

OCT-DEC 16

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# MEDICAL NEWS

A SingHealth Newsletter for Medical Practitioners MCI (P) 027/11/2016



## FOCUS: BREAST CANCER

The Landscape  
of Breast Cancer  
Screening and  
Treatment in Singapore

Intraoperative  
Radiotherapy  
(IORT) for Early  
Breast Cancer

Oncoplastic  
Breast  
Surgery



SingHealth Duke-NUS Academic Medical Centre

- Singapore General Hospital • KK Women's and Children's Hospital • Sengkang Health • National Cancer Centre Singapore • National Dental Centre of Singapore
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# The Landscape of Breast Cancer Screening and Treatment in Singapore – How Well Do We Know It?

■ Dr Benita Tan, Senior Consultant,  
SingHealth Duke-NUS Breast Centre

Breast cancer affects approximately 1 in 11 women in their lifetime (to age 99) in Singapore with 1,850 women diagnosed with breast cancer, and over 400 die from the disease each year. These figures will continue to increase with our existing risk factors, compounded by our ageing population. Survivorship has improved over the years with majority diagnosed with early breast cancer (EBC). This has led to a remodelling of the approach and management beyond just surviving from this disease, with new techniques and treatments emerging to improve the quality of life.

## MAMMOGRAPHY BENEFITS AND RISKS – WHAT YOU NEED TO KNOW

Mammograms do not prevent breast cancer, but they can save lives by finding breast cancer as early as possible. Finding breast cancers early allow more women being treated for breast cancer to keep their breasts as small cancers can be treated with breast-conserving surgery without resorting to mastectomies.

However, mammograms are not perfect. Normal breast tissue can hide a breast cancer; this is called a false negative. Mammography can also identify an abnormality that looks like a cancer, but turns out to be normal; this 'false alarm' is called a false positive. A false positive means more tests and follow-up visits, which adds to the anxiety of being diagnosed with breast cancer.

Hence, the roles of our healthcare professionals goes beyond recommending the screening mammograms at the primary care level, and include understanding and discussion of the benefits and the risks. Concerted efforts of education on awareness, breast self-examination and regular routine breast examinations by an experienced primary healthcare professional can allow cancers to be detected earlier. Occasionally, other forms of breast imaging, such as breast ultrasound, tomosynthesis (3-D mammograms) or MRI, may be added in the assessment.

## Some statistics

The incidence of breast cancer tripled from 23.8 per 100,000 person-years in 1975 to 1979 to 64.6 per 100,000 person-years in 2010 to 2014. It is the most common cancer among women in Singapore, with 9,284 women diagnosed with breast cancer between the years 2010 to 2014.

In the past decade, early breast cancer accounted for more than 70% of those diagnosed, with 33.3% in stage I and 38.1% in stage II in 2010 to 2014. Majority in this period were aged 45 to 64. Chinese women have a significantly higher risk of developing breast cancer in comparison to Malays and Indians, but they have improved survival.

Over the years, the overall age-standardised 5-year observed survival improved from 40.3% in 1973 to 18.77% to 70.5% in 2010 to 2014. The age-standardised observed survival in 2010 to 2014 was 90% for overall stage I, 80.1% for stage II; 72.7% for Chinese and 53.8% for Malays.

*Singapore Cancer Registry, Interim Annual Registry Report, Trends in Cancer Incidence Singapore, 2010-2014  
National Registry of Diseases Office, Singapore*

### Breast Self-Examination and Mammogram Recommendations

Age	Breast Self-Examination	Mammogram
30 - 39		-
40 - 49	Once a month (a week after your menses)	Please speak to your doctor about the benefits and limitations of going for a mammogram at this age. If screening is performed, it should be done once a year.
50 and above		Once every two years

### BREASTSCREEN SINGAPORE

BreastScreen Singapore (BSS) is our national breast cancer screening programme set up in 2002 under the Health Promotion Board (HPB) to raise public awareness, encourage early detection of breast cancer, and reduce its mortality. It enables early breast cancers to be detected before symptoms appear.

However, many myths about BSS still exist and they contribute to the low response to breast screening.

### Myths About Breast Cancer Screening and BSS

#### Myth 1 Breast cancer screening mammogram can only be done in hospitals.

**Fact:** Breast cancer screening mammograms can be done at the Polyclinics under BSS. BSS Hotlines to help women book appointments for screening mammograms without needing a doctor's consult:

SingHealth	<b>6536 6000</b>
National Healthcare Group Diagnostics	<b>6275 6443</b>
Radiologic Clinic	<b>6533 2721</b>

#### Myth 2 Doctors in the Polyclinics reading the mammograms are junior doctors with limited experience.

**Fact:** Doctors in BSS are specialist consultant radiologists, surgeons and pathologists treating patients with breast cancer in their affiliated institutions. Mammograms are read by 2 independent radiologists (double reading) with a 3<sup>rd</sup> reader for discordant cases. There is a Quality Assurance framework with regular audits, quality improvement measures, and multidisciplinary management to maintain a high standard of care.

#### Myth 3 Screening mammogram is expensive and not subsidised.

**Fact:** The cost of a mammogram is \$100. HPB subsidises the cost of the mammogram under HPB's Screen for Life programme, after which women pay the rest:

Singaporeans	\$50
Permanent residents	\$75
Pioneers (65 and above)	\$25

\*Aged 50 or above, screening mammogram is Medisave-claimable

#### Myth 4 The BSS process is slow and results in delay of treatment.

**Fact:** Women with symptoms are encouraged to see a doctor for early attention. BSS is recommended for well women with no symptoms and appointments can be made via the Hotline. After the mammograms are done on the screening date, the results letter is received within 3 to 4 weeks; there is no medical report or X-ray films provided as the reading results are recorded in the BSS system.

- If the results are normal, monthly breast self-examination and regular screening once every two years is recommended.
- If the results are abnormal or show changes, the notification result letters with instructions to book an appointment at the recommended hospital assessment centre will be sent instead. Further evaluations such as additional mammograms, ultrasounds, tomosynthesis (3-D mammography), including most of the needle biopsies, may be performed on the assessment day. This one-stop service negates the initial time required for assessment and notification for assessment.

#### Myth 5 BSS cannot do mammograms in women with breast implants.

**Fact:** Women with breast implants can still have mammograms done under BSS, but in the Assessment Centres as more specialised techniques (pinch view mammography) are required for all implants.

#### Myth 6 Radiation from mammograms can cause cancer.

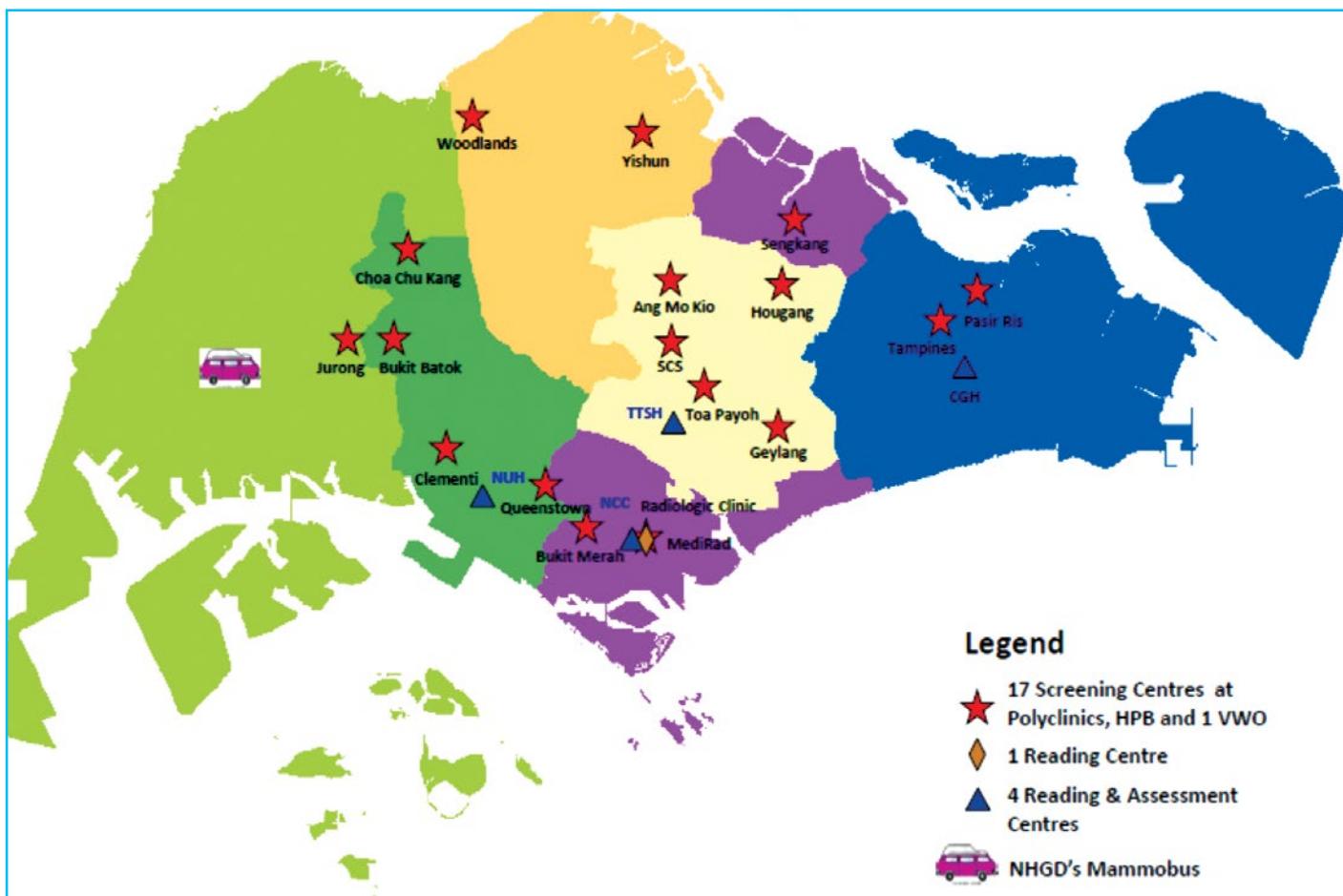
**Fact:** Radiation exposure from mammograms is low, equivalent to 6 months of background radiation exposure from daily living. The risk of harm is low, and the benefits outweigh the risk of having a cancer undetected and allowed to progress till symptoms appear when the cancer is more advanced.

#### Myth 7 Mammograms can detect all cancers.

**Fact:** No screening test is perfect, including the mammogram. Age and breast density can be masked by the breast tissue on a mammogram. Technical difficulties including discomfort in some women with small and dense breasts may limit the ability to obtain good mammograms to allow examination of all the breast tissue, hence screening mammograms are less effective in younger women because they tend to have denser breasts.

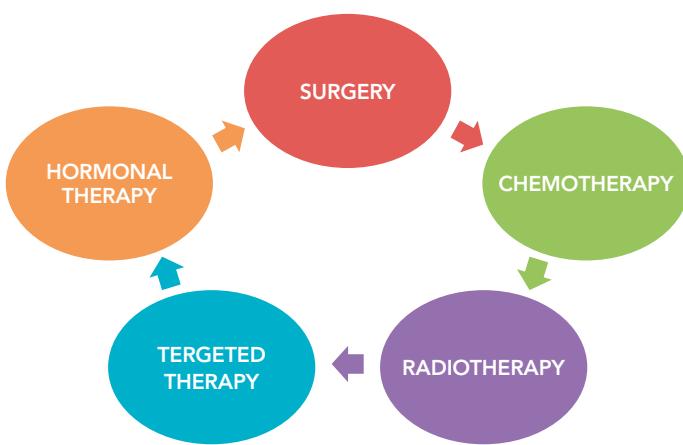


### Accessibility of BreastScreen Singapore Services



Source: Health Promotion Board

### MULTIDISCIPLINARY TREATMENT OF EARLY BREAST CANCER



The success of treatment stems from the multi-prong approach to this disease, with improved treatment options over the decades. Our multidisciplinary approach with Breast Tumour Board discussions and decisions also maintains a consistent high level of care throughout our institutions in SingHealth.

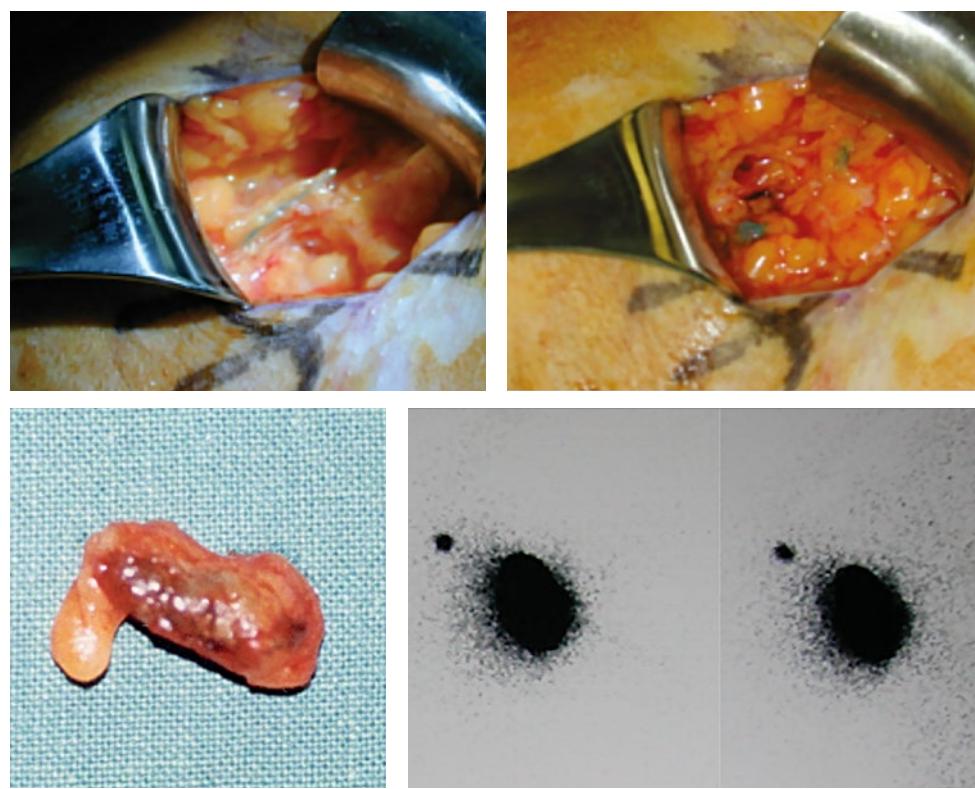
### SURGERY FOR BREAST CANCER

In EBC, surgery remains the cornerstone for treatment, occasionally, the only treatment needed, e.g. when DCIS is treated with mastectomy. More often, combination therapy, with the other modes of treatment after surgery as adjuvant therapy would be recommended. Surgery for breast cancer is viewed in two parts: the breast and the axilla, as axillary clearance is no longer a routine procedure for all breast cancers.

1. **Sentinel lymph node biopsy (SLNB)** is a standard of care for clinically early breast cancer. A blue dye or a radioactive isotope is injected around the cancer site or at the nipple prior to surgery to locate the SLN. If metastasis is detected in the SLN, axillary clearance with removal of the axillary lymph nodes will be performed immediately; otherwise, no further axillary surgery is needed.

The final histology will be reviewed about one week after surgery and in up to 5% of cases, the final assessment of the SLN may be different from the initial frozen section result and a second operation may be recommended.

### Sentinel lymph node localisation and biopsy



SLNB using blue dye involves identification of the blue nodes, while SLNB using radiocolloid involves using a gamma probe to identify the node through detection of the radioactivity counter.

**2. Breast surgery** involves either a breast-conservation surgery (lumpectomy or wide excision) or a mastectomy.

**Breast-Conserving Surgery (BCS)** involves removal of the breast cancer and a rim of normal surrounding breast tissue. The breast will remain; a scar and some changes in shape and size of the breast are expected. Patients can go home on the same day or the next day. A small tumour can be removed without noticeable deformities, but larger tumours to breast size and tumours in some locations result in more deformities.

**Oncoplastic Breast-Conserving Surgery (OBCS)** involves a range and combination of techniques we now provide to allow women to keep their breasts and avoid the disfiguring deformities that can arise. OBCS will be discussed in a later article.

**Mastectomy** is still the more common procedure amongst Singaporeans, with simple mastectomy the most performed surgery. However, the options and results of mastectomy with breast reconstructions have improved such that skin and nipple-sparing mastectomy with immediate breast reconstruction has become more common.

Flap reconstructions using skin, fat and sometimes muscle take about 6 to 8 hours and require a hospital stay between 1 to 2 weeks. Donor site for the flaps may be from the:

- Back (*latissimus dorsi*)
- Abdomen
  - TRAM (*transverse rectus abdominis myocutaneous*) flap
  - DIEP (*deep inferior epigastric perforator*) flap, taking skin and fat only
- Buttock
- Thigh

Breast silicone implants may be used and the operation takes about 4 to 5 hours, and the hospital stay is 2 to 5 days. It can be a 1-stage procedure when the permanent implant is inserted at the time of mastectomy; or a 2-stage procedure when a temporary expander is placed at the time of mastectomy and gradually expanded to stretch the skin. The expander will be exchanged for a permanent implant at a later surgery.

**ADJUVANT THERAPY FOR BREAST CANCER**

After surgery, most patients will require further (adjuvant) therapy. This usually depends on the size of the tumour, the lymph node status and the tumour characteristics e.g. hormone receptor status and HER2 status. These adjuvant therapies include chemotherapy, targeted therapy, radiotherapy and hormonal therapy.

1. **Radiotherapy** helps to decrease recurrence of the disease and usually takes place over a course of 4 to 6 weeks as external beam radiotherapy. If BCS is done, radiotherapy is recommended.

In some women with early breast cancer, a single dose of radiotherapy, known as Intraoperative Radiotherapy (IORT), may be given during the time of breast-conserving surgery (BCS). (*IORT will be discussed in the following article*).

2. **Chemotherapy** aims to decrease recurrence of the breast cancer in distant organs. It is usually administered over a course of 3 to 6 months.

Elderly patients, e.g. over 70 years old or those with multiple co-morbidities, would need additional considerations in view of the risks of complications.

In some women with large tumours, chemotherapy may be offered prior to surgery in order to shrink or downsize the tumour (neoadjuvant chemotherapy). In some cases, the chemotherapy may shrink the tumour enough so that a wide excision or lumpectomy can be safely done.

3. **Hormone Therapy** like Tamoxifen and Aromatase Inhibitors is recommended for women with cancers that have oestrogen or progesterone receptors. Hormonal therapy is usually taken for 5 to 10 years.

4. **Targeted Therapy** is recommended for women with cancer that have HER2/Neu receptor using Trastuzumab and Pertuzumab. Side effects are usually mild but cardio-toxicity must be considered.

**ROLE OF GPs IN SHARED PATIENT CARE**

GPs play an important role in the shared care of the patient in the following areas:

- Patient awareness and education: breast self-examination, recommend BSS mammograms
- Routine clinical examination
- Management of benign breast conditions
- Refer suspicious findings found in mammograms or ultrasound done outside BSS to specialists

**WHEN TO REFER TO A SPECIALIST**

Suspicious mammogram or ultrasound finding	Abnormal reports from screening mammogram outside BSS or diagnostic mammogram or ultrasound
Suspicious symptoms and signs	Hard, fixed and irregular lumps in women 40 years and above  Bloody nipple discharge
Patients newly diagnosed with breast cancer	



Dr Benita Tan is a Senior Consultant General Surgeon sub-specialising in breast surgery. Her clinical practice is largely on breast diseases, both benign and malignant. Experienced in a wide range of breast procedures, she performs breast biopsies including vacuum assisted biopsies (VAB) and breast cancer surgeries, from breast-conserving cancer surgery to mastectomies including skin-sparing surgery for breast reconstruction.

She enjoys teaching and shares her clinical experiences with students from the NUS Yong Loo Lin School of Medicine, Duke-NUS Medical School, SingHealth residents in General Surgery and Family Medicine programmes, as well as trainees in the Resident Nursing programme.

Active in research, she attained her Doctor of Philosophy at Saw Swee Hock School of Public Health, National University of Singapore. She has published in peer-reviewed journals and is a strong believer of collaborative efforts, with local and international research partners.



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# Intraoperative Radiotherapy (IORT) for Early Breast Cancer

**Dr Wong Fuh Yong, Senior Consultant,  
Division of Radiation Oncology, National Cancer Centre Singapore**

Women diagnosed with early breast cancers may face a lengthy treatment with a plethora of treatment modalities. Often, the very first choice they make is in deciding the type of surgery to remove the cancer: mastectomy where the entire involved breast is removed or a more limited surgery where the tumour alone is cleanly removed with clear margins, i.e. breast-conserving surgery (BCS). It is also at this time when patients often first learn of the need for post-operative radiotherapy (RT).

Without adjuvant radiotherapy, about 1 in 4 patients will recur in the breast. Long-term studies have shown that radiotherapy more than halves this risk and improves patients' survival. As such, RT is nearly always indicated after BCS.

However, despite the many benefits of breast-conserving therapy over mastectomy in terms of preservation of body image and psychosexual health at equivalent rates of disease control, the additional 4 to 6 weeks course of radiotherapy imposes significant financial and logistical challenge to many patients.

Furthermore, adjuvant radiation to the whole breast imparts not only short-term toxicity such as dermatitis but also low, but not negligible risks of long-term side effects to the heart, lungs and chest wall.

**Accumulating data suggests that it is not always necessary to irradiate the entire breast. It has been shown that the great majority of local recurrences occur in close proximity to the index lesion. It is here that the greatest true recurrence risks lies and where adjuvant RT exerts most of its curative effects.**

In contrast, adjuvant radiotherapy does not appear to reduce the incidence of non-index quadrants cancer occurrence which, incidentally, develops at a similar rate to new cancers in the opposite breast suggesting that some, if not all, of them are not related to the primary cancer.

Therefore, radiotherapy to the limited volume of highest risks around the tumour cavity may be sufficient to provide most of the disease control at minimum risks of side effects. This understanding gave rise to the concept of Accelerated Partial Breast Irradiation (APBI).

## ACCELERATED PARTIAL BREAST IRRADIATION (APBI)

In APBI, the volume of breast irradiated is reduced from whole breast radiation. This reduces the amount of sensitive normal tissue irradiated and helps to reduce both short- and long-term side effects. Because of this targeted delivery of radiation to only the at-risk tissue, radiation can be given over a shorter treatment course.

Depending on the techniques of APBI used, a normal conventional course of RT that used to last 4 to 6 weeks can be reduced to 1 week or as short as a single fraction. This drastically reduces the patient's treatment burden.

## Intraoperative Radiotherapy (IORT)

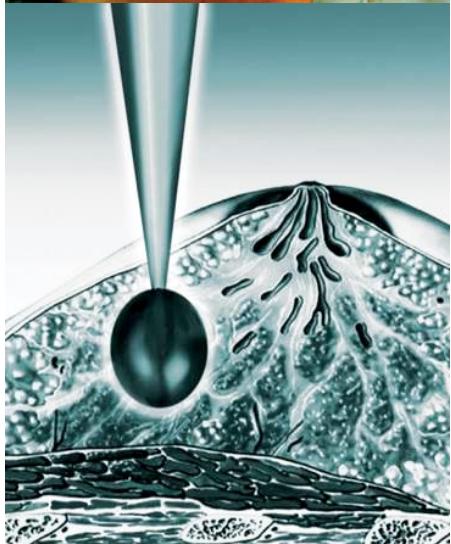
One method of APBI that has come to the forefront is the Intraoperative Radiotherapy (IORT). Since its introduction to National Cancer Centre Singapore (NCCS) 3 years ago, IORT has been the workhorse for our partial breast irradiation programme.

In this programme, patients are carefully selected to include only those patients in whom the risks of regional and distant metastases are low. In addition, candidates for IORT must fulfill other technical and pathological considerations including having clear margins at excision and features suggesting a low likelihood of extensive, multifocal disease. Thus, patients treated with IORT at NCCS are often the postmenopausal patients older than 50 years old with early-stage, node-negative breast cancers expressing hormone receptors.

## How it is done

For patients planned for IORT, they first undergo breast conservation surgery in the usual fashion. Sentinel lymph node biopsy (SLNB) will be performed and frozen section assessment of the lymph node done while the patient is still under general anaesthesia.

Once the result shows no cancer in the SLNB, a specialised applicator is emplaced in the open excision cavity to irradiate the cavity wall and surrounding breast. In the following 30 to 40 minutes, the radiation dose that used to take 6 weeks of daily treatment to deliver will be given in one session whilst the patients remain blissfully unaware under anaesthesia.



Intraoperative radiotherapy in progress

The success of IORT is predicated on the careful selection of patients. However, certain features of high-risk disease such as the presence of extensive intraductal components (ductal carcinoma *in-situ*), lymphovascular invasion, positive excision margins, or false negative sentinel lymph nodes can only be determined after the operation and IORT has been performed.

In such cases, further surgery may be indicated to complete treatment and the remaining untreated breast would need further external radiotherapy. This 'top-up' radiation typically lasts 3 weeks. The typical 'boost' dose given to the tumour bed in a conventional course of RT is omitted as IORT is considered equivalent.

#### SUMMARY

In summary, IORT represents a significant development in reducing the treatment burden of patients undergoing treatment for early breast cancers. Not only is time spent on treatment vastly reduced from 4 to 6 weeks to a single intraoperative fraction, the side effects often seen in patients undergoing conventional whole breast RT is largely avoided.

As such, IORT should be considered in all suitable patients undergoing breast conservation therapy for early breast cancers. Certainly, no woman should have to resort to choosing mastectomy as the Hobson's choice to avoid the burden of a lengthy course of adjuvant radiotherapy.

The field of APBI has been bolstered in recent years with encouraging reports of the outcomes of several scientific studies conducted. In the randomised control trial (TARGIT-A) examining the use of conventional whole breast radiotherapy versus the use of IORT and external beam radiation when indicated, patients undergoing IORT had non-inferior local control rates and survivals.

The 5-year local failure rates among patients treated with TARGIT in the same setting as their primary surgery is a reassuring 2.1% at 5 years. Wound-related complications are the same between arms and Grade 3/4 skin toxicity is lower in the IORT arm (0.2%).

It was further observed that while breast cancer mortality is similar (2.6% vs 1.9%,  $p=0.56$ , NS); non-breast-cancer mortality is higher in patients who received whole breast radiotherapy (1.4% vs 3.5%,  $p=0.0086$ , significant).

In NCCS, we are conducting further studies to explore if IORT can be safely delivered as an alternative to whole breast RT along with standard adjuvant systemic treatment for patients with moderate disease. We are also exploring the use of IORT in patients with pure ductal carcinoma *in situ*, an increasingly common diagnosis as more women undergo mammographic screening.



**Dr Wong Fuh Yong** is a Senior Consultant with the Division of Radiation Oncology, National Cancer Centre Singapore. He specialises in breast oncology, neuro-oncology and the use of stereotactic radiosurgery for both benign and malignant indications.

He is active in research in breast cancers and has published in several peer-reviewed journals. In his educator role, he has mentored students from medical students to specialist trainees under his care, and regularly lectures at Nanyang Polytechnic for Allied Health students.



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# Oncoplastic Breast Surgery

**Dr Veronique Tan, Consultant,  
SingHealth Duke-NUS Breast Centre**

Onco-plastic breast surgery combines cancer resection with established plastic surgery techniques to reshape or remodel the breast for an aesthetic final outcome.

It is a philosophy that considers how the breast form may be maintained, or even improved, while being uncompromising in cancer resection. The range of techniques available allow for a surgical solution that affords optimal oncologic resection whilst considering the breast form that the woman needs to live with for the rest of her life.

Being considerate of the aesthetics of the breast we leave our patients with is particularly important today, as advances in breast cancer therapies now afford excellent long-term survival. Survival for patients with early-stage breast cancers exceeds 90% at 10 years.

Breast-conserving surgery (BCS) removes the cancer with a rim of surrounding breast tissue. It provides equivalent survival to a mastectomy so long that resection margins are cancer-free, and radiation therapy is administered to the remaining intact breast.

It has advantages to a mastectomy as it allows the woman to retain her breast

– a breast that is warm, soft and sensitive; a breast that fits in her bra and moves and feels as a part of her body. It also allows for less radical surgery, thereby minimising surgical trauma and morbidity.

However, simply removing the cancer from the breast may well leave a patient with significant breast deformities (Figure 1). Loss of breast contour, puckered scars and deviations of the nipple are all potential consequences. These deformities arise because the volume of resection leaves a surgical cavity that collapses and pulls the parenchyma and skin towards the oncological cavity as the patient heals.

The severity of deformity depends on the location of the cancer within the breast, the volume of resection needed relative to the existing breast volume, and the surgical incision of choice. Tumours at the inferior and medial aspects of the breast are prone to deformities, and resection volumes exceeding 15-20% of breast volume often result in poor cosmetic outcomes.

## ONCOPLASTIC BREAST CONSERVING SURGERY (OBCS)

Oncoplastic breast-conserving surgery (OBCS) aims to achieve good aesthetic outcomes for women with breast cancers who would have unacceptable outcomes with other BCS techniques. Many of these patients would have otherwise been recommended a mastectomy or be relegated to live with a permanently deformed breast.

An oncoplastic procedure aims to minimise cosmetic detriment to the breast by eliminating surgical cavities that will then create distortion, hence, the terms parenchymal displacement (redistribution) or parenchymal replacement have been used.

### 1. Therapeutic Mammoplasty / Therapeutic Mastopexy

Breast reshaping by displacement and redistribution of breast parenchyma that remains after cancer resection is possible for patients with generous breasts and adequate remnant parenchyma. In such instances, breast cancer removal may be combined with a breast reduction or breast-lift procedure, con-

**Figure 1** Breast deformities after Breast-Conserving Surgery (BCS)



Patient A had bilateral wide excisions for bilateral breast cancers. Loss of volume and contour is noted, with a degree of 'beaking' of the right breast.



Patient B had a cancer in the left upper outer quadrant removed. Volume loss and deviation of the nipple resulted. She uses a partial breast prosthesis daily in view of the significant volume discrepancy.



sequently referred to as a 'therapeutic mammoplasty' or 'therapeutic mastopexy' respectively.

These procedures need to be carefully planned and performed by surgeons trained in such techniques as careful attention to factors such as cancer location, consistency of the breast, vascular supply of breast parenchyma, nipple and skin envelope and breast reshaping is critical to ensure an optimal final outcome.

The exact scar upon the breast depends largely on the cancer, the current breast size, degree of breast ptosis (droop) and the volume of reduction planned. Scars may range from being solely circumareolar (around the areolar edge) to those similar to a standard breast reduction like the vertical or Wise pattern type scars (Figure 2a).

The volume of breast reduction largely depends on the patient's preference. It

may be a small volume, where essentially the only breast volume reduction is the wide local excision itself; or significant volume breast reduction akin to those performed for macromastia (severe breast hypertrophy).

For patients with macromastia and large ptotic breasts, a breast reduction at the time of cancer resection has the added benefits of easing back, neck or shoulder pains, and minimising discomfort while exercising. A reduced breast volume also reduces the likelihood of heterogeneous irradiation and burns during adjuvant radiation therapy. Considerable cosmetic improvement to the breast may also be achieved.

The aim of a therapeutic mammoplasty or mastopexy is to create a breast with natural shape and contour, albeit of smaller size, after cancer resection. A similar reduction procedure to the opposite breast may be performed if there

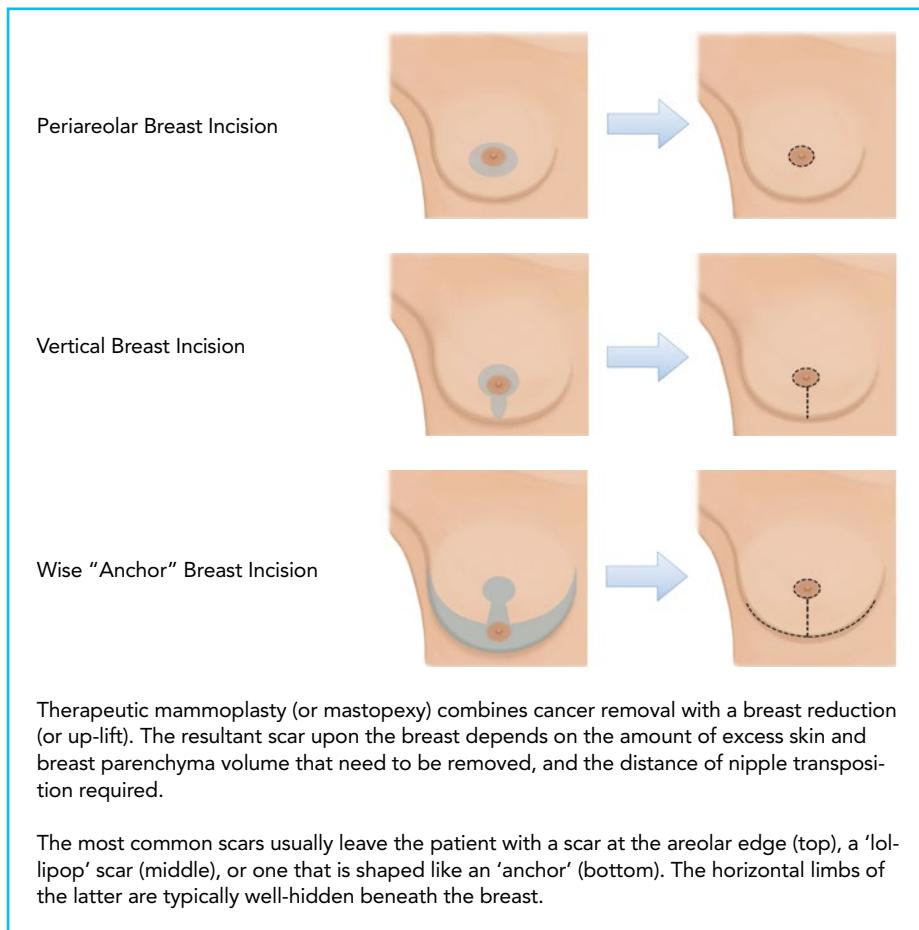
had been significant volume reduction during cancer resection and the patient wishes for better symmetry (Figure 2b).

## 2. Partial Breast Reconstruction

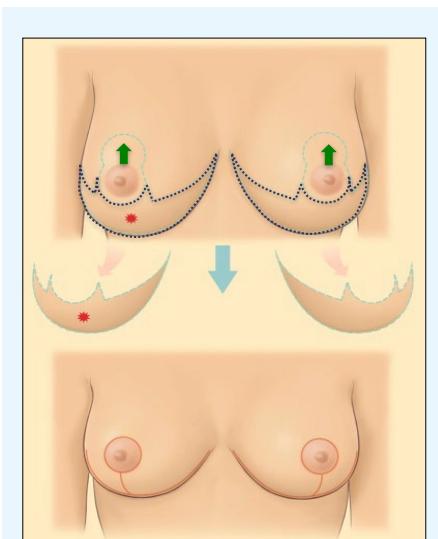
For patients with non-ptotic and modest-sized breasts, parenchyma redistribution options are limited. Very often the volume of resection, even for small cancers, results in significant breast deformities because it constitutes a large proportion of the existing breast volume.

Partial breast reconstruction is then of particular benefit. Such surgery replaces the volume of breast parenchyma resected for oncologic clearance with tissue similar in consistency to the breast, such as the soft, fatty tissue from the side of the chest wall or from beneath the breast.

**Figure 2a Therapeutic Mammoplasty / Therapeutic Mastopexy**



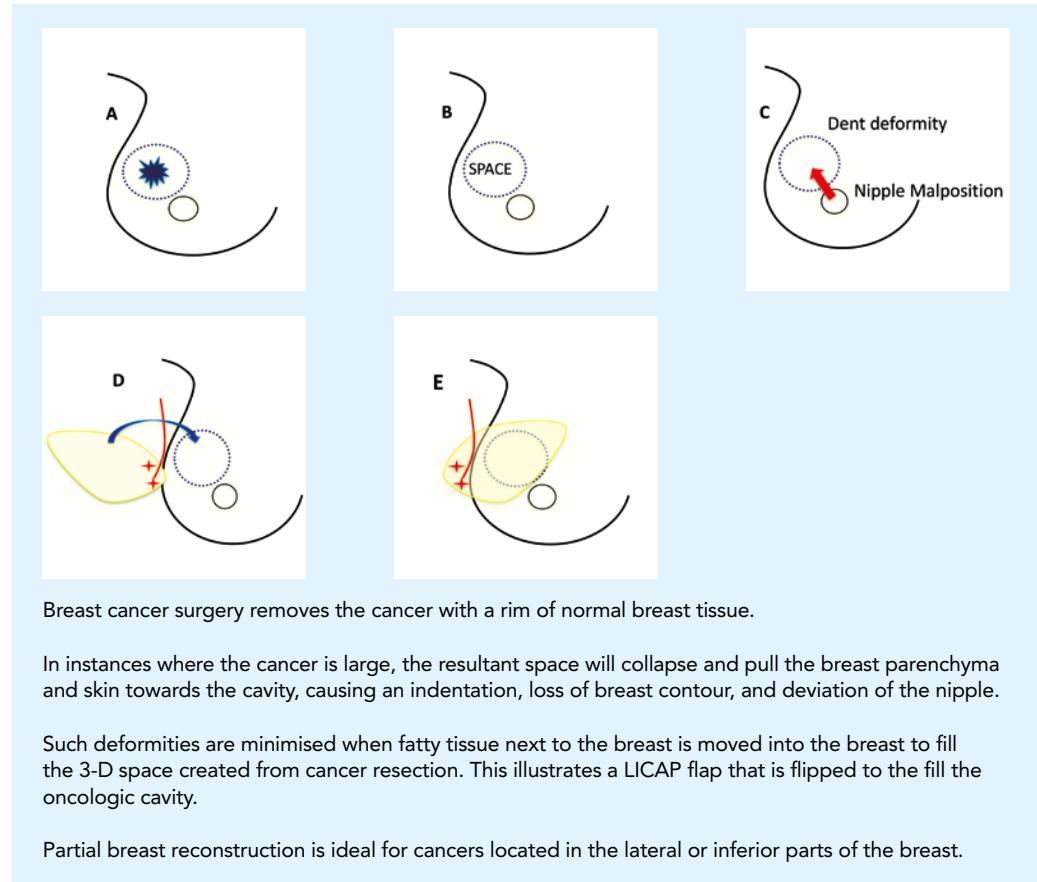
**Figure 2b Therapeutic Mammoplasty / Therapeutic Mastopexy**



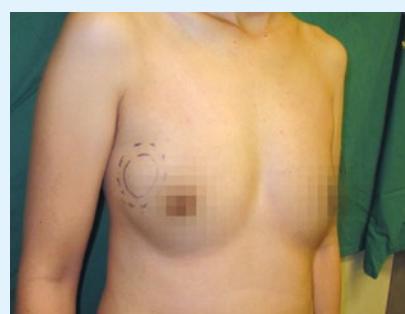
Lateral intercostal artery perforator (LICAP) flaps use skin and fat from the side of the breast, near the axilla, to fill breast defects following breast-conserving surgery. They are ideal for cancers that occur in the lateral aspect of the breast, effectively replacing breast volume, maintaining breast contour, and minimising displacement of the nipple areolar complex. These flaps are supplied by the small, named perforator vessels, and do not incorporate any muscle, thereby keeping donor site morbidity to a minimum.

Typically, breast cancer resection, axillary staging and harvest of the flap will all proceed through the one scar along the lateral chest wall. The scar may be long, but is seldom visible from the front (Figure 3).

**Figure 3a Partial Breast Reconstruction with a Perforator Flap**



**Figure 3b Patient who had a right breast wide excision + LICAP flap reconstruction**



Patient with non-ptotic breasts and a 33 mm cancer in upper outer quadrant of the right breast. Resection without volume replacement would result in significant contour deformity, volume deficit and nipple deviation. She had a LICAP flap partial breast reconstruction at the time of cancer resection.



Photos on the left show the stable surgical results 1 year after surgery and radiation therapy. The breast contour and nipple position are maintained. The surgical scar along the side of the chest wall is not visible from the front.



Anterior intercostal artery perforator (AICAP) flaps employ a similar concept. These crescent-shaped flaps comprising skin and fat are harvested from beneath the breast. Supplied by the AICAP vessels, these flaps are transposed superiorly to fill a breast defect that results from removing a cancer in the inferior pole of the breast.

The scar is well-hidden along the inframammary fold, and by filling the resection cavity with fat, such partial breast reconstruction circumvents the 'beaked' deformity that commonly occurs after resection of a cancer in the inferior part of the breast.

### 3. Fat Grafting

While all efforts should be made to minimise breast deformities associated with BCS, breast deformities may still occur. Secondary reconstruction is possible for patients who had prior breast-conserving surgery and resultant deformities. These may take the form of a formal partial breast reconstruction, where volume and skin may be replaced; or a less invasive approach associated with less scarring – fat grafting.

Fat grafting, also known as lipomodelling or autologous fat transfer, has been shown to be safe and effective for patients who develop breast deformities

after breast cancer resection and breast irradiation. Fat grafting adds volume, mitigates bad scarring, and improves the physical discomfort of a scarred and distorted breast.

In this procedure, fat is aspirated from the patient's abdominal wall, thighs or buttocks via small 4-5 mm incisions using cannulas. The fat is then processed before being injected into the breast to improve contour and volume. Tight scars are released during this procedure, often providing relief to pulling pains the patient experiences.

## CONCLUSION

Today, our patients with breast cancer are living longer than ever, and living well longer is what we aspire for our patients. To be able to preserve the breast affords much comfort and benefits to our patients, and preserving it aesthetically, not simply oncologically, improves their quality of life and rightly parallels advances in breast cancer survival.

Oncoplastic techniques extend the option of breast conservation to those who might otherwise be recommended a mastectomy, such as those with large cancer to breast volume ratios, and patients with cancers in sensitive locations of the breast prone to significant breast deformities.

For other patients, combining a breast reduction with cancer resection may address several issues at the same instance. The variety of techniques available for breast cancer surgery now allows for tailored, individualised surgical treatment for each patient diagnosed with breast cancer.



Dr Veronique Tan is a Consultant Oncoplastic Breast Surgeon at the National Cancer Centre Singapore (NCCS) and Singapore General Hospital (SGH). Dr Tan's practice covers benign breast conditions, the diagnosis and surgical treatment of symptomatic and screen-detected breast cancer, oncoplastic breast surgery and breast reconstruction. She is one of the few breast surgeons in Singapore formally trained in this discipline where breast cancer surgery is combined with plastic surgical techniques to ensure a good aesthetic outcome.



Active in research and education, Dr Tan holds a Master of Science for her research in cancer biology and teaches undergraduate and postgraduate students from the Yong Loo Lin and Duke-NUS medical schools. She has published several scientific papers in peer-reviewed journals on breast diseases and surgical techniques, and has been invited to present her work at numerous local and international meetings.

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# SingHealth Duke-NUS Breast Centre

## The One-Stop Multidisciplinary Centre for Breast Cancer Care



### Breast Centre

The SingHealth Duke-NUS Breast Centre is the largest centre in Singapore treating the full spectrum of breast conditions. The Centre serves its patients at 3 key SingHealth institutions, namely, National Cancer Centre Singapore (NCCS), Singapore General Hospital (SGH), and KK Women's and Children's Hospital (KKH). Annually, the Centre handles about 25,000 outpatient visits and manages over 1,000 breast cancer patients.

We offer state-of-the-art treatment options using the latest surgical techniques and cutting-edge equipment, including oncoplastic breast surgery, sentinel node biopsy and intraoperative radiotherapy.

Treatment is individualised for each patient, and at the SingHealth Duke-NUS Breast Centre, every case of breast cancer is discussed at a weekly multidisciplinary conference to ensure the best treatment options are recommended.

Patients have full access to warm, supportive care from the team of experts focused on breast cancer throughout their duration of treatment; working together in unison to achieve seamless and best outcome for patients.

For more information, please contact **SingHealth Duke-NUS Breast Centre** at:

Tel: 6321 4402 (SGH)  
6436 8288 (NCCS)  
6294 4050 (KKH)

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

#### OUR SERVICES

Our dedicated breast surgeons work closely in a multidisciplinary team to provide a full range of integrated services for the assessment and management of benign and malignant breast conditions in a caring and friendly environment.

Each case of breast cancer is different, and will be reviewed in detail by our multidisciplinary team to come up with the best treatment plan suited for each patient. The personal treatment team for each breast cancer patient includes a radiologist, pathologist, medical and radiation oncologist, surgeons and specially-trained support staff.

- Expert clinical assessment
- Radiological evaluation (digital mammography, 3D-breast tomosynthesis, ultrasonography, computed tomography 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 mastectomies and breast conserving surgery (BCS)
- Oncoplastic and reconstructive breast surgery
- Sentinel lymph node biopsy and axillary clearance
- Intraoperative radiotherapy (IORT) for breast-conserving surgery (only available in NCCS)
- Specialist breast care nurse support for peri-operative and post-operative care
- Post-operative physiotherapy and lymphoedema care
- Multidisciplinary care: Breast tumour board and radio-pathological meeting
- Pre-operative (neoadjuvant) therapy programme
- Genetic counselling and testing, fertility counselling and preservation to young and/or high-risk patients

#### OUR DOCTORS

- Dr Ong Kong Wee, Head and Senior Consultant
- Dr Benita Tan, Senior Consultant
- Dr Wong Chow Yin, Senior Consultant
- Dr Yong Wei Sean, Senior Consultant
- Dr Preetha Madhukumar, Senior Consultant
- Dr Lim Swee Ho, Senior Consultant
- Dr Veronique Tan, Consultant
- Dr Lim Geok Hoon, Consultant
- Dr Evan Woo, Consultant
- Dr Tan Yia Swam, Consultant
- Dr Sim Yirong, Associate Consultant
- Dr Tan Qing Ting, Associate Consultant
- Dr Yan Zhiyan, Associate Consultant
- Dr Jinnie Pang, Associate Consultant



## Services

# Skin Transplant at SGH Skin Donation Saves Lives

The **Skin Bank Unit**, one of the tissue banks under Transplant Tissue Centre SingHealth, at the Singapore General Hospital (SGH) Burns Centre, started in 1998 for the recovery, preparation, preservation and distribution of donated skin. Its main objective is to provide a ready source of donor skin allografts to treat severe burn patients in Singapore.

**The SGH Burns Centre is the only dedicated burns unit in Singapore and treats about 220 patients a year. Most of them suffer from burn injuries due to industrial or domestic accidents and of which, 10% of these patients require skin transplant.**

**The SGH Skin Bank Unit is the first skin bank in Southeast Asia accredited under American Association of Tissue Banks and has provided up to 1,236,097 cm<sup>2</sup> donor skin to 256 burn victims (almost the size of a badminton court) for grafting since 1998.**

### WHO NEEDS SKIN TRANSPLANT?

For patients who sustain major burns with a total body surface area (TBSA) in excess of 30%, or full thickness burns in excess of 20% of TBSA, donated human skin is routinely used to cover the excised burn wounds as autologous skin grafts may not be sufficient.

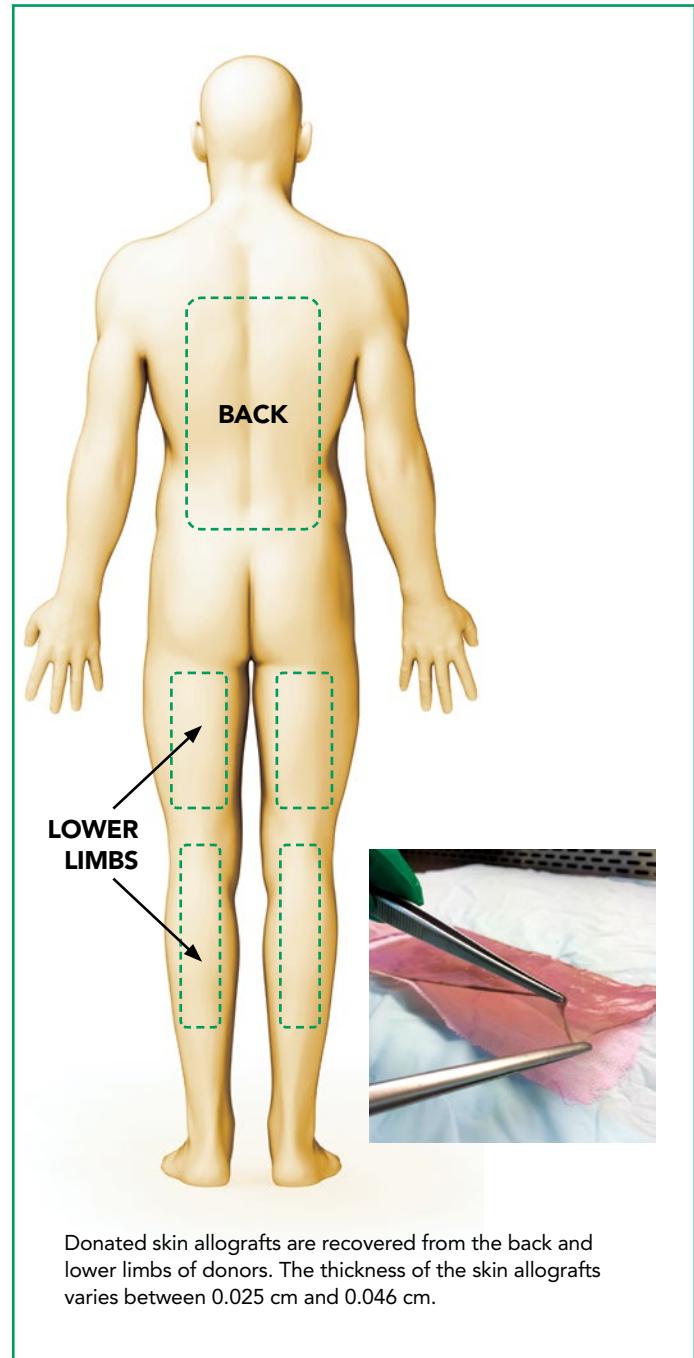
These temporary skin allografts are life-saving as they help to prevent infection, reduce loss of critical fluids as well as relieve the patient's pain and discomfort during the critical phase of their severe burn injury at the beginning. These transplanted tissues help to improve the patient's morale and immunity until it is possible to do an autologous skin graft for definitive wound coverage.

### ABOUT SKIN DONATION

Skin is recovered from a deceased donor. In order for the tissue to be useful, recovery is done within 15 hours from the time of death.

The screening process for a potential donor includes the checking of medical and social history, present illnesses, a physical examination and blood sampling for infectious diseases such as HIV and hepatitis. The screening process serves to exclude any possibility of transmissible infectious diseases and high-risk behaviour.

Skin is typically recovered from the deceased donor's back and lower limbs – areas which are usually covered by clothing. Exposed areas of the body such as the face, neck and upper limbs will not be considered.



Donated skin allografts are recovered from the back and lower limbs of donors. The thickness of the skin allografts varies between 0.025 cm and 0.046 cm.



The outer skin is recovered using a special surgical instrument called the dermatome. Typical thickness of the skin recovered varies between 0.025 cm and 0.046 cm, about the thickness of 4 pieces of paper. This leaves about 85% thickness of the donor's skin still intact.

After tissue recovery, the donor will be prepared appropriately, allowing for an open casket funeral. Family members can also specify which areas of the deceased donor's body to be left untouched.

The recovered skin tissues are processed, individually packed and specially stored at temperatures ranging from -70 degrees Celsius to -196 degrees Celsius, for up to 5 years. Stringent donor evaluation, which includes reviewing of all donor medical records, infectious disease screening and microbiology results, is performed before donated skin tissues are certified safe for transplantation.

#### **WHO ARE OUR DONORS?**

Multiple skin grafting operations are required during the course of treatment for a burn patient. At present, the Skin Bank Unit has not been able to meet the demand for donated skin allografts despite the increase of local donors from 5 in 2005 to 18 in 2015, which contributes to a mere 20% of skin grafts required. 80% of our skin supplies have to be imported from overseas tissue banks such as the Euro Skin Bank and others in the United States or Canada.

**Skin donations are not covered by Human Organ Transplant Act (HOTA). Anyone above the age of 18 can make this life saving decision by completing an Organ Donation Pledge Form to opt-in under the Medical (Therapy, Education and Research) Act (MTERA) and submitting it to the National Organ Transplant Unit (NOTU).**

**"Our protocol on early excision of burn wounds and skin grafting has reduced patients' length of stay by 30%, and reduced mortality from 45% to 16%."**

**Dr Chong Si Jack**  
Consultant at SGH Department of Plastic,  
Reconstructive and Aesthetic Surgery &  
Medical Director of Skin Bank Unit

For more information about this programme, please contact **Skin Bank Unit, Singapore General Hospital:**

Tel: 6321 4974  
Email: [gplskin@sgh.com.sg](mailto:gplskin@sgh.com.sg)  
Website: [www.sgh.com.sg/skinbank](http://www.sgh.com.sg/skinbank)



# Partnering GPs to Fight Diabetes

*Diabetes is a worrying trend locally – one in three Singaporeans aged 60 and above has the disease today, and if left unchecked, nearly one million Singaporeans could be affected by 2050. Healthcare providers across the continuum can achieve more by working together to tackle this challenge.*

**Medical News** speaks with family physician, Dr Theresa Yap of Yang & Yap Clinic and Surgery and Dr Emily Ho, Director of SingHealth Regional Health System who are partners in fighting diabetes and helping patients stay well-supported in the community.

**Q: For decades, you've been caring for patients with diabetes and encouraging those at-risk to go for early screening. What has been the main motivating factor for you?**

**Dr Yap:** I've been practising for the past 35 years. My interest in treating chronic diseases like diabetes stems from the fact that there is a great deal I can do for my patients before end-stage disease or organ damage sets in. We can help to prevent the disease onset or delay the progression through regular check-ups and monitoring of their lifestyle and diet. I feel a great sense of satisfaction when I help my patients improve or maintain their medical conditions.

**Q: How does the partnership between GPs and hospitals benefit patients?**

**Dr Ho:** As the population ages, there is a need to look after older individuals in the community who will have multiple chronic diseases. Holistic care will not only be clinical but should encompass psychosocial aspects as well.

As the closest touch point for healthcare in the community, a trusted GP knows his patients and their families intimately and is in the best position to take care of patients with stable chronic conditions. GPs are also key to bridging and connecting patients to other support services like allied health and community social services. By partnering GPs and ensuring a smooth handover of care, we can help patients have a more seamless journey as they transit from hospital to the community.

**Q: What are some of the challenges faced in fighting diabetes, and how do you overcome them?**

**Dr Yap:** The greatest difficulty is to get patients to comply with lifestyle and diet changes, which is vital for those with diabetes. I'm a firm believer of early screening because if someone knows that he is at risk of developing diabetes, he would be spurred to do something to help himself and comply with the recommended lifestyle changes.



Dr Theresa Yap, Family Physician, Yang & Yap Clinic and Surgery



Eligible individuals will be screened by participating GPs for diabetes, high blood pressure, high cholesterol and obesity.

**Dr Ho:** Studies have shown that diabetes can run in the family. In fact, relatives of individuals with Type 2 diabetes are two to six times more likely to have the disease. To encourage those who are at-risk to go for early screening, we introduced the STOP Diabetes programme which offers screening by partner GPs. By working with GPs, we can ensure timely follow-up and active management of someone who is at risk or has the disease.

**Q: Can you share what the screening procedure is like?**

**Dr Yap:** SingHealth arranges for interested individuals to be screened at a partner GP clinic near their homes or workplace.

Before the visit, patients would need to complete some forms to help us understand their medical history and lifestyle better. The blood test results can usually be collected at the clinic in two weeks' time.

If an individual is found to be at-risk or has diabetes, he can choose to receive follow-up care at the clinic. Or if the condition turns out to be severe, the patient would be referred for specialist care.

I started offering the screening to my patients and their family members since May 2016. Paperwork is involved but once you get yourself acquainted with the process, it's a breeze!

**Q: How would you sum up your experience as a GP on board the STOP Diabetes programme?**

**Dr Yap:** It's easy to forget to ask the patient's family members to come for such tests as busy clinic work can often overwhelm us. It does take a bit of initiative and the desire to do our part for society. But I would say it's a win-win situation – we get to grow our patient pool, and at the same time, help individuals at-risk and their loved ones to manage their conditions from the onset.

# BE OUR PARTNER

## Join us to help STOP Diabetes

### The STOP Diabetes Screening Programme

SingHealth is partnering GPs across the island to offer health screening for parents, siblings and children of individuals with diabetes mellitus (Type 2 diabetes).

- Screening is open to those aged 30 and above who have no known diabetes or impaired glucose tolerance.
- Eligible individuals will be screened by participating GPs for diabetes, high blood pressure, high cholesterol and obesity.
- Those found to be at-risk or suffering from diabetes will be referred for further tests and/or follow-up care by these GPs. Intervention programmes such as diet and lifestyle education, foot care and diabetes self-care will also be recommended.

*The STOP Diabetes screening programme is part of the SingHealth Regional Health System's ongoing efforts to partner community organisations in helping the public embark on preventive health and a healthier lifestyle.*

If you're a GP and keen to join the fight to help our patients combat diabetes, contact us.



stopdiabetes@singhealth.com.sg



6702 5485 / 6702 5486 / 6702 5487  
(9.30am – 5pm on Monday to Friday)



# Achieving Better Asthma Control

*Having a personalised asthma action plan and managing symptoms of allergic rhinitis can help*

Affecting about a tenth of the adult population in Singapore, asthma is a common enough chronic respiratory condition. The management of it, however, is highly dependent on the patient's understanding of his condition. The patient learns to recognise triggers and to avoid them, as well as to use daily medications to control symptoms and quick-relief inhalers to manage the flare-ups.

But not all patients are able to maintain good control. More frequent use of quick-relief inhalers is a classic indication that asthma control may be deteriorating. The presence of nocturnal symptoms such as breathlessness, cough, phlegm and wheezing is also another sign that reflects declining level of control.

In a local longitudinal study conducted by the Department of Research, SingHealth Polyclinics, it was found that 59% of asthma patients had nocturnal symptoms at recruitment.

**A key finding of the study was that patients who were not on any asthma action plan (AAP) were more likely to have nocturnal symptoms compared with those who were on a plan or had updated it.** The study was published in *Nature Partner Journals' Primary Care Respiratory Medicine*.

The AAP is not just a personalised record of the patient's symptoms. It systematically guides the patient how to adjust the medication should symptoms escalate so that an asthma attack can be prevented. In the event of an attack, it also informs the patient how and where to seek immediate medical attention.

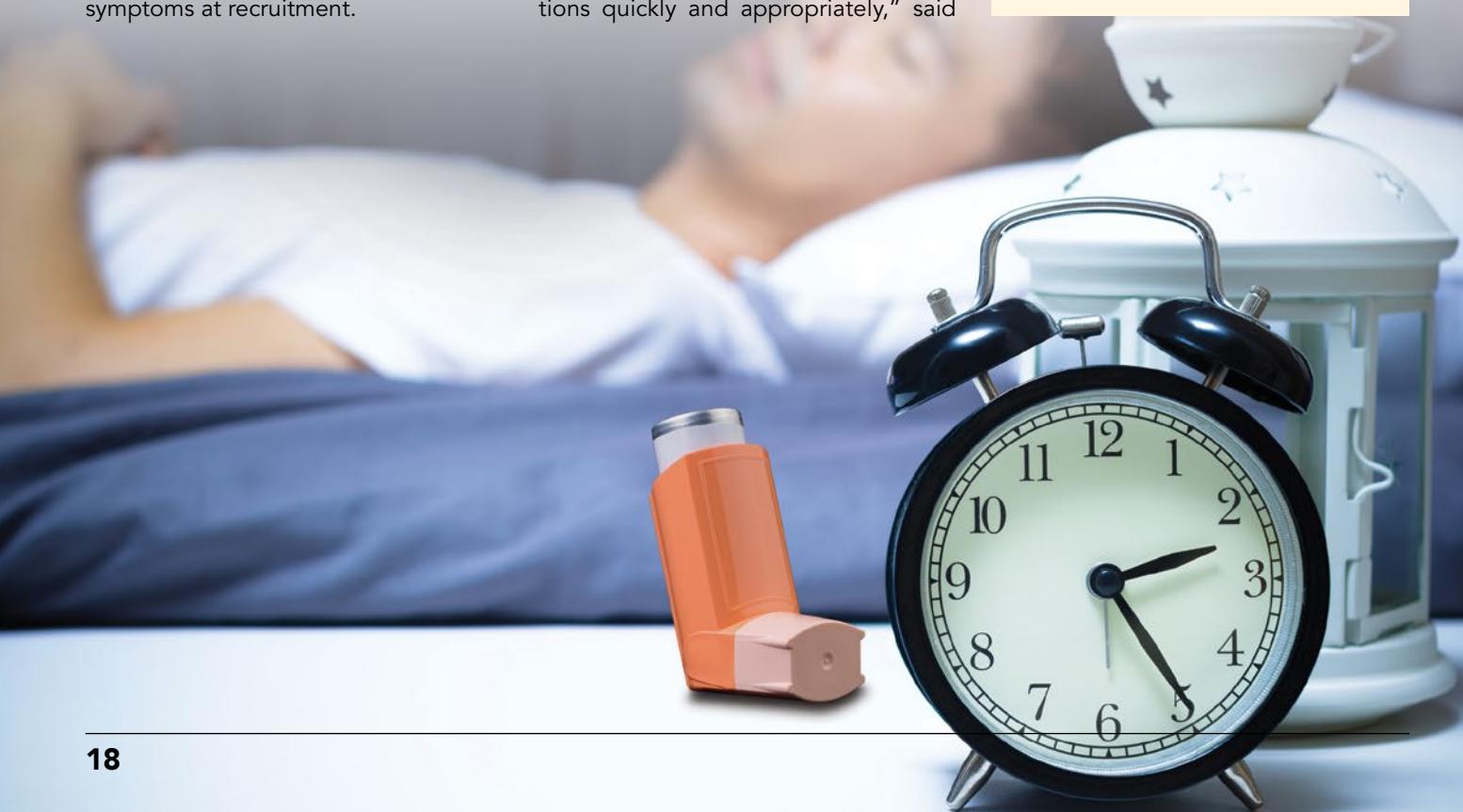
"As the patient may not remember what to do during the critical window period, a written AAP allows them to better control their asthma via symptom recognition and appropriate line of therapeutic action. It will give them the confidence to adjust their medications quickly and appropriately," said

Dr Tan Ngiap Chuan, Principal Investigator of the study.

Dr Tan's team also found that patients with allergic rhinitis were more at risk for nocturnal symptoms. Appropriate management of the allergic rhinitis can thus lead to better asthma control in the long-run.

## WHAT PRIMARY CARE PHYSICIANS CAN DO

"Primary care physicians are well-placed to assist patients to attain asthma control by prescribing an AAP, reviewing it regularly, and revising the plan if necessary. They can also educate their patients and steer them towards evidence-based treatment for allergic rhinitis, which can range from periodic anti-histamine alone to combination of anti-histamine and nasal steroid to immunotherapy," shared Dr Tan.



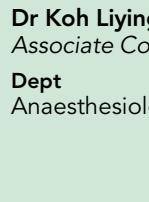


## Appointments

Oct-Dec 2016

# SINGAPORE GENERAL HOSPITAL APPOINTMENTS

Appointments: 6321 4402  
Email: appointments@sgh.com.sg

 <p><b>Dr Liu Weiyang Christopher</b> Associate Consultant <b>Dept</b> Anaesthesiology <b>Sub-specialty</b> Chronic Pain Management</p>	 <p><b>Dr Thangavelautham Suhitharan</b> Associate Consultant <b>Dept</b> Anaesthesiology <b>Sub-specialty</b> Intensive Care Medicine</p>	 <p><b>Dr Tham Wei Ping</b> Associate Consultant <b>Dept</b> Diagnostic Radiology <b>Sub-specialty</b> Body Imaging (Thoracic)</p>	
 <p><b>Dr Chua Si Yong Ivan</b> Associate Consultant <b>Dept</b> Emergency Medicine</p>	 <p><b>Dr Suresh Rama Chandran</b> Associate Consultant <b>Dept</b> Endocrinology <b>Sub-specialty</b> Endocrinology and Diabetes</p>	 <p><b>Dr Ong Ming Liang, Andrew</b> Associate Consultant <b>Dept</b> Gastroenterology &amp; Hepatology</p>	
 <p><b>Dr Ravishankar Asokkumar</b> Associate Consultant <b>Dept</b> Gastroenterology &amp; Hepatology <b>Sub-specialty</b> General Gastroenterology and Hepatology, Inflammatory Bowel Disease, Diagnostic and Therapeutic Endoscopy</p>		 <p><b>Dr Woong Liling Natalie</b> Associate Consultant <b>Dept</b> Internal Medicine <b>Sub-specialty</b> Palliative Medicine</p>	
 <p><b>Dr Soh Rui Ya</b> Associate Consultant <b>Dept</b> Respiratory &amp; Critical Care Medicine</p>	 <p><b>Dr Zhuang Kun Da</b> Associate Consultant <b>Dept</b> Diagnostic Radiology <b>Sub-specialty</b> Interventional Radiology</p>	 <p><b>Dr Koh Liying</b> Associate Consultant <b>Dept</b> Anaesthesiology</p>	
<b>Dr Lim Huili</b> Associate Consultant <b>Dept</b> Anaesthesiology	<b>Dr Loh Kent Neng Samuel</b> Associate Consultant <b>Dept</b> Anaesthesiology	<b>Dr Selene Tan Yan Ling</b> Associate Consultant <b>Dept</b> Anaesthesiology	<b>Dr Tan Keng Tiong Jerry</b> Associate Consultant <b>Dept</b> Anaesthesiology
<b>Dr Tan Yan Ru</b> Associate Consultant <b>Dept</b> Anaesthesiology	<b>Dr Teo Miqi Mavis</b> Associate Consultant <b>Dept</b> Anaesthesiology	<b>Dr Tien Jong-Chie Claudia</b> Associate Consultant <b>Dept</b> Anaesthesiology	<b>Dr Zeng Ling Antonia</b> Associate Consultant <b>Dept</b> Anaesthesiology
<b>Dr Ennaliza Salazar</b> Associate Consultant <b>Dept</b> Gastroenterology & Hepatology	<b>Dr Tay Hui Ming</b> Associate Consultant <b>Dept</b> Haematology	<b>Dr Lee Guozhang</b> Associate Consultant <b>Dept</b> Internal Medicine	<b>Dr Tan Qiao Li</b> Associate Consultant <b>Dept</b> Respiratory & Critical Care Medicine
<b>Dr Tan Shera</b> Associate Consultant <b>Dept</b> Respiratory & Critical Care Medicine			



## Appointments

### SINGAPORE GENERAL HOSPITAL PROMOTIONS



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



**Dr Jiang Kian Hong Jackson**  
Associate Consultant  
**Dept**  
Hand Surgery



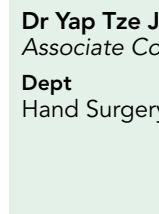
**Dr Tan Wei Keat, Andy**  
Associate Consultant  
**Dept**  
Obstetrics & Gynaecology



**Dr Yang Liying**  
Associate Consultant  
**Dept**  
Obstetrics & Gynaecology

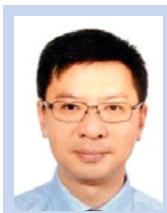


**Dr Ling Zhixing Marcus**  
Associate Consultant  
**Dept**  
Orthopaedic Surgery  
**Sub-specialty**  
Spine Surgery



**Dr Yap Tze Jin Robert**  
Associate Consultant  
**Dept**  
Hand Surgery

### KK WOMEN'S AND CHILDREN'S HOSPITAL APPOINTMENTS



**Dr Goy Wee Lip Raymond**  
Senior Consultant  
**Dept**  
Women's Anaesthesia



**Dr Ng Chee Hui**  
Associate Consultant  
**Dept**  
Diagnostic & Interventional Imaging



**Dr Simrita Kaur Khurana**  
Associate Consultant  
**Dept**  
Neonatology



**Dr Kang Hean Leng, Julian**  
Associate Consultant  
**Dept**  
Obstetrics & Gynaecology

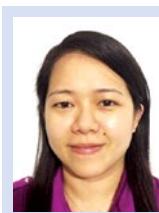


**Dr Tan Yun June, Angela**  
Associate Consultant  
**Dept**  
Paediatric Anaesthesia

### PROMOTIONS



**Dr Pang Siyan Jinnie**  
Associate Consultant  
**Dept**  
Breast Department



**Dr Teng Sung Shin**  
Associate Consultant  
**Dept**  
Emergency Medicine



**Dr Wang Junjie**  
Associate Consultant  
**Dept**  
Gynaecological Oncology



**Dr Koh Seow Choon Daniel**  
Associate Consultant  
**Dept**  
Maternal Fetal Medicine

## KK WOMEN'S AND CHILDREN'S HOSPITAL PROMOTIONS

Appointments: 6294 4050  
Email: centralappt@khh.com.sg



**Dr Tan Keng Wein Jeanette**  
Associate Consultant  
**Dept**  
Paediatrics (General Paediatrics & Adolescent Medicine Service)



**Dr Lim Yi Xiu, Jocelyn**  
Associate Consultant  
**Dept**  
Paediatrics (Neurology Service)

## NATIONAL HEART CENTRE SINGAPORE APPOINTMENT



**Dr Naik Madhava Janardhan**  
Senior Consultant  
**Dept**  
Cardiothoracic Surgery  
**Sub-specialty**  
Adult Cardiac Surgery, Off-Pump and Minimally Invasive Cardiac Surgery

## PROMOTIONS



**Adj Assoc Prof  
Ewe See Hooi**  
Senior Consultant;  
Co-Director,  
Echocardiography  
**Dept**  
Cardiology  
**Sub-specialty**  
Non-Invasive  
Multi-Modalities  
Cardiovascular Imaging



**Dr Eric Lim**  
Consultant  
**Dept**  
Cardiology  
**Sub-specialty**  
Electrophysiology and  
Pacing



**Dr Mathew  
Chakaramakkil Jose**  
Consultant  
**Dept**  
Cardiothoracic Surgery  
**Sub-specialty**  
Cardiothoracic Surgery  
(Adult)



**Dr Ruan Wen**  
Associate Consultant  
**Dept**  
Cardiology  
**Sub-specialty**  
Echocardiography  
and Pulmonary  
Hypertension



**Dr Kang Ning**  
Associate Consultant  
**Dept**  
Cardiothoracic Surgery



**Dr Chua Kim Chai**  
Associate Consultant  
**Dept**  
Cardiothoracic Surgery

## NEW APPOINTMENTS



**Adj Assoc Prof Aaron Wong**  
Head and Senior Consultant;  
Director, Interventional Cardiology  
**Dept**  
Cardiology  
**Sub-specialty**  
Interventional Cardiology



**Prof Carolyn Lam**  
Clinician Scientist and Senior Consultant  
**Dept**  
Cardiology  
**Sub-specialty**  
Heart Failure



## Appointments

### NATIONAL HEART CENTRE SINGAPORE

#### NEW APPOINTMENTS

**Adj Assoc Prof Tan Swee Yaw**  
Senior Consultant;  
Director, Cardiovascular Rehabilitation and Preventive Cardiology  
**Dept**  
Cardiology  
**Sub-specialty**  
Cardiovascular Rehabilitation & Preventive Cardiology, Cardiac Imaging

Appointments: 6704 2222  
Email: central.appt@nhcs.com.sg



**Adj Asst Prof Tan Teing Ee**  
Deputy Head and Senior Consultant;  
Director, Quality Assurance & Quality Management  
**Dept**  
Cardiothoracic Surgery  
**Sub-specialty**  
Cardiac Surgery (Adult), Heart/Lung Transplant, Mechanical Heart Assist Device, Robotic Surgery



**Adj Assoc Prof Soon Jia Lin**  
Consultant  
**Dept**  
Cardiothoracic Surgery  
**Sub-specialty**  
Cardiac Surgery (Adult), Transcatheter Valve Therapies, Heart Failure Surgery (including VAD & Transplant), VATS, Minimally Invasive Cardiac Surgery

### NATIONAL NEUROSCIENCE INSTITUTE

#### APPOINTMENT

Appointments: 6357 7095  
Email: appointments@nni.com.sg



**Dr Queck Kian Kheng**  
Associate Consultant  
**Dept**  
Neurology

### SENGKANG HEALTH

#### APPOINTMENTS

Appointments: 6472 2000  
Email: ah.appointment@skh.com.sg



**Dr Mohammad Arif Abdullah**  
Senior Consultant  
**Dept**  
Internal Medicine



**Dr Loh Jiashen**  
Associate Consultant  
**Dept**  
Internal Medicine



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



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



**Dr Tay Ze Yun**  
Associate Consultant  
**Dept**  
Otolaryngology



**Dr Mohammad Taufik Bin Mohamed Shah**  
Associate Consultant  
**Dept**  
Radiology



**Dr Ho Ming Li Leonard**  
Associate Consultant  
**Dept**  
Surgery

ATTENTION



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HealthBuddy

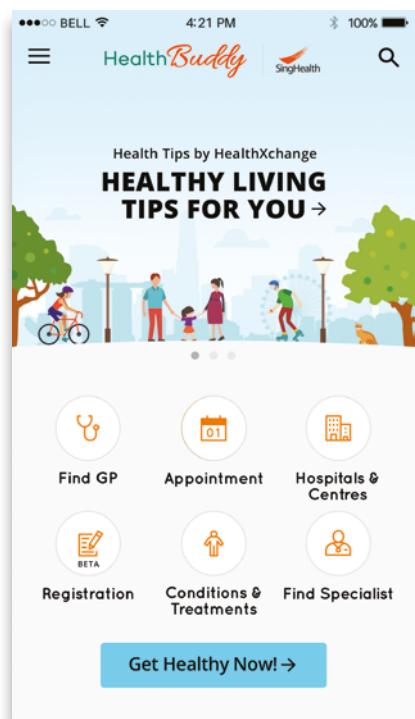
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\* Available for selected appointments at trial clinics only





## Recruitment

# Don't Limit Your Challenges. Challenge Your Limits.

If you are a qualified doctor, a challenging career awaits you at SingHealth.

### **Singapore General Hospital**

#### Departments seeking Resident Physicians and Registrars:

- Anaesthesiology
- Colorectal Surgery
- Diagnostic Radiology
- Emergency Medicine
- Family Medicine & Continuing Care
- Gastroenterology & Hepatology
- General Surgery
- Geriatric Medicine
- Haematology
- Hand Surgery
- Infectious Diseases
- Internal Medicine
- Neonatal & Developmental Medicine
- Nuclear Medicine & PET
- Obstetrics & Gynaecology
- Occupational Medicine
- Orthopaedic Surgery
- Otolaryngology
- Plastic, Reconstructive & Aesthetic Surgery
- Renal Medicine
- Rehabilitation Medicine
- Respiratory & Critical Care Medicine
- Rheumatology & Immunology
- Urology
- Staff Clinic

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

**Career Portal:** [www.sgh.com.sg/subsites/sgh-careers/medical/pages/career-opportunities.aspx](http://www.sgh.com.sg/subsites/sgh-careers/medical/pages/career-opportunities.aspx)

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

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

#### Department seeking Resident Physicians and Staff Registrars:

- Women's Anaesthesia

#### Department seeking Staff Registrars:

- Psychological Medicine

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

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

Interested applicants to email 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 e-mail address together with a non-returnable photograph.

Please email your CV to the respective institutions' email addresses/online career portals with the Reference Number MN1610.

### **Sengkang Health**

#### Departments seeking Resident Physicians and Staff Registrars:

- Anaesthesiology
- Cardiology
- Emergency Medicine
- General Surgery
- Internal Medicine
- Neurology
- Orthopaedic Surgery
- Rehabilitation Medicine

**Website:** [www.singhealth.com.sg/AboutSingHealth/CorporateOverview/sengkang-health/pages/home.aspx](http://www.singhealth.com.sg/AboutSingHealth/CorporateOverview/sengkang-health/pages/home.aspx)

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

### **National Heart Centre Singapore**

#### Department seeking Registrars:

- Cardiothoracic Surgery

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

**Email:** [hr\\_mgr@nhcs.com.sg](mailto:hr_mgr@nhcs.com.sg)

### **National Neuroscience Institute**

#### Department seeking Resident Physicians and Service Registrars:

- Neurology

**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**

#### Department seeking Staff Registrars and Resident Physicians:

- Ophthalmic Anaesthesiology

**Website:** [www.sneccom.sg](http://www.sneccom.sg)

**Email:** [recruitment@sneccom.sg](mailto:recruitment@sneccom.sg)

### **SingHealth Polyclinics**

#### Seeking Resident Physicians and Family Physicians:

- Polyclinic (Family Medicine)

**Website:** <http://polyclinic.singhealth.com.sg>

**Email:** [hr\\_admin@singhealth.com.sg](mailto:hr_admin@singhealth.com.sg)

## GP FAST TRACK APPOINTMENT HOTLINES

Singapore General Hospital

**6321 4402**

KK Women's and Children's Hospital

**6294 4050**

Sengkang Health

**6472 2000**

National Cancer Centre Singapore

**6436 8288**

National Dental Centre Singapore

**6324 8798**

National Heart Centre Singapore

**6704 2222**

National Neuroscience Institute

**6321 4402/  
6357 7095**

Singapore National Eye Centre

**6322 9399**

## DIRECT WARD REFERRAL CONTACT NUMBERS

Singapore General Hospital

**6321 4822**

KK Women's and Children's Hospital

**6394 1180**

## SINGHEALTH DUKE-NUS ACADEMIC MEDICAL CENTRE

Singapore General Hospital

KK Women's and Children's Hospital

Sengkang Health

National Cancer Centre Singapore

National Dental Centre Singapore

National Heart Centre Singapore

National Neuroscience Institute

Singapore National Eye Centre

Polyclinics SingHealth

Bright Vision Hospital