

Reimagining PAEDIATRIC EMERGENCY CARE



KK Women's and
Children's Hospital
SingHealth

25 Years of
KK Women's
and Children's Hospital
Children's Emergency



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Illustration of KK Women's and Children's Hospital.

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MESSAGE

PROFESSOR IVY NG

GROUP CHIEF EXECUTIVE OFFICER, SINGHEALTH



My heartiest congratulations to the KK Women's and Children's Hospital Children's Emergency (KKH CE) team as they celebrate their 25th anniversary. As the healthcare provider of choice for neonatal and paediatric acute care in Singapore, KKH CE plays a key role in SingHealth's mission to transform public health and place patients at the heart of all we do."



My heartiest congratulations to the KK Women's and Children's Hospital Children's Emergency (KKH CE) team as they celebrate their 25th anniversary. As the healthcare provider of choice for neonatal and paediatric acute care in Singapore, KKH CE plays a key role in SingHealth's mission to transform public health and place patients at the heart of all we do.

KKH CE opened its doors on 10 May 1997, when a group of prescient pioneers took the leap of faith to start a new discipline specialising in emergency care of paediatric patients. Prior to this, children who required emergent care could only go to the emergency departments of adult restructured hospitals.

Since its establishment, KKH CE's growth has closely mirrored the ever-changing healthcare landscape. The KKH CE team spearheaded

efforts in the care of paediatric patients with COVID-19, advocated for child health and safety, and harnessed technology towards exciting new frontiers in medical innovation.

The team has also pushed boundaries and participated in key collaborations across the SingHealth Duke-NUS Academic Medical Programme, and other healthcare partners; propelling efforts in clinical care, research and education to benefit our patients and improve healthcare practices.

I am very heartened to see the passion and grit of the founding team being deeply ingrained in the department, and sincerely thank everyone for their unwavering commitment all these transformative years. I look forward to their continued excellence in bringing quality emergency care to the children of Singapore in the years to come. ■

FOREWORD

PROFESSOR ALEX SIA
CHIEF EXECUTIVE OFFICER, KKH

Fully focused on the mission of providing excellent, holistic and compassionate patient-centred care, these great achievements have been made possible by the strategic and continuous investment in team learning and skills training.”



Over the past 25 years, KKH Children’s Emergency (KKH CE) has provided life-saving care for the children and babies in Singapore as our country’s largest and busiest emergency facility for paediatrics. In line with KKH’s journey in academic medicine, we have witnessed the evolution of KKH CE into a centre of excellence which is anchored on, and driven by state-of-the-art acute and trauma care.

Throughout the COVID-19 pandemic, KKH CE has played a critical role in leading the nation’s dynamic response for paediatric health, working relentlessly with the Ministry of Health (MOH) and care partners to keep patients, families and the population safe. We are deeply indebted to our staff for their dedication, commitment and sacrifices.

Fully focused on the mission of providing excellent, holistic and compassionate patient-centred care, these great achievements have been

made possible by the strategic and continuous investment in team learning and skills training.

KKH CE has collaborated with care partners in the community, including pre-hospital emergency care teams, to improve outcomes for patients. Excelling in research and innovation, the KKH CE team has successfully leveraged technology to establish the KKH Urgent Paediatric Advice Line (KKH U-PAL) – an online service for parents and caregivers to seek advice for common paediatric conditions. KKH CE is also a champion and leader in telemedicine services for seamless continuity of care.

I extend my heartiest congratulations to KKH CE on achieving this remarkable milestone. On this occasion of their 25th anniversary, we salute and celebrate the team’s tremendous contributions to the lives and health of generations of children in Singapore. ■

PREFACE

CHIEF NURSE WONG SOOK THOW

KKH



In the years to come, I hope the CE Nursing Team continues to excel, not only in acute paediatric emergency care, but also in playing bigger roles in the community.”



KKH Children’s Emergency started in 1997 with a modest number of 30 nurses. Over the years, nursing manpower has now increased by more than 300% to meet the needs of paediatric emergency care in Singapore.

KKH CE nurses are not only involved in bedside clinical care. They also play a critical role in patient education at a national level, promoting childhood injury prevention, paediatric first aid skills, and management of common paediatric conditions, via seminars and workshops. In recent years, CE nurses also played a major role in implementing KKH U-PAL. To continue to keep abreast with the latest clinical guidelines, CE nurses also attend advance life support training, such as the APLS Course, Advance Cardiac Life Support (ACLS) Course, Life Support Course for Nurses (LSCN), Hazmat Life Support (HMLS) Course, Hazmat Basic Provider Course (BPC), and International Trauma Life Support (ITLS).

The KKH CE nursing team also contributes to global health efforts, such as the Paediatric Emergency and Neonatal Care project in Surabaya, Indonesia. We shared clinical knowledge and skills to enhance the capabilities of local healthcare staff, empowering them to better care for paediatric

patients, with the aim to reduce infant and child mortality rates across public hospitals in East Java, Indonesia.

The CE Nursing leadership developed the CE Core Programme to equip CE nurses with advance clinical skills such as triaging and resuscitation. This was officially accredited by the Singapore Nursing Board in 2005. The programme has since benefited KKH CE nurses, and our fellow colleagues within the SingHealth cluster. The COVID-19 pandemic brought about opportunities to innovate, and the CE Core Programme migrated to an e-learning platform, in addition to mock code simulations. At the moment, the team is working towards formalising the CE Core Programme into a HMDP, and obtain accreditation by the SingHealth College of Clinical Nursing.

I wish to extend my heartiest congratulations to the team for all their achievements. In the years to come, I hope the CE Nursing Team continues to excel, not only in acute paediatric emergency care, but also in playing bigger roles in the community. I am confident that CE nurses are well prepared to tackle future challenges, and continue to pursue the forefront of quality paediatric nursing care. ■

ASSOCIATE PROFESSOR SASHIKUMAR GANAPATHY

HEAD OF DEPARTMENT, KKH CHILDREN'S EMERGENCY



This journey is only made possible because of the tireless effort put in by a team of passionate and tenacious individuals, who had not only developed their individual niche areas, but also nurtured and grew the next generation of leaders, who will continue to carry the department to even greater heights.”



KKH Children's Emergency has come a long way since we started operations on 10 May 1997. What started off as a small unit led by a humble team of 3 senior staff, has now grown into one big family. Today, the department is a leading centre for Paediatric Emergency Care in the region.

We have a long-standing partnership with emergency departments in other hospitals, primary care services, as well as many critically-acclaimed international research bodies. Over the past 25 years, we have not just been known internationally for providing holistic patient- and family-centred clinical care, but have also evolved to pioneer innovative healthcare, as well as be leaders of research in the domains of Paediatric Emergency Care. The ongoing pandemic has been a trying time for healthcare personnel globally, but the tenacity and camaraderie of the department has continued to demonstrate to the nation, that KKH CE, well and truly, has deserved that reputation we have carved for ourselves internationally.

This journey is only made possible because of the tireless effort put in by a team of passionate

and tenacious individuals, who had not only developed their individual niche areas, but also nurtured and grew the next generation of leaders, who will continue to carry the department to even greater heights.

As we look back and celebrate the achievements that we had, we must not rest on our laurels. We must also look forward to the next 25 years and continue to build on the foundation laid by our pioneers. We must have the courage to transform healthcare – by incessantly innovating and fine tuning to remodel our practices, to meet the diverse needs of our patients. We must empower not only our patients and their families; but also, the very people in this department, to have unrelenting vigour, and the vision and wisdom to transcend boundaries to deliver impactful and holistic care.

KKH Children's Emergency will continue to be at the forefront of clinical excellence and holistic patient experience. We will be the department of choice, for both patients and healthcare professionals alike. ■

INTRODUCTION



Paediatrics has had a rich history of more than 100 years in Singapore. Kandang Kerbau Hospital (KK Hospital) was established in 1858, initially as a general hospital. It subsequently became a maternity hospital in 1924 and remained so until 1997, when it was renamed KK Women's and Children's Hospital (KKH).

Paediatric patients were a common sight in the Emergency Departments (EDs) of the three adult restructured hospitals at that time - namely, Singapore General Hospital (SGH), Tan Tock Seng Hospital (TTSH) and Alexandra Hospital (AH). When admitted, these patients were managed by the paediatric inpatient team of the respective hospitals.



This book honours the contributions of our pioneers who took the uncharted route, to build a work family that is centred on resilience, courage, respect, grit and passion. This humble family had pulled together over the years, and relentlessly reimagine and transform, to deliver exceptional healthcare standards.”

In order to provide care for paediatric patients in a dedicated facility, the Ministry of Health (MOH) decided to consolidate paediatric services in the then-new building of KK Women's and Children's Hospital (KKH). As the only children's hospital locally, and in the region, it integrated Paediatric Medicine Departments from the 3 adult restructured hospital, various Paediatric Surgical disciplines, as well as the Anaesthesia team. The plan to institute a dedicated Children's Emergency Department in the hospital compound was finalised in 1994.

The Obstetrics and Gynaecology (O&G) and Neonatology teams from KK Hospital at Kampung Java Road moved across to the new KKH at 100 Bukit Timah Road on 10 March 1997. The Paediatric units from SGH, TTSH and AH subsequently shifted to KKH as well, and with the opening of KKH in 1997, the history of paediatrics in Singapore moved into a new phase. KKH became the first hospital in Southeast Asia to have a dedicated Children's Emergency, and the doors of KKH CE opened on a Saturday morning – 10 May 1997.

While the main aim of KKH CE had always been to provide initial evaluation, stabilisation and treatment of acutely ill or injured children, over the past 25 years, we have seen how the department had evolved, and attained extraordinary results. There had been extensive advancements in various aspects of paediatric emergency care, in addition to taking big steps to facilitate growth and redevelopments in other areas, such as harnessing the power of innovative medical technology and research to facilitate clinical endeavours. This shows how we had transcended far beyond what was previously envisioned.

This book honours the contributions of our pioneers who took the uncharted route, to build a work family that is centred on resilience, courage, respect, grit and passion. This humble family had pulled together over the years, and relentlessly reimagine and transform, to deliver exceptional healthcare standards.

KKH CE is poised to take on future challenges in this dynamic healthcare landscape, to bring paediatric emergency care to greater heights. ■



Official Opening of KKH on 10 October 1997, by then-Prime Minister Goh Chok Tong (accompanied by then-Health Minister Mr Yeo Cheow Tong).



The Big Shift to KKH on 10 May 1997.

TAKING THAT LEAP OF FAITH



“

On the very first day, the team that worked on a 2-shifts basis, saw an overwhelming number of patients of more than 200 patients. To date, KKH CE sees more than 400 patients daily.”

In the 1990s, Emergency Medicine was a nascent discipline, and Paediatric Emergency Medicine was a non-existent entity. Professor Anantharaman Venkataraman, regarded as the ‘Father of Emergency Medicine’ in Singapore, headed the Singapore General Hospital (SGH) Emergency Department (ED) from 1994 to 2003. He focused on creating niche areas for ED Specialists, and one of these areas created, was Paediatric Emergency. He had set up the ‘Yellow Area’ in SGH ED, which was a designated space for paediatric patients. Prior to the founding of KKH CE, the pioneers did numerous postings in various EDs. The clinical leaders of KKH subsequently contacted Prof Anantharaman, to request for the transfer of the paediatric section in SGH to form KKH CE.

The pioneering team who spearheaded the CE operations from scratch, consisted of the first Head of Department (HOD) Dr Sim Tiong Peng, Associate Professor (A/Prof) Ng Kee Chong (Chairman, Medical Board, KKH) and Dr Angelina Ang (Senior Consultant, KKH CE).

Dr Sim Tiong Peng was an Emergency Medicine trainee. A year of Emergency Medicine posting in Glasgow in 1992 ignited his curiosity, and he recognised the need for specialised training in managing paediatric patients in the context of Emergency Medicine. He then went on to complete his Health Manpower Development Plan (HMDP) in Paediatric Emergency Medicine in Boston Children’s Hospital.

A/Prof Ng Kee Chong was a Paediatric Medicine trainee doing his Emergency Medicine rotations in SGH ED in 1993 to 1996. He was invited by the Manpower Staff Officer in MOH to take up Paediatric Emergency.

When Dr Sim returned from his HMDP in Boston, he was appointed Head-Designate of KKH CE. He was then joined by A/Prof Ng, who also roped in his medical school classmate, Dr Angelina Ang, who had just completed her Paediatric Medicine training. In preparation for the opening of KKH CE, this core team consulted the heads of many paediatric subspecialties locally, as well as did site visits in overseas Paediatric Emergency Departments, to develop processes and workflows.

Operating a full-fledged Paediatric Emergency Department would not have been possible without the tireless support of a strong nursing team. The first three Nursing Officers were Sisters Lee Choy Kuan, Chia Lai Heng, and Zainab Amat, who were transferred from the adult hospitals. In 1998, A/Prof Tham Lai Peng joined the core team to further augment KKH CE's operations.

The projected number of attendees was 150 per day at the start, and there were only two rotating registrars, and eight medical officers posted to KKH CE by MOH. On the very first day, the team that worked on a 2-shifts basis, saw an overwhelming number of patients of more than 200 patients. Dr Sim Tiong Peng did not remember going home that day. To date, KKH CE sees more than 400 patients daily.

The inaugural edition of the CE Clinical Guidelines was published in May 2007, with about 100 pages. It covered the essential clinical and operational guidance for the medical staff. The guidelines had been updated and revised throughout the years, and the latest edition published in January 2022 is now running at 717 pages.

Meanwhile, being the biggest Children's Emergency in Singapore, we have always been on the frontline during national crises and major disease outbreaks such as SARS, H1N1 and COVID-19. These experiences of serving the nation are unforgettable, and have inevitably helped us to grow and develop in our profession.

That leap of faith in envisioning KKH CE continues to write history today. ■



Archival photo: Former entrance of KKH CE.



Archival photo: Former ambulance bay outside KKH CE.



Visit by Mr Chan Soo Sen, Parliamentary Secretary (Health) (first from left) and Mr Lim Hng Kiang, New Minister of Health (third from left), accompanied by A/Prof Cheng Heng Kock, former Chairman, Medical Board, KKH (second from left), and Dr Sim Tiong Peng, former Head of KKH CE (right) in 1998.

THE TRANSFORMATIVE YEARS

Children's Emergency started operations at 8am, 10 May 1997. Our first patient was a 3-year-old boy who was diagnosed with pneumonia by Dr Seng Yi-Chern. The boy became the first paediatric patient to be admitted to Children's Tower of the new KK Women's and Children's Hospital. In the first 24 hours of CE's operations, the department attended to 241 patients, with 100 admitted during this period. ■



In the first 24 hours of CE's operations, the department attended to 241 patients, with 100 admitted during this period."

SENIORS

Dr Sim Tiong Peng

A/Prof Ng Kee Chong

Dr Angelina Ang

REGISTRARS

Dr Sharon Lim

Dr Edmund Koh

MEDICAL OFFICERS

Dr Angeline Lai

Dr Seng Yi-Chern

Dr Caleb Chow

Dr Lim Luping

Dr Patricia Lee

Dr Merlene Bay

Dr Han Mei Lan

Dr Chua Mei Chien

KKH Children's Emergency Medical Team: May to Oct 1997

CATCH OF THE DAY

Children's A and E

AN accident and emergency department for children opens tomorrow morning.

The 24-hour clinic at the KK Women's and Children's Hospital will also cater to teenagers up to the age of 16.

It can handle about 150 cases a day. About 10 to 15 per cent of these patients may have to be warded.

Children will gain from such specialised emergency medicine because paediatricians will be on duty at the clinic, cutting down the need for transfers to other hospitals.

The clinic will also have equipment in sizes to fit children.

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A life-size A & E for pint-sized patients . . .

By Indrani Nadarajah

THE KK Women's and Children's Hospital accident and emergency department has soft toys scattered around; children's paintings adorn the walls and the floor itself resembles a sea-bed with corals, sea horses and fish.

Meant for children, this A & E department will start functioning from 8 am tomorrow.

The 24-hour clinic, which will also cater to teenagers up till the age of 16, can handle about 150 cases a day, and

about 10 to 15 per cent of these patients may have to be hospitalised, said Dr Ng Kee Chong, a registrar at the department.

He said: "Ailments such as fever, or a drop in appetite, which need not be emergencies in adults, can be dangerous in very young babies, and have to be attended to promptly."

But the typical teenage emergency cases that the department could expect to see would be injuries arising from fights and brawls, falls and fractures from sports such as roller-blading.

He said that children would benefit from such specialised emergency medicine because paediatricians would be on duty at the clinic, cutting down the need for transfers to another hospital.

Equipment such as blood pressure cuffs would be geared for children and would come in graduated sizes.

Setting up the department was particularly challenging because "it is a brand new department, and we have not set up new departments recently", he added.

Apart from KK, the Na-

tional University Hospital also offers paediatric emergency services.

Dr Carolyn Tan, head of paediatric surgery, said that ambulances that used to ferry children to NUH and Alexandra Hospital will continue to take them to NUH.

However, patients who used to be sent to other hospitals' emergency departments will now be brought to KK.

"But there will be no restrictions for walk-in patients. They can come from any part of the island," she added.

She was speaking at a press conference to an-

nounce the opening of KK Children's Hospital yesterday.

KK is the first children's hospital in Singapore.

It has 382 beds, and offers 23 services such as cardiology, neurology, infectious diseases and orthopaedics.

It is staffed by 87 specialists.

Ward charges range from \$20 a day for a class 'C' bed to \$600 a day for a deluxe suite.

There will also be a \$26 attendance fee charged for an emergency case, and \$32 for a non-emergency visit.

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Archival photos: Former kiosk dispensing queue numbers at the Triage Area (left) and the initial triage counters (right) at KKH CE.



Archival photos: Former consultation room (left) and observation area (right) in KKH CE.



Archival photo: Former Waiting Area at KKH CE.

DR SIM TIONG PENG ■ KKH CE 1ST HOD (1997-2005)



Since its humble beginning, Children's Emergency has become the go-to place for anxious parents and their sick children. Even now, it is at the forefront of the nation's response for paediatric health needs arising from the COVID-19 pandemic."



Dr Sim Tiong Peng (right) with his successor, A/Prof Ng Kee Chong (left).

Children's Emergency was conceived 25 years ago, with the opening of KK Women's and Children's Hospital in 1997. Prior to that, there was no emergency department dedicated to the care of children. I remember meeting then-CEO of the hospital, Dr Jennifer Lee, and deliberating about the perils and challenges of such a facility. She advised that I should gather a team to get the department going. A/Prof Ng Kee Chong and Dr Angelina Ang were part of that team, and A/Prof Tham Lai Peng joined shortly afterwards. Ms Annie Tan was there too, looking after the administration of the department from the start. Dr Lee visited the Department at the end of the first day it opened. Thanks to the founding team of doctors and nurses, I could report that the Department was functioning as planned.

The story of Children's Emergency began, when Prof Anantharaman, then the head of the Accident and Emergency Department at SGH, mooted the idea of developing Paediatric Emergency Medicine as a sub-specialty. Since its humble beginning, Children's Emergency has become the go-to place for anxious parents and their sick children. Even now, it is at the forefront of the nation's

response for paediatric health needs arising from the COVID-19 pandemic.

I want to thank all the doctors, nurses and allied health staff that have rotated through the department through the years. They often have to work in very difficult and demanding situations to ensure that sick children are safely and expeditiously cared for. I would also like to thank my colleagues and the senior staff, for their constant care and supervision of the junior staff. The department is in a much better shape than when it first began. They have also spearheaded new proficiencies in Paediatric Emergency Care in areas such as mass casualty management, trauma care, ultrasonography and Paediatric resuscitation and sedation.

This commemoration serves to inspire a new generation of healthcare professionals, who were possibly our patients, when the department first opened. They are now embarking on their career journeys in healthcare. I am sure they will rise up to the challenges of their generation, and find new ways to solve old problems. The healthcare environment is increasingly complex with the

rise of telemedicine, artificial intelligence, virtual reality and social media in the mix, the declining birth rate and changes in social mores. Still, there

are new fields to embrace but to do all this well, I would say, bear one another's burdens and be kind to one another. ■

- 1997** ■ KKH CE was tasked to design a Mass Casualty Programme for KKH.
- 1998** ■ KKH CE became the first Emergency Department in Singapore, and the first department within KKH and outside of the operating theatre and intensive care unit to use ketamine for procedural sedation.
- 2002** ■ KKH CE was the first Emergency Department to have a computerised prescription system.
- 2003** ■ Severe Acute Respiratory Syndrome (SARS) outbreak; KKH CE stopped using nebulised bronchodilators and switched to metered dose inhalers (MDI) via spacer devices.
- 2004** ■ Together with SGH and Changi General Hospital (CGH), KKH CE had played crucial roles in helping to set up the Drug and Poison Information Centre (DPIC).

A/PROF NG KEE CHONG ■ CHAIRMAN, MEDICAL BOARD, KKH KKH CE 2ND HOD (2005-2016)



Together we have grown, and together we make a difference in the care of our paediatric patients, for patients are always at the heart of all we do.”



As the adult Emergency Departments started to transform themselves in the 1990s, Paediatric Emergency Medicine was emerging as a subspeciality in its own right. It was also during this period, that the then new KK Women's & Children's Hospital was being formed. The initial clinician leaders tasked to oversee the establishment of KKH were Drs Ong Eng Keow, Irene Chan and Sim Chang Kee. Drs Ong and Chan were Paediatric

Intensivists running the Paediatric Intensive Care Units of TTSH and SGH at the time, while Dr Sim was a senior paediatric surgeon at SGH. Dr Sim Tiong Peng from SGH ED was subsequently appointed Head-Designate of Children's Emergency, KKH in 1995. The leadership group created 3 senior full-time positions for the new department - Tiong Peng, myself and Dr Angelina Ang.

We went about meeting all the heads and head-designates of the Children's Hospital in the lead up to May 1997, to establish clear workflows. As both Angelina and myself were trained in paediatric medicine, we especially wanted to ensure that acute paediatric surgical issues were also well managed at CE. To do so, our team also worked with our adult ED colleagues to institute safe practices for minor paediatric surgical procedures at our new CE at KKH.

As we geared up for our opening on Saturday, 10 May 1997, the core team of doctors and nurses were seconded to KKH from March 1997 to prepare for the operations. There was much work and activities in these frantic 2 months leading to the opening of the Children's Hospital. Within infrastructural limits that were already built in by March 1997, we sought to ensure enough measures were in place, to facilitate a seamless patient journey as much as possible. I especially recall walking multiple times with A/Prof Cheng Heng Kock, then CMB-designate, on how to transfer patients from our CE resuscitation room to the Computed Tomography (CT) scan room, to the Children's Intensive Care Unit and Operating Theatres at Level 1.

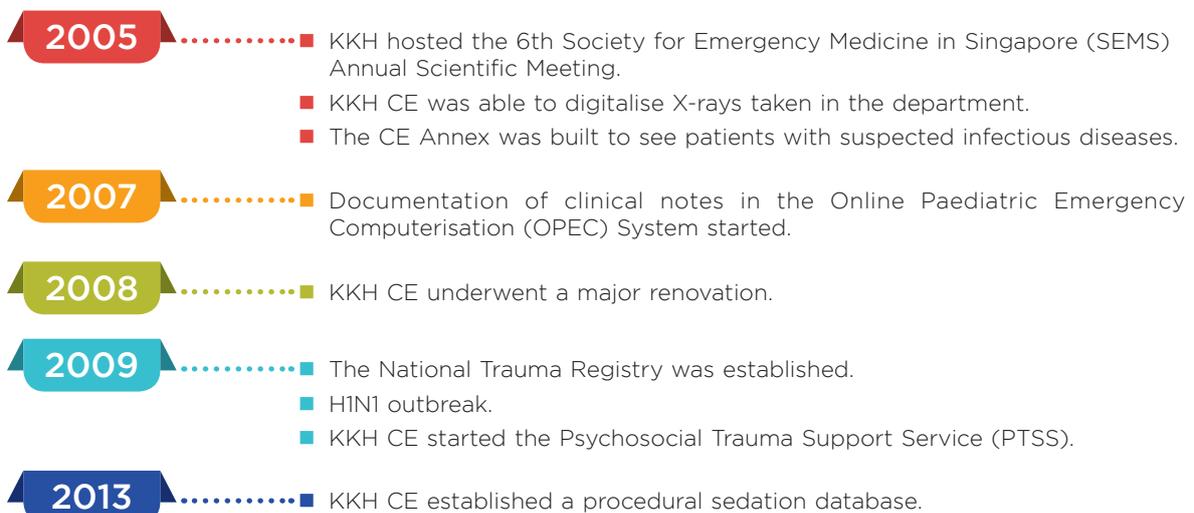
Our numbers at CE had consistently never gone below 250 patients a day, and that was when KKH leadership decided we needed another specialist within our initial rank of 3. A/Prof Tham Lai Peng

thus became our 4th core founding specialist member of CE in 1998 when she agreed to join us after she passed her paediatric examinations.

We have now seen how CE had evolved progressively and grew from strength to strength, with stellar achievements in multiple areas of interest.

As Aristotle says: "We live in deeds, not in years... Who thinks most, feels the noblest, acts the best." Through the perseverance and dedication of our pioneering doctors and nurses over these amazing 25 years, Paediatric Emergency Medicine has grown in stature and depth, and established itself as a core discipline in KKH and in Singapore. Institutional memory is important. It has to be passed on and shared with succeeding generations, so that we all continue to learn, grow and do better.

We are who we are today because of the sheer tenacity, hard work and relentless commitment of our many colleagues through the years. Together we have grown, and together we have made a difference in the care of our paediatric patients, for patients are always at the heart of all we do. The success of KKH CE has been a collective effort. This has been a collective success. ■



DR LEE KHAI PIN ■ KKH CE 3RD HOD (2016–2021)



There is palpable energy on a busy CE shift – a hidden tempo in the regular beep of the physiological monitor in the resuscitation room, the background chatter of adult conversations punctuated with the cries of an infant, the PA system announcing yet another VHF stand-by.”



I had my first taste of Paediatric Emergency Medicine (PEM) in 2003, during my first KKH Children’s Emergency (CE) posting as a Basic Specialist Trainee (BST) Medical Officer. Little did I know then that I would go on to do 18 months as a BST and 8 months as a Registrar (AST, Advanced Specialist Trainee) in CE, before officially returning to the KKH CE family as an Associate Consultant in December 2009.

In the blink of an eye, CE has grown through the years – from that tentative pre-primary child in 2003, to the angsty teenager in 2009, and now a blossoming young adult at 25 years. The CE team has expanded tremendously, to now include a work family of physicians, nurses and administrative staff, comprising of passionate and driven individuals with diverse personalities and strengths in different domains, making our daily work an exciting and rewarding event.

There is palpable energy on a busy CE shift – a hidden tempo in the regular beep of the physiological monitor in the resuscitation room,

the background chatter of adult conversations punctuated with the cries of an infant, the PA system announcing yet another VHF stand-by. One fine day, on an extremely hectic shift, I realised that I could harness that energy, feel that beat under my feet, and push myself to complete that shift with a clear sense of control over the shop floor chaos. I think that sense of accomplishment that very day convinced me that I would continue to pursue PEM professionally as my career choice. While some detractors would argue that hypoglycaemia could have easily caused my hallucinations, I continue to believe in my romantic notion of an epiphany.

Not unlike many adults growing up, CE has faced her fair share of growing pains, the latest being the ongoing COVID-19 pandemic affecting multiple aspects of patient care delivery. As a teenager, CE also had to navigate the complexities of social media and in the future, journey along with artificial intelligence and the metaverse. There will certainly be challenges ahead of us but I know that as long as we stick together, be open, honest,

authentic and sincere in our communications with one another, speak and act from a place of mutual love and respect, we will be OK.

I am tremendously grateful to be part of the CE family and I look forward to more good years together ahead.

Happy Birthday, CE! ■

- 2018 ■ Launch of KKH Urgent Paediatric Advice Line (U-PAL).
- 2020 ■ The start of COVID-19 pandemic.
 - Youth Well Being Questionnaire was rolled out in KKH CE.
 - Telemedicine Consult Service was started.
 - CE started seeing local paediatric COVID-19 patients.
- 2021 ■ Restructuring of CE's layout to create extended screening areas to ensure smooth and seamless patient care amidst the COVID-19 pandemic.

ASSOCIATE PROFESSOR SASHIKUMAR GANAPATHY

■ KKH CE 4TH HOD (2021-PRESENT)



KKH Children's Emergency has been on an incredible transformative journey over the past 25 years. In the years to come, KKH Children's Emergency will continue to strive to reinvent healthcare standards.”

KKH Children's Emergency has been on an incredible transformative journey over the past 25 years, but we still have a very long way to go. This journey has been so much more than having new people, an array of novel digital tools or redesigned workflows and processes. The other

important 'software' it encompasses is the ability of having a diverse group of individuals, with the right skills in the right places, working together to deliver quality patient-centred care. In the years to come, KKH Children's Emergency will continue to strive to reinvent healthcare standards. ■

HEARING FROM OTHER PIONEERS



As a paediatric emergency physician, I feel honoured to do ‘heroic stuff’ in the CE resuscitation room. But I have come to realise that the true heroes are my patients.”

DR ANGELINA ANG
SENIOR CONSULTANT, KKH CE



On the morning of 10 May 1997, we didn't feel ready at all. Clinical guidelines in consultation with paediatric surgical and medical specialties, nursing checklists, resuscitation room set-up, computerisation, registration and admissions workflows, supplies, patient information brochures, signages...check, check, check... but still... we were a small team. And who were we? We were just newly minted Registrars, and the head of department was just a Senior Registrar. The pioneer nurses (Nurse Clinician (NC) Indra Kasinathan, Registered Nurse (RN) Rosmini, Assistant Nurse Clinician (ANC) Khatijah Yacob, Senior Staff Nurse (SSN) Ho Lan Fong, Nursing Manager (NM) Tor Sow Khim, NC Lee Choy Kuan, and NC Chia Lai Heng) had also put in tireless preparation.

Tiong Peng made Kee Chong and I meet him in his office that morning. The ‘Martha’ in me wanted to continue with the last-minute flurry of settling issues on the ground, but Tiong Peng was set on a quick grounding in wisdom and strength. Using the story of an Israelite army leader who whittled down his team from more than 30,000 to 300 men, and leading this elite team to ultimately defeat the rival 135,000-strong troops, he demonstrated the antithesis of ‘strength in numbers’.

Throughout the years, amidst all the doctors who had rotated through CE, not many had envisioned a career path in Paediatric Emergency Medicine. Dr Arif Tyebally, Dr Lee Khai Pin, A/Prof Gene Ong,

Dr Peter Wong and A/Prof Chong Shu Ling joined almost a decade later. This inject of young talents was pivotal in the success of the International Conference for Emergency Medicine (ICEM) 2010 hosted by Singapore. Prof Anantharaman and Prof Eylline Seow were the co-chairpersons of ICEM 2010. Being appointed as the paediatric track chairperson, I mobilised the team to host a large group of international delegates in Paediatric Emergency Medicine (PEM). Dr Arif Tyebally, who was in charge of the social programme, intrigued the international delegates with the rich multiracial culture of Singapore at a dinner hosted by the KKH CE team. The friendships forged with the international PEM fraternity at the ICEM, paved the way for collaborations in training, conferences and research with PEM physicians worldwide, and led to the birth of PEMSIG (PEM Special Interest Group) in the International Federation of Emergency Medicine (IFEM).

Over the years, the department grew very slowly, but steadily. Looking back, I now have a clearer insight of the crucial ingredients for the success of the department. The ‘secret recipe’ for KKH CE's success has always been purpose, passion, strength and strategy, rather than pure numbers. This ‘secret recipe’ has helped us defy naysayers to become training ground for three SingHealth Duke-NUS Academic Clinical Programmes (ACP), provide for an intensely paced emergency service, survive the odds of pandemics, and achieve

clinical excellence in various subspecialty areas. Resourceful emergency planning, immaculate teamwork and innovative use of technology has enabled the department to thrive.

The exciting thing about pioneering work, where there is no precedent, is that there are no arduous conventional constructs which may shackle our efforts. For sure, a few good men, and women, with ingenuity and intuition, can transform care! ■

“

Some of the medical students and residents that I taught or supervised years ago are now established clinicians in their careers, and it is a joy for me to see them grow, blossom and flourish.”



A/PROF THAM LAI PENG SENIOR CONSULTANT, KKH CE

When KK Women’s and Children’s Hospital first opened in March 1997, I was one of the paediatric trainees from KKH Neonatology who transported the neonates from the old KK Hospital in Kampong Java to the current hospital and continued with the management. After I passed my M.MED (Paediatric Medicine) exams, I joined the Children’s Emergency as a Registrar in November 1997, and as permanent staff in 1998. It was a new department then, with no precedent, and I considered, together with Kee Chong, Tiong Peng and Angelina, we could develop Paediatric Emergency Medicine, and build this budding clinical department. I was the roster planner for senior doctors from 2001 to 2009. There were only 2 senior shifts (8am – 4pm, and 4pm – 8am) initially. With additional manpower from rotating registrars in 2001, we had 3 senior shifts and one senior per shift. The CE attendances increased from 65,000 in 1998 to 150,000 in 2009, testament to the quality care that we provided to our patients.

KKH CE was the first ED in local public hospitals to have a computerised prescription system in 2002. As part of a process mapping and re-design project, I led a team consisting of Information Technology (IT) personnel from Eutech and the KKH Pharmacy Department, to develop a

computerised outpatient prescription system in the OPEC electronic medical records with auto-calculation of drug dosages based on weight and age, as well as safety features of weight for age limits, that are continued in the current health information system. The CE team was actively involved in patient education, via multiple media interviews, forums, workshops, and videos, on management on common paediatric emergencies and injury prevention. My interest in sedation and pain management has led me to be a member of the KKH Sedation Committee since 2007, and Pain Management Committee since 2014, developing and advancing clinical practices in these areas, and starting a sedation database in CE. A significant part of my career journey is my role as a clinician educator both in teaching and medical education assessments. I have been teaching and mentoring medical students since 2000 and residents as Core and Physician Faculty of the SingHealth Paediatric and Emergency Medicine (EM) Residency Programmes respectively since 2010. I am currently a member of the SingHealth Duke-NUS EM ACP Directorate of Clinical Services, and was a member of the EM Residency Advisory Committee (2013 – 2021). Since 2014, I am one of the pioneer members of the M.MED (Emergency Medicine) Examination Committee involved in

writing of examination questions, standard setting, and reviewing the blueprints. I am also a member of the EM Joint Committee on Specialist Training (JCST) Exit Examination Committee.

With a special interest in pre-hospital care, I completed my HMDP Fellowship in Paediatric Emergency Medicine at Royal Children's Hospital in Melbourne, including attachments with the Metropolitan Ambulance Service in 2004, and a study trip to a high-performance Emergency Medical Service in Richmond, USA in 2007. Since 2007, I was appointed a member of the Medical Advisory Committee of Singapore Civil Defence Force (SCDF) by the Ministry of Home Affairs, to provide clinical expertise on paediatric pre-hospital emergency care. My interest in cardiac

arrest resuscitation research started in 2001. I joined Prof Marcus Ong as a co-investigator to establish a national out-of-hospital cardiac arrest registry in Singapore through CARE Study then. In 2010, the Pan Asian Resuscitation Outcome Study (PAROS) Clinical Research Network was formed. It is a multi-centre collaborative study (32 sites in 11 countries). Since then, we have published multiple research papers in high impact journals using the PAROS database.

Looking back at the last 25 years, it has been a rewarding journey for me. I had the privilege of having mentors who guided me when I was a junior doctor. I am thankful for the team in CE and there is still much work that can be achieved together. ■



There was no doubt that work was tough and backbreaking, yet the team spirit was what kept us going strong.”

NURSE MANAGER CHIA LAI HENG

PIONEER NURSE WHO WAS FORMERLY FROM KKH CE



KKH CE started operations on 10 May 1997. I was excited and apprehensive as it was the first time that we were assigned to start a nursing unit from scratch. Together with me were NM Zainab Binte Amat from SGH and NM Lee Choy Kuan from TTSH. The early days were truly challenging due to staff shortage, lack of familiarity among staff who hailed from different hospitals, and getting used to a new working environment. There was no doubt that work was tough and backbreaking, yet the team spirit was what kept us going strong.

Slowly, we established policies and protocols, and put in place structures to get our daily operational systems working. As part of our efforts to upskill the department, we participated in the national mass casualty exercises and hazardous materials exercises. We were most proud of our efficient

triage system, which helped us prioritise sick patients who needed immediate and urgent medical attention. This system was subsequently refined to what it is today. In addition, the department empowered nursing staff to serve simple antipyretics, which helped to relieve patients' discomfort, prevent patients' symptoms from worsening during their waiting time and reduce parental anxiety.

As the first dedicated children's emergency facility in Singapore, we have always been at the frontline during national crises and major disease outbreaks such as SARS and H1N1. These experiences of serving the nation are unforgettable, and have inevitably helped us to grow and develop in our profession. ■

STATISTICS FOR THE LAST DECADE



STATISTICS FOR THE LAST DECADE

An average of 158,071 patients/year

An average of 4381 toilet and suture (T&S) procedures/year

An average of 1408 manipulation and reduction (M&R) procedures/year

“

This journey of growth is never ending, but I have full faith in the CE family. We will always be lifting each other up, to continue to achieve extraordinary results.”

A/Prof Sashikumar Ganapathy
Head of Department, KKH CE

THE VARIOUS FACETS OF PAEDIATRIC EMERGENCY CARE

Pre-Hospital Paediatric Emergency Care

While paediatric out-of-hospital cardiac arrests (OHCA) are uncommon when compared to adults, it is still associated with significant morbidity and poor neurological outcomes, as well as a high mortality rate of more than 90%. A/Prof Tham Lai Peng is KKH CE's representative of the Pan Asian Resuscitation Outcomes Study (PAROS) Clinical Research Network, which is a multi-centre, prospective registry of OHCA across the Asia-Pacific Region, with collaborations with Emergency Medical Services agencies and medical providers in eleven countries. The aim of PAROS was to provide information that support cost-effective strategies to improve survival outcomes of this group of paediatric patients.

Since 2007, A/Prof Tham has also been a member of the Medical Advisory Committee of Singapore Civil Defence Force (SCDF), to provide clinical expertise to paediatric pre-hospital emergency care. The team ensures that ambulances are equipped with appropriately sized paediatric resuscitation equipment and monitoring devices, writes and updates protocols for various paediatric emergencies, and teaches paramedics advanced skills and post cardiac arrest care, to improve the quality of pre-hospital support. In 2015, with A/Prof Tham helming the role of Course Director, her team consisting of A/Prof Gene Ong, Dr Lee Khai Pin, and paramedics from SCDF and Civil Defence Academy (CDA) started the Pre-Hospital Paediatric Life Support Course (PPLS), which includes lectures, and practical skills sessions on airway management, vascular access, defibrillation and simulation of paediatric emergency scenarios. Since 2016, the course has been accredited by the Singapore Resuscitation First Aid Council (SRFAC).

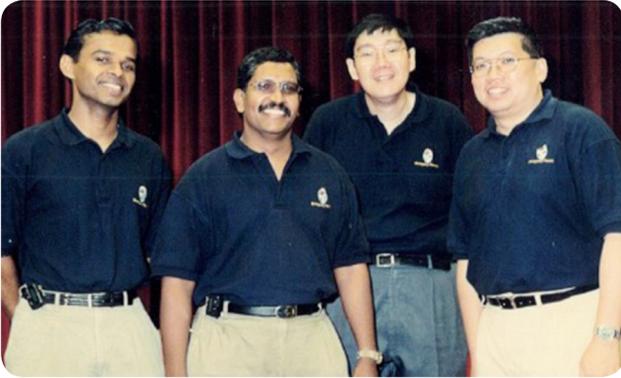
Paediatric Sedation

Major clinical guidelines for paediatric procedural sedation have been published internationally by the American Academy of Paediatrics (AAP),

American College of Emergency Physicians (ACEP) and American Society of Anaesthesiologist (ASA) since 1980s. In 1998, KKH CE was the first emergency department in Singapore, and the first department in KKH, outside of the operating theatre and Intensive Care Unit, to use ketamine as procedural sedation for children who were undergoing painful procedures, such as reduction of fractures or wound suturing. Information from various international guidelines were adapted to ensure they are applicable to the CE setting. In the first year of implementation, an average of 100 children per month benefited from this initiative. Minor surgical procedures that were previously done in the operating theatres, are now able to be performed safely in a controlled setting in the CE. In 2006, Nitrous Oxide was introduced as well. A/Prof Tham, the course Director of KKH Paediatric Sedation Advanced Life Support Course, has been CE's representative in the Hospital Sedation Committee since 2007, to review the safety of sedation practices in CE and KKH, as well as credentialing doctors on procedural sedation.

In 2013, A/Prof Tham launched a procedural sedation database, and started conducting regular audits of sedation related events, to monitor the safety of sedation practices in the department. Data from this database was used for research projects, leading to numerous evidence-based publications.

Over the last 2 years, as part of KKH Pain Management Committee, A/Prof Tham had worked closely with KKH Child Life Therapists to train CE nursing and medical staff in using non-pharmacological pain interventions, such as music or animated patient education videos, to improve patients' experience when undergoing minor surgical or painful procedures. These collaborative efforts in providing institution-wide and evidence-based approaches to the treatment of children's pain have been recognised. On 23 March 2022,



1st HAZMAT Course at TTSH (2001).



Exercise Kingfisher (2017).



Exercise Bobcat (2017), originally known as Mass Casualty Exercise 2017.

KKH became the first children's hospital outside of United States of America (USA) to be certified a ChildKind institution.

Paediatric Emergency Planning

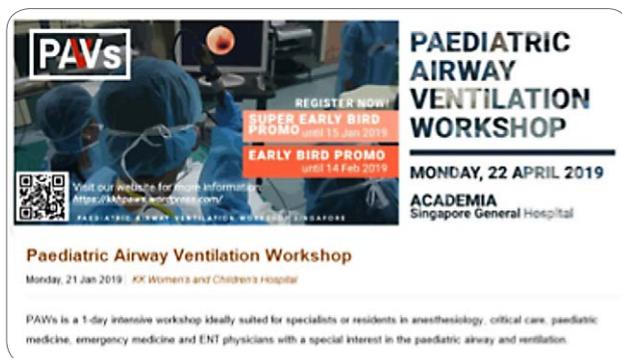
In 1997, KKH CE was tasked to plan a paediatric mass casualty programme for the hospital. This major task was fronted by A/Prof Ng Kee Chong, and he developed a specialised Paediatric Field Team, which would be deployed to the scene of civil emergencies. This has evolved to also include establishing paediatric protocols and workflows for civil and national emergencies. After the September 11 tragedy, the team also drew up Hazardous Materials (HAZMAT) protocols for chemical, biological and radiation-related disasters for paediatric patients, as well as crafted the paediatric curriculum for MOH's HAZMAT Training Programme for healthcare providers.

The KKH CE physicians undergo various forms of disaster medicine training, such as the HAZMAT course or Pre-Hospital Trauma Life Support Course, to keep abreast with updated workflows and practices, to improve our level of emergency preparedness. Several members of KKH CE are also part of the MOH's Disaster Site Medical Command (DSMC), which coordinates medical response, to mobilise medical support at disaster sites, in times of civil emergencies. Senior Consultant Dr Arif Tyebally was previously seconded to MOH as Project Consultant from February 2010 to December 2013, for hospital-based mass casualty preparedness, developing a preparedness framework for all hospitals in Singapore, and performing real-time audits to assess the hospital's state of readiness. He is currently the Medical Advisor to Crisis Planning and Operations in KKH, while Consultant Dr Ronald Tan is currently appointed as the Assistant Commander of MOH DSMC.

KKH CE last participated in Exercise Kingfisher on 1 July 2017. The exercise, being a simulation of a civil emergency, was an experience that allowed the hospital and department to validate existing response plans. It brought forth inspirational team work, and showcased the team's vigilance, commitment and capabilities.

Paediatric Resuscitation

Head of department A/Prof Sashikumar is the Course Director of the Advanced Paediatric Life Support (APLS) Course. The APLS is an accredited Singapore Resuscitation and First Aid Council (SRFAC) Course, which trains healthcare professionals in the skills required, for advanced paediatric care, in an ambulatory setting. Majority of KKH CE staff are also APLS Instructors, contributing to the delivery of lectures, and skills training, on paediatric and neonatal resuscitation.



Senior Consultant A/Prof Gene Ong currently serves as a Paediatric Life Support Emeritus Member of the International Liaison Committee on Resuscitation (ILCOR), Chairperson of Paediatric subcommittee of Singapore Resuscitation

and First Aid Council (SRFAC), member of the Paediatric subcommittee of National Resuscitation Council, Singapore, and member of the KKH Resuscitation and Emergency Code Blue Committee. The department is actively involved in making recommendations for the Singapore Paediatric Resuscitation Guidelines, and being part of international efforts to improve paediatric resuscitation protocols.

Cardiopulmonary arrest is an uncommon event in paediatric patients, and a critical and highly stressful situations, to help them prepare confidently with a future event. The department partakes actively in Mock Code simulations to help everyone fill knowledge and practice gaps, to prepare for real-life situations.

In 2015, KKH CE participated in the SimWARS, a national competition involving high-fidelity simulation of patient resuscitation, during the Society for Emergency Medicine (SEM)-Singapore's Annual Scientific Meeting. Being the only representative from a paediatric emergency department at the competition, the KKH CE Team showcased our teamwork, clinical competence and resilience, to emerge Champion of SimWARS.



(Left) Winning team (from left): Dr Christie Lyndsay (EM resident who previously rotated through KKH CE), Senior Staff Nurse Xu Suduan (former nurse in CE), Dr Victoria Tan (Associate Consultant, CE), Dr Chew So-Phia (Senior Staff Registrar, formerly in CE), Dr Eileen Yap (Associate Consultant, CE).

(Right) SEMS 2018.



Paediatric Trauma, Toxicology and Childhood Injury Prevention

Requiem of Resilience

By Dr Angelina Ang

*Limitless potential, enduring vivacity
Like my young medical and nursing colleagues
You would be in your early thirties today
If you had chosen to go up your school bus
Instead of plunging down your block of flats
You were only 10, that fateful morning.*

*"Doctor to resus room!"
"10-year-old, fall from height,
unconscious. E.T.A 10 minutes".
"Trauma Code, at Children's Emergency,
Basement 1, Children's Tower!"
The trauma team was poised in anticipation
I steeled my nerves to fulfil my calling
You were only 10, that fateful morning.*

*SCDF ambulance drew up at the porch.
No pulse! Continue CPR!
Size 6.5 ETT! Suction! Tube in! Bag!
I.O. Needle! Normal Saline! E Blood!
Hard to bag. Chest wall crepitus.
Pulseless Electrical Activity.
You were only 10, that fateful morning.*

*Outside the resus room.
Your dad had gone to wash his face.
The stoic Chinese way to wake
up from a nightmare.
"他不行了, 是吗?" (He cannot make it, right?)
I nodded.
You were only 10, that fateful morning.*

*At the corridor outside your flat.
Your dad had been watching out for you.
To see you go up the school bus.
You had been upset the night before.
Distracted over a corrupted floppy disk.
You were only 10, that fateful morning.*

"5 H's and 5 T's"

*"Bilateral tension pneumothorax.
Subcutaneous emphysema"
"Needle Thoracotomy, followed
by chest tube insertion".
Batches of bright-eyed medical students
and residents pored over your X Ray.
They were older than you, and now younger.
You were only 10, that fateful morning.*

*Your Chest X Ray on radiographic film
Now a mouldy memorial
digitalized to immortalize
To teach Paediatric Trauma
Resuscitation, and underscore
The importance and imminence
of psychosocial support
For the vulnerable adolescent patient.
You were only 10, that fateful morning.*

*Paediatric injury control and
prevention pursued with passion
"Children are a lot more difficult to mend".
"Monkey bars are for monkeys only".
"I am not a psychiatrist."
"There is no time in the ED."
You were only 10, that fateful morning.*

*Faster pace and higher tech.
N95, goggles, scrub suit.
Would you have disclosed your distress?
In the Youth Well-Being Questionnaire?
If you share, I promise to care.
You were only 10, that fateful morning.*

*Just want you to know...
We've got your back.
"Seeking help is a sign of strength!"
It's OK to fall
We have strengthened the safety net.
You are young, you will bounce back!*

In the above poem, Dr Angelina Ang shares how, the memory of being involved in a resuscitation of a 10-year-old boy who had jumped from the corridor of his flat, remains etched in her mind. She was one of the founding members of the Ministry of Health (MOH) workgroup that set up the National Trauma Registry in 2009.

Paediatric patients with multiple traumatic injuries receiving medical attention in KKH CE is not an uncommon sight. The first Paediatric Trauma Manual used by KKH CE was prepared by Surgeon Dr V. T. Joseph. It adapted the principles of Advanced Trauma Life Support (ATLS), and detailed the procedures and responsibilities for paediatric polytrauma patients. It gave the team a standardised and systematic approach to the initial management of such patients. Over the past 2 decades, KKH CE staff had gone through ATLS training to hone their skills, and now, many are ATLS Instructors as well. Today, KKH CE acts as the Trauma Code Leader for polytrauma paediatric patients seen in KKH CE, and various senior staff are representatives of the KKH and National Trauma Committees.

In 2004, together with SGH and CGH, KKH CE had played crucial roles in helping to set up the Drug and Poison Information Centre (DPIC), as well as writing national paediatric toxicology guidelines. Today, A/Prof Gene Ong, who is an Executive Member of the Toxicology Society of Singapore, contributes to the teachings of paediatric toxicology via means of lectures, seminars, workshops, as well as high fidelity simulation training for multi-dimensional considerations in the assessment and management of a critically ill poisoned patient.

To date, childhood accidental trauma is still a major morbidity and mortality in our local population. The first Child Safety Centre in KKH was birthed from a collaboration between KKH CE, led by Dr Angelina Ang, and the late Prof Chao Tzee Cheng. The Child Safety Centre was located in Level 1 of the KKH Retail Mall, and it was a space used for public education about various childhood injuries and their corresponding prevention strategies.

Childhood Injury & Poisons Reporting and Prevention Program



Children are a lot harder to mend

'Monkey bars are for monkeys only'

By SHEILA NARAYANAN

If your child loves playing on monkey bars (right), this may not be good news. They can be dangerous, if Dr Angelina Ang had her way, there would't be any in Singapore playgrounds.

"We are advocating that monkey bars are not appropriate for children," said the assistant consultant of Emergency Medicine at KK Women's and Children's Hospital (KKH).

Dr Ang, who is also the vice-chairman of KKH's child safety centre management committee, sees three or four children who have fallen from monkey bars every day.

"They can sustain elbow fractures. And if it does not heal properly, the child may be deformed," said Dr Ang, who began a two-year research into childhood injuries last month. (See other report.)

In 2008 alone, the Children's Emergency section saw 1,269 children with upper limb fractures that could have caused permanent disabilities or

deformation.

"The orthopaedic department which sees these injuries, too, believes that monkey bars should not be in the playgrounds," she said.

"Monkey bars are for monkeys only, they say."

Monkey bars are the cause of many playground-related injuries. Although most children suffer only cuts and bruises, sometimes minor injuries can turn out to be serious.

Dr Ang spoke of a four-year-old boy who fell while playing in an indoor playground.

"He fell on his back and suffered minor bruises. Five days later, he was at children's emergency for vomiting."

Doctors later realised that the vomiting was related to the fall. There was a blood clot in the duodenum (first part of the intestine after the stomach) which caused the gastric outlet to be blocked. Surgery was required to remove the clot.

"The mother did not take much notice at first because it seemed minor," added Dr Ang.



Although this was an unusual case, freak injuries can still happen. Dr Ang feels that playgrounds should have appropriate equipment for different ages.

"A fitness park would be better for a teenager than a little kid," she said.

Parental vigilance is important. Mr Gokarna Ayyappan, a 52-year-old storekeeper agreed.

His four boys — aged two to seven — play at the neighbourhood playground under his wife's strict supervision.

"As parents, we must make sure that children can play on the bars," he said.

"If they can't, they should not be allowed to."

SURVEY

THE Childhood Injury and Poisons Reporting and Prevention Program will survey hospital and polyclinic patients who have sustained childhood injuries.

It hopes to:

- Get data to guide a local injury prevention programme.
- Provide understanding of how and where childhood injuries occur.
- Find out how to detect risk factors and develop injury control measures.

Data will be gathered from KKH, the Singapore General and Chang Gernal Hospitals and Fairview and Institute of Health Polyclinics. About 15,000 has been given for the two-year study.

And ban the baby walker

INJURIES are the third or fourth most common cause of death for children up to 14 years old, Dr Ang said at a workshop for doctors and healthcare workers yesterday.

KKH's Children's Emergency sees 10,000 children a year for injuries from falls, scalds, poisoning,

choking and so on. Like monkey bars, baby walkers can be dangerous, too. In Canada and Europe, they are banned.

Dr Ang described how babies can get hurt. They cruise along HUB corridors and fall down stairs. Or tug at table cloths and a pot of soup falls on them," she said.

Dr Tan Ngaiap Chuan, Director of SingHealth Polyclinics, Fairview, conducted a year-long study on baby walkers.

He had 446 caregivers in his study. About 311 used walkers. Out of that 24 cases had walker-related injuries," he said. "Fortunately there were no deaths."

However, there was still a lack of awareness of the hazards of baby walkers. Nearly two-thirds of the participants were not aware of the dangers.

Dr Tan said that he strongly discourages parents from buying the walkers. "A single injury is one too many," he said.

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In 2001, KKH CE collaborated with Prof Anantharaman, Dr Adeline Ngo (SGH ED), Prof Goh Siang Hiong (CGH ED), Prof Tan Ngaiap Chuan (SingHealth Polyclinics – Pasir Ris), Dr Chow Mun Hong (Institute of Health Polyclinic), Dr Derrick Heng (Clinical Trials and Epidemiology Research Unit, National Medical Research Council (NMRC)), Prof Chin Hoong Chor (National University of Singapore Centre for Transportation Research) and Dr Wee Keng Poh (Forensic Pathology, Health Sciences Authority), and was awarded a \$143,000 NMRC grant for research on "Epidemiology and Prevention of Unintentional Childhood Injuries in Singapore". The slogan used for this campaign was "Children are a lot more difficult to mend".

Over the years, KKH CE has been involved in ongoing national and inter-ministerial collaborative efforts with stakeholders such as the State Coroner, Active SG, Traffic Police, to name a few, to share clinical and surveillance data, and



In recent years, KKH CE has seen increasing numbers of patients who present with behavioural and mental health issues. To the distressed adolescents who come to seek medical attention in CE, we hope to be able to relay the important message that ‘seeking help is a sign of strength’.”



medical expertise, to contribute to better design interventions of playgrounds, car seats, and public education. “Monkey bars are for monkeys only” was used in media interviews to promote awareness of the risks of upper limb fractures associated with falls from monkey bars in playgrounds. The baton of injury prevention advocacy has now been passed to Dr Ronald Tan, who was appointed Chairman of the Workgroup for Childhood Injury Prevention in 2021.

Youth Well-Being and Child Abuse

In 2009, as part of MOH’s National Mental Health Programme, KKH CE played a key role in establishing the Paediatric Psychosocial Trauma Support Service (PTSS), which uses the Trauma-Focused Cognitive Behavioural Therapy approach, to address mental health needs in our local paediatric population. In recent years, KKH CE has seen increasing numbers of patients who present with behavioural and mental health issues. Understanding that one of the barriers to seeking appropriate help is the perceived stigma of ‘being weak’, Dr Angelina Ang fronted efforts to introduce the Youth Well-Being Questionnaire in KKH CE in February 2020, allowing physicians to conduct efficient, yet empathetic psychosocial assessment of adolescents with possible psychosomatic complaints, and directing them to appropriate avenues for assistance. To the distressed adolescents who seek medical attention in CE, the team hopes to be able to relay the important message that ‘seeking help is a sign of strength’.

Having a special interest in child abuse, Senior Consultant Dr Peter Wong serves in the KKH Suspected Child Abuse and Neglect (SCAN) Team, and chairs the Sub-Committee for the Child and Adolescent Sexual Assault Team. Being actively involved in child advocacy work, Dr Wong also facilitates workshops and gives lectures to a diverse audience, consisting of medical and nursing students, faculty members, and residents from the SingHealth Paediatric and Emergency Medicine Residency Programmes. He has also given speeches about child abuse at several international and local conferences. In a collaboration between KKH, Singapore Police Force (SPF) and Child Protection Services in 2018, Dr Wong had helped to establish the One-Stop Centre for the Multi-Disciplinary Interview of Paediatric Sexual Assault Victims. In appreciation of his commitment in inter-agency child abuse work, Ministry of Social and Family Development (MSF) had awarded Dr Wong “Friend of MSF” in 2021.

Research and Education

In partnership with Duke-NUS Medical School, the SingHealth cluster has developed Academic Clinical Programmes (ACPs). This establishment harnesses the cluster's clinical expertise and Duke-NUS' medical education and research abilities, to improve patient and healthcare outcomes.

The team in KKH CE had not only mentored and groomed medical students from the three medical schools in Singapore, but are also actively engaged in educational research, and hold various educational leadership positions at the national and institutional levels. Many CE physicians have also been appointed Core Faculty of the SingHealth Paediatric Residency Programme, as well as Physician Faculty of the SingHealth Emergency Medicine Residency Programme. They play different roles as tutors, supervisors, and examiners for summative exams for undergraduates, as well as being content experts for the examination committees of the Residency programmes.

In recent years, the team consisting of Senior Consultants Dr Arif Tyebally, A/Prof Sashikumar Ganapathy and Dr Zaw Lwin, as well as Senior Staff Registrar Dr Khoo Su Ann, had revamped the training programme at CE, for both residents and faculty members. The introduction of web-based learning and incorporation of blended team-based learning activities, had increased engagement in learners, as well as provided a clear learning structure.

The KKH CE team had also won multiple Education awards, and notably, Dr Khoo Su Ann was recently presented with the Education Research Merit Award, by the SingHealth Duke-NUS EM ACP in 2021.

Research has been a key niche area in KKH CE, with multiple individuals being awarded competitive grants, and publishing many high impact papers in various reputable medical journals. Today, the department is extremely proud to have representatives who have done outstanding work in this field. In particular, Senior Staff Physician A/Prof Chong Shu-Ling, holds various appointments as the Scientific Co-Chairperson in the Emergency Medicine Education and Research by Global Experts (EMERGE) network, principal investigator leading multi-centre research in brain injuries in Paediatric Acute and Critical Care Medicine Asian Network (PACCMAN), and the Deputy Vice-Chairperson (Research) of SingHealth Duke-NUS EM ACP.

Humanitarian Efforts

In 2004, Dr Arif Tyebally, a then-junior Medical Officer, was tasked to be KKH paediatric representative in the Mercy Relief team deployed to Banda Aceh Tsunami Relief. That trip sparked his passion in medical relief work. His commitment in sharing his skills, and caring for vulnerable children, has led him to various disaster relief projects, to help communities with acute care needs in the



(Left) Dr Arif Tyebally at a disaster relief project. (Right) Train the Trainers Programme, Cambodia.



(Left and right) Acute Paediatric Emergency Care Course (APEC).

immediate post disaster phase in various parts of the world. He was the paediatric representative for missions to Pakistan after the 2005 Muzaffarabad earthquake, and Team Leader for MOH's medical mission to Myanmar after Cyclone Nargis in 2008. To honour his steadfast advocacy for vulnerable children, and his contributions to human rights and world peace, he was awarded The Outstanding Young Persons of Singapore Award-Merit, in 2009. Embarking on a global health initiative, the team also participated in the Train the Trainers Project in several countries, such as China and Cambodia, to share our expertise, and empower medical teams on the ground to better assess, triage and manage acute paediatric conditions. KKH CE's efforts in the 2018-2021 Surabaya Paediatric Emergency and Neonatal Programme in Surabaya, Indonesia, from 2018 to 2021 had earned the department, the President's Volunteerism and Philanthropy Award in 2021.

Medical Innovation

The concept of telemedicine has evolved and been increasingly accepted in the recent years, due to a change in perception regarding effectiveness of care delivery. In 2018, KKH CE created a medical chatbot called 'the KKH Urgent Paediatric Advice Line (U-PAL)' in 2018 – an online service for parents and caregivers to seek advice for common paediatric conditions, such as fever, cough, and common injuries. This service enables caregivers to conveniently receive advice and clarifications for concerns, and enable them to better assess when their child would need to seek acute care at

KKH CE. KKH CE also conducts telecollaborative consults within the CE, and with other EDs in local hospitals. Since June 2020, the CE team also started conducting telemedicine consultations for selected patients who were discharged.



Emerging Infectious Diseases (EID)

Being a densely populated city and a highly popular travel hub, Singapore is susceptible to communicable diseases. In 2003, the SARS outbreak challenged the national healthcare system. Under the guidance of MOH, KKH CE set up isolation facilities in the hospital with negative pressure rooms, and the team learnt how to don on and off PPE. The practice of using nebulised medications stopped, and Metered Dose Inhalers (MDIs) and spacer devices were used to deliver bronchodilator medications instead. Thankfully, the SARS outbreak, that lasted from March to May 2003, was rapidly contained. In 2005, the CE Annex was constructed, and it has been operational, for the consultation of patients with infectious diseases.

On 11 June 2009, the World Health Organisation (WHO) declared the first Influenza (H1N1) pandemic of the 21st century. By August 2009, 440 children with confirmed H1N1 were admitted to KKH. KKH CE had set up isolation tents to manage patients with H1N1 infection. Influenza A kits were used during that pandemic, and during the mitigation phase, the CE team treated patients with symptoms of acute respiratory infections (ARIs) with Oseltamivir when they were discharged.

The Ebola virus and the Middle East Respiratory Syndrome Coronavirus (MERS-Cov) had resulted in high mortality rates in various parts of the world, but there were fortunately no paediatric cases in Singapore. The constant preparation for these outbreaks in the recent years had helped KKH CE gear up for the COVID-19 pandemic.

Singapore was one of the earliest countries affected by COVID-19, and this evolving disease outbreak has exacted tremendous toll on our national healthcare system. Over the past 2 years, the KKH Children's Emergency had transformed in many unprecedented ways, to strengthen our pandemic management capabilities, to continue to provide quality care to our patients. Today, the team continually makes dynamic reassessments of workflows and manpower organisations, and augments our isolation infrastructure, to be in tandem with national and institutional healthcare policies.

A/Prof Sashikumar, in conjunction with the Ministry of Health (MOH), had directed efforts to allow eligible paediatric COVID-19 patients to recover at home under the Home Recovery Programme (HRP), and receive in addition to the implementation of video consultation services conducted by KKH medical staff. Senior Consultant Dr Lee Khai Pin also commands the operations of D'Resort Pasir Ris, one of the Community Isolation Facilities (CIF) established by MOH, to accommodate COVID-19 patients. Both A/Prof Sashikumar and Dr Lee Khai Pin are also instrumental in devising workflows for the management of COVID-19 patients in the CE setting. The CE team continues to initiate and champion efforts in public education, via press release and media coverages, as well as sharing information and knowledge with the community healthcare professionals and private paediatricians, to empower them to care for paediatric patients in the community confidently.

These past experiences have taught all of us valuable lessons - the implementation of stringent measures, heightened surveillance and timely restructuring of departmental needs and workflows when the need arises. Future pandemics will continue to challenge the system, but the KKH CE team will forge ahead, with unwavering spirit and dedication. ■



KK Women's and
Children's Hospital
SingHealth

Home Recovery Guide

For Children with COVID-19

The symptoms of COVID-19 infection are similar to that of an acute respiratory infection or pneumonia. The treatment is mainly supportive. If your child remains alert, active and continues to eat well, your child can recover at home.



Your child may experience one or more of the following:

- Fever (temperature $\geq 38^{\circ}\text{C}$)
- Sore throat
- Cough
- Loss of taste or smell
- Runny Nose
- Diarrhoea



At the hospital, I was examined by Dr Sashi

OUR NURSES

Since the inception of KKH CE, there have been many progressive advancements in the ways nurses care for patients in this evolving healthcare landscape.

Over the years, manpower has been ramped up, in response to the large volumes of paediatric patients the department sees on a daily basis. To keep the nursing team's skills and knowledge up to date, the Senior Nursing Staff designed a structured training curriculum, with regular competency and proficiency checks. To support the nurses' professional growth and development, eligible candidates are also chosen to partake in programmes such as the Advanced Diploma in Nursing (Emergency) and leadership training courses. Nurses have also been trained to be in charge of the KKH U-PAL, and Advanced Practice Nurse Cynthia Lim is also part of the telemedicine team in CE.

The nursing team participates actively in Quality Improvement (QI) projects to contribute to CE's processes and enhance patients' experiences. These QI projects were showcased on different platforms. Notably, the project, that detailed how

'Passage 11' at CE was converted to a medication area to create a seamless patient journey, was awarded the 2nd Runner Up at the SingHealth Duke-NUS EM ACP QI eFEST in 2020.

Being at the forefront of the COVID-19 pandemic, the nurses have demonstrated dedication and resilience, by adapting to dynamic changes in workflows and infection control measures, contributing to the department's efforts in reconfiguring infrastructural layout to accommodate CE's patient load, as well as enduring long hours in full personal protective equipment (PPE) during their shifts.

To better care for CE staff's physical and mental well-being during this challenging period, a 'Tranquility Corner' was created for rest during breaks, and the 'Flexi Work Hours' initiative was also introduced to enhance work-life balance. In the recent SingHealth Employee Engagement Survey in 2021, the KKH CE nursing team achieved significant improvement in all 18 rated categories, of which, the top three areas were availability of direct supervision, innovation and communication. The survey also revealed that the nursing team has great faith in CE's processes, especially in the aspects of error prevention, and patient and staff safety.

The nurses' outstanding contributions over the last 2 decades have been widely recognised. The team received multiple prestigious nursing awards, such as the National Day Efficiency Award, Nursing Practice Excellence Award, MOH Merit Award, Singapore Service Excellence Award, and the SingHealth Duke-NUS EM ACP Teaching Excellence Award.

We are proud of each and every nurse in the team, and we look forward to making more memories together in the next 25 years. ■



KKH CE Senior Nursing Team.

OUR WORK FAMILY



“

Patients place a lot of trust in us when they arrive at CE, especially when they are in a critical state. The care that we give can make a difference between life and death, and we owe it to our patients to be the best possible paediatric emergency physicians that we can be. Personal drive is important, but we cannot discount how important training is, to ensure that we nurture top notch paediatric emergency physicians. My hope for the future is that paediatric emergency medicine will grow into a formal subspecialty, as this will create an environment to support structured training, to ensure our doctors are nothing short of the best!”

Dr Arif Tyebally, Senior Consultant



I rotated through CE as a newly minted medical officer, and enjoyed the satisfaction of helping young patients and their parents. I wish for CE to remain strong and grounded in its roots of treating children with heart, while also pushing new frontiers in innovation and technology to achieve better care.”

Dr Joyce Tan, Associate Consultant



I have been with KKH CE since 1997, and it's been an honour to witness how the department had transformed over the years. One of the major changes that I felt had the greatest impact on patient care, was the transition of the Electronic Medical Record (EMR) from Outpatient Paediatric Emergency Care (OPEC) to SCM-ED, allowing seamless care of our patients. The department has come a long way in its battle against numerous waves of infectious diseases, from SARS (leading to the construction of the CE Annex), H1N1 (erection of our first isolation “tentage”), and now our ongoing battle with COVID-19. The CE nursing team has truly exemplified the spirit of resilience and grit in these difficult times.”

Katijah, Assistant Nurse Clinician (ANC)



Despite the challenges over the years, the CE team continues to stay unite, and puts in tremendous amount of effort to ensure the smooth running of the department to deliver quality and safe patient care. The pandemic has taught me resilience, and the importance of adapting to constant changes. I am proud to soldier alongside my CE colleagues, and the appreciation and gratitude expressed by patients and their caregivers bring immense joy to myself and the team. That's the greatest gift any nurse can receive.”

Ho Lan Fong, Senior Staff Nurse (SSN)



I joined KKH in April 1997 and witnessed the official opening of Children Emergency in May 1997. The CE Nursing family has certainly grown over the years. I have also seen how CE had expanded, not only in terms of physical space, but also our scope of services to provide holistic patient-centred care. CE has always been my second home and my chosen family. The team displays great teamwork and collaborative spirit. As we continue to put our patients at the heart of all we do, I look forward to continuing my journey here, with my CE family.”

Rosmini, Principal Enrolled Nurse (PEN)

OUR PATIENTS' VOICES



Thank you for all the hard work and sacrifice you have made!”

Parent 1 “My children attended the Children’s Emergency on separate occasions a week apart. Coincidentally, they were seen by the same doctor. Both times, the doctor was very meticulous and patient. He was sincere, caring and knowledgeable, and not to mention, good with children too. He was very different from many doctors I’ve met. Thank you! I hope you will continue to touch the lives of all your patients in this positive way!”

Parent 2 “My 4-year-old son fell and broke his elbow around Chinese New Year and we went to KKH CE for treatment. He was understandably scared and in pain, but the CE staff were very gentle, and this made him feel at ease. Special shout-out to the doctor for her professionalism and caring attitude. We were also very pleased with the overall service at CE. Kudos to the CE team for having such an excellent, smooth and efficient workflow – the triaging, investigations, consult, treatment and arrangement of appointments were all done within a mere hour!”



I hope you will continue to touch the lives of all your patients in this positive way!”

Parent 3 “I would like to say a big thank you to the Children’s Emergency team. I brought my child to CE after a fall, and the team caring for him really reassured us. They were patient and gentle when interacting with my child. Even the nurses and patient service associates were friendly and pleasant as well. Thank you for taking such great care of us!”

Parent 4 “My 3-year-old daughter and I were transported to KKH for a doctor’s assessment in the morning, after she tested positive for COVID-19. I was very heartbroken when I knew about my daughter’s diagnosis, and I was really worried after reading up online about how the virus had affected some children, as well as hearing about others’ experience from many different sources. I would like to thank the doctor from the bottom of my heart, for taking time to answer all my questions and clarifying my misconceptions. I am truly grateful that she took time to reassure me, and took such good care of my child, despite the busy pandemic situation. To everyone in the healthcare sector, Thank you for all the hard work and sacrifice you have made!”



Kudos to the CE team for having such an excellent, smooth and efficient workflow.”

RECENT ACCOLADES

2021

A/Prof Sashikumar Ganapathy, A/Prof Tham Lai Peng, A/Prof Gene Ong, Dr Lee Khai Pin, Dr Arif Tyebally, Dr Peter Wong and Dr Zaw Lwin ▪ *Emergency Medicine Academic Clinical Programme Golden Quill Award*

2021

Dr Khoo Su Ann ▪ *Emergency Medicine Academic Clinical Programme Education Research Merit Award*

2021

Dr Peter Wong ▪ *Outstanding Faculty Award (SingHealth Excels (RiSE) Awards)*

2021

Nurse Clinician Huang Weili ▪ *Efficiency Medal, National Day Awards*

2020

A/Prof Sashikumar Ganapathy ▪ *Outstanding Faculty Award (SingHealth Excels (RiSE) Awards)*

2020

A/Prof Gene Ong, A/Prof Tham Lai Peng, Dr Arif Tyebally, Dr Peter Wong, Dr Zaw Lwin, A/Prof Sashikumar Ganapathy, Dr Ronald Tan and ANC Katijah Bte Yacob ▪ *Emergency Medicine Academic Clinical Programme (EM ACP) Teaching Excellence Award*

2020

Senior Nurse Manager Andrea Hei Geok Mei
▪ *Efficiency Medal, National Day Awards*

2019

A/Prof Sashikumar Ganapathy ▪ *Golden Apple Award for Education - Outstanding Young Educator Award*

2019

Dr Arif Tyebally ▪ *SingHealth GCEO Excellence Award - Outstanding Educator*

2019

A/Prof Gene Ong ▪ *Emergency Medicine Academic Clinical Programme (EM ACP) Teaching Excellence Award*



A/Prof Sashikumar Ganapathy: Golden Apple Award for Education - Outstanding Young Educator Award (2019).



2019

Dr Lee Khai Pin ▪ *Outstanding Faculty Award (SingHealth Excels (RiSE) Awards)*

2018

A/Prof Sashikumar Ganapathy ▪ *Healthcare Humanity Award*

2018

Dr Arif Tyebally ▪ *AMEI Golden Apple Award for Education – Outstanding Young Educator Award*

2018

Dr Arif Tyebally ▪ *Outstanding Faculty Award (SingHealth Excels (RiSE) Awards)*

2017

A/Prof Tham Lai Peng ▪ *Outstanding Faculty Award (SingHealth Excels (RiSE) Awards)*



(Left) KKH Children's Emergency: SingHealth Excellence Award, Distinguished Team Award (2016).

(Right) A/Prof Chong Shu-Ling: Healthcare Humanity Award (2015).



2016

KKH Children's Emergency (A/Prof Tham Lai Peng, A/Prof Gene Ong, Dr Lee Khai Pin and A/Prof Chong Shu-Ling) ▪ *SingHealth Excellence Award, Distinguished Team Award*

2016

A/Prof Gene Ong and Dr Peter Wong ▪ *Outstanding Faculty Award (SingHealth Excels (RiSE) Awards)*

2015

Dr Peter Wong ▪ *Singapore Public Service Awards – PS21 Star Service Award*

2015

A/Prof Chong Shu-Ling ▪ *Healthcare Humanity Award*

THE KKH CE TEAM

SENIOR DOCTORS



NURSES



“

KKH Children's Emergency will continue to be at the forefront of clinical excellence and holistic patient experience. We will be the department of choice, for both patients and healthcare professionals alike.”

RESIDENT PHYSICIANS AND LOCUMS ■ ADMINISTRATIVE TEAM



REFERENCES

1. Chay OM, Ng KC, Mahesan H, Pang NL, Ho LY, Phua KB, Tan KH. Journey of KK Women's Hospital - Collective Memories. *Proceedings of Singapore Healthcare*, 2012; 21(4): 228-37.
2. Field CE. The development of Paediatrics in Singapore. *J Singapore Paediatric Society* 1962; 3:1-7.
3. Ng KC, Lee KP. Pioneering Local Paediatric Emergency Care: KKH Children's Emergency. *SMA News, Insight*. 2016; 24-25.
4. Nadarajan GD, Chan JSE (Ed). *Emergency Medicine Singapore General Hospital Celebrating our first 70 Years*. 2018. Chapter 2 Development of Subspecialties And Interdepartmental Collaboration, (7) Paediatrics: 99-100. (<https://dem70thanniversary.files.wordpress.com/2018/10/sgh-dem-final-book-e-version.pdf>)
5. S H Lim, V Anantharaman. Emergency medicine in Singapore: past, present, and future. *Ann Emerg med*. 1999Mar;33(3): 338-43.
6. Ng KC, Ho LY, Quak SH, Tan KW, Ho NK, Phua KB. From the 20th to the 21st century: the first 100 years of paediatrics in Singapore. *SMJ* 2021. 62(1 Suppl): S2-12.
7. Paediatric Emergency Medicine (Chapter 8). *State of Emergency Medical Care*: 121-35.
8. The Straits Times © SPH Media Limited. Permission required for reproduction.
9. The New Paper © SPH Media Limited. Permission required for reproduction.
10. Ng KC. Paediatric Emergency Medicine. *SMA News* November 2005 Vol.37 (11).
11. Li M, Baker D, Ropp L J. Pediatric emergency medicine: a developing subspecialty. *Pediatrics*; 1989 Aug;84(2):336-42.
12. ME Pena, BL Synder. Pediatric emergency medicine. The history of a growing discipline. *Emerg Med Clin*. 1995; 13(2):235-53.
13. Tham LP, Lee KP. Procedural Sedation and Analgesia in Children: Perspectives from Paediatric Emergency Physicians. *Proceedings of Singapore Healthcare*. June 2010: 132-144.

KKH children's emergency



Thank you
for taking
care of the
children in
Singapore

Super - hero

doctors and

nurses

