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HKSH MEDICAL GROUP

For Immediate Release

## The Grand Opening of HKSH's Proton Therapy Centre Marks a Significant Advancement in Precision Cancer Treatment in Hong Kong

(2 December, 2023 Hong Kong) HKSH Medical Group (HKSH) announced today the grand opening of the HKSH Proton Therapy Centre (the Centre) – the first of its kind in Hong Kong. Located at the HKSH Eastern Medical Centre in A Kung Ngam, Shau Kei Wan, the Centre boasts two state-of-the-art treatment rooms and a cutting-edge proton therapy system. This system comprises two half-rotating proton therapy gantries, a synchrotron-based accelerator and an advanced beam transport system. The system is ingeniously positioned in a vertically stacked format, making it an excellent example of compact design configurations suitable for densely populated urban areas like Hong Kong.

Since commencing initial operations in July this year, the Centre has provided proton therapy to about 40 cancer patients aged between seven and 88. These cases encompass a wide range of cancer types, including 26 breast cancer cases and six paediatric cancer cases, while the rest are prostate, head & neck, thorax and craniospinal cancers. All six paediatric cancer cases were referred by the Hong Kong Children's Hospital. These paediatric cases involve neuroblastoma, synovial sarcoma, maxillary sinus sarcoma, maxillary sinus carcinoma and craniopharyngioma.

Proton therapy is considered the most advanced form of radiotherapy modality currently available for cancer treatment. Distinguished from conventional photon-based radiotherapy, which allows radiation to infiltrate through the target site and potentially destroy normal tissue beyond the tumour, proton therapy exhibits amazing precision. It delivers a concentrated burst of energy to the target volume while ensuring that radiation abruptly ceases and dissipates afterwards. This distinctive physical phenomenon is known as the “Bragg Peak”.

Proton therapy involves meticulous computation and regulation of the depth and intensity of the proton beam, precisely targeting cancer cells. Since the proton beam only focuses on the cancer cells, damage caused to healthy tissues and organs surrounding the tumour is minimal, thus reducing the risk of complications and side effects commonly associated with conventional radiotherapy. Therefore, proton therapy is particularly effective in treating tumours located near critical organs, such as those in the head and neck, brain, lung, liver, breast, pancreas, prostate, as well as sarcoma.

The unique advantages of employing proton treatment in a head and neck cancer case were elucidated by **Dr LAW Chun-key, Honorary Consultant in Clinical Oncology and Specialist in Clinical Oncology of Hong Kong Sanatorium & Hospital**. “While both proton therapy and conventional radiotherapy deliver comparable radiation doses to the tumour region for the purpose of killing cancer cells, proton therapy significantly minimises radiation exposure to the surrounding healthy tissues and organs. In the cases of head and neck cancer as well as brain tumours, it is crucial for minimising radiation exposure to the salivary glands, eyes, ears, oral cavity and the brain as a whole. Proton therapy can potentially reduce adverse effects like dry mouth, impaired hearing and vision, oral pain, temporal lobe necrosis and the development of secondary malignancies in the surrounding areas. These potential complications can have a long-lasting impact on the patient’s quality of life.”

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Proton therapy is the best option for treating breast cancer, according to **Dr CHANG Tien-ye, Amy, Honorary Consultant in Clinical Oncology and Specialist in Clinical Oncology of Hong Kong Sanatorium & Hospital**. “This is especially true if vital organs like heart and lungs are in close proximity to the tumour. Proton therapy reduces the risk of late cardiovascular events while effectively protecting these organs,” said Dr Chang.

She also illustrates the benefits of proton therapy in treating prostate cancer. One of the primary advantages is a significant reduction in radiation dose to adjacent organs such as the bladder, rectum, and intestines. “Many clinical studies have shown the high effectiveness of proton therapy with minimal side effects. Furthermore, because the length of the treatment and the number of fractions needed for the treatment are shortened, patients can complete their therapy sooner,” added Dr Chang.

**Professor CHAN Chi-fung, Godfrey, Honorary Consultant in Paediatrics and Specialist in Paediatric Haematology & Oncology of Hong Kong Sanatorium & Hospital**, asserts that “proton therapy is less harmful to children in the short and long term without compromising its effectiveness. This treatment option lessens many radiation-induced adverse effects for growing children, such as cognitive function impairment, growth and endocrine issues, as well as the likelihood of secondary malignancy later in life.”

**Dr KAM Koon-ming, Michael, Honorary Consultant in Clinical Oncology and Specialist in Clinical Oncology of Hong Kong Sanatorium & Hospital**, recently treated several paediatric cases using proton therapy and highlighted the advantages of this treatment for children. He stated, “Children generally experience a longer survival period after treatment and are more vulnerable to the side effects of radiation during their developmental stage. Taking brain tumours as an example, proton therapy can reduce the radiation dose to vital structures in the developing brain. Studies indicate that the ten-year overall survival rate for children with medulloblastoma is comparable between those who undergo proton therapy and those who undergo conventional photon therapy. However, proton therapy has been shown to have a lower incidence of neurocognitive and thyroid function impairments, as well as a reduced risk of developing secondary malignancies within a ten-year period.”

The ageing population of Hong Kong has led to an uptick in cancer cases, with approximately one in four people developing cancer before the age of 75<sup>1</sup>. To provide comprehensive support for patients facing aggressive types of cancer, HKSH aims to empower them with a wider range of treatment options tailored to their unique conditions. With the addition of the proton therapy system, HKSH now has one of the most extensive ranges of radiotherapy facilities worldwide. **Mr Wyman LI, Chief Operating Officer of HKSH Medical Group and Director of Hong Kong Sanatorium & Hospital**, said, “The inauguration of the HKSH Proton Therapy Centre signifies a new chapter in cancer management in Hong Kong. It further underscores our commitment to establishing a centre of excellence in oncology. In addition to the essential hardware and infrastructure, we have also assembled a growing team of highly specialised and multidisciplinary oncology experts, including clinical oncologists, radiation therapists, medical physicists, medical dosimetrists and specialised nurses.”

As the visionary leader spearheading the conceptualisation and realisation of the proton therapy centre, Mr Li disclosed that the idea of establishing the Centre originated in 2005. It represents one of the most intricate

<sup>1</sup> Overview of Hong Kong Cancer Statistics of 2021, Hospital Authority.



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proton therapy construction projects worldwide, primarily due to its challenging site location on solid granite rocks and the limited floor space available for construction. "Extensive efforts were made to excavate the rocks from the ground and build the gantry-based treatment rooms deep underground. The COVID-19 pandemic also presented significant obstacles in recent years, as it impeded Hitachi engineers from traveling to Hong Kong to install the massive system. However, thanks to the unwavering dedication and commitment of the Hitachi team, the proton therapy system was successfully delivered to HKSH in July this year. It is incredibly exciting to see this decade-long project come to fruition. We have conducted nearly a hundred studies on MR-guided radiation therapy and proton therapy, and our commitment to intensive clinical research in these applications remains unwavering. Our goal is to continually optimise the benefits of these treatment modalities and enhance their effectiveness in patient care," stated Mr Li.

HKSH is also a leading pioneer among international medical institutions in offering state-of-the-art Magnetic Resonance (MR) guidance technology in proton radiotherapy. **Dr Ben YU, Head of Medical Physics Department at HKSH Medical Group**, explained, "imaging is particularly crucial for tumours located in organs that undergo motion, such as the lung or liver. It ensures accurate targeting of the proton beam by tracking the tumour's movement, allowing clinicians to adjust the depth and intensity of the proton beam accordingly. This approach enables the tumour to receive an optimal dose while minimising the risk of damaging surrounding healthy tissues."

HKSH will continue to collaborate with the public sector and the medical schools of Hong Kong's universities to conduct clinical treatment, provide medical training, and engage in scientific research using this advanced proton beam system. With the accumulation of clinical application experience, HKSH aims to push the boundaries of proton therapy and improve outcomes for cancer patients. It is anticipated that 400 to 600 patients across a broad range of cancer types will benefit from proton therapy annually when the Centre is fully operated.

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## **Proton Therapy Case Sharing**

### **Nasal cancer**

A 50-year old male sought medical help for frequent nosebleeds early this year, which led to a diagnosis of nasopharyngeal carcinoma after further CT scan and biopsy test. Following three rounds of chemotherapy to shrink the tumour for subsequent radiotherapy in June. It was determined that proton therapy would be the best option due to the tumour's proximity to his left eye. His attending doctor recommended this approach to minimise the risk of blindness, and the patient began a six-week proton therapy course in early October. Each session lasted approximately 35 minutes and imaging scanning was conducted to ensure accurate beam positioning every time. The patient had to undergo CT scan every week. During the initial two weeks, he experienced minimal side effects, but in the third week, he encountered skin redness, swelling, throat ulcers. To mitigate these effects, he followed a prescribed nutrient milk regimen and received medication from his doctor. The diligent monitoring and support from his healthcare team allowed him to successfully complete 30 fractions by late November, and he has since returned to a relatively normal daily life.

### **Breast cancer patient**

The first proton therapy patient in Hong Kong, a woman aged over 65 noticed an abnormal shape in her right breast and sought medical consultation. After scans and biopsy, breast cancer was confirmed. The patient underwent a total mastectomy and partial lymphatic drainage due to significant lymphatic spread, despite the relatively small tumour size. To reduce the risk of recurrence, her attending doctor recommended a comprehensive treatment plan consisting of adjuvant chemotherapy, radiation therapy targeting the lymphatic area, and hormonal and targeted drug therapy. However, conventional radiation treatment posed a potential risk to her lungs as the treatment area extended from the neck to the waist. The newly opened HKSH Proton Therapy Centre presented an alternative option and she opted for proton therapy immediately. In July, she began a three-week course of 15 proton therapy fractions. A personalised mask was designed for her to ensure precise beam positioning, securely fastened during each session. Throughout the treatment, she experienced skin irritation similar to sunburn effects, and fatigue. Nevertheless, she managed to drive daily between her home and the proton therapy centre. Completing the proton therapy in July, she immediately commenced the third phase of hormonal and targeted therapy to consolidate the treatment effectiveness.

### **Breast cancer patient**

A 30-year-old woman discovered a shadow on her right breast during a regular breast ultrasound examination in August this year, leading to a diagnosis of early-stage breast cancer. Following tumour removal surgery, her primary physician recommended postoperative radiation therapy for treatment consolidation. Concerned about potential long-term side effects associated with conventional radiation therapy, such as organ impact near the tumour site, she made the decision to undergo proton therapy after a detailed explanation from her doctor. The aim was to alleviate the discomfort and side effects typically linked to conventional radiation treatment. Starting at the end of September, she embarked on a 15-fraction proton therapy. Towards the conclusion of the treatment, she experienced fatigue, redness, and itching of the skin in the treatment area. However, she managed to maintain her normal lifestyle and work routine, with the exception of taking precautions to avoid sweating and exacerbating skin discomfort. Following the completion of her treatment, she made a full recovery, and the aforementioned side effects gradually diminished.



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**Photo Captions:**

1. (From left to right) **Dr LAW Chun-key**, Honorary Consultant in Clinical Oncology and Specialist in Clinical Oncology of Hong Kong Sanatorium & Hospital; **Professor CHAN Chi-fung, Godfrey**, Honorary Consultant in Paediatrics and Specialist in Paediatric Haematology & Oncology of Hong Kong Sanatorium & Hospital; **Mr Wyman LI**, Chief Operating Officer of HKSH Medical Group and Director of Hong Kong Sanatorium & Hospital; **Dr KAM Koon-ming, Michael**, Honorary Consultant in Clinical Oncology and Specialist in Clinical Oncology of Hong Kong Sanatorium & Hospital; **Dr Ben YU**, Head of Medical Physics Department at HKSH Medical Group; and **Dr CHANG Tien-ye, Amy**, Honorary Consultant in Clinical Oncology and Specialist in Clinical Oncology of Hong Kong Sanatorium & Hospital, shared the development of proton therapy and its clinical application.



2. **Mr Wyman LI**, Chief Operating Officer of HKSH Medical Group and Director of Hong Kong Sanatorium & Hospital, said that the establishment of the HKSH Proton Therapy Centre spanned over a decade and it is one of the most intricate proton therapy construction projects worldwide. In addition to the essential hardware and infrastructure, HKSH has also assembled a growing team of highly specialised oncology experts, including clinical oncologists, medical physicists and medical dosimetrists. The inauguration of the HKSH Proton Therapy Centre signifies a new chapter in cancer management in Hong Kong.



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3. The HKSH Proton Therapy Centre boasts two state-of-the-art treatment rooms and a cutting-edge proton therapy system which comprises two half-rotating proton therapy gantries, a synchrotron-based accelerator and an advanced beam transport system.



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**About HKSH Medical Group**

Officially launched in September 2017, HKSH Medical Group promotes public health and advanced medicine through a multi-faceted, coordinated approach across clinical services, medical education, scientific research and public health education. Members of the Group, including Hong Kong Sanatorium & Hospital, HKSH Healthcare and HKSH Eastern Medical Centre, are dedicated to offering top-quality holistic care to patients, upholding the motto ‘Quality in Service, Excellence in Care.’

Established in 1922, Hong Kong Sanatorium & Hospital is one of the key members of HKSH Medical Group and a leading private hospital in Hong Kong. Living up to its motto of ‘Quality in Service, Excellence in Care’, the Hospital is committed to serving the public as well as promoting medical education and research.

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