SOL✓E CHD

NHMRC Synergy Grant 2020 – 2025

Annual Report 2021

THE UNIVERSITY OF SYDNEY

THE UNIVERSITY OF WESTERN AUSTRALIA

DEAKIN UNIVERSITY

Heart Foundation

ACvA — Australian Cardiovascular Alliance

HSA — SUPPORT INFORMATION ENCOURAGEMENT

ACRA — Australian Cardiovascular Health and Rehabilitation Association

NHMRC — BUILDING A HEALTHY AUSTRALIA

Funded by NHMRC

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SOLV✔E CHD

Message from the Principal Investigator

On behalf of the entire SOLVE-CHD team, I am thrilled to share with you a report that summarises our activities and achievements to date. The SOLVE-CHD Synergy grant offers a unique and important opportunity to modernise care for people with heart disease. The first two years have been both challenging and rewarding for SOLVE-CHD. Despite the unpredictable COVID-19 disruptions, the SOLVE-CHD team have made significant progress in all key activity areas.

We have supported a diverse range of novel research projects across Australia and in the UK. In total, seven multidisciplinary collaboration projects have kicked off and you can read more about these in the report. We also completed a national Data Capture project that gives us a national picture of how cardiac rehabilitation services capture and store clinical information for individual patients who participate in their programs. This will now allow us to work with jurisdictions to establish local processes and infrastructure that enable improvements and better use of data. Our aim is to repeat the project in 4 years time so as to measure what differences have been made.

We have also commenced our capacity building program through identification of future health service research leaders coupled with cultivation of community engagement. I am pleased to welcome eight young and talented PhD candidates and Postdoctoral Research Fellows to the team. It has been exciting to see many of our key members achieving recognition, winning prestigious awards and contributing to influential leadership roles in their respective areas. Our team have attracted over $7 million in new funding that supports the work of SOLVE-CHD and importantly, 6 out of 10 of these successes were led by PhD candidates and EMCRs.

The SOLVE-CHD National Network was launched in April 2021 and we have already seen over 140 members joining us from more than 50 institutions nationwide. In mid-2021, SOLVE-CHD became the first official affiliate of the National Cardiac Registry. This crucial partnership will not only facilitate our governance and sustainability, but also highlight the importance of building a secondary prevention and cardiac rehabilitation electronic record keeping system at a national level.

As I reflect on the success of this year, I am proud of all we have done and excited about what is ahead. I look forward to continuing the work with our amazing colleagues and community members, supporting research that optimises access to and quality of secondary prevention, collaborating with State campaign leaders to develop and implement the transformative data system and many more!

Professor Julie Redfern
On behalf of all SOLVE-CHD Investigators

SOLVE CHD

Our goal is to modernise post-discharge secondary prevention and reduce the burden of heart disease by decreasing deaths, hospitalisations and costs via a program of work that integrates data, technology, partnerships and capacity.

SOLVE-CHD is a 5-year program of work that builds on previous and current efforts. In particular, the work of the Australian Cardiac Rehabilitation Measurement Taskforce where there has been national consensus and development of quality indicators for cardiac rehabilitation. SOLVE-CHD will see delivery of interlinked service reform and research across 4 key activities.

1. Transformative data & quality

Collection of real-time, consistent jurisdictional and national cardiac rehabilitation data with appropriate governance established. This will ultimately reduce inequity, improve patient outcomes and systems efficiency through performance metrics, benchmarking and quality improvement. These data will be collected real-time and will be linked with electronic medical records.

2. New research

Development and investigation of novel interventions that utilise technology within the context of personalised models of care, usefulness, patient reported outcomes and value for money. These should be personalised and tailored according to need, patient preference and level of risk (to ensure treatment optimisation) and could be delivered using digital health. Examples include the potential of virtual reality, peer support and telehealth approaches.

3. Capacity building

Identify and cultivate multidisciplinary research capacity, community engagement and future health services researcher leaders. Implement a program of project (small EMCR catalysts & pilot funds) and people support (PhD Scholarships & postdoctoral fellowships) as well as opportunities for travel and exchange between working environments (where possible). These funds will be provided to projects and people answering specific research questions relevant to SOLVE-CHD.

4. National network

We are establishing a virtual National Secondary Prevention Network to support and unify researchers, clinicians, government, non-government and consumers. This will help facilitate sharing of solutions, building partnerships and provide a conduit for sharing resources.

Our People

The SOLVE-CHD team is made up of investigators, research fellows, PhD students, affiliates & project support staff

Investigators

Professor Julie Redfern	University of Sydney
Professor Tom Briffa	University of Western Australia
Professor Robyn Gallagher	University of Sydney
Professor Adrienne O'Neil	Deakin University
Professor Garry Jennings	Sydney Health Partners & University of Sydney
Professor David Brieger	ANZ Research Institute & University of Sydney
Emeritus Professor David Wood	National University of Ireland Galway
Emeritus Professor Adrian Bauman	University of Sydney
Professor Elizabeth Geelhoed	University of Western Australia
Associate Professor Carolyn Astley	Australian Cardiovascular Health and Rehabilitation Association
Professor Clara Chow	University of Sydney
Professor Gemma Figtree	University of Sydney
Dr Karice Hyun	University of Sydney
Christine Connors	Top End Health Service
Associate Professor Simon Poon	University of Sydney
Rachelle Foreman	Brisbane North PHN
Dr Robert Herkes	Australian Commission on Safety and Quality in Health Care
Professor Peter Thompson	Harry Perkins Institute of Medical Research; Sir Charles Gairdner Hospital; University of Western Australia
Steve Woodruffe	Southern Queensland Rural Health
Dr Emma Thomas	University of Queensland
Cate Ferry	Previously The Heart Foundation

Affiliate Appointments

Dr Christian Verdicchio	Macquarie Health, University of Sydney and University of Adelaide
Robert Zecchin	Western Sydney Local Health District
Dr Susie Cartledge	Monash University

Admin Support Staff

Julia Ning	University of Sydney
Ritu Trivedi	University of Sydney

Research excellence recognised and leadership highlights

SOLVE-CHD is made up of a multidisciplinary research team of researchers and clinicians with allied health, nursing, cardiology, public health, health economics and psychology backgrounds. Over the past year, many of them have received extraordinary achievements in their respective areas, including several prestigious awards and holdings of impactful leadership positions.

Professor Julie Redfern was awarded the University of Sydney Vice-Chancellor's Award for Outstanding Mentoring and Leadership 2021

Professor Redfern is currently the Co-Director of ACvA Implementation & Policy Flagship and the Co-chair of Exercise, Prevention & Rehabilitation Council of the CSANZ, and CPC Node Leader at the University of Sydney

Emeritus Professor Adrian Bauman was awarded the Order of Australia (AO) in the Queens Birthday Honours 2021.

Professor Bauman is currently the Co-director of WHO Collaborating Centre for physical activity, nutrition and obesity

Professor Robyn Gallagher
2021 Class of Fellows of the American Academy of Nursing

Professor Gallagher is the Chair of the International Council of Cardiovascular Prevention and Rehabilitation.

Professor Adrienne O'Neil was awarded the Victorian Young Tall Poppy Awards for her innovative, high community impact research in mental and cardiovascular health 2021

Professor O'Neil is currently the Co-director of the Food Mood Centre at Deakin University

Dr Karice Hyun's paper titled *Gender Difference in Secondary Prevention of Cardiovascular Disease and Outcomes Following the Survival of Acute Coronary Syndrome* was one of the top 10 articles downloaded from *Heart, Lung and Circulation* in 2021

Dr Hyun is currently the Big Data Lead for the Cardiovascular Initiative, University of Sydney

SOL✓E CHD EMCRs

Sarah Gauci BSc BPsych (Hons) | *Associate Research Fellow* | Deakin University

Sarah Gauci has recently completed her PhD investigated how dietary patterns and cardiometabolic risk factors are related to cognitive performance in middle-aged and older adults. In her current role, she will be focusing on improving access to and quality cardiac rehabilitation for patients with comorbid mental health and cognitive issues. Her research program for SOLVE-CHD will also explore the role of lifestyle in the secondary prevention of heart disease.

Dr Matthew Hollings PhD, ESSAM AES | *Postdoctoral Research Fellow* | The University of Sydney

Dr. Matthew Hollings is an exercise and sport scientist whose research focuses on the importance of exercise for health and performance across the lifespan, with a specific interest in resistance training. Matt has a particular interest in improving the quality and uptake of exercise in clinical practice through patient/clinician education and with the support of modern technologies. Matt is a member of the Professional Development Committee for the NSW branch, Australian Cardiac Rehabilitation Association and is the co-lead of the Implementation and Policy pipeline, USyd Cardiovascular Initiative.
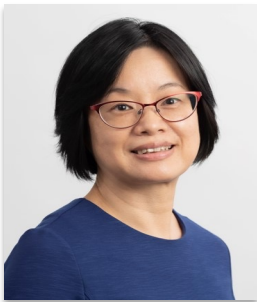
Dr Ling Zhang PhD, BN (Hons), BH, RN | *Postdoctoral Research Fellow* | The University of Sydney

Dr Ling Zhang is a clinical researcher and a practicing registered nurse. She has a strong research interest in understanding and supporting patients who have heart disease throughout their recovery, encouraging and enabling good self-management and reducing cardiac events recurrence through secondary prevention. She will address secondary prevention needs of CALD cardiac patients through a multi-method study combining patient insights, NSW-level cardiac rehabilitation data and assessment of a novel information strategy for SOLVE-CHD project.

Dr Clara Zwack PhD DPT BSc | *Postdoctoral Research Fellow* | The University of Sydney

Dr Clara Zwack is a registered Physiotherapist with seven years' clinical expertise in public and community health, rehabilitation and aged care. She completed her PhD, which investigated the cardiometabolic health profile of young adults with intellectual disability. Her current project *Guardian Angel* aims to investigate whether a digital platform for peer-interaction reduces cardiovascular risk, improves clinical and patient reported outcome measures and is cost-effective.

SOLVE CHD PhD Candidates

Dion Candelaria MN (ClinEd), GradCert (Cardiovasc), BSN, RN | *PhD Candidate*, The University of Sydney

Mr. Candelaria is a Registered Nurse with extensive clinical experience in cardiothoracic and coronary care nursing. He is currently completing his PhD exploring health-related quality of life (HRQL) outcomes from different models of cardiac rehabilitation (CR). His research will inform patient-centred quality improvement initiatives for CR programs. He is an executive board member of the CSANZ Nursing Council. Dion recently won the Best Oral Presentation Award at Singapore Prevention & Cardiac Rehabilitation Symposium 2021.

Joseph Weddell BSc (Hons), RN, CNS | *PhD Candidate*, University of Sydney

Joseph Weddell is a registered nurse with a comprehensive background in intensive care and cardiothoracic surgery. Joe holds 8 years critical care experience, working as a Clinical Nurse Specialist in intensive care. His flagship study aims to use a large cohort study design composed of participant from across multiple NSW cardiac rehabilitation programs. It will explore the prevalence and features of cognitive impairment in ACS, provide validation of a 5-minute screening tool for detecting cognitive and include qualitative research to explore their perceptions of "brain fog" and potential educational needs.

Rebecca Raeside BBiomedSc, MPH | *PhD Candidate, University of Sydney*

Rebecca Raeside is a first-year PhD Candidate. Her research study aims to strengthen the connection between young people and primary care services by developing a prevention program to support and improve CVD risk factors from an early age. This will provide young people with opportunities to form strong relationships to primary care services, which can potentially lead to early diagnosis and management of CVD throughout the life course.

Deborah Manandi BSc (MedSci), BAdvStudies (Hons)| *PhD Candidate, University of Sydney*

Deborah Manandi is a Medical Science graduate. She completed her Honours evaluating the applicability of the Plan-Do-Study-Act cycle methodology for improving the quality of cardiovascular disease management in general practices. Her PhD will focus on investigating and finding strategies to reduce the socioeconomic disparity in accessing cardiac rehabilitation. Deborah is also involved in the Wellbeing Health & Youth Centre of Research Excellence as a commissioner. She was awarded the Sydney International Student Award, to support her PhD tuition fees.

Transformative Data & Quality

Data collection and assessment of quality with an overarching need to improve access and equity are needed.

Australian Cardiac Rehabilitation Data Capture Project

In this project SOLVE-CHD evaluate and compare, across Australian jurisdictions, record keeping and data entry as part of routine care in cardiac rehabilitation programs. We will also be exploring the usefulness, barriers, and enablers to implementation of the National Cardiac Rehabilitation Quality Indicators.

In 2021, SOLVE-CHD National Data Capture Team conducted national data management survey which included 316 (80%) cardiac rehabilitation services nationally. We used very rigorous individualised methods to identify, recruit and collect the most accurate information and included public and private facilities, all states and territories and urban and remote locations.

We found >80% have access to electronic data platforms for patient data management and 47% store at least some data in an electronic medical record (EMR).

However, the majority of services used paper for assessments and recording data and duplicate entry for electronic data platforms.

While larger volume services used direct electronic entry more often, the number of patients enrolled made little difference (below). This survey provides the most accurate register of cardiac rehabilitation services in Australia and emphasises that ≈55,000 patients are supported by cardiac rehabilitation annually.

Find out more about this project visit
https://solvechd.org.au/national-cr-data-capture/

The Team

Professor Robyn Gallagher, University of Sydney

Professor Julie Redfern, University of Sydney

Dr Ling Zhang, University of Sydney

Dr Clara Zwack, University of Sydney

Dr Matthew Hollings, University of Sydney

Professor Tom Briffa, University of Western Australia

Dr Nicole Gordon, University of Western Australia

Mr Robert Zecchin, Western Sydney Local Health District
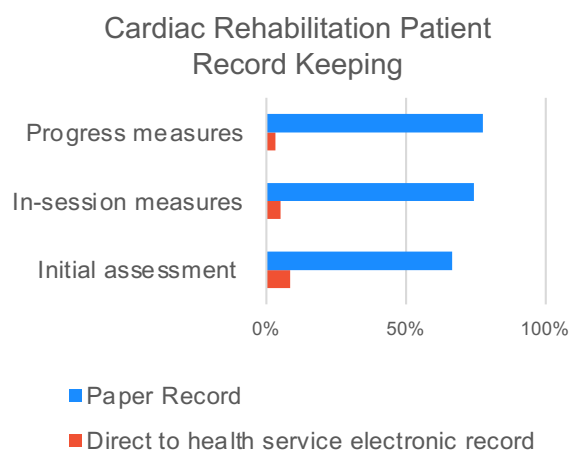
Dr Carolyn Astley, ACRA South Australia

Professor Adrienne O'Neil, Deakin University

Sarah Gauci, Deakin University

Dr Susie Cartledge, Monash University

Rosy Tirimacco, Integrated Cardiovascular Clinical Network SA

Samara Phillips, Clinical Improvement Unit MSH, Metro South Health

Cardiac Rehabilitation Patient Record Keeping

(categories: Progress measures, In-session measures, Initial assessment; x-axis 0% – 100%)

Legend:
■ Paper Record
■ Direct to health service electronic record

SOL✔E CHD Partnerships

National Cardiac Registry

The National Cardiac Registry (NCR) is a Clinical Quality Registry established to record information on cardiac procedures and devices in order to harness insights to drive better outcomes for all Australians. The NCR utilises a collaborative, federated model for effective engagement, participation and support from stakeholders and provides national benchmarking of key quality performance measures for cardiac conditions/procedures/devices and secondary prevention.

In 2021, SOLVE-CHD became the first national affiliate of the NCR, collaborating and partnering to facilitate governance and sustainability. SOLVE-CHD is playing a vital role in supporting the roll-out and collection of national quality indicators for cardiac rehabilitation. Establishing a secondary prevention module is now a recognised objective of the NCR.

https://nationalcardiacregistry.org.au/

Cls Professor Tom Briffa and Professor David Brieger are the SOLVE-CHD Representatives on the NCR's Steering Committee.
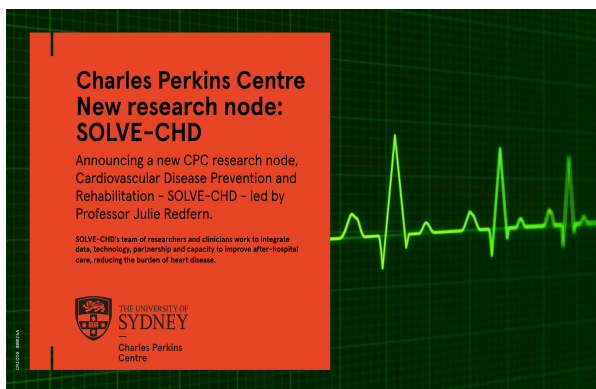
Charles Perkins Centre Project Node

In 2021, SOLVE-CHD has officially become a new research node at Charles Perkins Centre, University of Sydney: Cardiovascular Disease Prevention and Rehabilitation led by Professor Julie Redfern.

The SOLVE-CHD multidisciplinary initiative is closely in-line with the CPC research strategy which will address identified major gaps in secondary prevention space of cardiovascular disease.

SOLVE-CHD will be able to build capacity through a range of programs, offer training, mentoring, co-funding and educational opportunities to CPC and USyd Community.

The new SOLVE-CHD Node will combine with the previous "Preventive Cardiology Node" to provide a more expanded version now that Prof Robyn Gallagher and Prof Julie Redfern have been successful with a NHMRC Synergy grant to support this area of work. Such data falls into the cardio-metabolic area so there is a great potential that our work could be shared in other CPC Project Nodes such as Digital solutions in cardiovascular diseases prevention as well as Wireless Wellbeing, Physical Activity and Energy Expenditure, and Health Literacy. We also believe the node integrates across Population and Solutions Domains of the CPC.
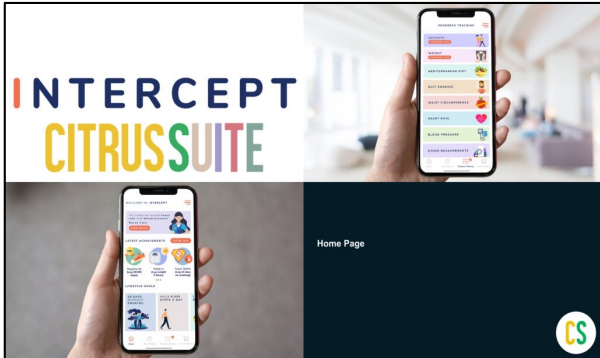
https://www.sydney.edu.au/charles-perkins-centre/our-research/current-research/integrative-systems-and-modelling/solve-chd.html

SOL✔E CHD Collaboration Projects

INTERCEP

INTERCEPT is a nurse-led virtual program to improve secondary prevention in post-acute coronary syndrome (ACS) patients in the COVID-19 era with a nurse (prescriber) intervention using SMART technology.

The overall aim of the INTERCEPT program is to transform secondary preventive care through an innovative nurse (prescriber) led programme, delivered virtually and supported by SMART technology, bridging care between hospital and home whilst observing the social restrictions imposed by COVID-19.

The INTERCEPT-App is in development with Citrus Suite Co Ltd UK led by Professor Catriona Jennings and Professor Lis Neubeck and is now ready for trialling.

This feasibility trial will be undertaken in the Coronary Care Unit at the University Hospital Galway under the direction of Professor Bill McEvoy, Consultant Cardiologist, and led by Irene Gibson, a PhD student, whose postgraduate programme includes the INTERCEPT project. Irene Gibson has set up a coronary patient group to inform the development of the I-App and the conduct of the feasibility trial. The purpose of the trial in 30 patients and their partners is to (i) test the use and acceptability of the lifestyle, risk factor and therapeutic elements of the I-App from the patient perspective; and (ii) test the use of the nurse portal for managing patients and partners through the I-App from the health professional perspective.

The I-App will be presented for the first time as a working model to health professionals at the National Prevention Meeting organised by the National Institute for Prevention and Cardiovascular Health on November 18th, 2022.

Following the feasibility trial, the I-App and Nurse Portal will be modified to take account of the findings and the next step is to evaluate the impact of the I-App compared to usual care in a larger randomised controlled trial measuring 16 week and one-year outcomes for lifestyle, risk factor control and adherence with cardioprotective medications.

Find out more about this project visit https://solvechd.org.au/intercept/

THE TEAM

Professor Catriona Jennings, Honorary Professor of Nursing at the National Institute for Prevention and Cardiovascular Health, National University of Ireland Galway, Ireland

Professor Lis Neubeck, Professor of Cardiovascular Health, Edinburgh Napier University

Irene Gibson, Cardiovascular specialist nurse, Galway University Hospital

Professor David Wood, Emeritus Professor of Cardiology and Adjunct Professor of Preventive Cardiology at the National Institute of Prevention and Cardiovascular Health (NIPC), National University of Ireland-Galway, Republic of Ireland

Professor David Wood
Chief Investigator of SOLVE-CHD

"INTERCEPT is bridging care for acute coronary syndrome patients between hospital and home using smart technology and with the vital support of the SOLVE-CHD project we are evaluating the impact of the I-App on lifestyle, risk factor control and therapeutic outcomes."

SOL✔E CHD Collaboration Projects

TEACH-RA Study

The Telehealth Education and Counselling intervention aims to optimise secondary prevention of patients with cardiovascular disease living in these rural areas.

TEACH-RA is a novel approach which will be tested for feasibility in collaboration with integrated clinical care network (iCCnet) country access to cardiac health (CATCH) program for implementation among rural and remote patients. The study is in its developmental stage with the protocol and the detailed intervention being developed in 2021. The intervention involves sessions of tailored patient education and counselling provided through telehealth and the use of an application (iPad) to provide patients with health information and support them in their self-management.

Find out more about this project visit
https://solvechd.org.au/teach-ra-study/

"The SOLVE-CHD collaboration enables us to support patients with hypertension and cardiovascular disease living in rural and remote areas in South-Australia"

THE TEAM

Professor Jeroen Hendriks, Leo J Mahar Cardiovascular Nursing Chair at Flinders University and Central Adelaide Local Health Network, Heart Foundation Future Leader Fellow

Dr Lemma Bulto, Postdoctoral Research Associate at Flinders University

Professor Robyn Clark, Heart Foundation Future Leader Fellow and Professor of acute care and cardiovascular research at Flinders University

Ms Rosy Tirimacco, Operations and Research Manager of the iCCnet SA

Dr Philip Tideman, Cardiologist and the Clinical Director of the iCCnet SA

SOL√E CHD Collaboration Projects

Value for money in Cardiac Rehabilitation

Improving secondary prevention and survivorship after a cardiovascular event is an important priority. In order to address this priority, translation of evidence-based interventions into service delivery models is necessary for improving patient and health system outcomes. Consequently, it is unacceptable that despite four decades of clinical research highlighting the multifactorial benefits of cardiac rehabilitation programs, less than half of patients with an eligible cardiovascular diagnosis in Australia are referred to these programs and as few as 10-20% complete them.

Our study seeks to conduct a modelling study, using published data, to understand the likely impact of implementing evidence-based changes to models of care for cardiac rehabilitation to improve engagement and enhance outcomes following cardiac events in Australia. We will synthesise evidence from published literature and use simulation models to determine the most cost-effective care models for individual services for Australian health settings.

Find out more about this project visit https://solvechd.org.au/value-for-money-in-cardiac-rehab/

THE TEAM

Dr Sameera Senanayake: The Australian Centre for Health Services Innovation (AusHSI), Queensland University of Technology

Dr Sameera Senanyak, QUT

Associate Professor Sanjeewa Kularatna: The Australian Centre for Health Services Innovation (AusHSI), Queensland University of Technology
Professor William Parsonage: The Australian Centre for Health Services Innovation (AusHSI), Queensland University of Technology
Professor Steven McPhail: The Australian Centre for Health Services Innovation (AusHSI), Queensland University of Technology
Dr Bridget Abell: The Australian Centre for Health Services Innovation (AusHSI), Queensland University of Technology
Dr Victoria McCreanor: The Australian Centre for Health Services Innovation (AusHSI), Queensland University of Technology

"Our research group is focussed on improving health services and health outcomes for people with cardiovascular disease. One of our key projects is mapping the evidence for different models of cardiac rehabilitation. The SOLVE-CHD contribution fills an important gap, enabling us to build on that work and undertake cost-effectiveness modelling based on the evidence mapping outcomes. The evidence generated through the economic evaluation of different models of cardiac rehabilitation will provide important information for policy-makers wanting to understand the impact, both in terms of patient outcomes and health system costs, of investment in the various models of care."

SOLVE CHD Collaboration Projects

Assisted self-management to prevent new life-threatening events for all in need after a heart attack (SPAN)

The National Heart Foundation Strategic Grant 2020

This study will establish the value of moving to a personalised, focused approach of preventing new attacks compared to routine care after a heart attack. It allows survivors to identify the key aspects to reducing their risk, the approach taken, goals set and maintaining engagement with health professionals in the three months after leaving hospital. The benefits of a personalised approach lay in both the potential for improved management of risk factors for an individual together with greater uptake and completion of the intervention across the entire population at risk.

For each additional person completing personalised care it will translate to the reduction of up to 1 death and/or heart attack/stroke per improved risk factor. The study will clarify the optimal method of providing care post heart attack, inform international clinical practice, guidelines, policy and improve the outcome of heart attack survivors everywhere.

Find out more about this project visit
https://solvechd.org.au/span/

THE TEAM

Professor Tom Briffa, UWA, Head of Cardiovascular Research Group and Centre for Health Services Research

Professor Julie Redfern, USyd, Professor of Public Health, Faculty of Medicine and Health

Professor Derek Chew, Commission for Excellence and Innovation in Health, SA & Flinders University

Professor John Atherton, Royal Brisbane and Women's Hospital

Professor Graham Hillis, Royal Perth Hospital & University of Western Australia

Professor Stephen Nicholls, Monash Health & Monash University

Professor David Brieger, Concord Hospital, Sydney & USYD

Dr James Rankin, Fiona Stanley Hospital (clinical and interventional cardiologist)

Associate Professor Andrew Maiorana, Fiona Stanley Hospital & Curtin University

Dr Charley Budgeon, UWA

Anne Cordingly, Consumer Representative, Perth Western Australia

Professor Tom Briffa
Chief Investigator of SOLVE-CHD

SOLV✓E CHD Collaboration Projects

Guardian Angel: Implementation of a peer support program for people with heart disease.

Our multidisciplinary team and stakeholders will build on our previous research to evaluate a scalable strategy for improving survivorship and reducing morbidity for people living with heart disease via the implementation of a peer support program that has in-person and digital options. We will evaluate a phased roll-out (stepped wedge cluster RCT) of the peer and emotional support across 25 LGAs (>1350 patients) across Australia.

The in-person option will expand the existing Heart Support Australia program across diverse geographical areas and community groups. The digital option is our purpose-built co-designed 'app' (eGuardian Angel) that enables digital peer support based on the concept of emotional contagion. We will also establish a national peer support registry of connected and engaged patients managed within the eGuardian Angel database enabling ongoing evaluation, communication and quality improvement by leveraging capacity across geographical and cultural groups.

Find out more about this project visit

https://solvechd.org.au/guardian-angel/

THE TEAM

Professor Julie Redfern, USyd, Professor of Public Health, Faculty of Medicine and Health

Professor Robyn Gallagher, USyd, Professor of Nursing

Professor Adrian Bauman, Emeritus Professor of Public Health, Sydney School of Public Health

Professor Gemma Figtree, Interventional cardiologist and professor, USyd;

Professor Tom Briffa, UWA, Head of Cardiovascular Research Group and Centre for Health Services Research

Professor Andrew Maiorana, Professor at Curtin University and Exercise Physiologist

Professor Maree Hackett, Program Health, Mental Head at The George Institute for Global Health

Dr Karice Hyun, USyd, Senior Research Fellow

Dr Stephen Law, USyd Senior Research Fellow in Health Economics

Associate Professor Simon Poon, USyd, Health Informatics Research

**Dr Clara Zwack,** USyd Research Fellow

Dr Emily Li, USyd Research Officer

SOLVE CHD Collaboration Projects

My Heart Mate

The MyHeartMate study evaluates the effect of a unique game-based mobile app intervention (MyHeartMate) to promote lifestyle change on objective and subjective measures of cardiovascular risk patients with coronary heart disease (CHD). We recruited 394 patients with coronary heart disease to a parallel-group, single-blind randomised trial with half the patients using our unique game-based mobile app to support their secondary prevention efforts. Game features centred on an avatar/virtual representation of the patient's own heart health maintained by using coins earned by risk factor work including tracking, challenges and quizzes; engagement was promoted by in-app games.

| Tracking overall Fun and achievement | Earn points Reward | Challenges Achievement |
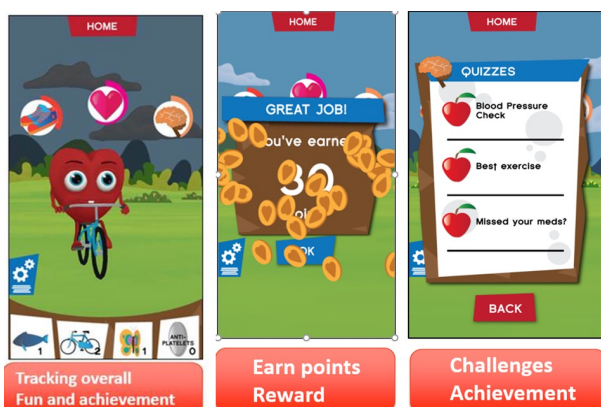
We found that most patients (age mean 61 years, 82% men) engaged with all active app components for <30 days (68.0%) although 26.8% engaged for ≥30 days (26.8%). We assessed outcomes after 6 months and found that while the MyHeartMate group had higher physical activity (MET mins/week) than the control group (1830 vs 1570) this was not a statistically significant difference (p=0.20). MyHeartMate participants achieved lower triglyceride levels (mean difference -0.31 (95% CI -0.5, -0.1 mmol/L, p=.004) mmol/L.

Find out more about this project visit
https://solvechd.org.au/myheartmate/

A randomised controlled trial to evaluate the effectiveness of a gamified mobile app on secondary prevention in coronary heart disease patients.

THE TEAM

Professor Gemma Figtree, Interventional cardiologist and professor at USyd; President, Australian Cardiovascular Alliance;

Professor Robyn Gallagher, USyd, Professor of Nursing

Prof Gemma Figtree   **Prof Robyn Gallagher**

Professor Julie Redfern, USyd, Professor of Public Health

Professor Lis Neubeck, Edinburgh Napier University, Professor of Cardiovascular Health

Professor Clara Chow, USyd, Professor of Medicine

Professor David Celermajer, USyd, the Scandrett Professor of Cardiology

Professor Geoffrey Tofler, USyd, Professor of Preventative Cardiology

Dr Karice Hyun, USyd, Senior Research Fellow

Dr Helen Parker, USyd, Academic Fellow

Associate Professor Tom Buckley, USyd, Critical/Acute Care

Dr Tracey Schumacher, Hunter Medical Research Institute, Postdoctoral Research Fellow

Ms Cate Ferry, ex-Clinical Manager at National Heart Foundation

SOLVE CHD Consumer Engagement

SOLVE-CHD is committed to enhancing our partnerships with consumers, carers, and families, and pursuing our responsibility to improve experience of Australian cardiac rehabilitation in the years to come through real partnership with consumers and communities.

Objectives

- Establish framework to support and strengthen engagement activity
- Establish and build up SOLVE-CHD Consumer Network through SOLVE-CHD National Network
- Progress consumer involvement on committees
- Promote partnership for engagement

First SOLVE-CHD Consumer Engagement Workshop held in July 2021 via Zoom

Key Activities

- Two Consumer workshops per year (invited speakers and focus groups) SOLVE-CHD will reimburse costs for participants
- Videos of consumer stories in collaboration with Heart Foundation
- Promote SOLVE-CHD Network to relevant consumer groups
- Consumer section on SOLVE-CHD website, quotes from consumer/patient representatives
- Partnership with relevant projects/organisations (i.e., Guardian Angel for peer support/Heart Support Australia)
- Consumer representatives in SOLVE-CHD Advisory Committee
- Share research project progress and outcome with Consumers
- Specific training and resources will be available to build consumer capabilities in required areas, including advocacy and research

Visit https://solvechd.org.au/consumer-engagement/ for more SOLVE-CHD consumer stories

At SOLVE-CHD, we are grateful to have health consumers from diverse backgrounds involved in our research from the very early stage. Having their contributions and participations are essential to our research program. We look forward to fostering the exciting collaboration that will follow.

SOL✔E CHD National Network

The SOLVE-CHD virtual National Network is established to support and unify researchers, clinicians, government, non-government and consumers. We encourage collaboration and commitment with the focus on cardiac rehabilitation and secondary prevention field. The Network aims to facilitate sharing of solutions, building partnerships and provide a conduit for sharing resources and provide hands-on training for members.

The National Network had its soft launch in April 2021. Despite the disruption of COVID-19 pandemic, we have over 140 members as of Dec 2021. Members are from more than 50 different Institutions across all states in Australia and from diverse backgrounds.

Membership by Discipline
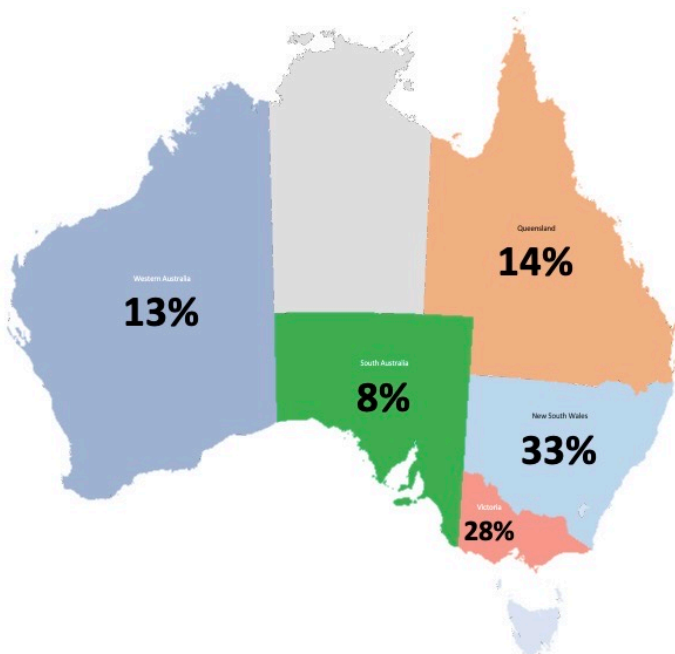
Nursing

Allied Health

Medical

Research

Health Economics

Public Health

Consumer Representatives

Membership by State

NSW 33%   **VIC 28%**
QLD 14%   **WA 13%**
TAS & NT 3%   **ACT 3%**

SCAN ME TO JOIN NOW

SOLVE CHD Socials

275 Followers on Twitter

116 Connections on LinkedIn

20 times In the Media

11760 Website views

9 Membership Newsletters

61.4% Newsletter open rate

Top 3 Tweets in 2021

SOLVE-CHD 🫀
@SolveChd

🥳🥳Another wonderful news! Heartfelt congratulations to #SOLVECHD CI A/Prof @DrAdrienneOneil @deakinresearch for being awarded #NHMRC #Emergingleadership 2 Investigator Grant $1.567M! What an achievement during these tough times! #celebratingresearchexcellence

NHMRC EL2 Investigator Grant Recipient 2021
A/Prof. Adrienne O'Neil

10, 896 Impressions

137 Total Engagement

SOLVE-CHD 🫀
@SolveChd

Join a supportive multidisciplinary PhD student community to develop your CVD research career, on a stipend of up to AU$32k pa. Find out more: bit.ly/3eb7hZX @heartfoundation @ACRA_ACRA @thecsanz @syd_health @SHPartners @OzCvA

SOLVE CHD
Transforming post-hospital care for people with heart disease in Australia

PhD Scholarship Program for Cardiovascular Rehabilitation and Secondary Prevention research, available at the University of Sydney, Deakin University and the University of Western Australia

Applications are officially open!
Ready to apply?

9,841 Impressions

151 Total Engagement

SOLVE-CHD 🫀
@SolveChd

Celebrating #WorldHeartDay @SolveChd
As we are working on solving the long-standing evidence-practice gap associated with #cardiacrehab and #secondaryprevention of coronary heart disease ❤️
Special thanks to everyone who was, is and will be joining us on this exciting journey!

SOLVE CHD

World Heart Day 2021
Use ❤️ to connect

8,157 Impressions

171 Total Engagement

SOL✔E CHD Impact & Outcomes

In the first two years of operation, some remarkable impact has been made. A full list of the previous years' output can be found in appendix 1 & 2 from page 22

36 Presentations (11 invited)

3 Poster Presentations

70 Publications

$7.39 Million
Total leveraged funding 2020 – 2021

- **Professor Julie Redfern,** MRFF Grant, Guardian Angel: Implementation of a peer support program for people with heart disease ($656K)

- **Professor Julie Redfern,** NHMRC Level 2 Investigator Grant, Modernising cardiac rehabilitation and secondary prevention of heart disease ($2.87M)

- **Professor Julie Redfern,** NSW Health Cardiovascular Senior Researcher Grant: Providing a peer support program to people with heart disease across NSW ($750K)

- **Professor Tom Briffa,** Heart Foundation Strategic Grant, SPAN: Secondary Prevention for all in need ($1M)

- **Professor Adrienne O'Neil,** NHMRC Emerging Leadership 2 Investigator Grant, NHMRC EL2 Investigator Grant ($1.57M)

- **Dion Candelaria,** Paulette Isabel Jones Postgraduate Research Completion Scholarship ($7K)

- **Dr Karice Hyun,** National Health and Medical Research Council, Investigator Grant ($129K)

- **Dr Karice Hyun,** Sydney Informatics Hub Project Scheme ($33K)

- **Dr Karice Hyun,** NSW Health Cardiovascular Research Capacity Grants. EMCR ($370K)

- **Deborah Manandi,** Sydney International Student Award, $10,000p.a deduction of tuition fee

Moving Forward

During 2021, we have worked on our four key activity areas: Transformative Data and Quality, New Research, Capacity Building as well establishing the SOLVE-CHD National Network. These programs will continue in 2022, with a particular emphasis on initiatives targeted towards Early and Mid Career Researchers, fostering partnership and offering trainings and workshops to SOLVE-CHD network.

Transformative Data & Quality

- National Data Capture Project
- Continue to collaborate with National Cardiac Registry as a formal affiliate
- Share findings with jurisdictions and collaborate to facilitate implementation of electronic data systems and evaluate use of cardiac rehabilitation data to support quality improvement
- Establish national database to coordinate and manage deidentified Australian data

Research Support and Capacity Building

- PhD Scholarships and Postdoctoral Fellowship Program
- SOLVE-CHD Collaboration Projects (EMCR and Pilot Projects)
- Travel Awards and International training support for cardiac rehabilitation
- SOLVE-CHD Annual Project Progress/Showcase Workshop
- Grant Support Workshops (including consumer review)
- Growing SOLVE-CHD National Network
- Support and grow completion and dissemination of collaborative projects
- CSANZ Position Statement on Exercise Prescription and Cardiac Rehabilitation

Consumer Involvement

- Reviewing research concepts and protocols from the community perspective
- Progress consumer involvement on committees
- Participating in working group
- Review grant applications
- Building up consumer network through SOLVE-CHD National Network

SOL✔E CHD Appendix 1. Publications

2020

1. Agostino JW, Wong D, Paige E, et al. Cardiovascular disease risk assessment for Aboriginal and Torres Strait Islander adults aged under 35 years: a consensus statement. Med J Aust. 2020;212(9):422-427.

2. Arnott C, Patel S, Hyett J, **Jennings G**, Woodward M, Celermajer DS. Women and Cardiovascular Disease: Pregnancy, the Forgotten Risk Factor. Heart Lung Circ. 2020;29(5):662-667.

3. **Candelaria D**, Randall S, Ladak L, **Gallagher R**. Health-related quality of life and exercise-based cardiac rehabilitation in contemporary acute coronary syndrome patients: a systematic review and meta-analysis. Qual Life Res. 2020;29(3):579-592.

4. Ferguson C, Inglis SC, **Gallagher R**, Davidson PM. Reflecting on the Impact of Cardiovascular Nurses in Australia and New Zealand in the International Year of the Nurse and Midwife. Heart Lung Circ. 2020;29(12):1744-1748.

5. **Gallagher R, Ferry C, Candelaria D**, Ladak L, **Zecchin R**. Evaluation of Cardiac Rehabilitation Performance and Initial Benchmarks for Australia: An Observational Cross-State and Territory Snapshot Study. Heart Lung Circ. 2020;29(9):1397-1404.

6. **Gallagher R**, Parker H, **Zhang L,** et al. Target Audience and Preferences Related to an Australian Coronary Heart Disease Specific Mobile App: A Mixed Methods Study. Heart Lung Circ. 2020;29(5):696-702.

7. **Gallagher R**, Thomas E, **Astley C,** et al. Cardiac Rehabilitation Quality in Australia: Proposed National Indicators for Field-Testing. Heart Lung Circ. 2020;29(9):1273-1277.

8. Inglis SC, Naismith C, White K, et al. CSANZ COVID-19 Cardiovascular Nursing Care Consensus Statement: Executive Summary. Heart Lung Circ. 2020;29(9):1263-1267.

9. James S, Perry L, **Gallagher R**, Lowe J. A discussion of healthcare support for adolescents and young adults with long-term conditions: Current policy and practice and future opportunities. Int J Nurs Pract. 2020;26(5):e12882.

10. Ladak LA, **Gallagher R**, Hasan BS, Awais K, Abdullah A, Gullick J. Exploring the influence of socio-cultural factors and environmental resources on the health related quality of life of children and adolescents after congenital heart disease surgery: parental perspectives from a low middle income country. J Patient Rep Outcomes. 2020;4(1):72. Published 2020 Aug 28.

11. Ladak LA, Hasan BS, Gullick J, Awais K, Abdullah A, **Gallagher R**. Health-related quality of life in congenital heart disease surgery patients in Pakistan: protocol for a mixed-methods study. BMJ Open. 2017;7(10):e018046. Published 2017 Oct 30.

12. Mills J, Grace SL, Ross MK, et al. Future Prospects and International Perspectives. Cardiovascular Prevention and Rehabilitation in Practice. 2020:305-312.

13. NCD Risk Factor Collaboration (NCD-RisC). Height and body-mass index trajectories of school-aged children and adolescents from 1985 to 2019 in 200 countries and territories: a pooled analysis of 2181 population-based studies with 65 million participants. Lancet. 2020;396(10261):1511-1524.

14. NCD Risk Factor Collaboration (NCD-RisC). National trends in total cholesterol obscure heterogeneous changes in HDL and non-HDL cholesterol and total-to-HDL cholesterol ratio: a pooled analysis of 458 population-based studies in Asian and Western countries. Int J Epidemiol. 2020;49(1):173-192.

15. NCD Risk Factor Collaboration (NCD-RisC). Repositioning of the global epicentre of non-optimal cholesterol. Nature. 2020;582(7810):73-77.

16. Neubeck L, Hansen T, Jaarsma T, Klompstra L, **Gallagher R**. Delivering healthcare remotely to cardiovascular patients during COVID-19 : A rapid review of the evidence. Eur J Cardiovasc Nurs. 2020;19(6):486-494.

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17. Nicholls SJ, Nelson M, **Astley C,** et al. Optimising Secondary Prevention and Cardiac Rehabilitation for Atherosclerotic Cardiovascular Disease During the COVID-19 Pandemic: A Position Statement From the Cardiac Society of Australia and New Zealand (CSANZ). Heart Lung Circ. 2020;29(7):e99-e104.

18. **O'Neil A,** Nicholls SJ, **Redfern J,** Brown A, Hare DL. Mental Health and Psychosocial Challenges in the COVID-19 Pandemic: Food for Thought for Cardiovascular Health Care Professionals. Heart Lung Circ. 2020;29(7):960-963.

19. **O'Neil A,** Scovelle AJ, Thomas E, et al. Sex-Specific Differences in Percutaneous Coronary Intervention Outcomes After a Cardiac Event: A Cohort Study Examining the Role of Depression, Worry and Autonomic Function. Heart Lung Circ. 2020;29(10):1449-1458.

20. **O'Neil A,** Thompson K, Russell JD, Norton R. Inequalities and Deteriorations in Cardiovascular Health in Premenopausal US Women, 1990-2016. Am J Public Health. 2020;110(8):1175-1181.

21. Pacleb A, Lowres N, Randall S, Neubeck L, **Gallagher R.** Adherence to Cardiac Medications in Patients With Atrial Fibrillation: A Pilot Study. Heart Lung Circ. 2020;29(7):e131-e139.

22. **Redfern J, Figtree G, Chow C,** et al. Cardiac Rehabilitation and Secondary Prevention Roundtable: Australian Implementation and Research Priorities. Heart Lung Circ. 2020;29(3):319-323.

23. **Redfern J,** Hafiz N, **Hyun K,** et al. QUality improvement in primary care to prevent hospitalisations and improve Effectiveness and efficiency of care for people Living with coronary heart disease (QUEL): protocol for a 24-month cluster randomised controlled trial in primary care. BMC Fam Pract. 2020;21(1):36. Published 2020 Feb 14.

24. Sharman JE, O'Brien E, Alpert B, et al. Lancet Commission on Hypertension group position statement on the global improvement of accuracy standards for devices that measure blood pressure. J Hypertens. 2020;38(1):21-29.

25. Straiton N, **Gallagher R.** Prioritizing what matters most in digital health research [published online ahead of print, 2021 Nov 13]. Eur J Cardiovasc Nurs. 2021;zvab103.

26. Thomas E, **Gallagher R,** Grace SL. Future-proofing cardiac rehabilitation: Transitioning services to telehealth during COVID-19 [published online ahead of print, 2020 Apr 23]. Eur J Prev Cardiol. 2020;2047487320922926.

27. Thomas E, Grace SL, Boyle D, et al. Utilising a Data Capture Tool to Populate a Cardiac Rehabilitation Registry: A Feasibility Study. Heart Lung Circ. 2020;29(2):224-232.

28. Wang Y, Jiao Y, Nie J, et al. Sex differences in the association between marital status and the risk of cardiovascular, cancer, and all-cause mortality: a systematic review and meta-analysis of 7,881,040 individuals. Glob Health Res Policy. 2020;5:4. Published 2020 Feb 28.

29. Zaman S, MacIsaac AI, **Jennings GL,** et al. Cardiovascular disease and COVID-19: Australian and New Zealand consensus statement. Med J Aust. 2020;213(4):182-187.

30. **Zhang L,** Ding D, Fethney J, Neubeck L, **Gallagher R.** Tools to measure health literacy among Chinese speakers: A systematic review. Patient Educ Couns. 2020;103(5):888-897.

31. **Zhang L,** Ding D, Neubeck L, **Gallagher R.** Health literacy as a predictor of emergency department visits and self-rated health among Chinese immigrants: findings from an Australian survey. Patient Educ Couns. 2020;103(11):2353-2360.

32. Zhao E, Lowres N, Woolaston A, Naismith SL, **Gallagher R.** Prevalence and patterns of cognitive impairment in acute coronary syndrome patients: A systematic review. Eur J Prev Cardiol. 2020;27(3):284-293.

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2021

33. Armstrong M, Halim NK, **Raeside R**, et al. How Helpful and What Is the Quality of Digital Sources of Healthy Lifestyle Information Used by Australian Adolescents? A Mixed Methods Study. Int J Environ Res Public Health. 2021;18(23):12844. Published 2021 Dec 6.

34. Astin F, Harris E, Neubeck L, **Gallagher R**, Jones J. 13 Patient education and communication. ESC Textbook of Cardiovascular Nursing. 2021:339-416.

35. Ayad M, **Hyun K**, D'Souza M, et al. Factors that influence whether patients with acute coronary syndromes undergo cardiac catheterisation. Medical Journal of Australia. 2021;214(7):310-317.

36. Bachelet BC, **Hyun K**, D'Souza M, **Chow CK, Redfern J, Brieger DB**. Sex differences in the management and outcomes of non-ST-elevation acute coronary syndromes. Med J Aust. 2022;216(3):153-155.

37. **Candelaria D, Gallagher R, Hendriks J.** Future-proofing your research career post-PhD: top tips for doctoral students [published online ahead of print, 2021 Dec 18]. Eur J Cardiovasc Nurs. 2021;zvab115.

38. **Candelaria D, Zecchin R, Ferry C**, Ladak L, Randall S, **Gallagher R.** Shorter Wait Times to Cardiac Rehabilitation Associated With Greater Exercise Capacity Improvements: A MULTISITE STUDY. J Cardiopulm Rehabil Prev. 2021;41(4):243-248.

39. Chen YC, Li IC. Effectiveness of interventions using empowerment concept for patients with chronic disease: a systematic review. JBI Libr Syst Rev. 2009;7(27):1179-1233.

40. Choi M, **Raeside R, Hyun K**, Partridge SR, Thiagalingam A, **Redfern J.** Understanding Preferences for Lifestyle-Focused Visual Text Messages in Patients With Cardiovascular and Chronic Respiratory Disease: Discrete Choice Experiment. J Med Internet Res. 2021;23(9):e26224. Published 2021 Sep 20.

41. Coorey G, **Figtree GA**, Fletcher DF, **Redfern J.** The health digital twin: advancing precision cardiovascular medicine. Nat Rev Cardiol. 2021;18(12):803-804.

42. Coorey G, Peiris D, Scaria A, et al. An Internet-Based Intervention for Cardiovascular Disease Management Integrated With Primary Care Electronic Health Records: Mixed Methods Evaluation of Implementation Fidelity and User Engagement. J Med Internet Res. 2021;23(4):e25333. Published 2021 Apr 26.

43. Davis AJ, Parker HM, **Gallagher R.** Gamified applications for secondary prevention in patients with high cardiovascular disease risk: a systematic review of effectiveness and acceptability. Journal of Clinical Nursing. 2021;30(19-20):3001-3010.

44. Fritsch CG, Ferreira PH, Prior JL, et al. TEXT4myBACK - The Development Process of a Self-Management Intervention Delivered Via Text Message for Low Back Pain. Arch Rehabil Res Clin Transl. 2021;3(2):100128. Published 2021 Apr 27.

45. **Gallagher R**, Woolaston A, Tofler G, et al. Cognitive impairment and psychological state in acute coronary syndrome patients: A prospective descriptive study at cardiac rehabilitation entry, completion and follow-up. Eur J Cardiovasc Nurs. 2021;20(1):56-63.

46. **Gallagher R, Zhang L**. Evaluating mobile health technologies: does the traditional randomized controlled trial serve our needs?. Eur J Cardiovasc Nurs. 2021;20(6):623-626.

47. Ghisi GLM, Xu Z, Liu X, et al. Impacts of the COVID-19 Pandemic on Cardiac Rehabilitation Delivery around the World. Glob Heart. 2021;16(1):43. Published 2021 Jun 10.

48. Hafiz N, **Hyun K**, Knight A, et al. Gender Comparison of Receipt of Government-Funded Health Services and Medication Prescriptions for the Management of Patients With Cardiovascular Disease in Primary Care. Heart Lung Circ. 2021;30(10):1516-1524.

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49. Hanson CL, Neubeck L, Kyle RG, et al. Gender Differences in Uptake, Adherence and Experiences: A Longitudinal, Mixed-Methods Study of a Physical Activity Referral Scheme in Scotland, UK. Int J Environ Res Public Health. 2021;18(4):1700. Published 2021 Feb 10.

50. Hsu B, Carcel C, Wang X, et al. Sex differences in emergency medical services management of patients with myocardial infarction: analysis of routinely collected data for over 110,000 patients [published correction appears in Am Heart J. 2021 Dec 24;:]. Am Heart J. 2021;241:87-91.

51. Hure AJ, Ramanathan S, Deeming S, et al. Translation and Impact of Funded Australian Cardiovascular Research: A Review With Perspective. Heart Lung Circ. 2021;30(10):1442-1448.

52. **Hyun K**, Negrone A, **Redfern J,** et al. Gender Difference in Secondary Prevention of Cardiovascular Disease and Outcomes Following the Survival of Acute Coronary Syndrome. Heart Lung Circ. 2021;30(1):121-127.

53. Jennings C, Berra K, Hayman L, Gibson I, Jones J, Atrey A, Thompson DR, Ski CF, Kerins M, Conboy T, Neubeck L, **Gallagher R**, Koob S. 11 Cardiovascular prevention and rehabilitation. ESC Textbook of Cardiovascular Nursing. 2021:304-354.

54. **Jennings GL**, Audehm R, Bishop W, et al. National Heart Foundation of Australia: position statement on coronary artery calcium scoring for the primary prevention of cardiovascular disease in Australia. Med J Aust. 2021;214(9):434-439.

55. Klimis H, Nothman J, Lu D, et al. Text Message Analysis Using Machine Learning to Assess Predictors of Engagement With Mobile Health Chronic Disease Prevention Programs: Content Analysis. JMIR Mhealth Uhealth. 2021;9(11):e27779. Published 2021 Nov 10.

56. Klimis H, Shaw T, Von Huben A, et al. Can existing electronic medical records be used to quantify cardiovascular risk at point of care? [published online ahead of print, 2021 Jun 22]. Intern Med J. 2021;10.1111/imj.15439.

57. Li J, Lowres N, Koo FK, **Gallagher R**. A systematic review of quantitative and qualitative literature on health professionals' experiences communicating with Chinese immigrants. Int J Nurs Pract. 2021;27(6):e12960.

58. Liu X, Ghisi GLM, Meng S, et al. Establishing a process to translate and adapt health education materials for natives and immigrants: The case of Mandarin adaptations of cardiac rehabilitation education. Heart Lung. 2021;50(6):794-817.

59. NCD Risk Factor Collaboration (NCD-RisC). Heterogeneous contributions of change in population distribution of body mass index to change in obesity and underweight. Elife. 2021;10:e60060. Published 2021 Mar 9.

60. **O'Neil A**, Russell JD, Murphy B. How Does Mental Health Impact Women's Heart Health?. Heart Lung Circ. 2021;30(1):59-68.

61. Paige E, Doyle K, Jorm L, et al. A Versatile Big Data Health System for Australia: Driving Improvements in Cardiovascular Health. Heart Lung Circ. 2021;30(10):1467-1476.

62. Parker HM, **Gallagher R**, Duffield C, Ding D, Sibbritt D, Perry L. Occupational and Leisure-Time Physical Activity Have Different Relationships With Health: A Cross-Sectional Survey Study of Working Nurses. J Phys Act Health. 2021;18(12):1495-1502. Published 2021 Oct 22.

63. Pearsons A, Hanson CL, **Gallagher R**, et al. Atrial fibrillation self-management: a mobile telephone app scoping review and content analysis. Eur J Cardiovasc Nurs. 2021;20(4):305-314.

64. Sarkies MN, Robinson S, **Briffa T**, et al. Applying a framework to assess the impact of cardiovascular outcomes improvement research. Health Res Policy Syst. 2021;19(1):67. Published 2021 Apr 21.

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65. Scovelle AJ, Oldenburg B, Taylor CB, et al. Resting Heart Rate and Heart Rate Variability in the Year Following Acute Coronary Syndrome: How Do Women Fare?. Heart Lung Circ. 2021;30(1):128-134.

66. Shi W, Ghisi GLM, **Hyun K, Zhang L, Gallagher R.** Patient education interventions for health behaviour change in adults diagnosed with coronary heart disease: A protocol for a systematic review and meta-analysis. J Adv Nurs. 2021;77(2):1043-1050.

67. Shi W, Ghisi GLM, **Zhang L, Hyun K,** Pakosh M, **Gallagher R.** A systematic review, meta-analysis, and meta-regression of patient education for secondary prevention in patients with coronary heart disease: impact on psychological outcomes [published online ahead of print, 2022 Feb 4]. Eur J Cardiovasc Nurs. 2022;zvac001.

68. Thompson DR, Neubeck L, **Gallagher R.** 15 Looking forward. ESC Textbook of Cardiovascular Nursing. 2021:443.

69. Tong A, Sorrell TC, Black AJ, et al. Research priorities for COVID-19 sensor technology. Nat Biotechnol. 2021;39(2):144-147.

70. **Zhang L,** Ding D, Fethney J, **Gallagher R.** A psychometric evaluation of the Health Literacy Questionnaire for Chinese immigrants: Linguistic and cultural considerations. Int J Nurs Pract. 2021;27(2):e12909.

SOLVE CHD Appendix 2. Presentations

1. **Briffa T.** Future-proofing your cardiac rehabilitation program: The SOLVE-CHD National Data Capture and Record Keeping Initiative (Invited Presentation); 2021; ACRA Seminar; WA, Australia

2. **Briffa T.** The SOLVE-CHD National Data Capture and Record Keeping Initiative (Invited Presentation); 2021; ACRATAS Annual Education Seminar

3. Chung S, **Candelaria D, Gallagher R.** Women's health-related quality of life substantially improves with tailored cardiac rehabilitation: A systematic review and meta-analysis (mini oral presentation); 2021; CSANZ; Adelaide, Australia

4. Chung S, **Candelaria D, Gallagher R.** Women's health-related quality of life substantially improves with tailored cardiac rehabilitation: A systematic review and meta-analysis; 2021; Euroheartcare; virtual

5. **Gallagher R.** ACRA Quality Indicators and SOLVE-CHD (invited); 2021; CSANZ; Adelaide, Australia

6. **Gallagher R.** Cardiac rehabilitation: global issues needing an international collaborative response; 2021; BACP; Belfast, Ireland

7. **Gallagher R.** Gaming in Cardiac Rehabilitation (invited); 2021; Virtual showcase of global innovations and technologies in cardiac care Euroheartcare

8. **Gallagher R**, Kirkness A, Roach K, Glenatsis H, Bruntsch C, Fletcher A, Stephenson C, Noone E, Farrell M, Ashcroft A, Chung S, **Candelaria D.** Remote delivery of cardiac rehabilitation can achieve equivalent health-related quality of life outcomes to in-person methods in patients with coronary heart disease: a multi-site study; 2021; Euroheartcare; Virtual

9. **Gallagher R.** The Great Debate (Invited); 2021; ESC Digital

10. **Gallagher R.** The psychosocial impact of wearable trackers; 24 October 2021; ESC DIGITAL SUMMIT

11. Gooley L, **Gallagher R**, Kirkness A, Roach K, Glenatsis H, Bruntsch C, Fletcher A, Stephenson C, Noone E, Farrell M, Ashcroft A, Chung S, **Candelaria D.** Remote delivery of cardiac rehabilitation can achieve equivalent health-related quality of life outcomes to in-person methods in patients with coronary heart disease: a multi-site study (poster); 2021; CSANZ; Adelaide, Australia

12. Gordon N, **Briffa T.** Future-proofing your cardiac rehabilitation program: The SOLVE-CHD National Data Capture and Record Keeping Initiative (Invited presentation); 2021; Training Centre in Subacute Care, Rural Health West, Heart Foundation and ACRAWA

13. Gordon N, **Briffa T.** The changing face of patients referred for cardiac rehabilitation: hospitalisation patterns, medication adherence, and mortality risk (Invited Presentation); 2021; ACRA Vic Seminar

14. Luxton N, **Gallagher R, Poon S**, Sutarlim K, **Redfern J.** Eguardian Angel: Development of an Interactive Peer Support Digital Health System; 2021; World Physiotherapy Congress

15. Qiang Tu. (QuELL team). Age-related differences in the receipt of primary healthcare services in managing contemporary patients with cardiovascular disease in Australia; 2021; CSANZ; Adelaide, Australia

16. **Redfern J.** Peer review 101: constructive rather than destructive; June 2021; ESC ACNAP Webinar

17. **Redfern J.** ECR Development Day Australian Society for Medical Research; 2021

18. **Redfern J.** High Blood Pressure Council of Australia Peer Review and Mentoring; Dec 2021

19. **Redfern J.** Peer Review, Panels and Perils (Invited); June 2021; ACNAP

20. **Redfern J.** Physiotherapy and Global Cardiovascular Health World Congress of Physiotherapy; 2021

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21. **Redfern J.** Promising Growth towards the top In Cardiac Research 3rd World Cardiology and Cardiac Rehabilitation Meeting (Invited keynote speaker); 11 to 12 November 2021

22. **Redfern J.** Virtual Showcase of global innovations and technologies in cardiovascular care (Invited Roundtable and Judge); 2021; EuroheartCare ESC

23. Shi W, Ghisi G, **Zhang L, Gallagher R.** Patient education interventions for health behaviour change in adults diagnosed with coronary heart disease: a systematic review, meta-analyses and meta-regressions; 2021; CSANZ; Adelaide, Australia

24. Smith M, Orchard J, La Gerche A, **Gallagher R**, Fitzpatrick J. Fit, Female or Fifty - Is Cardiac Rehabilitation fit for purpose?

25. Straiton N, Gullick J, **Gallagher R.** Getting back to normal – how functional recovery impacts the acceptability of transcatheter aortic valve implantation (TAVI) for older adults with severe aortic stenosis: a qualitative analysis; 2021; Prevention and Cardiac Rehabilitation Symposium; Singapore

26. Shi W, Ghisi GLM, **Zhang L, Hyun K**, Pakosh M, **Gallagher R.** Patient education interventions for health behaviour change in adults diagnosed with coronary heart disease: a systematic review and meta-analysis (abstract); 2021; Europrevent; Virtual

27. Zhao E, Lowres N, Naismith S, Tofler G, **Bauman A, Gallagher R.** Cognitive function and the relationship with health literacy and secondary prevention in acute coronary syndrome patients at early discharge; 2021; European Society of Cardiology Europrevent

EMCR Led

28. **Candelaria D.** Human connection: a valuable element for health-related quality of life outcomes in cardiac rehabilitation during COVID-19 (Poster); 2021; ESC ACNAP-EuroHeartCare Congress

29. **Candelaria D**, Parker H, Straiton N, Alharbi M, **Gallagher R.** Patient-reported physical activity as an important adjunct to objective exercise assessments in patients attending cardiac rehabilitation: A pilot study Patient Reported Outcome Measures; 2021; PROMS Down Under

30. **Candelaria D**, Randall S, Ladak L, Glinatsis H, **Gallagher R.** Human connection: a valuable element for health-related quality of life outcomes in cardiac rehabilitation during COVID-19 (mini oral presentation); 2021; CSANZ; Adelaide, Australia

31. **Candelaria D**, Randall S, Ladak L, Glinatsis H, **Gallagher R.** Human connection: a valuable element for health-related quality of life outcomes in cardiac rehabilitation during COVID-19; 2021; Euroheartcare; virtual

32. **Candelaria D**, Randall S, Ladak L, Glinatsis H, **Gallagher R.** Implementing remote delivered cardiac rehabilitation for coronary heart disease during COVID-19: A prospective cohort study of health-related quality of life outcomes and patient experiences; 2021; Implementation Science Health Conference; Australia

33. **Candelaria D**, Randall S, Ladak L, Glinatsis H, **Gallagher R.** In-person versus remote delivered cardiac rehabilitation for coronary heart disease during COVID-19: A prospective cohort study of health-related quality of life outcomes and patient experiences; 2021; Prevention and Cardiac Rehabilitation Symposium Prize Session; Singapore

34. **Candelaria D.** Validity and reliability of the PROMIS-29v2 and SF-12v2 for assessing health-related quality of life outcomes in cardiac patients (oral presentation); 2021; The International Society for Quality of Life Research (ISOQOL) Annual Conference

35. **Zhang L.** Development of an avatar-based mobile application to improve discharge education in patients with heart attack: an evidence-based and co-design approach (Oral presentation); 2021; Digital Health Week

36. **Zhang L.** Online health information-seeking and eHealth literacy among first-generation Chinese immigrants: findings from an Australian survey (poster); 2021; Digital Health Week

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