



THE UNIVERSITY
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AUSTRALIA

CREATE CHANGE

Centre of Research Excellence in Telehealth

Final Report

Funded by the National Health and Medical Research Council



Centre of Research Excellence in Telehealth

Final Report

Acknowledgements

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Introduction

The Centre of Research Excellence in Telehealth (CRE) was established in October 2013 with funding from the National Health and Medical Research Council (NHMRC) (APP1061183) and concluded in 2019. The aim of the CRE was to accelerate the research agenda in telehealth using a dual approach: to examine the effectiveness of telehealth strategies in a variety of clinical settings and to secure a better understanding of the enablers of and barriers to the implementation of telehealth.

Telehealth refers to the delivery of health services in circumstances involving separation in location and/or time, using information and communication technologies.

The CRE’s research team focused on the implementation of telehealth in a variety of locations and facilities

underserved by health professionals, including residential aged care facilities, rural communities, in patients’ homes (home care) and in Indigenous communities. The team also examined technology solutions and current telehealth challenges — economics and business processes — in each setting.

This report offers a snapshot of activities conducted by the researchers associated with the CRE and key outputs generated during the five years of funding 2014–2018. A large number of projects were initiated during that time and only a few highlights can be reported in this document. Importantly, many implementation projects are continuing beyond the duration of the CRE funding.

Summary of achievements

The CRE was established in 2013. Eighteen Chief and Associate Investigators from six universities aspired, through their research and advocacy, to accelerate the implementation of effective telehealth strategies in Australia. They sought to raise the quality and influence of research in telehealth to better inform implementation.

A particular research focus of the CRE was to identify enablers and barriers to the implementation of telehealth in Australia. The team progressed the thinking around these issues, transforming the concept into a dynamic consideration of the implementation challenges. Barriers are not a series of problems to be solved in a single time point. Attention needs to be given to the configuration of technology, information sharing, funding incentives, workforce training and acclimatisation, modification of work flows and, more broadly, change management. If all ingredients are not adequately addressed, service establishment will be slow or may fail. Recognising the importance of careful preparation for a telehealth program led to the CRE producing a guide to assist health service teams in their telehealth implementation ‘Innovation to Implementation for Telehealth: a practical guide for knowledge translation for telehealth.

The team established partnerships with a variety of healthcare delivery agencies to ensure research was grounded in day-to-day practice. Notable and enduring collaborators included BUSHkids, the Royal Flying Doctor Service, many metropolitan and rural health services across Queensland, particularly Metro South Health in Brisbane, and Indigenous communities in south-western Queensland and the Torres Strait.

To support their research, the team sourced an additional \$26.5 million in funding from organisations including the NHRMC, departments of health and other service provider agencies.

Developing a workforce of telehealth researchers was a major goal for the CRE. The CRE recruited eight postdoctoral researchers and offered PhD scholarships to nine students.

In total, 40 Higher Degree Research students were actively supported by the CRE.

Together, over the life of the CRE, the team produced 236 publications and made 259 conference presentations. More than half of these publications were in journals not specifically dedicated to telehealth, reflecting the increasing importance of telehealth within other health disciplines. The team published a series of instructive papers in the Journal of Telemedicine and Telecare that were designed to assist researchers to improve the quality of their research in telehealth. This series had generated over 13,000 downloads at the time of writing.

In addition to journal publications, the CRE disseminated knowledge about its work through its website, social media, public forums and scientific meetings.

The CRE’s research revealed enormous potential for telehealth beyond the original concept of providing videoconference services to rural and remote communities — essentially to be a substitute for conventional consultations. This potential encompasses a variety of strategies — including email and text, telephone, remote monitoring, store-and-forward mechanisms and artificial intelligence — to provide advice and support to patients. We envisage wide application of such methods in metropolitan practice, primary care and other healthcare settings that will radically re-engineer the way patients interact with the health system.

The CRE concluded its activities at the end of September 2019. To mark the occasion, the CRE team invited federal and state health departments and health industry leaders, academics and service providers to a policy forum in October 2019 to consider how potentially disruptive telehealth strategies can be integrated into standard practice in Australia. Ultimately, the aim of the CRE was to improve patients’ lives by improving access to health expertise, and this will be accelerated by careful review of policy and funding arrangements.

Professor Len Gray, CRE in Telehealth Lead Investigator



The Team - Chief Investigators



Professor Len Gray

Professor Gray was the lead investigator of the CRE. He is the Director of the Centre for Health Services Research (CHSR) within the Faculty of Medicine at The University of Queensland (UQ). Before assuming this role, he directed both the Centre for Online Health and the Centre for Research in Geriatric Medicine, which have been incorporated into the new CHSR. He occupies the Masonic Chair in Geriatric Medicine. His research interests focus on e-health and telehealth strategies, aged care policy, models of aged care service delivery, assessment and care planning systems.



Professor Deborah Theodoros

Professor Theodoros is the Director of the RECOVER Injury Research Centre. She is a Professor of Speech Pathology, and Co-director of the Centre for Research in Telerehabilitation, and the Telerehabilitation Clinic within the School of Health and Rehabilitation Sciences at UQ. Her main areas of research include the development and evaluation of telerehabilitation applications for delivering allied health services into the community, implementing telerehabilitation into mainstream practice, and developing and evaluating interventions for motor speech disorders after brain injury.



Professor Anthony Smith

Professor Smith is the Director of the Centre for Online Health — a foundation centre within the CHSR. He is an Adjunct Professor at Centre of Innovative Medical Technology in Denmark. He is also the Editor-in-Chief of the Journal of Telemedicine and Telecare. Professor Smith has more than 18 years research experience in planning, implementing and evaluating telehealth applications to benefit clinicians and patients in regional and remote areas of Australia.



Professor Trevor Russell

Professor Russell is a Professor and Head of Physiotherapy at UQ and is director of the Masters of Physiotherapy Studies program. He is founder and co-director of the Centre for Research in Telerehabilitation and the UQ Telerehabilitation Clinic. His primary research interests include validating rehabilitation assessments and treatment interventions performed at a distance via mobile technologies and telecommunication tools and implementing these into clinical services.



Professor H. Peter Soyer

Professor Soyer is the Director of the Dermatology Research Centre (DRC), UQ Diamantina Institute, UQ Faculty of Medicine and Director of the Dermatology Department at the Princess Alexandra Hospital, Brisbane. His primary research focus is the early detection of melanoma using new imaging technologies combined with teledermatology.



Professor Jennifer Whitty

Professor Whitty is Head of the Health Economics Group at the Norwich Medical School, Faculty of Medicine and Health Sciences at the University of East Anglia, United Kingdom. She is also an Honorary Professor at UQ. She leads multidisciplinary research projects in health economics and health services research. Her research has retained a consumer-centred focus, evaluating patient and public preferences, choices and values around health and healthcare delivery.



Professor Nicole Gillespie

Professor Gillespie is a Professor in Management and KPMG Chair in Organisational Trust at UQ Business School, and International Research Fellow at the University of Oxford. Her research in the health sector focuses on trust in health organisations and their services, the implementation and adoption of technology-enabled health services, and organisational and practice change. She has conducted research in a range of health contexts, as well as in other sectors including financial services, resources, higher education, defence and not-for-profits.



Professor Noel Hayman

Professor Hayman is the Director of Inala Indigenous Health Service, which he started in 1995. Queensland's first Indigenous doctor, Professor Noel Hayman is recognised for his work in Indigenous health and his mission to improve the life expectancy of Indigenous Australians. As a Wakka Wakka and Kalkadoon man, he was one of the first two Indigenous medical students to graduate from UQ in 1990.



Associate Professor Tracy Comans

Dr Comans is an NHMRC Boosting Dementia Research Leadership Fellow in CHSR, UQ, where she leads the Health Economics Research and Modelling Unit. Her research involves applying economic models to investigate the cost-effectiveness of healthcare interventions and leading and developing health services research focusing on older people, allied health and rehabilitation services.

Associate Investigators

Dr Nigel Armfield	The University of Queensland
Professor Elizabeth Beattie	Queensland University of Technology
Professor Peter Brooks	University of Melbourne
Dr Liam Caffery	The University of Queensland
Professor Colin Carati	Flinders University
Dr Sisira Edirippulige	The University of Queensland
Dr Melinda Martin-Khan	The University of Queensland
Professor Anthony Maeder	Flinders University
Professor Paul Scuffham	Griffith University

Post-doctoral Research Fellows

The CRE funded several postdoctoral research fellow positions that were occupied during the duration of the CRE by the following researchers: Dr Natalie Bradford, Dr Anna Finnane, Dr Anne Hill, Dr Helen Haydon, Dr Joanna Kho, Dr Redzo Mujcic, Dr Maike Neuhaus and Dr Centaine Snoswell.

Other postdoctoral research fellows who also made significant contributions to the CRE’s work were Dr Danette Langbecker and Dr Farhad Fatehi.

Affiliates

The CRE Chief Investigators invited a number of collaborators to become Affiliates of the CRE, inviting them to be involved in the CRE activities in recognition of their experience and contributions to telehealth research. The CRE team is grateful for their support.

Dr Matthew Bambling	UQ Medicine
Dr Clare Burns	Metro North Health/UQ Health and Behavioural Sciences
Associate Professor Belinda Goodenough	University of Wollongong
Dr David Hansen	CSIRO
Dr Nicole Hartley	UQ Business School
Professor Monika Janda	UQ CHSR
Dr Mohan Karunanithi	CSIRO
Associate Professor Anthony Russell	Metro South Health and UQ
Dr Tori Wade	University of Adelaide
Professor Elisabeth Ward	UQ Health and Behavioural Sciences

Program Manager

Dr Dominique Bird	The University of Queensland
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Summary of outputs

Outputs were collected for just over five years, between October 2013 and December 2018.



236 Publications
58% of journal articles in non-telehealth publications



Research income 2014-2018
\$26.5m as chief investigators
\$21.5m as collaborative investigators



Students (Higher Degree Research)
Oct 2013-Sept 2019
9 started prior to CRE
31 enrolled
10 PhDs completed
1 MPhil completed



348 presentations
259 at conferences



46 Public forums



The CRE in action

Tuning in to local learnings about dementia

UQ's Centre for Online Health has been collaborating with Aboriginal and Torres Strait Islander communities and the Australian Department of Health to improve dementia care for people.

The project, DREAMT (Dementia, Regional and Remote, Empowering, Aboriginal and Torres Strait, Medicine, Telehealth), implemented a new way of assessing and caring for people with early-onset dementia. Initiated during the CRE, the service is scheduled to continue until mid-2020. Indigenous health workers screen people in the community to help identify dementia and telehealth (video consultations) is then used to provide specialist geriatric consultations.

The service is for Aboriginal and Torres Strait Islander people and their carers living in rural and remote Queensland and runs from local health services, meaning people don't have to travel to major cities to access care.

The Centre for Online Health worked with the communities of Charleville, Cunnamulla, Cherbourg and Torres Strait for DREAMT. According to Auntie Mischa Fisher, one of the health workers from Cherbourg, "Dementia services are really needed in our community".

Dementia education and training has been provided to the health staff as well as to the communities. [Two films](#) written, directed and produced in close collaboration with the health workers, are being used to educate people with early-onset dementia and their carers. The films are also being used nationally to educate medical staff, allied health workers and Aboriginal and Torres Strait Islander health workers.

Professor Anthony Smith heads several major projects in telehealth, all focusing on providing remote communities in Queensland with improved access to specialist services for common medical conditions.

"We implemented telehealth strategies to improve access to specialist aged care services for carers and people living with dementia. A videoconference appointment can bring together the patient, the carers, the health workers, the local medical team, and the specialist all in one room — without the need for a full day of travel."

Community-controlled Aboriginal Medical Services and Health Services provide a range of telehealth-supported dementia services, including screening, treatment, patient support, and community awareness across rural and remote Queensland. Medical specialists from two hubs in Brisbane and Cairns use telehealth to consult with Indigenous people and their local health workers. Telehealth equipment has been installed and local staff have been given training in how to use it.

This project would not have been possible without the contribution of the communities involved. We acknowledge the Traditional Custodians of the land, and pay respect to Elders past, present and future, and acknowledge Aboriginal and Torres Strait Islander people's relationship with Country and their cultural and spiritual beliefs.

Rethinking diabetes care - REMODEL

Using modern society’s love of mobile technology and



personalised data to counter Australia’s fastest growing chronic disease is at the heart of an exciting ongoing project by UQ’s Faculty of Medicine.

Associate Professor Anthony Russell from the CHSR and Metro South Health heads up an integrated program known as REMODEL, tasked with reducing the impact of diabetes.

Every day, 280 Australians develop diabetes, with self-management of blood glucose levels forming a central part of the healthcare response.

“REMODEL works on the basis of a Bluetooth glucose meter that is paired with a mobile app and a web portal so patients can upload their self-management data and receive automated feedback. Importantly, clinicians also have access to that data,” Dr Russell said.

“The primary aim is to encourage optimal blood glucose management over a long period.

“We know if we can do this, we will keep people out of hospital.

“The potential is there to reduce complications associated with this chronic disease by 30–50 per cent.”

So far, trials have been successful, with the first targeted demographic being those with type 2 diabetes (also known as adult onset diabetes).

The average age of the first wave of participants was 59 years, but the potential exists to assist younger generations and those with type 1 diabetes (also known as juvenile diabetes).

“The only requirement is that you have to be able to use a smart phone,” Dr Russell said.

“The program’s app allows users to review what they have been doing and also provides links to further help with their self-management, if required.

“Although the primary aim is to prompt the patient to reflect on their circumstance and management strategy, if there is a significant issue they are advised to contact their health professional immediately.

“Foremost, however, we are trying to provide feedback to patients at the right place and right time so they can avoid any issues worsening and to also reduce the burden on healthcare facilities and personnel.”

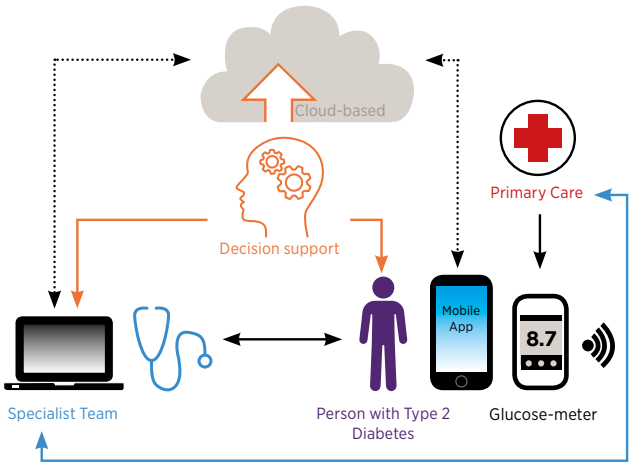
Funding from the Medical Research Future Fund has been provided to further investigate the barriers to diabetes care and the practical implementation of REMODEL.

General practitioners, patients and health professionals will all be consulted, with the aim to fine-tune the technology and counter any obstacles.

Dr Russell’s presiding ambition is to provide integrated care for people with diabetes across the health spectrum.

“If REMODEL can help us all be on the same page; that’s the goal,” he said.

The project is a collaboration between UQ CHSR, Metro South Health and CSIRO.



Telehealth boosting services for kids in the bush

BUSHkids is a long-standing, community-based, not-for-profit organisation that provides early allied healthcare intervention, education and prevention programs to children and their families in rural areas of Queensland.

A research collaboration between BUSHkids and the CRE was established to examine the impact of introducing telehealth as a mode of service delivery for the organisation.

A stakeholder needs analysis identified health services gaps within the community, and determined that psychology and speech pathology services could be successfully delivered via telehealth, along with a parent education webinar about children’s readiness for school called ‘A Steady Start to School’.

The BUSHkids telehealth project was led by Professors Deborah Theodoros and Trevor Russell with assistance from Professor Nicole Gillespie and Dr Nicole Hartley, and was the focus of the research of PhD candidate Jessica Campbell. Ms Campbell said the project had been successful in several ways.

“Firstly, the three telehealth services trialed improved access — or provided comparable access — to services that are similar to in-person consultations, had cost benefits, had similar clinical or learning outcomes to in-person delivery, and were highly satisfactory to parents and providers.

“Secondly, BUSHkids has continued using telehealth after the data collection period, expanding the telepsychology service to a full-time role.

“Thirdly, BUSHkids has built internal capacity to plan and deliver telehealth services. For example, we co-developed a customised set of training modules and a telehealth guideline for BUSHkids to use into the future.”

The study highlighted the importance of both clinicians and parents as key agents in the implementation of telehealth for rural children.

“It has been incredibly satisfying to do practice-based research that has an immediate and direct impact on real services for rural, regional and remote children and families,” said Professor Theodoros.

“The BUSHkids community was really interested and involved in the research in several ways — in initial consultations and providing feedback on telehealth services.

“The research project has built competence and confidence with a new model of service delivery. This project has been highly successful and is an excellent example of collaboration between researchers and a community partner in translating telehealth into practice.”

BUSHkids CEO, Carlton Meyn, said the project has resulted in positive outcomes for the organisation.

“Strategically, the telehealth project has gone extremely well; it’s been well-researched and well-documented,” Mr Meyn said.

“We now have a telehealth team and have been seeing clients who otherwise wouldn’t be getting services.”





Telehealth becomes an important back-up for the royal flying doctor service in remote Australia

Such was the success of a recent UQ and the Royal Flying Doctor Service telehealth trial for primary care that some recommendations are being adopted before they are formally made.

Dr Melinda Martin-Khan of UQ's CHSR worked with the Royal Flying Doctor Service in four bases across Australia to ascertain how people in remote communities could be better served with the assistance of technology.

"The Royal Flying Doctor Service may visit a town once a month, once a fortnight or once a week, but in between there are also instances where primary care might be needed," Dr Martin-Khan said.

"With telehealth, we can schedule a link-up to cut that wait time in half, for example.

"There might be instances where all somebody needs is a prescription or a follow-up and by using televisual technology, they receive that attention sooner, rather than later.

"Originally, some people were worried this service might replace flights, but they've come to realise it's only meant to complement and improve the service.

"Anything that is an emergency will still be dealt with by an emergency flight or service."

The NHMRC-funded project included customised trials in Charleville (Queensland), Broken Hill (New South Wales), Port Augusta (South Australia) and Kalgoorlie (Western Australia).

However, in each location the local Royal Flying Doctor Service staff were given freedom to design the telehealth offering to suit their personal preferences, capabilities and resources.



“It was a really successful partnership and I believe that’s largely because it wasn’t a regimented research protocol being forced upon anybody,” Dr Martin-Khan said.

“Telehealth clinics were designed largely based on the teams’ level of experience and what they were comfortable with.

“The Royal Flying Doctor Service staff have chosen to continue with the telehealth system, even before the results of the trial are known.

“They can see the benefits and the opportunities already.”

Dr Martin-Khan praised Royal Flying Doctor Service personnel for using “innovative and flexible” approaches to telehealth that provided upsides not immediately predictable.

In some cases, where patients from remote areas travelled interstate for holidays, they were able to maintain contact with the service’s doctors via telehealth.

In another instance, where a town’s scheduled primary care clinic visit from the Royal Flying Doctor Service had to be postponed due to a conflicting emergency, telehealth was used to fill the void.

“If a community only sees the Royal Flying Doctor Service once a month and that plane happens to get diverted, use of telehealth can be extremely valuable,” Dr Martin-Khan said.

“Previously, a competing emergency would mean the end of that clinic, but by using technology, at least an element of contact and care can be provided.

“One of the really pleasing findings was that the amount of technical problems was very minimal throughout the project, so that barrier to adoption was put to rest.”

Professor Nicole Gillespie and Dr Joanna Kho from UQ Business School were collaborators on the project, leading an examination of the change and implementation process at each of the four Royal Flying Doctor Service bases. This work involved travelling to each base, and conducting multiple observations and interviews over time to understand how doctors, nurses and coordinators adapted to the delivery of primary care services via videoconferencing.

“Our research shows that sustained adoption and uptake of telehealth require careful attention to change management practices and processes over time.” Professor Gillespie said. “It’s a dynamic process, and requires a lot more than just technical training and extra resourcing at one point in time.”

Dr Joanna Kho, who conducted the field research, observed: “For telehealth adoption to be effective and sustained, we found it is important to have a strong advocate and champion for telehealth at the base, who took on the responsibility for coordinating and embedding the new systems and gaining staff and community buy-in”.



3D imaging to see a world without melanoma

Melanoma is Australia’s national cancer, with Australians experiencing 12 times the global average incidence. Currently, almost 14,000 Australians are diagnosed with melanoma each year, and it is the most common cancer in Australians aged 15–39 years.

The Australian Cancer Research Foundation and the Australian Centre of Excellence in Melanoma Imaging and Diagnosis, led by UQ, together with The University of Sydney and Monash University, will implement cutting-edge 3D imaging technology, in combination with a telemedicine network, to improve the early detection of melanoma.

Driven by the vision of a ‘World Without Melanoma’, this unique research collaboration will enhance the capacity of clinicians and researchers to detect and understand melanoma. With the assistance of a \$10 million grant from the Australian Cancer Research Foundation, the project will roll out 15 3D total-body imaging systems across Queensland, New South Wales and Victoria, with the potential to expand Australia-wide.

UQ Dermatology Research Centre Director Professor H. Peter Soyer said the centre would combine cutting-edge 3D imaging technology with a telemedicine network.

“Early detection is the key to saving lives and to achieving our vision of a world without melanoma.”

The 3D imaging system takes a total body image in milliseconds, significantly improving the identification and tracking of lesions, while greatly reducing appointment times and healthcare costs.

Australian Cancer Research Foundation CEO, Professor Ian Brown, said the grant would boost the country’s melanoma research capability.

“The Australian Centre of Excellence in Melanoma Imaging and Diagnosis is a world-first approach to improve early detection, tackling the significant national burden of melanoma,” Professor Brown said.

“By providing the machines in capital and regional centres across Queensland, New South Wales and Victoria with the potential to expand the network Australia-wide, linked with innovative telemedicine capabilities, this bold project will enhance the capacity to improve the early detection of melanoma and save lives.”

It is estimated each of the 3D imaging machines will undertake 3,000 examinations each year, resulting in approximately 100,000 digital avatars within three years.

This large data set will add to the capacity of the centre to inform other clinical studies, including the computation of artificial intelligence algorithms to assist clinical decision making.



Highlights from the research themes

The CRE’s research was conducted around key themes:



Indigenous communities



Telerehabilitation in the home



Rural communities



Store-and-forward — teledermatology



Aged care



Business and organisational processes



Health economics



Education and training in telehealth.

The following pages showcase highlights of the work conducted under these themes.



Indigenous communities

Lead researchers: Professor Noel Hayman and Professor Anthony Smith

Indigenous communities often lack access to culturally appropriate medical services, in both metropolitan and rural communities. New models of care need to be developed in collaboration with Indigenous communities for a more consistent approach to routine community-based health services, early detection of chronic disease, and better access to specialist treatment. The following research projects are examples of projects carried out to address these challenges, but growth has been slow. The projects in this theme were multidisciplinary to develop and validate the delivery of allied health services into the home via telehealth and assessed the impact on clients, clinicians, and service providers.



DREAMT

The DREAMT project (**D**ementia, **R**egional and remote, **E**mpowering, **A**boriginal and Torres Strait, **M**edicine and **T**elemedicine and telehealth) is exploring ways of introducing telehealth services for dementia care amongst Aboriginal and Torres Strait Islander peoples living in rural and remote Queensland. Medical specialists from Brisbane and Cairns consult with patients and their local health workers. User perspectives, service utilisation, economic and organisational aspects of the DREAMT project were evaluated. This project is funded by the Australian Department of Aged Care Services.



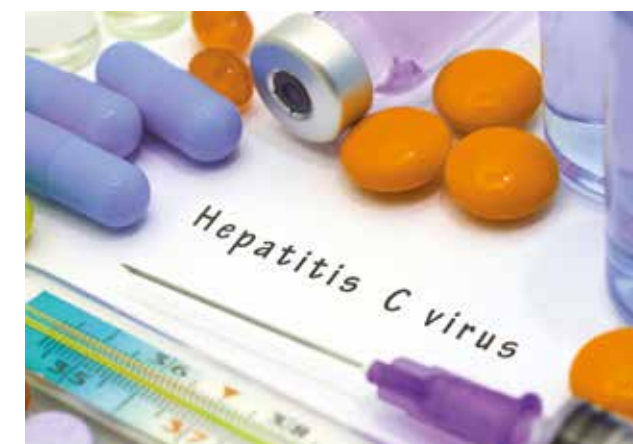
Health-e-Screen-4-Kids

Health-e-Screen-4-Kids transitioned from a small-scale feasibility study in 2007 to a routine community-based ear health screening service in Cherbourg, Queensland. Indigenous health workers conduct routine ear health screening for children using a mobile screening unit. Information collected by the screening service is then made available to local health services to determine the most appropriate form of treatment, if required. The proportion of children screened for chronic ear conditions has increased from 38 per cent to over 80 per cent in the Cherbourg community. This work is supported by funding from Queensland Health.



Hepatitis C treatment and telementoring

A new model of care supports primary care providers at Indigenous Health Services to treat patients with Hepatitis C. A specialist hepatology team at the Princess Alexandra Hospital in Brisbane offers case conferencing services via videoconference to assess patients, prescribe medications, and review progress during the full course of treatment. This work is an initiative of Metro South Health and the Centre for Online Health, funded by Queensland Health.



Telediabetes

The Telediabetes project demonstrated that, in the right circumstances, telehealth can provide Indigenous people with access to diabetes specialists — without the inconvenience and cost of travel away from home. The feasibility and logistical challenges of a telediabetes service in Cunnamulla and Charleville, in partnership with the Metro South Telehealth Service, was explored. The project, involving PhD candidate Dr Sumudu Wickramasinghe, highlighted the complexity of operating a telehealth service in a culturally acceptable and sustainable way.



Telerehabilitation in the home

Lead researchers: Professor Deborah Theodoros and Professor Trevor Russell

Accessing health services in the home is convenient for both adults and children who need allied health services and helps to engage with clients. Personal computers and mobile devices provide the technological capacity to expand this mode of care, but growth has been slow. The projects in this theme were multidisciplinary to develop and validate the delivery of allied health services into the home via telehealth and assessed the impact on clients, clinicians, and service providers.

BUSHkids project

A research collaboration between BUSHkids and researchers associated with the CRE examined the impact of introducing telehealth as a mode of service delivery into the organisation. Jessica Campbell was the recipient of a PhD scholarship from BUSHkids for this project. This project demonstrated that similar or greater access to health and education services could be achieved for people living rurally using telehealth, compared to in-person consultations for psychology and speech pathology. A parent education program was also delivered. This change in delivery mode did not disturb the foundations of clinical or educator practice or identity. The study highlighted the importance of both clinicians and parents as key agents in implementing telehealth for rural children.



Asynchronous home rehabilitation for aphasia

This project evaluated the clinical feasibility of delivering language therapy in the home to people with aphasia, using a platform called eSALT. A speech-language pathologist designed and uploaded personalised therapy tasks for patients to access on a mobile device. The results of the tasks were relayed to the clinician who remotely monitored the patients' progress and modified tasks as necessary. Participants stated the model encouraged intensive therapy practice and enabled independence. The model tasks were delivered flexibly and patients could take breaks as needed. The intensive and tailored therapy with instant feedback was motivating for patients. Dr Anne Hill conducted this project with the support of an Early Career Research Grant from UQ.

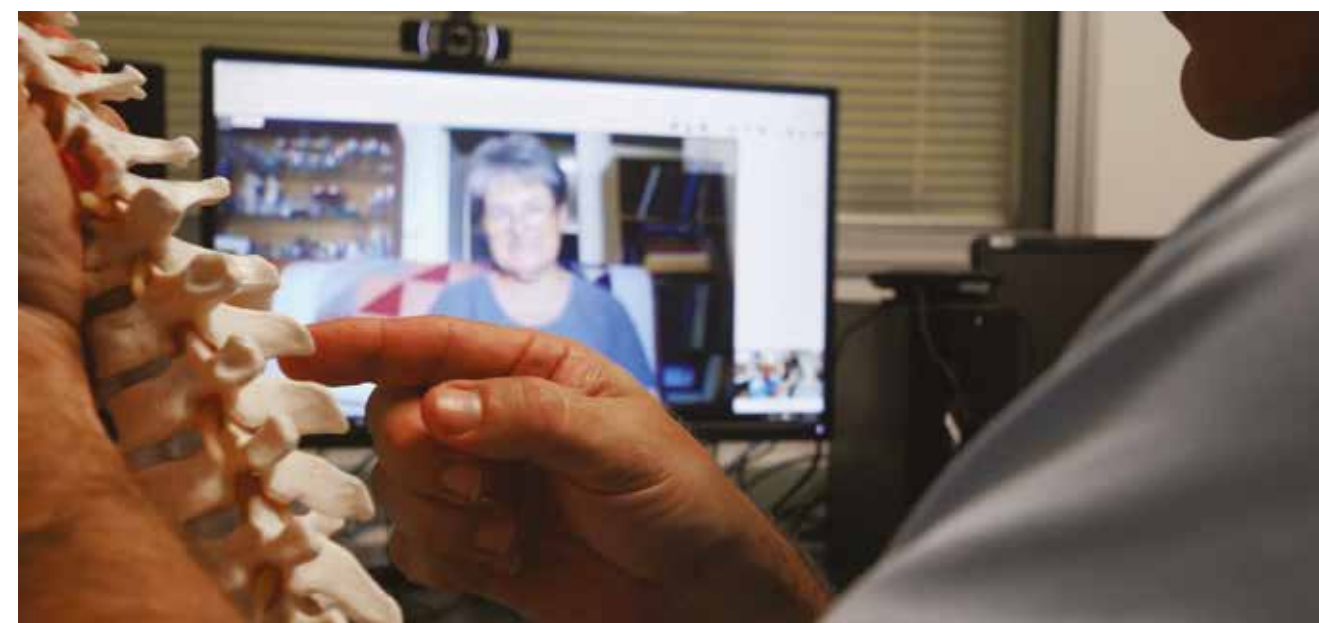


Predicting older Australians' uptake of home telehealth

This NHRMC-funded project examined the factors that are important for older Australians when they are deciding to use home telehealth. People from across Australia were interviewed about their experiences with telehealth and their expectations of healthcare services as they age. This information will be used to design a predictive model to be evaluated in 2020.

Providing multidisciplinary telerehabilitation services in Queensland

The Neurosurgical & Orthopaedic Physiotherapy Screening Clinic and Multidisciplinary Service is an alternative, non-surgical pathway for patients on neurosurgical and orthopaedic specialist waiting lists. For patients living outside Brisbane, access to multidisciplinary rehabilitation services can be difficult. In collaboration with Queensland Health, this project first validated and then developed and implemented a sustainable telerehabilitation service to provide physiotherapy, occupational therapy, psychology, dietetics and pharmacy into the home via videoconferencing. A validity study showed decisions made via telehealth can be trusted, and demonstrated the impact of this service for Queenslanders. This project is the first to utilise the I2I-4-Telehealth implementation guide developed by the CRE team to facilitate telehealth implementation into clinical services. Michelle Cottrell conducted this work for her PhD supported by a scholarship from the CRE.





Rural communities

Lead researcher: Professor Anthony Smith

Over 75 per cent of Australia's hospitals are located in regional or remote areas. The absence of a full range of specialist services in these small rural communities means that patients often have to travel to city-based specialists. Telehealth strategies can enhance access to specialist expertise and provide training opportunities for regional clinicians. Telehealth also promotes continuity of care in the community and reduces the need for patients to travel. The aim of telehealth is to provide access to health services as close to home as possible. The projects in this theme explored the role of telehealth in small rural communities.



Health-e-Regions

The Health-e-Regions project is conducted in partnership with Shell's QGC business with the primary aim of raising awareness of telehealth and improving access to a range of health services in the Western Downs region of Queensland. This whole-of-community project explored the use of telehealth services within hospitals, general practice, and residential aged care settings. In the last couple of years, UQ-led telerehabilitation services have been provided to children in selected schools for speech therapy, physiotherapy and occupational therapy.



Exploring the value of telehealth in primary care: a controlled trial within the Royal Flying Doctor Service

With funding from the NHMRC, researchers worked with the Royal Flying Doctor Service to trial and evaluate the role of telehealth within the service. The evaluation focused on telehealth service models, service utility, potential cost savings, and user experiences. The project provided a clearer understanding of the role of telehealth alongside traditional fly-in-fly-out services.



Development of a telemedicine planning framework

Many telemedicine initiatives do not progress beyond the research phase and are not implemented into mainstream practice, often due to a lack of formal planning to determine community needs and clinical requirements. This project was led by PhD candidate Sharifah Al Dossary and resulted in the development of a telemedicine planning framework based on needs assessment.



e-PIMH Telepsychiatry evaluation

This Queensland Health-funded project involves the evaluation of a telehealth-supported perinatal and infant mental health service (e-PIMH). Children's Health Queensland's ePIMH engages with local service providers to support parents with their mental health needs. Local referral pathways and tailored training and education are being developed for local care providers. Evaluation of this service will inform opportunities for expansion to other health services throughout Queensland.



Princess Alexandra Hospital telehealth service

In close partnership with Metro South Health, UQ's Centre for Online Health manages the day-to-day operation of the Princess Alexandra Hospital's Telehealth Service. This important industry partnership creates the perfect environment to conduct practical research that addresses real-life challenges in the health service. It also fosters close and productive relationships between clinicians and academic staff, who all share a common interest in improving access to healthcare services, especially for people living in underserved locations.



Store-and-forward - teledermatology

Lead researcher: Professor H. Peter Soyer

Using various telehealth methodologies including videoconferencing and store-and-forward methods, teledermatology provides a convenient way of accessing dermatologists' expertise and is expanding worldwide. The projects in this theme focused on skin cancer early detection strategies and on expanding the applications of teledermatology and teledermoscopy.

Total Body 3D imaging system

The \$10 million Australian Centre of Excellence in Melanoma Imaging and Diagnosis will roll out 15 3D total-body imaging machines across Queensland, New South Wales and Victoria, combining cutting-edge 3D imaging technology with a telemedicine network to improve the early detection of melanoma. This project is funded by the Australian Cancer Research Foundation and is a collaboration between researchers at UQ, The University of Sydney and Monash University.

Associated projects funded by the NHMRC and the Medical Research Future Fund are assessing the acceptability and feasibility of integrating a 3D teledermatology network into clinical practice for individuals at high risk of melanoma.

Mobile teledermoscopy

Skin self-examination is important in early detection of melanoma and other skin cancer. This project examined improving skin self-examination with mobile teledermoscopy, combining smartphones with an attachable dermatoscope to send images of skin lesions for dermatological review. The clinical accuracy of mobile teledermoscopy-enhanced skin self-examination versus naked-eye skin self-examination, compared to gold standard in-person clinical skin examination is being determined. The feasibility of monitoring skin lesions on easy-to-see body areas versus difficult-to-see body areas using sequential consumer mobile teledermoscopy is also being examined. These projects are funded by the NHMRC SKin INnovation Partnership Grant and NHMRC Centre of Research Excellence for the Study of Naevi.

Standardising dermatology imaging

This project aims to develop dermatology-specific extensions to the Digital Imaging and Communications in Medicine (DICOM) standard. DICOM is the international standard to transmit, store, retrieve, process, and display medical images and associated metadata. This work will result in dermatology using the same standard as all other medical imaging specialties, leveraging existing infrastructure such as enterprise image repositories, simpler integration of dermatology imaging into electronic medical records, and facilitating teledermatology. Proposed technical guidelines were

published as part of this project. Widespread adoption of these guidelines would be the first step in achieving international standardisation of skin imaging.

Skin emergency teledermatology service

The Skin Emergency Teledermatology Service uses a store-and-forward approach to provide rapid specialist advice for dermatological cases presenting to Queensland emergency departments, where clinicians send images and clinical notes for review by an on-call dermatologist. This service was initially piloted at the Princess Alexandra Hospital in Brisbane. Researchers associated with the CRE conducted a follow-up audit in 2016 that demonstrated ongoing success and growth of the program. The Skin Emergency Teledermatology Service protocol has now been implemented in emergency and Outpatient Departments across Queensland's public health system.



Aged care

Lead researcher: Professor Len Gray

Population ageing is creating an inevitable growth in the demand for aged care services in a context of workforce shortfalls. New solutions are required to deliver accessible, timely, and affordable services to older Australians, a patient group that finds it difficult to travel. The projects identified ways to enable older people isolated by distance or disability to access healthcare services.



Specialist consultations into small rural communities and residential aged care facilities

The CRE researchers refined systems and protocols to support geriatrician video consultations, creating a stable procedure for case preparation, web-based clinical decision support that enables information sharing and communication with GPs, clinics, and sophisticated video consultation. Based on this model, services have been replicated across Queensland, other states and internationally. Continuing work will examine the barriers and enablers to support further take-up of geriatrician video consultations.

Evaluation of the efficacy of specialist consultation into aged care facilities

A controlled trial was implemented in nine aged care facilities in and around Brisbane to examine the impact of specialist geriatrician video consultations on care and health outcomes. This was a challenging trial in which some facilities struggled to provide or maintain sufficient staff for case presentation or hosting of consultations. Overall findings suggest video consultations have the potential to support improved patient outcomes.

Online medication reviews

Australia's medication review scheme is operated by pharmacists who make regular visits to aged care facilities to review complex medication regimes and provide advice to GPs. This project investigated the feasibility, acceptability and cost of an online alternative to traditional visits. Preliminary results suggested that the process is feasible, acceptable to practitioners and has potential cost-savings. Further work is required to examine other parameters.



Business and organisational processes

Lead researcher: Professor Nicole Gillespie

Successfully implementing and adopting telehealth requires careful attention to organisational and business processes. Significant change impacts clinicians, patients, administrators and communities, so effectively engaging these stakeholders is critical because resistance and distrust are common reactions to organisational and technological change. This theme focused on understanding the uptake, adoption and implementation of virtual health services in a variety of healthcare contexts.



Examining telehealth implementation and change processes at the Royal Flying Doctor Service

In many small rural communities, insufficient demand for primary healthcare services results in limited access to services, but fly-in-fly-out access to services delivered by the Royal Flying Doctor Service can be complemented by clinics offered via videoconferencing. Results to date indicate that integrating scheduled videoconferencing clinics requires significant inter-organisational coordination, a comprehensive understanding of and management of change, strong leadership support, as well as stakeholder engagement.

The transformation of work practices to deliver telehealth services

The PhD research of Dr Joanna Kho examined how healthcare professionals adapt to telehealth work. A 15-month longitudinal study of tele-geriatric services to five residential aged care facilities identified how competence was shown, how new service routines were integrated and how relational expertise was developed when professionals transition to virtual health delivery and work contexts. This research provided a picture of how disruptive technology can trigger transformation of professional practice and how multiple routines are coordinated when establishing telehealth services.

A change management framework for telemedicine implementation

While healthcare practitioners and researchers agree that successful implementation of telehealth involves significant organisational and practice change, there is currently no evidenced-based change management framework to guide the implementation of telehealth. A scoping review of the change management strategies used in telemedicine conducted by Dr Joanna Kho was contrasted against change management strategies known to be important for

effective sustained change. This work concluded that the low rates of implementation success may reflect a piecemeal approach and the neglect of key change management practices commonly recognised as important for sustained change.

Predicting home telehealth adoption in the ageing population: consumer perspectives

As part of the broader NHMRC project examining consumer perspectives, a study explored the factors influencing older Australians to adopt home telehealth services. More than 300 respondents revealed key predictors to adoption are trust in telehealth, technology use and anxiety, healthcare habits, dissatisfaction with traditional healthcare, and general online behaviour. A second project interviewed older Australians to understand their attitudes towards in-home telehealth services and a national survey tested a conceptual model of adoption across key market segments. Findings suggest the intention to adopt home telehealth is influenced by the quality of and access to current healthcare services, trust in healthcare and providers, the perceived future need for telehealth, the performance expectations of telehealth, and the perceived ease of using telehealth. Consumers identified potential benefits as enhanced access, service efficiency, convenience, monitoring and cost savings, as well as potential barriers including data security and privacy, connectivity, technology skills, and the need for physical examination and treatment.



Virtual care business models for mobile teledermoscopy

Virtual care using mobile teledermoscopy technologies enables the expansion of dermatology services to patients who are time poor or underserved, and offers new revenue streams and business opportunities to health practitioners. A better understanding of the business features associated with existing commercial ventures may increase uptake and improve the financial viability of mobile teledermoscopy applications as a complementary tool to traditional in-person care models. This project, funded under a broader NHMRC grant and led by Dr Joanna Kho, identified three business elements that support the viability, sustainability and growth of online dermatology services: developing key partnerships, clinician involvement in the design and implementation process, and managing the medico-legal risks and liabilities relevant for each country.

Clinicians' experience of virtual service delivery and trust formation in telehealth

This project revealed how healthcare clinicians experience virtual service delivery and establish trust. The research, conducted by Dr Teegan Green for her PhD, was based on interviews with clinicians and observations of telehealth clinics and determined that six practices are used to establish and maintain trust with patients during virtual service delivery: leveraging face-to-face opportunities; transferring trust via third-parties; conveying competence; normalising telehealth; establishing connections and reading emotions; and providing continuity of care.



Health economics

Lead researchers: Professor Jennifer Whitty and later in partnership with Associate Professor Tracy Comans

Demonstrating the value for money of new technology is vital for decision makers to invest in and drive future uptake and spread of evidence-based interventions. The projects in this theme assessed the costs and benefits of telehealth programs developed during the CRE.



Contribution to economic evaluation methods for telehealth

A methods paper on the economic evaluation of telehealth was published in the 2017 special issue by the Journal of Telemedicine and Telecare. It describes how to tailor health economics analysis methods to telehealth interventions to produce findings that can be applied outside the research environment. A robust economic analysis with appropriately interpreted results can provide a case for service implementation.

Investigating consumer preferences for telehealth

This project examined consumer preferences for dermatology and speech pathology telehealth services. Findings about consumer preferences are valuable to decision makers and commercial businesses when designing services that consumers will access. For example, for teledermatology, consumers preferred to have their images reviewed by a dermatologist rather than by a GP and preferred many of the service components of teledermatology.



Economic evaluation and acceptability of teledermoscopy for skin cancer

This project considered the economic evaluation and acceptability of teledermoscopy services in Australia in the context of skin cancers. Dr Centaine Snoswell was awarded her PhD in 2018 for this work. This research program undertook economic evaluations of teledermoscopy from the perspective of each major stakeholder. Findings showed that teledermoscopy would cost Medicare an extra \$2.10 for each day that diagnosis was expedited. This was consistent with the finding that consumers were willing to pay \$2.20 to expedite their diagnosis by one day. It is hoped this research will accelerate the adoption of teledermoscopy, which may reduce the morbidity and mortality of skin cancer in Australia by reducing time to diagnosis and treatment.

Can telehealth save money for the health system?

This project was a scoping review examining the circumstances where telehealth can save money for the health system, undertaken as part of the NHMRC Partnership Centre for Health System Sustainability, which examined mechanisms for improving the sustainability of the Australian health system. The available evidence indicated that while telehealth provides overwhelmingly positive patient benefits and increases productivity for many services, it does not routinely reduce the cost of care delivery for the health system. Therefore, health services considering implementing telehealth should be motivated by benefits other than budgetary impact.



Education and training in digital health

Lead researchers: In the Centre for Online Health: Dr Sisira Edirippulige, Professor Anthony Smith and Dr Liam Caffery; in the Centre for Research in Telerehabilitation: Professor Deborah Theodoros and Professor Trevor Russell

The Centre for Online Health (CHSR) and the Centre for Research in Telerehabilitation (School of Health and Rehabilitation Sciences) have been developing digital health curriculums and providing education and training within the formal university teaching programs as well as through professional development activities. The CRE was a catalyst to expand the education and training arms of both centres.

Within UQ, digital health education has attracted many students in the centres' various programs. Over the last five years, nearly 2,500 undergraduate and postgraduate students from many disciplines completed digital health education and many are actively contributing to the field of health technology.



Digital health education and training in the medical curriculum

The Centre for Online Health has been instrumental in incorporating digital health education into UQ's medical curriculum, helping the UQ Faculty of Medicine train future medical professionals to work in a digitally enabled healthcare environment.

Training students in the Telerehabilitation Clinic

Clinical training through the Telerehabilitation Clinic in the School of Health and Rehabilitation Sciences has become an integral part of student clinical training programs in speech pathology, physiotherapy, occupational therapy, and audiology.



Providing professional development education in telehealth

The Centre for Online Health and the Centre for Research in Telerehabilitation provide telehealth and digital health education and training for Australian and overseas health workers, including health professionals, health administrators, business executives, health information officers and health policy workers.

Development of digital health curriculum for health professional training

Staff from the Centre for Online Health and the Centre for Research in Telerehabilitation are developing an online education and training program to up-skill health practitioners in digital health and the delivery of services via telehealth. This curriculum will focus on the fundamentals of telehealth, technology, service development and implementation, discipline-specific considerations for service delivery, and evaluation of telehealth. This program is jointly funded by Southern Queensland Rural Health and the Faculty of Health and Behavioural Sciences.

Contribution to scholarship of teaching and learning

CRE member centres made a major contribution to the research and the scholarship of teaching and learning in digital health. For example, a national study of eHealth in the Australian medical curriculum, 'It's important, but not important enough', showed that while eHealth is considered important to clinical practice, competing priorities mean there is little place for it in crowded curriculums.

Improving telehealth awareness and research capacity

The CRE team produced resources to address barriers identified by health service stakeholders. These resources aimed to assist practitioners and researchers in planning, implementing and evaluating telehealth programs.

Knowledge translation guide for telehealth innovation

[Innovation to implementation for telehealth \(I2I-4-TELEHEALTH\)](#) is a knowledge translation guide that outlines seven steps to move from telehealth innovation to implementation, including thinking about the key players. This guide is based on the I2I approach originally developed by the Mental Health Commission of Canada.



Contributions to yearly successes and failures in Telehealth conference

Since 2001, the Successes and Failures in Telehealth conferences have provided a unique forum where real lessons in telehealth can easily be shared. The conference attracts prominent national and international speakers and delegates. The CRE's work featured prominently at the conferences and Lead Investigator, Professor Len Gray, provided an annual update and invited delegates to contribute to the CRE's work program. The conferences provided an opportunity to expand the CRE's extensive list of interested stakeholders.



A snapshot of telehealth policy documents conducted in 2015

In 2015, CRE researchers set out to create a snapshot of policy documents guiding the use of telehealth in Australia. This repository of policy documents included fact sheets, guidelines, policy, position statements and standards. This policy digest also identified policy dimensions covered by each document. It provided a reference point for anyone wanting to review policies guiding use of telehealth in their jurisdiction or health profession, or for groups considering the creation of similar documents for their organisation.

Research methods in telehealth — manuscript series

In conjunction with Professor Anthony Smith (Editor-in-Chief, Journal of Telemedicine and Telecare) and Dr Tori Wade (former Editor-in-Chief), the CRE team produced a series of 10 publications on methods and methodology in telehealth research. The series was published in a special issue of the Journal of Telemedicine and Telecare in September 2017 (journals.sagepub.com/toc/jtta/23/9).

The series offers resources for new researchers as well as innovative methods for implementing telehealth. The series complements the existing literature on research methodologies and methods by providing information and examples relevant to telehealth researchers.

Wade, V., & Smith, A. C. EDITORIAL: [Research methods and methodology in telemedicine](#)

Wade, V., Gray, L., & Carati, C. [Theoretical frameworks in telemedicine research](#)

Fatehi, F., Smith, A. C., Maeder, A., Wade, V., & Gray, L. C. [How to formulate research questions and design studies for telehealth assessment and evaluation](#)

Caffery, L. J., Martin-Khan, M., & Wade, V. [Mixed methods for telehealth research](#)

Langbecker, D., Caffery, L. J., Gillespie, N., & Smith, A. C. [Using survey methods in telehealth research: A practical guide](#)

Clemensen, J., Rothmann, M. J., Smith, A. C., Caffery, L. J., & Danbjorg, D. B. [Participatory design methods in telemedicine research](#)

Wade, V., Barnett, A. G., Martin-Khan, M., & Russell, T. [Designing quantitative telemedicine research](#)

Snoswell, C., Smith, A. C., Scuffham, P. A., & Whitty, J. A. [Economic evaluation strategies in telehealth: obtaining a more holistic valuation of telehealth interventions](#)

Russell, T. G., Martin-Khan, M., Khan, A., & Wade, V. [Method-comparison studies in telehealth: Study design and analysis considerations](#)

Kidholm, K., Clemensen, J., Caffery, L. J., & Smith, A. C. [The Model for Assessment of Telemedicine \(MAST\): A scoping review of empirical studies](#)

Telehealth awareness videos

Many health consumers know little about telehealth and many health professionals are also unfamiliar with it. The CRE team commissioned six short videos to illustrate what telehealth is and provide examples based on research projects.

The videos included a short overview of telehealth, debunked some myths about telehealth and provided examples of using telehealth for head and neck cancer, for spinal pain, for skin lesions, and for consultations in residential aged care facilities, together with clinicians' experience of using telehealth.



Higher Degree Research students

When the CRE started in 2013, Chief Investigators and Associate Investigators were supervising nine Higher Degree Research students whose research was focused on advancing telehealth research. Between October 2013 and December 2018, 31 additional students enrolled to complete a higher degree under the supervision of one of the CRE investigators. Most candidates have continued towards completion.



Ten students have completed their PhDs during the life of the CRE:

1. Dr Sharifah Al Dossary: The development and evaluation of a needs-based planning framework for telemedicine services [PhD Thesis]. UQ; 2018.
2. Dr Annie Banbury: Digital Futures: E-health, health literacy and chronic disease self-management skills for older people [PhD Thesis]. Central Queensland University; 2018.
3. Dr Clare Burns: Enhancing access to specialist swallowing, speech, and voice intervention for patients with head and neck cancer: An evaluation of two new telepractice models [PhD Thesis]. UQ; 2017.
4. Dr Teegan Green: Trust Me, I'm a doctor: Understanding clinician's experiences of service separation and trust formation in telehealth [PhD Thesis]. UQ; 2017.
5. Dr Rita Hwang: Providing heart failure rehabilitation in the home via telerehabilitation [PhD Thesis]. UQ; 2017.
6. Dr Joanna Kho: Transforming work practices to deliver telehealth services: A study on professional competence, routines and relational expertise. [PhD Thesis]. UQ; 2019
7. Dr Rachelle Pitt: The development, feasibility, and effectiveness of an online aphasia group intervention – TeleGAIN. [PhD Thesis] UQ; 2018.
8. Dr Centaine Snoswell: Economic evaluation and acceptability of teledermoscopy for skin cancer in Australia. [PhD Thesis]. UQ; 2018.
9. Dr Laurelie Wall: Examining the use of telepractice for delivering intensive, prophylactic swallowing therapy to patients with head and neck cancer undergoing (chemo) radiotherapy [PhD Thesis]. UQ; 2017.
10. Dr Sumudu Wickramasinghe: An evaluation of a telehealth-based specialist consultation service for Indigenous people living with diabetes in Queensland. [PhD Thesis]. UQ; 2019.

One candidate completed her MPhil:

- Olivia Taylor: Speech and language screening for children with medical complexity: A comparison of telepractice and in-person methods [MPhil Thesis]. UQ; 2018.

A number of candidates are currently progressing towards completion in 2019 or 2020.

PhD Student	Institution	Telehealth research field
Jessica Campbell	UQ Health and Behavioural Sciences	Rural paediatric community health service
Chelsea Castillo	UQ Medicine	Improving information on imaging requests
Imon Chakraborty	UQ Medicine	Health IT start-ups
Belinda Coldebella	UQ Medicine	Bariatric surgery
Michelle Cottrell	UQ Health and Behavioural Sciences	Orthopaedic physiotherapy screening clinic
Anthony Deacon	UQ Health and Behavioural Sciences	Adolescent diabetes management
Pablo Fernandez	UQ Medicine	Youth mental health
Georgina Hobson	UQ Medicine	Dementia support with Aboriginal and Torres Strait Islander peoples
Ray Lang	UQ Health and Behavioural Sciences	Cystic fibrosis management in children
Lynette Lyzwinski	UQ Medicine	Mindfulness for weight management via mobile health
Anish Menon	UQ Medicine	Using e-health to rethink diabetes care
Perrin Moss	UQ Health and Behavioural Sciences	Telementoring
Uthara Nair	UQ Medicine	Mobile health for gestational diabetes
Mark Nelson	UQ Health and Behavioural Sciences	Hip replacement rehabilitation
Leana Nichol	UQ Health and Behavioural Sciences	Aphasia self-management
Joshua Simmich	UQ Health and Behavioural Sciences	Gaming to assist rehabilitation post-surgery
Megan Swales	UQ Health and Behavioural Sciences	Speech pathology for Parkinson's disease
Melinda Symon	UQ Medicine	Drug and alcohol rehabilitation
Yu Takizawa	UQ Health and Behavioural Sciences	E-learning for psychotherapy education in Japan
Alan Taylor	Flinders University	Sustainable service provision

Concluding remarks

The CRE facilitated and saw dramatic growth in the reach and sophistication of telehealth applications over five years. At national and state levels, there has been substantial growth in the availability and use of video consultation in rural communities to enable patients to connect with medical specialists. In some practices and facilities, video consultation has become an integral component of day-to-day practice. Many of the CRE's projects identified unique ways for various specialties and patient groups to take advantage of this capability. However, for this more traditional mode of telehealth delivery, further work remains. Many communities and small hospitals remain under-served and the application of telehealth in home settings is still limited. There is virtually no use of video consultation in metropolitan locations, where time and convenience make it an attractive alternative for patients and health systems. Further work at the educational, technical and policy levels is required to complete this effort. It will remain a focus of our research and development for years to come.

The work of the CRE revealed the value of many other forms of telehealth to enable the provision of healthcare at a distance: store-and-forward techniques, modern communication strategies, remote monitoring of biometric information and artificial intelligence. Devices and systems that facilitate these activities are becoming ubiquitous: high speed internet, smart phones, consumer devices for biometric measurement, and home computers are opening the way for an array of telehealth-mediated options for health system delivery. These approaches offer the

opportunity to improve access and convenience, and also to improve the effectiveness and efficiency of the health system. This opportunity provides an incentive for a new generation of research to identify how best to configure these capabilities to secure the best outcomes.

Many opportunities will not be realised without adjustments to policy and funding arrangements. Therefore, the awareness and engagement of senior administrators and policy makers is key. The CRE will conclude with a 'Telehealth Futures' forum to consider future directions of telehealth and how they might be facilitated by policy and funding incentives.

Finally, I would like to acknowledge the magnificent contributions of the CRE investigator teams, comprised of some of the smartest and most thoughtful people from a wide range of organisations across Australia. Most have stayed the journey across the five years and have contributed to producing great research, and to training and mentoring a new generation of telehealth researchers. I would also like to acknowledge the participation of a host of healthcare provider organisers who have contributed to our research effort, offering an environment for our research to be conducted in, and offering know-how and energy to craft new ways of delivering healthcare. Finally, the CRE would not have had the same level of success without the intelligent and enthusiastic efforts of our coordinator, Dr Dominique Bird. We are indebted to her for her unsurpassed commitment and skill.

Professor Len Gray, Lead Investigator

Research publications

Between October 2013 and December 2018, the team of CRE investigators and post-doctoral researchers wrote 236 publications including 218 journal articles, out of which 58% are in non-telehealth publications, and 12 book sections.

Journal articles

1. AIDossary, S., Martin-Khan, M. G., Bradford, N. K., & Smith, A. C. (2017). A systematic review of the methodologies used to evaluate telemedicine service initiatives in hospital facilities. *International Journal of Medical Informatics*, 97, 171-194. doi:10.1016/j.ijmedinf.2016.10.012.
2. AIDossary, S., Martin-Khan, M. G., Bradford, N. K., Armfield, N. R., & Smith, A. C. (2017). The Development of a Telemedicine Planning Framework Based on Needs Assessment. *Journal of Medical Systems*, 41(5), 74. doi:10.1007/s10916-017-0709-4.
3. Anton, D., Nelson, M., Russell, T., Goni, A., & Illarramendi, A. (2016). Validation of a Kinect-based telerehabilitation system with total hip replacement patients. *Journal of Telemedicine and Telecare*, 22(3), 192-197. doi:10.1177/1357633x15590019.
4. Armfield, N. R. (2014). Comment on 'The 60 most highly cited articles published in the Journal of Telemedicine and Telecare and Telemedicine Journal and E-health'. *Journal of Telemedicine and Telecare*, 20(3), 164-165. doi:10.1177/1357633x14527713.
5. Armfield, N. R., & Smith, A. C. (2014). Responding to the Christmas Island health care crisis. *Medical Journal of Australia*, 200(6), 319-320. doi:10.5694/mja13.00262.
6. Armfield, N. R., Coulthard, M. G., Slater, A., McEniery, J., Elcock, M., Ware, R. S., . . . Smith, A. C. (2014). The effectiveness of telemedicine for paediatric retrieval consultations: rationale and study design for a pragmatic multicentre randomised controlled trial. *BMC Health Services Research*, 14(1), 546. doi:10.1186/s12913-014-0546-9.
7. Armfield, N. R., Edirippulige, S., Caffery, L. J., Bradford, N. K., Grey, J. W., & Smith, A. C. (2014). Telemedicine — A bibliometric and content analysis of 17,932 publication records. *International Journal of Medical Informatics*, 83(10), 715-725. doi:10.1016/j.ijmedinf.2014.07.001.
8. Armfield, N. R., Edirippulige, S. K., Bradford, N., & Smith, A. C. (2014). Telemedicine - is the cart being put before the horse? *Medical Journal of Australia*, 200(9), 530-533. doi: 10.5694/mja13.11101.
9. Armfield, N. R., Bradford, M., & Bradford, N. K. (2015). The clinical use of Skype — For which patients, with which problems and in which settings? A snapshot review of the literature. *International Journal of Medical Informatics*, 84(10), 737-742. doi:10.1016/j.ijmedinf.2015.06.006.
10. Arzberger, E., Curiel-Lewandowski, C., Blum, A., Chubisov, D., Oakley, A., Rademaker, M., . . . Hofmann-Wellenhof, R. (2016). Teledermoscopy in high-risk melanoma patients: a comparative study of face-to-face and teledermatology visits. *Acta Dermato-Venereologica*, 96(6), 779-784. doi:10.2340/00015555-2344.
11. Ashby, S. E., Snodgrass, S. H., Rivett, D. A., & Russell, T. (2016). Factors shaping e-feedback utilization following electronic Objective Structured Clinical Examinations. *Nursing and Health Sciences*, 18(3), 362-369. doi:10.1111/nhs.12279.
12. Banbury, A., Parkinson, L., Nancarrow, S., Dart, J., Gray, L., & Buckley, J. (2014). Multi-site videoconferencing for home-based education of older people with chronic conditions: the Telehealth Literacy Project. *Journal of Telemedicine and Telecare*, 20(7), 353-359. doi:10.1177/1357633x14552369.
13. Banbury, A., Parkinson, L., Nancarrow, S., Dart, J., Gray, L. C., & Buckley, J. (2016). Delivering patient education by group videoconferencing into the home: Lessons learnt from the Telehealth Literacy Project. *Journal of Telemedicine and Telecare*, 22(8), 483-488. doi:10.1177/1357633x16674359.
14. Banbury, A., Chamberlain, D., Nancarrow, S., Dart, J., Gray, L., & Parkinson, L. (2017). Can videoconferencing affect older people's engagement and perception of their social support in long-term conditions management: a social network analysis from the Telehealth Literacy Project. *Health and Social Care in the Community*, 25(3), 938-950. doi:10.1111/hsc.12382.
15. Banbury, A., Nancarrow, S., Dart, J., Gray, L., & Parkinson, L. (2018). Telehealth Interventions Delivering Home-based Support Group Videoconferencing: Systematic Review. *Journal of Medical Internet Research*, 20(2), e25. doi:10.2196/jmir.8090.
16. Bashi, N., Karunanithi, M., Fatehi, F., Ding, H., & Walters, D. (2017). Remote Monitoring of Patients With Heart Failure: An Overview of Systematic Reviews. *Journal of Medical Internet Research*, 19(1), e18. doi:10.2196/jmir.6571.
17. Bashi, N., Fatehi, F., Fallah, M., Walters, D., & Karunanithi, M. (2018). Self-Management Education Through mHealth: Review of Strategies and Structures. *JMIR Mhealth Uhealth*, 6(10), e10771. doi:10.2196/10771.
18. Biscak, T. M., Eley, R., Manoharan, S., Sinnott, M., & Soyer, H. P. (2013). Audit of a state-wide store and forward teledermatology service in Australia. *Journal of Telemedicine and Telecare*, 19(7), 362-366. doi:10.1177/1357633x13506509.
19. Boyd, R. N., Baque, E., Piovesana, A., Ross, S., Ziviani, J., Sakzewski, L., . . . Scuffham, P. A. (2015). Mitii ABI: study protocol of a randomised controlled trial of a web-based multi-modal training program for children and adolescents with an Acquired Brain Injury (ABI). *BMC Neurology*, 15, 140. doi:10.1186/s12883-015-0381-6.
20. Bradford, N., Armfield, N. R., Young, J., Ehmer, M., Lawson, R., & Smith, A. C. (2013). Internet video to support intravenous medication administration in the home: a cost minimisation study. *Journal of Telemedicine and Telecare*, 19(7), 367-371. doi:10.1177/1357633x13506510.

21. Bradford, N., Herbert, A., Mott, C., Armfield, N., Young, J., & Smith, A.C. (2014). Components and Principles of a Pediatric Palliative Care Consultation: Results of a Delphi Study. *Journal of Palliative Medicine*, 17(11), 1–8. doi:10.1089/jpm.2014.0121.
22. Bradford, N. K., Armfield, N. R., Young, J., & Smith, A. C. (2014). Paediatric palliative care by video consultation at home: a cost minimisation analysis. *BMC Health Services Research*, 14, 328. doi:10.1186/1472-6963-14-328.
23. Bradford, N. K., Armfield, N. R., Young, J., Herbert, A., Mott, C., & Smith, A. C. (2014). Principles of a paediatric palliative care consultation can be achieved with home telemedicine. *Journal of Telemedicine and Telecare*, 20(7), 360–364. doi:10.1177/1357633X14552370.
24. Bradford, N. K., Young, J., Armfield, N. R., Herbert, A., & Smith, A. C. (2014). Home telehealth and paediatric palliative care: clinician perceptions of what is stopping us? *BMC Palliative Care*, 13, 29. doi:10.1186/1472-684X-13-29.
25. Bradford, N. K., Caffery, L. J., & Smith, A. C. (2015). Awareness, experiences and perceptions of telehealth in a rural Queensland community. *BMC Health Services Research*, 15, 427. doi:10.1186/s12913-015-1094-7.
26. Bradford, N. K., & Penny, R. A. (2016). Registered nurse and midwife experiences of using videoconferencing in practice: a qualitative systematic review protocol. *JB1 Database of Systematic Reviews and Implementation Reports*, 14(5), 3–9. doi:10.11124/JBISRIR-2016-002679.
27. Bradford, N. K., Caffery, L. J., & Smith, A. C. (2016). Telehealth services in rural and remote Australia: a systematic review of models of care and factors influencing success and sustainability. *Rural Remote Health*, 16(4), 3808.
28. Bradford, N., Caffery, L., Taylor, M., Meiklejohn, J., Smith, A. C., & Langbecker, D. (2018). Speech-language Pathology Services Delivered by Telehealth in a Rural Educational Setting: the School's Perspective. *Journal of the International Society for Telemedicine and EHealth*, 6, 1–8. doi:10.29086/JISfTeH.6.e20.
29. Brownlee, G. L., Caffery, L. J., McBride, C. A., Patel, B., & Smith, A. C. (2017). Telehealth in paediatric surgery: Accuracy of clinical decisions made by videoconference. *Journal of Paediatrics and Child Health*, 53 (12) 1220–1225. doi:10.1111/jpc.13599.
30. Burns, C. L., Keir, B., Ward, E. C., Hill, A. J., Farrell, A., Phillips, N., & Porter, L. (2015). A Dynamic Image Quality Evaluation of Videofluoroscopy Images: Considerations for Telepractice Applications. *Dysphagia*, 30(4), 473–481. doi:10.1007/s00455-015-9626-1.
31. Burns, C. L., Ward, E. C., Hill, A. J., Phillips, N., & Porter, L. (2016). Conducting Real-Time Videofluoroscopic Swallow Study via Telepractice: A Preliminary Feasibility and Reliability Study. *Dysphagia*, 31(3), 473–483. doi:10.1007/s00455-016-9701-2.
32. Burns, C. L., Kularatna, S., Ward, E. C., Hill, A. J., Byrnes, J., & Kenny, L. M. (2017). Cost analysis of a speech pathology synchronous telepractice service for patients with head and neck cancer. *Head and Neck*, 39(12), 2470–2480. doi:10.1002/hed.24916.
33. Burns, C. L., Ward, E. C., Hill, A. J., Kularatna, S., Byrnes, J., & Kenny, L. M. (2017). Randomized controlled trial of a multisite speech pathology telepractice service providing swallowing and communication intervention to patients with head and neck cancer: Evaluation of service outcomes. *Head and Neck*, 39(5), 932–939. doi:10.1002/hed.24706.
34. Caffery, L. J., & Smith, A. C. (2015). Investigating the quality of video consultations performed using fourth generation (4G) mobile telecommunications. *Journal of Telemedicine and Telecare*, 21(6), 348–354. doi:10.1177/1357633X15577311.
35. Caffery, L. J., Armfield, N. R., & Smith, A. C. (2015). Radiological interpretation of images displayed on tablet computers: a systematic review. *British Journal of Radiology*, 88(1050), 20150191. doi:10.1259/bjr.20150191.
36. Caffery, L. J., Manthey, K. L., & Sim, L. H. (2016). The effect of time in use on the display performance of the iPad. *British Journal of Radiology*, 20150657. doi:10.1259/bjr.20150657.
37. Caffery, L. J., Farjian, M., & Smith, A. C. (2016). Telehealth interventions for reducing waiting lists and waiting times for specialist outpatient services: A scoping review. *Journal of Telemedicine and Telecare*, 22(8), 504–512. doi:10.1177/1357633X16670495.
38. Caffery, L. J., Taylor, M., Lucas, K., & Smith, A. C. (2016). Substitution rates of video consultations for traditional consultations at a tertiary public hospital. *Journal of Telemedicine and Telecare*, 22(8), 453–458. doi:10.1177/1357633X16672767.
39. Caffery, L. J., Bradford, N. K., Wickramasinghe, S. I., Hayman, N., & Smith, A. C. (2017). Outcomes of using telehealth for the provision of healthcare to Aboriginal and Torres Strait Islander people: a systematic review. *Australian and New Zealand Journal of Public Health*, 41(1), 48–53. doi:10.1111/1753-6405.12600.
40. Caffery, L. J., Taylor, M., North, J. B., & Smith, A. C. (2017). Tele-orthopaedics: A snapshot of services in Australia. *Journal of Telemedicine and Telecare*, 23(10), 835–841. doi:10.1177/1357633X17732800.
41. Caffery, L. J., Martin-Khan, M., & Wade, V. (2017). Mixed methods for telehealth research. *Journal of Telemedicine and Telecare*, 23(9), 764–769. doi:10.1177/1357633X16665684.
42. Caffery, L. J., Smith, A. C., & Bradford, N. K. (2017). Author's response to comment on “Accuracy of dental images for the diagnosis of dental caries and enamel defects in children and adolescents: A systematic review”. *Journal of Telemedicine and Telecare*, 23(5), 563. doi:10.1177/1357633X16665251.
43. Caffery, L. J., Taylor, M., Gole, G., & Smith, A. C. (2017). Models of care in tele-ophthalmology: A scoping review. *Journal of Telemedicine and Telecare*, 1–17. doi:10.1177/1357633X17742182.
44. Caffery, L.J., Bradford, N., Meurer, M., & Smith, A.C. (2017). Association between patient age, geographical location, Indigenous status and hospitalisation for oral and dental conditions in Queensland, Australia. *Australian Journal of Primary Health*, 23(1), 46–52. doi:10.1071/PY15105.
45. Caffery, L. J., Bradford, N. K., Smith, A. C., & Langbecker, D. (2018). How telehealth facilitates the provision of culturally appropriate healthcare for Indigenous Australians. *Journal of Telemedicine and Telecare*, 24(10), 676–682. doi:10.1177/1357633X18795764.
46. Caffery, L. J., Clunie, D., Curiel-Lewandrowski, C., Malvey, J., Soyer, H. P., & Halpern, A. C. (2018). Transforming Dermatologic Imaging for the Digital Era: Metadata and Standards. *Journal of Digital Imaging*, 31(4), 568–577. doi:10.1007/s10278-017-0045-8.
47. Callins, A., Hill, A. J., & Theodoros, D. (2016). Are Patient Expectations and Treatment Credibility related to outcomes from LSVT@LOUD?. *Journal of Clinical Practice in Speech-Language Pathology*, 18(1), 8–14.
48. Cartmill, B., Wall, L. R., Ward, E. C., Hill, A. J., & Porceddu, S. V. (2016). Computer Literacy and Health Locus of Control as Determinants for Readiness and Acceptability of Telepractice in a Head and Neck Cancer Population. *International Journal of Telerehabilitation*, 8(2). doi:10.5195/ijt.2016.6203.
49. Cassimatis, M., Kavanagh, D. J., & Smith, A. C. (2014). Perceived Needs for Supported Self-management of Type 2 Diabetes: A Qualitative Investigation of the Potential for a Web-based Intervention. *Australian Psychologist*, 49(2), 75–85. doi:10.1111/ap.12050.
50. Cassimatis, M., Kavanagh, D. J., Hills, A. P., Smith, A. C., Scuffham, P. A., Edge, S., . . . Gericke, C. (2015). Development of the OnTrack Diabetes Program. *JMIR Research Protocols*, 4(2), e24. doi:10.2196/resprot.2823.
51. Cassimatis, M., Kavanagh, D. J., Hills, A. P., Smith, A. C., Scuffham, P. A., Gericke, C., & Parham, S. (2015). The OnTrack Diabetes Web-Based Program for Type 2 Diabetes and Dysphoria Self-Management: A Randomized Controlled Trial Protocol. *JMIR Research Protocols*, 4(3), e97. doi:10.2196/resprot.2813.
52. Chao, J. T., 2nd, Loeschner, L. J., Soyer, H. P., & Curiel-Lewandrowski, C. (2013). Barriers to mobile teledermoscopy in primary care. *Journal of the American Academy of Dermatology*, 69(5), 821–824. doi:10.1016/j.jaad.2012.10.039.
53. Chipchase, L., Hill, A., Dunwoodie, R., Allen, S., Kane, Y., Piper, K., & Russell, T. (2014). Evaluating telesupervision as a support for clinical learning: An action research project. *International Journal Of Practice Based Learning In Health And Social Care*, 2(2), 40–53. doi:10.11120/pblh.2014.00033.
54. Clemensen, J., Rothmann, M. J., Smith, A. C., Caffery, L. J., & Danbjorg, D. B. (2017). Participatory design methods in telemedicine research. *Journal of Telemedicine and Telecare*, 23(9), 780–785. doi:10.1177/1357633X16686747.
55. Clunne, S. J., Ryan, B. J., Hill, A. J., Brandenburg, C., & Kneebone, I. (2018). Accessibility and Applicability of Currently Available e-Mental Health Programs for Depression for People With Poststroke Aphasia: Scoping Review. *Journal of Medical Internet Research*, 20(12), e291. doi:10.2196/jmir.9864.
56. Coldebella, B., Armfield, N. R., Bambling, M., Hansen, J., & Edirippulige, S. (2018). The use of telemedicine for delivering healthcare to bariatric surgery patients: A literature review. *Journal of Telemedicine and Telecare*, 24(10), 651–660. doi:10.1177/1357633X18795356.
57. Coleman, J. J., Frymark, T., Franceschini, N. M., & Theodoros, D. G. (2015). Assessment and Treatment of Cognition and Communication Skills in Adults With Acquired Brain Injury via Telepractice: A Systematic Review. *American Journal of Speech-Language Pathology*, 24(2), 295–315. doi:10.1044/2015_ajslp-14-0028.
58. Collins, A., Burns, C. L., Ward, E. C., Comans, T., Blake, C., Kenny, L., . . . Best, D. (2017). Home-based telehealth service for swallowing and nutrition management following head and neck cancer treatment. *Journal of Telemedicine and Telecare*, 23(10), 866–872. doi:10.1177/1357633X17733020.
59. Comans, T. A., Martin-Khan, M., Gray, L. C., & Scuffham, P. A. (2013). A break-even analysis of delivering a memory clinic by videoconferencing. *Journal of Telemedicine and Telecare*, 19(7), 393–396. doi:10.1177/1357633X13506532.
60. Comans, T., Mihala, G., Sakzewski, L., Boyd, R. N., & Scuffham, P. (2017). The cost-effectiveness of a web-based multimodal therapy for unilateral cerebral palsy: the Mitii randomized controlled trial. *Developmental Medicine and Child Neurology*, 59(7), 756–761. doi:10.1111/dmcn.13414.
61. Constantinescu, G., Waite, M., Dornan, D., Rushbrooke, E., Brown, J., McGovern, J., . . . Hill, A. (2014). A pilot study of telepractice delivery for teaching listening and spoken language to children with hearing loss. *Journal of Telemedicine and Telecare*, 20(3), 135–140. doi:10.1177/1357633X14528443.
62. Cotton, Z., Russell, T., Johnston, V., & Legge, J. (2017). Training therapists to perform Pre-Employment Functional Assessments: A telerehabilitation approach. *Work*, 57(4), 475–482. doi:10.3233/wor-172578.
63. Cottrell, M. A., Galea, O. A., O'Leary, S. P., Hill, A. J., & Russell, T. G. (2017). Real-time telerehabilitation for the treatment of musculoskeletal conditions is effective and comparable to standard practice: a systematic review and meta-analysis. *Clinical Rehabilitation*, 31(5), 625–638. doi:10.1177/0269215516645148.
64. Cottrell, M. A., Hill, A. J., O'Leary, S. P., Raymer, M. E., & Russell, T. G. (2017). Service provider perceptions of telerehabilitation as an additional service delivery option within an Australian neurosurgical and orthopaedic physiotherapy screening clinic: A qualitative study. *Musculoskeletal Science and Practice*, 32, 7–16. doi:10.1016/j.msksp.2017.07.008.
65. Cottrell, M. A., Hill, A. J., O'Leary, S. P., Raymer, M. E., & Russell, T. G. (2018). Clinicians' Perspectives of a Novel Home-Based Multidisciplinary Telehealth Service for Patients with Chronic Spinal Pain. *International Journal of Telerehabilitation*, 10(2), 81–88. doi:10.5195/ijt.2018.6249.
66. Cottrell, M. A., Hill, A. J., O'Leary, S. P., Raymer, M. E., & Russell, T. G. (2018). Patients are willing to use telehealth for the multidisciplinary management of chronic musculoskeletal conditions: A cross-sectional survey. *Journal of Telemedicine and Telecare*, 24(7), 445–452. doi:10.1177/1357633X17706605.
67. Cottrell, M. A., O'Leary, S. P., Swete-Kelly, P., Elwell, B., Hess, S., Litchfield, M. A., . . . Russell, T. G. (2018). Agreement between telehealth and in-person assessment of patients with chronic musculoskeletal conditions presenting to an advanced-practice physiotherapy screening clinic. *Musculoskeletal Science and Practice*, 38, 99–105. doi:10.1016/j.msksp.2018.09.014.
68. Deacon, A. J., & Edirippulige, S. (2015). Using mobile technology to motivate adolescents with type 1 diabetes mellitus: A systematic review of recent literature. *Journal of Telemedicine and Telecare*, 21(8), 431–438. doi:10.1177/1357633X15605223.

69. Desai, S., Williams, M. L., & Smith, A. C. (2013). Teleconsultation from a secondary hospital for paediatric emergencies occurring at rural hospitals in Queensland. *Journal of Telemedicine and Telecare*, 19(7), 405–410. doi:10.1177/1357633X13506528.
70. Ding, H., Fatehi, F., Russell, A. W., Karunanithi, M., Menon, A., Bird, D., & Gray, L. C. (2017). User Experience of an Innovative Mobile Health Program to Assist in Insulin Dose Adjustment: Outcomes of a Proof-of-Concept Trial. *Telemedicine and e-Health* 24(7). doi:10.1089/tmj.2017.0190.
71. Dullet, N. W., Geraghty, E. M., Kaufman, T., Kisse, J. L., King, J., Dharmar, M., . . . Marcin, J. P. (2017). Impact of a University-Based Outpatient Telemedicine Program on Time Savings, Travel Costs, and Environmental Pollutants. *Value in Health*, 20(4). doi:10.1016/j.jval.2017.01.014.
72. Edirippulige, S., Levandovskaya, M., & Prishutova, A. (2013). A qualitative study of the use of Skype for psychotherapy consultations in the Ukraine. *Journal of Telemedicine and Telecare*, 19(7), 376–378. doi:10.1177/1357633X13506523.
73. Edirippulige, S., Reyno, J., Armfield, N. R., Bambling, M., Lloyd, O., & McNevin, E. (2015). Availability, spatial accessibility, utilisation and the role of telehealth for multi-disciplinary paediatric cerebral palsy services in Queensland. *Journal of Telemedicine and Telecare*, 22(7), 391–396. doi:10.1177/1357633X15610720.
74. Edirippulige, S., Armfield, N. R., Greenup, P., & Bryett, A. (2016). Telehealth coordinators in hospital based telehealth services: Who are they and what do they do? *Journal of Telemedicine and Telecare*, 22(8), 447–452. doi:10.1177/1357633X16671241.
75. Edirippulige, S. (2017). What do people think about their general practitioners? Survey results comparing public opinion over 40 years from a community in Sydney, Australia. *Health and Primary Care*, 1(1), 1–8. doi:10.15761/HPC.1000105.
76. Edirippulige, S., & Armfield, N. R. (2017). Education and training to support the use of clinical telehealth: A review of the literature. *Journal of Telemedicine and Telecare*, 23(2), 273–282. doi:10.1177/1357633X16632968.
77. Edirippulige, S., Brooks, P., Carati, C., Wade, V. A., Smith, A. C., Wickramasinghe, S., & Armfield, N. R. (2018). It's important, but not important enough: eHealth as a curriculum priority in medical education in Australia. *Journal of Telemedicine and Telecare*, 24(10), 697–702. doi:10.1177/1357633X18793282.
78. Edirippulige, S., Samanta, M., & Armfield, N. R. (2018). Assessment of Self-Perceived Knowledge in e-Health Among Undergraduate Students. *Telemedicine and e-Health*, 24(2), 139–144. doi:10.1089/tmj.2017.0056.
79. Edirippulige, S., Smith, A. C., Wickramasinghe, S., & Armfield, N. R. (2018). Examining the Influence of E-Health Education on Professional Practice. *Journal of Medical Systems*, 42(11), 215. doi:10.1007/s10916-018-1084-5.
80. Fatehi, F., Armfield, N. R., Dimitrijevic, M., & Gray, L. C. (2014). Clinical applications of videoconferencing: a scoping review of the literature for the period 2002-2012. *Journal of Telemedicine and Telecare*, 20(7), 377–383. doi:10.1177/1357633X14552385.
81. Fatehi, F., Gray, L. C., & Russell, A. W. (2014). A Clinimetric Study of Outpatient Diabetes Consultations: The Potential for Telemedicine Substitution. *Diabetes Technology & Therapeutics*, 16(1), 8–14. doi:10.1089/dia.2013.0213.
82. Fatehi, F., Martin-Khan, M., Gray, L. C., & Russell, A. W. (2014). Design of a randomized, non-inferiority trial to evaluate the reliability of videoconferencing for remote consultation of diabetes. *BMC Medical Informatics and Decision Making*, 14, 11. doi:10.1186/1472-6947-14-11.
83. Fatehi, F., Armfield, N. R., Dimitrijevic, M., & Gray, L. C. (2015). Technical aspects of clinical videoconferencing: a large scale review of the literature. *Journal of Telemedicine and Telecare*, 21(3), 160–166. doi:10.1177/1357633X15571999.
84. Fatehi, F., Gray, L. C., Russell, A. W., & Paul, S. K. (2015). Validity Study of Video Teleconsultation for the Management of Diabetes: A Pilot Randomized Controlled Trial. *Diabetes Technology & Therapeutics*, 17(10), 717–725. doi:10.1089/dia.2014.0416.
85. Fatehi, F., Martin-Khan, M., Smith, A. C., Russell, A. W., & Gray, L. C. (2015). Patient satisfaction with video teleconsultation in a virtual diabetes outreach clinic. *Diabetes Technology & Therapeutics*, 17(1), 43–48. doi:10.1089/dia.2014.0159.
86. Fatehi, F., Gray, L. C., & Russell, A. W. (2017). Mobile Health (mHealth) for Diabetes Care: Opportunities and Challenges. *Diabetes Technology & Therapeutics*, 19(1), 1–3. doi:10.1089/dia.2016.0430.
87. Fatehi, F., Smith, A. C., Maeder, A., Wade, V., & Gray, L. C. (2017). How to formulate research questions and design studies for telehealth assessment and evaluation. *Journal of Telemedicine and Telecare*, 23(9), 759–763. doi:10.1177/1357633X16673274.
88. Fatehi, F., Menon, A., & Bird, D. (2018). Diabetes Care in the Digital Era: a Synoptic Overview. *Current Diabetes Reports*, 18(7), 38. doi:10.1007/s11892-018-1013-5.
89. Finch, E., & Hill, A. J. (2014). Computer use by people with aphasia: a survey investigation. *Brain Impairment*, 15(2), 107–119. doi:10.1017/BrImp.2014.17.
90. Finch, L., Youl, P., Marshall, A. L., Soyer, H. P., Baade, P., & Janda, M. (2015). User preferences for text message-delivered skin cancer prevention and early detection. *Journal of Telemedicine and Telecare*, 21(4), 227–234. doi:10.1177/1357633X15571652.
91. Finnane, A. R., Siller, G., & Soyer, H. P. (2015). Teledermatologists' management of emergency skin conditions. *Medical Journal of Australia*, 203(7), 286. doi:10.5694/mja15.00362.
92. Finnane, A., & Soyer, H. P. (2015). Smartphone diagnosis of skin cancer: there's not yet an app for that. *British Journal of Dermatology*, 172(6), 1474–1475. doi:10.1111/bjd.13842.
93. Finnane, A., Siller, G., Mujcic, R., & Soyer, H. P. (2016). The growth of a skin emergency teledermatology service from 2008 to 2014. *Australasian Journal of Dermatology*, 57(1), 14–18. doi:10.1111/ajd.12411.
94. Finnane, A., Curiel-Lewandowski, C., Wimberley, G., Caffery, L., Katragadda, C., Halpern, A., . . . Soyer, H.P. & International Society of Digital Imaging of the Skin for the International Skin Imaging Collaboration. (2017). Proposed Technical Guidelines for the Acquisition of Clinical Images of Skin-Related Conditions. *JAMA Dermatology*, 153(5):453–457. doi:10.1001/jamadermatol.2016.6214.
95. Finnane, A., Dallest, K., Janda, M., & Soyer, H. P. (2017). Teledermatology for the Diagnosis and Management of Skin Cancer: A Systematic Review. *JAMA Dermatology*, 153(3), 319–327. doi:10.1001/jamadermatol.2016.4361.
96. Freeman, C. R., Peel, N. M., Watts, J. N., Gae, Atefi, T. A., Caffery, L. J., Hubbard, R. E., . . . Gray, L. C. (2017). Development of a protocol for telehealth Residential Medication Management Reviews to enable collaboration of pharmacists and geriatricians. *Journal of Pharmacy Practice and Research*, 47(2), 153–157. doi:doi:10.1002/jppr.1335.
97. Fu, S., Theodoros, D. G., & Ward, E. C. (2015). Delivery of Intensive Voice Therapy for Vocal Fold Nodules Via Telepractice: A Pilot Feasibility and Efficacy Study. *Journal of Voice*, 29(6), 696–706. doi:10.1016/j.jvoice.2014.12.003.
98. Garne Holm, K., Brødsgaard, A., Zachariassen, G., Smith, A. C., & Clemensen, J. (2017). Participatory design methods for the development of a clinical telehealth service for neonatal homecare. *SAGE Open Medicine*, 5. doi:10.1177/2050312117731252.
99. Garne Holm, K., Brødsgaard, A., Zachariassen, G., Smith, A. C., & Clemensen, J. (2018). Parent perspectives of neonatal tele-homecare: A qualitative study. *Journal of Telemedicine and Telecare*, 25(4) 221–229. doi:10.1177/1357633X18765059.
100. Goode, A. D., Hadgraft, N. T., Neuhaus, M., & Healy, G. N. (2018). Perceptions of an online 'train-the-champion' approach to increase workplace movement. *Health Promotion International*, 1–12. doi:10.1093/heapro/day092.
101. Gray, L. C., Heckman, G. A., & Hirdes, J. P. (2013). Addressing Health Care Needs For Frail Seniors In Canada: The Role of InterRAI Instruments. *The Canadian Geriatrics Society — CME Journal*, 3(1), 8–16, <http://hdl.handle.net/10012/11701>.
102. Gray, L. C., Fatehi, F., Martin-Khan, M., Peel, N. M., & Smith, A. C. (2016). Telemedicine for Specialist Geriatric Care in Small Rural Hospitals: Preliminary Data. *Journal of the American Geriatrics Society*, 64(6), 1347–1351. doi:10.1111/jgs.14139.
103. Gray, L. C., Beattie, E., Boscart, V. M., Henderson, A., Hornby-Turner, Y. C., Hubbard, R. E., . . . Peel, N. M. (2018). Development and Testing of the interRAI Acute Care: A Standardized Assessment Administered by Nurses for Patients Admitted to Acute Care. *Health Services Insights*, 11. doi:10.1177/1178632918818836.
104. Green, T., Hartley, N., & Gillespie, N. (2016). Service Provider's Experiences of Service Separation: The Case of Telehealth. *Journal of Service Research*, 19(4), 477–494. doi:10.1177/1094670516666674.
105. Hames, S. C., Sinnya, S., Tan, J.-M., Morze, C., Sahebian, A., Soyer, H. P., & Prow, T. W. (2015). Automated detection of actinic keratoses in clinical photographs. *PLoS One*, 10(1). doi:10.1371/journal.pone.0112447.
106. Hartley, N., & Green, T. (2017). Consumer construal of separation in virtual services. *Journal of Service Theory and Practice*, 27(2), 358–383. doi:10.1108/JSTP-05-2015-0118.
107. Hayman, N. E., Askew, D. A., & Spurling, G. K. (2014). From vision to reality: a centre of excellence for Aboriginal and Torres Strait Islander primary health care. *Medical Journal of Australia*, 200(11), 623–624. doi:10.5694/mja14.00766.
108. Hill, A. J., & Breslin, H. M. (2016). Refining an Asynchronous Telerehabilitation Platform for Speech-Language Pathology: Engaging End-Users in the Process. *Frontiers in Human Neuroscience*, 10, 640. doi:10.3389/fnhum.2016.00640.
109. Hill, A. J., & Breslin, H. M. (2018). Asynchronous telepractice in aphasia rehabilitation: outcomes from a pilot study. *Aphasiology*, 1–3. doi:10.1080/02687038.2018.1484877.
110. Horsham, C., Loescher, L. J., Whiteman, D. C., Soyer, H. P., & Janda, M. (2016). Consumer acceptance of patient-performed mobile teledermoscopy for the early detection of melanoma. *British Journal of Dermatology*, 175(6), 1301–1310. doi:10.1111/bjd.14630.
111. Hwang, R., Bruning, J., Morris, N., Mandrusiak, A., & Russell, T. (2015). A Systematic Review of the Effects of Telerehabilitation in Patients With Cardiopulmonary Diseases. *Journal of Cardiopulmonary Rehabilitation and Prevention*, 35(6), 380–389. doi:10.1097/HCR.0000000000000121.
112. Hwang, R., Morris, N. R., Mandrusiak, A., Mudge, A., Suna, J., Adsett, J., & Russell, T. (2016). Timed Up and Go Test: A Reliable and Valid Test in Patients With Chronic Heart Failure. *Journal of Cardiac Failure*, 22(8), 646–650. doi.org/10.1016/j.cardfail.2015.09.018.
113. Hwang, R., Bruning, J., Morris, N. R., Mandrusiak, A., & Russell, T. (2017). Home-based telerehabilitation is not inferior to a centre-based program in patients with chronic heart failure: a randomised trial. *Journal of Physiotherapy*, 63(2), 101–107. doi:10.1016/j.jphys.2017.02.017.
114. Hwang, R., Mandrusiak, A., Morris, N. R., Peters, R., Korczyk, D., & Russell, T. (2017). Assessing functional exercise capacity using telehealth: Is it valid and reliable in patients with chronic heart failure? *Journal of Telemedicine and Telecare*, 23(2), 225–232. doi:10.1177/1357633X16634258.
115. Hwang, R., Mandrusiak, A., Morris, N. R., Peters, R., Korczyk, D., Bruning, J., & Russell, T. (2017). Exploring patient experiences and perspectives of a heart failure telerehabilitation program: a mixed methods approach. *Heart and Lung: The Journal of Acute and Critical Care*. 46(4):320–327. doi:10.1016/j.hrtlng.2017.03.004.
116. Hwang, R., Morris, N. R., Mandrusiak, A., Bruning, J., Peters, R., Korczyk, D., & Russell, T. (2018). Cost-Utility Analysis of Home-based Telerehabilitation Compared with Centre-based Rehabilitation in Patients with Heart Failure. *Heart Lung and Circulation*. doi:10.1016/j.hlc.2018.11.010.
117. Ines Meurer, M., Caffery, L. J., Bradford, N. K., & Smith, A. C. (2015). Accuracy of dental images for the diagnosis of dental caries and enamel defects in children and adolescents: A systematic review. *Journal of Telemedicine and Telecare*, 21(8), 449–458. doi:10.1177/1357633X15605225.

118. Ito, J., Edirippulige, S., Aono, T., & Armfield, N. R. (2017). The use of telemedicine for delivering healthcare in Japan: Systematic review of literature published in Japanese and English languages. *Journal of Telemedicine and Telecare*, 23(10), 828–834. doi:10.1177/1357633x17732801.
119. Janda, M., & Soyer, H. P. (2013). Skin cancer detection by one click - are we any closer? *Medical Journal of Australia*, 199(11), 739. doi:10.5694/mja13.11338.
120. Janda, M., Loeschner, L. J., Banan, P., Horsham, C., & Soyer, H. P. (2014). Lesion selection by melanoma high-risk consumers during skin self-examination using mobile teledermoscopy. *JAMA Dermatology*, 150(6), 656–658. doi:10.1001/jamadermatol.2013.7743.
121. Janda, M., Finnane, A., & Soyer, H. P. (2015). Redefining Dermatologists' Role in Skin Cancer Early Detection and Follow-up Care. *JAMA Dermatology*, 151(5), 483–484. doi:10.1001/jamadermatol.2014.3875.
122. Janda, M., & Soyer, H. P. (2017). Automated diagnosis of melanoma. *Medical Journal of Australia*, 207(8), 361–362. doi: 10.5694/mja17.00618.
123. Janda, M., & Soyer, P. (2017). Greater Precision in Melanoma Prevention. *JAMA Dermatology*, 153(1), 18–19. doi:10.1001/jamadermatol.2016.3472.
124. Janda, M., Horsham, C., Koh, U., Gillespie, N., Loeschner, L. J., Vagenas, D., & Soyer, H. P. (2018). Redesigning Skin Cancer Early Detection and Care Using a New Mobile Health Application: Protocol of the SKIN Research Project, a Randomised Controlled Trial. *Dermatology*. doi:10.1159/000493729.
125. Jensen, C. M., Overgaard, S., Wiil, U. K., Smith, A. C., & Clemensen, J. (2018). Bridging the gap: A user-driven study on new ways to support self-care and empowerment for patients with hip fracture. *SAGE Open Medicine*, 6, 2050312118799121. doi:10.1177/2050312118799121.
126. Kaambwa, B., J. Ratcliffe, W. Shulver, M. Killington, A. Taylor, M. Crotty, C. Carati, J. Tieman, V. Wade & Kidd, M. R. (2017). Investigating the preferences of older people for telehealth as a new model of health care service delivery: A discrete choice experiment. *Journal of Telemedicine and Telecare*, 23(2), 301–313. doi:10.1177/1357633x16637725.
127. Katragadda, C., Finnane, A., Soyer, H.P., Marghoob, A. A., Halpern, A., Malvey, J., . . . Curiel-Lewandrowski, C & International Society of Digital Imaging of the Skin (ISDIS)-International Skin Imaging Collaboration (ISIC) Group. (2017). Technique standards for skin lesion imaging: A delphi consensus statement. *JAMA Dermatology*, 153(2), 207–213. doi:10.1001/jamadermatol.2016.3949.
128. Keogh, K., Clark, P., Valery, P. C., McPhail, S. M., Bradshaw, C., Day, M., & Smith, A. C. (2016). Use of telehealth to treat and manage chronic viral hepatitis in regional Queensland. *Journal of Telemedicine and Telecare*, 22(8), 459–464. doi:10.1177/1357633X16673794.
129. Kidholm, K., Clemensen, J., Caffery, L. J., & Smith, A. C. (2017). The Model for Assessment of Telemedicine (MAST): A scoping review of empirical studies. *Journal of Telemedicine and Telecare*, 23(9), 803–813. doi:10.1177/1357633X17721815.
130. Langbecker, D., Caffery, L. J., Gillespie, N., & Smith, A. C. (2017). Using survey methods in telehealth research: A practical guide. *Journal of Telemedicine and Telecare*, 23(9), 770–779. doi:10.1177/1357633X17721814.
131. Liddle, J., Ireland, D., McBride, S. J., Brauer, S. G., Hall, L. M., Ding, H., . . . Chenery, H. J. (2014). Measuring the lifespan of people with Parkinson's disease using smartphones: proof of principle. *JMIR Mhealth Uhealth*, 2(1), e13. doi:10.2196/mhealth.2799.
132. Lyzwinski, L. N., Caffery, L. J., Bambling, M., & Edirippulige, S. (2017). Consumer perspectives on mHealth for weight loss: a review of qualitative studies. *Journal of Telemedicine and Telecare*, 24(4), 290–302. doi:10.1177/1357633X17692722.
133. Lyzwinski, L. N., Caffery, L., Bambling, M., & Edirippulige, S. (2018). A Systematic Review of Electronic Mindfulness-Based Therapeutic Interventions for Weight, Weight-Related Behaviors, and Psychological Stress. *Telemedicine and e-Health*, 24(3), 173–184. doi:10.1089/tmj.2017.0117.
134. Lyzwinski, L. N., Caffery, L., Bambling, M., & Edirippulige, S. (2018). Relationship Between Mindfulness, Weight, and Weight-Related Behaviors in College Students: A Systematic Review. *Alternative and Complementary Therapies*, 24(5), 202–214. doi:10.1089/act.2018.29182.Inl.
135. Lyzwinski, L. N., Caffery, L., Bambling, M., & Edirippulige, S. (2018). The Relationship Between Stress and Maladaptive Weight-Related Behaviors in College Students: A Review of the Literature. *American Journal of Health Education*, 49(3), 166–178. doi:10.1080/19325037.2018.1449683.
136. Manahan, M. N., Soyer, H. P., Loeschner, L. J., Horsham, C., Vagenas, D., Whiteman, D. C., . . . Janda, M. (2014). A pilot trial of mobile, patient-performed teledermoscopy. *British Journal of Dermatology*, 172(4), 1072–1080. doi:10.1111/bjd.13550.
137. Mar, V. J., & Soyer, H. P. (2018). Editorial. Artificial intelligence for melanoma diagnosis: how can we deliver on the promise? *Annals of Oncology*, 29(8), 1625–1628. doi:10.1093/annonc/mdy193.
138. Martin-Khan, M., Fatehi, F., Kezilas, M., Lucas, K., Gray, L. C., & Smith, A. C. (2015). Establishing a centralised telehealth service increases telehealth activity at a tertiary hospital. *BMC Health Services Research*, 15(1), 534. doi:10.1186/s12913-015-1180-x.
139. Martin-Khan, M., Salih, S., Rowland, J., Wootton, R., & Gray, L. (2015). General practitioners, patients and carer givers support the use of a telegeriatric memory disorder consultation for older adults. *Advances in Alzheimer's Disease*, 4(1), 1–9. doi:10.4236/aad.2015.41001.
140. Martin-Khan, M. G., Edwards, H., Wootton, R., Varghese, P., Lim, K., Darzins, P., . . . Gray, L. C. (2016). Web-based (online) comprehensive geriatric assessment is more time efficient, and as reliable, as reading patient medical records and conducting traditional in person consultations. *Journal of Telemedicine and Telecare*, 22(8), 478–482. doi:10.1177/1357633X16674088.
141. Martin-Khan, M. G., Edwards, H., Wootton, R., Counsell, S. R., Varghese, P., Lim, W. K., . . . Gray, L. C. (2017). Reliability of an Online Geriatric Assessment Procedure Using the interRAI Acute Care Assessment System. *Journal of the American Geriatrics Society*, 65(9), 2029–2036. doi:10.1111/jgs.14895.
142. Massone, C., Maak, D., Hofmann-Wellenhof, R., Soyer, H. P., & Fruhauf, J. (2014). Teledermatology for skin cancer prevention: an experience on 690 Austrian patients. *Journal of the European Academy of Dermatology and Venereology*, 28(8), 1103–1108. doi:10.1111/jdv.12351.
143. Mea, V., Carbone, A., Di Loreto, C., Bueno, G., De Paoli, P., Garcia-Rojo, M., . . . Pantanowitz, L. (2017). Teaching digital pathology: The international school of digital pathology and proposed syllabus. *Journal of Pathology Informatics*, 8(1), 27. doi:10.4103/jpi.jpi_17_17.
144. Menon, A., Gray, L. C., Fatehi, F., Darssan, D., Bird, D., Bennetts, D., & Russell, A. W. (2017). A comparison of characteristics of patients seen in a tertiary hospital diabetes telehealth service versus specialist face-to-face outpatients. *Journal of Telemedicine and Telecare*, 23(10), 842–849. doi:10.1177/1357633x17733295.
145. Morris, J. N., Howard, E. P., Steel, K., Perlman, C., Fries, B. E., Garms-Homolova, V., . . . Szczerbinska, K. (2016). Updating the Cognitive Performance Scale. *Journal of Geriatric Psychiatry and Neurology*, 29(1), 47–55. doi:10.1177/0891988715598231.
146. Mosadeghi-Nik, M., Askari, M. S., & Fatehi, F. (2016). Mobile health (mHealth) for headache disorders: A review of the evidence base. *Journal of Telemedicine and Telecare*, 22(8), 472–477. doi:10.1177/1357633X16673275.
147. Mozer, R., Bradford, N. K., Caffery, L. J., & Smith, A. C. (2015). Identifying perceived barriers to videoconferencing by rehabilitation medicine providers. *Journal of Telemedicine and Telecare*, 21(8), 479–484. doi:10.1177/1357633X15607136.
148. Nair, U., Armfield, N. R., Chatfield, M. D., & Edirippulige, S. (2018). The effectiveness of telemedicine interventions to address maternal depression: A systematic review and meta-analysis. *Journal of Telemedicine and Telecare*, 24(10), 639–650. doi:10.1177/1357633X18794332.
149. Nathalie Lyzwinski, L., Caffery, L., Bambling, M., & Edirippulige, S. (2018). University Students' Perspectives on Mindfulness and mHealth: A Qualitative Exploratory Study. *American Journal of Health Education*, 49(6), 341–353. doi: 10.1080/19325037.2018.1502701.
150. Navarro, P., Bambling, M., Sheffield, J., & Edirippulige, S. (2018). Exploring Young People's Perceptions of the Effectiveness of Text-Based Online Counseling: Mixed Methods Pilot Study. *JMIR Mental Health*, e13152. doi:10.2196/13152.
151. Nelson, M. J., Crossley, K. M., Bourke, M. G., & Russell, T. G. (2017). Telerehabilitation Feasibility in Total Joint Replacement. *International Journal of Telerehabilitation*, 9(2), 31–38. doi:10.5195/ijt.2017.6235.
152. Nelson, M., Bourke, M., Crossley, K., & Russell, T. (2017). Telerehabilitation Versus Traditional Care Following Total Hip Replacement: A Randomized Controlled Trial Protocol. *JMIR Research Protocols*, 6(3), e34. doi:10.2196/resprot.7083.
153. Nelson, M. J., Bourke, M. G., Crossley, K. M., & Russell, T. G. (2018). Outpatient physiotherapy rehabilitation for total hip replacement: comparison of current practice with clinical evidence. *International Journal of Therapy and Rehabilitation*, 25(11), 613–622. doi:10.12968/ijtr.2018.25.11.613.
154. Neuhaus, M., Langbecker, D., Caffery, L. J., Taylor, M., Garner, L., Williams, G., . . . Macdonald, G. A. (2018). Telementoring for hepatitis C treatment in correctional facilities. *Journal of Telemedicine and Telecare*, 24(10), 690–696. doi:10.1177/1357633x18795361.
155. Ngoo, A., Finnane, A., McMeniman, E., Soyer, H. P., & Janda, M. (2018). Fighting Melanoma with Smartphones: A Snapshot of Where We are a Decade after App Stores Opened Their Doors. *International Journal of Medical Informatics*, 118, 99–112. doi:10.1016/j.ijmedinf.2018.08.004 .
156. Ngoo, A., Finnane, A., McMeniman, E., Tan, J. M., Janda, M., & Soyer, H. P. (2018). Efficacy of smartphone applications in high-risk pigmented lesions. *Australasian Journal of Dermatology*, 59(3), e175–e182. doi:10.1111/ajd.12599.
157. Nguyen, K. H., Smith, A. C., Armfield, N. R., Bensink, M., & Scuffham, P. A. (2015). Cost-Effectiveness Analysis of a Mobile Ear Screening and Surveillance Service versus an Outreach Screening, Surveillance and Surgical Service for Indigenous Children in Australia. *PLoS One*, 10(9). doi:10.1371/journal.pone.0138369.
158. Nichol, L., Hill, A. J., Wallace, S. J., Pitt, R., & Rodriguez, A. D. (2018). Exploring speech-language pathologists' perspectives of aphasia self-management: a qualitative study. *Aphasiology*, 32(sup1), 159–161. doi:10.1080/02687038.2018.1470603.
159. Nicola, K., Waugh, J., Charles, E., & Russell, T. (2018). The feasibility and concurrent validity of performing the Movement Assessment Battery for Children – 2nd Edition via telerehabilitation technology. *Research in Developmental Disabilities*, 77, 40–48. doi.org/10.1016/j.ridd.2018.04.001.
160. Nix, J., & Comans, T. (2017). Home Quick - Occupational Therapy Home Visits Using mHealth, to Facilitate Discharge from Acute Admission Back to the Community. *International Journal of Telerehabilitation*, 9(1), 47–54. doi:10.5195/ijt.2017.6218.
161. Nufer, K. L., Raphael, A. P., & Soyer, H. (2018). Dermoscopy and overdiagnosis of melanoma in situ. *JAMA Dermatology*, 154(4), 398–399. doi:10.1001/jamadermatol.2017.6448.
162. Penny, R. A., Bradford, N. K., & Langbecker, D. (2018). Registered nurse and midwife experiences of using videoconferencing in practice: A systematic review of qualitative studies. *Journal of Clinical Nursing*, 27(5–6), e739–e752. doi:10.1111/jocn.14175.
163. Pitt, R., Theodoros, D., Hill, A. J., & Russell, T. (2017). The development and feasibility of an online aphasia group intervention and networking program - TeleGAIN. *International Journal of Speech-Language Pathology*, Epub. doi:10.1080/17549507.2017.1369567.
164. Pitt, R., Theodoros, D., Hill, A. J., Rodriguez, A. D., & Russell, T. (2017). The feasibility of delivering constraint-induced language therapy via the Internet. *Digital Health*, 3, 1–11. doi:10.1177/2055207617718767.

165. Pitt, R., Hill, A. J., Theodoros, D., & Russell, T. (2018). "I definitely think it's a feasible and worthwhile option": perspectives of speech-language pathologists providing online aphasia group therapy. *Aphasiology*, 32(9), 1031-1053. doi:10.1080/02687038.2018.1482403.
166. Pitt, R., Theodoros, D., Hill, A. J., & Russell, T. (2018). The impact of the telerehabilitation group aphasia intervention and networking programme on communication, participation, and quality of life in people with aphasia. *International Journal of Speech-Language Pathology*, 1-11. doi:10.1080/17549507.2018.1488990.
167. Quinn, R., Park, S., Theodoros, D., & Hill, A. J. (2018). Delivering group speech maintenance therapy via telerehabilitation to people with Parkinson's disease: A pilot study. *International Journal of Speech-Language Pathology*, 1-10. doi:10.1080/17549507.2018.1476918.
168. Raphael, A. P., & Soyer, H. P. (2018). Automated diagnosis: shedding the light on skin cancer. *British Journal of Dermatology*, 178(2), 331-333. doi:10.1111/bjd.16219.
169. Rayner, J. E., Laino, A. M., Nufer, K. L., Adams, L., Raphael, A. P., Menzies, S. W., & Soyer, H. P. (2018). Clinical Perspective of 3D Total Body Photography for Early Detection and Screening of Melanoma. *Frontiers in Medicine*, 5(152), 152. doi:10.3389/fmed.2018.00152.
170. Richardson, B. R., Truter, P., Blumke, R., & Russell, T. G. (2017). Physiotherapy assessment and diagnosis of musculoskeletal disorders of the knee via telerehabilitation. *Journal of Telemedicine and Telecare*, 23(1), 88-95. doi:10.1177/1357633X15627237.
171. Rowell, P. D., Pincus, P., White, M., & Smith, A. C. (2014). Telehealth in paediatric orthopaedic surgery in Queensland: a 10-year review. *ANZ Journal of Surgery*, 84(12), 955-959. doi:10.1111/ans.12753.
172. Russell, T. G., Gillespie, N., Hartley, N., Theodoros, D., Hill, A., & Gray, L. (2015). Exploring the predictors of home telehealth uptake by elderly Australian healthcare consumers. *Journal of Telemedicine and Telecare*, 21(8), 485-489. doi:10.1177/1357633X15606264.
173. Russell, T. G., Martin-Khan, M., Khan, A., & Wade, V. (2017). Method-comparison studies in telehealth: Study design and analysis considerations. *Journal of Telemedicine and Telecare*, 23(9), 797-802. doi:10.1177/1357633X17727772.
174. Senanayake, B., Wickramasinghe, S. I., Eriksson, L., Smith, A. C., & Edirippulige, S. (2018). Telemedicine in the correctional setting: A scoping review. *Journal of Telemedicine and Telecare*, 24(10), 669-675. doi:10.1177/1357633X18800858.
175. Simmich, J., Deacon, A. J., & Russell, T. G. (2018). Active Video Games for Rehabilitation in Respiratory Conditions: Systematic Review and Meta-Analysis. *JMIR Serious Games*, e10116. doi:10.2196/10116.
176. Sinnya, S., O'Rourke, P., Ballard, E., Tan, J. M., Morze, C., Sahebian, A., Hames, S., Prow, T., Green, A. & Soyer, H. P. (2015). Counting actinic keratosis-is photographic assessment a reliable alternative to physical examination in clinical trials? *Acta Dermato-Venereologica*, 95(5), 604-605. doi:10.2340/00015555-2040.
177. Smith, A. C., Armfield, N. R., Wu, W. I., Brown, C. A., Mickan, B., & Perry, C. (2013). Changes in paediatric hospital ENT service utilisation following the implementation of a mobile, indigenous health screening service. *Journal of Telemedicine and Telecare*, 19(7), 397-400. doi:10.1177/1357633X13506526.
178. Smith, A. C., Caffery, L. J., Saunders, R., Bradford, N. K., & Gray, L. C. (2014). Generating new telehealth services using a whole of community approach: experience in regional Queensland. *Journal of Telemedicine and Telecare*, 20(7), 365-369. doi:10.1177/1357633X14552371.
179. Smith, A. C., Garner, L., Caffery, L. J., & McBride, C. A. (2014). A review of paediatric telehealth for pre- and post-operative surgical patients. *Journal of Telemedicine and Telecare*, 20(7), 400-404. doi:10.1177/1357633X14552373.
180. Smith, A. C., Brown, C., Bradford, N., Caffery, L. J., Perry, C., & Armfield, N. R. (2015). Monitoring ear health through a telemedicine-supported health screening service in Queensland. *Journal of Telemedicine and Telecare*, 21(8), 427-430. doi:10.1177/1357633X15605407.
181. Smithers, B. M., Dunn, J., & Soyer, H. P. (2017). Whither melanoma in Australia? *Medical Journal of Australia*, 207(8), 330-331. doi: 10.5694/mja17.00740.
182. Snodgrass, S. J., Ashby, S. E., Rivett, D. A., & Russell, T. (2014). Implementation of an electronic Objective Structured Clinical Exam for assessing practical skills in pre-professional physiotherapy and occupational therapy programs: Examiner and course coordinator perspectives. *Australasian Journal of Educational Technology*, 30(2), 152-166, doi:10.14742/ajet.348.
183. Snodgrass, S. J., Rivett, D., Farrell, S., Ball, K., Ashby, S. E., Johnston, C. L., . . . Russell, T. (2016). Clinical educator and student perceptions of iPad™ technology to enhance clinical supervision: the Electronically-Facilitated Feedback Initiative (EFFI). *Internet Journal of Allied Health Sciences*, 14(4), 4. nsuworks.nova.edu/ijahsp/vol14/iss4/4/.
184. Snoswell, C., Finnane, A., Janda, M., Soyer, H. P., & Whitty, J. A. (2016). Cost-effectiveness of Store-and-Forward Teledermatology: A Systematic Review. *JAMA Dermatology*, 152(6), 702-708. doi:10.1001/jamadermatol.2016.0525.
185. Snoswell, C., Smith, A. C., Scuffham, P. A., & Whitty, J. A. (2017). Economic evaluation strategies in telehealth: obtaining a more holistic valuation of telehealth interventions. *Journal of Telemedicine and Telecare*, 23(9), 792-796. doi: 10.1177/1357633X16671407.
186. Snoswell, C. L., Caffery, L. J., Whitty, J. A., Soyer, H., & Gordon, L. G. (2018). Cost-effectiveness of skin cancer referral and consultation using teledermoscopy in Australia. *JAMA Dermatology*, 154(6), 694-700. doi:10.1001/jamadermatol.2018.0855.
187. Snoswell, C. L., Whitty, J. A., Caffery, L. J., Finnane, A., & Soyer, H. P. (2018). What do Australian dermatologists expect to be paid for store-and-forward teledermoscopy? A preliminary investigation. *Journal of Telemedicine and Telecare* (Epub). doi:10.1177/1357633X18776766.
188. Snoswell, C. L., Whitty, J. A., Caffery, L. J., Loescher, L. J., Gillespie, N., & Janda, M. (2018). Direct-to-consumer mobile teledermoscopy for skin cancer screening: Preliminary results demonstrating willingness-to-pay in Australia. *Journal of Telemedicine and Telecare*, 24(10), 683-689. doi: 10.1177/1357633X18799582.
189. Spinks, J., Janda, M., Soyer, H. P., & Whitty, J. A. (2016). Consumer preferences for teledermoscopy screening to detect melanoma early. *Journal of Telemedicine and Telecare*, 22(1), 39-46. doi:10.1177/1357633X15586701.
190. Stevenson, P., Finnane, A. R., & Soyer, H. P. (2016). Teledermatology and clinical photography: safeguarding patient privacy and mitigating medico-legal risk. *Medical Journal of Australia*, 204(5), 198-200. doi:10.5694/mja15.00996.
191. Surka, S., Edirippulige, S., Steyn, K., Gaziano, T., Puoane, T., & Levitt, N. (2014). Evaluating the use of mobile phone technology to enhance cardiovascular disease screening by community health workers. *International Journal of Medical Informatics*, 83(9), 648-654. doi:10.1016/j.ijmedinf.2014.06.008.
192. Swales, M., Hill, A., & Finch, E. (2015). Speech pathologists' preferences for computer-based aphasia therapy. *International Journal of Speech-Language Pathology*, 18(4), 315-328. doi:10.3109/17549507.2015.1081283.
193. Swales, M., Theodoros, D., Hill, A. J., & Russell, T. (2018). Communication service provision and access for people with Parkinson's disease in Australia: A national survey of speech-language pathologists. *International Journal of Speech-Language Pathology*, 1-12. doi:10.1080/17549507.2018.1537372.
194. Taylor, M., Caffery, L. J., Scuffham, P. A., & Smith, A. C. (2018). Economic modelling of telehealth substitution of face-to-face specialist outpatient consultations for Queensland correctional facilities. *Australian Health Review*, 42(5), 522-528. doi:10.1071/AH17135.
195. Taylor, O. D., Armfield, N. R., Dodrill, P., & Smith, A. C. (2014). A review of the efficacy and effectiveness of using telehealth for paediatric speech and language assessment. *Journal of Telemedicine and Telecare*, 20(7), 405-412. doi:10.1177/1357633X14552388.
196. Theodoros, D. G., Hill, A. J., & Russell, T. G. (2016). Clinical and Quality of Life Outcomes of Speech Treatment for Parkinson's Disease Delivered to the Home Via Telerehabilitation: A Noninferiority Randomized Controlled Trial. *American Journal of Speech-Language Pathology*, 25(2), 214-232. doi:10.1044/2015_ajslp-15-0005.
197. Theodoros, D., Aldridge, D., Hill, A. J., & Russell, T. (2018). Technology-enabled management of communication and swallowing disorders in Parkinson's disease: a systematic scoping review. *International Journal of Language and Communication Disorders*. Epub. doi:10.1111/1460-6984.12400.
198. Trnka, P., White, M. M., Renton, W. D., McTaggart, S. J., Burke, J. R., & Smith, A. C. (2015). A retrospective review of telehealth services for children referred to a paediatric nephrologist. *BMC Nephrology*, 16, 125. doi:10.1186/s12882-015-0127-0.
199. Truter, P., Russell, T., & Fary, R. (2014). The validity of physical therapy assessment of low back pain via telerehabilitation in a clinical setting. *Telemedicine and e-Health*, 20(2), 161-167. doi:10.1089/tmj.2013.0088.
200. van de Pol, E., Lucas, K., Geraghty, T., Pershouse, K., Harding, S., Atresh, S., . . . Smith, A. C. (2016). The delivery of specialist spinal cord injury services in Queensland and the potential for telehealth. *BMC Health Services Research*, 16(1), 29. doi:10.1186/s12913-016-1256-2.
201. Versleijen, M., Martin-Khan, M. G., Whitty, J. A., Smith, A. C., & Gray, L. C. (2015). A telegeriatric service in a small rural hospital: A case study and cost analysis. *Journal of Telemedicine and Telecare*, 21(8), 459-468. doi:10.1177/1357633X15611327.
202. Wade, V., Soar, J., & Gray, L. (2014). Uptake of telehealth services funded by Medicare in Australia. *Australian Health Review*, 38, 528-532. doi:10.1071/ah14090.
203. Wade, V., & Smith, A. C. (2017). Research methods and methodology in telemedicine. *Journal of Telemedicine and Telecare*, 23(9), 757-758. doi:10.1177/1357633X17733088.
204. Wade, V., Barnett, A. G., Martin-Khan, M., & Russell, T. (2017). Designing quantitative telemedicine research. *Journal of Telemedicine and Telecare*, 23(9), 786-791. doi:10.1177/1357633X16671240.
205. Wade, V., Gray, L., & Carati, C. (2017). Theoretical frameworks in telemedicine research. *Journal of Telemedicine and Telecare*, 23(1), 181-187. doi:10.1177/1357633X15626650.
206. Wall, L. R., Cartmill, B., Ward, E. C., Hill, A. J., Isenring, E., & Porceddu, S. V. (2016). Evaluation of a weekly speech pathology/dietetic service model for providing supportive care intervention to head and neck cancer patients and their carers during (chemo)radiotherapy. *Supportive Care in Cancer*, 24(3), 1227-1234. doi:10.1007/s00520-015-2912-5.
207. Wall, L. R., Cartmill, B., Ward, E. C., Hill, A. J., Isenring, E., Byrnes, J., . . . Porceddu, S. V. (2016). "ScreenIT": Computerized screening of swallowing, nutrition and distress in head and neck cancer patients during (chemo) radiotherapy. *Oral Oncology*, 54, 47-53. doi:10.1016/j.oraloncology.2016.01.004.
208. Wall, L. R., Ward, E. C., Cartmill, B., Hill, A. J., & Porceddu, S. V. (2017). Adherence to a Prophylactic Swallowing Therapy Program During (Chemo) Radiotherapy: Impact of Service-Delivery Model and Patient Factors. *Dysphagia*, 32(2), 279-292. doi:10.1007/s00455-016-9757-z.
209. Wall, L. R., Ward, E. C., Cartmill, B., Hill, A. J., & Porceddu, S. V. (2017). Examining user perceptions of SwallowIT: A pilot study of a new telepractice application for delivering intensive swallowing therapy to head and neck cancer patients. *Journal of Telemedicine and Telecare*, 23(1), 53-59. doi:10.1177/1357633X15617887.
210. Wall, L. R., Kularatna, S., Ward, E. C., Cartmill, B., Hill, A. J., Isenring, E., . . . Porceddu, S. V. (2018). Economic Analysis of a Three-Arm RCT Exploring the Delivery of Intensive, Prophylactic Swallowing Therapy to Patients with Head and Neck Cancer During (Chemo)Radiotherapy. *Dysphagia*. Epub. doi:10.1007/s00455-018-9960-1.
211. Ward, E. C., Burns, C. L., Theodoros, D. G., & Russell, T. G. (2013). Evaluation of a Clinical Service Model for Dysphagia Assessment via Telerehabilitation. *International Journal of Telemedicine and Applications*, 2013, 918526. doi:10.1155/2013/918526.

212. Ward, E. C., Burns, C. L., Theodoros, D. G., & Russell, T. G. (2014). Impact of dysphagia severity on clinical decision making via telerehabilitation. *Telemedicine and e-Health*, 20(4), 296–303. doi:10.1089/tmj.2013.0198.

213. Ward, E. C., Wall, L. R., Burns, C. L., Cartmill, B., & Hill, A. J. (2017). Application of telepractice for head and neck cancer management: a review of speech language pathology service models. *Current Opinion in Otolaryngology & Head and Neck Surgery*, 25(3), 169–174. doi:10.1097/MOO.0000000000000357.

214. Wickramasinghe, S. I., Caffery, L. J., Bradford, N. K., & Smith, A. C. (2016). Enablers and barriers in providing telediabetes services for Indigenous communities: A systematic review. *Journal of Telemedicine and Telecare*, 22(8), 465–471. doi:10.1177/1357633X16673267.

215. Witkowski, A., Łudzik, J., & Soyer, H. P. (2016). Telediagnosis with confocal microscopy: a reality or a dream? *Dermatologic Clinics*, 34(4), 505–512. doi.org/10.1016/j.det.2016.05.013.

216. Wright, O., Klein, K., Lakhan, P., Vivanti, A., & Gray, L. (2015). Development of an integrated screener for undernutrition within a comprehensive geriatric assessment system. *The Journal of Aging Research & Clinical Practice*, 4, 25–33.

217. Xie, H., Peel, N. M., Hirdes, J. P., Poss, J. W., & Gray, L. C. (2016). Validation of the interRAI Pressure Ulcer Risk Scale in Acute Care Hospitals. *Journal of the American Geriatrics Society*, 64(6), 1324–1328. doi:10.1111/jgs.14131.

218. Youl, P. H., Soyer, H. P., Baade, P. D., Marshall, A. L., Finch, L., & Janda, M. (2015). Can skin cancer prevention and early detection be improved via mobile phone text messaging? A randomised, attention control trial. *Preventive Medicine*, 71, 50–56. doi:10.1016/j.ypmed.2014.12.009.

Book sections

1. Armfield, N., & Donovan, T. (2015). Acute Care Telemedicine. In H. Eren & J. Webster (Eds.), *Telemedicine and Electronic Medicine* (pp. 597–618). United States: CRC Press.

2. Bradford, N., & Irving, H. (2015). Teleoncology. In H. Eren & J. Webster (Eds.), *Telemedicine and Electronic Medicine* (pp. 561–580). United States: CRC Press.

3. Burns, C. L., Hill, A. J., & Ward, E. C. (2014). Supporting Head and Neck Cancer Management: Use of Technology. In E. C. Ward & C. van As-Brooks (Eds.), *Head and Neck Cancer: Treatment Rehabilitation and Outcomes* (Second Edition ed.): Plural Publishing.

4. Caffery, L. (2015). An Analysis of DICOM and Its Use for Image Management and Communication in Store-and-Forward Telehealth. In H. K. Raad (Ed.), *Telemedicine: Emerging Technologies, Applications and Impact on Health Care Outcomes* (pp. 33–54). New York: Nova Science Publishers.

5. Caffery, L. (2015). Teleradiology. In H. Eren & J. Webster (Eds.), *Telemedicine and Electronic Medicine* (pp. 489–510). United States: CRC Press.

6. Edirippulige, S., Armfield, N., Caffery, L., & Smith, A.C., (2015). Education and Training for Supporting Practitioners in the Use of Clinical Telehealth: A Needs Analysis. In H. Eren & J. Webster (Eds.), *Telehealth and Mobile Health* (pp. 319–328). United States: CRC Press.

7. Edirippulige, S., Bambling, M., & Fernandez, P. (2017). Telemental Health Services for Indigenous Communities in Australia: A Work In Progress? In H. Jefee-Bahloul, A. Barkil-Oteo, & E. F. Augusterfer (Eds.), *Telemental health in resource-limited global settings* (pp. 131–144). London: Oxford University Press.

8. Edirippulige, S., Ozhegova, L. A., & Ozhegov, A. (2017). Factors influencing the development and the current status of telemedicine: Geographical perspective. In Vahkrushev (Ed.), *In Scientific Notes: Geography and Geology* (pp. 207–218). Simferopol, CRIMEA: Federal University of Crimea named after V. I. Vernadski.

9. Edirippulige, S., & Marasinghe, R. B. (2017). Telemental Health Services in Sri Lanka. In H. Jefee-Bahloul, A. Barkil-Oteo, & E. F. Augusterfer (Eds.), *Telemental health in resource-limited global settings* (pp. 105–116). London: Oxford University Press.

10. Martin-Khan, M., Freeman, S., Adam, K., & Betkus, G. (2017). The Evolution of Telehealth. In H. Marston, S. Freeman, & C. Musselwhite (Eds.), *Mobile e-Health*. Cham, Switzerland: Springer International Publishing.

11. Russell TG, Theodoros DG. (2017). Rehabilitation. In: Rheuban K, Krupinski EA. (Eds.), *Understanding Telehealth* (pp. 155–170). New York, NY: McGraw-Hill.

12. Theodoros, D. (2013). Speech-language pathology and telerehabilitation. In S. Kumar & E. R. Cohn (Eds.), *Telerehabilitation* (pp. 311–323). London, United Kingdom Springer.

Other publications

1. Caffery, L., Hobbs, A., Hale-Robertson, K., & Smith, A. C. (2017). Telehealth substitution of rural outreach services: an economic analysis. Paper presented at the 14th National Rural Health Conference, Cairns, Queensland, Australia. ruralhealth.org.au/14nrhc/sites/default/files/Caffery%2C%20Liam_A2.pdf.

2. Campbell J, Theodoros D, Russell T, Gillespie N, Hartley N. (2017). A Telehealth Framework for BUSHkids: Service Gap Analysis Findings. Brisbane, Australia: UQ; 24 March 2017.

3. Costa, A. P., Hirdes, J., Arino-Blasco, S., Berg, K., Boscart, V., Carpenter, C., . . . Wellens, N. I. (2017). *interRAI Emergency Department (ED) Assessment System Manual: for use with the interRAI ED Screener (EDS) and ED Contact Assessment (ED-CA) (Vol. Version 9.3)*. Washington D.C.: interRAI.

4. Gray, L., Ariño-Blasco, S., Berg, K., Fries, B. E., Heckman, G., Jónsson, P. V., . . . Topinková, E. (2017). *InterRAI Acute Care for Comprehensive Geriatric Assessment (AC-CGA) Assessment Form and User’s Manual: interRAI*.

5. Smith, A.C., Saunders, R., Caffery, L., Bradford, N., Grey, J., & Gray, L. (2015). A multi-stakeholder strategy for the generation of new telehealth services in rural Queensland. Paper presented at The American Telemedicine Association Twentieth Annual Telemedicine Meeting and Trade Show, USA.

6. Theodoros, D., Hill, A., Hartley, N., Martin-Khan, M., Bird, D., Russell, T., Goodenough, B., & Gillespie, N. (2016). Innovation to Implementation for Telehealth: A Practical Guide to Knowledge Translation in Telehealth. CRE in Telehealth, Australia. Retrieved from cretelehealth.org.au/content/i2i-4-telehealth.

Theses

1. AIDossary, S. (2018). The Development and Evaluation of a Needs-based Planning Framework for Telemedicine Services. (PhD Thesis), UQ, Australia.

2. Banbury, A. (2018). Digital Futures: E-health, health literacy and chronic disease self-management skills for older people. (PhD Thesis), Central Queensland University, Australia.

3. Burns, C. (2017). Enhancing access to specialist swallowing, speech, and voice intervention for patients with head and neck cancer: An evaluation of two new telepractice models (PhD Thesis), UQ, Australia.

4. Green, T. (2017). Trust Me, I'm a Doctor: Understanding Clinician’s Experiences of Service Separation and Trust Formation in Telehealth. (PhD Thesis), UQ, Australia.

5. Hwang, R. (2017). Providing heart failure rehabilitation in the home via telerehabilitation. (PhD Thesis), UQ, Australia.

6. Pitt, R. (2018). The development, feasibility, and effectiveness of an online aphasia group intervention — TeleGAIN. (PhD Thesis), UQ, Australia.

7. Snoswell, C. L. (2018). Economic evaluation and acceptability of teledermoscopy for skin cancer in Australia. (PhD Thesis), UQ, Australia.

8. Taylor, O. D. (2018). Speech and language screening for children with medical complexity: A comparison of telepractice and in-person methods. (MPhil Thesis), UQ, Australia.

9. Wall, L. R. (2017). Examining the use of telepractice for delivering intensive, prophylactic swallowing therapy to patients with head and neck cancer undergoing (chemo)radiotherapy. (PhD Thesis), UQ, Australia.

Research income

The CRE investigators secured additional research income to advance the CRE’s aim of accelerating the research agenda in telehealth: \$26.5 million as chief (primary) investigators and \$21.5 million as collaborative investigators on grants administered by UQ or other institutions.

2014 — Research income secured by CRE researchers as chief investigator			
Project title	Granting scheme	Amount	Investigators
Telerehabilitation Clinic	Bowness Foundation	\$500,000	Theodoros, D.; Russell, T.; Hickson, L.; Nissen, P.
Introducing tele-diabetes services into rural Indigenous communities	Diamond Jubilee Partnerships	\$180,000	Smith, A.; Caffery, L.
Introducing tele-diabetes services Into rural Indigenous communities	Diabetes Queensland PhD Scholarship	\$30,000	Wickramasinghe, S.
Establishing the feasibility of a telehealth network for Indigenous patients with diabetes	Diamond Jubilee Partnerships	\$57,000	Smith, A.; Caffery, L.
Telemedicine late evening consultant WARD rounds in the paediatric intensive care unit	Children’s Health Queensland	\$28,000	Coulthard, M.; Smith, A.; Armfield, N.
Let’s Play! Language Action Games for Constraint Induced Language Therapy	National Stroke Foundation	\$2,982	Tang, J.; Hill, A; Finch, E.
The feasibility of online aphasia group therapy	National Stroke Foundation	\$19,757	Pitt, R.; Theodoros, D.; Russell, T.; Hill, A.
Consumer preferences for the delivery of novel telehealth interventions in speech pathology and physiotherapy	HABS Research Collaboration Seeding Grant, UQ	\$20,000	Whitty, J.; Theodoros, D.; Russell, T.
Consumer preferences for the delivery of a novel teledermoscopy intervention for screening individuals at an increased risk of melanoma	Griffith Health Institute Project Grant	\$12,000	Whitty, J.; Janda, M.; Soyer, H.P.

2014 — Research income secured by CRE researchers as collaborative investigator			
Project title	Granting scheme	Amount	Investigators
Establishing a regional paediatric modified barium swallow clinic via telehealth to improve outcomes for Sunshine Coast children with oropharyngeal dysphagia	Health Practitioner Research Grant Scheme — Queensland Health	\$30,000	King, S.; Weir, K.; Lord, N.; Saxon, R.; Walker, K.; Smith, A.; Ware, R.
The feasibility, efficacy and acceptability of using telehealth to provide multi-disciplinary assessment and advice for children with inherited bleeding disorders	Health Practitioners Research Grant Scheme	\$18,000	Brown, S.; McCosker, J.; Bradford, N.; Armfield, N.
The feasibility, efficacy and acceptability of using telehealth to provide multi-disciplinary assessment and advice for children with inherited bleeding disorders	Australian Haemophilia Centre Directors Organisation	\$33,000	Brown, S.; McCosker, J.; Bradford, N.; Armfield, N.
Finding a way with words: optimising communication in paediatric palliative care	QUT Engagement Innovation Grant	\$29,342	Ekberg, S.; Bradford, N.; Herbert, A.; Danby, S.; Yates, P.

2014 — Research income secured by CRE researchers as collaborative investigator

Project title	Granting scheme	Amount	Investigators
Centre of Research Excellence in Stroke Rehabilitation and Brain Recovery	NHMRC Centre of Research Excellence	\$2,500,000	Chief Investigators: Bernhardt, J.; Nilsson, M.; Carey, L.; Van Vliet, P.; Cadilhac, D.; Parsons, M.; Bladin, C., Middleton, S.; Levi, C.; Donnan, G. Associate Investigators: Lalor, E.; Faux, S.; Russell, T.; Worrall, I.; Churilov, L.; Pollack, M.; Lindley, R.; Davis, S.; Karayanidis, F.; Howells, D.
Does a computerised swallowing, nutrition, and distress screening tool capture those patients and carers who need face-to-face intervention during (chemo)radiotherapy for head and neck cancer?	Cancer Council Queensland	\$50,000	Cartmill, B.; Ward, E.; Wall, L.; Hill, A.; Isenring, E.; Byrne, J.; Chambers, S.; Dunn, J.; Nixon, J.; Whelan, J.; Porceddu, S.
Conducting instrumental assessments of adult dysphagia via telehealth: A pilot validation study	RBWH Foundation	\$26,414	Burns, C.; Ward, L.; Hill, A.

2015 — Research income secured by CRE researchers as chief investigator

Project title	Granting scheme	Amount	Investigators
Effective, electronic, and everywhere: An evaluation of eSALT language therapy for aphasia	UQ Early Career Researcher Grant	\$35,906	Hill, A.
Training students in effective communication strategies via telehealth	Technology-Enhanced Learning Grant, UQ	\$50,283	Finch, E.; Rose, T.; Fleming, J.; Theodoros, D.; Copland, D.; Lethlean, J.; Cameron, A.; McPhail, S.
School-based telehealth program (Health-e-Regions: Phase 3)	Shell QGC	\$520,000	Smith, A.; Bradford, N.; Caffery, L.; Gray, L.
Fostering future leaders grant	National Stroke Foundation	\$9,625	Hill, A.
The TeleSwell Study: Exploring the feasibility of a provider-assisted self-management program for the long-term management of lymphoedema	HABS-M+BS Collaborative Seeding Grant	\$28,000	Finnane, A.; Soyer, H.; Russell, T.; Bradford, N.
Improving communicative interactions between people with dementia and their family: The development and evaluation of Hear-Communicate-Remember	HABS-M+BS Col-laborative Seeding Grant	\$33,000	Meyer, C.; Pachana, N.; Hill, A.; Ryan, B.
Centre of Research Excellence for the study of naevi	NHMRC Centre of Research Excellence	\$2,496,835	Soyer, H.P.; Green, A.; Aitken, J.; Menzies, S.; Sturm, R.; Duffy, D.; Janda M.; Prow, T.; Schaider, H.

2015 — Research income secured by CRE researchers as collaborative investigator

Project title	Granting scheme	Amount	Investigators
Can a computerised home-therapy program provide an effective & cost-efficient model for delivering intensive swallowing therapy? An RCT of an innovative service model for head and neck cancer patients	PA Research Support Scheme	\$75,000	Ward, L.; Cartmill, B.; Porceddu, S.; Isenring, E.; Hill, A.
Evaluating the implementation of a swallowing, nutrition and distress screening service model for patients with head and neck cancer and their carers undergoing (chemo)radiotherapy treatment	PA Foundation Project Grant	\$75,000	Cartmill, B.; Ward, L.; Wall, L.; Isenring, L.; Hill, A.; Porceddu, S.
REthinking MOdel of Diabetes care utilising E-heaLth (REMODEL)	Queensland Health Telehealth Seed Funding	\$150,000	Russell, A.; Gray, L.; Smith, A.; Caffery, L.; Fatehi, F.; Menon, A.; Bird, D.

2016 — Research income secured by CRE researchers as chief investigator

Project title	Granting scheme	Amount	Investigators
Health-e-Regions: Establishing and evaluating telehealth service models in primary schools and community settings	Shell QGC	\$540,000	Smith, A.; Caffery, L.; Gray, L.
Technology-enabled self-management in chronic aphasia: when, how and what works	Speech Pathology Australia Research/ Higher Degree Student Research Grants	\$10,000	Byrne, L.; Hill, A.
Developing partnerships to support older adults with driving cessation: Feasibility of delivering telehealth UQDRIVE and UQDRIVE-dementia in South Australia	UQ FirstLink Scheme	\$15,000	Gustafsson, L.; Liddle, J.; Pachana, N.; Russell, T.; Mitchell, G.; Scott, T.
Telehealth delivery of an online driving cessation intervention for people with dementia: Translation and feasibility trial	HABS-M+BS	\$40,000	Scott, T.; Russell, T.; Gustafsson, L.; Pachana, N.; Brown-Wilson, C.; Mitchell, G.
Travel to USA (2016 Academy of Management Meeting, Anaheim)	UQ Graduate School Travel Grant	\$5,000	Kho, J.
Telehealth-enabled systems to improve medicines use among persons with cognitive impairment and dementia in residential aged care facilities	NHMRC via Cognitive Decline Partnership Centre	\$586,555	Gray, L.; Caffery, L.; Hubbard R.; Peel, N.; Hilmer, S; Bell, S.
A telehealth framework for BUSHkids. funding for PhD scholarship	BUSHkids	\$79,000	Theodoros, D.; Russell, T.; Gillespie, N.; Hartley, N.; Hill, A.
Exploring the value of telehealth in primary Care: A controlled trial within the Royal Flying Doctor Service	NHMRC Partnership Grant	\$465,164	Gray, L.; Smith, A.; Whitty, J.; Pascoe, E.; Mitchell, G.; Russell, T.; Gillespie, N.; Whitehead, O.; Hansen, A.;
Telehealth implementation of cochlear implant mapping across the lifespan	HABS Large Scale Research Initiative Development Fund	\$10,000	Russell, T.; Hickson, L.; Theodoros, D.; Waite, M.; Hill, A.; Dornan, D.; Arnott, W.; Rushbrooke, E.; Atkinson, S.; Pedley, K.; Eikelboom, R.; Upson, G.

2016 — Research income secured by CRE researchers as chief investigator

Project title	Granting scheme	Amount	Investigators
Exploring telehealth options for outreach services	Metro South Hospital and Health Service	\$69,644	Caffery, L.; Smith, A.; Armfield, N.; Mujcic, R.; Gray, L.
Review of interventions which improve efficiency of specialist referrals in tertiary facilities	Metro South Hospital and Health Service	\$33,000	Smith, A.; Gray, L.
REthinking MOdel of Diabetes care using E-heaLth (REMODEL)	Diabetes Queensland PhD Scholarship	\$30,000	Menon, A.

2016 — Research income secured by CRE researchers as collaborative investigator

Project title	Granting scheme	Amount	Investigators
Advancing cerebral palsy in Queensland program	Advance Queensland Innovation Partnerships Program (Queensland Government)	\$1,500,000	Boyd, R.; Colditz, P.; Rose, S.; Karunanithi, M.; Smith, A.; Scuffham, P.; Edwards; P.; Novak, I.; Morgan, C.; Badawi, N.
Redesigning skin cancer early detection and care	NHMRC Partnership Grant	\$581,319	Janda, M.; Soyer H.P.; Loescher, L.; Gillespie, N.; Vagenas, D.
Developing a suite of quality indicators (QIs) for telehealth services	University of Northern British Columbia, Canada	\$10,113	Freeman, S.; Flood, F.; Steegstra, K.; Martin-Khan, M.; Singh, A.

2017 — Research income secured by CRE researchers as chief investigator

Project title	Granting scheme	Amount	Investigators
Implementation of a telehealth facilitated model of dementia care to support Indigenous people living in remote communities	Commonwealth Department of Health: Dementia and Age Care Service Fund	\$1,440,000	Smith, A.; Caffery, L.; Langbecker, D., Gray, L.; Strivens, E.; Varghese, P.; Martin-Khan, M.; Hayman, N.
Health-e-Regions: Establishing and evaluating telehealth service models in primary schools and community settings	Shell QGC	\$670,000	Smith, A.; Caffery, L.; Langbecker, D.
Indigenous health screening in the South Burnett	Suncorp	\$9,860	Smith, A.; Caffery, L.; Langbecker, D.
Building a virtual child and youth forensic health service	Australian Centre for Health Service Innovation (AusHSI)	\$145,000	Smith, A.; Caffery, L.; Langbecker, D.; Stathis, S.; Wood, J.; Harden, S.; Hasan, T.
Evaluation of the implementation of a nursing assessment system for acute care	Australian Centre for Health Service Innovation (AusHSI)	\$149,000	Gray, L.; Hubbard, R.; Peel, N.; Henderson, A.; Beattie, E.; Kitson, A.
Predictors of home telehealth adoption in the ageing population: Consumer perspectives	NHMRC Project Grant	\$325,255	Russell, T; Gillespie, N; Hartley, N; Theodoros, D.; Hill, A.; Gray, L.
NHMRC Partnership Centre for Health System Sustainability	NHMRC via Macquarie University	\$210,000	Gray, L.; Caffery, L.
Telehealth-based hepatitis C treatment for Indigenous communities	Queensland Health – Telehealth Seed Funding	\$88,500	Neuhaus, M.; Caffery, L.; MacDonald, G.; Smith, A.

2017 — Research income secured by CRE researchers as chief investigator

Project title	Granting scheme	Amount	Investigators
eGROW Phase 2	Queensland Mental Health Commission	\$70,652	Smith, A.; Caffery, L.
International Society Imaging Collaboration Melanoma Project	Memorial Sloan Kettering Cancer Centre, USA	\$279,110	Caffery, L
Implementing the Tailored Activity Program for people with dementia and their family living at home: i-TAP (Australia)	NHMRC Boosting Dementia Research Grants	\$1,060,719	Bennett, S.; Clemson, L.; Gitlin, L.; Gannon, B.; Russell, T.; O'Reilly, M.
CyFiT Telehealth: web-based data management and clinical support system	Australian Cystic Fibrosis Research Trust	\$116,050	Russell, T.; Lang, L.; Johnston, L.; Stockton, K.
Nursing workforce preparedness to deliver cancer survivorship care using telehealth	Cancer Nurses Society of Australia Research Grant	\$14,970	Fox, J.; Brunelli, V.; Langbecker, D
UQ Faculty of Medicine Health Outcome Program	UQ Faculty of Medicine Health Outcome Program	~\$365,000	Soyer, H.P.; Whiteman, D.; Connelly, L.; Van Driel, M.; Finnane, A.; Gray, L.; Janda, M.; Macgregor, S.; McMeniman, E.; Smithers, M.
Caring for the carer: Development and pilot testing of an online intervention to improve carer preparedness to provide care for family carers of primary brain tumour patients	Sam Ryan Memorial AWARD	\$10,000	Langbecker, D.; Halkett, G.; Nowak, A.; Blackler, T.
Improving the management of ear disease amongst Indigenous children	The Honda Foundation	\$18,096	Langbecker, D.; Caffery, L.; Neuhaus, M.; Taylor, M.; Smith, A.
Advice and guidance on telehealth for the Three Rivers University Department of Rural Health	Charles Sturt University / UDRH	\$138,000	Smith, A.; Caffery, L.
Evaluation of the Queensland Health telehealth program	Queensland Health	\$148,309	Caffery, L.; Smith, A.; Langbecker, D.; Neuhaus, M.
Development of advice on priorities for, and governance of telehealth in the Tasmanian Health Service	Tasmanian Department of Health and Human Services	\$98,000	Smith, A.; Caffery, L.; Gray, L.; Taylor, M.; Langbecker, D.; Neuhaus, M.
Development of an active video game for the long term maintenance of exercise in people with chronic obstructive pulmonary disease	HABS-MNHHS Research Collaboration Seeding Grants	\$39,535	Russell, T.; Money, J.; Hartley, N.; Mandrusiak, A.

2017 — Research income secured by CRE researchers as collaborative investigator

Project title	Granting scheme	Amount	Investigators
Centre of Research Excellence: 'Australasian Cerebral Palsy Clinical Trials Network (AusCP-CTN): optimising interventions and effective services for children with Cerebral Palsy'	NHMRC Centre of Research Excellence	\$2,500,000	Boyd, R.; Novak, I.; Wallace, M.; Badawi, N.; Fahey, M.; Rose, S.; Colditz, P.; Ziviani, J.; Elliott, C.; Stott, N. Guzzetta, A.; Smith, A.; Whitty, J.; Whittingham, K.; Sakzewski, L.; Barber, L.; Davies, P.; Russo, R.; Ware, R.; McIntyre, S.

2017 — Research income secured by CRE researchers as collaborative investigator

Project title	Granting scheme	Amount	Investigators
Mobile Device Utilisation Lifting Adherence and Treatment Engagement in Cystic Fibrosis (MODULATE-CF)	Vertex Pharmaceuticals Circle of Care Grant	\$74,376	Smith, D.; Tay, G.; Reid, D.; Edirippulige, S.; Armfield, N.
NHMRC Partnership Centre in Health System Sustainability	NHMRC	\$10,700,000	Braithwaite, J.; Ward, R.; Anderson, T.; Teede, H.; Wells, L.; Gray L.; Yeend, T.; Coiera, E.; Westbrook, J.; Glasziou, P.; Scott, A.; Karnon, J.; Buchbinder, R.
Supporting older adults with dementia with driving cessation and mobility: An innovative telehealth approach	NHMRC Boosting Dementia Research Grants	\$1,868,907	Scott, T.; Pachana, N.; Mitchell, G.; Gustafsson, L.; Liddle, J.; Russell, T.
Quality Indicators (QIs) for telehealth services	University of Northern British Columbia, Canada	\$20,600	Freeman, S.; Martin-Khan, M.; Flood, F.
Investigating the use of telehealth audiology service provision in Cairns and Hinterland Hospital and Health Service	Qld Health (Allied Health Profession's Office of Qld)	\$84,700	McMillan, K.; Winter, N.; Harvey, D.; McBride, L.; Theodoros, D.; Russell, T.; Hickson, L.

2018 — Research income secured by CRE researchers as chief investigator

Project title	Granting scheme	Amount	Investigators
Digital Health Curriculum	Southern Queensland Rural Health (SQRH) & HABS, UQ	\$400,000	Theodoros, D.; Russell, T.; Smith, A.; Caffery, L.; Edirippulige, S.
Implementation of an innovative teledermatology network for the early detection of melanoma in high-risk Australians	NHMRC Partnership Projects	\$1,195,649	Soyer, H.P.; Gray, L.; Janda, M.; Eakin, E.; Gordon, L.; Aitken, J.; Whiteman, D.; Osborne, S.; Finnane, A.; Caffery, L.
Health-e-Regions Phase 5	Shell QGC	\$743,699	Smith, A.; Langbecker, D.; Theodoros, D.; Caffery, L.
e-PIMH Telepsychiatry Evaluation	Children's Health Queensland	\$10,010	Smith, A.; Caffery, L.; Neuhaus, M.; Taylor, M.
Australian Centre of Excellence in Melanoma Imaging (ACEMID)	Australian Cancer Research Foundation	\$9,889,200	Soyer, H.P.; Mann, G.; Mar, V.; Janda, M.; Aiken, J.; Fernandez-Penas, P.; Gray, L.; Menzies, S.; Scolyer, R.; Wolfe, R.; Cust, A.; Guitera, P.; McCormack, C.; Morton, R.; Caffery, L.
Improving sun protection behaviour in young Australian adults using a digital behavioural intervention	Harry J Lloyd Melanoma Research Grants	\$232,116	Soyer, H.P.; Janda, M.; Baade, P.; Loescher, L.

2018 — Research income secured by CRE researchers as chief investigator

Project title	Granting scheme	Amount	Investigators
Targeted and personalised early detection of melanoma using a 3D teledermatology network	PA Research Foundation	\$100,000	Soyer, H.P.; Whiteman, D.; Janda, M.; Aitken, J.; Schaidler, H.; Khosrotehrani, K.; Sturm, R.; McMeniman, E.; Finnane, A.; Gordon, L.; Peach, E.
Personalised early detection of melanoma	MRFF Next Generation Clinical Researchers Program – Practitioner Fellowship	\$577,189	Soyer, H.P.
Travel to Australian Diabetes Congress	Australian Diabetes Society Travel Grant	\$600	Menon, A.
Mobile-based Disease Management System for insulin dose adjustment in type 2 diabetes for specialist outreach and diabetes telehealth service	Study, Education and Research Committee Pathology Queensland	\$2,532	Menon, A.
Telerehabilitation in home-based stroke survivors – a co-design study.	Study Education Research Trust Fund (SERTF)	\$19,990	Rosbergen, I.; Grimley, R.; Russell, T.; Brauer, S.
Improving quality of care for people with dementia in the acute care setting	NHMRC Boosting Dementia Research Grants	\$1,860,000	Martin-Khan, M.; Gray, L.; Peel, N.; Hirdes, J.; Henderson, A.; Pascoe, E.; Gillespie, N.; Fries, B.; Boscart, V.; Crilly, J.
Developing practice guidelines for teledermatology	Australasian College of Dermatologists Scientific Research Fund	\$30,000	Caffery, L.; Smith, A.; Gray, L.

2018 — Research income secured by CRE researchers as collaborative investigator

Project title	Granting scheme	Amount	Investigators
Examining effectiveness of telegeriatric care in northern BC (Canada Funding)	Northern Health Authority, Canada	\$16,500	Freeman, S.; Price, A.; Lau, S.; Martin-Khan, M.
Technology versus tradition: a non-inferiority trial comparing video to face-to-face consultations with a physiotherapist for people with knee osteoarthritis.	NHMRC Project Grant	\$1,244,128	Hinman, R.; Russell, T.; Foster N.; Kasza, J.; Harris, A.

Notes

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More information

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