CASE STUDY

TEIN
Global collaboration

Telemedicine:
Spreading surgical best practice across Asia-Pacific

TEIN network enables live streaming of operations to aid medical training

Through telemedicine, technology and communications have radically changed healthcare in the Asia-Pacific region, enabling remote diagnosis and underpinning international collaboration. High-speed research and education internet networks, such as TEIN, enable a new phase of telemedicine by providing the ability to remotely train doctors on the latest medical techniques by streaming high quality live operations and consultations across Asia. This helps spread best practice, benefits physicians and surgeons in developing countries and is saving many lives.

The challenges for telemedicine

Traditionally telemedicine has been held back by the bandwidth requirements needed to transmit high-quality images between hospitals. In Asia, two groups that are working to overcome these issues are the TEMDEC project, led by telemedicine–pioneering Kyushu University Hospital in Japan and the Medical Tele-Collaboration among TEIN members (MTC) group, led by Seoul National University Bundang Hospital (SNUBH) in Korea. By combining the fast and stable network connections provided by TEIN and Digital Video Transport System (DVTS) equipment, which runs on a standard PC, TEMDEC enables the high-quality live streaming of surgery and consultations from operating theatres to remote classrooms. This allows medical professionals across the region to adopt complex clinical techniques, such as endoscopic surgery, that they can then use themselves to benefit local patients. The MTC project is running regular live surgery, tele-education and teleconference sessions across Asia Pacific.

The impact on surgeons and their patients

Amongst the doctors to have benefitted is Dr. Shiaw-Hooi Ho, a gastroenterologist and gastrointestinal endoscopist from the University of Malaya Medical Centre in Kuala

The Challenge :
Enable physicians across Asia-Pacific to learn the latest techniques and collaborate with their peers to improve patient outcomes.

The Solution :
By live streaming high quality footage of operations and consultations, the TEMDEC and MTC telemedicine projects enable the remote training of doctors, wherever they are located. It relies on stable, high-capacity research and education networks, such as TEIN, to link hospitals and doctors across the region and further afield.

Key Benefits :
TEMDEC and MTC revolutionise how specialist medical training is carried out, as clinicians are able to observe new procedures and techniques through interactive, high-quality video training. This quickly spreads best practice across the region's entire medical community, helping physicians learn new skills and ultimately benefiting patients.

SNUH SEOUL NATIONAL UNIVERSITY BUNDANG HOSPITAL

TEMDEC Telemedicine Development Center of Asia

KOREN KOREA ADVANCED RESEARCH NETWORK

SINET4

Lumpur in Malaysia. He has been involved with telemedicine for five years and sees three advantages.

"*Firstly, telemedicine encourages the transfer of knowledge and experience from more advanced centres to other hospitals. For example, currently in the field of gastrointestinal endoscopy, the world is learning from Japan regarding the technique of diagnosis of early gastrointestinal cancer and its endoscopic treatment. Secondly, sharing experience helps with faster, more accurate diagnosis - certain diseases that are not well recognized by a local physician due to their low prevalence are diagnosed quickly by doctors who happen to treat and manage these diseases more often. Finally, live demonstrations also foster new friendships and ties which enhance collaboration in medical research, ultimately bringing about advancement in medical sciences.*"

Spreading best practice

Since the first TEMDEC event in 2003, over 441 operations and consultations have been shared over TEIN and other academic networks, bringing together surgeons at 310 institutions in 46 countries. Live events have focused on two interrelated areas. Firstly, streaming of examinations using endoscopic techniques (which involves a small camera being inserted into the patient) in order to diagnose and treat gastric cancers at an early stage - without full surgery, thus reducing patient risk and cost, as well as saving lives across the region. Additionally, the technique of minimally invasive endoscopic surgery, which is being pioneered by SNUBH, is being taught through telesurgery, helping spread best practice in a scalable manner.

> Technology promises a new era for telemedicine. Using high-speed research networks it is now easy to transmit uncompressed surgical images beyond geographic borders. High-quality pictures and minimal time delay are essential to recognise anatomical details and to follow every step of surgery. This project will help medical education and enable standardisation of techniques across the globe.
>
> *Prof. Shuji Shimizu, Director TEMDEC, Kyushu University Hospital, Japan*

> Our hospital is a pioneer in Minimally Invasive Surgery (MIS), which helps patients recover faster and leaves a much smaller scar than traditional techniques. Through live streaming of operations we have been able to train hundreds of surgeons across Asia, without the need or cost for them to travel to Korea. This MTC activity has widened the benefits MIS brings to a much larger population and undoubtedly helped save lives.
>
> *Prof. Ho-Seong Han, Vice Director of Seoul National University Bundang Hospital, Korea.*

The network requirements

Without the existence of a pervasive, stable and high capacity network such as TEIN, telemedicine and consequent improved patient care would not be possible. Key to enabling these projects, TEIN links 19 countries in the region and supports DVTS technology at speeds of 30 Mbps as well as creating a human network of doctors and physicians who learn from each other. In many areas it would simply not be affordable to use commercial networks, due to the high cost of the bandwidth required. Additionally, through TEIN's links to research networks in other regions, such as GÉANT in Europe, and Internet2 in the United States, operations and consultations are able to be truly global.

Due to the success of this remote medical training, knowledge is being transferred across the region, particularly to less developed countries, building capacity, and saving lives. As Dr Ho says, "*Being involved with telemedicine has brought great benefits to myself and the medical community. It allows the sharing of medical experience through high-quality video teleconferences without the need for us to travel far abroad, enriching our skills to benefit our local patients.*"

The Trans-EurAsia Information Network (TEIN) project began in 2000 and is now in its fourth phase, TEIN4, managed by TEIN*CC. Co-funded by the EC and Asian partners, the project has created a high speed network in Asia-Pacific that links local national research and education networks (NRENs) together, and provides direct connectivity to GÉANT, the pan-European research network, creating a gateway for global collaboration.

TEIN COOPERATION CENTER

For more information:

- TEIN: www.tein.asia www.teincc.org
- TEMDEC: http://www.temdec.med.kyushu-u.ac.jp/eg/
- Seoul National University Bundang Hospital: http://www.snuh.org/english/snuh/snuh04/sub04/ http://future.snubh.org/MTC.asp
- SINET4: http://www.sinet.ad.jp
- KOREN: http://www.koren.kr

This document has been produced with the financial assistance of the European Union. The contents of this document are the sole responsibility of TEIN*CC and can under no circumstances be regarded as reflecting the position of the European Union.