



GSMA 5G Case Studies

5G: ENABLING DIGITAL HEALTHCARE

HKT collaborates with CUHK Medical Centre to create a 5G smart hospital for remote consultation, remote training and tele-medicine

HKT COLLABORATES WITH CUHK MEDICAL CENTRE TO CREATE A 5G SMART HOSPITAL FOR REMOTE CONSULTATION, REMOTE TRAINING AND TELE-MEDICINE

Operator partner: HKT & CUHKMC • **Technologies:** 5G • **Country:** Hong Kong

Reliable high-speed 5G connectivity could transform healthcare by enabling smart hospitals to improve the patient journey and overall operational efficiency. For example, 5G can transfer 4K ultra high definition medical videos and images, such as those obtained from operating theatres and endoscopy centres, for real-time review by remote specialist clinicians.

According to mobile operator HKT, its 5G network is able to support speeds of over 1Gbps with latency of less than 10ms. Such connections are fast and responsive enough to support very high quality 4K video, 3D imaging, virtual reality (VR), augmented reality (AR) and multi-camera views, thereby providing a fully immersive experience for remote clinicians and students.

In Hong Kong, CUHK Medical Centre (CUHKMC) is using HKT's high throughput and low latency 5G to support innovative medical applications, such as remote consultation, remote training, tele-medicine, and treatments guided by AR services. HKT has built full 5G coverage across the entire CUHKMC hospital. Wholly owned by The Chinese University of Hong Kong, CUHKMC has 28 operating rooms, 49 consultation rooms and 516 beds for in-patients.

CUHKMC is using 5G technology to speed up consultation, diagnosis and treatment. In cases where patients need specialist advice and help, front-line medics have historically referred them to an expert in the relevant field of medicine. Such referrals can take time to arrange, delaying treatment. Now, CUHKMC is using 5G-enabled real-time

remote consultation with specialists, eliminating the need for a separate appointment. An on-site doctor can promptly seek a second opinion from a remote specialist, thereby speeding up critical decision-making.

"Through the innovative use of 5G technology to support a wide array of smart hospital applications such as remote consultation (doctor-to-doctor), remote training (doctor-to-student) and telemedicine (doctor-to-patient), resources in the hospital can be optimised and patients can receive the best possible care," explains Tom Chan, Managing Director of Commercial Group of HKT. "5G also supports other innovative applications such as the Internet of Medical Things (IoMT) and robotics to better serve the Hong Kong public."

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Tom Chan - Managing Director of Commercial Group of HKT

SUPPORTING SURGERY AND FOLLOW-UP CONSULTATIONS



CUHKMC operating theatres are fully covered with 5G, which is used to transmit multiple 4K video streams of the surgery as well as images captured by medical equipment, such as an endoscope. Where appropriate, multiple video streams are combined into a single view to give the remote clinician an immersive experience of the surgery. Viewed on a mobile device or PC, these visuals can help the remote specialist provide expert opinion on the surgery.

Leverage 5G connectivity, CUHKMC can provide virtual follow-up consultation for patients, reducing the need for them to revisit the hospital. The quality of diagnosis can be further improved by harnessing the IoMT. For example, a connected blood pressure monitor could track the progress of recovering patients, both in the hospital and after discharge.

KEEPING STAFF AND STUDENTS CONNECTED



At the same time, the 5G network ensures reliable connectivity for CUHKMC staff and devices, such as cameras, iPads and medical equipment in operating theatres, endoscopy rooms, patient wards, and the multi-function auditorium, which is used as a training venue for broadcasting live streams of medical procedures. The 5G connectivity is also used to enable remote clinical training for medical students and to support international medical conferences hosted by CUHKMC, with participants physically located in the Greater Bay Area and overseas.

In the face of COVID-19, 5G's capacity for transmitting videos and images to auditoria and students' mobile devices helps ensure the continuance of large-scale clinical training and seminars even during a pandemic outbreak. It can even broadcast high-definition footage of surgical processes to global medical conferences, further strengthening the international standing of Hong Kong's healthcare industry.



HARNESSING AR IN HEALTHCARE



5G infrastructure is also used to support very bandwidth-intensive applications, such as AR and VR services. Today, clinicians use two-dimensional multi-slice images, such as those from a CT scan, to make a diagnosis; in future, 5G could offer them a three-dimensional model of scan results.


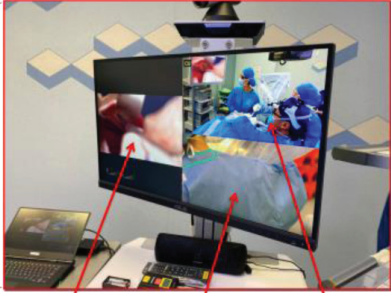
Through a 5G-connected headset, such as a HoloLens, medics will be able to view a detailed 3D model of the scan from multiple angles. Even bi-directional communication between two HoloLens is possible, allowing clinicians to simultaneously view and annotate on the same 3D model. In clinical training, a 3D model can be a very useful tool for professors giving lectures to medical students.

“The focus of our smart hospital is to improve the patient journey by delivering optimal treatment and enhancing medical safety,” said Dr Fung Hong, Chief Executive Officer of CUHKMC. “Through our partnership with HKT on 5G technology and applications, the digital transformation of CUHKMC is accelerated, thus improving the overall effectiveness and efficiency of the hospital.”



Mr Tom Chan, Managing Director of Commercial Group of HKT, joins Dr Fung Hong, Chief Executive Officer of CUHKMC, at the 5G smart hospital for a look at the state-of-the-art facilities.



Exoscope View

4K Camera View

Smart Glasses View

5G Remote Consultation at Operating Theater

5G enables live remote consultation with participants at different locations.

ABOUT HKT



HKT (SEHK: 6823) is Hong Kong's premier telecommunications service provider and a leading innovator. Its fixed-line, broadband, mobile communication and media entertainment services offer a unique quadruple-play experience. HKT meets the needs of the Hong Kong public and local and international businesses with a wide range of services, including local telephony, local data and broadband, international telecommunications, mobile, media entertainment, enterprise solutions and other telecommunications businesses, such as customer premises equipment sales, outsourcing, consulting and contact centers.

HKT is the first local mobile operator to launch a true 5G network with differentiated value-added services. Backed by its substantial holding of 5G spectrum across all bands and a robust and extensive fiber backhaul infrastructure, HKT is committed to providing comprehensive 5G network coverage across the city.

HKT delivers end-to-end integrated solutions employing emerging technologies such as 5G, cloud computing, Internet of Things (IoT) and artificial intelligence (AI) to accelerate the digital transformation of enterprises and contribute to Hong Kong's development into a smart city.

Riding on its massive loyal customer base, HKT has also built a digital ecosystem integrating its loyalty program, e-commerce, travel, insurance, FinTech and HealthTech services. The ecosystem deepens HKT's relationship with its customers, thereby enhancing customer retention and engagement.

For more information, please visit www.hkt.com.

ABOUT CUHK MEDICAL CENTRE



CUHK Medical Centre (CUHKMC) is a non-profit, private teaching hospital wholly owned by The Chinese University of Hong Kong (CUHK). With a social mission to bridge the service gaps between private and public healthcare in Hong Kong, CUHKMC is dedicated to offering quality healthcare service at affordable and transparent package prices. In line with the not-for-profit principle, all surpluses from all healthcare services will be ploughed back to the hospital for hospital development and the CUHK Faculty of Medicine for research and teaching.