Expanding rural service delivery through emerging technologies

Karen Dixon[1], **Andrea Church**[1]

[1]Country Health SA Local Health Network

Technology is advancing at an incredible rate with new devices, wearables, gadgets and gizmos coming on to the market every week. Technology provides rural health services with new ways of connecting with country consumers and innovative opportunities in the way we provide health services. Our thinking is changing from everyone who needs a health service coming into a hospital, health centre or clinic and describing our capacity in terms of hospital bed numbers, to considering every person in every household across our rural areas as a potential 'hospital bed'—the vision held by the late Dr Peter Chapman, Chief Medical Advisor Country Health SA Local Health Network (CHSA).

This paper will describe the key factors necessary for the successful implementation of technology-enabled health services implemented by CHSA in rural South Australia. Examples of technology-based initiatives will be described, highlighting the key impacts, elements necessary for successful implementation and the challenges faced.

CHSA provides a range of health services across regional, rural and remote SA. Covering 1 million square kilometres, CHSA is the largest geographical health service in SA and the second largest in Australia behind WA. CHSA provides services to a population of more than 470,000 people. There are 64 public hospitals in country South Australia with community and acute health services provided in approximately 220 sites. CHSA provides residential aged care services for more than 1400 clients.

SA faces challenges because of vast distances and finite resources. Virtual services enable CHSA to expand services in a resource poor environment across a large geographic area, improving access to services and ultimately health outcomes for country consumers. The use of technology also reduces avoidable journeys to larger centres or Adelaide by linking specialist services with consumers closer to home and supporting local health workers with timely clinical advice. Being able to monitor to detect changes in peoples' symptoms provides opportunities for intervening early and potentially preventing hospitalisation.

Country Health SA has invested in a dedicated telehealth network. The SA Digital Telehealth Network (DTN) was first introduced in 2012 to support CHSA's ability to comply with the Mental Health Care Act. The DTN now provides a state-wide network of high quality video-conference capability with 230 endpoints and over 100 additional clients who have capability to link to the DTN from a variety of devices.

A range of key factors have been identified for the sustainability of technology-enabled health service models in country SA:

- strategic vision, intent and context
- cultural change and bold leadership
- consumer, community, service need driving change
- foundation on which technology is built
- embedding technology utilisation into service models, structures and funding
- digital intelligence and access.

Strategic vision, intent and context

The vision to be the best rural health service supported by the CHSA Strategic Plan 2015-2020 provided the strategic context for innovative strategies to be implemented while also promoting local presence, central strength and maintaining the primary focus on consumers. Recognising strategic challenges can also become opportunities for creative solutions. The Strategic Plan emphasises the importance of establishing high quality information systems and technology, to meet clinical and communication requirements to facilitate access to care as close to home as possible.

The governance structure of CHSA reflected these aspirations with an executive-level Culture and Innovation Committee established in 2015 charged with the responsibility to provide high-level oversight of and guidance on the development of new initiatives consistent with CHSA strategic directions, including the development of a culture necessary for organisational and clinical transformation.

To guide current and future technology-enabled initiatives within CHSA and with the hope of influencing uptake more broadly across the State, an overarching framework; the *eHealth Clinical Services Strategy* was required. A workshop was held with executive and clinical leaders to develop a shared vision and collectively come up with ideas about how to embed telehealth and other ehealth strategies into our everyday business as a health service.

The CHSA *eHealth Clinical Services Strategy* (Figure 1) was developed following this workshop and supports the intent to be the best rural health service by creating an integrated, patient-centric, technology-enabled health service for country South Australia through:

- maximising use of new and emerging technology
- coordinated e-education
- consumer education via tablets and robots
- mobile, home-based options
- greater use and embedding of videoconferencing
- improving IT literacy.

CHSA strives to be an organisation that provides patient-centred services utilising technology at every level of care with reliable, timely, interconnected and robust systems.

Technology assists country health services work in partnership with rural general practitioners to provide high quality evidence-based patient care, safe workplaces and best practice patient outcomes. Creativity and innovation are promoted, particularly where it supports increasing service access for patients, reducing the need to travel and improving the connectedness for communities with low population densities.

The *CHSALHN Transforming through Technology—eHealth Clinical Services Strategy* provides an overarching framework to guide current and future technology enabled initiatives within CHSA.

Figure 1   CHSA eHealth Clinical Services Strategy

Cultural change supported by bold leadership

Courageous and visionary leadership; clinical, executive and at the middle management level provided the spaces and environment for innovative technology-enabled solutions to be implemented. Even when there were limited funds available to invest in new technology, flexible, nimble opportunities were encouraged matched with a good amount of stealth! The gaps between the silos of bureaucracy were the spaces where innovative solutions came to life.[1]

A continual challenge for CHSA is to encourage a system-wide or statewide commitment to utilising technology as an alternative to requiring patients to travel to access services. Advocating for technology as an enabler for all parts of the health system is a key role for CHSA and other rural health services, making it easy for clinicians to use the technology, ensuring timely access to accurate clinical information and embedding technology as one way of providing services rather than a separate initiative in itself.

Consumer, community, service need/gap driving change

Technology has enabled CHSA to work in partnership with consumers and other members of the health care team to provide high quality evidence-based care contributing to best practice patient outcomes. The need for change to approaches to service delivery has necessitated the addition of technology to increase efficiency and improve access. Rather than technology driving innovation, the needs of consumers and gaps in health service provision must remain the main catalyst.

In response to the growing incidence of chronic disease in an ageing population and with dispersed resources over vast distances, innovative technological solutions were considered a vital enabler to strengthen existing services.

Country Access to Cardiac Health (CATCH)

Although cardiac rehabilitation is a widely recognised form of secondary prevention, for people with cardiac risks or disease, participation rates are low in Australia (10–30%)[2]. Issues that have been identified as barriers to attendance include: lack of referral and referral systems, transport difficulties, work schedules, social commitments, lack of perceived need and functional impairment.

With the ongoing budgetary pressure public health providers are experiencing the need for innovative ways to address the provision of services for people living with cardiovascular disease.

The CATCH program funded by the Country SA Primary Health Network and developed by CHSA includes a central referral point for all country patients requiring cardiac rehabilitation and an alternative to face-to-face cardiac rehabilitation through telephone-based support with the aim of improving both enrolment and completion rates. While the use of the telephone is not a new or an emerging technology the whole of system approach taken to improve access to cardiac rehabilitation is a useful example of the utilisation of a different medium to complement existing services.

Evaluation of the CATCH program demonstrated patients who participated in telephone cardiac rehabilitation have fewer readmissions to hospital (13.8% v 30.3% patients) and shorter lengths of stay when readmitted (3.74 v 6.70 days) compared with participants who declined cardiac rehabilitation. Evaluation of clinical data through patient follow up indicates positive trends on several clinical parameters including lipids, particularly evident at six months post completion (LDL 2.77 at pre-assessment v 2.08 at 6 month review). These reduced admissions and improvements in clinical parameters demonstrate more effective out of hospital care of these patients, reducing the burden of their disease on the health system.

The CATCH telephone program provides patient centred and accessible care through facilitating opportunities for cardiac rehabilitation participation regardless of the patient's location. Through this service, patients have successfully completed cardiac rehabilitation where they previously had limited options for this service. The program is a patient centred model and incorporates flexibility in timing and program content. The establishment of a central referral point has markedly increased referral rates from 12% in 2011 pre-CATCH to 95% in 2015 with all eligible clients within a defined geographical area being offered a cardiac rehabilitation service.

Success of the program resulted in expansion across all of country SA. To ensure all eligible clients across country are offered a cardiac rehabilitation service, electronic referrals directly linked to coded hospital admission data has recently been introduced resulting in a 20% increase in cardiac referrals from the previous year.

Virtual Clinical Care Home Telemonitoring Service

The Virtual Clinical Care Home Telemonitoring Service (VCC) is the first of its kind for SA Health. This telemonitoring service model has been built upon the existing platform of remote support for point of care testing provided by the Integrated Cardiovascular Clinical Network CHSA (iCCnet) and the local CHSA nursing and coordination services provided through the Better Care in the Community program.

VCC provides home telemonitoring for people with chronic conditions (eg chronic obstructive airways disease, heart failure, diabetes, hypertension etc).
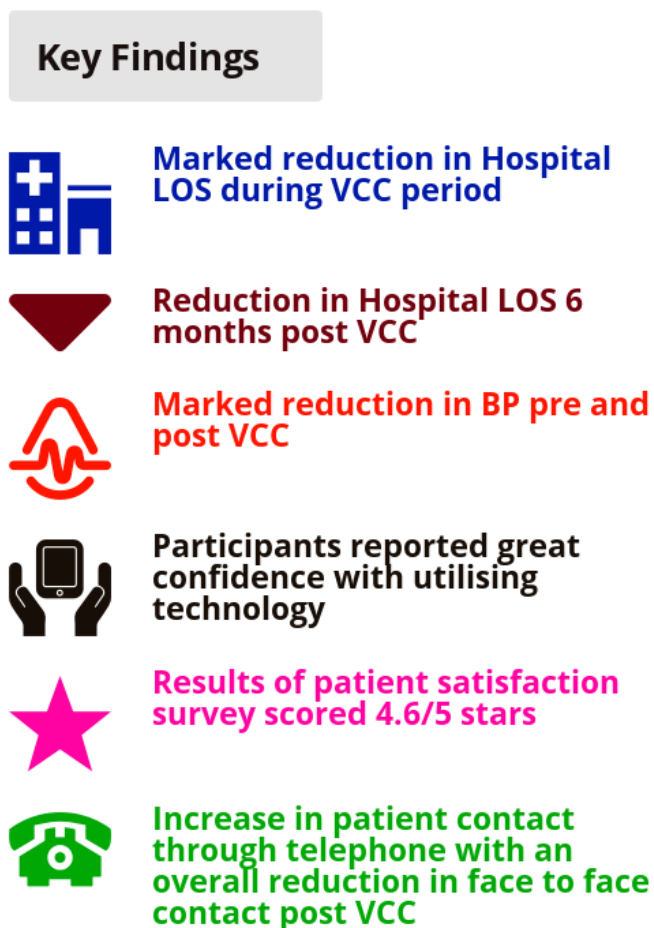
Patients are provided with equipment (eg pulse oximeter, glucometer, scales, blood pressure monitor) linked to a telehealth device, that transmits clinical information to a secure database which is monitored daily by clinical staff located across country SA.

Since April 2015 this initiative has supported over 200 patients in their home. Results outside the patient's normal limits trigger a planned, proactive approach from the healthcare team.

Improving the access to clinical information for patients and their health care team is a vital aspect of VCC, enabling earlier detection of symptom changes. Earlier detection of symptoms may prevent disease from worsening and leading to hospital admission. Patients have been able to link their behaviours to changes in their clinical results leading to greater understanding and improved self-management.

Evaluation of the VCC service has included feedback from staff and patients, clinical data analysis and pre and post patient survey data to determine attitudes to using the technology, patients' ability to self-manage their chronic condition(s) and their satisfaction with the service. Patients surveyed pre and post-monitoring reported improvements in overall healthy living, managing their condition and taking action on early warning signs and symptoms. (Figure 2).

Figure 2   Key Findings VCC Implementation Phase

Key Findings

Marked reduction in Hospital LOS during VCC period

Reduction in Hospital LOS 6 months post VCC

Marked reduction in BP pre and post VCC

Participants reported great confidence with utilising technology

Results of patient satisfaction survey scored 4.6/5 stars

Increase in patient contact through telephone with an overall reduction in face to face contact post VCC

While a number of commercial products are available, from October 2016, CHSA chose to invest in equipment and expand our in-house system capabilities. An in-house product allows greater flexibility to adapt the content and add to over time to suit a range of services and environments in country SA. A challenge for any stand-alone database is the linkages between and compatibility with other clinical data sources.

VCC—other applications

Community paramedics and chronic condition nurses are utilising VCC equipment in collaboration with remote Aboriginal Health Clinics to provide a chronic disease risk screening service for Aboriginal people living in remote communities with limited access to health services. Screening includes: Blood Pressure, Atrial Fibrillation, Blood Sugar Levels, Pulse, Weight and Foot Screening. People identified at risk of chronic conditions receive any immediate care required, with referral to other health providers for further treatment or follow-up as indicated.

SA Virtual Emergency Service (SAVES)

Commencing in February 2017 patients and health professionals in country South Australia now have access to additional medical support as part of an innovative new service. Learning from the Western Australian Emergency Triage Service, SA has developed a model to fit within our context and in response to local and regional needs.

SAVES provides remote medical assistance to triage category three, four and five patients presenting to accident and emergency areas at hospitals when the resident GP is unavailable between the hours of 11pm and 7am.

The SAVES program is now available in 16 regional hospitals. GPs based at the Rural Doctors Workforce Agency site in Adelaide link with patients and their local health workers in country emergency departments via video-conferencing to conduct face-to-face consultations.

This additional support enables local GPs and nursing staff to provide safe care as close to home as possible for those in rural and remote communities.

Provision of Custom Footwear using 3D Scanning Technology

Provision of functionally appropriate footwear for clients across country South Australia is challenging. This is especially true in the remotest parts of the state where access to any sort of shoe shop is limited.

Using a portable 3D foot scanner linked to computer assisted design and manufacturing (CAD/CAM) has resulted in increased access to footwear that is clinically and functionally appropriate, looks good and is cost effective irrespective of where the client lives.

Strong foundation on which new uses of technology can be built

Remote networks of support coupled with quality, accessible clinical data complement local services on the ground across country SA providing a robust and sustainable framework in which to embrace new and emerging technology.

A platform or foundation has been established in CHSA through the network of videoconferencing (DTN), point of care testing and remote clinical support coupled with flexible local and regional services that has been and will continue to be built on over time.

The CHSA Integrated Cardiovascular Clinical Network (iCCnet), was established in 2001 to support country doctors to practice evidence based cardiac care, in response to the poorer outcomes reported for SA country patients compared with those in metropolitan areas. By 2008 all country hospitals were linked to the iCCNet ensuring that for all patients presenting at a country hospital with a cardiac concern, local medical staff are able to carry out point of care testing (PoCT) and link with a Cardiologist to confirm next clinical steps.

Outcome results showed the iCCnet was closing the gap between rural and metropolitan hospital mortality for Acute Coronary Syndrome. A publication in the Medical Journal of Australia in 2014 reported a 22% reduction in 30 day Acute Myocardial Infarction mortality across country South Australia.[3]

Point of Care Testing

iCCnet have a significant role in managing one of the largest PoCT networks across Australia with more than 450 instruments implemented across country SA. All PoCT instruments are embedded into a quality framework which includes instrument quality control and assurance, competency assessment and regular education for all users. The quality framework, along with 24/7 technical support is managed by clinical scientists at iCCnet in Adelaide.

Introduction of PoCT enables timely and evidence based treatment of country patients, particularly for hospitals without an on-site laboratory. In some cases, PoCT helps to prevent the unnecessary transfer of patients that require constant monitoring to a regional or metropolitan hospital.

All PoCT results are electronically transferred to The Integrated Point of Care Clinical Systems (iPOCCS) database, making the results available to all members of the health team caring for the patient.

Embedding the utilisation of technology into service models, structures

It is vital that technological initiatives are embedded within a foundation of local services thereby ensuring timely responsiveness to patient issues requiring direct patient care. Embedding technology within service models as one way or an alternative method of providing a service where it forms part of the tool box for clinicians rather than viewed as a separate, stand-alone initiative is important.

CATCH, VCC and SAVES are good examples of embedding technology within services in country SA to enhance and complement on the ground services providing an alternative way of supporting people with acute illness and chronic disease.

Digital intelligence and access

It is important that CHSA keeps up to date with technology ensuring staff have the ability to utilise and navigate systems and tools with appropriate access and connectivity at all times (clinician mobility) required for service provision.

CHSA will also continue to advocate for our remote populations to ensure they are able to benefit from advances in technology through appropriate connectivity. Consumers have been and will continue to be involved in the development of new models of care utilising technology and also informed about the use of technology to improve access to health services. It is vital that people of all literacy levels benefit from exciting advances in health care. National initiatives such as those led by

the *Broadband for the Bush Alliance* are vital where the goal is 'Fast and reliable Internet for remote and rural Australia'.[4]

It is important that we also acknowledge and address issues of equity of access to digital technology. We know there are 'dead spots' with network coverage and challenges with bandwidth in some locations. We also cannot presume the same levels of digital literacy across all groups in CHSA. The challenge for rural health services is to introduce technology in a way that includes consumers rather than inadvertently contributing to widening the gap in health service access and further impacting on the gap between health outcomes for people living in remote and very remote areas compared with those living in urban or near-urban areas.

One strategy is to ensure patients have access to their own clinical information enabling them to make informed choices more easily and to proactively contact health care team as required.

Many rural health services have embraced technology to improve service access, and there are great examples of technological advances in Queensland and the United Kingdom of which we aspire to achieving. CHSA has built a foundation on which we have commenced the implementation of technology-enabled services. We recognise that a sustainable change such as this takes time and requires strategic vision, cultural change, bold leadership and embedding technology into service models. Continuing to work towards a vision of every household being enabled to access health services through technology requires commitment over the longer term and ongoing collaboration with country consumers.

Recommendations

- At a National level how can technology be better embedded into health services?

- How can we challenge historic models of health care provision to enable more utilisation of appropriate technologies?

- How can ehealth policies benefit those with the greatest need for improved access to health services (ie people living in rural and remote communities)?

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Presenter

Karen Dixon is the Manager Strategic Clinical Change for Country Health SA Local Health Network where a key aspect of her role is to identify and facilitate innovative opportunities for improving access to health services for people living in rural and remote South Australia. She oversees a range of programs and change processes while strongly advocating for country consumers and health workers. Karen seeks innovative ways to overcome the challenges faced by the tyranny of distance, with a recent example being the successful implementation of the Virtual Clinical Care Home Tele-monitoring program for people living with a chronic condition(s) in country SA. Karen has a background in occupational therapy and a strong commitment to reducing the disparities between health outcomes for people living in rural areas as compared to their city cousins as evidenced by the 15 years she has worked in rural health.