# NEXUS

APAN

The Magazine from the APAN Community | APAN56 Edition

-

"This collective effort nurtures robust collaboration, driving shared progress that ultimately benefits the entire community" Asitha Bandaranayake, LEARN/Sri Lanka, Chair/LOC



# Shaping the Future of Healthcare:

Exploring the Impact of Telemedicine with Dr. Tomohiko Moriyama



Dr. Tomohiko Moriyama - Vice Director of the International Medical Department at Kyushu University Hospital and Chair of the APAN Medical Working Group (Image credits: Kyushu University)

### "Our vision is to reduce the disparity of healthcare that exists between developed and developing nations,"

states the Vice Director of the International Medical Department at Kyushu University Hospital and Chair of the APAN Medical Working Group, Dr.Tomohiko Moriyama. This aspiration encapsulates the transformative potential of telemedicine, a force that is progressively dismantling barriers to quality healthcare by enhancing accessibility, particularly in remote and underserved communities.

Simultaneously, these telemedical advances are redefining the landscape of medical knowledge exchange.

No longer constrained by geographical limitations, doctors from diverse corners of the globe are seamlessly sharing insights, techniques, and experiences, catalysing a dynamic shift in how medical knowledge is disseminated and refined. In this story, we explore with Dr.Moriyama the transformative potential of telemedicine to build a more equitable healthcare landscape, erasing the divide between those with easy access to medical care and those left on the fringes.



#### **Reudcing Global Medical Disparity and the Danger of NCDs**

(Image credits: The Lancet Global Health)

In the pursuit of a healthier world and to combat the pervasive threat of Non-Communicable Diseases (NCDs), the dedicated team at Kyushu University Hospital has set its sights on a noble mission: reducing medical disparities across the globe. Explaining the seriousness that NCDs pose, Dr. Moriyama explains, "The world is undergoing a significant demographic shift towards a hyper-ageing society. This phenomenon is not exclusive to Asia; it's a global one."

NCDs, which encompass a range of age-related diseases such as cancer and cardiovascular issues, cast a formidable shadow over global health. So tackling NCDs becomes increasingly imperative." Shockingly, these diseases account for a staggering 71% of all deaths, claiming the lives of approximately 41 million individuals annually. Delving into the data on NCD-related mortality among those under the age of 70, a stark contrast emerges: developed economies exhibit a notably lower mortality rate compared to their developing counterparts, where the toll is alarmingly high.

#### Pioneering Remote Exchanges Between Doctors



Since its inception in 2008, TEMDEC has hosted several remote discussions between doctors covering a wide array of topics. (Image credits - TEMDEC | Kyushu University Hospital)

Notably, Japan has achieved remarkable success in treating NCDs, particularly in the realm of cancer. The country's advancements in medical science and surgical techniques have garnered global attention, attracting doctors from all corners of the world who seek to learn from Japanese surgeons. Dr. Moriyama acknowledges these human exchanges are valuable and effective, but their sustainability is limited. This is owing to factors such as time constraints, expenses, and the scarcity of occasions for meaningful interactions among a limited number of individuals.

Recognising the limitations of traditional methods of knowledge transfer, Kyushu University Hospital established

the Telemedicine Development Center of Asia (TEMDEC) in 2008. Led by Dr. Moriyama, its mission is to organise attractive, effective remote education, involving interactive discussions in various medical fields. Since then, TEMDEC has hosted 1772 events with participation from 1446 institutions spanning 82 countries. These events explored several topics, ranging from endoscopy to surgery, paediatrics to oncology, transplantations to dentistry, and countless others. Through these efforts, they pioneered remote discussions and live demonstrations connecting doctors globally, facilitating the exchange of techniques, insights, and expertise.

Dr. Moriyama went on to share that traditionally, live demonstrations necessitated the physical presence of participating doctors, often involving extensive travel. This approach, while valuable, posed several challenges. Language barriers and the impact of jet lag could create a less-than-ideal atmosphere for performing medical procedures. Organisers also had to navigate the complexities of obtaining a temporary medical licence for visiting doctors. More critically, patient safety was a concern when procedures were conducted in unfamiliar settings.

The introduction of remote doctor-to-doctor engagements has revolutionised this dynamic. Dr. Moriyama elaborates, "By leveraging technology to connect medical professionals across borders, doctors can now showcase their procedures in the familiar and controlled environment of their hospitals, surrounded by their trusted staff. This approach enhances patient safety and comfort, eliminates the risks associated with jet lag, and provides a seamless platform for knowledge exchange."

#### The Transformative Benefits of Remote Consultations for Patients



Remote consultations offer several benefits, particularly for patients afflicted with conditions that make it difficult for them to travel and for those in remote communities. (Image credits: Wall Street Journal)

Building atop its efforts to connect doctors remotely, Kyushu University Hospital recently expanded into remote patient consultations. This feat is enabled by secure networks for sharing high-quality images while ensuring patient privacy and confidentiality of sensitive medical information. Thus, the doctors of the hospital have now begun exploring the potential of this technology by hosting remote consultations with international patients. Dr. Moriyama firmly believes telemedicine efforts of this nature bring profound benefits to patients, particularly those who reside far from medical facilities.

These remote consultations offer a lifeline to individuals who would

otherwise need to undertake arduous journeys or endure lengthy waiting times to access skilled medical professionals. This is particularly pertinent for patients dealing with conditions that make travel physically demanding, such as orthopaedic patients or those with cardiac issues. The availability of remote consultations ensures that these patients can receive expert medical guidance without the added burden of exhaustive travelling.

Moreover, the impact of remote consultations extends well beyond urban areas. In remote regions where access to specialised medical care is often limited, the integration of such technologies is nothing short of transformative.

But the biggest challenge to realising this potential is stable high-bandwidth networks. As Dr. Moriyama explains, "It's in remote areas where there is the greatest need for remote consultations with healthcare professionals. But these areas also struggle with poor network connectivity." Nevertheless, by overcoming this issue, telemedicine holds the promise of bridging the healthcare divide between urban centres and underserved remote regions.



New technologies like Mixed Reality and Metaverse platforms hold the promise of enabling risk-free training environments for medical students, but their graphical capabilities need to improve substantially before they can be used for surgical training. (Image credits: Stock Imagery)

Towards the vision of reducing global medical disparity, Dr. Moriyama and his team, alongside the wider APAN Medical Working Group, have also been exploring the potential of new technologies such as the metaverse and mixed reality (MR) platforms. One notable demonstration took place during the APAN47 event held in Korea, where simulators were showcased that generated immersive 3D images of the human body. Commenting on these

platforms, Dr. Moriyama said, "They're most helpful for medical students in learning human anatomy, which is one of the hardest topics they may face."

Such platforms have the potential to serve as invaluable training tools for medical students and young doctors, particularly when it comes to mastering intricate surgical procedures. Dr. Moriyama envisions these technologies as the future of medical education. He emphasises the crucial aspect of the metaverse and MR environments enabling training without subjecting real patients to risk. However, there remain challenges on the path to fully realising the potential of these technologies.

One significant hurdle is the current image quality of metaverse platforms, which has yet to reach the level required for precise medical education.

At present, the graphical capabilities of virtual platforms are primarily designed for video games. Dr. Moriyama, citing a simulator for training in emergency room scenarios, believes they enable medical students to better grasp fundamental tasks and processes. But while acknowledging the enticing possibilities, achieving high-quality images for virtual training of surgical procedures is likely years away. Nevertheless, the potential to revolutionise medical training, minimise patient risks, and elevate the expertise of future medical professionals makes this endeavour a promising pursuit.

#### How the COVID-19 Pandemic Transformed Telemedicine



The COVID-19 pandemic saw a broad shift among medical professionals to embrace digital platforms for collaboration, which was enabled by the rapid investment and improvement of these platforms at the time as well. (Image credits - TEMDEC | Kyushu University Hospital)

The COVID-19 pandemic, with its unforeseen disruptions, became an unexpected catalyst for transformation across various sectors, and the field of telemedicine was no exception. The journey of Kyushu University Hospital, with remote doctor-to-doctor engagements, reflected this broader shift that swept through the global medical community. In the early stages, Dr. Moriyama shares that the concept faced initial resistance. Particularly in developed economies across Europe and North America, medical professionals were accustomed to physical conferences as their primary avenue for knowledge exchange. Hence, many doctors were hesitant in embracing online platforms.

However, with the pandemic making in-person gatherings impossible, medical practitioners were compelled to shift their interactions to virtual spaces. What once seemed unfamiliar and unappealing gradually revealed its efficiency and effectiveness. Dr. Moriyama remarked on this pivotal shift stating, "Even if you wanted to meet in person, the situation didn't permit it. So we met virtually and realised it's quite simple and useful to communicate, have discussions, and even share presentations." Thus, the pandemic acted as a crucible, forcing medical professionals to adapt and embrace digital platforms for collaboration.

A key enabler of this transformation was the rapid investment in and improvement of video conferencing systems. Dr. Moriyama noted that video conferencing systems, once plagued by issues of unclear audio and video, have undergone substantial enhancements. This evolution in technology was profound enough to enable even remote instructions for surgical procedures, a development that was previously challenging due to technical limitations. In essence, the pandemic acted as a catalyst for a sea change in the medical community's attitudes toward telemedicine and remote collaborations.

## The Impact of the APAN Medical Working Group



In the intricate world of medical advancements, the APAN Medical Working Group serves as a dynamic catalyst for knowledge exchange, collaboration, and research. Dr. Moriyama elaborates that the intricacies of medical practices often demand real-world validation of new methods. The collaborative environments of the APAN Working Groups serve as a bridge between theoretical concepts and practical applications. By enabling doctors across the world to work together, the APAN Working Group contributes significantly to the assessment of emerging technologies and techniques in diverse settings.

The APAN community not only facilitates valuable collaboration among medical professionals but also serves as a pivotal bridge between various stakeholders. This extends beyond doctors to include technologists, researchers, and individuals from various domains. For instance, Kyushu University held an event for endoscopists and reached out to the APAN community to expand its reach, which highlights APAN's role in expanding interactions and knowledge dissemination. Ultimately, Dr. Moriyama believes that the APAN Medical Working Group serves as a platform for empowering researchers. One that enables them to forge connections and initiate collaborative research endeavours that will push the boundaries of medicine.

#### **Exploring the Future of Telemedicine**



The Smart Cyber Operating Theater (SCOT®) is a shining example of what's possible with telemedicine today. While optimistic about the technology to help doctors serve more patients. (Image credits: The Government of Japan)

As the world of telemedicine continues to evolve, its future will be built upon robust, stable, and high-bandwidth networks. Dr. Moriyama re-emphasizes the paramount importance of reliable networks in telemedicine. He paints a scenario where a surgeon is guiding a critical procedure remotely, underlining that a network failure in such a moment could have grave consequences for the patient. While the challenge of stable high-speed networks remains, particularly in remote and underserved areas with limited bandwidth infrastructure, the imperative for such remote treatments persists.

Yet, Dr. Moriyama holds a hopeful outlook for the future, stating that researchers are already looking at telemedicine applications for 6G networks. Noting the progress being made, he points to the Japanese surgical society's preliminary guide to tele-surgeries, a milestone that highlights the growing integration of telemedicine into medical practice. Further exemplifying this trend is the Smart Cyber Operating Theater (SCOT®), a sophisticated networked operating theatre, which is a collaborative effort between multiple Japanese universities and private companies.

While technical challenges are met with optimism, Dr. Moriyama envisions an even greater challenge on the horizon: ensuring equitable accessibility to medical care. In developing economies, there are social systems that grant citizens access to affordable high-quality healthcare. However, the same cannot be said for many developing economies, where healthcare access is a luxury. While telemedicine can improve access to healthcare, Dr. Moriyama aptly points out, "The issue of affordability is one for public officials. But access to doctors is something we can change with telemedicine."

The future of telemedicine, as envisioned by experts like Dr. Moriyama, is not only one of technological evolution but also of social change. It's a landscape where networks will grow stronger, remote interventions will become more precise, and global medical collaboration will flourish. Importantly, it's a future where technology bridges the disparity between medical services in developed urban centres and long-underserved remote communities, promising a world where medical expertise knows no boundaries.

