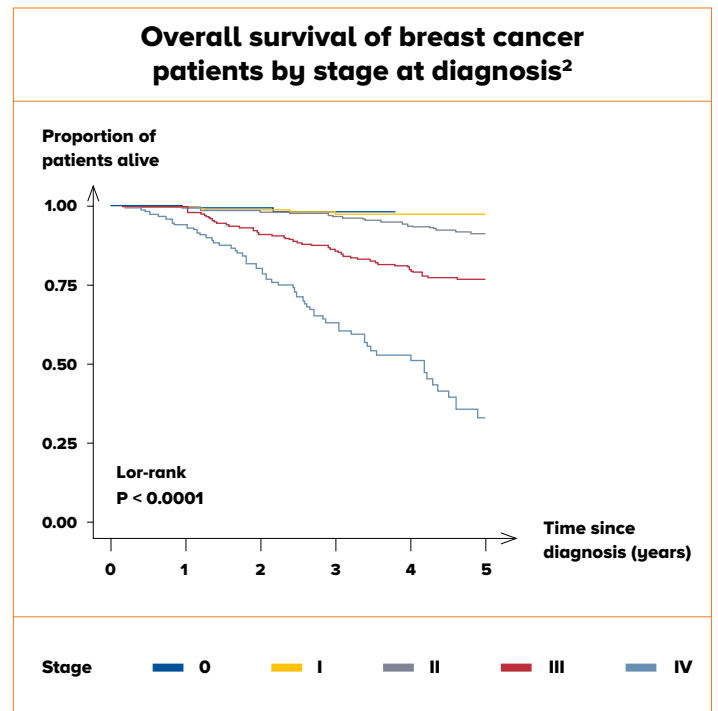


Figure 2

## HOW GPs CAN HELP IMPROVE SURVIVAL OUTCOMES

Early diagnosis is associated with improved survival outcomes.

**Primary care physicians play a key role in raising awareness, early detection and referral of breast cancer in young women.**

They must work closely with the oncology team throughout the patient journey by helping to manage:

- Side effects
- Holistic care
- Survivorship and wellness care

## CASE STUDY

### Patient background

Ms L is a 31-year-old single lady with no past medical history nor significant family history. She noticed a painful breast nodule in July 2022, and was then referred by her company doctor to see a breast surgeon in October 2022.

### Investigations

A **breast ultrasound** detected a solid nodule, reported as probably benign. After consultation with the surgeon, she underwent an **excision biopsy** in late November 2022 which unfortunately revealed an aggressive invasive carcinoma.

Staging investigations done subsequently yielded extensive regional nodal involvement on PET CT. There was no evidence of distant metastasis.

### Diagnosis

A **lymph node biopsy** confirmed the presence of nodal spread, hence a diagnosis of **locally advanced, clinical T2N3M0 invasive breast carcinoma** was confirmed.

### Treatment

Due to the advanced nature of her breast cancer, she was recommended **neoadjuvant chemotherapy** with **plans for subsequent surgery**.

## NEOADJUVANT CHEMOTHERAPY

Increasingly, there is a move towards neoadjuvant chemotherapy prior to surgery for patients with breast cancer. This is especially the case for young women with locally advanced and aggressive tumours.

### Benefits of neoadjuvant chemotherapy

1. Downstaging of the tumour
  - Increases rates of breast conservation surgery, in contrast with mastectomy
2. Early treatment of micrometastatic disease
3. Permits evaluation of effectiveness of systemic therapy in in situ tumour
  - Pathological complete response is a strong surrogate endpoint for event-free survival (EFS)
4. Allows tailoring of further adjuvant treatment by risk-stratifying higher-risk patients who have residual disease, to receive additional therapies or a change in therapies
  - E.g., capecitabine as per CREATE-X or T-DM1 as per KATHERINE
5. Allows time for genetic testing
6. Allows time to plan reconstruction (if desired)

## WHY EARLY GP REFERRAL IS CRUCIAL

### Identifying symptoms

Breast cancer is often perceived as a disease that primarily affects older women, leading to a lower suspicion of breast cancer in young patients. This could potentially result in missing its early signs and symptoms.

Younger women may develop other breast lumps including fibroadenomas or have cyclical fibrocystic change. **However, should symptoms persist, these patients should still receive an expedited referral for specialist breast evaluation including further imaging.**

### Importance of early referral

In Ms L's case, five months had passed from her initial presentation to when she was able to start treatment for her breast cancer. With aggressive locally advanced breast cancers, treatment delays are associated with poorer overall survival rates.

**Hence, it is imperative to commence treatment as soon as possible, and early referral to a breast surgeon is key if there is any clinical suspicion.**

## SYMPTOMS AND SIGNS AMONG YOUNG WOMEN

### Self-examination

Screening mammograms do not start till age 40, hence most young patients only present after they exhibit symptoms.

Regular monthly BSE is also often neglected in the young and should be emphasised. In a 2017 survey commissioned by the Breast Cancer Foundation (BCF), though the majority of Singaporeans regard breast cancer as dangerous, only 62% of females reported ever doing a BSE.

### Symptoms

Young patients may present with symptoms similar to older patients, including:

- Breast or axillary lumps
- Skin changes such as thickening or swelling (including peau d'orange)
- Persistent uniductal bloody or brownish nipple discharge, including bloody discharge

These symptoms may occur with other benign conditions, however **having a low index of suspicion should prompt earlier evaluation, imaging and specialist consultation.**

## CHALLENGES FACED BY YOUNG WOMEN WITH BREAST CANCER

Breast cancer in young women presents multiple challenges and should be managed by a dedicated multidisciplinary team with special focus on their specific needs.

Unique issues faced by young women with breast cancer include:

- **Diagnostic delays**
- **More aggressive disease biology** – chemotherapy is more often indicated
- Higher risk for inheritable **genetic mutations** – commonly *BRCA1* and *BRCA2*, among others
- **Fertility and pregnancy concerns** – chemotherapy and hormonal therapy in the treatment of breast cancer may result in premature ovarian failure or affect fertility
- **Social functioning** – relationships, young families with dependents
- **Work and financial stability**
- **Psychological distress** – anxiety, depression
- **Body image** concerns after breast surgery

## WHAT BREAST CHANGES TO LOOK OUT FOR

**A**

### CHANGES IN BREAST SHAPE



Dimple



Bump



New shape or size



Skin sores



Growing vein



Hard lump

**B**

### CHANGES IN SKIN SURFACE



Thickened skin



Red or hot



Orange peel skin

**C**

### CHANGES IN NIPPLE



Nipple crust



Unusual discharge



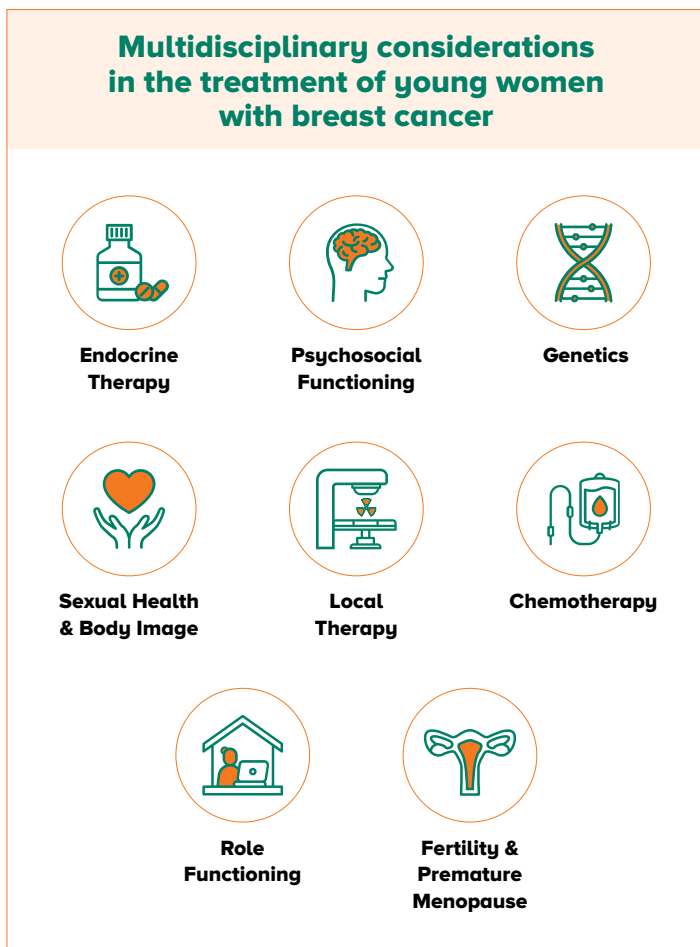
Sunken nipple





- **Sexuality and sexual dysfunction** – this is a sensitive topic in Asian culture, and may stem from multiple factors (e.g., side effects of treatment, body image issues, mood and confidence issues)
- **Survivorship** – life, relationships and work after cancer; getting back to a new normal; dealing with the side effects of the treatment administered

Facing the often unexpected diagnosis of cancer, together with the barrage of attendant issues above, can often be overwhelming and isolating. The care of a young woman with breast cancer requires a dedicated, specialised team trained to actively look out for and manage all the medical and non-medical aspects of treatment (**Figure 3**).



**Figure 3**  
 Adapted from Tesch M & Partridge A. ASCO Ed Book 2022. Howard-Anderson J et al. JNCI 2012

## SHARED CARE WITH GPs DURING SYSTEMIC TREATMENT

While patients undergo treatment, most will experience some side effects. Some of these patients may present to primary care, especially if after-hours.

**Conditions that require attention during systemic treatment include:**

### 1. Uncontrolled vomiting

Patients are given antiemetics. However, despite this, some patients continue to have significant vomiting and should be referred back to hospital if they exhibit signs of dehydration.

### 2. Fever

Patients with ongoing chemotherapy are at risk for myelosuppression and neutropaenia. If they present with a high fever of 38 degrees or above, they should be assessed for risk of febrile neutropaenia and referred back to hospital for further management.

### 3. Mucositis

Patients may consult their GP for pain relating to oral ulcers and mucositis.

**After treatment is complete, the oncology team will work closely with the primary care team to:**

- Help the patient integrate back to a new normal
- Monitor for medical and non-medical issues that may occur while on surveillance
- Follow-up on her cancer



**KEY TAKEAWAYS FOR GPs**



- ★ Young women do get breast cancer, and these women have **unique needs** and issues.
- ★ **Early detection and treatment** of breast cancer improves survival greatly.
- ★ A **strong support system** is essential to management, which requires a dedicated and specialised multidisciplinary team working hand-in-hand with the patient, family and primary healthcare team.
- ★ **Increased awareness** of the importance of regular monthly BSE, even in young women, should be emphasised with **early referral** for assessment and treatment if required.

**THE YOUNG WOMEN WITH BREAST CANCER PROGRAMME**

The Young Women with Breast Cancer programme (also known as **YoWo**) was set up to help support and guide these young women through all the emotions, decisions and challenges unique to their stage in life.



Encompassing a multidisciplinary team of medical oncologists, breast surgical oncologists, radiation oncologists, genetics specialists, fertility specialists, supportive care physicians, psychologists and social workers, and featuring our dedicated and experienced breast care nurses (BCNs) at the centre of the programme, we provide a **comprehensive support programme** for young women throughout their journey battling breast cancer.

YoWo specially curates resources for them – relating to the aforementioned unique issues and other common questions they may have.



## RESOURCES

### a. Your Breast Health: Making Informed Choices (SingHealth)

[www.singhealth.com.sg/patient-care/patient-education/breast-health](http://www.singhealth.com.sg/patient-care/patient-education/breast-health)

A specially curated booklet with a summary of the common breast conditions, breast cancer, screening recommendations, etc. Available in English and Mandarin.

### b. Guiding Young Women with Breast Cancer (National Cancer Centre Singapore)

[www.nccs.com.sg/patient-care/Pages/Guiding-young-women-with-breast-cancer-.aspx](http://www.nccs.com.sg/patient-care/Pages/Guiding-young-women-with-breast-cancer-.aspx)

An introduction to SingHealth YoWo.

### c. Breast Self-examination Video (Singapore Cancer Society)

[www.youtube.com/watch?v=JVOWdDKExEs](http://www.youtube.com/watch?v=JVOWdDKExEs)

Also available in Mandarin, Malay and Tamil.

## REFERENCES

1. Singapore Cancer Registry Annual Report 2019. National Registry of Diseases Office 28 Jan 2022.
2. Cohort profile: The Singapore Breast Cancer Cohort (SGBCC), a multi-center breast cancer cohort for evaluation of phenotypic risk factors and genetic markers. Ho PJ, Yeoh YS, Miao H et al. PLoS One 2021, 26(16):4. doi: 10.1371/journal.pone.0250102.



### Dr Tan Si Ying

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Dr Tan Si Ying is an Associate Consultant at the SingHealth Duke-NUS Breast Centre. She graduated on the dean's list at the Yong Loo Lin School of Medicine, National University of Singapore in 2009. She became a Fellow of the Royal College of Surgeons (Edinburgh) and registered as a specialist in general surgery in 2018.

She has a keen interest in bettering multidisciplinary and holistic care for young women with breast cancer. Her current research interests are in mucinous breast carcinoma, patient-reported outcome measures in breast cancer patients and exercise and breast cancer.



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Dr Ma Jun graduated from Monash University, Australia with MBBS (Hons) and completed her specialty training in medical oncology at the National Cancer Centre Singapore. She currently specialises in breast cancer. Her key areas of interest include breast cancer in young women and supportive care needs in breast cancer.



GPs can call the **SingHealth Duke-NUS Breast 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

**National  
Cancer Centre  
Singapore**  
6322 9399



# Breast Preservation and Scar Minimisation: The Future of Breast Surgery is Here

**Asst Prof Sabrina Ngaserin Ng Hui Na**

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Consultant, Department of General Surgery, Sengkang General Hospital;  
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**Good surgical management is the cornerstone of breast cancer treatment and the restoration of self for patients. With surgical advancements in oncoplastic breast surgery, minimally invasive breast surgery and breast reconstruction, patients can now look forward to better cosmetic outcomes and quality of life.**

## INTRODUCTION

Breast cancer is the most common cancer affecting women in Singapore and the world. Much thanks to the international community's efforts driving advancements in innovation and research, breast cancer therapy is one of the most rapidly evolving fields in medical and surgical practice, and personalised tailored treatment is the prioritised concept in the modern day.

## THE FOCUS OF MODERN-DAY BREAST SURGERY

Oncological surgical resection, safety, function and aesthetics are now viewed as integral components of comprehensive breast surgical care. As the field of breast surgical oncology has evolved, surgeons have largely abandoned extensive disfiguring resections as standard therapy.

In its stead, modernised techniques now favour:

- Breast preservation
- De-escalation of axillary surgery
- Whole and partial breast reconstructions
- Mindful prophylactic measures to avoid long-term complications

This means respecting the value of **scar minimisation**, **cosmetic optimisation** and **preservation of function** in our surgical planning.

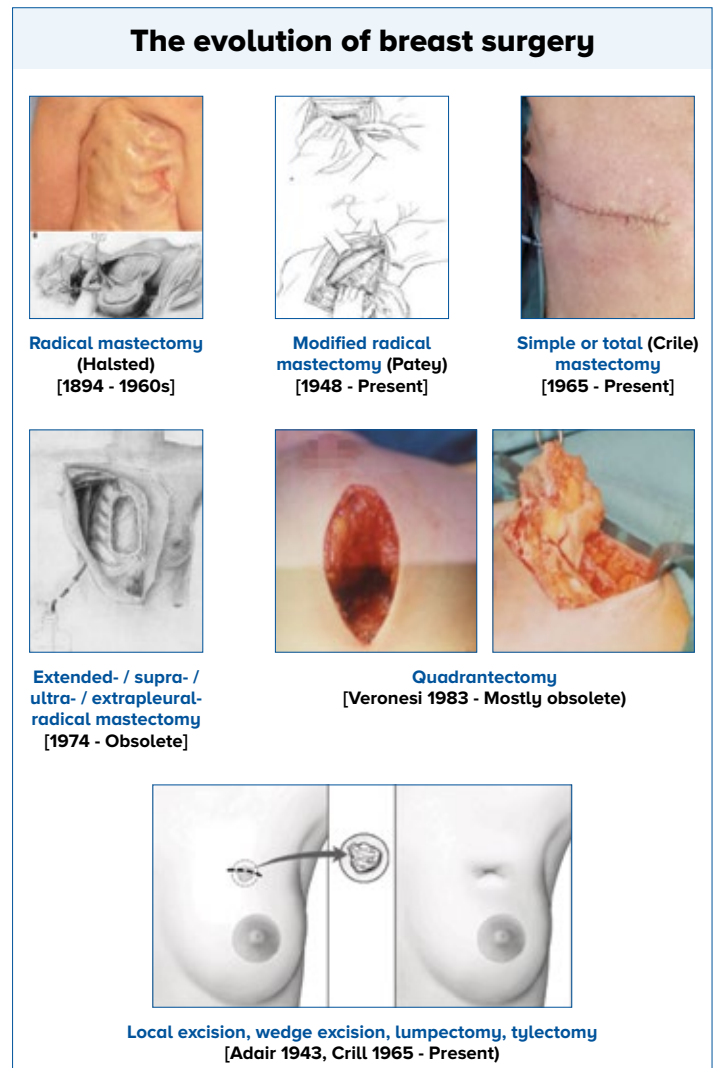


Figure 1

Today, breast cancer surgery that optimises quality of life can be better achieved by principle of two broad groups of surgical skills that surgeons have embraced in a complementary manner:

## 1. Oncoplastic breast surgery

## 2. Minimally invasive breast surgery

# 1. Oncoplastic Breast Surgery

### Breast conservation concerns in the past

Oncoplastic breast surgery (oBCS) was revolutionary in the efforts towards breast conservation.

Before the evolution of oBCS, it was believed that the upper limit of reasonable resection was a mere 10% before a cosmetic deformity would result. That made for a very low threshold that pushed a good proportion of patients away from a breast conservation surgery (BCS) and towards mastectomy.

When BCS was introduced, the average five-year survival rate was about 65% (1940s to 1980s). Survival was the primary goal of treatment at the time, and it was commonly believed that cosmetic breast preservation was unachievable with what was considered an adequate cancer operation.

The emotional impact of losing a breast can be overwhelming. It induces trauma, disrupts the sense-of-self and sexual functioning (*Figure 1*).

### Breast conservation today

The five-year age-standardised survival rate for breast cancer in Singapore is now 82.1%, and there is a **definite expectation of long-term survival**.

In addition, we are now certain that both aesthetic and functional outcomes contribute towards overall **patient satisfaction**, and are considered major determinants of **quality of life**.

**oBCS increases the proportion of patients eligible for BCS, and considers cosmetic outcomes individualised to patient-tumour morphology, cancer biology and patient choice.**

### What is oBCS?

By definition, oBCS is a 'tumour-specific, partial and immediate breast reconstruction method that applies aesthetically derived volume displacement, volume

replacement or volume reduction techniques to the field of breast cancer surgery, to allow for higher volume excision with minimal aesthetic compromise'.<sup>1</sup>

### Types of oBCS

As an overview, the types of oncoplastic breast procedures can be thought of as:

- Conventional BCS, but with thoughtful and favourable scar placement and orientation.** Examples include incisions placed discretely at the edge of the areolar (periareolar), through the nipple base, in the bra line (inframammary fold) or underarm (axillary).
- Volume displacement oBCS** or reshaping procedures that transpose a dermoglandular flap of breast tissue into the defect site (e.g., mastopexy and mammoplasty) (*Figure 2*).
- Volume reduction oBCS** techniques when the removal of excessive parenchyma can result in an aesthetic or quality of life benefit (i.e., the reduction mammoplasty) (*Figure 2*).

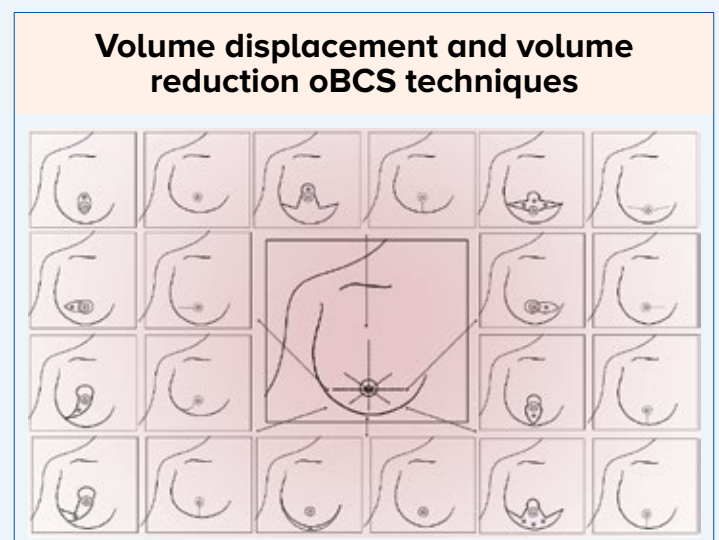
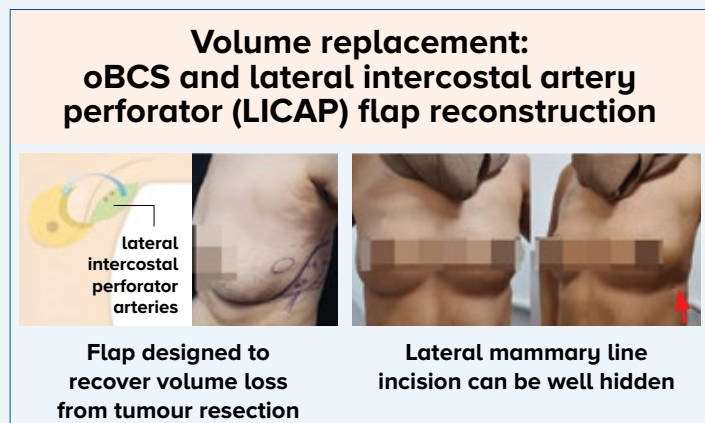


Figure 2

4. **Volume replacement oBCS** which includes autologous tissue flaps or implants to correct the partial mastectomy defect (e.g., intercostal artery perforator flap, thoracodorsal artery perforator flap, latissimus dorsi flap or omental flap reconstruction) (*Figure 3*).



*Figure 3*

5. **Complimentary contralateral breast symmetrisation, fat grafting** (lipofilling), nipple-areolar tattoo or reconstruction and other **cosmetic corrections** are now regarded as vital components of our repertoire.

'Levels' have also been assigned to describe the spectrum of oncoplastic surgical techniques, according

to the volume of tumour removed and to reflect the complexity of the reconstructive procedure required (i.e., level 1 comprises resection volumes less than 20% and level 2 around 20% to 50%).

### Benefits of oBCS

#### 1. Surgical safety

The **oncological safety of oBCS has been widely established** in terms of disease-free outcomes and overall survival. Complication rates were once thought to be higher, but with experience and time are now recognised to be comparable to BCS, and preferable to a mastectomy.

#### 2. Good cosmetic outcomes

**Good cosmetic outcomes**, reported in more than 80% to 90% of patients, have contributed to **quality survivorship**. Complementing this is a strong collective of studies reinforcing the importance of quality of life in terms of vitality, self-esteem, social functioning and emotional and mental health.

### The place of oBCS today

The lessons we have learnt as a community practicing oBCS have been invaluable. Ultimately, one can say that regardless of whether specialised techniques are indicated or otherwise, **all breast surgeries ought to be oncoplastic in nature**, permeating our practice right down to a cosmetically-optimised simple mastectomy.

## 2. Minimally Invasive Breast Surgery

### What it is

Minimally invasive breast surgery (MIBS) evolved in tandem with oBCS to push conventional boundaries of aesthetic outcomes. It utilises endoscopic-laparoscopic instruments or robotic surgical platforms.

On this journey towards the holy grail of discrete resection-restoration, the fundamentally unshakable tenets of practice are:

1. **En-bloc resection** (as opposed to fragmentation of the specimen which compromises oncological safety)
2. **Surgical safety**

Beyond this, there is no ceiling to creativity and artistry.

Initially utilised mainly for mastectomy (whole breast resection), more surgeons have been moving towards the application of MIBS in BCS (partial breast resection).

### Benefits of MIBS

1. For the surgeon, the use of a camera and endo-robotic instruments allows for **improved visualisation, agility and precision in dissection and haemostasis**.
2. But the most obvious advantage of the minimally invasive endoscopic or robotic techniques is that the surgeon is empowered to make **smaller inconspicuous incisions** that can even be sited off the main mound of the breast.

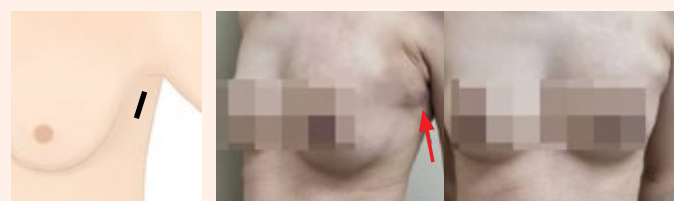
3. Planning an off-the-breast scar placement is not just purely aesthetic. Smaller inconspicuous incisions cause **minimal scarring, less postoperative pain and greater patient satisfaction, and wound complications are said to be rare events.**



Figure 4 Endoscopic MIBS and reconstruction

Because the breast skin and nipple-areolar complex (NAC) remain surgically unaltered and a scar is potentially not found on the breast itself in a direct face-on manner, we have had patients who were very happy to report that the resultant natural effect could even allow them to forget that breast surgery, or even breast cancer, was once a part of their lives (Figures 4 and 5).<sup>2</sup>

### Endoscopic BCS (eBCS)



Small well-hidden axillary scar following eBCS

Figure 5

## BREAST RECONSTRUCTION

For any patient facing a mastectomy, **skin and NAC preservation** and **consideration of breast reconstruction** are requisite therapeutic components. The NAC represents a geometric and aesthetic focal point of the breast, and the breast itself retains significant psychoemotional importance to most women.

### NAC preservation

Although we were once more conservative, there is increasing community consensus that the nipple-sparing mastectomy (NSM) can now be performed for any tumour of any size that does not involve the skin or NAC directly, independent of axillary status.

The main remaining contraindications to nipple and/or areola preservation are:

- Clinical signs of nipple involvement
- R1 resection at the nipple margin
- A positive retroareolar margin

### Breast reconstruction

The community also recognises that autologous reconstruction establishes enduring natural aesthetics and tactile results.

The **abdominal-based free perforator flap** (e.g., deep inferior epigastric perforator [DIEP] flap), has edged itself as the preferred reconstruction method. It allows close to ideal breast defect restoration, while also minimising abdominal donor site morbidity since the 'free' DIEP flap spares the underlying rectus abdominis muscle (Figure 6).

Alternative flaps such as those listed below continue to provide the suitable individual niche benefits:

- Superficial inferior epigastric artery
- Profunda artery perforator
- Transverse rectus abdominis myocutaneous (TRAM)
- Latissimus dorsi (back)
- Gluteal artery (buttock)
- Upper gracilis (thigh)
- Omental (intra-abdominal adipose) flap

### Prosthetics and other procedures

Prosthetics (breast implants) and adjunctive procedures continue to provide options for patients who present with challenging clinical scenarios or unavailable or inadequate abdominal donor sites, or as a component of patient choice.

## Endoscopic NSM and abdominal-based free flap reconstruction

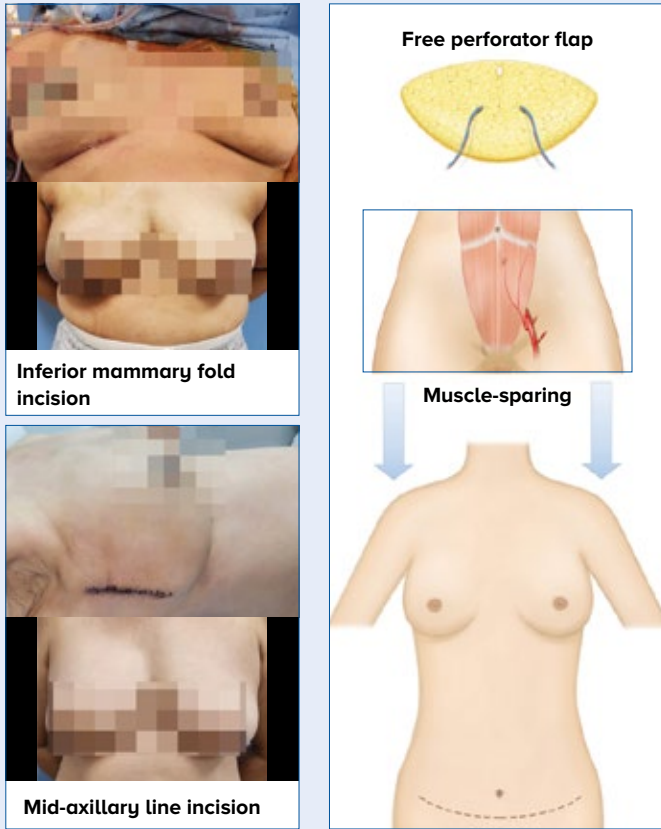


Figure 6

## CONCLUSION

Breast cancer is a complex disease that is multifactorial in aetiology and threatens life, function and identity. While therapy is ultimately multidisciplinary, good surgical management remains the cornerstone of locoregional management and restoration of self.

Multidisciplinary collaborative efforts and more effective treatments are continually evolving through research and clinical trials. As breast surgeons, we hold ourselves responsible for the guidance of decision making, coordination, communication, widening our collaborative efforts and seeking continual self-improvement in order to reach the ultimate goal of optimal recovery for every patient.

## REFERENCES

1. Bertozzi N et al. Oncoplastic breast surgery: comprehensive review. *Eur Rev Med Pharmacol Sci.* 2017 Jun;21(11):2572-2585. PMID 28678328
2. Ngaserin S, Wong AW, Leong FQ, Feng JJ, Kok YO, Tan BK. A Preliminary Experience of Endoscopic Total Mastectomy With Immediate Free Abdominal-Based Perforator Flap Reconstruction Using Minimal Incisions, and Literature Review. *J Breast Cancer.* 2023 Apr;26(2):152-167. doi: 10.4048/jbc.2023.26.e10. Epub 2023 Mar 13. PMID: 37051645; PMCID: PMC10139846.



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Assistant Prof Sabrina Ngaserin, a Consultant Breast Surgical Oncologist, is the Head of Breast Surgery at Sengkang General Hospital's Breast Service. Her main interest lies in cutting-edge breast cancer surgical techniques that consider the patient's disease alongside their need for aesthetic surgical solutions. She is particularly passionate about oncoplastic and minimally invasive breast surgery, tailoring 'off-the-breast' and 'minimal-access' incisions to provide the illusion of 'nearly scarless' breast resections. These practice principles prioritise not only disease eradication but also physical restoration, and optimise mental wellbeing and overall quality of life for cancer survivors.



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

**Singapore  
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6326 6060

**Changi  
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Hospital**  
6788 3003

**Sengkang  
General  
Hospital**  
6930 6000

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

**National  
Cancer Centre  
Singapore**  
6436 8288





# Thyrotoxicosis: Diagnostic and Therapeutic Uses of Radioactive Iodine

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When general practitioners are presented with thyrotoxicosis in their practice, radioactive iodine can be a useful adjunct for imaging to aid in its diagnostic management, as well as for treatment. Singapore General Hospital shares more about the indications for referral and shared care with GPs post-treatment.

## INTRODUCTION TO THYROTOXICOSIS

Thyroid diseases encompass a wide variety of problems seen at the primary healthcare setting, and experts estimate that up to 5 to 10 percent of the population suffer from a thyroid disorder. In particular, patients with thyrotoxicosis are commonly presented to the general practitioner (GP).

### Causes of thyrotoxicosis

The causes of thyrotoxicosis may include:

- Graves' disease
- Toxic adenomas
- Toxic multinodular goitre (+/- compressive symptoms)
- Thyroiditis
- Factitious hyperthyroidism

The goals of managing thyrotoxicosis would be to determine the aetiology as appropriate management depends on the underlying mechanism.

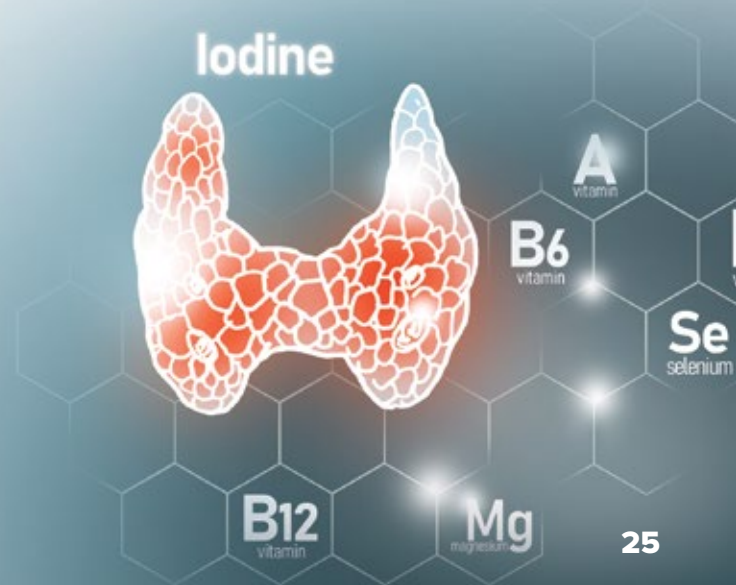
The most common cause of endogenous thyrotoxicosis (hyperthyroidism) would be Graves' disease, also known as diffuse toxic goitre. Graves' disease is an autoimmune condition affecting the thyroid that usually occurs in young to mid-adulthood, and in women more than men.

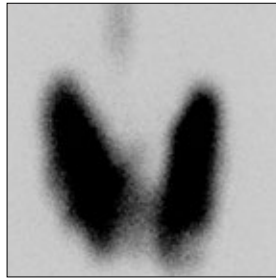
Up to 30% of patients with Graves' disease suffer from Graves' ophthalmopathy, and smokers are more prone to thyroid eye disease.

## WHAT IS RADIOACTIVE IODINE (RAI)?

Iodine is a chemical element, and this trace mineral is found naturally in the environment and many foods. Its clinical significance lies in the fact that the body uses iodine to make thyroid hormones which control metabolism.

There are many radioisotopes of iodine, of which I-123 and I-131 are important for imaging and therapeutics respectively.





**Figure 1A** Graves' disease with enlargement of the thyroid gland and increased radiotracer activity throughout the gland relative to the background, as well as visualisation of the pyramidal lobe



**Figure 1B** A toxic adenoma (a.k.a. 'hot nodule') at the mid-upper pole of the right thyroid lobe

## RAI IMAGING OF THE THYROID

### How it works

Thyroid imaging and treatment capitalise on the process of hormone synthesis in the glands. This is dependent on the sodium-iodide symporter (NIS). Via the NIS, RAI gets trapped intracellularly. Radioiodine is then organified to form thyroid hormones (T3 and T4).

The images in **Figure 1** show common causes of hyperthyroidism and their appearances.

### Its role in thyrotoxicosis management

The role of thyroid nuclear imaging referred from the primary care setting will mainly be to relate the general structure of the gland to function. This will be particularly useful in **differentiating the causes of thyrotoxicosis** such as Graves' disease from toxic nodular goitre or thyroiditis.

In Singapore, almost all healthcare institutions will usually use a different radiotracer, Tc-99m pertechnetate, as an imaging substitute for RAI thyroid scintigraphy as it is more easily accessible and has a shorter radiation half-life.

At Singapore General Hospital (SGH), our team will routinely pair thyroid nuclear imaging with a correlative ultrasound as an adjunct, and also for anatomical correlation.

## WHO SHOULD BE REFERRED FOR RAI THERAPY OF THE THYROID

**Indications for RAI therapy of hyperthyroidism due to Graves' disease, toxic multinodular goitre or adenoma**

- Refractory to medical therapy
- Relapsed cases previously on medical therapy

- Allergy to antithyroid drugs
- Unsuitable for surgery

RAI is the most commonly used hyperthyroid treatment in the United States.

### Contraindications to using RAI for therapy

- Hypersensitivity reaction to iodine
- Pregnancy or planning a pregnancy within 4 to 6 months
- Breastfeeding (patient will have to give up breastfeeding for that infant if RAI is given)
- Uncontrolled hyperthyroidism with FT4 > 30 (relative contraindication – will need better control before elective RAI therapy)
- Severe Graves' ophthalmopathy

Do consider providing opportunistic smoking cessation advice to any patients referred for RAI therapy.

## POSSIBLE SIDE EFFECTS AND COMPLICATIONS OF RAI THERAPY

- Nausea
- Metallic taste in mouth
- Salivary gland swelling and discomfort
- Transient discomfort of thyroid gland +/- rise in thyroid hormone levels
- Thyroid storm (rare)
- Aggravation of pre-existing Graves' ophthalmopathy (rare)

On occasion, we may refer some patients for an **ophthalmology assessment** prior to RAI therapy should it be required.

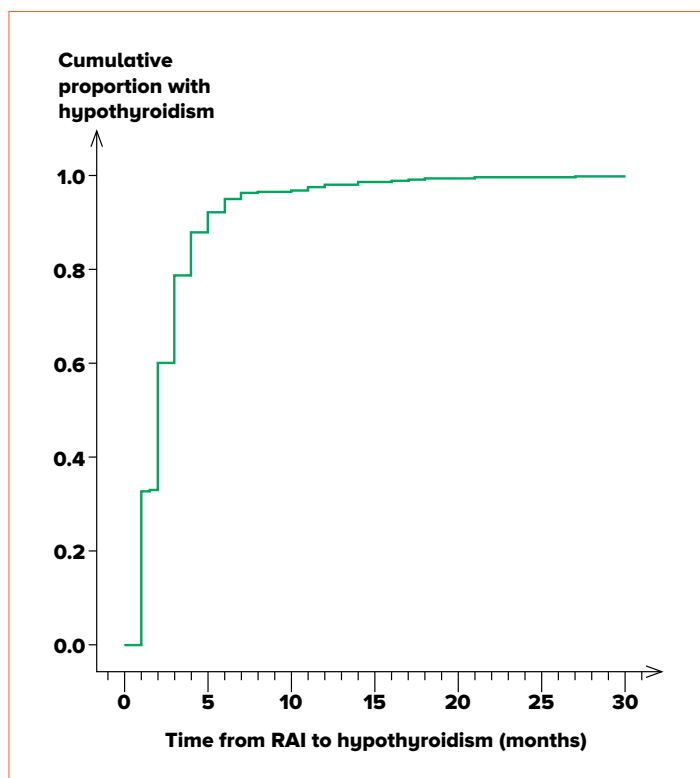
Patients have to be counselled that they **may develop hypothyroidism** after RAI thyroid ablation necessitating lifelong thyroxine replacement, but this is the intended aim rather than a side effect.

### EFFICACY OF RAI THERAPY

Treatment with RAI is efficacious and the majority of individuals have a successful clinical outcome, with most patients rendered hypothyroid within a few months after first-time RAI therapy.

A larger goiter size and thyroid stimulating hormone receptor antibody (TRAb) positivity at RAI may predict failure of first-time RAI therapy necessitating a second treatment.

**Patients are discharged back to their primary care provider once they are hypothyroid and started on thyroxine replacement.**



**Figure 2** Cumulative incidence of hypothyroidism seen in patients after first-time RAI therapy performed at SGH (2014-2015)

*Adapted from the Annals of the Academy of Medicine, Singapore<sup>1</sup>*

### PREPARING FOR RAI THERAPY IN SGH

#### Patient preparation

After clinical consultation, our team of doctors and nurses will provide **comprehensive counselling** for RAI dose preparation with regard to medications and low iodine dietary advice.

Patients will be provided with a detailed pamphlet to help **allay patient concerns** regarding radiation exposure. They will also be given a set of **instructions for what to do and what to avoid** regarding radiation exposure to family and members of the public post-treatment as an outpatient.

No hospitalisation is needed with the low levels of RAI activity prescribed for hyperthyroidism.

#### RAI preparation

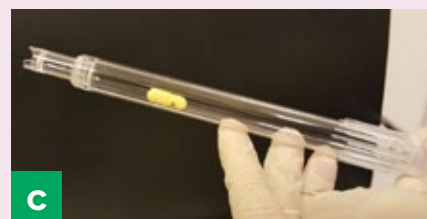
The RAI capsule or liquid is ordered by the laboratory and will require a three-week lead time (usually sourced from Europe). Upon its arrival, over the weekend, the relevant quality control and dose activity checks will be performed. It will then be placed securely in a lead-shielded area ready for outpatient administration on a weekday afternoon (**Figure 3**).



**A** Radionuclide preparation facilities



**B** RAI capsule facilities



**C** Dispensing RAI via tilting a mouthpiece

**Figure 3**

## CONCLUSION

**RAI is a useful adjunct for imaging to aid in the diagnostic management of patients presenting to the GP with thyrotoxicosis.** In addition, RAI is one of the mainstays of treatment for hyperthyroidism with the preferred clinical outcome of lifelong thyroxine replacement rather than prolonged treatment with anti-thyroidal drugs.

After successful treatment with RAI, patients will be discharged back to their primary healthcare provider for further titration of thyroxine and long-term follow-up.

GPs can call the SGH Department of Nuclear Medicine and Molecular Imaging for appointments at **6321 4203** or **6321 3838**.

## REFERENCE

1. Tay WL, Chng CL, Tien CS, Loke KS, Lam WW, Fook-Chong SM, Tong AK. High Thyroid Stimulating Receptor Antibody Titre and Large Goitre Size at First-Time Radioactive Iodine Treatment are Associated with Treatment Failure in Graves' Disease. *Ann Acad Med Singap.* 2019 Jun;48(6):181-187.



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He received his specialist accreditation in nuclear medicine in 2015 and serves as the current Chairman in the Chapter of Nuclear Medicine Physicians, Academy of Medicine Singapore. He has a keen interest and takes an active role in various research and educational activities.



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Dr Tham Wei Ying is a Consultant Nuclear Medicine Physician at Singapore General Hospital. She completed her nuclear medicine senior residency at SingHealth in 2018 and has been with the Department of Nuclear Medicine and Molecular Imaging since. She maintains a broad interest in both diagnostic and therapeutic nuclear medicine scans and procedures. She is also actively involved in education and is a core faculty member of the nuclear medicine senior residency programme.



GP Appointment Hotline: **6326 6060**

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



# Specialised Antenatal Clinics for High-Risk Pregnancies: Collaborative Care for Better Outcomes

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**As general practitioners are often the first point of contact, they are in a unique position to identify women who are potentially at risk during pregnancy, labour and birth. Find out more about the importance of prompt referral to a specialised antenatal clinic in order to optimise pregnancy outcomes.**

## INTRODUCTION

Over the years, there has been a rising prevalence of medical problems in pregnancy due to a complex interplay between demographic and lifestyle factors, in addition to advances in medical care. This has resulted in a rising number of complex, high-risk obstetric patients.

Advances in medical care mean that women with medical problems who were previously unable to get pregnant can now do so. For example, in the past, women with kidney failure could not get pregnant due to kidney disease affecting their fertility. Now, with renal transplant, many of these women manage to get pregnant and achieve good outcomes. At the same time, more such pregnancies also correlate with an increase in medical problems in pregnancy.

An understanding of medical problems in pregnancy is essential for optimising outcomes, which involves:

- Pre-pregnancy counselling
- Optimisation of medical therapy
- Multidisciplinary management throughout pregnancy and the postnatal period

## THE ROLE OF SPECIALISED ANTENATAL CLINICS

Specialised antenatal clinics are run by a team of obstetricians working together with specialist physicians (cardiologists, endocrinologists, rheumatologists, haematologists and nephrologists) and nurses who have expertise in the management of a range of medical conditions in pregnancy.

### This unique service provides:

- Pre-conception advice
- Routine antenatal care such as blood pressure and urine checks
- Routine antenatal advice
- Detailed ultrasound scans of the baby and placenta
- Monitoring of medication and blood tests
- Monitoring and management of symptoms related to the specific disorder
- A birth care plan
- Postnatal management



Specialised antenatal clinics utilise a multidisciplinary approach to ensure that the care provided is personalised and decisions about care are made using the best available evidence, in partnership with the woman and her partner.

**General practitioners (GPs), often being the first point of contact, are in a unique position to identify women who have the potential for risks during pregnancy, labour and birth and refer them directly to the most appropriate specialised antenatal clinic as early as possible.**

## CASE STUDY

### Background

Ms P, a 35-year-old para 2 lady was referred from a polyclinic for her first antenatal booking visit. The referral letter stated that she was diagnosed with systemic lupus erythematosus (SLE) in 2017 and currently in remission.

Her active medications at time of referral were hydroxychloroquine, prednisolone, and mycophenolate mofetil (MMF). She is on biannual follow-up with her rheumatologist and her last follow-up visit was four months ago.

### Presentation and diagnosis

She first presented to the polyclinic at around 11 weeks of amenorrhoea, and was subsequently seen at the general obstetric clinic for her first booking visit at 13 weeks of amenorrhoea.

At this booking visit, a viable singleton foetus with crown rump length corresponding to the 13<sup>th</sup> week of gestation was confirmed.

### Patient counselling

Ms P and her partner were counselled regarding the implications of MMF use during the first trimester, in particular the risk of major birth defects (e.g., defects of the distal limbs, heart, oesophagus and kidney). As her foetus was exposed to MMF throughout the organogenesis period in the first trimester, the risk of birth defects for her foetus has been reported to be as high as 31.6%.

She and her partner were not able to accept this risk and decided on termination of the pregnancy. Following termination, she was counselled on contraceptive choices as the couple does not wish to have more children. She opted for the levonorgestrel intrauterine system (Mirena) method.



## A SHIFT TOWARDS BETTER PREGNANCY OUTCOMES

Pregnancy in women with SLE should be considered high-risk, and the coexistence of pregnancy and SLE is by no means a rare event as the disease mainly occurs among fertile women.

Women with SLE were previously discouraged from pregnancy because of concerns regarding its potential effects on both mother and child. However, over the last decade, a better understanding of the disease, advancing medical technology and changes in the

way we practice now mean that in many cases, a good pregnancy outcome is possible.

This shift in practice applies not only to women with SLE but also to many other conditions, such as organ transplant recipients, complex cardiac disease and end-stage kidney disease, just to name a few.

This list of conditions will continue growing as medical advances have made good outcomes possible for women who were unable to get pregnant in the past, or were discouraged from pregnancy.

## KEY TAKEAWAYS FROM THE CASE STUDY

### 1. The Importance of Pre-pregnancy Counselling

**For the best chance of a successful pregnancy, women with medical conditions that deem them at higher risk should receive pre-pregnancy counselling.**

Counselling should be provided by obstetricians and physicians, ideally in a joint multidisciplinary clinic setting, who are adept in managing women with such medical conditions in pregnancy.

#### Counselling and recommendations

Pre-pregnancy counselling not only provides information on the impact of pregnancy on their existing medical condition and vice versa, but also allows for a plan to be put in place from pre-conception to delivery – which includes recommendations regarding changes to the treatment regime.

In any condition, pregnancy is usually advised when the disease has been quiescent for some time before conception (i.e., six months of ‘inactive’ period on stable therapy for SLE) or when disease control has been optimised (e.g., HbA1c < 6.5% for patients with type 1 or 2 diabetes mellitus).

#### Medication review

An important aspect of planning pregnancy in women with pre-existing medical conditions is to ensure that

any medications that they are taking are appropriate prior to conception and during pregnancy.

MMF, the medication taken by Ms P in the case study, is a purine synthesis inhibitor that is used as an immunosuppressant agent in the prophylaxis of organ rejection in patients receiving organ transplant and in patients with autoimmune conditions. MMF is a teratogen.

Its use in pregnancy is associated with spontaneous abortions (SABs) and major birth defects involving the external ear, facial anomalies, cleft lip/palate and defects of the distal limbs, heart, oesophagus and kidney.

Many organisations recommend discontinuing MMF at least six weeks prior to conception to take into account its wash-out period. Discontinuing MMF more than six weeks prior to pregnancy is associated with a birth defect rate of 5%, similar to that of the general population.

However, discontinuing MMF in first and second trimester is associated with birth defect rates of up to 8.5% and 31.6% respectively.

### 2. The Importance of Prompt Referral to Specialised Clinics

The case study also emphasises the importance of referring such cases urgently.

There was a two-week gap between Ms P’s first polyclinic visit and antenatal booking visit, during which the foetus continued to be exposed to MMF.

It would have been beneficial for her to be seen directly at the Rheumatology Obstetric Clinic, part of the Centre for High-Risk Pregnancies (CHiRP) at Singapore General Hospital (SGH), so that she could be counselled directly by both the high-risk maternal foetal medicine specialist and the rheumatologist, as well as for her medications to be switched to pregnancy-compatible agents.

## THE CENTRE FOR HIGH-RISK PREGNANCIES

The Centre for High-Risk Pregnancies (CHiRP) at the Department of Obstetrics & Gynaecology, SGH was created to provide a **one-stop multidisciplinary tertiary integrated care service for high-risk pregnancy care and counselling for prospective mothers with risk factors.**



### Specialist antenatal clinics and services at CHiRP

Specialist antenatal clinic	Who to refer / services offered
<b>Gestational Diabetes Joint Clinic (GDJC)</b>	<ul style="list-style-type: none"> <li>• Type 1 and 2 diabetes</li> <li>• Gestational diabetes</li> </ul>
<b>Cardiology Joint Clinic (CJC)</b>	<ul style="list-style-type: none"> <li>• Congenital heart disease</li> <li>• Valvular disease</li> <li>• Ischaemic heart disease</li> <li>• Arrhythmia</li> <li>• New-onset cardiac issues</li> </ul>
<b>Rheumatology Obstetric Clinic (ROC)</b>	<ul style="list-style-type: none"> <li>• All rheumatological conditions, including systemic lupus erythematosus (SLE), rheumatoid arthritis and mixed connective tissue disease</li> </ul>
<b>Obstetrics &amp; Gynaecology Haematology (OGH) Clinic</b>	<ul style="list-style-type: none"> <li>• Transfusion-dependent thalassaemia</li> <li>• Sickle cell disease</li> <li>• Platelet disorders (e.g., immune thrombocytopenia [ITP])</li> <li>• Haemophilia</li> <li>• Thrombophilia</li> </ul>
<b>Obstetric Kidney Clinic (OKC)</b>	<ul style="list-style-type: none"> <li>• Chronic kidney disease</li> <li>• End-stage kidney disease</li> <li>• Lupus nephritis</li> <li>• Kidney transplant</li> </ul>
<b>Obstetric Medicine (ObsMed) Clinic</b>	<ul style="list-style-type: none"> <li>• Thyroid disorder</li> <li>• Neurological conditions</li> <li>• Dermatology</li> <li>• Multiple medical comorbidities</li> </ul>
<b>High-Risk Clinic (HRC)</b>	<ul style="list-style-type: none"> <li>• Patients with previous poor obstetric history</li> <li>• Placenta accreta spectrum</li> </ul>
<b>Perinatal Genetics Clinic (PGC)</b>	<ul style="list-style-type: none"> <li>• Counselling and management of fetuses at risk of heritable conditions</li> </ul>
<b>Foetal Medicine Clinic (FMC)</b>	<ul style="list-style-type: none"> <li>• Diagnosis, counselling and management of foetal anomalies</li> <li>• Diagnosis and treatment of foetal infections</li> </ul>

These clinics under CHiRP are held at levels 1 and 2 at the Department of Obstetrics & Gynaecology, SGH, Block 5.



## HOW GPs CAN REFER A PATIENT



To refer a patient to any of the aforementioned CHiRP clinics, GPs can download the information letter from the QR code and submit it via:

Fax: **6321 4837**

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

Please contact our nurses at **6321 4516** should an urgent appointment be required, or should advice be needed on which clinic is the most appropriate.

In special cases, we may initiate monitoring and treatment before the first clinic appointment, such as starting seven-point blood sugar profile monitoring and insulin in patients with suboptimally controlled diabetes in pregnancy.



## CONCLUSION

- The management of medical problems in pregnancy should begin before conception, with pre-pregnancy counselling and optimisation of medical therapy for women of reproductive age.
- GPs can refer women with medical conditions who are considering pregnancy or currently pregnant directly to the most appropriate specialised antenatal clinic.

## REFERENCE

1. King RW, Baca MJ, Armenti VT, et al. Pregnancy outcomes related to mycophenolate exposure in female kidney transplant recipients. *American Journal of Transplantation*. 2017; 17: 151-160



### Dr Pamela Partana

*Associate Consultant, Department of Obstetrics & Gynaecology,  
Singapore General Hospital;  
Division of Surgery & Surgical Oncology, National Cancer Centre Singapore*

Dr Pamela Partana is an Associate Consultant Obstetrician and Gynaecologist at Singapore General Hospital. She graduated with Distinction from the King's College London School of Medicine in 2013 and was nominated to represent King's at the prestigious University of London Gold Medal Viva competition. She is currently pursuing her sub-specialty training in maternal foetal medicine and has a keen interest in the management of high-risk pregnancies.

GPs who would like more information about CHiRP, please contact Dr Partana at **6321 4675**.



GP Appointment Hotline: **6326 6060**

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



# Seamless, Individualised Care for the Full Spectrum of Breast Conditions

## The SingHealth Duke-NUS Breast Centre

### ABOUT THE CENTRE

The SingHealth Duke-NUS Breast Centre is a multidisciplinary centre in Singapore treating the full spectrum of breast conditions.

Annually, the Centre handles about 70,000 outpatient visits and manages over 1,300 breast cancer patients. It serves patients at five key SingHealth institutions:

- Singapore General Hospital
- Changi General Hospital
- Sengkang General Hospital
- KK Women's and Children's Hospital
- National Cancer Centre Singapore

### INDIVIDUALISED TREATMENT FOR OPTIMAL OUTCOMES

The Centre offers **advanced treatment options** using modern surgical techniques and equipment, including oncoplastic breast surgery, sentinel node biopsy and intraoperative radiotherapy.

Treatment is **individualised** for each patient, and every case of breast cancer is discussed at a **weekly multidisciplinary conference** to ensure that the best care options are recommended.

### A DEDICATED, MULTIDISCIPLINARY CARE TEAM

Throughout the duration of treatment, patients have full access to warm, supportive care from a **team of experts** focused on breast cancer – working in unison to achieve seamless care and optimal outcomes for each woman.

## Our Services

- Expert clinical assessment
- Radiological evaluation (digital mammography, 3D breast tomosynthesis, ultrasonography, CT and MRI)
- Minimally invasive breast biopsy (stereotactic, ultrasound- or MRI-guided), core biopsy and vacuum-assisted breast biopsy (VAB)
- Wire and radiocolloid (ROLL) localisation of occult lesions for surgical biopsy
- Breast cancer surgery – all forms of mastectomy and breast-conserving surgery (BCS)
- Oncoplastic and reconstructive breast surgery
- Sentinel lymph node biopsy and axillary clearance
- Intraoperative radiotherapy (IORT) for BCS (only available at the National Cancer Centre Singapore)
- Specialist breast care nurse support for perioperative and postoperative care
- Postoperative physiotherapy and lymphoedema care
- Multidisciplinary care – breast tumour board and radio-pathological meetings
- Preoperative (neoadjuvant) therapy programme
- Genetic counselling and testing, and fertility counselling and preservation for young and/or high-risk patients

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

**Singapore General  
Hospital**  
6326 6060

**Changi General  
Hospital**  
6788 3003

**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/breastcentre](http://www.singhealth.com.sg/breastcentre)**

## Our Executive Committee



### Head

- 1. Assoc Prof Veronique Tan Kiak Mien**  
Head, Senior Consultant  
Department of Breast Surgery  
Division of Surgery and Surgical Oncology  
SGH & NCCS

### Director, Breast Screening Services

- 2. Dr Ching Boon Chye**  
Senior Consultant  
Department of Diagnostic Radiology  
SGH

### Director, Education

- 3. Assoc Prof Yong Wei Sean**  
Senior Consultant  
Department of Breast Surgery  
Deputy Chairman  
Division of Surgery and Surgical Oncology  
SGH & NCCS

### Director, Research

- 4. Asst Prof Sim Yirong**  
Senior Consultant  
Department of Breast Surgery  
Division of Surgery and Surgical Oncology  
SGH & NCCS

### Service Chief @ CGH

- 5. Assoc Prof Tan Su-Ming**  
Head, Senior Consultant  
Division of Breast Surgery  
Director of Breast Centre  
Department of General Surgery  
CGH

### Service Chief @ SKH

- 6. Asst Prof Sabrina Ngaserin**  
Head, Consultant  
Breast Service,  
Department of General Surgery  
SKH

### Service Chief @ KKH


- 7. Assoc Prof Lim Geok Hoon**  
Head, Senior Consultant  
Breast Department  
KKH

# Specialist Promotions & Appointments


## NEW APPOINTMENTS




**Dr Cheng Chee Leong**  
*Head &  
Senior Consultant*  
**Dept**  
Anatomical Pathology



**Dr Anupama Roy  
Chowdhury**  
*Head &  
Senior Consultant*  
**Dept**  
Geriatric Medicine




**Dr Lam Wing Chuen  
Winnie**  
*Head &  
Senior Consultant*  
**Dept**  
Nuclear Medicine &  
Molecular Imaging



**Dr Lim John Wah**  
*Head &  
Senior Consultant*  
**Dept**  
Occupational &  
Environmental Medicine




**Dr Johnson Fam**  
*Head &  
Senior Consultant*  
**Dept**  
Psychiatry




**Dr Goh Xian-Yang,  
Charles**  
*Consultant,  
Nuclear Medicine &  
Molecular Imaging;*  
**Chief Medical  
Informatics Officer, SGH**

## APPOINTMENTS – SENIOR CONSULTANTS




**Dr Michelle Chan  
Mei Fung**  
*Senior Consultant*  
**Dept**  
Anatomical Pathology



**Dr Chanda Kendra Ho**  
*Senior Consultant*  
**Dept**  
Gastroenterology  
& Hepatology

## APPOINTMENTS – ASSOCIATE CONSULTANTS



**Dr Lim Yiqi Ofelia**  
*Associate Consultant*  
**Dept**  
Anaesthesiology



**Dr Li Yihan**  
*Associate Consultant*  
**Dept**  
Anatomical Pathology




**Dr Loong Shihleone**  
*Associate Consultant*  
**Dept**  
Anatomical Pathology




**Dr Chai Zi Teng**  
*Associate Consultant*  
**Dept**  
Dermatology



**Dr Goniyamalimage  
Shashendra Ravinath  
Apons**  
*Associate Consultant*  
**Dept**  
Dermatology



**Dr Ang Chieh Hwee**  
*Associate Consultant*  
**Dept**  
Haematology



**Dr Chua Wei Ming**  
*Associate Consultant*  
**Dept**  
Nuclear Medicine &  
Molecular Imaging



**Dr Soong Junwei**  
*Associate Consultant*  
**Dept**  
Orthopaedic Surgery



**Dr Toh Rui Xiang**  
*Associate Consultant*  
**Dept**  
Orthopaedic Surgery



## APPOINTMENTS – ASSOCIATE CONSULTANTS



**Dr Tham Kar Mun**  
*Associate Consultant*  
**Dept**  
Pain Medicine



**Dr Yek Jia Lin, Jacklyn**  
*Associate Consultant*  
**Dept**  
Pain Medicine



**Dr Lye Siyu**  
*Associate Consultant*  
**Dept**  
Surgical Intensive Care



**Dr Tay Jun Hoe**  
*Associate Consultant*  
**Dept**  
Surgical Intensive Care



**Dr Chia Choon Kwang  
Adrian**  
*Associate Consultant*  
**Dept**  
Vascular Surgery



Appointments: 6788 3003 | Email: [cgh.com.sg](mailto:cgh.com.sg)

## NEW APPOINTMENTS



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



**Adj Assoc Prof Chionh Chang Yin**  
*Senior Consultant;*  
*Assistant Chairman, Medical Board*  
*(Medical Disciplines)*

## APPOINTMENT – SENIOR CONSULTANT



**Dr Cristine Ding  
Szu Lyn**  
*Senior Consultant*  
  
Division of Anatomical  
Pathology

## APPOINTMENTS – ASSOCIATE CONSULTANTS



**Dr Sharon Chong Lai  
Ching**  
*Associate Consultant*  
**Dept**  
Accident & Emergency



**Dr Tong Kai Yi, Clara**  
*Associate Consultant*  
**Dept**  
Anaesthesia &  
Surgical Intensive Care



**Dr Felix Maverick  
Rubillar Uy**  
*Associate Consultant*  
**Dept**  
Cardiology

# Specialist Promotions & Appointments

## APPOINTMENTS – ASSOCIATE CONSULTANTS



**Dr Tang-Lin Lydia**  
*Associate Consultant*  
**Dept**  
Dermatology



**Dr Sumitro Harjanto**  
*Associate Consultant*  
**Dept**  
Endocrinology



**Dr Anantharaman Saradha**  
*Associate Consultant*  
**Dept**  
Renal Medicine



**Dr Chan Li-Shan, Stephanie**  
*Associate Consultant*  
**Dept**  
Surgery



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

## NEW APPOINTMENTS



**Assoc Prof Wong Merng Koon**  
*Chairman & Senior Consultant*  
Division of Ambulatory and Outpatient Care



**Dr Annitha D/O Annathurai**  
*Director & Senior Consultant*  
Population Health and Integrated Care



**Assoc Prof Tay Bee Gek Laura**  
*Head & Senior Consultant*  
**Dept**  
Geriatric Medicine



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*Head & Senior Consultant*  
**Dept**  
Internal Medicine



**Dr Poon Kein Boon**  
*Head & Senior Consultant*  
**Dept**  
Orthopaedic Surgery



**Dr Pek Jen Heng**  
*Deputy Head & Consultant*  
**Dept**  
Emergency Medicine

## APPOINTMENT – CONSULTANT



**Dr Chuang Lee Ren, Leyland**  
*Consultant, Infectious Diseases*  
**Dept**  
General Medicine



## APPOINTMENTS – ASSOCIATE CONSULTANTS



**Dr Ee Siqing**  
*Associate Consultant,  
Dermatology*  
**Dept**  
General Medicine



**Dr Kho Swee Then  
Felix**  
*Associate Consultant,  
Dermatology*  
**Dept**  
General Medicine



**Dr Cher Wei Liang Eric**  
*Associate Consultant*  
**Dept**  
Orthopaedic Surgery



**Dr Liu Jiaxuan**  
*Associate Consultant*  
**Dept**  
Respiratory Medicine



KK Women's and  
Children's Hospital  
SingHealth

**Appointments: 6692 2984 | Email: [centralappt@kkh.com.sg](mailto:centralappt@kkh.com.sg)**

## NEW APPOINTMENTS



**Adj Assoc Prof Oh  
Jean Yin**  
*Senior Consultant,  
Adolescent Medicine  
Service;  
Head,  
Dept of Paediatrics*



**Dr Khoo Zi Xean**  
*Consultant, General  
Paediatrics Service;  
Deputy Head,  
Dept of Paediatrics*



**Dr Chiang Li Wei**  
*Head &  
Senior Consultant*  
**Dept**  
Paediatric Surgery



**Dr Ting Teck Wah**  
*Senior Consultant,  
Genetics Service;  
Director, Newborn  
Screening Programme*

## APPOINTMENT – CONSULTANT



**Dr Teo Tzu Li Sylvia**  
*Consultant*  
  
Family Medicine  
Service

# Specialist Promotions & Appointments

## APPOINTMENTS – ASSOCIATE CONSULTANTS



**Dr Farah Safdar Husain**  
*Associate Consultant*  
Family Medicine Service



**Dr Dhillshad Binti Muhammad Abdul Qadir**  
*Associate Consultant*  
**Dept**  
Obstetrics and Gynaecology



**Dr Ting Chun Yi**  
*Associate Consultant*  
Respiratory Medicine Service



**Dr Wee Liang Yi Justin**  
*Associate Consultant*  
Respiratory Medicine Service



Appointments: 6436 8288 | Email: [gpnetwork@nccs.com.sg](mailto:gpnetwork@nccs.com.sg)

## APPOINTMENT – ASSOCIATE CONSULTANT



**Dr Ma Jun**  
*Associate Consultant*  
Breast & Gynaecology,  
Division of Medical Oncology




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

## PROMOTIONS – SENIOR CONSULTANTS



**Clin Asst Prof Go Yun Yun**  
*Senior Consultant*  
**Dept**  
Cardiology  
**Sub-specialties**  
Echocardiography, Cardiac Magnetic Resonance Imaging, Cardio-Oncology



**Dr Ruan Wen**  
*Senior Consultant*  
**Dept**  
Cardiology  
**Sub-specialties**  
Echocardiography, Pulmonary Hypertension



**Clin Asst Prof Philip Pang Yi Kit**  
*Senior Consultant*  
**Dept**  
Cardiology  
**Sub-specialties**  
Cardiac Surgery (Adult), Minimally Invasive Cardiac Surgery






## PROMOTION – CONSULTANT




**Dr Cynthia Chia Ming Li**  
*Consultant*  
**Dept**  
Cardiology  
**Sub-specialty**  
Thoracic Surgery

 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



**Dr Yu Wai-Yung**  
*Head & Senior Consultant*  
**Dept**  
Neuroradiology



**Dr Chiew Hui Jin**  
*Head & Consultant*  
Neurology Service  
(NNI@KTPH)

## APPOINTMENT – ASSOCIATE CONSULTANT



**Dr Nishal Kishinchand Primalani**  
*Associate Consultant*  
**Dept**  
Neurosurgery

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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 DM2304.



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 (FMCC)
- 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

- Accident & Emergency
- Anaesthesia & Surgical Intensive Care
- Breast Surgery
- Cardiology
- Dermatology
- Diagnostic Radiology
- Endocrinology
- Geriatric Medicine
- Medicine
- Neurosurgery
- Ophthalmology
- Orthopaedic Surgery
- Otorhinolaryngology - Head & Neck Surgery
- Psychological Medicine
- Rehabilitation Medicine
- Surgery
- Urology

##### Associate Consultants

- Anaesthesia & Surgical Intensive Care
- Cardiology
- Dermatology
- Diagnostic Radiology / Interventional Radiology
- Infectious Diseases
- Laboratory Medicine - Histopathology
- Orthopaedic Surgery
- Otorhinolaryngology - Head & Neck Surgery
- Rheumatology
- Surgery
- Urology

##### 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
- Urology
- Vascular Surgery Service

##### Senior Consultant, Consultant, Associate

##### Consultant

- Emergency Medicine
- Gastroenterology
- 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

##### Consultants

- Psychological Medicine
- Women's Anaesthesia

##### Staff Registrars

- Child Development
- Diagnostic & Interventional Imaging
- Neurology Service
- Paediatric Surgery

##### Family Physician

- Family Medicine

##### Resident Physicians

- Diagnostic & Interventional Imaging
- Emergency Medicine
- Obstetrics & Gynaecology
- Ophthalmology Service
- Orthopaedic Surgery
- Otolaryngology
- Paediatric Medicine
- Paediatric Surgery
- Psychological Medicine
- Women's Anaesthesia

**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

- Head & Neck Surgery

**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
- Associate Consultant, Restorative Dentistry – Endodontics
- Dental Officer/ Dental Surgeon, Geriatric Special Dentistry Care
- Dental Officer/ Dental Surgeon, Restorative Dentistry

**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:** [lim.bee.kuan@nhcs.com.sg](mailto:lim.bee.kuan@nhcs.com.sg) / [goh.bing.xue@nhcs.com.sg](mailto:goh.bing.xue@nhcs.com.sg)

### National Neuroscience Institute

#### Departments seeking Resident Physicians and

#### Service Registrars

- 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, Outram Community Hospital and Bright Vision 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)

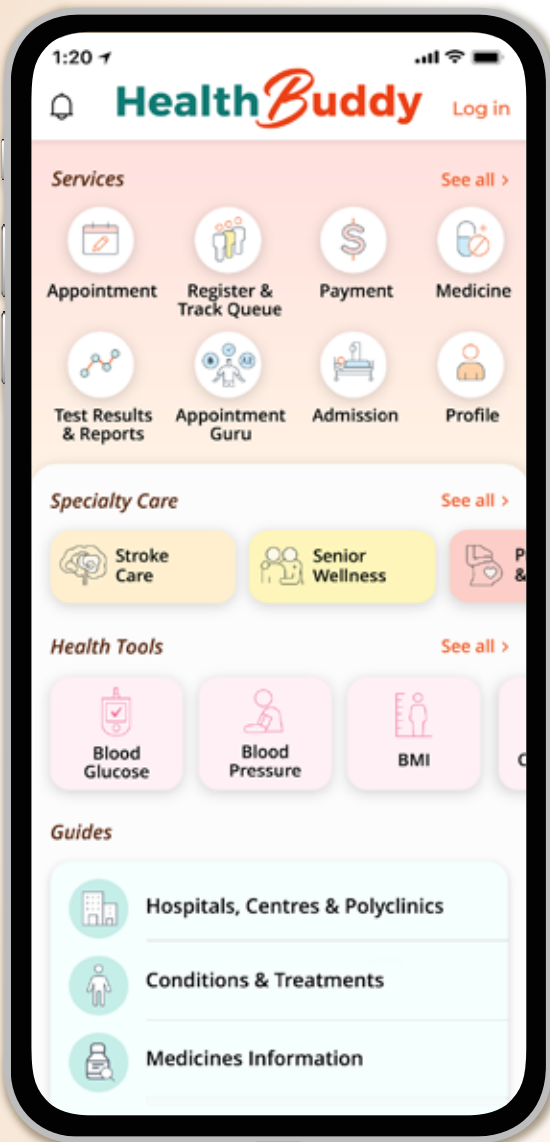
**Email:** [schrecruitment@singhealthch.com.sg](mailto:schrecruitment@singhealthch.com.sg)



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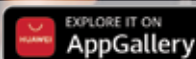
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# CMEs & Courses

## SGH Lunchtime GP Q+A Sessions 2023



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</b> admission
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Date	Session 1 (1pm to 1.30pm)	Session 2 (1.30pm to 2pm)
14 Jun	<b>Dept of Orthopaedic Surgery</b> Dr Lim Yee Gen (Consultant)	<b>Dept of Plastic, Reconstructive &amp; Aesthetic Surgery</b> Dr Hui Li Yu, Cheryl (Consultant)
12 Jul	<b>Dept of Gastroenterology &amp; Hepatology</b> Dr Ravishankar Asokkumar (Consultant)	<b>Dept of Head &amp; Neck Surgery</b> Dr Gerald Tay Ci An (Senior Consultant), Dr Rena Dharmawan (Consultant), Dr Rahul Nagadia (Consultant)
16 Aug	<b>Dept of Respiratory &amp; Critical Care Medicine</b> Dr Young Si Ling (Associate Consultant)	<b>Dept of Vascular Surgery</b> Dr Chng Siew Ping (Senior Consultant)
13 Sep	<b>Dept of Urology</b> Dr Lu Yadong (Associate Consultant)	<b>Dept of Haematology</b> Clin Assoc Prof Ng Heng Joo (Head & Senior Consultant)
11 Oct	<b>Dept of Breast Surgery</b> Dr Christina Yang Shi-Hui (Associate Consultant)	<b>Dept of Psychiatry</b> Assoc Prof Leslie Lim Eng Choon (Senior Consultant)
8 Nov	<b>Dept of Hepato-pancreato-biliary and Transplant Surgery</b> Dr Tan Hwee Leong (Associate Consultant)	<b>Dept of Nuclear Medicine and Molecular Imaging</b>



**Scan the QR code to register.**

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



## 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>

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

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