On Recent Advancement of

BDMS Centers of Excellence

Chirotchana Suchato, MD and Chaiyos Kunanusont, MD, PhD

To commemorate the 10th year anniversary of The Bangkok Medical Journal, the Chief and faculty members of BDMS Center of Excellence (COE) institutes are proud to share recent advancements in orthopedics, neuroscience, cancer, cardiology, and trauma.

We congratulate the achievements of COE orthopedics and their systematic approach of using a registry to guide services. The BDMS Fracture Registry collects and compiles data from more than 7,500 cases a year; it shows a clear reduction of complications (surgical wound infection, deep vein thrombosis, pulmonary embolism, compartment syndrome and others) from 0.48% in 2019 to 0.33% in 2020 and an increase in the proportion of open fracture cases receiving surgery within six hours from 58.54% to 84.98% during the same period. In addition to transporting patients, the orthopedics teams often travel to perform operations on site, assisting surgeons in network hospitals, which helps to reduce suffering in patients and to increase the skills of surgeons in network hospitals. A long list of research and publications reflects the didactic leadership of the Orthopedics Chief Faculty. The team has done a lot to pave the way and certainly will contribute even more towards service excellence in orthopedics.

An intensive care unit (ICU), dedicated for neurological and neurosurgical cases in Bangkok International Hospital (BIH), stands out as a new subspecialty of Neurointensive Care. One of our neurointensivists explains in the special article, on behalf of the Neuroscience Chief Faculty, what neuroinensive care or neuro ICU is and how this will help to improve neuroscience services. In several countries, this aspect of care has proven cost-benefits, and is now available in Thailand for the improved quality of care and safety of neurological patients.

With the increasing number of gynecological cancer cases, COE Cancer Institute shares with us in a special article, the overall epidemiologic patterns of cervical, uterine and ovarian cancers. These are the three most common gynecologic cancers in Thailand Service data in 2020, reflecting a persistent need for continuous care in a new normal environment of COVID-19 pandemic. In addition to excellent services, early detection and preventive strategies, working in collaboration with various institutes, need to be in place to reduce the burden of these and other kinds of cancers.

The Chief of the Faculty of Cardiology Institute explains in his special article the present status and future direction along with the guiding principle on how to build services of high quality with high value. He refers to Sun Tzu's "Art of War" and makes an analogy to win the war with several enemies of cardiologic maneuvers. The article describes particular areas of interest that require a multi-disciplinary team approach. The author points out that BDMS Cardiology CoE has applied the Accreditation for Cardiovascular Excellence (ACE) from the American College of Cardiology into the team. With staff dedication and management support, the BDMS Cardiology CoE network is making significant improvements towards service excellence.

The pathway towards the successful operation of the BDMS Trauma Center of Excellence is set out as five elements of patient care, capacity strengthening, affiliation, networking, research and publication. Development thus far has been impressive, with the accreditation and re-accreditation of at least eight trauma centers. The number of trauma cases registered by the network rose from 7,828 in 2018, to 15,986 in 2019, and 18,303 in 2020, with a steady decrease in mortality rates among patients with TRISS of more than 0.75, from 0.28% in 2018, to 0.15% in 2019, and most recently 0.12% in 2020.

There will be more updates to follow in the next issue, as these special articles are telling us only part of the story of the development of BDMS Centers of Excellence network.

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10th Anniversary
THE BANGKOK MEDICAL JOURNAL
For Better HealthCare

BDMS Center

of Excellence in Orthopedics

Suthorn Bavonratanavech, MD
Chief of BDMS Orthopedics and Trauma Care Network

At BDMS, we continue to be aligned with the vision of our former president: we aspire to be at the forefront of orthopedics care. First and foremost, we offer the most recent, most noteworthy quality treatment available to assist our patients to live the lives exactly as they need. We defined an outstanding criteria for our designated centers of excellence within our network. Centers of Excellence (CoE) are specialized programs within BDMS that provide expertise and comprehensive orthopedic care.

1. Patient care and network

The BDMS Fracture Registry

As Thailand's largest orthopedic network of 49 hospitals, we want to lead the change in delivering good quality outcomes in Orthopedics. Accordingly, the BDMS Orthopedic Institute designed the BDMS Fracture Registry to collect quality care metrics, to quantify our successes and to identify areas of improvement and opportunity.

The BDMS Fracture registry program started in 2017, and it was fully launched in 2018 at 9 CoE hospitals, including:

Bangkok Hospital Headquarters
Samitvej Sukhumvit Hospital
Samitivej Srinakarin Hospital
Phayathai 2 Hospital
Bangkok Pattaya Hospital
Bangkok Phuket Hospital
Bangkok Chiang Mai Hospital
Bangkok Udon Hospital
Bangkok Ratchasima Hospital
Royal Phnom Penh Hospital

Bangkok Sanamchan Hospital and Bangkok Rayong Hospital joined the registry program a year later, bringing the total to 12 CoE Hospitals. From the outset, we paid particular attention to ensure that the BDMS Fracture Registry was a valuable resource from both a clinical and business perspective.

BDMS Fracture Registry Data	2019	2020
Number of orthopedic fracture cases	8,354	7,784
Complication rate (SSI, DVT, PE, Compartment Syndrome, and others)	0.48%	0.33%
Unexpected operation during hospitalization	0.09%	0.11%
Inpatient Mortality Rate	0.07%	0.09%
Patients with open fracture operated within 6 hours	58.54%	84.98%

The registry data provides us with essential information for more than 7,500 fracture cases, visits and treatments at BDMS CoE Orthopedic Hospitals each year. To improve the quality of treatment offered, the BDMS Orthopedic Institute set four key performance indicators to measure clinical outcomes. These are: complication rates; mortality rates; unexpected operations during hospitalization and; when an orthopedic surgeon has to operate on an open fracture patient within 6 hours of arrival at the hospital.

The significant complications of treating fractures are continuously monitored, including: Superficial Surgical Infection (SSI), Deep Vein Thrombosis (DVT), Pulmonary Embolism (PE), and compartment syndrome. We found that our complication rate is relatively low at just 0.48% in 2019, dropping slightly to 0.33% in 2020. The inpatient mortality rate was 0.07% in 2019 and 0.09% in 2020. The rate of unexpected operation is similarly low during hospitalization, at 0.09% and 0.11% in 2019 and 2020. In terms of waiting time for patients with an open fracture, in 2019, just over half (58.54%) of all patients underwent surgery within 6 hours. In 2020, the percentage had significantly improved, reaching 84.98% of patients.

Geriatric Hip Fracture Care

Older adults are the fastest-growing segment of Thailand's population. Thus, an aging society results in many hip fractures in elderly patients. This is associated with significant morbidity, mortality, loss of independence, and financial burden. Bangkok Hospital Headquarters (BHQ) established and implemented the Geriatric Hip Fracture Co-Management Pathway (GFC) in 2013. After seven years of implementation, 411 hip fractures were treated, with outstanding clinical results. During hospitalization, the mortality rate is 0.73%, and the mortality rate within 28 days after discharge is zero. The mean average

length of stay (LOS) of the previous year was six days. BHQ applied to the International Osteoporosis Foundation for Capture the Fracture Best Practice recognition and it was awarded the bronze medal in 2019. BHQ is now stepping forward to expand the clinical pathway to incorporate all fracture sites in elderly patients to promote healthier bones and to prevent secondary fractures in senior citizens.

In 2018, the ongoing effort to improve the quality of fracture treatment saw the adoption of the GFC in more CoE Orthopedic Hospitals. In 2020, the total number of cases recruited to the pathway in 11 CoE Hospitals was 194 cases. 87.11% of patients were treated surgically, with 73.11% operated on within 48 hours of admission. The average LOS was 7.01 days, and only 0.51% mortality rate in 28 days post-discharge.

Pelvic Acteabulum Mobile Team

Pelvic and acetabulum fracture is a challenging operation to deliver successfully. Most pelvic and acetabular fractures are caused by a high-energy event, such as a car crash. Consequently, patients will often have additional orthopedic manifestations such as lower extremity fracture, plus systemic injuries such as head injury, chest injury, and abdominal injury that require immediate treatment. To achieve the best clinical result requires an experienced surgeon working closely with a comprehensive multidisciplinary team. Surgical clinical outcomes in pelvic and acetabulum fracture correlate with the quality of articular reduction. Thus, for the highly skilled surgical team, access to proper implants and surgical instruments is crucial.

To overcome difficulties in providing experienced surgeons and investing in high-quality surgical tools to all network hospitals, BDMS started the Pelvic Acetabulum Mobile Team Project in March 2017. The team comprises five expert orthopedic surgeons specialized in pelvic and acetabulum fracture management. Along with the team, the surgical instrument box set is provided to make it possible to respond quickly and to impose a minimum requirement on transportation and logistics resources. The expert surgeons are scheduled by day (24 hours shift). They are continuously communicating and giving instructions to the attending orthopedic surgeon of the network hospital on how best to manage the injured patient. If the attending surgeon cannot operate on the patient, the expert surgeon will go to that hospital either by car or by air with the surgical instrument box set and the necessary implants to perform a surgery. However, in cases where the local hospital facilities are not adequate or lack an experienced multidisciplinary team to provide appropriate care to the patient, the patient will be transferred to a hospital with a higher trauma care level. The mobile team will operate with the surgeon at that hospital. Since March 2017, the Pelvic Mobile Team has received 386 consultations and operated on 189 cases across the network hospitals, with a very excellent outcome. The mortality rate is zero, and there is a minimal complication rate

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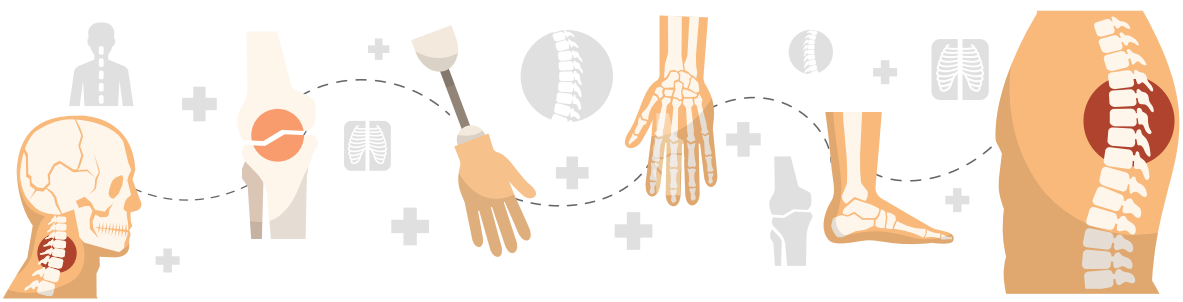
Rib fracture mobile team

Surgical rib fixation (SRF) is gradually becoming an accepted treatment for multiple rib fractures. Studies have reported that rib fixation can benefit some patients with flail chest to reduce their ICU stay and to improve outcomes. However, SRF requires unique training and other specialized surgical implants. The rib fracture mobile team has adapted the same concept as the Pelvic Acetabulum Mobile Team. Three skilled surgeons have been assigned to provide advice and to serve all network hospitals in BDMS.

2. Academic and Training

Education and training remain our core values at the BDMS Orthopedic Institute. We provide education and training in orthopedics on a regular basis for both physicians and nurses. The cadaveric courses take place frequently in order to increase surgical skills for our orthopedic surgeons. These include the Minimally Invasive Plate Osteosynthesis workshop and the Pelvic and acetabulum cadaveric practice. Most courses are conducted in English to increase access to both Thai and other Asian Orthopedic surgeons. The teaching for orthopedic nurses is also organized with regularity. We arrange courses annually for AO Fracture Management for Operating Room Personnel. Moreover, the institute organized a two-month Orthopedic Nursing Course in 2018 to help an orthopedic nurse coordinator who worked in the network hospital to gain more expertise and knowledge.

The BDMS Orthopedic Teleconference is another academic activity arranged monthly in CoE hospitals to share information and advanced knowledge. The facility provides interesting subjects hosted weekly by each COE Hospital in turn to share educational information and best practice throughout the BDMS network.



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In BHQ, we provide a one-year fellowship training program in four subspecialties: Sports Medicine, Orthopedic Trauma, Hip and Knee Reconstruction, and Spine Surgery. During the past eight years, orthopedic surgeons at BHQ have been mentoring and instructing 4 to 10 orthopedic fellows per year from hospitals around the country. In order to graduate, fellows must conduct research and must publish their work in journals or present at a national or international conference. Most of the graduates are now working in the network hospitals. Some of them are working in other government and private hospitals all over the country. What is more, in 2019, a Nepali surgeon was the first foreigner to graduate the Orthopedic Trauma Fellowship at BHQ.

Through the partnership with Johnson and Johnson and DePuy Synthes, BHQ surgeons also provide educational lectures and practical instructor training for orthopedic surgeons both locally and internationally on various courses. These include: Pelvic and Acetabulum Fracture Class, Direct Anterior Approach for Total Hip Arthroplasty, Hand and Wrist Course.

3. Research and Publication

Healthcare research is one of the critical success factors to provide essential information about diseases and treatment outcomes. The institute strongly encourages all CoE Hospitals to conduct health research to solve their orthopedic related problems and to ask and explore theoretical questions.

We'd like to highlight the following research that has been carried out and published recently by physicians in the CoE Orthopedic Hospitals.

Phayathai 2 Hospital

- Can urinary CTX-II be a biomarker for knee osteoarthritis? 2018/ Piti Arunrukthavon, MD.
- Effect of transdermal micro needle patch with NSAID in osteoarthritis knee, 2019 / M. Pisuttanawat, et al.

Bangkok Phuket Hospital

- Isolated Avulsion of the Biceps Femoris Insertion: A Case Report and Literature Review, Bangkok Medical Journal, Feb 2020 / Narong Budhraja, MD. Nathawoot Sawasdee, MD.
- Initial Experience of Office-based, Orthopaedic Surgeon Operated Ultrasonography of the Shoulder, Bangkok Medical Journal, Sep 2020/ Narong Budhraja, MD. Nathawoot Sawasdee, MD.

Bangkok Hospital Headquarters

- Prosthesis selection and Rationale for use in Revision Total Knee Replacement Knee Arthroplasty: New & Future Directions, Springer 2020 / Phonthakorn Panichkul, MD.
- Minimum 15-year Results of a Dual-Offset Uncemented Femoral Stem in Total Hip Arthroplasty Journal of Arthroplasty 2019 / Panichkul P, McCalden RH, MacDonald SJ, Howard JL, Naudie DD.
- Comparative Outcomes Between Collar Versus Collarless of Direct Anterio Approach Total Hip Arthroplasty: Systematic Review And Indirect Meta-Analysis European J Orthopedic Surgery & Traumatology 2019 / Panichkul P, Bavonratanavech S, Arirachakaran A, Kongtharvonskul J.
- Profunda femoris artery injury caused by lesser trochanter fragment in intertrochanteric fracture: A case report. Trauma Case Rep. 2018;13:14-7. Mayurasakorn C, Phiphobmongkol V, Sridermma W, Bavonratanavech S.

- Hindfoot alignment of adult-acquired flatfoot deformity: A comparison of clinical assessment and weight-bearing cone beam CT examinations. Foot Ankle Surg. 2019 Dec;25(6):790-797. / de Cesar Netto C, Shakoor D, Roberts L, Chinanuvathana A, Mousavian A, Lintz F, Schon LC, Demehri S; Weight-Bearing CT International Study Group.
- Metal artifact reduction MRI for total ankle replacement sagittal balance evaluation. Foot Ankle Surg. 2019 Dec;25(6):739-747. de Cesar Netto C, Schon LC, da Fonseca LF, Chinanuvathana A, Stern SE, Fritz J.
- Outcomes of flexor digitorum longus (FDL) tendon transfer in the treatment of Achilles tendon disorders. Foot Ankle Surg. 2019 Jun;25(3):303-309. de Cesar Netto C, Chinanuvathana A, Fonseca LFD, Dein EJ, Tan EW, Schon LC.
- Rib fixation with osteosynthesis plates in Bangkok hospital headquarter: case reports. Pongtorn Sirithianchai, MD.

4. Affiliation

CoE Orthopedic Institute collaborates with the Hannover Medical Centre, Germany, and the Missouri Orthopedic Institute, USA. The collaboration had led to demonstrable and significant progress in strengthening the proficiency and competence of our medical team. Several medical staff and nurses from various network hospitals had the opportunity to study and visit both institutes and to bring back knowledge and skills to improve BDMS orthopedics and trauma care. Over the past few years, staff from both institutes have joined the BDMS Academic Annual Congress to exchange knowledge and to strengthen our relationship.

Commitment to Continuous Improvement

Following extensive preparation throughout 2020, BDMS CoE Orthopedic will be tracking patient outcomes to deliver higher-value care. To provide the highest-value orthopedics

treatment, we must track how well our care is given. We are doing that now through our Orthopedic Patient-Reported Outcome (OPRO) program. All CoE Hospitals have been collecting information on patients through OPRO since 2020, but it has not been utilized consistently in care delivery. At appropriate intervals, all fracture patients treated surgically and patients who undergo hip and knee arthroplasty will be given a disease-specific health questionnaire that asks about physical function, pain, and overall quality of life. These questionnaires assess how much patients have progressed since their treatment began with us. Eventually, this will help us to monitor how well patients do over time. Moreover, we launched the BDMS Hip and Knee Registry in mid-January 2021. With the registry data, we hope to benchmark our treatment outcome with the national database and identify improvement opportunities.

The BDMS Orthopedic Institute will additionally introduce the Pre-Op Discussion Project to all network hospitals. This project aims to promote patient safety, decrease complications and adverse events in orthopedic surgical cases. The project will be applying Microsoft Team application and data collection forms to work as a team-based discussion between the orthopedic surgeon and expert panelists before surgery. A clear plan of optimal surgical treatment for the individual patient, particularly in complex orthopedics condition, will be determined from this discussion. Before the operation, the attending surgeon will also have an opportunity to evaluate their competency, correct application of orthopedic implants, and surgical instruments' readiness.

To achieve national leadership in musculoskeletal care, BDMS Orthopedic Institute continues to advance through academic collaborations, information systems, and care innovations. Finally, we want to express our gratitude to the president and the board members, the CEOs of each group, hospital directors, orthopedic surgeons, nurses, and all medical personnel for the tremendous support. We appreciate their dedication to achieving our shared mission to provide excellence in orthopedics and to deliver the best possible service to our patients.

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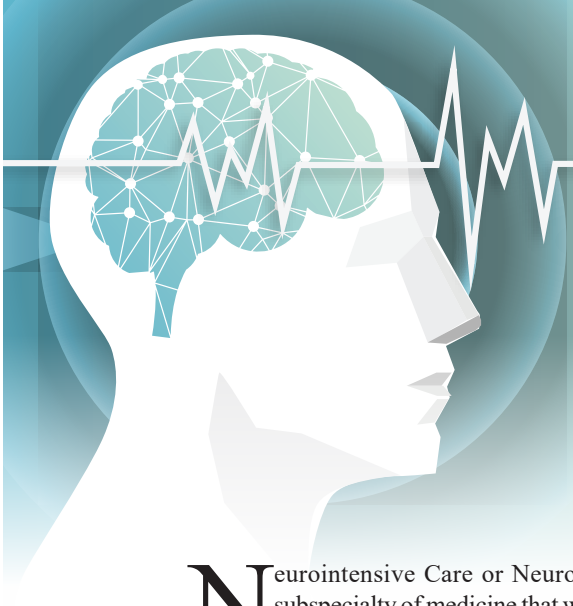

What is Neurointenstive Care

and how would it help to improve Neurosciences services?

Doungporn Ruthirago, MD and Pavis Laengvejkal, MD

Neurointensive Care or Neurocritical Care is a new subspecialty of medicine that was developed at the end of the 2000s. Its aim is to improve treatment of complicated, life-threatening diseases of the brain, spinal cord and peripheral nervous system. Neurointensivists are physicians who are trained and certified in the care of critically ill patients with neurological/neurosurgical diseases and conditions. Neurointensive Care Unit (or Neuro ICU) is an ideal place to provide care for these special patients as it combines specialists, monitoring technology and innovative treatments – all in one place.[1]

Several types of neurological diseases require ICU-level care. Acute ischemic stroke and intracerebral hemorrhage are the two most common conditions, followed by aneurysmal subarachnoid hemorrhage, traumatic brain injury (TBI), status epilepticus, cerebral edema, increased intracranial pressure, coma and altered mental status. For other neurological illnesses, once the patients are too unstable to be safely managed in a regular ward, they may require treatment in the ICU, such as neuroinfectious diseases, autoimmune or paraneoplastic encephalitis, spinal cord injury, transverse myelitis, neuromuscular weakness (Guillain-Barré syndrome, myasthenia gravis, Amyotrophic Lateral Sclerosis). Postoperative neurosurgical patients that require close monitoring are also another patient population that would benefit from Neuro ICU.

The patients in Neuro ICU receive not only standard treatments but also special monitoring of intracranial pressure, cerebral perfusion pressure/cerebral blood flow, continuous electroencephalography (EEG), and in some advanced centers, brain tissue oxygenation and cerebral microdialysis. These advanced neuromonitoring technologies allow neurointensivists to promptly detect early signs of secondary brain injury, and treatments can be adjusted to minimize detrimental impact.

The Neurointensive Care Unit at Bangkok International Hospital (BIH) uses Smart ICU design, a system that implements technology from the field of medical informatics. The IntelliSpace Critical Care and Anesthesia (ICCA) system collects clinical data of each patient, then precisely evaluates and displays a large amount of information in real-time. All the vital signs, oxygenation, fluid intake & output, cardiac telemetry, intracranial pressure, EEG, and if required, intraoperative neurophysiological monitoring (IONM), are recorded and ready to be used to help select the best treatment for critically ill neurological patients 24-hour a day, both in the Neuro ICU and to support telemedicine services with our network hospitals. The concepts of real-time data collection, integration of information, and action-reaction allow physicians and nurses to follow the treatment outcomes and adjust the treatment for each patient in a timely manner as we emphasize the idea of precision and personalized medicine.

Several researches found favorable influences on outcomes of critically ill neurological patients who received care from Neurointensivist in Neuro ICU (when compared to care provided in general ICU). In these studies, patients with stroke, TBI, subarachnoid hemorrhage and neurosurgical patients had lower mortality, shorter length of stay and better functional outcome.[2-5] The cost of care of these patients in Neuro ICU was also lower than a National Benchmark of USA in one study.[6]

While Neurocritical Care has already proven itself to be an important subspecialty in several countries in the Western world, the challenges of the creation of a new branch of medicine and a new specialized ICU in developing countries are still ongoing. Bangkok International Hospital's Critical Care team, in collaboration with CoE Neurosciences services, is proudly introducing the first Neurointensive Care Unit in Thailand that is staffed by fully trained neurointensivists and highly trained Neuro ICU nurses. **Our goal is to make our ICU the place where innovation meets the traditional values of patient safety and quality of care.**

References

1. Bithal PK. Neurointensive Care Unit and neurointensivist: Do we need them? *J Neuroanaesthesiol Crit Care* 2016;3:1-2.
2. Josephson SA, Douglas VC, Lawton MT, English JD, Smith WS, Ko NU. Improvement in Intensive Care Unit outcomes in patients with subarachnoid hemorrhage after initiation of neurointensivist co-management. *J Neurosurg* 2010;112:626-30.
3. Knopf L, Staff I, Gomes J, McCullough L. Impact of a neurointensivist on outcomes in critically ill stroke patients. *Neurocrit Care* 2012;16:63-71.
4. Bleck TP. The impact of specialized neurocritical care. *J Neurosurg* 2006;104:709-10.
5. Kramer AH, Zygun DA. Do Neurocritical Care Units save lives? Measuring the impact of specialized ICUs. *Neurocrit Care* 2011;14:329-33.
6. Mirski MA, Chang CW, Cowan R. Impact of a Neuroscience Intensive Care Unit on neurosurgical patient outcomes and cost of care: Evidence-based support for an intensivist-directed specialty ICU model of care. *J Neurosurg Anesthesiol* 2001;13:83-92.

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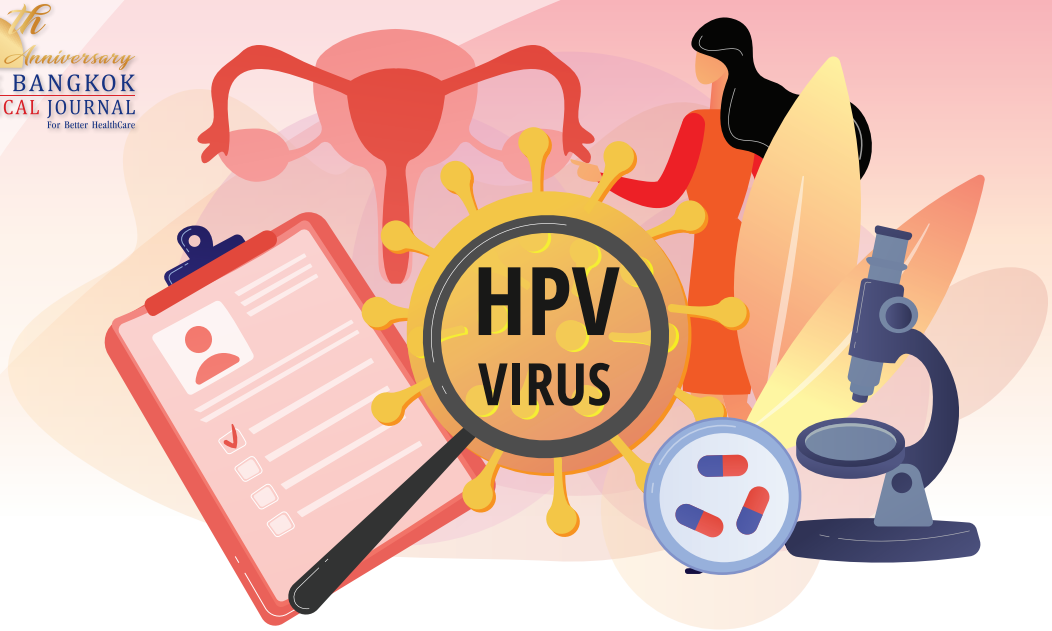

Gynecologic Cancer Introduction to 2021

Duangmani Thanapprapasr, MD
Assistant Professor of Gynecologic Oncology

From the beginning of the Pandemic Outbreak in the end of 2019, the Coronavirus has disrupted the lives of everyday humans around the globe. Healthcare and its researching counterpart are becoming the greatest industries in today's world. Parallel to the viral outbreak, cancer is still the most lethal disease to threaten human health, and still requires continuous collaborations with experts for controlling strategies.

In 2020, the total Thai population was 69,799,978, with a total of 35,833,918 females. There were 190,636 people, both male and female, who were newly diagnosed with cancer, which resulted in 124,866 deaths. 97,211 of those new cases were women who were diagnosed with cancer. Unfortunately, 56,779 Thai women, more than half of the total, died from cancer in 2020. The age-standardised incidence rate of 159 women per 100,000 people was lower when compared to a group of men (173.1) from a population of 100,000 people.[1]

The human papilloma virus (HPV) has deteriorated health with similar extreme lethality to the Coronavirus (COVID-19). The discovery of HPV by Professor Harald zur Hausen, who received the Prince Mahidol Award in 2005 and the Nobel Prize in Physiology or Medicine in 2008, explained the cause of cervical cancer,[2] where Oncogenic HPV is responsible for almost all cervical, anogenital and oropharyngeal cancers worldwide[3] (Figure 1). Medical technology has been applied to develop an HPV vaccine that could prevent women from cervical cancer itself. Cervical cancer incidences and mortalities have already had a crucial impact on the vulnerability of today's women, but from the professor's discovery, it is now much easier to prevent the cancer outright. These incidences are expected to decrease gradually.

Cervical cancer has become the third most common cancer in Thailand. 9,158 patients (9.4% of all female's cancer diagnosis) were diagnosed in 2020. In comparison, there were 6,884 COVID-19 confirmed patients throughout 2020. Unfortunately, 4,705 women died due to cervical cancer during the COVID-19 viral outbreak, with 61 deaths reported from the Thai Public Health Administration, Ministry of Health. Breast cancer is the most prevalent and common of all female cancers. As of today, there were already 22,158 new cases (22.8% of all females diagnosed), followed by colorectal cancer (10,443 new cases, 10.7%), cervical cancer, liver cancer (9,125 new cases, 9.4%), and lung cancer (8,295 new cases, 8.5%).[1]

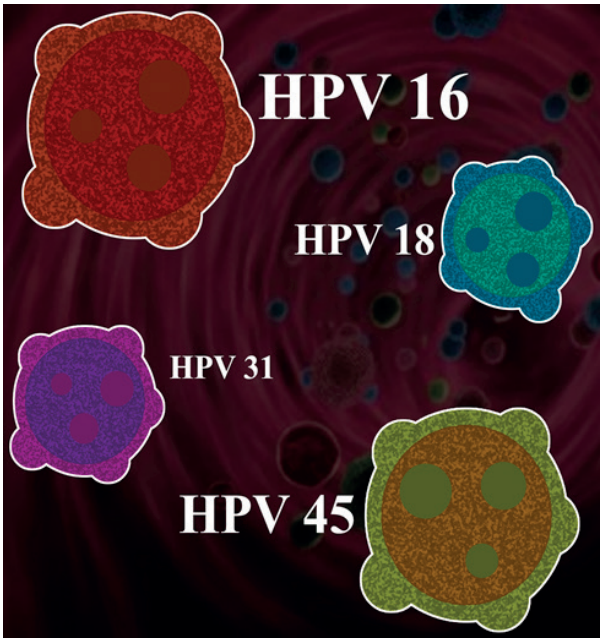

Figure 1: Human Papilloma virus high-risk types 16, 18, 31, 45 are common oncogenic viruses which caused cervical cancer.

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Among gynecologic cancers, uterine cancer and ovarian cancer were the second and the third most common. Uterine cancer has been reported in 4,524 new cases (2.4% of all females diagnosed with cancer), which caused 1,382 deaths (1.1%). Ovarian cancer has the highest mortality to case ratio of 0.65 (2,941 deaths), which were reported along with 4,475 new cases diagnosed in 2020 afterwards.[1]

The Wattanosoth Cancer Hospital healthcare team took stock of the situation, and prioritised the improvement of gynecological cancer care. Patients who attended the clinic received medical counselling, investigations, diagnosis, surgical treatments, and early detection services. We have been collecting and preliminarily reporting cervical cancer prevention statistics since before 2020. From January 2019 to October 2020, 37,059 liquid-based cervical cytology were all performed at the Bangkok Headquarters services.

Many foreign patients around the globe have visited our hospital and attended to our gynecological services. Thirty-six percent of our patients were fly-in and/or residents including North American, European, African, Australian and Oceania, and Asian, as shown in Figure 2. The majority of the patients were between 30-50 years of age (60.3%) (Figure 3).

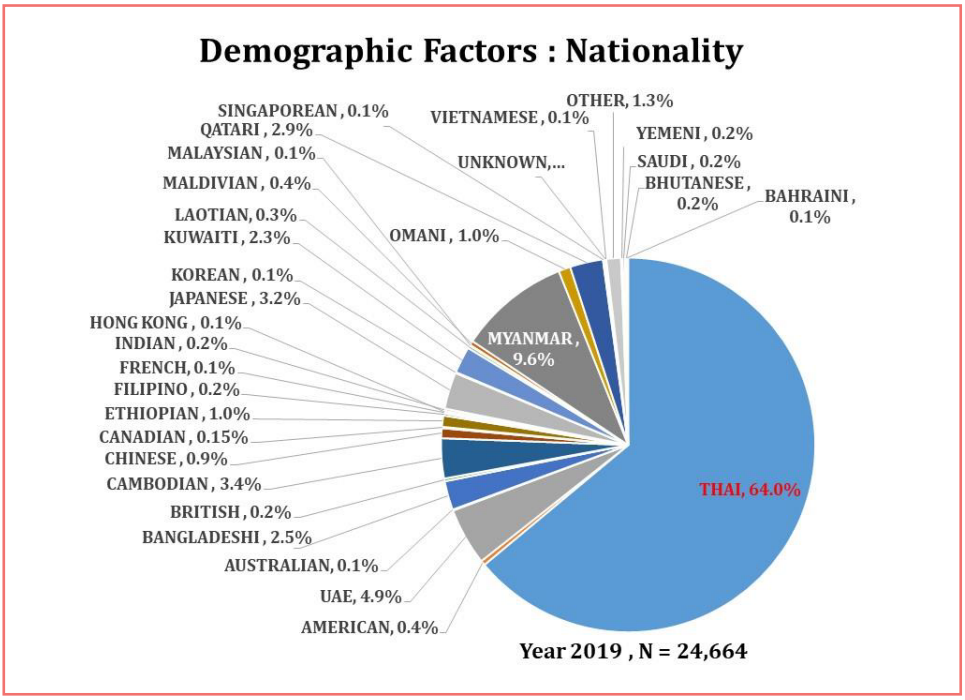

Figure 2: Number of foreign patients who attended to our gynecological services in 2019.

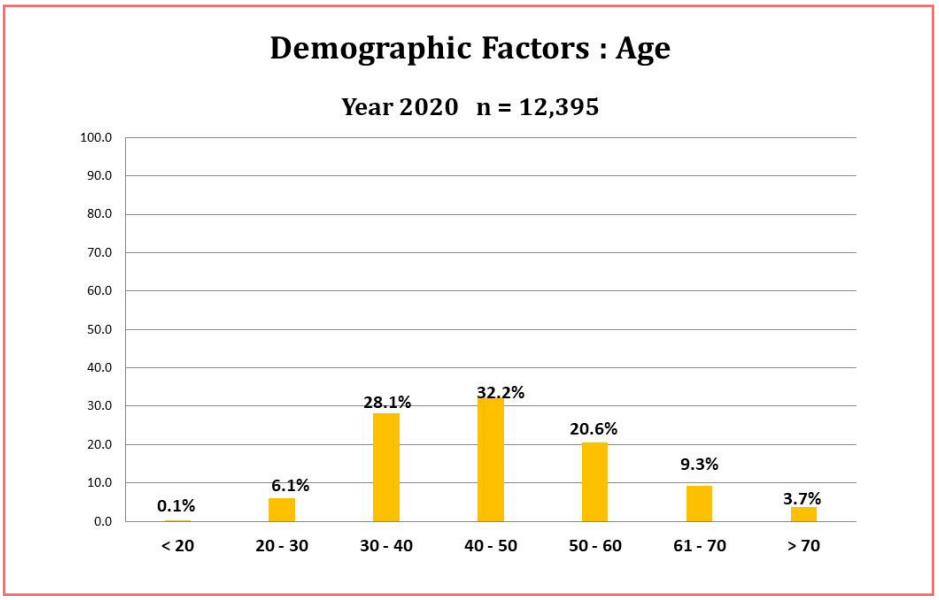

Figure 3: Age of the patients in 2020.

The 12,395 tests performed in 2020 resulted in 315 abnormal cells (2.54%) (Figure 4). All of them have been directly notified by their physicians immediately by either phone or email for upcoming plans of their treatments. Two hundred and eleven patients have decided to received colposcopy with biopsy at the clinic. The pathological results are shown in Figure 5. We have detected the patients who have squamous cells carcinoma (2.4%), carcinoma in situ (0.9%) and moderate to severe cervical dysplasia (20.95%).

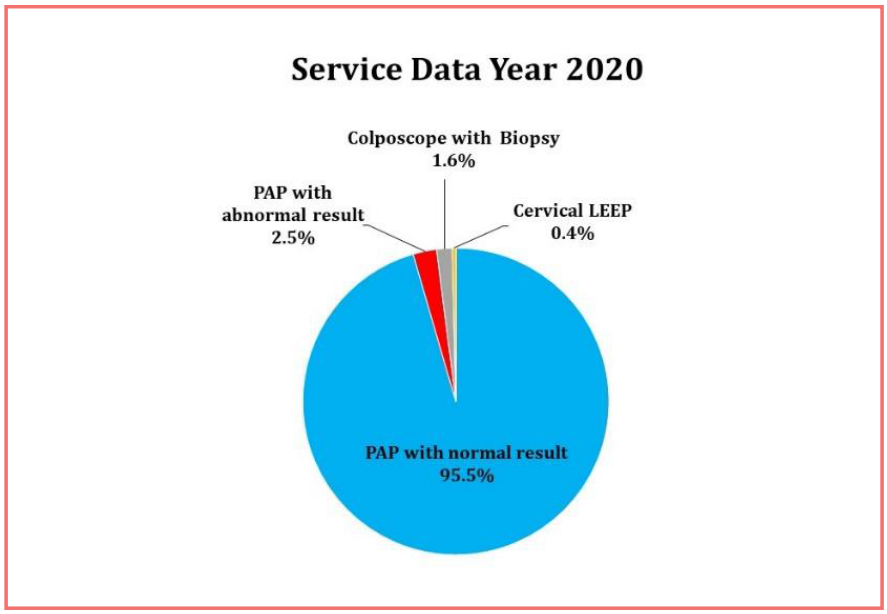

Figure 4: Percentage of gynecological early detection services.

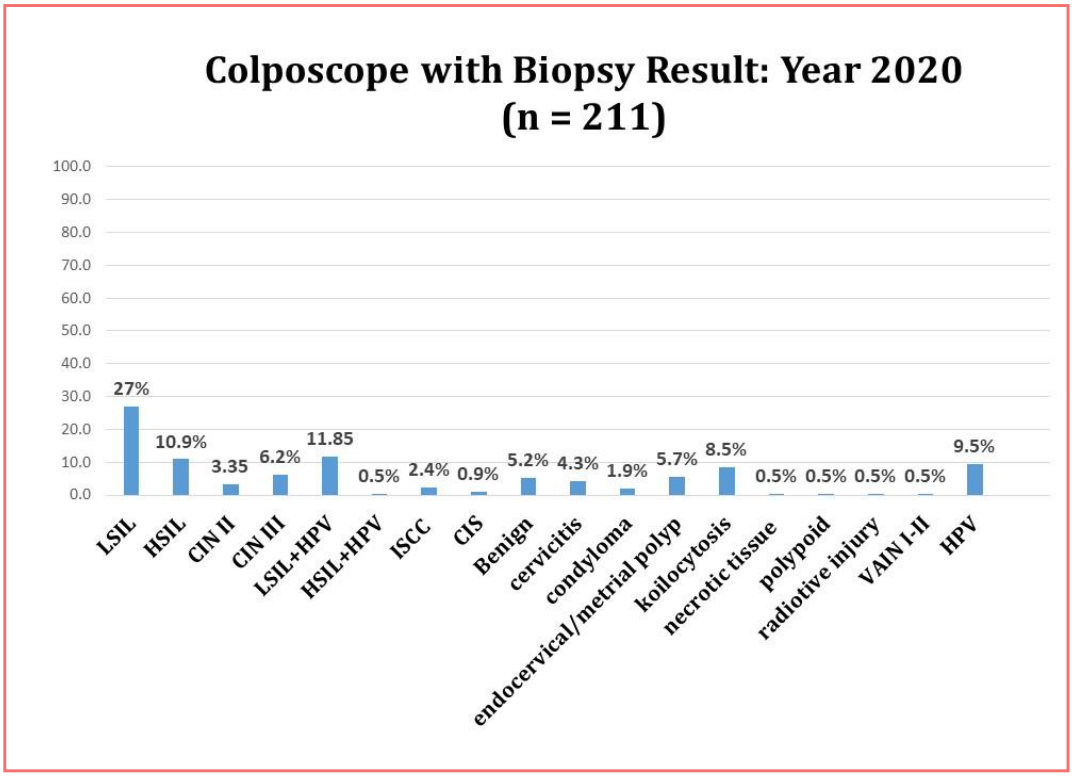

Figure 5: Pathological results of Colposcopy with biopsy in 2020.

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Loop Electrosurgical Excision Procedures (LEEP) were performed in an operation room with an anesthesiologist consult, as outpatient or inpatient, depending on their medical indications. Uneventful procedures of 49 patients were performed after informed consent was given. Most of them had moderate to severe cervical dysplasia (73.4%) (Figure 6). Two patients (4.1%) had squamous cell carcinoma of the cervix. All of them were evaluated by gynecologic oncologists and registered at the Tumor Conference for treatment.

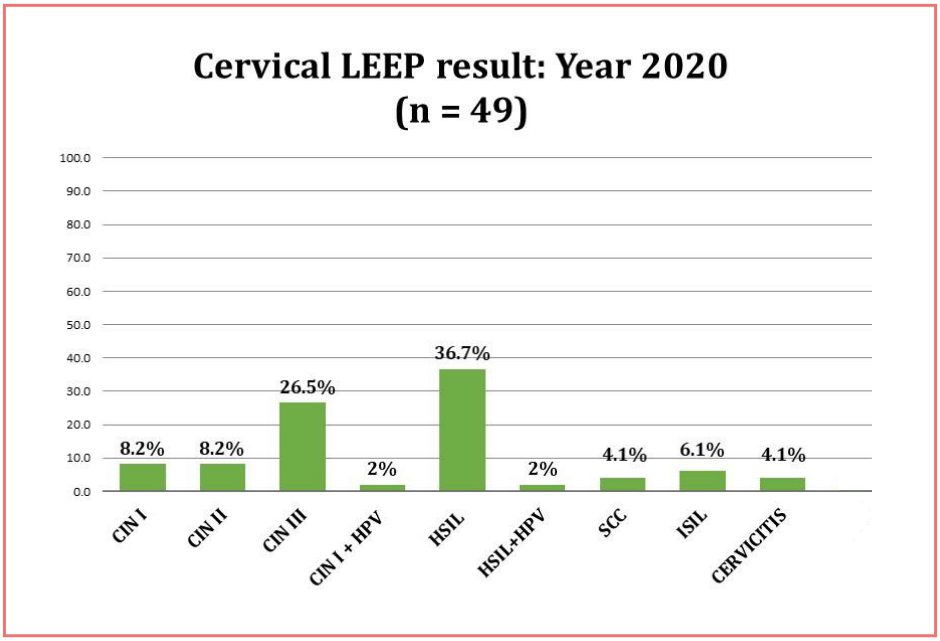

Figure 6: Pathological results of cervical LEEP from January to October 2020.

In conclusions, during the COVID-19 outbreak, cancer and its negative effects should still be considered as an even more significant health issue. Early detection and prevention strategies with medical technology and collaborative works are all required during this pandemic crisis. Further cancer investigations and treatment data analysis would be beneficial to future research and statistics.

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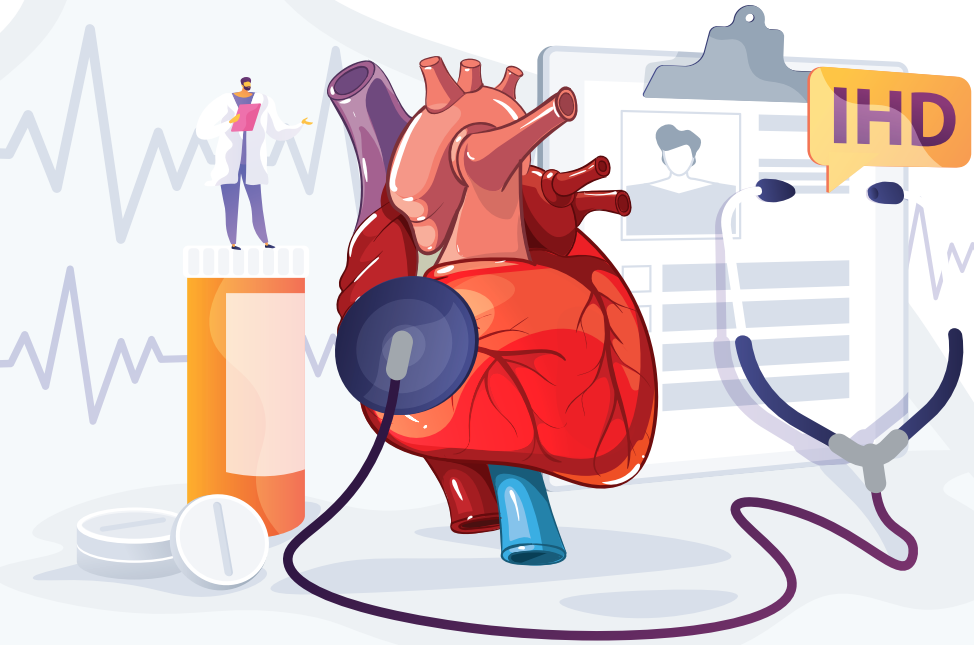
References

1. World Health Organization, International Agency for Research on Cancer. Cancer Today.(Accessed at January 10, 2021, at https://gco.iarc.fr/today/data/factsheets/populations/764-thailand-fact-sheets).
2. Wikipedia The Free Encyclopedia. Harald Zur Hausen. (Accessed at January 10, 2021, at https://en.wikipedia.org/wiki/Harald_zur_Hausen#cite_note-ScienceInsider-8).
3. de Martel C, Plummer M, Vignat J, et al. Worldwide burden of cancer attributable to HPV by site, country and HPV type. *Int J Cancer* 2017;141(4):664-70. doi: 10.1002/ijc.30716.



10th Anniversary
BDMS THE BANGKOK MEDICAL JOURNAL
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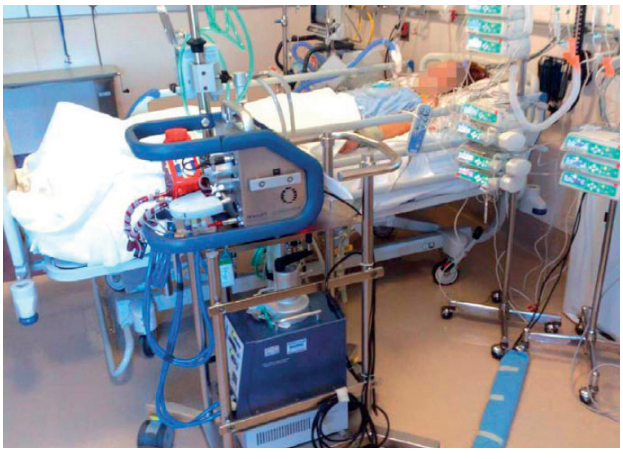
Present and Future Center of Excellence (HEART)

Damras Tresukosol, MD, FSCAI, FAPSI
Chief Faculty of CoE Cardiovascular Institute

There are 7 heart centers designated as Centers of Excellence (CoE) and there have been changes to the scope of CoE among all BDMS centers. To my knowledge, CoE's conceptual framework has been strengthened across the board, and now all 7 CoEs should understand and follow the excellence pathway. The strategic objectives, the strategy and the action plan have been implemented at all 7 CoEs. The strategic objectives are Management Excellence and Sustainability, Innovative Healthcare and Service Excellence. The definition of CoE has been widely discussed, both top-down and bottom-up. We describe CoE Heart as a group of cardiologists, cardiac surgeons and supportive staff members leading the Heart Center comprised of different structures in a specific focus area towards pre-determined goals. The specific focus area is the catheter-based intervention which requires the greatest resources, with a high expectation of greater income.

The CoE structure aids in improving expertise in this area, to make the most of its resources to help business improve. CoE must become a successful enterprise, reach goals efficiently, set pragmatic principles guiding the management team, improve efficiency, business and set up the group network. A team of skilled knowledge workers has to be put in place, capable of providing best practice around the particular area of interest, catheter based coronary intervention. We encourage working closely with the functional support area of interest, such as non-invasive team of treadmill stress test, echocardiography (2D- or 3D-), stress-echocardiography, the high performance of coronary imaging study as computerized tomography of coronary artery (CTA), magnetic resonance imaging (MRI) for heart and coronary artery evaluation pior to the catheter coronary intervention. This is the value offered to provide best practice to our patients.

However, there are incoming litigations, lawsuits that should be prevented or attenuated through a better structure reformation. We applied Sun Tzu's "Art of War", simply quoted as "Know your enemies, know yourself, know the terrain, you will win a hundred battles". Our enemies are the practice of heart disease treatment as catheter-based intervention; the difficulty of maneuvering the devices, the complexity of the coronary disease itself, the status of our resources to combat such a complex case and finally our competency and results of the previous treated cases. These are the apples of the strategy that help to establish more mature CoE, resulting in high quality and high value service excellence. We are the only hospital group to adopt the "Accreditation for Cardiovascular



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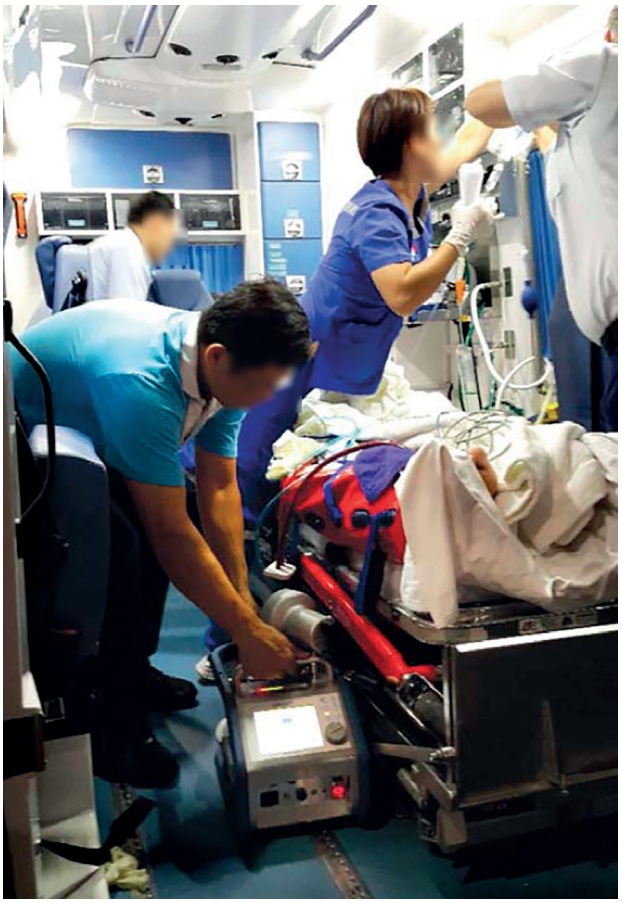
Excellence (ACE), quality in invasive cardiovascular care" from the American College of Cardiology (ACC), into our management team. The ACE Standards for Catheterization Laboratory Accreditation has been applied to all CoE heart management teams and interventionists who participate in the programme, and we state many key performance indicators and performance indicators comparable with top US hospitals for ranking. This is the way we want to make our beloved patients know, trust, and cherish our services. Since May 2020, we have encouraged all CoE Heart members to participate in our designed BDMS Cath-PCI Registry, applied from the American National cardiovascular data registry (NCDR), to link, share and learn from each other across multiple dimensions during and after catheter-based coronary intervention.

Our mission is to provide high quality and high value in the management of heart disease. The quality of cardiovascular care is the degree of health services provided to individuals and populations. The likelihood of achieving desired health outcomes rises when we consistently adhere to best practice and guidelines. The value must meet the expectation of patients, funders and regulators. As a result, high quality care becomes an integral part of the value and the adoption of a safe, effective and efficient catheter-based coronary intervention. The final value is determined by the health outcome per Thai baht spent.

In addition to the catheter-based coronary intervention, we perform off-pump coronary artery bypass surgery, mitral valve repair surgery, new innovations in very specific treatments, despite these being lower in number such as transcatheter aortic valve replacement, percutaneous mitral valve repair (MitraClip), endovascular aortic graft replacement, open aortic artery repair, and extracorporeal membrane oxygenation (ECMO) and the mobile transport ECMO. With these frameworks, we will continue to expand the full vision and conceptualized framework to other focus areas I have mentioned.



Finally, the two-year journey to build a unified CoE Heart has been of benefit to our management teams, and to our patients and funders who will see an improvement in quality and value, in all dimensions, backed by the strong support of the executive members of Bangkok Dusit Medical Services (BDMS). I foresee that the CoE Heart will expand to include several new heart centers in the years to come.

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Trauma Network, BDMS

Suthorn Bavonratanavech, MD
Chief of BDMS Orthopedics and Trauma Care Network

The vision of our former president, Dr. Prasert Prasarttong-Osoth, MD, considered that BDMS, as a medical profession establishment, should take more responsibility for the treatment of Thai citizens from road traffic accidents in order to reduce both death and disability from injury. Road traffic accidents lead to high mortality and morbidity rates, especially in young age groups. It is a national health problem, one of the causes of most death among Thais. A good trauma system and high standard trauma centers are powerful factors to save lives in the event of an accident.

According to the World Health Organization (WHO), road traffic accidents kill more than 1.25 million people each year. In Thailand, according to 2019 statistics, there were 14,947 deaths from road traffic accidents alone, which is 40 persons per day, 917,804 injured cases. In response to the urgent need for effective trauma care, Bangkok Dusit Medical Services Public Company Limited (BDMS) developed a Center of Excellence for Trauma and Orthopedics as a pilot project in September 2015. Guided by a strong collaboration network of many leading medical institutions around the world, the quality of our facilities, services and practices has risen higher yet, to become a Center of Excellence Network (CoE). Examples of such collaboration are with the Hannover Medical School (MHH), a pioneer of the Trauma system in Germany that started 50 years ago. MHH has given generous support to train and educate our team leader and others, see Table 1 below:

BDMS Affiliation in Trauma Care

1.Hannover Medical School, Germany
2.Trauma Committee, Royal College of Surgeons of Thailand (ATLS)
3.Faculty of Medicine, Mahidol University
4.Faculty of Medicine, Prince of Songkhla University
5.Faculty of Medicine, Chiangmai University
6.Faculty of Medicine, Khonkaen University

To date, 11 Centers of Excellence in Trauma care have been developed in different regions of the country. The system has integrated pre-hospital and facility-based trauma care systems to promptly respond to emergency cases. It has been a great challenge to set up organized trauma centers with well trained staff and well-equipped facilities to overcome many obstacles and difficulties in our hospital network. At first, it is important to define the meaning of a Center of Excellence to all executive and medical personnel. There are 5 pillars that are the main focus, which should be measurable and sustainable.

1. **Patient Care:** The CoE must upgrade high-level medical services to international standards in the areas of Center of Excellence, such as Trauma, Orthopedic, Cardiovascular, Cancer and others.
2. **Academic:** All treatment has to be of a gold standard, with academic background, supported by evidence to ensure every patient receives appropriate treatment.
3. **Research and Publication:** We need to conduct research for clinical studies and publication to show the outcome of our treatment.
4. **Affiliation:** BDMS continues to collaborate with leading medical institutions within the country and around the world to raise the quality of its facilities, services and practices, to accelerate achieving our goal.
5. **Network within BDMS:** There are 50 hospitals with differences in staff competency and level of care. However, there is a system for teleconsultation and a mobile surgical team mobilized upon request to support the treatment of patients.

In order to fulfil the mission, it is important to identify the key successful measures as follows;

1. A clear mandate from the top executive to all CEO of different groups in BDMS for full support to the project.
2. A strong commitment from all levels of personnel to support this project.

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3. Change in attitude of medical staffs to transform our private hospital to become an academic center equivalent to university hospitals.
4. Provide education and training programs in order to become a highly efficient multidisciplinary team in Trauma.
5. Develop a good registry system to regularly monitor KPIs for continuous improvement.

In the first phase, 11 major hospitals from each group were categorized as a level 1 regional trauma center to serve as a hub for each geographical zone around the country. Each regional trauma center hospitals will work and support the other BDMS hospitals in the same zone. All 11 CoE hospitals in Trauma have been designated to upgrade to become fully equipped with the facilities of a Trauma Center and to be able to give definitive care with full capacity. Other remaining hospitals have been assigned a different trauma center level according to the facilities and competencies of the staff. In case the patient requires definitive emergency care that is not possible in a particular hospital, the patient needs to be quickly transferred to a hospital that can provide proper treatment. All the hospitals have been grouped together according to geographic location to provide the most effective care of trauma system in pre-hospital, at the hospital and transfers when required, to a higher level of trauma center.

During the past 5 years, there have been several training courses for surgeons, nurses, emergency physician and other medical personnel in the team. Each hospital sent their personnel to attend all the required courses, depending on the priorities.

Table 2: Academic and Training

Training	2018 (Persons)	2019 (Persons)	2020 (Persons)
ATLS for Physician	4 courses	4 courses	1 course
Role & Responsibility of TMD and Trauma risk management	-	1 course	-
Role & Responsibility of BDMS TNC	-	1 course	
TDTR; Instructor course	-	1 course	-
TDTR; Regular course	-	1 course	2 courses
Tele training; Trauma course for nurse	-	-	1 course
Tele training; Intensive course for BDMS TNC	-	-	1 course
Trauma Congress	1	-	-

Research and Publication

The BDMS trauma center teams are required to focus on conducting research and publication in many areas of expertise to ensure optimal academic skills and proficiency are always updated. The following is an evidence-based article publication that was conducted into BDMS Trauma Care by our trauma team.

"Establishing a trauma registry: Quality assurance for trauma care" 4th International Conference and Expo on Surgery and Transplantation. July 22-23, 2019, Brussels, Belgium Krongdai U., Wittaya C., Trin C, and Suthorn B.

The structure of the emergency room was upgraded to international standards, with a unification of working processes and standards of protocol, such as establishing algorithms for different trauma and emergency conditions. All these algorithms have been approved by all hospitals and can be used at different hospital levels. In case the facility and staff competency cannot provide definitive care, the patient will be transferred to the specific higher level of hospital based on their location and severity of injury. The nearest hospital with an emergency room is not always the best place to take care of a polytrauma patient. Seriously injured patients, for example, should be transported to major trauma centers, as this could dramatically increase the patient's chances of survival.

The next step was to integrate and standardize BDMS transportation system which included ground, sea and air transport in order to best support our trauma care system. Furthermore, to maintain the highest quality of trauma care of our network hospitals, the teams from each trauma center are required to undergo regular standard of treatment training, attending a **re accreditation trauma center*** and requiring a simulation training.

Commitment for Improving by Re accreditation Trauma Center

1. Re accreditation Trauma Center 2 from RCS ----- BPH (2021), BPK (2022)
2. Re accreditation Trauma Center 3 from RCS ----- BSI, PT3 (2022)
3. Accreditation Trauma Center 2 from RCS ----- BRH (2022)
4. Accreditation Trauma Center 3 from RCS ----- BPL, BHH, PTN (2022)

For an effective trauma center, it is mandatory to provide the highest levels of trauma care through greater access, highly trained expertise, increased speed of response and seamless coordination. These factors are the key components of a Center of Excellence Trauma Care and can often mean the difference between life and death.

In the past 5 years of implementation of the trauma system in the BDMS network, the number and complexity of trauma cases have gradually increased. Each day there are 800-1,000 cases visiting the emergency room (ER) of BDMS network hospitals. Many lives have been saved, and many major injuries have been treated. Table 4 shows that the number of patients visited and treated at ER BDMS hospitals has increased each year, including the number of trauma cases treated at BDMS network hospitals since the start of the CoE project.

The BDMS trauma registry was developed in 2017, and started a pilot with only 9 hospitals in the BDMS network. In 2018, more hospitals joined the registry program, with a total of 39 hospitals having now joined the trauma registry program (Table 5). From 2018-2020, the trauma registry (Table 5) has been shown a significant improvement in term of key performance indicators (KPI) such as Injury Severity Score (ISS) score and TRISS score in the quality of treatment, reduction of mortality and mobility rates in BDMS network hospitals have been monitored in order to improve the quality of treatment and to meet international standard KPIs of trauma care. We have recorded more than 18,303 trauma cases visited and treated in 2020 across 39 network hospitals. Regarding the ISS and TRISS score in the BDMS network, hospitals have successfully been monitored and have met the international KPI standard.

However, there is still room for improvement and we continue to share best practice. It is still a long journey to be recognized as a Center of Excellence in Trauma that provides the highest level of trauma care through greater access, highly trained expertise, increased speed of response and seamless coordination.

Table 4: Patient care

Trauma Patients visit ER	2018 (42 hospitals) Jun-Dec	2019 (44 hospitals) Jan-Dec	2020 (45 hospitals) Jan-Dec
Number of Trauma Cases	**169,894**	**308,663**	**280,640**

Table 5: BDMS Trauma Registry

BDMS Trauma Registry	2018 (22 hospitals)	2019 (32 hospitals)	2020 (39 hospitals)
Number of trauma cases	7,828	15,986	18,303
Number of trauma patients with ISS > 15	85	911	792
Mortality rate of trauma patients with TRISS > 0.75	0.28%	0.15%	0.12%
Mortality rate of major trauma patients with ISS 16-24	2.27%	0.79%	1.48%
Mortality rate of severe trauma patients with ISS > 24	7.69%	19.06%	18.69%

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