CSIRO DIGITAL PRODUCTIVITY AND SERVICES
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CSIRO Submission to Queensland Parliamentary Inquiry into Telehealth Services in Queensland

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The CSIRO Digital Productivity and Services Flagship is partnering with Queensland Health in an unincorporated Joint Venture, the Australian e-Health Research Centre (AEHRC). The AEHRC developed and carried out a number of mobile health and telehealth trials in Queensland and elsewhere in Australia over the past 10 years. Details of these trials and their key outcomes are given below.

CSIRO sees the emphasis on telehealth to be more than simple video-conferencing and includes any mechanism of providing remote care to patients. All of the AEHRC trials have been to implement a delivery model of care that captures patient data in a community, remote health clinic or home setting. Health Services can then use that information to improve health service delivery and empower the patient to better self manage their health. This approach has the ability to increase the quality of care and access to health services for patients while increasing the productivity of the health service. CSIRO has worked with Queensland Health staff in many of its programs. The feedback from the Queensland staff is that they are keen to see further roll out of the technologies and programs we have co-developed. We are currently working with Queensland Health to see our mobile rehabilitation platform and secure store and forward telehealth platform technologies are used more widely.

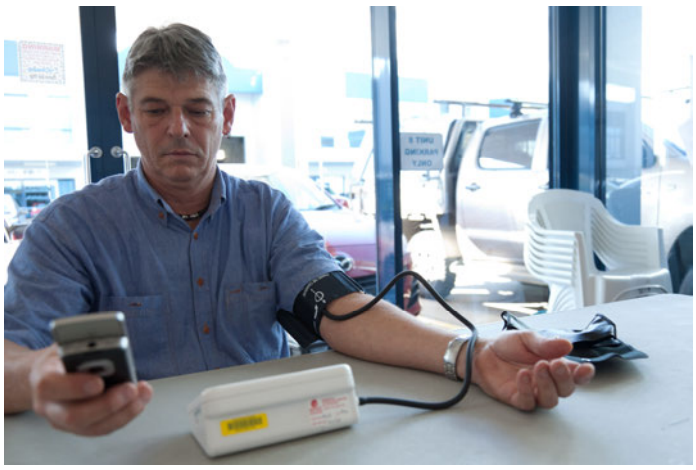
Further information on these programs of care, technologies and trials is available on request.

1. Care Assessment Platform: Mobile phone-based cardiac rehabilitation service.

Cardiac Rehabilitation (CR) is a coordinated, multifaceted intervention designed to optimise a cardiac patient's physical, psychological, and social functioning. Studies have shown that completion of a Cardiac Rehabilitation program can reduce the incidence of a second heart attack by 40%.. However, utilisation of traditional, centre- or hospital- based programs is on average less than 20% of those patients eligible in most developed countries. To overcome this, AEHRC in collaboration with Metro North Health Services, Queensland Health, designed and developed an ICT-based home care delivery model using smartphones and a web portal, to deliver CR. This was called the Care assessment Platform (CAP). The smartphone was used to capture patient data via a health diary app and deliver educational and motivational multimedia content. The web portal updates patient information to the care mentor to provide video/voice weekly consultations.

In 2013, the CAP CR model was validated in a randomised control trial among 120 patients with myocardial infarction, eligible for CR. The outcome of the trial demonstrated that 30% more home based patients completed CAP CR compared with traditional CR programs. Moreover, the CAP CR is as effective in improving the health outcomes of CR patients as that of the traditional CR program. The conclusion of the trial found that the CAP CR program is a valid alternative tele/mobile health delivery model for CR

programs. Offering a mobile phone-based program to cardiac rehabilitation patients will see greater completion of cardiac rehabilitation and hence a significant reduction in second heart attacks.



The AEHRC is now working with Metro North Brisbane HHS to develop further models of mobile care technology for other cardiac and chronic disease patients. AEHRC is also working with other health service providers to develop mobile phone-based models for other disease types. These include Metro South Brisbane HHS to trial a program for stabilizing insulin dosage for diabetic patients and the UQ Centre for Clinical Research for Parkinson's Disease patients (see below).

2. Parkinson's disease trial

Parkinson's disease (PD) is the second most common neurodegenerative disorder after Alzheimer's disease, and in 2011 impacted one in every 350 Australians. Its prevalence is predicted to increase by over 80% in the next two decades. People living with PD experience a gradual worsening in symptoms including tremor, rigidity, difficulty in movement such as walking, difficulty in swallowing, and cognitive decline. While there is currently no cure for PD, pharmaceutical and surgical interventions help many patients manage its symptoms. However, clinical decision-making is often complicated by the variability of the patient's experience of the disease.

Mobile health technology holds the promise of better informing clinical decision making, and facilitating more personalised treatment, through the use of smart phones and sensors to gather objective measures of the patient's experience of the disease.

AEHRC is collaborating with the University of Queensland's Centre for Clinical Research via the Asia-Pacific Centre for Neuromodulation (APCN), and their clinical partners at St Andrews War Memorial Hospital, to investigate the role of m-health in clinical decision making for people with PD. One study we are pursuing seeks to quantify the change in symptoms experienced by a person with PD undergoing a surgical intervention called Deep Brain Stimulation (DBS).

3. NBN Tele-eye care service to the Torres Strait

This is one of the two CSIRO-led projects that have been successful in receiving funding from the competitive Broadband-enabled Telehealth Pilots Program administered by the federal Department of Health.

For the past year, our researchers have been working with the Torres Strait-Northern Peninsula Hospital and Health Service and the Indigenous and Remote Eye Health Service (IRIS) to set up a remote eye screening service at Badu Island, Thursday Island and Bamaga—giving hundreds of people access to specialist eye care. For patients, this eliminates a round trip for the care of some 5 hours, and saves Health services funds that would otherwise be used to pay for travel.

Our Remote-I system utilises local nurses and clinicians to conduct routine 15 minute retinal screenings, often as part of hospital or scheduled health clinic visits. Our software securely sends high resolution retinal images taken in the screening to ophthalmologists in Brisbane, via satellite broadband.

With the Remote-I, a Brisbane-based ophthalmologist can screen up to 60 retinal images per week, and can efficiently schedule patients for surgery or recommend treatment to ease their conditions.

Preliminary results from a review of data collected shows that only three out of 82 patients screened had a sight-threatening condition and required an immediate referral. Previously, those 79 patients with no problems would also have needed to travel unnecessarily.

Analysis of diagnosis data to date also indicates 60 cases of diabetic retinopathy (DR) have been picked up (28 in WA and 32 in Qld). Critically, in both Qld and WA, two patients were diagnosed with Proliferative DR and two with severe Non-prolific DR. Diabetic Macula Oedema was noted in 48 patients to date (23 in WA, 25 in Qld).

By June 2014, the Tele-Eye Care trial will have screened 900 patients in remote WA and QLD. In addition to streamlining health care processes, the trial is collecting a lot of data, which is where the science gets interesting. These collected images will be used by part of the Tele-Eye Care project to study blood vessel patterns in retinas. Algorithms will then be designed to automatically detect particular eye diseases to aid diagnosis in routine screenings. Although tele-ophthalmology has been around for many years, this is the first time anyone has looked at image processing techniques to automatically detect eye defects in routine screening environments via satellite broadband.

Being able to provide diagnoses on the spot will make a huge impact on delivering faster, more cost effective eye care services to the outback and prevent blindness.

4. Telehealth Home Monitoring of Chronic Disease for Aged Care

CSIRO, with funding from the Federal Department of Health, is running a national trial of telehealth home monitoring. With six sites in five states it is the most comprehensive trial yet run in Australia and will gather health care outcomes and socio-economic evidence of the effectiveness of this service model. The aim of the trial is to develop a robust business case and business model for large scale deployment of telehealth services.

Our broadband enabled telemonitoring program provides an opportunity to demonstrate how telehealth services for the management of chronic disease in the community can be deployed nationally at scale. The outcomes of the trial will show how telehealth home monitoring can address the escalating costs of chronic disease health service delivery and provide health force efficiencies. CSIRO is also developing new ways of detecting, on a daily basis, changes in the health status of patients being monitored so that their care team can be advised to take prompt and effective action at the right time to avoid unnecessary hospitalisation.

CSIRO is partnering with public and private providers in this trial. Three test sites are located within public sector (Local Health Districts) community-based health services, one within a Hospital setting and two located within not for profit community health service organisations operating in the non-government

sector. Each site will enrol 25 Test patients who will be provided with home monitoring services and 50 Control patients who will receive normal care.

The trial will be finishing in late 2014 and is on track to collect significant data about the patient and whole of system benefits of telehealth home monitoring.

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