

# Singapore

Asia's premier healthcare hub





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### **Singapore's well-established reputation for medical excellence places it as Asia's premier medical hub.**

With nine hospitals and six specialty centres, the Public Healthcare Group Singapore (PHGS) provides 80% of Singapore's acute tertiary care. PHGS institutions are also national and regional referral as well as training centres with proven clinical outcomes. They are testimonies of the excellent yet affordable medical care in Singapore.

### **Excellent Clinical Outcomes**

Singapore tracks clinical outcomes and is in the process of benchmarking many healthcare processes and procedures to ensure that healthcare standards are kept high.

For example, the five year survival rate of liver transplant at one of our hospitals is 78%, which is better than international standards. The proportion of patients with high-risk stomach cancer (stage II to IV) who are alive at two years after surgery and chemo-radiotherapy at Singapore's hospitals is 69.4%. These statistics fare better than what is reported in international studies.

### **Collegiate Practice**

The bedrock of Singapore's public healthcare system is its multidisciplinary collegiate practice. Our patients have access to highly qualified doctors trained in some of the best centres in the world. They enjoy the attention of a team of specialist doctors, clinical nurses and

paramedical staff, all working together to provide each patient with a high level of care.

### **International Collaboration**

Singapore's status as a destination for healthcare excellence is enhanced by an international network of collaboration with highly regarded and prestigious institutions across the world, including Duke University, Johns Hopkins International Medical Center and the St Jude Children's Research Hospital.

### **Pushing Frontiers**

With some of the most advanced and complex medical care facilities in Asia, PHGS is able to provide high-end specialty care and surgical interventions in over 100 clinical specialties and sub-specialties. These include cutting edge techniques such as stem cell transplants for worn-out cartilage and world-class treatment for conditions such as leukaemia, lymphoma and myeloma.

Ground-breaking surgical techniques are also carried out in Singapore. For example, heart patients in Singapore have been given a new lease of life with a ground-breaking surgical technique. Known as DOR surgery, the technique involves the exclusion of damaged heart muscle and the reshaping of the heart from a conical shape back to its original spherical shape. This surgery has significantly improved the lives of heart failure patients who are on the heart transplant wait list and those whose heart failure is not severe enough to be put on the wait list. Patients who underwent this surgery had



an 85% chance of not being re-admitted to hospital for recurrent heart failure within 18 months after surgery. They also had better survival rates.

Keraprostheses surgery, also known as “Tooth-in-Eye” surgery, which restores vision to the most severe cases of corneal and ocular surface patients.

Other complex treatments available to patients from across the region and further afield include Osteo-Odonto

Singapore also made medical history when Asia’s first heart-liver transplant was carried out here.

## Singapore – A Healthcare Destination of Choice

- Singapore’s healthcare system was ranked as the sixth best in the world and the best in Asia by the World Health Organisation in 2000
- Ten of our institutions are accredited by the Joint Commission International, the highest US standard for hospital accreditation
- Singapore is committed to transparency in the pricing of services. Public and private sector bills and length of stay for common medical conditions can be found at [www.moh.gov.sg](http://www.moh.gov.sg)
- Our doctors are UK & US board certified
- Singapore has pro-actively built up its biomedical industry thus patients have access to novel treatment options available by progressive clinical research taking place here
- Singapore has a vibrant English-speaking environment

## Outstanding Medical Achievements

**Our institutions have achieved outstanding results in advanced clinical treatments and high-end complex surgeries.**

- ✓ Percutaneous closure of left atrial appendage using Watchman device
- ✓ Percutaneous aortic valve replacement
- ✓ Combined heart and liver transplant
- ✓ Delta reversed shoulder replacement
- ✓ Vision restoration therapy
- ✓ Robotic system – Da Vinci Si Dual for lobectomy
- ✓ Robotic surgery for gynaecological cancer
- ✓ Expansion thoracostomy procedure to treat congenital scoliosis and thoracic insufficiency syndrome
- ✓ Open-heart microsurgery on premature infants weighing just over 1kg
- ✓ Operation via navel for rare complication (ectopic pregnancy)
- ✓ Modified jaw advancement technique for the treatment of obstructive sleep apnoea
- ✓ Successful cord blood transplant for a patient with thalassaemia major
- ✓ Non-myeloblastic cord blood transplant performed for patient with acute myeloid leukaemia
- ✓ Forearm attachment to shoulder blade



# Blazing a trail in orthopaedics

The clinical expertise available across PHGS has led to a number of pioneering treatments being carried out in the field of orthopaedics.

PHGS' institutions are recognised centres of excellence in orthopaedics and are able to offer leading edge treatments with outcomes comparable to renowned institutions worldwide. See Figure 1: Clinical Outcomes – Knee Replacement.

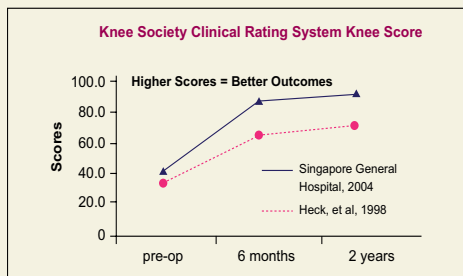
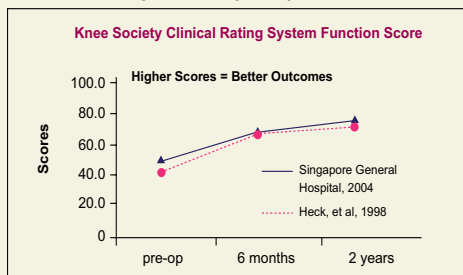
Besides holding the distinction of having trained many surgeons in Asia, our doctors are regional pioneers in the treatment of a wide variety of bone and joint disorders.

In a revolutionary treatment for worn-out cartilage, stem cells from the patient's bone marrow are put into a petri-dish and coaxed to grow into cartilage. This cartilage is then implanted into the patient's knee joints. The procedure offers patients a viable and effective alternative to painful knee replacement surgery.

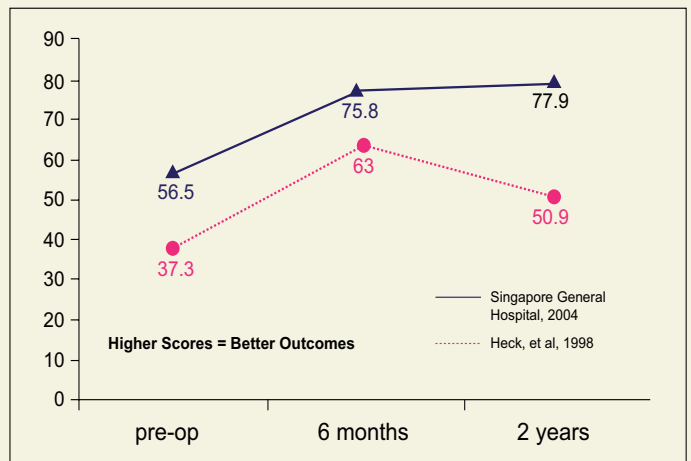
We are also one of the few centres in Southeast Asia that has a BrainLab Navigation System which is increasingly used to aid in minimally invasive total joint replacement, advanced trauma surgery and certain arthroscopic minimally invasive sports injury operations.

Figure 1: Clinical Outcomes – Knee Replacement

## Knee Society Score (KSS)\*



## SF-36\*\*



\*: KSS based on clinical parameters combined with functional scores based on normalcy felt by patient in conducting specific activities; most widely used in US

\*\* : SF-36 based on WHO definition of health; comprises eight scales including physical functioning, bodily pain, mental health, etc. Recently SF-36 was judged the most widely evaluated generic patient assessed health outcome measure



# Blazing a trail in cardiac care

**Cardiac care is a major strength of Singapore's healthcare institutions. A combination of highly-skilled medical professionals, cutting-edge medical research and healthcare infrastructure has enabled Singapore to remain at the forefront in this field.**

Heart patients in Singapore are managed by a multi-disciplinary team comprising specialist cardiologists, cardiothoracic surgeons, nurse clinicians, physiotherapists and dieticians. This collaborative team effort to create a customised health plan ensures optimal outcome for every patient.

The expertise of the surgical teams in Singapore is underpinned by an extensive rehabilitation program which offers patients several therapeutic components such as health education, dietary, metabolic as well as psychological counselling to help patients in their recovery process.

Singapore's healthcare professionals collaborate with their local and overseas counterparts to promote and develop research in the area of cardiovascular sciences. Research projects are carried out across professions with cardiologists working alongside engineers, and scientists with clinicians to develop leading edge innovations in cardiovascular medicine.

Public healthcare institutions in Singapore are national and regional tertiary referral centres receiving patients who require specialised cardiovascular care from other hospitals in Singapore and our neighbouring countries.

We have also assisted regional hospitals to carry out biventricular pacing, a treatment option which improves the quality of life of patients with heart failure symptoms.

Our institutions have also trained numerous doctors from across Asia in various cardiac sub-specialties making Singapore the preferred training centre for postgraduate training in cardiovascular medicine.

## Singapore – Pioneers in Cardiology

- First in Southeast Asia to carry out the left ventricular assist device implantation. This device supports patients with terminal heart failure during recovery or as a bridge to transplantation
- Pioneered the use of catheter ablation for arrhythmia in Southeast Asia and is the first to use the implantable cardioverter defibrillator in Singapore
- First in Asia-Pacific to implant the PLAATO device for stroke in patients with irregular heartbeats
- One of the few healthcare institutions in Southeast Asia to introduce distal protection devices for angioplasty
- First in Asia and one of about 25 centres in the world to perform the robotic-assisted lobectomy for lung cancer patients using a sophisticated robotic system - the Da Vinci Si Dual
- First in Asia to perform the percutaneous closure of the left atrial appendage using the Watchman device for high-risk patients with atrial fibrillation to prevent them from having a stroke caused by blood clots in the heart



# Blazing a trail in women's healthcare

**Singapore's reputation as a world class centre for women's healthcare is epitomised by its medical capability to carry out complex surgical procedures, even in emergency situations.**

Dedicated surgical teams working at Singapore's KK Women's and Children's Hospital (KKH) have carried out a number of intricate operations in recent years.

## Single Port Laparoscopy

KKH has been at the forefront of the development of Single Port Laparoscopy for gynaecological conditions. Single Port Laparoscopy is a surgical technique which requires only a single incision resulting in less pain, lower risk of unplanned bleeding and scarring.

Single Port Laparoscopy poses a greater challenge to surgeons compared with conventional laparoscopy as all the instruments are parallel to each other, limiting freedom of motion. However, surgical teams at KKH have successfully used the technique to treat a number of complex medical conditions in women.

## Better Outcomes

KKH was the scene of an emergency operation for a cornual ectopic pregnancy, performed entirely through Single Port Laparoscopy.

Cornual ectopic pregnancies develop at the "corners" of the uterus, adjacent to the fallopian tube. Removing such pregnancies, which represent just 2% to 4.7% of

all ectopic pregnancies, is highly challenging due to the high risks of bleeding, the need for intricate laparoscopic suturing and the emergency nature of the procedure.

Traditionally, surgeons need to surgically remove the cornual ectopic tissue by making a large incision in the abdomen to gain entry. However, in September 2009, a team of KKH surgeons successfully carried out the first ever Single Port Laparoscopic Surgery to treat the condition, greatly reducing the risk to the patient and speeding up post-operative recovery.

## Single Port Hysterectomy

The KKH team made another medical history when it carried out Singapore's first Single Port Laparoscopic Hysterectomy.

Unlike conventional laparoscopy where three to four small incisions are needed, the team in Singapore was able to carry out the procedure by making an incision of just two centimetres in the navel.

With this procedure, patients no longer have to bear the pain of multiple incisions. There is also improved cosmesis and reduced scarring from just a single incision. Patients can therefore recover faster and return to normal activities earlier.

Developing technical excellence in Single Port Laparoscopic Surgeries to address complex gynaecological conditions is part of KKH's efforts to provide cutting edge surgeries and innovative treatments to improve clinical outcomes for its patients.



# Blazing a trail in ophthalmology

**Every year, surgeons at the Singapore National Eye Centre (SNEC) perform close to 300 corneal transplants with an overall graft success rate of about 98%.**

For over two decades, the Centre, known for cutting-edge medical care, provides pioneering and innovative treatments to restore the sight of thousands of patients.

## Advanced Corneal Transplant Surgery

Advanced corneal transplant techniques constitute over 70% of all transplants performed at the SNEC. Since 2005, surgeons at the SNEC have been carrying out DSAEK, or Descemet's Stripping Automated Endothelial Keratoplasty.

The SNEC today is one of few leading transplant centres in the world, and the foremost in Asia, to offer these new advanced techniques to corneal transplant patients.

DSAEK provides better and faster visual recovery with fewer complications. Some patients can recover their sight within a few weeks, as opposed to six months for traditional penetrating keratoplasty. Our Centre has also devised the first commercially available and FDA approved donor insertion device (the Tan EndoGlide). A recently published study revealed that endothelial cell loss with this device is reduced by 50% as compared to other published donor insertion techniques.

The SNEC is one of the few centres in the world to offer these revolutionary methods of corneal transplant and is an international referral centre for complex eye conditions.



## 'Tooth-in-Eye' Surgery

Another trail-blazing technique available at the SNEC is Osteo-Odonto Keratoprosthesis (OOKP) or 'Tooth-in-Eye' surgery, a procedure that restores sight to patients with end-stage corneal disease where other forms of corneal transplant surgery may not help. This programme was initiated in 2004 with the help of Dr Christopher Liu, Consultant Ophthalmic Surgeon, Sussex Eye Hospital, Brighton, UK, who remains our programme advisor.

Since the procedure was first performed at the SNEC in 2004, the Centre has successfully restored vision to 39 patients from the USA, Middle-East, Australia and other parts of the Asia-Pacific region.

SNEC is believed to be the first Centre in Southeast Asia to perform the procedure and is one of a few centres worldwide offering it.

## Hospitals



## Specialty centres



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[www.youtube.com/phgsingapore](https://www.youtube.com/phgsingapore)

Send your enquiries to: [info@phg.sg](mailto:info@phg.sg)