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MEDIA RELEASE

New home for SGH Pathology and SingHealth Research complete with education facilities

By 2010, the SGH Pathology Department will move to a new home to be built near its present premises, along College Road.

The new SGH Pathology Building with twin blocks of 13 storeys each will have a total Gross Floor Area (GFA) of 57,600 square metres. About half of this space has been earmarked for Pathology services. This is 75 per cent bigger than the current Pathology Department premises, which was built in 1958. The remaining space will be for SingHealth research laboratories and the largest healthcare group's education and training facilities. The estimated development cost is about \$230 million.

The location on Outram Campus along College Road, where a public car park currently stands, was picked for its strategic location close to clinical services at SGH and the national centres as well as its proximity to the Duke-NUS Graduate Medical School (GMS).

"The Building brings to fruition years of careful planning to create capacity for pathology, education and research. We aim to harness synergies from the convergence of pathology, research and education to ensure that we progress and innovate to boost the high standards of clinical service and care for our patients. This is an integral part of our overall plans to develop Outram Campus and gear up to meet Singapore's future healthcare needs," said Professor Tan Ser Kiat, Group CEO of SingHealth and CEO of SGH.

"Co-locating pathology and research in the same building, with its proximity to the Duke-NUS GMS and connectivity to SGH's clinical services will create synergy between the service and research laboratories to maximise opportunities for interaction and professional collaboration between the teams. It is envisaged that this will lead to products that can improve the diagnosis, treatment and cure for patients in addition to prevention of diseases. Cross-sharing of resources common to pathology and research will also maximise efficiencies," said Prof Tan.

New Facilities for Pathology

The 104-year-old Department of Pathology has grown to become a highly distinguished centre of excellence for pathology services in Singapore and the region. The completion of the new Pathology Building will allow consolidation of its current multi-site and spatially tight laboratories into an expanded space within a single facility – all under one roof. It is an excellent opportunity for the Department to integrate latest technology into laboratory processes to further enhance test accuracy, reliability and turnaround times for the benefit of our patients.

The capacity for pathology services will increase by 50%, accommodating the projected growth in clinical demand for laboratory investigations. Built-in sample delivery systems, which can operate at several times today's speed, will significantly expedite transportation of specimens to the laboratory, translating into faster test results for the patient.

Automated systems within a core laboratory will lead to greater cost-efficiency and cost-effectiveness with optimisation of manpower and other resources. With automation, labour intensive, manual processes can be reduced, and staff can be re-deployed to carry out more complex, interpretive and consultative work at the upper end of the value chain.

Redesigned flexible workspaces in the new facility will allow continued introduction of new pathology test platforms that can be upscaled. In particular, the increasing momentum of molecular diagnostics in achieving rapid diagnoses of infections and facilitating individualised cancer treatment will be met. The laboratories are also planned to allow trainee and staff pathologists to work side-by-side in a conducive, collaborative and educationally enriching environment.

The experience of SARS (Severe Acute Respiratory Syndrome) has underscored the tremendous importance of laboratory safety in handling clinical samples. As with our current laboratories that are accredited for safe practices, the new laboratories will also be built to comply with exacting safety standards to ensure that staff are properly protected when working on potentially contagious specimens.

“The Department of Pathology, SGH, has a long history of service to patients. With the new facility, we will be better equipped to meet the challenges of medical globalization and exponential technological advances within the changing healthcare landscape. We look forward to the opportunity to re-engineer our processes, improve ourselves and do our best to serve patient needs as we

have done so for over a 100 years,” said Associate Professor Tan Puay Hoon, Head, Department of Pathology, SGH.

Doubling of Research Facilities

SingHealth is committed to investing in translational and clinical research as it opens new horizons of offering new drugs, medical devices and cutting-edge technologies still under development for the benefit of patients. Furthermore, building and supporting a robust clinical research environment will allow SingHealth to grow the research talent pool of Clinician Scientists and Clinician Investigators to support the national biomedical sciences agenda.

The geographical concentration of clinical expertise, services, facilities and large patient base promise excellent potential for the development of strong translational and clinical research programmes on Outram Campus. Space proposed in the new building will accommodate research laboratories focused on disease-specific programmes.

The proposed construction of the additional laboratories concurrent with the Pathology laboratories in this new building and the laboratories in the new Duke-NUS GMS facility to open in 2009, will bring the total pool of laboratories on Outram Campus from the current stock of 65 laboratories to 130.

SingHealth’s new research infrastructure will complement the research facilities at Duke-NUS GMS and leverage on the School’s basic research capabilities to support translational and clinical research initiatives on Outram Campus. In addition, the planned linkage with the Duke-NUS GMS building will ease and encourage sharing and spill over of activities between the two research facilities.

Education & Training Facilities

Ongoing acquisition of skills and education for healthcare professionals is essential to the delivery of quality healthcare. SingHealth institutions on Outram Campus and especially SGH have a long history of training healthcare professionals for the nation and region. The total number of healthcare professionals trained on Outram Campus each year has increased due to the ongoing introduction of new education programmes and national requirements for certification and re-certification. The rise in demand for new knowledge and skills is expected to continue as SingHealth is committed to ensuring that all its healthcare staff are properly equipped with up-to-date, essential skills to deliver quality patient care.

The SGH Pathology Building will house SingHealth's first one-stop multi-disciplinary education centre, which will facilitate the re-invention of education for healthcare professionals.

Team-based learning in simulated environments for healthcare professionals including doctors, nurses and allied health professionals is gaining popularity as it allows learning to be carried out in a structured, objective, safe and consistent environment. Provision has thus been made to increase the skills lab space to enable more training in this area. The expanded training facilities are expected to provide 26,000 training places for staff and 9,500 training places from external organisations per year at Outram Campus.

"With this new research infrastructure, we have set our vision to build a vibrant eco-system of healthcare services, new knowledge and research," added Prof Tan Ser Kiat.

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About Singapore General Hospital

Singapore General Hospital (SGH) is Singapore's largest acute tertiary hospital and national referral centre. Dedicated to providing multidisciplinary medical care and backed by state-of-the-art facilities, it offers team-based quality patient care that is widely acknowledged to be amongst the best in the world.

Established in 1821, SGH is Singapore's public sector flagship hospital. Specialties like Plastic Surgery and Burns, Renal Medicine, Nuclear Medicine and PET, Pathology and Haematology have been established as national referral centres, enabling them to offer the most developed medical technology, highest medical expertise and largest range of services in the country.

With its 29 clinical specialties, SGH is also a seat of medical education and a centre of research for innovative treatments and medical breakthroughs. SGH is the largest teaching hospital in Asia and second largest in the world to be accredited by the Joint Commission International (JCI).

About Singapore Health Services (SingHealth)

SingHealth is the largest healthcare group in Singapore, offering a complete range of multidisciplinary and integrated medical care. The group consists of 3 Hospitals, 5 National Specialist Centres and a network of 9 polyclinics. We have a faculty of internationally qualified medical specialists and we are also well equipped with advanced diagnostic and treatment medical technology. We are dedicated to providing quality healthcare that is affordable and accessible to our patients. At SingHealth, we are guided by our shared values of Clinical Excellence, Commitment and Collaboration to provide Genuine Care to all our patients.

The SingHealth group sees 3 million patient visits per year and performs 175,000 surgeries per year. As the largest healthcare group in Singapore, it performs 51% of all day surgeries in the country. There are 42 clinical specialties under the SingHealth group.

Members of the SingHealth group:

Hospitals : *Changi General Hospital, KK Women's and Children's Hospital and Singapore General Hospital*

National Specialist Centres : *National Cancer Centre, National Dental Centre, National Heart Centre, National Neuroscience Institute, and Singapore National Eye Centre*

SingHealth Polyclinics : *Bedok, Bukit Merah, Geylang, Marine Parade, Outram, Pasir Ris, Queenstown, Sengkang and Tampines*

Pathology – The Foundation of Medicine

It is the Science that is associated with the various branches in the Pathology Department that allows the provision of proper and appropriate care for patients. It is the final bridge between basic science and clinical medicine; and the investigative tool by which critical decisions on patient management are made.

The SGH Department of Pathology was established in 1903. Since then, it has grown to provide the most comprehensive scope of Pathology services in Singapore and the region.

The scope of services includes:

- 1. Blood Bank**
- 2. Central Tuberculosis Laboratory**
- 3. Clinical Biochemistry**
- 4. Cytogenetics**
- 5. Cytology**
- 6. Diagnostic Bacteriology**
- 7. Food and Water Microbiology**
- 8. Histopathology**
- 9. Immunology & Serology**
- 10. Molecular Laboratory**
- 11. Pharmaceutical Microbiology**
- 12. Virology**

1. Blood Bank

The SGH Blood Bank laboratory provides a 24-hour transfusion service to both inpatients and outpatients of the Singapore General Hospital, National Heart Centre, National Cancer Centre and Singapore National Eye Centre. The laboratory offers a wide range of blood and blood components, whole blood, red blood cells, fresh frozen plasma and platelets for transfusion. In addition, plasma derivatives such as human albumin solution, intravenous immunoglobulin, factor concentrates are also available for the patients. In the year 2006, the laboratory issued a total of 57,285 units of blood components and 31,433 units of plasma derivatives to the patients. The laboratory also offers routine analysis such as ABO and Rhesus blood grouping, antibody screening and compatibility testing as part of the pre-transfusion studies.

2. Central Tuberculosis Laboratory

The Central Tuberculosis laboratory (CTBL) provides laboratory diagnosis of tuberculosis and other mycobacterial diseases for all hospitals, clinics, laboratories and other organisations in Singapore. The section provides TB surveillance to MOH as well as to WHO Global TB Surveillance, Planning and Financing Project through the MOH-STEP Registry (WHO/ IUATLD Surveillance on Anti-TB Drug Resistance).

3. Clinical Biochemistry

The Clinical Biochemistry laboratory incorporates cutting edge technology in its test profiles with automated processes, tandem mass spectrometry among other evolving test platforms. The laboratory provides analysis of biochemical constituents in blood, urine and other body fluids (e.g. cerebrospinal fluid, pleural fluid, ascitic fluid, etc.) for the diagnosis, prognosis and monitoring of patients. The biochemical constituents analysed range from trace inorganic elements to large organic molecules. Their measurements help clinicians in the diagnosis and management of a wide variety of diseases. The laboratories also offer a variety of tests for the diagnosis of inherited metabolic disorders, such as amino aciduria, organic aciduria and mucopolysaccharidoses.

4. Cytogenetics

The Cytogenetics laboratory offers state-of-the-art chromosome investigations for cancers, constitutional abnormalities, and prenatal and postnatal diagnoses. The laboratory also offers a wide range of molecular tests using the Fluorescence In Situ Hybridization (FISH) technique. For expectant mothers with late referrals or urgent requests, a rapid 24h chromosome screening is available for the diagnosis of Down syndrome and some other more common chromosome abnormalities. Other molecular tests available include the diagnosis of several congenital syndromes in children, as well as the detection of chromosomal and genetic anomalies associated with a wide variety of cancers in both children and adults. Analyses are performed with high-resolution microscopes with the aid of dedicated computers equipped with software specifically written for cytogenetic and molecular analyses. The laboratory performed more than 2,800 assays in 2006 and this number is expected to increase by more than 10% this year. The disease pick-up rates and results turnaround times are among the best in the region, comparable to those in the United States. The laboratory is also actively engaged in R&D so as to provide international standards of clinical genetic services by continuously evaluating and developing new techniques and procedures.

5. Cytology

The Cytology laboratory evaluates cells in relation to disease, primarily in the detection of tumours, but also of specific types of infection, pre-tumourous conditions or in the evaluation of hormonal state. Two main areas are cervical smears (Pap smears) and non-gynaecologic cytology (exfoliated and aspirated fluid cells). The Laboratory participates in the National Cervical Screening programme.

6. Diagnostic Bacteriology

The Diagnostic Bacteriology laboratory is the largest in Singapore, processing the largest number of specimens (218,341 in 2006) and isolating the largest number of bacterial strains. The section works closely with the Ministry of Health (MOH) on all notifiable pathogens as soon as they are isolated or diagnosed. The laboratory also investigates outbreaks for both community and healthcare associated infections, performs screening tests, and types the isolates using various typing methods to see if clonal or related (i.e. coming from one source). The section is now moving on to molecular methods like polymerase chain reaction (PCR) and genetic sequencing for some slow growing or difficult to identify pathogens. The laboratory also conducts on-going antibiotic susceptibility studies, including studying the mechanisms of antibiotic resistance.

7. Food and Water Microbiology

The Food and Water Microbiology laboratory is SAC-SINGLAS accredited and provides quality analytical services for the monitoring of food and water samples for safe consumption or utilisation. These services are provided to meet regulatory requirements or guidelines or to help customers achieve their own targets for quality assurance or quality control purposes. Our microbiologists are able to conduct in-service education for food handlers, provide inspection services for kitchens and food preparation areas. The section services government and statutory boards (such as Ministry of Health, National Environment Agency, Public Utilities Board), local food and beverage establishments, and overseas clients including those from China, Malaysia, Brunei, Indonesia, Philippines and Vietnam.

8. Histopathology

The Histopathology laboratory studies diseases at the cellular and molecular level. It involves specially prepared tissues and cells removed from patients for examination under the microscope. Many types of tissue stains are used to delineate different cell structures. The laboratory has established subspecialty expertise in haematolymphoid,

gastrointestinal, head and neck, liver, renal, breast, urologic and bone and soft tissue pathology. Immuno-histochemistry, electron microscopy and molecular techniques are used to arrive at a diagnosis of the patient's disease. Cancer is one of the most important diagnoses a histopathologist makes. Besides coming to a definite diagnosis after due microscopic examination, the histopathologist is able to indicate the likely prognosis of the patient's condition.

9. Immunology & Serology

The Immunology & Serology laboratory provides serology of autoimmune and IgE-mediated allergic disorders, infectious disease serology, sexually transmitted disease (STD) serology and STD culture. The STD culture laboratory provides microbiological services for the isolation of *Neisseria gonorrhoeae* and *Haemophilus ducreyi* to the Department of Sexually Transmitted Diseases Control (DSC) and the National Skin Centre (NSC). The laboratory also performs and provides national data for the susceptibility testing of *N. gonorrhoeae* strains. The STD serology laboratory performs specialised confirmatory tests for syphilis serology and is also involved in the WHO Gonococcal Antimicrobial Surveillance Programme.

10. Molecular Laboratory

The Molecular Laboratory has a wide menu of infectious disease diagnostic tests and together with Histopathology; it is also incorporating oncologic applications for increasingly individualised cancer treatment.

The Molecular laboratory offers tests for the detection of a wide range of viruses and other microorganisms by molecular methods. Molecular methods rely on the enzymatic replication of a fragment of the genetic material of interest, without the need of a living microorganism. These methods are therefore very sensitive and specific. Most molecular methods are variations of the polymerase chain reaction (PCR). The laboratory makes use of both commercial kit-based assays as well as in-house PCR assays. It also offers molecular tests for monitoring of viral loads. This is particularly important in the treatment of patients with hepatitis B and C viruses and BK virus. In addition, molecular methods are also used in the detection of mutations and genotyping of viruses. This can give information on whether a virus has developed resistance to anti-viral drugs and how a patient will respond to drug therapy.

The Molecular laboratory is involved in surveillance work for specific viral infections for MOH and has assisted in the investigations of outbreaks such as the Hand, Foot and Mouth Disease, the SARS outbreak and the norovirus outbreaks. In addition, the section also performed surveillance work for enterovirus 71 and dengue typing by PCR.

11. Pharmaceutical Microbiology

The Pharmaceutical Microbiology Laboratory is SAC-SINGLAS accredited, and provides microbiological tests for the quality, efficacy and safety of pharmaceutical products, biological products, medical administration devices, dialysate solutions from dialysis centres, cosmetics, Chinese proprietary medicine and health supplements. It provides services to government departments, restructured hospitals and pharmaceutical industry.

12. Virology

The Virology laboratory provides the most comprehensive range of virological tests, many of which (e.g. virus culture and haemagglutination inhibition test), are complex and not offered by other laboratories in Singapore. The section has gained recognition, both nationally and internationally, for its high standard of work. It is the World Health Organisation (WHO) National Influenza Centre, which belongs to the Global Influenza Surveillance Network. It maintains surveillance of influenza viruses circulating in Singapore, characterising them and sharing variant strains with WHO for use in the influenza vaccine. Two influenza strains from Singapore were included for use in influenza vaccines.

As the WHO National Poliomyelitis Laboratory, the section tests samples from children with acute flaccid paralysis for poliovirus, and further determines if the virus is of vaccine or wild type. The section contributed to Singapore being certified polio-free by the WHO since October 2000. The section is also the WHO National Measles Laboratory, working with the WHO and MOH to achieve the objective of eliminating measles globally through surveillance of cases for implementation of containment measures if necessary.

During the SARS (Severe Acute Respiratory Syndrome) epidemic in 2003, the Virology Section was a WHO SARS Laboratory, cooperating with international and local colleagues to help bring the outbreak under control through timely laboratory diagnosis of a new viral infection. The section further assumes the role of the MOH-appointed National HIV Reference Laboratory. It also undertakes many investigations of public health importance for the MOH during outbreaks such as SARS, hand-foot-mouth disease, Nipah, dengue, and viral conjunctivitis, and maintains surveillance of hand-foot-mouth disease, polio and influenza.

Research – Bringing Hope to Singaporeans

SingHealth's Research exists to create and apply knowledge to advance human health. It aims to be a globally acclaimed academic research centre at the cutting edge of the medical sciences, integrated in a comprehensive health services organisation offering the highest quality of advanced care to all Singaporeans.

The new multi-purpose research facilities will consolidate our existing and future activities solely for pursuing innovative translational and clinical (bench-to-bedside) research. Currently, our most comprehensive and well-integrated programmes – oncology, ophthalmology, neurosciences and cardiology – are disease-centric.

The intent is to organise our research initiatives in the new facilities to cut across these signature programmes in the form of five 'virtual', group-wide focus groups in the areas of:

- Experimental medicine and molecular therapeutics
- Regenerative and advanced cell therapy
- Advanced bio-imaging
- Clinical trials
- Personalised medicine

SingHealth is committed to forging strong, mutually beneficial linkages with our national counterparts, especially Duke-NUS Graduate Medical School. Co-location of teams of like-minded researchers and clinicians from SingHealth, along with those of our collaborators, in the new facilities will enable us to achieve critical mass, synergies and complementarities in order to help transform the Outram Campus into a vibrant and holistic medical hub.

Education – Where New Technology and Methodology Prevail

SingHealth institutions have been training generations of doctors, nurses and allied health professionals, and therefore education is a natural extension of their professionalism.

Being the largest healthcare group, education will lead the way in empowering healthcare leaders, professionals and managers, ensuring their relevance so that Singapore maintains its competitive advantage as the region's medical hub.

New technological platforms and educational methodologies will be introduced to deliver our academic programmes. This will also serve as an exchange for scientists, clinicians, academics and other healthcare professionals to connect and interact.

Our Education Research, Resource and Technology laboratories will be test beds for development of new curriculum, teaching methodology and education delivery techniques. Video-conferencing capabilities will catalysed networked communities.

The educational facility will include SingHealth's member educational institutions:

- Postgraduate Medical Institute (PGMI) – a regional postgraduate medical training centre for clinicians which has offered fellowship training and attachment programme to more than 600 overseas fellows since its inception in 1994
- Alice-Lee Institute of Advanced Nursing (IAN) – offers a comprehensive range of courses for nurses including nursing specialisation programme and advanced practice-based training courses developed and conducted by experienced nursing specialists
- Postgraduate Allied Health Institute (PGAHI) – provides more than 500 training places yearly in 50 different professional skills developmental courses and clinical attachment programmes for allied health professionals
- Skills and Simulation Teaching Laboratories
 - i) Clinical Skills Lab – where doctors can hone surgical and clinical skills
 - ii) Nursing Skills Lab – where nurses can hone patient care skills
 - iii) Life Support Training Lab – where healthcare professionals can be trained in basic and advanced life support skills
- Centre for Health Services Research
- Centre for Leadership and Health Management Studies
- Office of Student Affairs and Business Centre – to serve the needs of our local and international fellows and trainees