

The health sector's central nervous system

by Sol Trujillo, CEO, Australia's Telstra Corporation

Given the world's aging population, the velocity of epidemic propagation in the jet-age, the increasing complexity of medical diagnostics and treatment, and the rising costs, the healthcare challenge is growing. There are never enough caregivers, specialists and diagnosticians, especially in remote and developing regions. Information and communications technology can bring healthcare to patients wherever they may be, while lowering both operational and infrastructure expenses. Next-generation networks will play a major role in overcoming the challenges that healthcare faces.



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The world has changed rapidly over the past two decades, and it has often been people working in the health sector who've faced some of the greatest challenges dealing with the consequences, including:

- An aging population;
- Increased personal mobility leading, for example, to the spread of SARS;
- Increased complexity in disease mutation; and,
- Spiralling healthcare costs driven by equipment, hospitals, salaries, and indemnity insurance.

While technology has improved, replicating medical facilities, equipment and expertise in every locality is simply not feasible. Distance

and the need for timeliness present additional problems.

In Australia, there are solutions that utilise information networks, people and assets to leverage scarce resources - to share information, share expertise and share equipment. This means saving money, time and lives.

Telecommunications networks can underpin a series of paradigm shifts in the experience of patients, medical professionals and health administrators. At the heart of these changes is a shift away from information that is compartmentalized, fragmented by provider and hard to access. The tendency is to shift to information that is integrated, user-generated and accessible in real time.

Next-generation communications services will deliver great improvements in productivity by

changing the ultimate service variable - time. In an emergency, location technology can help to pinpoint the scene and dispatch the nearest ambulance. Wireless broadband can access patient records instantly or record and transmit the patient's diagnostic images via video to the best available professional for diagnosis and recommendation.

Diagnosis often requires in-person consultations, but access and quality is determined by geographic proximity. In tomorrow's world, diagnosis can take place using high-resolution video conferencing, without the patient and the professional having to be physically together. In Australia, some area health services are already conducting tele-diagnosis, using standard resolution video. In traumatic situations, real-time video-based communication between patients and health professionals can immediately reduce

patient stress and give health professionals greater scope to make accurate decisions about what, how and where to administer care. This is important because accurate and timely diagnosis can mean the difference between dying of cancer and being in remission.

Today a serious medical condition often entails regular, costly trips to and from distant health facilities, and these trips can place a large burden on those caring for the patient. Patients on prescribed medication rely on their own memory to comply with correct dosage and regime - an increasing concern given the prevalence of Alzheimer's and dementia. Families are increasingly dispersed and peace of mind is hard to get without regular phone calls and visits to elderly parents.

In the future, telecommunications networks will fundamentally change how patients are cared for. Using body area networks, patients can have their vital signs checked 24/7 with interactive biometric monitoring. Using networked mobile phones, TVs and PCs, patients can get reminders to take their medication and alerts can be generated if they don't. Non-intrusive mechanisms can monitor elderly parents remotely; they can even check to see if the toilet was flushed or the doors were opened. An acute event can trigger a remedial process that alerts the care team but protects the privacy of the patient.

These scenarios have serious cost implications. According to a study by the university of Arizona, non-compliance with medication regimes costs the US economy alone nearly US\$100 billion a year in extra medical care. A Scottish study last year showed treating older people at home with alert and sensor assistive technologies costs 100 times less than moving patients into residential care.

Medical professional experience

The paperwork associated with healthcare can be overwhelming, repetitive and problematic. Imagine a world with longitudinal electronic health medical histories for all patients stored securely in the network and accessible from anywhere. Specialists are making it possible for nurses to access patient records remotely anywhere, anytime. Imagine if medical professionals could track who has accessed patient records and could verify all of the agencies involved in the care of each patient. Imagine that the same record has all of the pathology results embedded in it with click-through access to digital images of x-rays, blood tests, immunisation history, allergies and ultra-sounds. Imagine having references

immediately available regarding physiological attributes, disease, contamination and location.

Next-generation networks with sessions recorded, stored and accessible from anywhere over any device - from home TVs, to PDAs or to mobile phones - can also assist professional development. Tracking who has downloaded the sessions and when can also greatly assist medical oversight and supervision.

There is also scope for improving multi-disciplinary relationships and knowledge management. For example, a radiologist could assess a diagnostic scan and then record an audio file with her comments together with the digital image. Using shared calendars, a video conference with health specialists from across the network could be organised to assess diagnostic scan results together with a complete patient history. A treatment plan could then be developed online and immediately linked electronically to the patient. The productivity gains from such collaborative and interactive relationships are substantial - especially considering the growing number of people using medical facilities.

Health administration

In today's world many healthcare institutions are forced to create their own ecosystem of services. A large number of healthcare facilities cannot afford the infrastructure needed to leverage ICT for improved efficiency and care delivery. Telecommunications networks can promote savings by facilitating shared accounting and payroll services, resident management, rostering, fleet management, procurement, patient entertainment and clinical record administration and access. A pilot programme to provide remote patient emergency care, using a specialised video communication unit to link two hospitals west of Sydney, has halved accident and emergency admissions in one remote hospital.

While there is a trend towards computer-generated and printed prescriptions, many prescriptions continue to be handwritten, on the run, in hospitals, emergency rooms and nursing homes. In the future, networked e-prescribing using mobile telephony will be commonplace, integrated into the patient's record and accessible by any pharmacist the patient authorises. In Sweden, ePrescribing in Stockholm County is expected to deliver a net economic benefit of more than €95 million in 2008; the investment costs will total less than €4 million during the entire 2001 to 2008 period.

In today's world, the storage, authentication and 'use-by' dates for medicines are often dependent upon the patient's memory or left to chance. Using RFID technology, medicines can be checked for validity and the consumer alerted if there is a problem. Next-generation networks can also assist in improving the timeliness of results from pathologists and radiologists by automating notifications of the availability of the results and by making information accessible via the network.

In Australia, Breast Screen Victoria, BSV, runs a van that travels around the state with scanning equipment. It typically pulls up in large shopping centres providing breast screening for rural Australians. BSV has purchased storage services from its network operator and is now using the operator's next-generation network to transmit images for assessment. Prior to the next-generation network, vans had to wait until they returned to base to have the scans examined - thereby wasting precious time.

Telecommunications networks can leverage health information, people and assets. This means less investment per facility, less redundant equipment and less duplication. It means reducing the amount of time needed, whether it is for travel, analysis or diagnostics. Telecommunications networks can give everyone access to the best doctors, the best equipment and the best services no matter where they might be.

Next-generation networks unlock the door to saving literally billions of dollars by changing the paradigms of time and distance in the provision of healthcare.

The transformation of today's systems can be greatly assisted by making sure that:

- the reasons for the change and the benefits derived are communicated to those affected;
- the new solutions are simple to use and training is provided to those using it; and,
- the technology is globally compatible.

The reach and attributes of today's networks and services are helping to make Australia a world leader in eHealth. ●