Teleophthalmology equipment being transported via a plane to a remote area in British Columbia

Desktop cameras and mobile units at the Stan Cassidy Rehabilitation Centre in New Brunswick

SCREEN TEST

As the UK eyes telehealth as a solution to improving patient care while reducing the costs of avoidable admissions, Alison Tonge reports from leading telehealth nation Canada

TELEHEALTH BEGAN IN Canada in the 1950s in response to the challenges of access to healthcare, particularly among rural communities, which account for about a third of the population. Nunavut Aujuittuq, for example – or 'the place that never thaws' – is 700km from the nearest town.

Starting with transferring X-rays and EEGs, serious infrastructure investment since the 1950s now means Canada is a world leader in telehealth. And it has delivered a measurable return on that investment in terms of improved quality, cost and patient experience. So what has made it so successful in Canada and what can the NHS learn as it looks to apply similar technology?

Canada's take on telehealth involves live videoconferencing supplemented by the use of diagnostic tools such as digital stethoscopes, otoscopes and patient examination cameras. These tools are used at the patient's location to provide clinical information to a consulting specialist at a distance. Tools fall into two types. Store-and-forward solutions capture, store and transmit data, images or video to a specialist clinician for interpretation – typical applications are in radiology, pathology, wound care, ophthalmology and dermatology. And telemonitoring solutions monitor then transmit clinical data from a patient's home to a centralised facility for review by a care team. These are often used for the management of chronic diseases such as stroke or diabetes.

Education and training is also provided via videoconferencing and online resources – particularly useful in linking training to team-based care across primary and secondary care.

The scope of clinics offered with telemedicine mirrors the full scope of services in a typical outpatient consultation, diagnostic centre or therapies service – cardiology and cancer care to diabetes and psychiatry.

A recent report commissioned by healthcare IT champion Canada Health Infoway on progress on telehealth reports an astounding growth rate of 35% per year on average over the past five years. In 2010, there were nearly 260,000 telehealth events in Canada delivered through 5,710 systems to 1,175 communities. In the same year, it is estimated rural and remote patients saved 47 million kilometres of travel, resulting in cost savings of C$70m.

This coincided with a reduction in waiting times for a range of specialties. In Ontario, for example, waits for emergency child and adolescent psychiatry appointments fell from nine months to 72 hours.

Quality has also improved. The report says telestroke programmes have shown that in about 20% of consultations, TPA (tissue plasminogen activator) could be administered within the critical three-hour window. This is double the national average, with outcomes comparable to patients at major hospitals.

Clinicians see the value of the service. Dr Khurshid Khan, a neurologist and professor at the University of Alberta in Edmonton, says: 'We assess the patient directly on a video link. We can look at the pictures from CT scans in real time as they are sent to our computers. Telestroke creates a virtual emergency room right in my office – I can see the patient; I can speak to the patient; I can examine the patient as if that person is right there in my office.'

Demand control

Telehealth is also having an impact on demand, says the report, reducing avoidable health system use by an estimated C$55m in 2010. Telehomecare is said to have helped the health system avoid an estimated C$21m in hospital use. A study by the Ontario Telemedicine Network showed a significant avoidance of cost in heart failure and COPD, citing a reduction of up to 66% in hospital admissions and 74% in emergency visits.

The report also claims the government has saved C$34m through reduced medical care-related travel and subsidies. And more than 80% of patients have reported satisfaction with telehealth compared with face-to-face visits with their care provider.

Telehealth is used by the Glenrose Hospital, a specialist rehabilitation centre in Edmonton

Alberta, as a key tool in the education of patients and carers. A Caregiver College gives spouses, family and friends the ability to learn about the physical, emotional, and psychological experiences of their patient or loved one through online learning and resources.

The most recent development in telehealth in Alberta is myhealth.Alberta.ca. The web portal initially focuses on advice and guidance but by the end of this year will include access to a personal health record, where patients can input information including data from home monitoring devices. This will be uploaded and linked with the electronic health record so that all health professionals can view it.

If the growth of telehealth continues as it has over the past five years, it is predicted the Canadian health system will gain from additional benefits valued at C$730m and an extra C$440m in cost avoidance for patients.

Critical success factors

Telehealth has been a serious enterprise in Canada for decades. Investment nationally through Canadian Health Infoway, national and aboriginal transition funds and provincial grants has amounted to hundreds of millions of dollars. But while these grants have enabled fast progress, there is also a risk that the service is seen as an add-on and that, when the grant disappears, so might the service.

However, some provinces have established stand-alone telehealth structures to support the wider system. The Ontario Telemedicine Network, which has more than 1,400 sites, is one of the largest providers. It is a not-for-profit membership organisation funded by the province and by membership fees for three key deliverables:

- Governance systems on interoperability across providers providing consistent rules of the road
- Infrastructure provision for four main channels: emergency; home care; clinic consultations; and training
- Business adoption support.

An organisation such as this can also leverage commercial partnerships to innovate and transfer knowledge between providers quickly. As provider networks emerge in the UK the development of dedicated shared infrastructure with a membership structure would feel like a good cultural fit that might rapidly set foundation trust networks and integrated providers apart.

Having visible champions and a shared team across providers is a key winning strategy. This helps to ensure rapid agreement on clinical governance, professional regulation, policy and investment priorities. But it can also provide training, change management and infrastructure. This also makes it easier to capture better measurement and evaluation of the return on investment from telehealth.

From a commissioning perspective, there is a big opportunity to build in the specification of telehealth deployment in terms of end-to-end pathways and care models and encourage adoption through incentives (see below).

Aligning the billing with the services is also a key issue in Canada. Reimbursement models haven't quite caught up with virtual healthcare provision across settings.

Using telehealth should result in a reduction or avoidance of usage in the hospital sector and shift care to the community. So a redesign of the incentives and tariffs is vital at the same time as the implementation of this technology to encourage rapid adoption of telehealth in acute and community settings.

POSSIBLE TELEDIABETES PATHWAY

SCREENING	DIAGNOSIS AND TREATMENT	MONITORING AND FOLLOW-UP	EDUCATION AND WEB PORTAL	EMERGENCY INTERVENTION
• Patient presents at a **mobile screening clinic** in her village • **Digital cameras used to capture high-resolution 3D retinal images** • Images transmitted to retinal specialists at central reading clinic	• The screening test looks like diabetic retinopathy • Results sent to endocrinologist who orders further blood and urine tests • Results confirm early onset diabetes • Endocrinologist and nutritionist confer with patient and local nurse via **videoconferencing** to advise on future treatment plan • Advice includes enrolling in **home telehealth programme** for future monitoring and education sessions	• **Home telehealth system** deployed to home • Offers low-tech solution to monitor weight, blood pressure, glucose etc • Allows patients to stay at home and enjoy greater quality of life • Actively engages patients in managing their care • Provides confidence that **vital signs are being monitored** and condition can be assessed remotely	• Patient invited to participate in diabetes educational session via **videoconference** from central site to several communities • Meets fellow diabetes patients and joins **online support group** • Learns session has been recorded and is available on the **internet** • Wider family can download educational session to iPod • It can be accessed at convenience • Material can be updated to reflect current trends	• Patient catches flu, misses meals and becomes disorientated • Is found by family • Calls 24-7 nurse helpline (**teletriage**) who, having access to EHR, suspects hypoglycaemia, provides support and calls ambulance service • During transit condition is monitored • **Wireless** connection to base hospital • **Exchange of vital signs and continual advice during transit** • Positive outcome

FURTHER INFORMATION

More details of the Canadian health system, including details of its structure and funding arrangements, can be found in an HFMA briefing published in December 2011. Based on an HFMA/ACCA study tour, the briefing also looks at a virtual ward scheme and approaches to integration.

- Download the briefing at www.hfma.org.uk/publications-and-guidance

The scale of adoption in Canada is a function of both the need for the technology in rural communities and a national and provincial infrastructure investment fund. This fund has reduced pressure on the operational providers to select this as an investment above others.

The question for the NHS is how this sort of fund can be prioritised. While telehealth improves access, more systematic research and evaluation is needed on its impact on cost and productivity. However, key costed benefits include travel time and avoided travel, better system use and reduced transfers of care to specialists – specialists come to the patient.

In the case of telestroke, the saving in lower unit costs is put at C$600 per patient, with a lifetime saving of C$3,800 and 3.46 additional quality-adjusted life years. Primary care offers the biggest opportunity where low-cost telehealth interventions can realise large-scale system benefits.

A recent study using a telehealth phone reminder system, manned by health staff, showed that increasing influenza immunisation rates by as little as 2.5% could save C$8.5m to the system in lower usage.

Telehealth providers are focusing on several key areas. They recognise the rate of adoption can be increased by using more dedicated change management, communication and marketing staff co-located with clinicians. They also realise the cost of entry to the systems must be cut by developing light applications, internet, PC and mobile technology, rather than restricting access to expensive videoconferencing equipment and wired networks.

The Ontario Telemedicine Network is looking to launch a PC-based videoconferencing system for primary care physicians.

The full benefits of this telehealth revolution won't be realised without an integrated telehealth and electronic health record system. There needs to be a more customer-centric approach, building on existing 24-7 online telehealth advice and triage systems to enable a more personalised access for patients to care records, consultations and bookings. ■

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