

2021

# RBWH Research Report

CRITICAL CARE  
AND CLINICAL  
SUPPORT  
SERVICES

# Contents

<b>Critical Care and Clinical Support Services .....</b>	<b>2</b>
<b>Emergency and Trauma Centre .....</b>	<b>3</b>
<b>Genetic Health Queensland.....</b>	<b>10</b>
<b>Hyperbaric Medicine Services .....</b>	<b>16</b>
<b>Intensive Care Services .....</b>	<b>17</b>
<b>Professor Tess Cramond Multidisciplinary Pain Centre .....</b>	<b>33</b>

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# Critical Care and Clinical Support Services

## 2021 Executive Director's Report

The Critical Care and Clinical Support Services (CC&CSS) has a well-established research program integrated across its varied clinical teams. Dedicated research teams including national and international collaborations coupled with professorial roles with academic partners have continued to support the research agenda during the COVID-19 pandemic response and challenges.

Our researchers have demonstrated their flexibility and innovation in responding to these challenges with new and exciting research partnerships created, projects developed, continued high output with over 200 peer review publications across the service line as well as recognition on the international stage for a number of our clinician researchers.

We have had a number of research highlights in 2021 including:

- ❖ Participation in the Herston Research Symposium highlighting departmental achievements
- ❖ Professor Michael Reade ranking 15<sup>th</sup> of 5412 authors in the field of Military medicine worldwide
- ❖ Professor Fiona Coyer recognised with best original article at the 2021 Wounds Australia National Conference
- ❖ The Australian Genomics (AG) cardiovascular disorders flagship, co-lead by Professor Julie McGaughan, successfully reached its recruitment target of 600 participants by December 2021, an amazing achievement given the challenges of the pandemic for the past 2 years of the study recruitment
- ❖ The Emergency and Trauma Centre (ETC) continuing its focus of research into emergency care of First Nations people
- ❖ Several of our ETC staff are collaborating in two successful NHMRC Partnership Project grants worth over \$1.7 over 4 years, one investigating improved diagnostics for cardiac patients and the second, optimising evidence translation for high-risk acute cardiac chest pain. Dr Jaime Greenslade is leading one of these projects, and of note, Dr Louise Cullen is a collaborator on both of these projects
- ❖ The Professor Tess Cramond Pain and Research Centre (TCPRC) moved into the Surgical, Treatment and Rehabilitation Services (STARS) building within the Herston Precinct that is purpose built to support clinical and research activities, enabling research collaborations across STARS and RBWH.

2021 also marked the year for Critical Care that Professor Jeffrey Lipman retired after more than two decades in an exemplary career in clinical and research leadership. Professor Lipman set the foundation and played a fundamental role in transitioning productivity to the next generation of researchers not only within Critical Care but to others within RBWH.

Focussing on Health Equity and Closing the Gap in health outcomes for Aboriginal and Torres Strait Islander Peoples, the Critical Care teams have led the way with dedicated research focusing on care of the critically ill, emergency access and enabling access to genetic health services.

I am very proud of the CC&CSS teams for their ongoing commitment to the research agenda while providing exceptional care to the patients we serve, under challenging circumstances. The links with industry and academic partners are the direct result of the teams' patient focus and will improve patient care through innovation and evidence based research.

## Emergency and Trauma Centre

Clinical researchers at the Emergency and Trauma Centre made progress across many projects in 2021 despite it being the second year of the COVID-19 pandemic. Their efforts were rewarded with 25 peer-reviewed publications. Research into the emergency care of First Nations peoples was a focus during the year, as were chest pain and other types of pain, patient flow, staff well-being, sepsis, pre-hospital care and several pandemic-specific projects. As always, we acknowledge the effectiveness of partnerships with a variety of external collaborators, including the academic sector across southeast Queensland, and health service partners from Brisbane to Perth and Melbourne to Cairns.

### Research Grants

Investigator Names (RBWH staff in bold)	RBWH Departments / Research Groups	Research Project Title	Granting Body	Total Awarded (whole all years)	Length of Awards in years and years active
<b>Greenslade J.</b>		A protocol to assess chest pain in the Emergency Department; The University of Queensland	Queensland Government Advancing Queensland Industry Research Fellowship	\$300,000	2018, 2019-21
<b>Chu K, Bellapart J, Winter C, Jeffree R, Lipman J, Ungerer J, et al.</b>	Department of Emergency Medicine	Timing of lumbar puncture for the detection of xanthochromia in subarachnoid haemorrhage	RBWH and RBWH Foundation	\$39,978	2017, 2018
<b>Cullen L, Parsonage W, McCormack L, Yadav R, Lawton L, Ashover S, et al.</b>	Emergency and Trauma Centre	Validation of an accelerated diagnostic protocol for Aboriginal and Torres Strait Islander patients presenting to an emergency department (ED) with suspected Acute Coronary Syndrome	Medical Research Future Fund Rapid Applied Research Translation Program	\$235,354	2019
<b>Bodnar D, Mitchell G, Brown NJ, Hughes J, Chu K.</b>	Emergency and Trauma Centre	How long can a clinician wearing personal protective equipment safely work in a high-risk isolation area during one continuous shift?	Emergency Medicine Foundation Leading Edge Grant	\$11,255	2020, 2021
<b>Bodnar D, Mitchell G, Brown NJ, Hughes J, Chu K.</b>	Emergency and Trauma Centre	How long can a clinician wearing personal protective equipment safely work in a high-risk isolation area during one continuous shift?	RBWH & RBWH Foundation	\$9,823	2020
<b>Baldwin M, Rothwell S, Brown NJ, Chu K</b>	Emergency and Trauma Centre	Can telepresence robots enhance social distancing and maintain clinical care of undifferentiated respiratory patients isolated in one area of ED?	Emergency Medicine Foundation	\$21,425	2020
<b>Starmer K, Cullen L, Starmer G, Foran L, Greenslade J, Parsonage W, et al.</b>	Emergency and Trauma Centre	Prevalence of coronary artery disease in Aboriginal and Torres Strait Islander people presenting to the Emergency Department with suspected acute coronary syndrome	Emergency Medicine Foundation	\$115,000	2020-22
<b>Hills A, Williams J, Ray M, Greenslade J</b>	Emergency and Trauma Centre	Subculture: Investigating the frequency and outcomes of subsequent blood cultures	Emergency Medicine Foundation	\$36,920	2021-22

Investigator Names (RBWH staff in bold)	RBWH Departments / Research Groups	Research Project Title	Granting Body	Total Awarded (whole all years)	Length of Awards in years and years active
<b>Williams J, Greenslade J, Hills A, Ray M, Carmichael H</b>	Emergency and Trauma Centre	Intervention with concentrated albumin for resuscitation of undifferentiated sepsis (ICARUS): A randomised controlled trial	Emergency Medicine Foundation	\$82,402	2020-22
<b>Reis K, Carl J, Foran L, Gopalkumar N, Brown NJ, MacDonald C</b>	Emergency and Trauma Centre	TECS Community Engagement Strategy	Clinical Excellence Queensland Culturally Welcoming Emergency Department Trial Project	\$35,000.00	2020, 2021
<b>Reis K, Carl J, Foran L, Gopalkumar N, Brown NJ, Cullen L</b>	Emergency and Trauma Centre	Embedding staff cultural capability for the care of Aboriginal and Torres Strait Islander People in the Emergency Department	Link and Seed Project	\$160,415	2020, 2021
<b>McCormick E, Greenslade J, Crilly J, Brough P, Markwell A, Rule M, et al.</b>	Emergency and Trauma Centre	Helping our healers: health and performance of ED staff	RBWH & RBWH Foundation	\$39,539.24	2020, 2021
<b>Hughes J.</b>	Emergency and Trauma Centre	From Big Data to the Bedside – Answering big questions in emergency department pain care using artificial intelligence and patient-reported outcomes	Emergency Medicine Foundation	\$97,326	2020-22
<b>Higgs L, Hughes JA, Atkinson D</b>	Emergency and Trauma Centre	A pragmatic randomised control trail of the effects of therapeutic activity kits in emergency department patients with dementia and responsive behaviours	Nursing and Midwifery Research Fellowship	\$14,975	2021
<b>Greenslade J, Cullen L, Parsonage W, Chew D, McPhail S, Figtree G, et al.</b>	Emergency and Trauma Centre	The Limit of Detection in the Emergency Department Trial: A stepped-wedge cluster randomised trial for rapid assessment of patients with suspected acute coronary syndrome in the Emergency Department	NHMRC Partnership Project	\$532,120.00	2021-24
Chew D, Briffa T, <b>Cullen L</b> , Quinn S, Karnon J, Liaw S-T, et al.	Emergency and Trauma Centre	Optimizing evidence translation in the high-risk time-critical environment of the emergency management for suspected cardiac chest pain (RAPIDx)	NHMRC Partnership Project	\$1,230,191.40	4 years 2021-24
Button E, Byrnes J, <b>Hughes JA</b> , Gavin N.	Cancer Care Services	An economic evaluation of a cancer care services nurse-led model of emergent care for people with cancer	Nursing and Midwifery Research Fellowship	\$20,000	2021
<b>Burke J, Spratt B, Corry P, Brown NJ, Chu K.</b>	Emergency and Trauma Centre	Modelling Emergency Department Patient Flow under Normal Operating Conditions and in a Pandemic	Emergency Medicine Foundation Leading Edge	\$95,770	2020-22

Investigator Names (RBWH staff in bold)	RBWH Departments / Research Groups	Research Project Title	Granting Body	Total Awarded (whole all years)	Length of Awards in years and years active
<b>Brownlee E, Cullen L, Greenslade J, Parsonage W, Hawkins T, Foran L</b> , et al.	Emergency and Trauma Centre	Relief of chest pain in the Emergency Department (RELIEF)	Emergency Medicine Foundation	\$36,396	2020-22
<b>Hughes J, Higgs L, Atkinson D, Brown NJ, Kramer D</b> , Schnitker L, et al.	Emergency and Trauma Centre	A pragmatic randomised controlled trial of the effects of therapeutic activity kits on emergency department patients with dementia and responsive behaviours - The TACK Study	Rosemary Bryant Foundation Seeding Grant	\$9357.00	2019/20
<b>Greenslade J, Cullen L, Parsonage W</b> , Perez S, Kinnear F, Hamilton-Craig C, et al.	Emergency and Trauma Centre	The Limit of Detection in the Emergency Department (LEGEND) trial: A stepped-wedge intervention trial of a clinical decision rule to rule out acute myocardial infarction	Emergency Medicine Foundation	\$93,240	2020-21

### Current RBWH Emergency and Trauma Centre Research Activity

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021
<b>Mark Baldwin</b>	<b>Sean Rothwell, Nathan Brown, Kevin Chu, Nikesh Gopalkumar</b>	Can mobile robotic telepresence help clinicians safely deliver care to undifferentiated ED patients with respiratory symptoms?	
<b>Daniel Bodnar</b>	<b>Gary Mitchell, Nathan Brown, James Hughes, Kevin Chu</b>	How long can a clinician wearing personal protective equipment safely work in a high-risk isolation area during one continuous shift?	
<b>Daniel Bodnar</b>	Zoe Stevens (UQ), Stephen Rashford (QAS), <b>Michael Handy, Sue Williams</b>	A retrospective, observational study examining the coagulation, full blood count and blood gas profiles for trauma patients receiving pre-hospital packed red blood cell transfusions	
<b>Daniel Bodnar</b>	Emma Bosley (QAS), Stephen Rashford (QAS), Mark Shirran (GCUH), <b>Catherine Hurn</b> , Matthew Meister, Glenn Ryan (PAH)	Queensland pre-hospital study identifying which trauma patients are at risk of bleeding to death	
<b>Emily Brownlee</b>	<b>Louise Cullen, Jaimi Greenslade, Will Parsonage, Tracey Hawkins, Laura Foran, Elly McCormick, James Hughes, Jessica Carl, Aaron Robinson, Iliah Said</b>	Relief of chest pain in the Emergency Department (RELIEF)	
<b>John Burke</b>	<b>Nathan Brown, Kevin Chu</b> , Paul Corry (QUT), Lean South (QUT), Thomas van der Weegen (QUT)	Modelling emergency department patient flow under normal operating conditions and in a pandemic	



Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021
Kevin Chu	<b>Judith Bellapart, Craig Winter, Rosalind Jeffree, Jeffrey Lipman</b> , Jacobus Ungerer (Pathology Qld), Anita Pelecanos (QIMR Berghofer), <b>Anthony Brown, Nathan Brown</b>	Timing of lumbar puncture for the detection of xanthochromia in suspected subarachnoid haemorrhage	
Louise Cullen	<b>William Parsonage</b>	Basel Syncope Evaluation Study (Basel IX)	
Louise Cullen	<b>Jaimi Greenslade, William Parsonage (Cardiology), Adam Scott (Cardiology)</b> , Jacobus Ungerer (Pathology Queensland), <b>Tracey Hawkins</b> , Gerben Keijzers (GCUH), Julia Crilly (Griffith University), Nicholas Graves (QUT), Ariel Ho (UQ)	Examining translation of research into improved assessment for heart attack	
Louise Cullen	<b>Jaimi Greenslade, William Parsonage</b> , Jacobus Ungerer (Pathology Qld), Carel Pretorius (Pathology Qld), Siegfried Perez (Logan Hospital), Gavin Fincher (TPCH), Gerben Keijzers (GCUH), Vinay Gangathimmaiah (The Townsville Hospital), Andrew Staib (PAH) Andrew Hobbins-King (SCUH)	Use of the Siemen's Atellica high sensitivity troponin assay for assessment of patients with suspected acute myocardial infarction	
Peter Del Mar	<b>Nathan Brown</b> , Min Juong Kim, Joon Min Park, <b>Kevin Chu, John Burke</b>	The effects of COVID-19 preparations on ED overcrowding	
Jaimi Greenslade	<b>Louise Cullen, William Parsonage (RBWH Cardiology)</b> , Nicholas Graves (QUT), Siegfried Perez (Logan Hospital), Fran Kinnear (TPCH), Christian Hamilton-Craig (TPCH), Niranjana Gaikwad (TPCH), <b>Tracey Hawkins</b>	Limit of detection in the emergency department (LEGEND) trial: a pre-post intervention trial of a clinical decision rule to rule out acute myocardial infarction	
Leonie Higgs	<b>Di Atkinson, Nathan Brown, Leanne Bennett, Dave Kramer</b> , Greg Merlo (UQ), Linda Schnitker (QUT), <b>James Hughes</b>	A pragmatic randomised controlled trial of the effects of therapeutic activity kits in emergency department patients with dementia and responsive behaviours	
Angela Hills	<b>Julian Williams, Mercedes Ray, Jaimi Greenslade</b>	Subculture: Investigating the frequency and outcomes of subsequent blood cultures	
James Hughes	Anthony Nguyen (CSIRO), <b>Nathan Brown, Kevin Chu</b> , Clint Douglas (QUT/MNHHS), Lee Jones (QUT)	The application of machine and deep learning techniques to the identification of patients arriving in pain to the adult emergency department	
James Hughes	Lee Jones (QUT), <b>Nathan Brown, Kevin Chu</b> , Rajeev Jarugala (TPCH), Clint Douglas (QUT/MNHHS)	A psychometric evaluation of the APS-POQ-R in acute pain presenting to the adult emergency department	
James Hughes	Brendan Shultz (QAS), Vivienne Tippet (QUT)	The Influence of Prehospital Care in Emergency Department Treatment of Patients Presenting with Painful Conditions.	

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021
<b>James Hughes</b>	<b>Tiarne Campbell, Brodie Rostin, Jasmine Khan, Alison Bell, Iina Vuorinem, Rachel McLeish, Caitlin Parsons, Shelly Watson, Alexandra Cornell, Grace Millar, Jarrah Flemming-Gardner, Gaywin Mans, Nikesh Gopalkumar</b>	Pain assessment in the emergency department – does the documentation tool make a difference? A retrospective cohort study.	
<b>Clancy McDonald</b>	<b>James Hughes</b> , Niall Higgins (QUT/MNHHS), <b>Lisa Fawcett, Emma Grozdanovic</b>	An investigation of the educational needs of emergency department nurses in mental health nursing and evaluation of a clinical immersion program in mental health nursing or emergency department nurses.	
<b>Elly McCormick</b>	<b>Jaimi Greenslade</b> , Julia Crilly (GCUH), P Brough, <b>Alex Markwell, Melanie Rule, James Hughes, Laura Foran, Emily Brownlee</b>	Helping our healers: health and performance of ED staff	
<b>Gary Mitchell</b>	<b>Louise Cullen, Cliff Pollard, Nathan Brown</b> , Warwick Locke (CSIRO), Jason Ross (CSIRO), <b>Jack Taylor</b> , Fatimah Nasrallah (UQ), <b>Michael O'Sullivan</b>	The characteristics of brain-origin circulating cell-free DNA in adult emergency department patients with suspected mild traumatic brain injury	
<b>Matilda Schmidt</b>	<b>James Hughes, Kim Lai, Julia Brownlie, Amy Arnold</b>	Identifying the Usage and Appropriateness of Anti-D Immunoglobulin in the Pregnant Female Presenting to the Emergency Department	
<b>Julian Williams</b>	<b>Jaimi Greenslade, Mercedes Ray, Angela Hills, Hayley Carmichael.</b>	ICARUS - Intervention with Concentrated Albumin for Resuscitation of Undifferentiated Sepsis.	

### Collaborative Research Activity Involving RBWH Emergency and Trauma Centre Group

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021
<b>Elise Button (Cancer Care Services)</b>	Josh Byrnes, <b>James Hughes</b> , Patsy Yates, Brighid Scanlon, Michael Smith, Nicole Gavin, David Wyld, <b>John Burke, Mercedes Ray</b> , Glen Kennedy, Cameron Curley, Sussane Chaffey, Paul Moran, Eileen Fennelly, Kieren Barker, Therese Hayes, Kirsten Lorrimer	Cancer Care Services Emergent Care project	
Julia Crilly (Griffith University and GCUH)	<b>David Rosengren , Sean Rothwell , Jill Duncan , Nathan Brown</b>	Evaluating the impact of alcohol on emergency department presentations (ETOH)	
Shane George (GCUH)	<b>Catherine Hurn , Anthony Holley</b>	Fibrinogen early in children with severe trauma study (FEISTY Junior)	
Christopher Reid (Curtin University of Technology, WA)	<b>Louise Cullen</b>	Centre for Research Excellence in Cardiovascular Outcomes Improvement	
John Fraser (TPCH)	<b>Louise Cullen</b>	Cardiovascular haemodynamics in an ovine model of brain stem death	
Flavia Huygens (QUT)	<b>James Hughes , Julian Williams , Graeme Nimo</b>	Testing of InfectID® using blood samples	



Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021
Ann-Maree Kelly	<b>Kevin Chu</b> , and the HEAD Study investigators.	Headache in Emergency Departments: A multinational observation study (HEAD Study).	
Lucy Thomas (UQ)	<b>Kevin Chu</b> , <b>Andrew Wong</b> , <b>Ian Parker</b> , <b>Claire Muller</b>	Validation of a diagnostic support tool for early recognition of cervical arterial dissection in people with acute neck pain and headache in primary care	

## Research Activity with a Specific Focus on First Nations People

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021
Katrina Starmer (Cairns Hospital)	<b>Louise Cullen</b> , <b>Laura Foran</b> , <b>Jaimi Greenslade</b> , <b>William Parsonage</b> , <b>Nathan Brown</b> , <b>Louise McCormack</b>	Prevalence of coronary artery disease in Aboriginal and Torres Strait Islander people presenting to the Emergency Department with suspected acute coronary syndrome	0
<b>Louise Cullen</b>	<b>William Parsonage</b> , <b>Louise McCormack</b> , Raibhan Yadav, Luke Lawton, <b>Sarah Ashover</b> , <b>Tanya Milburn</b> , <b>Laura Foran</b> .	Validation of an accelerated diagnostic protocol for Aboriginal and Torres Strait Islander patients presenting to an emergency department (ED) with suspected Acute Coronary Syndrome.	0

## Research Publications

### Publications in 2021

#### Journal Articles (RBWH staff in bold)

- Winearls J, Wulschleger M, Wake E, McQuilten Z, Reade M, **Hurn C**, et al. Fibrinogen Early In Severe Trauma study (FEISTY): results from an Australian multicentre randomised controlled pilot trial. Crit Care Resusc. 2021;23(1):32-46.
- Williamson F**, **Warren J**, **Cameron CM**. Rib fractures in blunt chest trauma: factors that influence daily patient controlled opiate use during acute care. Injury. 2021;53(1):145-51.
- Williamson F**, **Grant K**, **Warren J**, **Handy M**. Trauma Tertiary Survey: Trauma Service Medical Officers and Trauma Nurses Detect Similar Rates of Missed Injuries. Journal of Trauma Nursing. 2021;28(3):166-72.
- Williamson F**, Collins S, Dehn A, Doig S. Vascular injury is an infrequent finding following non-fatal strangulation in two Australian trauma centres. Emerg Med Australas. 2021(In press).
- Vuong KA, Manzanero S, Ungerer JPJ, **Mitchell G**, McWhinney B, Vallmuur K, et al. Prevalence of Alcohol Consumption in Emergency department presentations (PACE) in Queensland, Australia, using alcohol biomarkers ethanol and phosphatidylethanol: an observational study protocol. BMJ Open. 2021;11(11):e047887.
- Toloo GS, Lim D, **Chu K**, Kinnear FB, Morel DG, Wraith D, et al. Acceptability of emergency department triage nurse's advice for patients to attend general practice: A cross-sectional survey. Emerg Med Australas. 2021(In Press).
- Smith S, Ketheesan S, Touma E, Lipman J, **Brown AFT**. Lorazepam challenge test for catatonia. Emerg Med Australas. 2021;33(4):763-4.
- Sarkies MN, Robinson S, Briffa T, Duffy SJ, Nelson M, Beltrame J, **Cullen L**, et al. Applying a framework to assess the impact of cardiovascular outcomes improvement research. Health Res Policy Syst. 2021;19:67.
- Nestelberger T, Boeddinghaus J, Lopez Ayala P, Gehrke J, Twerenbold R, **Cullen L**... **Greenslade J**, et al. Utility of Echocardiography in Patients With Suspected Acute Myocardial Infarction and Left Bundle-Branch Block. J Am Heart Assoc. 2021;10(18):e021262.
- Moriarty S, **Brown N**, Waller M, **Chu K**. Isolated vehicle rollover is not an independent predictor of trauma injury severity. J Am Coll Emerg Physicians Open. 2021;2(4):e12470.
- Mitchell G**, **Taylor J**, Jin G, **Snelling R**. A review of minor traumatic brain injury presentations and their management in Brisbane emergency departments. Journal of Concussion. 2021;5:20597002211006551.

## Journal Articles (RBWH staff in bold)

12. **Lipp T, McDonald C.** Emergency department management plans: Practical advice for trainees. *Emerg Med Australas.* 2021;33:562-63.
13. Lambrakis K, Papendick C, French JK, Quinn S, Blyth A, Seshadri A... **Cullen L**, et al. Late Outcomes of the RAPID-TnT Randomized Controlled Trial: 0/1-Hour High-Sensitivity Troponin T Protocol in Suspected ACS. *Circulation.* 2021;144(2):113-25.
14. Kozlovski J, Matthews A, **Bertenshaw C**, Ho JH. Do we do enough paediatrics? *Emerg Med Australas.* 2021;33(4):734-6.
15. Khan E, Lambrakis K, Nazir SA, Chuang A, Halabi A, Tiver K, Briffa T, **Cullen L**, et al. Implementation of more sensitive cardiac troponin T assay in a state-wide health service. *Int J Cardiol.* 2021;347:66-72.
16. Kelly AM, Kuan WS, **Chu KH**, Kinnear FB, Keijzers G, Karamercan MA, et al. Epidemiology, investigation, management, and outcome of headache in emergency departments (HEAD study)-A multinational observational study. *Headache.* 2021;61(10):1539-52.
17. Jetmalani K, **Brown NJ**, Boustany C, Toelle BG, Marks GB, Abramson MJ, et al. Normal limits for oscillometric bronchodilator responses and relationships with clinical factors. *ERJ Open Research.* 2021;7(4):00439-2021.
18. **Hughes JA**, Jones L, Potter J, Wong A, **Brown NJ**, **Chu K**. An initial psychometric evaluation of the APS-POQ-R in acute pain presenting to the emergency department. *Australas Emerg Care.* 2021;24(4):287-95.
19. **Hughes JA**, Chiu J, **Brown NJ**, **Hills A**, Allwood B, **Chu K**. The documentation of pain intensity and its influences on care in the emergency department. *Int Emerg Nurs.* 2021;57:101015.
20. **Hughes JA**, Alexander KE, Spencer L, Yates P. Factors associated with time to first analgesic medication in the emergency department. *Journal of Clinical Nursing.* 2021;30(13-14):1973-89.
21. Foster M, Egerton-Warburton D, **Cullen L**, Fatovich DM, Keijzers G. Is a nudge all we need to promote deliberate clinical inertia and thoughtful clinical decision making? *Emerg Med Australas.* 2021;33(4):748-52.
22. Dodd KW, Zvosec DL, Hart MA, Glass 3rd G, Bannister LE, Body RM... **Cullen L**... **Mitchell GJ**, et al. Electrocardiographic Diagnosis of Acute Coronary Occlusion Myocardial Infarction in Ventricular Paced Rhythm Using the Modified Sgarbossa Criteria. *Ann Emerg Med.* 2021;78(4):517-29.
23. **Bodnar D**, **Stevens Z**, **Williams S**, **Handy M**, Rashford S, **Brown NJ**. Hypofibrinogenaemia and hypocalcaemia in adult trauma patients receiving pre-hospital packed red blood cell transfusions: Potential for supplementary pre-hospital therapeutic interventions. *Emerg Med Australas.* 2021(In press).
24. Beck S, Kinnear FB, Maree Kelly A, **Chu KH**, Sen Kuan W, Keijzers G, et al. Clinical presentation and assessment of older patients presenting with headache to emergency departments: A multicentre observational study. *Australas J Ageing.* 2021(In Press).
25. Adams K, Ballard E, Amoako A, Khalil A, Baartz D, **Chu K**, et al. When is it too late? Ovarian preservation and duration of symptoms in ovarian torsion. *Journal of Obstetrics and Gynaecology.* 2021:1-5.

## Books (RBWH staff in bold)

1. **Brown AFT**, Cadogan MD. *Emergency Medicine: Diagnosis and Management.* 8th Ed. Boca Raton: CRC Press; 2021

## Keynote or Plenary Lectures given in 2021

Date	Title
07/2021	<b>Louise Cullen</b> (Plenary lecture). Doing what matters: a research journey into acute cardiac care in the ED. Australian College of Emergency Medicine Winter Symposium, Cairns, Australia.

## Genetic Health Queensland

The Australian Genomics (AG) cardiovascular disorders flagship, co-lead by Prof Julie McGaughan, successfully reached its recruitment target of 600 participants by December 2021. An amazing achievement given the challenges of the pandemic for the past two years of study recruitment.

GHQ's involvement with other Australian Genomics projects continued to prove productive in 2021. Acute care and Genomic Autopsy recruitment is tracking well. A Research assistant is now in place to facilitate GHQ's ongoing contribution to AG.

For Mackenzie's Mission, Queensland has recruited greater than 600 couples across the state, from both public and private health care providers. This has included 61 couples from GHQ. The team is also investigating couple recruitment at community-controlled health services across the state, ensuring equitable access for Aboriginal and Torres Strait Islander peoples.

Additionally, GHQ is involved in a number of projects funded from the MRFF Genomic Health Futures Mission (GHFM), including Massimo's Mission, Automated Reanalysis, and Undiagnosed Disease Network.

GHQ continues to work to achieve equity in access for Aboriginal and Torres Strait Islander peoples across the state. Collaboration with QIMRB led to the development of an integrated care pathway. Professor McGaughan is also a CI on the Achieving Equity in Genomic Healthcare project looking at barriers and enablers to equitable access to genetic services for First Nations peoples.

In July, over 1400 DNA samples from GHQ patients (women affected by breast/Ovarian cancer) were successfully transported to the Breast Cancer Refined analysis of Sequence Tests: Risk and Penetrance (BRA STRAP) study at Monash University for the commencement of a new format of panel genetic testing.

The Renal Genetics Team, including GHQ staff members Dr Chirag Patel and Lindsay Fowles, won an award in the category of Excellence in Training and Education at the Metro North Staff Excellence Awards for the development decision aids to support mainstreaming of genomic testing in renal medicine.

In a collaboration between MNH, Pathology Queensland and Illumina, GHQ has been undertaking an assessment of the impact of implementing whole genome sequencing-based testing. This has been available to all clinically appropriate patients under 18 years seen across Queensland. In the first year of the program, GHQ recruited over 300 patients

## Research Awards and Achievements

Recipient (RBWH staff in bold)	Award	Event
<b>Chirag Patel, Lindsay Fowles</b>	Excellence in Training and Education	Metro North Staff Excellence Awards 2021

## Research Grants

Investigator Names (RBWH staff in bold)	RBWH Departments / Research Groups	Research Project Title	Granting Body	Total Awarded (whole all years)	Length of Awards in years and years active
<b>Prof Julie McGaughan</b>	GHQ (UQ)	The TELO-SCOPE study: Attenuating Telomere Attrition with Danazol. Is there Scope to Dramatically Improve Health Outcomes for Adults and Children with Pulmonary Fibrosis	MRFF	\$1,828,446 (all sites)	2020-2025
<b>Prof Julie McGaughan</b>	GHQ (UQ)	Genomic Health Futures Mission: Achieving Equity in Genomic Health for Indigenous Australians (AEGH)	MRFF	\$499,990	Jun 2020- Jun 2023
<b>Prof Julie McGaughan</b>	GHQ (UQ)	Genomic Health Futures Mission: Genomic Autopsy	MRFF	\$3 200 000 (all sites)	July 2020 - June 2023

Investigator Names (RBWH staff in bold)	RBWH Departments / Research Groups	Research Project Title	Granting Body	Total Awarded (whole all years)	Length of Awards in years and years active
<b>Prof Julie McGaughran</b>	GHQ	Genomic Health Futures Mission: The Australian Undiagnosed Diseases Network (UDN-Aus): An internationally networked national approach for transforming diagnosis for individuals living with rare diseases	MRFF	\$3 000 000 (all sites)	2021 - 2023
<b>Prof Julie McGaughran</b>	GHQ	Australian Genomics	NHMRC	\$15,000,000	2020-2023
<b>Prof Julie McGaughran</b>	GHQ	Genomic Health Futures Mission: Mackenzie's Mission	MRFF	\$20 000 000 (all sites)	2020 - 2023
<b>Dr Chirag Patel</b>	GHQ	National rapid genomic diagnosis program for critically ill children	MRFF	\$5,000,000 (all sites)	2020-2023
<b>Dr Chirag Patel</b>	GHQ	Genomic Health Future Mission: The Australian Functional Genomics Network	MRFF	\$6,000,000 (all sites)	2020-2023
<b>Dr Chirag Patel &amp; Dr Lindsay Fowles</b>	GHQ	Statewide Renal Clinical Network Genomics Education Project	Queensland Genomics	N/A	Jul 2020- Jun 2021
<b>Dr Chirag Patel</b>	GHQ	KidGen Clinics, Education, Data and Research (KidGen CEDAR): Improving Care and Outcomes of Australians with Genetic Kidney Disease	Department of Health	\$693,000 (all sites)	Jul 2020- Jun 2023
<b>Dr Chirag Patel</b>	GHQ	A national large-scale automated reanalysis program to increase rare disease diagnosis	MRFF	\$3,000,000 (all sites)	Jun 2021- May 2024
<b>Dr Chirag Patel</b>	GHQ	The KidGen National Kidney Genomics Program – improving genomic outcomes for Australian families with genetic kidney disease	MRFF	\$3,000,000 (all sites)	Jun 2021- May 2025
<b>Dr Chirag Patel</b>	GHQ	The Australian Functional Genomics Network	MRFF	\$6,000,000 (all sites)	Jun 2021- May 2026
<b>Dr Chirag Patel &amp; Dr Lindsay Fowles</b>	GHQ	Delivering Value-Based Healthcare Through a Genetic Testing Stewardship Program	MNHHS LINK Program	\$125,000	Jul 2021- Jun 2022

### Current RBWH Genetic Health Queensland Research Activity

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
<b>Prof Julie McGaughran</b>	Prof Chris Semsarian (Co lead), AGHA Flagship, <b>Linda Wornham</b> (GC), <b>Rachel Austin</b> (Coord), <b>Michael Quinn</b> (PO), <b>Dr Karin Van Spaendonck-Zwarts</b>	Cardiovascular Genetic Disorders Flagship (AGHA)	25	134 (QLD)
<b>Prof Julie McGaughran &amp; Dr Chirag Patel</b>	Genomic Institute	Whole Genome Sequencing (WGS) Partnership Program	300	300

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
<b>Dr Mohammad Al-Shinnag, Dr Helen MarFan</b>	Dr Jonas Bjorkman, Dr Shu Fen Lee, <b>Rachel Austin (GC)</b>	Association between uterine serous carcinoma and BRCA mutation (USC & BRCA)	3	31

### Collaborative Research Activity Involving RBWH Genetic Health Queensland

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
Prof Kathryn North	<b>Prof Julie McGaughran</b>	Australia Genomics (AG)	See responses below	
AGHA ICon Cancer Flagship	<b>Prof Julie McGaughran, Dr Helen Marfan, Rachel Austin, Dr Rachel Susman, Jan Wakeling (GC), Julie White (GC)</b>	AGHA: Preparing Australia for genomic medicine	1	56
A/Prof Zornitza Stark, Dr Sebastian Lunke	<b>Dr Chirag Patel, Prof Julie McGaughran, Dr Michael Quinn</b>	National rapid genomic diagnosis program for critically ill children	3	7
Prof Hamish Scott, Assoc Prof Chris Barnett	<b>Prof Julie McGaughran</b> <b>Dr Chirag Patel</b>	Genomic autopsy of perinatal death	3	8
kConFab (Lead by Stephen Fox)	<b>Julie McGaughran</b>	The Kathleen Cunningham National Research Consortium For Research on Familial Breast Cancer	N/A	N/A
QIMR-Berghofer (Lead by Barbara Leggett)	<b>Helen Mar Fan</b>	Identification of the Gene Causing Hereditary Flat Adenoma Syndrome (RBWH Research Foundation grant)	N/A	N/A
Prof Finlay Macrae (lead)	<b>Dr Helen Marfan (PI)</b> <b>Rachel Austin (CRA)</b>	A randomised double-blind dose noninferiority Trial of aspirin in Lynch syndrome. CaPP3	N/A recruitment completed	1
A/Prof Dan Buchanan	<b>Dr Rachel Susman, Dr Helen Marfan, Jan Wakeling, Rachel Austin</b>	ANGELS: Applying Novel Genomic approaches to Early-onset and suspected Lynch Syndrome colorectal and endometrial Cancer	~6	57
Prof Bettina Meiser	<b>Dr Rachel Susman, Rachel Austin</b>	A qualitative study to explore patient attitudes and system enablers to establishing a national genomics registry of inherited cancer predisposition	Recruitment completed	10
Prof Diane Fatkin	<b>Dr Karin can Spaendonck-Zwarts</b> <b>Prof Julie McGaughran</b> <b>Rachel Austin (GC contact)</b>	Molecular Mechanisms of Inherited Cardiomyopathies and Arrhythmias (TTNtv Penetrance study)	5	20
Prof Melissa Southey	<b>Dr Helen Marfan (PI)</b> <b>Rachel Austin (CRA)</b>	Breast Cancer Refined Analysis of Sequence Tests: Risk and Penetrance (BRASTRAP)	Recruitment completed	1485

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
Prof Andrew Mallett	<b>Dr Chirag Patel</b> <b>Dr Lindsay Fowles (GC)</b>	Statewide Renal Clinical Network Genomics Education Project	N/A	N/A
Dr Honey Heussler	<b>Dr Chris Richmond</b>	CHQ Genomics of Intellectual Disability	N/A	N/A
Prof Martin Delatycki, Prof Edwin Kirk, Prof Nigel Laing	<b>Prof Julie McGaughran (site PI)</b> <b>Camron Ebzery (GC)</b> <b>Tenielle Clinch (GC)</b>	Genomic Health Futures Mission: McKenzie's Mission, Functional genomics, UDN-Aus	59	61
	<b>Dr Chirag Patel</b> <b>Dr Lindsay Fowles (GC)</b> <b>Aimee Dane (GC)</b>	Delivering Value-Based Healthcare Through a Genetic Testing Stewardship Program	N/A	N/A
<b>Dr Mark Appleyard</b>	<b>Dr Helen Marfan (GHQ contact)</b> Kim Ryan (QLD Coordinator)	Pancreatic screening trial	~9 GHQ pt	N/A

## Research Activity with a Specific Focus on First Nations People

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
Prof Margaret Kelaheer	<b>Prof Julie McGaughran</b>	Genomic Health Futures Mission: Achieving Equity in Genomic Health for Indigenous Australians (AEGH)	N/A	pending
Greg Pratt	<b>Prof Julie McGaughran</b> Kelly Dingli, Victoria Donoghue	Genetic Health Referral Pathways	N/A	N/A

## Research Publications

### Publications in 2021

#### Journal Articles (RBWH staff in bold)

- Austin R, Quinn MCJ**, Afoakwah C, Metke-Jimenez A, Leroux H, **Atherton J**,... **McGaughran J**, et al. Investigation of current models of care for genetic heart disease in Australia: A national clinical audit. *Int J Cardiol.* 2021;330:128-34.
- Meiser B, Kaur R, Morrow A, Peate M, Wong WKT, McPike E, **Austin R**, et al. Impact of national guidelines on use of BRCA1/2 germline testing, risk management advice given to women with pathogenic BRCA1/2 variants and uptake of advice. *Hered Cancer Clin Pract.* 2021;19(1):24.
- International Mismatch Repair Consortium (**R Austin, R Susman**). Variation in the risk of colorectal cancer in families with Lynch syndrome: a retrospective cohort study. *Lancet Oncol.* 2021;22(7):1014-22.
- Meiser B, Woodward P, Gleeson M, Kentwell M, **Fan HM**, Antill Y, et al. Pilot study of an online training program to increase genetic literacy and communication skills in oncology healthcare professionals discussing BRCA1/2 genetic testing with breast and ovarian cancer patients. *Fam Cancer.* 2021:1-10.
- Tijssen AJ, Cócera Ortega L, Reckman YJ, Zhang X, van der Made I, Aufiero S,... **van Spaendonck-Zwarts, K. Y.... et al.** Titin Circular RNAs Create a Back-Splice Motif Essential for SRSF10 Splicing. *Circulation.* 2021;143(15):1502-12.



## Journal Articles (RBWH staff in bold)

6. Stark Z, Foulger RE, Williams E, Thompson BA, **Patel C**, Lunke S, et al. Scaling national and international improvement in virtual gene panel curation via a collaborative approach to discordance resolution. *Am J Hum Genet.* 2021;108(9):1551-7

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7. Wong MD, **Patel C**, McTaggart S, Wainwright CE. Atypical haemolytic uraemic syndrome in a child with cystic fibrosis. *J Paediatr Child Health.* 2021.

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8. Nisselle A, Janinski M, Martyn M, McClaren B, Kaunein N, Barlow-Stewart K,... **Patel C**, et al. Ensuring best practice in genomics education and evaluation: reporting item standards for education and its evaluation in genomics (RISE2 Genomics). *Genet Med.* 2021;23(7):1356-65.

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9. Li D, March ME, Fortugno P, Cox LL, Matsuoka LS, Monetta R, ...**Patel C**, et al. Pathogenic variants in CDH11 impair cell adhesion and cause Teebi hypertelorism syndrome. *Hum Genet.* 2021;140(7):1061-76

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10. Tanudisastro HA, Holman K, Ho G, Farnsworth E, Fisk K, Gayagay T,... **Patel C**, et al. Australia and New Zealand renal gene panel testing in routine clinical practice of 542 families. *NPJ Genom Med.* 2021;6(1):20.

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11. Best S, Brown H, Lunke S, . . .**Patel C**, Pinner J, Barnett CP, et al. Learning from scaling up ultra-rapid genomic testing for critically ill children to a national level. *NPJ Genom Med.* 2021;6(1):5.

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12. Mallawaarachchi AC, Lundie B, Hort Y, Schonrock N, Senum SR, Gayevskiy V,... **Patel C**, et al. Genomic diagnostics in polycystic kidney disease: an assessment of real-world use of whole-genome sequencing. *Eur J Hum Genet.* 2021;29(5):760-70.

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13. Stamberger H, Hammer TB, Gardella E, Vlaskamp DRM, Bertelsen B, Mandelstam S,... **Patel C**, et al. NEXMIF encephalopathy: an X-linked disorder with male and female phenotypic patterns. *Genet Med.* 2021;23(2):363-73.

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14. Jayasinghe K, Stark Z, Kerr PG, Gaff C, Martyn M, Whitlam J, ...**Creighton B**...**Patel C**, et al. Clinical impact of genomic testing in patients with suspected monogenic kidney disease. *Genet Med.* 2021;23(1):183-91.

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15. **Richmond CM**, James PA, Pantaleo SJ, Chong B, Lunke S, Tan TY, et al. Clinical and laboratory reporting impact of ACMG-AMP and modified ClinGen variant classification frameworks in MYH7-related cardiomyopathy. *Genet Med.* 2021;23(6):1108-15.

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16. **Al-Shinnag M**, **Marfan H**, **Susman R**, **Wakeling J**, Gustafson S, Wood S, et al. Birt-Hogg-Dubé Syndrome and Hereditary Leiomyomatosis and Renal Cell Carcinoma Syndrome: An Effective Multidisciplinary Approach to Hereditary Renal Cancer Predisposing Syndromes. *Front Oncol.* 2021;11:738822.

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17. Faundes V, Goh S, Akilapa R, Bezuidenhout H, Bjornsson HT, Bradley L,...**McGaughran J**,...**Rogers J**. et al. Clinical delineation, sex differences, and genotype-phenotype correlation in pathogenic KDM6A variants causing X-linked Kabuki syndrome type 2. *Genet Med.* 2021;23(7):1202-10.

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18. Hüffmeier U, Kraus C, Reuter MS, Uebe S, Abbott MA, Ahmed SA,...**McGaughran J**... et al. EIF3F-related neurodevelopmental disorder: refining the phenotypic and expanding the molecular spectrum. *Orphanet J Rare Dis.* 2021;16(1):136.

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19. Dalach P, Savarirayan R, Baynam G, **McGaughran J**, Kowal E, Massey L, et al. "This is my boy's health! Talk straight to me!" perspectives on accessible and culturally safe care among Aboriginal and Torres Strait Islander patients of clinical genetics services. *Int J Equity Health.* 2021;20(1):103.

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20. EA Verberne, S Goh, J England, M van Ginkel, L Rafael-Croes, S Maas, **CM Richmond** et al. JARID2 haploinsufficiency is associated with a clinically distinct neurodevelopmental syndrome. *Genetics in Medicine* 23 (2), 374-383

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21. J van der Spek, J den Hoed, LS Blok, AJM Dingemans, D Schijven, **CM Richmond** et al. Inherited variants in CHD3 demonstrate variable expressivity in Snijders Blok-Campeau syndrome. *medRxiv* 2021.

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22. **Rodgers J**, Calvert S, Shoubbridge C, **McGaughran J**. A novel ARX loss of function variant in female monozygotic twins is associated with chorea. *Eur J Med Genet.* 2021 Nov;64(11):104315.

## Keynote or Plenary Lectures given in 2021

Date	Title
05/2021	The Cardiovascular Genetic Disorders Flagship
05/2021	Introduction to Genomics in Healthcare
05/2021	Understanding the different types of Ovarian Cancer and tumour testing
08/2021	Interesting cases from AGHA ICCOn study
10/2021	Expanded panels breast cancer

# Hyperbaric Medicine Services

## Current RBWH Department / Research Group Led Research Activity

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021
<b>Brenda Laupland</b>		Sensorineural hearing loss – retrospective review	
<b>Brenda Laupland</b>		Trends in management of blood glucose during hyperbaric oxygen treatment – A survey of accredited hyperbaric chambers in Australia and New Zealand	
<b>Adam Storey</b>	Kenneth Thistlethwaite, Margaret O'Connell	A proposal for a novel use of the Amron Oxygen Treatment Hood (hyperbaric hood) as part of the health response to COVID-19 at the Royal Brisbane & Women's Hospital	

## Collaborative Research Activity Involving RBWH Department / Research Group

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
Tom Moloney	<b>Ken Thistlethwaite, Robert Webb</b>	Outcomes of Hyperbaric Oxygen Treatment for Central and Branch Retinal artery occlusion at a major Australian referral hospital		22

## Intensive Care Services

2021 marked the year that Professor Jeffrey Lipman retired after more than two decades in an exemplary career in clinical and research leadership within the department. He set the foundation and played a fundamental role in transitioning productivity to the next generation of researchers not only within the department but to others within RBWH.

The research office continues to be instrumental in the training and recruitment of research co-ordinators and the department supports participation and completion of higher research degrees among the department staff.

The Herston Research Symposium was as a forum to highlight departmental achievements especially within medical education and evolving leadership in the development of clinical applications of 3D printing related to critical care. The RBWH ICU has been extensively involved in national and international collaborations. In addition, a multi-centred collaborative has been developed within the Queensland Critical Care Research Network with RBWH playing a central role.

Productivity has been evidenced by 147 peer review publications, 27 peer reviewed grants, and conduct of more than more than 30 ongoing clinical trials within the ICU. Departmental members have been recognised including Professor Michael Reade who has been ranked as 15<sup>th</sup> of 5,412 authors in the field of Military Medicine worldwide and Professor Fiona Coyer who was recognised as the best original article at the 2021 Wounds Australia National Conference.

Increasing engagement of departmental members in research and recruitment of new members will build on the successes to date and set the stage for increasing productivity and research innovation in future years.

## Research Awards and Achievements

Recipient (RBWH staff in bold)	Award	Event
<b>Fiona Coyer</b> , Kerrie Coleman, Kathy Hocking, Tom Leong, Annabel Levido, Michelle Barakat-Johnson	Winner for the original research article category in the Coloplast Biatain Literary Awards for 2020: Maintaining skin health and integrity for staff wearing personal protective equipment for prolonged periods: a practical tip sheet	2021 Wounds Australia National Conference
<b>Jeffrey Lipman</b>	D Med (Res) Refining $\beta$ -lactam dosing in ICU for better efficacy	2021

## Research Grants

Investigator Names (RBWH staff in bold)	RBWH Departments / Research Groups	Research Project Title	Granting Body	Total Awarded (whole all years)	Length of Awards in years and years active
<b>Marianne Kirrane, Fiona Coyer, George Pang, Chris Futter, Hamish Pollock</b> , Mathilde Desselle, Dr David Forrestal, Dr Michael Wagels, Dr Deniz Erbulut, Nick Green, Isabel Byram, Ryan Daley, Luke Wainwright, Daniel Host, Joshua Drew, Clinton Henderson.	DICS, HBI CSDS	EPIIC: Engineering for pressure injuries in Intensive Care	MNH LINK & SEED grants	\$99788	1 yr 2021-22
<b>Marianne Kirrane</b> , Mathilde Desselle, David Forrestal, Luke Wainwright, <b>George Pang</b> , Chris Futter, <b>Fiona Coyer</b>	Intensive Care Services, Herston Biofabrication Institute, Clinical Skills Development Centre	Improving critical care outcomes by reducing the risk of pressure injuries to the face in prone patients	MNHHS SEED Grant	\$99,788	2yrs, 2021-2022

Investigator Names (RBWH staff in bold)	RBWH Departments / Research Groups	Research Project Title	Granting Body	Total Awarded (whole all years)	Length of Awards in years and years active
Deanne August, Nicole Marsh, Colette McIntyre, Pieter Koorts, Melissa Lai, Joshua Byrnes, Robert Ware, Kathleen Finlayson, Craig McBride, <b>Fiona Coyer</b> , Amanda Ullman	Nursing and Midwifery Research Centre, Neonatal Unit,	What lies beneath: accurate measurement and sequelae of neonatal mechanical skin injuries (WLB-neoSkin)	RBWH and RBWH Foundation Research Project Grant	\$50,000	1yr, 2021
<b>Dhanani J</b> , Hudson <b>J, Laupland KB</b> , Foster S	Intensive Care Services	The role of bromodomain and extra-terminal domain (BET) containing protein inhibitors in a translational model of sepsis-induced myocardial dysfunction	Collaborative Research Grants (CRG) program	\$50,000	2021
<b>Bryan Gregory</b> , <b>Annabelle Levido</b> , <b>Pierre Clement</b> , <b>Helena Morrey</b> , <b>Marianne Kirrane</b> , <b>Adam Stott</b> , <b>Kristy Jackman</b> , <b>Fiona Coyer</b>	Intensive Care Services, Nursing and Midwifery Research Centre, Social Work, Surgical, Treatment & Rehabilitation	Virtual visiting for families in the ICU – the VITAL study	RBWH Foundation COVID grant round	\$25,267.95	2yrs, 2020-2021
<b>A Holley</b> ,			Special Grants RBWH Foundations	\$117400	
Antje Blumenthal, <b>J Cohen</b> , B Venkatesh	Intensive Care	Enhancing host defence mechanisms in severe bacterial infections	NHMRC	\$830,447	5 years, 2017-2022
B Venkatesh, J Myburgh, <b>J Cohen</b>	Intensive Care	Vascular responsiveness in septic shock	NHMRC	\$863,510	5 years, 2018-2023
A Delaney, <b>J Bellapart</b> , <b>J Cohen</b>	Intensive Care	The SAHaRA Trial: Understanding the best red cell transfusion practice in patients with intracranial bleeding from a ruptured aneurysm	MRFF	\$902,752	5 years 2018-2023
Mitra B, Bernard S, Gruen R, <b>Reade MC</b> , Maegele M, McQuilten Z.	ICU	Prehospital administration of freeze-dried (lyophilized) plasma for traumatic shock.	Australian National Blood Authority	\$50,000	2yr 2021- 2023
<b>Flint A</b> , McQuilten Z, Brady K, <b>Reade MC</b> , Wood E.	ICU	Blood transfusion practices in intensive care – support for the ANZICS CTG Point Prevalence Program	Australian and New Zealand Society for Blood Transfusion	\$14,000	1yr 2021

Investigator Names (RBWH staff in bold)	RBWH Departments / Research Groups	Research Project Title	Granting Body	Total Awarded (whole all years)	Length of Awards in years and years active
McQuilten Z, Cooper J, <b>Flint A</b> , French C, Higgins L, Irving A, <b>Reade MC</b> , Winearls J, Wood E.	ICU	International Point Prevalence Study of Intensive Care Unit Transfusion Practices – the InPUT-study – a point prevalence study of blood product use in intensive care units in Australia benchmarking blood product use against current guidelines and international practice	Australian National Blood Authority	\$155,000	1yr 2022
<b>Dhanani J</b> , Roberts J, Gray P, Claus A, Lisec C, <b>Reade MC</b> .	ICU	Does nebulized dexmedetomidine reduce or eliminate the requirement for conventional sedation and analgesia (intravenous ketamine and midazolam) for procedural pain management in burns patients? A pilot phase III clinical trial	Royal Brisbane and Women's Hospital Foundation Grant	\$58,000	2yr 2021-2023
<b>Holley A</b> , Droder B, <b>Reade MC</b> , <b>Lipman J</b> , <b>Cohen J</b> .	ICU	The Development of an Australasian Burns Critical Care Registry	Royal Brisbane and Women's Hospital Foundation Grant	\$114,000	2yr 2021-2023
Fitzgerald M and 49 co-investigators including <b>Reade MC</b>	ICU	An informatics approach to predict outcomes and monitor intervention efficacy following moderate to severe TBI.	MRFF Traumatic Brain Injury Mission Stream 1 (Incubator).	\$500000	5yr 2021-2026
McQuilten Z, Winearls J, Cooper J, <b>Reade MC</b> , Wood E, Higgins A, Mitra B, Daly J, Wullschlegel M, Balogh Z, French C, Heller G, Presneill J.	ICU	Fibrinogen <b>Early In Severe Trauma</b> studY ( <b>FEISTY II</b> ).	MRFF Unmet Need Grant Proposal	\$1.5 million	5yr 2021-2026
<b>Roberts J</b> , <b>Lipman J</b> , Peake S, Turnidge J, Slavin M, Hopkins P, Paul S, De Waele J, Joynt G.	ICU	Centre of Research Excellence - REduce the burden of antimicrobial reSistance through oPtimal, perSONalised Dosing (RESPOND).	(NHMRC APP2007007)	\$2,500,000	2021-25
<b>Roberts J</b> , <b>Lipman J</b> , <b>Paterson D</b> , Abdul-Aziz MH	ICU	Continuous vs intermittent infusion of $\beta$ -lactam antibacterial drugs: impact on resistance and outcomes in sepsis	US Food and Drug Administration (FDA)	\$535,640.	2021-23
<b>Roberts JA</b> .	ICU	PERSONA: PERSONalised Anti-infective treatment solutions: all patients, all ages, all countries.	University of Queensland Strategic Initiatives Fund	\$780,000.	2021-24,
<b>Roberts JA</b>	ICU	REDEFINING ANTIMICROBIAL USE TO REDUCE RESISTANCE AND PROLONG THEIR CLINICAL UTILITY	Queensland Advancing Clinical Research Fellowship, Queensland Health	\$499,950	2020-24



Investigator Names (RBWH staff in bold)	RBWH Departments / Research Groups	Research Project Title	Granting Body	Total Awarded (whole all years)	Length of Awards in years and years active
Cree M, Mattke A, Schlapbach L, Parker S, <b>Roberts JA</b>	CHQ	Pharmacokinetic modelling of antibiotics and antifungals (antimicrobials) in critically ill children on life saving therapies (extracorporeal therapies).	Study Research and Trust Account, Children's Health Queensland,	\$20,450	2020-2021
<b>Lipman J</b> , Abdul-Aziz MH, <b>Dhanani J</b> , <b>Fourie C</b> , <b>Roberts JA</b> .	ICU	Developing evidence-based antimicrobial dosing guidelines during extracorporeal therapies using advanced pharmacometric methods: pharmacokinetics of cefepime, ceftriaxone and ceftolozane/tazobactam during extracorporeal membrane oxygenation (ECMO) and/or renal replacement therapy (RRT).	RBWH Foundation Research Project Grant,	\$49,315	2020-2021
<b>Roberts JA</b> , Lipman J, De Waele J, Koulenti D.	ICU	Novel dosing regimens to maximise antibiotic effectiveness for treatment of pneumonia in the intensive care unit	NHMRC Project Grant (APP1162281)	\$815,403	2019-22
Wainwright C, Bell SC, Wason J, Thomson R, <b>Roberts JA</b> , Coin L, Byrnes J, Tiddens H, Grimwood K, Ahern S.,	ICU	A platform clinical trial approach to the management of Mycobacterium abscessus complex.	Medical Research Futures Fund Lifting Clinical Trials and Registries Capacity (LCTRC) grant	\$2,091,178	2018-22
<b>Lipman J</b> , <b>Roberts JA</b> , Myburgh J, Peake S, <b>Dulhunty J</b> , <b>Paterson D</b> , McGuinness S, Rhodes A, DeWaele J, Finfer S.	ICU	BLING III: A phase III randomised controlled trial of continuous beta-lactam infusion compared with intermittent beta-lactam dosing in critically ill patients.	NHMRC APP1121481	\$3,269,942	2017-21
<b>Roberts JA</b>	ICU	Redefining antibiotic dosing to reduce bacterial resistance	National Health and Medical Research Council of Australia Practitioner Fellowship (NHMRC APP1117065)	\$474,512.	2017-21
<b>Lipman J</b>	ICU	Building PK and clinical trial capacity at the Herston Campus	UQ Strategic Grant.	\$1,884,000	2017-2021
<b>Lipman J</b>	ICU	BLING III: A phase III randomised controlled trial of continuous beta-lactam infusion compared with intermittent beta-lactam dosing in critically ill patients.	Belgian Knowledge Center	1,194,809 EUR	2019-2022

## Current RBWH Intensive Care Research Activity

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
<b>Bryan Gregory</b>	<b>Annabelle Levido, Pierre Clement, Helena Morrey, Marianne Kirrane, Adam Stott, Kristy Jackman, Fiona Coyer</b>	Virtual visiting for families in the ICU: The VITAL study	62 staff 38 family members	105 staff 69 family members
<b>Fiona Coyer</b>	<b>Annabel Levido, Kerrie Coleman, Kathy Hocking,</b> Michelle Barakat-Johnson, Tom Long	Clinicians' experiences of extended PPE wear, a qualitative study	12	12
<b>Kevin Laupland</b>	David Paterson, Patrick Harris	Occurrence and determinants of bloodstream infections, Queensland, 2000-2019	N/A	N/A
<b>J Cohen</b>	<b>M Reade</b>	Pharmacokinetics of transcutaneous nicotine in Intensive care		

## Collaborative Research Activity Involving RBWH Intensive Care Services

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
Deanne August	<b>Nicole Marsh, Colette McIntyre,</b> Pieter Koorts, Melissa Lai, Joshua Byrnes, Robert Ware, Kathleen Finlayson, Craig McBride, <b>Fiona Coyer,</b> Amanda Ullman	What lies beneath: accurate measurement and sequelae of neonatal mechanical skin injuries (WLB-neoSkin)	0	0
Andrea Marshall	<b>Fiona Coyer</b>	Family Engagement in ICU Study	65	65
<b>Kevin Laupland</b>	Mahesh Ramanan, Angus Carter, James McCullough, Hayden White, Stephen Luke, Adrian Langley, Kyle White, Kevin Plumptre, Alexis Tabah, Anthony Attokaran, Paula Lister, Vikram Masurkar, Kiran Shekar, Siva Senthuran, <b>Marianne Kirrane,</b> Robert Andrews	Optimising utilisation and outcomes of critical illness: A multicentred, interdisciplinary collaborative in Queensland	N/A	N/A
<b>Kevin Laupland</b>	Alexis Tabah, Tom Stelfox, Jean Yves Lefrant, Gavin Joynt, Leo Seonane, <b>Cheryl Fourie, Jeffrey Lipman</b>	Physician attire in the intensive care unit and family perceptions: An international study	68	110
Jean Yves Lefrant	Gavin Joynt, Lowell Ling, <b>Kevin Laupland, Renee Saba,</b>	Psychological impact of the COVID-19 outbreak on caregivers involved in Intensive Care Unit patient management: Impact on the occurrence of post-traumatic stress disorder, anxiety, and depression	200	200
<b>Kevin Laupland,</b>	Lowell Ling, Daniel Niven, Derek Vonderhaar, on behalf of the <b>Calgary-Brisbane-Hong Kong-Ochsner-Nimes/Montpellier (CaBOoM)</b> Collaboration Investigators	Body mass index and outcome of critical illness: A multi-national study	N/A	N/A
<b>Jeremy Cohen</b>		FLUDRESS study		

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
<b>Jeremy Cohen</b>		REFINE study		
<b>Jeffrey Lipman</b>	Roberts J, Myburgh J, Peake S, Dulhunty J, Paterson D, McGuinness S, Rhodes A, de Waele J, Finfer S	BLING III: A phase III randomised controlled trial of continuous betalactam infusion compared with intermittent betalactam dosing in critically ill patients	209	6300/7000
<b>Jeffrey Lipman</b>	Prof Jason Roberts, Dr Jayesh Dhanani, Prof Andrew Udy, Dr Cornelia Landersdorfer, Prof Jan De Waele, Prof Jean-Yves Lefrant, Dr Claire Roger, Dr Lowell Ling, Dr Hafiz Abdul-Aziz, Dr Helmi Sulaiman, Cheryl Fourie, Janine Stuart	PNEUDOS Study	11	63
<b>Jeffrey Lipman</b>	Prof Jason Roberts, Dr Patrick Harris, Dr Peter Kruger, Prof Luregn Schlapbach, Dr Kieran Shekar, Prof David Paterson, Dr Krispin Hajkowitz	DIRECT Study	43	200
Craig French	Nichol A, Bellomo R, Cooper DJ, Bailey M, Higgins A, McArthur C, Hodgson C, Gabbe B, Duranteau J, Presneill J, Rosenfeld J, Napolitano L, Skrifvars M, <b>Reade MC, Pettit V</b>	ErythroPOietin alfa to prevent mortality and reduce severe disability in critically ill TRAUMA patients: a multicentre, stratified, double blind, placebo randomised controlled trial. (The EPO-TRAUMA trial)	2	122
<b>Jeffrey Lipman</b>	<b>Jason Roberts, Kevin Laupland, Jayesh Dhanani, Patrick Harris, Jacobus Ungerer, Brett McWhinney,</b> Steven Wallis, Menino Osbert Cotta, Hafiz Abdul-Aziz, Gene Chai, <b>Adam Stewart, Cheryl Fourie</b>	Resistance Optimised Antimicrobial Dosing in Critically ill Patients Pharmacokinetic/Pharmacodynamic-optimised betalactam dosing to prevent the emergence of bacterial resistance: a proof of concept.	9	9

## Research Publications

### Publications in 2021

#### Journal Articles (RBWH staff in bold)

1. Abdul-Aziz MH, Brady K, **Roberts JA**. Therapeutic drug monitoring of antibiotics: defining the therapeutic range. *Ther Drug Monit* 2021; in press (date accepted 1st October 2021; TDM21-175-R1).
2. Abeysekera N, Whitmore KA, Abeysekera A, Pang G, **Laupland KB**. Applications of 3D printing in critical care medicine: A scoping review. *Anaesth Intensive Care* 2021;49(3):164-172.
3. Adamson S, **Carpenter H, Pang G, Pincus J, Gregory B, Reade MC**. Staff perceptions of military CBRN air purifying masks during a simulated clinical task in the context of SARS-CoV-2. *Anaesthesia and Intensive Care*, 2021; 49(3): 190-197.
4. Agyeman AA, Rogers KE, Tait JR, Bergen PJ, Kirkpatrick CM, Wallis SC, Bulitta JB, Paterson DL, **Lipman J**, Nation RL, **Roberts JA**, Landersdorfer CB. Evaluation of meropenem-ciprofloxacin combination dosage regimens for the pharmacokinetics of critically ill patients with augmented renal clearance *Clin Pharmacol Ther* 2021 : 109 :1104-1115 doi:10.1002/cpt.2191
5. Alawie J, Heffernan A, Wallis SC, **Roberts JA**, Sime FB. Pharmacodynamic evaluation of a single dose versus a 24hour course of multiple dose of cefazolin for surgical prophylaxis. *Antibiotics* 2021; in press (date accepted 16th April 2021; antibiotics-1205358).

## Journal Articles (RBWH staff in bold)

6. Al-Shaer M, Goutelle S, Santevecchi B, Shoulders B, Venugopalan V, Cherabuddi K, Liu J, Kiel P, **Roberts JA**, Sime F, Scheetz M, Neely MN, Peloquin C. Cefepime precision dosing tool: From Standard to Precise Dose Using Nonparametric Population Pharmacokinetics. *Antimicrob Agents Chemother* 2021; in press (date accepted 8th December 2021; AAC02046-21R1).
7. Axfors C, **Roberts JA**, Hemkens LG. Association of convalescent plasma treatment with mortality in COVID-19 patients: an international collaborative meta-analysis of randomized clinical trials. *BMC Infect Dis*; 2021 21: 1170.
8. Barakat-Johnson M, Basjarahil S, Campbell J, Cunich M, Disher G, **Coyer F** et al. Implementing best available evidence into practice for incontinence-associated dermatitis in Australia: A multisite multimethod study protocol. *Journal of Tissue Viability*. 2021;30(1):67-77. <https://doi.org/10.1016/j.jtv.2020.10.002>.
9. Barreto EF, Rule AD, MD; Alshaer MH, **Roberts JA**, Abdul-Aziz MH, Scheetz M, Mara KC, Jannetto PJ, Gajic O, O'Horo JC, Boehmer KR. Provider perspectives on beta-lactam therapeutic drug monitoring programs in the critically ill: a protocol for a multicenter mixed-methods study. *Implement Sci Comm* 2021; in press (date accepted 9th March 2021; ISCM-D-21-00066).
10. Batterbury A, Douglas C, **Coyer F**. The illness severity of patients reviewed by the medical emergency team: A scoping review. *Australian Critical Care*. 2021. <https://doi.org/10.1016/j.aucc.2020.11.006>
11. **Bellapart J**, Nasrallah F, Winearls J, **Lassig-Smith M**, Stuart J, Boots R, Winter C, Flaws D, Bulmer A, Jones L, **Laupland KB**. Diagnostic sensitivity of plasma endothelin-1 for cerebral vasospasm after subarachnoid hemorrhage, a multicentre double-blind study. *J Intensive Care Med* 2021(Epub ahead of print)
12. Belveyre T, Scala-Bertola J, Esposito M, Luc A, **Lipman J**, Novy E. New PK/PD parameters for cefoxitin prophylaxis in obese patients *Eur J Drug Metabol Pharmacokinet* 2021 : 46 : 479-485.
13. Beraldi-Magalhaes F, Parker SL, Sanches C, Garcia LS, Carvalho BKS, Fachi MM, de Liz MV, Pontarolo R, **Lipman J**, Cordeiro-Santos M, **Roberts JA**, Is dosing of ethambutol as part of a fixed dose combination product optimal for mechanically ventilated ICU patients with TB? A population pharmacokinetic study *Antibiotics* 2021 : 10 : 1559 doi: 10.3390/antibiotics10121559
14. Blassmann U, Roehr AC, Frey OR, **Roberts JA**, Brinkmann A. Personalized  $\beta$ -lactam dosing in patients with coronavirus disease 2019 (COVID-19): A retrospective analysis on pharmacokinetics, pharmacokinetic target attainment and use of resources. *Medicine* 2021; in press (date accepted 21st May 2021; MD-D-21-01318R1)
15. Bray J, Acworth J, Page G, Parr M, Morley P, Cameron A, Carey C, Celenza A, Christiansen R, Considine J, Douglas N, et al. incl. **Reade M**. Aussie KIDS SAVE LIVES: A position statement from the Australian Resuscitation Council and supported by stakeholders. *Emergency Medicine Australasia*, 2021, published ahead of print. doi: 10.1111/1742-6723.13840.
16. Bright M, Raman V, **Laupland KB**. Use of therapeutic caffeine in acute care post-operative and critical care settings: A scoping review. *BMC Anaesthesiology* 2021;21(1):100
17. Buckley MS, Smithburger PL, Wong A, Fraser GL, **Reade MC**, Klein-Fedyshin M, Ardiles T, Kane-Gill SL. Dexmedetomidine for Facilitating Mechanical Ventilation Extubation in Difficult-to-Wean ICU Patients: Systematic Review and Meta-Analysis of Clinical Trials. *J. Intensive Care Medicine*, 2021; 36(8): 925-936.
18. Burke A, Smith D, Coulter C, Bell SC, Thomson R, **Roberts JA**. Clinical Pharmacokinetic and Pharmacodynamic Considerations in the Drug Treatment of Non-Tuberculous Mycobacteria in Cystic Fibrosis. *Clin Pharmacokinet* 2021; in press (date accepted 22nd February 2021; CPKA-D-20-00199R1).
19. Burrell AJ, Neto AS, French C, Udy AA, **Sprint Sari Australia Investigators**. Rapid Translation of COVID-19 Preprint Data into Critical Care Practice. *Am J Respir Crit Care Med* 2021;203(3):368-371
20. Burrows AM, **Laupland KB**. Comprehensiveness of distributed medical education systems: A regional population-based perspective. *BMC Med Ed* 2021;21(1):42
21. Cairns KA, Avent M, Buono E, Cheah R, Devchand M, Khumra S, Rawlins M, **Roberts JA**, Xenos K, Munro C. Standard of practice in infectious diseases for pharmacy services. *J Pharm Pract Res* 2021; 51:247-64.
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23. Chau MM, Daveson K, Alffenaar JWC, Gwee A, Ho SA, Marriott DJE, Trubiano JA, Zhao J, **Roberts JA**. Consensus guidelines for optimising antifungal drug delivery and monitoring to avoid toxicity and improve outcomes in patients with haematological malignancy, 2021. *Internal Med J* 2021; in press (date accepted 12th October 2021; IMJ15587).

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24. Cheng V, Abdul-Aziz MH, Burrows F, Buscher H, Cho YJ, Corley A, Diehl A, Gilder E, Jakob S, Kim HS, Levkovich B, Lim SY, McGuinness S, Parke R, Pellegrino V, Que YA, Reynolds C, Rudham S, Wallis S, Welch S, Zacharias D, **Roberts JA**, Shekar K, Fraser J. Population pharmacokinetics of cefepime in critically ill adult patients receiving extracorporeal membrane oxygenation (an ASAP ECMO study). *Int J Antimicrob Agents* 2021; in press (date accepted 18th October 2021; IJAA-D-21-00879R2).
25. Cheng V, Abdul-Aziz MH, Burrows F, Buscher H, Cho YJ, Corley A, Diehl A, Gilder E, Jakob S, Kim HS, Levkovich B, Lim SY, McGuinness S, Parke R, Pellegrino V, Que YA, Reynolds C, Rudham S, Wallis S, Welch S, Zacharias D, Fraser J, Shekar K, **Roberts JA**. Population pharmacokinetics of vancomycin in critically ill adult patients receiving extracorporeal membrane oxygenation (an ASAP ECMO study). *Antimicrob Agents Chemother* 2021; in press (date accepted 25th September 2021; AAC01377-21R1).
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32. **Cohen J**, Delaney A, Anstey J, Anstey M, Barge D, Bellomo R, Bhardwa V, Brinkerhoff G, Board J, Campaign A et al: Dysnatremia and 6-month functional outcomes in critically ill patients with aneurysmal subarachnoid hemorrhage: a prospective cohort study. *Critical Care Explorations* 2021, 3(6).
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34. **Coyer F**. Letter to the Editor: Silicone adhesive multilayered foam dressings for pressure ulcer prevention. *British Journal of Dermatology*. 2021. <https://doi.org/10.1111/bjd.19873>
35. Dagleish L, Finlayson K, Campbell J, Barakat-Johnson M, Beath A, **Coyer F** et al. Understanding the skin failure conversation: A scoping review. *Advances in Skin and Wound Care*. 2021. <https://doi.org/10.1097/01.ASW.0000755844.87283.20>
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38. Dhanani J, Lipman J, Pincus J, Townsend S, Livermore A, Wallis SC, Abdul-Aziz MH, **Roberts JA**. Pharmacokinetics of fluconazole and ganciclovir as combination antimicrobial chemotherapy on ECMO- A case report *Int J Antimicrob Agents* 2021 : 58 : 106431 doi: 10.1016/j.ijantimicag.2021.106431



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40. Duncan CF, Youngstein T, **Kirrane MD**, Lonsdale DO. Diagnostic Challenges in Sepsis. *Curr Infect Dis Rep* 23, 22 (2021). <https://doi.org/10.1007/s11908-021-00765-y>
41. Dyda A, Fahim M, Fraser J, **Kirrane M**, Wong I, McNeil K, Ruge M, Lau CL, **Sullivan CS**. Managing the Digital Disruption Associated with COVID-19-Driven Rapid Digital Transformation in Brisbane, *Australia. Appl Clin Inform* 2021; 12(05): 1135-1143 DOI: 10.1055/s-0041-1740190
42. Evans L, Rhodes A, Alhazzani W, Antonelli M, Coopersmith CM, French C, Machado FR, McIntyre L, Ostermann M, Prescott HC, Schorr C, Simpson S, Wiersinga WJ, Alshamsi F, Angus DC, Arabi Y, Azevedo L, Beale R, Beilman G, Belley-Cote E, Burry L, Cecconi M, Centofanti J, Coz Yataco A, De Waele J, Dellinger RP, Doi K, Du B, Estenssoro E, Ferrer R, Gomersall C, Hodgson C, Møller MH, Iwashyna T, Jacob S, Kleinpell R, Klompas M, Koh Y, Kumar A, Kwizera A, Lobo S, Masur H, McGloughlin S, Mehta S, Mehta Y, Mer M, Nunnally M, Oczkowski S, Osborn T, Papathanassoglou E, Perner A, Puskarich M, **Roberts JA**, Schweickert W, Seckel M, Sevransky J, Sprung CL, Welte T, Zimmerman J, Levy M. Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021. *Crit Care Med.* 2021 Oct 4. doi: 10.1097/CCM.0000000000005337.
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## Keynote or Plenary Lectures given in 2021

Date	Title
11/2021	Finlayson K, Sinasac P, Francis M, Coleman K, <b>Coyer F</b> . Implementation of the protecting skin integrity model for evidence-based wound management. The 6 <sup>th</sup> Annual Meeting of Wound Management Association of HCM City. (Online presentation). 2021
09/2021	<b>Coyer F</b> . 3D engineering for facial pressure injury protection in ICU. Herston Health Precinct Symposium, Royal Brisbane & Women's Hospital. 2021
2021	<b>Reade MC</b> . The next 10 years of military anaesthesia in the Australian Defence Force. <i>Australian Society of Anaesthetists Annual Scientific Meeting</i> , Brisbane, 2021.
2021	<b>Reade MC</b> . Is whole blood as good as everyone says? <i>Australasian Trauma Society Annual Scientific Meeting</i> , Brisbane, 2021.
2021	<b>Reade MC</b> . The Australian Defence Force experience of Trauma Verification. <i>Australasian Trauma Society Annual Scientific Meeting</i> , Brisbane, 2021.
2021	<b>Reade MC</b> . Platelets – the forgotten blood component? <i>Australasian Trauma Society Annual Scientific Meeting</i> , Brisbane, 2021.
2021	<b>Reade MC</b> . Leadership and cultural development: an Army Health perspective. <i>Royal Australasian College of Surgeons Annual Scientific Congress</i> , Melbourne, 2021.
2021	<b>Reade MC</b> . Lessons learnt from Iraq and Afghanistan. <i>Royal Australasian College of Surgeons Annual Scientific Congress</i> , Melbourne, 2021.
2021	<b>Reade MC</b> . Australia's contribution to Pacific health security. <i>Royal Australasian College of Surgeons Annual Scientific Congress</i> , Melbourne, 2021.
2021 (Multiple Dates)	<b>Lipman J</b> – Convenor, 2021 Herston Precinct Grand Rounds
06/2021	<b>Roberts JA</b> – Invited Speaker, “Optimising drug therapy for resistant infections in critical illness”. Pre-ECCMID Course for European Conference on Clinical Microbiology and Infectious Diseases. Virtual
07/2021	<b>Roberts JA</b> – Invited Speaker, “Antibiotic dosing in RRT and ECMO”. European Conference on Clinical Microbiology and Infectious Diseases. Virtual
07/2021	<b>Roberts JA</b> – Invited Speaker, “Antimicrobial Dose Optimisation”. Infectious Diseases Masterclass, Society of Hospital Pharmacists of Australia
08/2021	<b>Lipman J</b> – Invited Speaker, Annual Scientific Congress for the Malaysian Society of Anaesthesiologists, Virtual
08/2021	<b>Roberts JA</b> – Invited Speaker, “Advanced Infection Management”. Critical Care Extension Seminar, Society of Hospital Pharmacists of Australia
08/2021	<b>Roberts JA</b> – Invited Speaker, “COVID-19 Therapeutics: anti-virals and anticoagulants”. Critical Care Extension Seminar, Society of Hospital Pharmacists of Australia



<b>09/2021</b>	<b>Lipman J</b> – Program Convenor, 2021 Herston Health Precinct Symposium, Brisbane
<b>09/2021</b>	<b>Roberts JA</b> – Invited Speaker, “Dosing optimisation of antibiotic therapy in augmented renal clearance”. 11th Annual Conference of the South African Society of Clinical Pharmacists. Virtual
<b>10/2021</b>	<b>Lipman J</b> – Invited Speaker, ESICM LIVES 2021, Virtual
<b>11/2021</b>	<b>Lipman J</b> – Invited Speaker, APCCMI 2021, Singapore

## Professor Tess Cramond Multidisciplinary Pain Centre

The major highlight for the Tess Cramond Pain and Research Centre (TCPRC) in 2021 was moving into the Surgical, Treatment and Rehabilitation Services (STARS) building on the Herston Precinct. The new Centre is purpose built to support clinical and research activities. This move has afforded research collaborations in STARS, as well as continuing with existing collaborations within the RBWH.

In 2021 the TCPRC was awarded four research grants that will commence in 2022: i) the ANZCA Novice Investigator scheme, LIDOPAIN study, to inform dose and patient selection for improved benefit and safety of intravenous lidocaine infusions for neuropathic pain at the TCPRC; ii) the RBWH Foundation Project scheme, to study the development of small nerve fibre pathology in chronic whiplash-associated disorder, as an important marker for people who are most at risk of persistent pain and disability; iii) the RBWH Burns Research scheme, for a trial of nebulized dexmedetomidine as an analgesic option to reduce the requirement for intravenous ketamine/midazolam for procedural pain management in burns patients; and iv) iron infusions in patients with iron deficiency anaemia and persistent pain (VITAL Study). These studies will contribute approximately \$223,000 in research funding (RBWH Foundation project funds split between CC&CSS and UQ RECOVER). The outcome for an NHMRC-NIHR Collaborative Grant led by Nadine Foster is still outstanding, and unsuccessful applications were also submitted for the NHMRC Ideas and the RBWH Seed schemes in 2021.

There were 10 peer reviewed publications by TCPRC researchers that include RBWH affiliations in 2021. Publications covered a broad range of medical and allied health pain topics, that directly inform clinical interventions such as treating iron deficiency anaemia in patients with persistent pain, improve clinician understanding and communication with patients of Aboriginal and Torres Strait Island heritage or implementing videoconference appointments for persistent pain management. This was achieved through collaborations between the TCPRC and RBWH Departments of Anaesthesia, Occupational Therapy, Physiotherapy and the Burns Unit, as well as external collaborations with GCUH Interdisciplinary Persistent Pain Service, QIMRB, QUT, UQ, RECOVER Injury Research Institute.

At the Australian Pain Society annual scientific meeting, TCPRC had strong national representation with Nicole Andrews providing an invited presentation on a pain self-management app, Paul Gray leading a 70min topical session discussion on communication with Aboriginal and Torres Strait Islander patients, and Andrew Claus leading/contributing to five poster presentations with TCPRC clinical staff and collaborators. An online presentation was also delivered at the International Association for the Study of Pain, and community engagement through a radio interview on pain with ABC Qld Regional Radio.

An important area of research progress at the TCPRC was advancing the research engagement of clinical staff. Occupational therapy, physiotherapy and psychology staff were all investigators in one or more research projects. From medicine, Gunjeet Minhas enrolled to commence MPhil candidature with UQ in 2022, to undertake the LIDOPAIN study. This study in particular will also engage pharmacy and nursing staff in research activity as well as strengthening collaborations with researchers of international standing, create original research outputs through 2022-2023, and providing the necessary pilot data and recent track record to enable successful applications with larger external funding schemes in subsequent years.

## Research Awards and Achievements

Recipient (RBWH staff in bold)	Award	Event
Elizabeth Hay, <b>Nicole Andrews</b> , <b>Andrew Claus</b> , David Ireland, Daria Westerman, Mikaela Schlumpf, Tanya Rose, Pravnavie Vijayakumar, Lyza Burvill, <b>Jenny Strong</b>	Best Student Research Project for 2021	2021 UQ Physiotherapy Graduation Awards

## Research Grants

Investigator Names (RBWH staff in bold)	RBWH Departments / Research Groups	Research Project Title	Granting Body	Total Awarded (whole all years)	Length of Awards in years and years active
<b>Megan Murdoch, Peter Window, Emma Ballard, Andrew Claus, Caroline Morton</b>	RBWH Department of Physiotherapy, RBWH Tess Cramond Pain and Research Centre.	How far must you walk to improve persistent pain?: Identifying cohort-specific repeatability and clinically important differences in the 6-minute walk test.	RBWH Department of Physiotherapy Project Grant	\$10,000	2020 - 2021

## Current RBWH Department / Research Group Led Research Activity

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
<b>Megan Murdoch</b>	<b>Peter Window, Andrew Claus, Emma Ballard, Caroline Morton</b>	How far must you walk to improve persistent pain?: Identifying cohort-specific repeatability and clinically important differences in the 6-minute walk test	53	53
<b>Nicole Andrews</b>	<b>Andrew Claus</b> , David Ireland, Daria Westerman, Mikaela Schlumpf, Tanya Rose, <b>Jenny Strong</b>	Differences in language used and pain education needs across different age groups in a persistent pain cohort.	59	59
<b>Nicole Andrews</b>	<b>Fatima Amershi, Paul Gray, Riley O'Donohue, Andrew Claus</b> , Joshua Simmich , Trevor Russell	Enhancing the management of chronic pain: A new eHealth model to extend on-site care and benefits back into the community	0	0
<b>Peter Window</b>	<b>Michelle McGrath</b> , Esther Smits, Venerina Johnston, Trevor Russell, Daniel Harvie, <b>Megan Murdoch, Grahame Milne</b>	The effect of simulating functional tasks during an immersive virtual reality environment on pain and fear of movement in people with chronic non-specific low back pain.	16	22
<b>Andrew Claus</b>	Emily Gall, Emirald Balitaan, Elissa Liu, Jessica Li	Can baseline pain measures tell us about the future?: a systematic review of quantitative sensory testing and persistent spinal pain prognoses.	Systematic literature review	0
<b>Andrew Claus</b>	<b>Genesta Nicolson, Riley O'Donohue, Paul Gray</b>	Identifying the gaps to close: insight from electronic persistent pain outcomes (eppoc) for aboriginal and torres strait islander people's pain-related challenges.	ePPOC survey audit	0

## Collaborative Research Activity Involving RBWH Department / Research Group

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
Julie Vermeir	<b>Paul Gray</b> , Melanie White, Daniel Johnson, Geert Crombez, Dimitry Van Rycheghem	Testing the effects of a novel psychological program for adults with chronic pain: A randomised, double-blind, placebo-controlled trial.	15	16

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
Trevor Russell	<b>Andrew Claus, Caroline Morton, Megan Murdoch, Nicole Andrews,</b> Joshua Simmich	Smartphone-based 6-Minute Walk Test in chronic pain: a validation study	5	5

## Research Activity With a Specific Focus on First Nations People

Lead Investigator Name (RBWH staff in bold)	Other Study Investigators (RBWH staff in bold)	Research Project Title	Number of RBWH Patients Recruited in 2021	Total number of RBWH Patients Recruited
Christina Bernardes	Stuart Ekberg, Stephen Birch, Renata Meuter, <b>Andrew Claus,</b> Matthew Bryant, Jermaine Isua, <b>Paul Gray,</b> Joseph Kluver, Dmaiel Williamson, Corey Jones, Kushla Houkamau, Taylor Marayah, Eval Malacova, Ivan Lin, Gregory Pratt.	Clinical Yarning: Improving communication and health outcomes for Aboriginal and Torres Strait Islander people living with chronic pain'	91	121

## Research Publications

### Publications in 2021

#### Journal Articles (RBWH staff in bold)

- Brown J, Doherty D, **Claus AP**, Gilbert K, Nielsen M. In a Pandemic That Limits Contact, Can Videoconferencing Enable Interdisciplinary Persistent Pain Services and What Are the Patient's Perspectives? Archives of physical medicine and rehabilitation. 2021.
- Holden S, Matthews M, Rathleff MS, Kasza J, Vicenzino B, FOHX Group (**Claus, Andrew**, Nee, Robert and Crossley KM) (2021). How do hip exercises improve pain in individuals with patellofemoral pain? Secondary mediation analysis of strength and psychological factors as mechanisms. Journal of Orthopaedic and Sports Physical Therapy, 51 (12), 602-610. doi: 10.2519/jospt.2021.10674
- Labrom FR, Izatt MT, **Claus AP**, and Little P (2021). Adolescent idiopathic scoliosis 3D vertebral morphology, progression and nomenclature: a current concepts review. European Spine Journal, 30 (7), 1823-1834. doi: 10.1007/s00586-021-06842-z
- Dewar, Rosalee M., Tucker, Kylie, **Claus, Andrew P.**, Ware, Robert S. and Johnston, Leanne M. (2021). Postural control performance on the Functional Reach Test: validity of the Kids-Balance Evaluation Systems Test (Kids-BESTest) criteria. Archives of Physical Medicine and Rehabilitation, 102 (6), 1170-1179. doi: 10.1016/j.apmr.2020.12.018
- Elphinston RA, Sterling M, Leung J, **Gray PD**, Scotti Requena S, Connor JP. Brief Psychological Interventions for Reducing Prescription Opioid Use, Related Harm, and Pain Intensity in Patients With Chronic Pain: A Systematic Review and Assessment of Patient Interest. Clin J Pain. 2021;37(4):270-80.
- Bernardes CM, Lin I, Birch S, Meuter R, **Claus A**, Bryant M, Isua J, **Gray P**, Kluver JP, Ekberg S, Pratt G, (2021). Study protocol: Clinical yarning, a communication training program for clinicians supporting Aboriginal and Torres Strait Islander patients with persistent pain: A multicentre intervention feasibility study using mixed methods. Public Health in Practice, 3 100221, 100221. doi: 10.1016/j.puhip.2021.100221
- Crofton E**, Meredith P, **Gray P**, **Strong J**. Sensory processing and detection thresholds of burn-injured patients: A comparison to normative data. Burns. 2021.
- Crofton E**, Meredith P, **Gray P**, O'Reilly S and **Strong J**. (2021). Response to letter to the editor: Efficacy of pressure garment on prevention and regression of scars. Burns, 48 (1), 247-248. doi: 10.1016/j.burns.2021.05.024
- Meredith P, **Andrews NE**, Thackeray J, Bowen S, Poll C, **Strong J** (2021). Can Sensory- and Attachment-Informed Approaches Modify the Perception of Pain? An Experimental Study. Pain Research and Management, 2021 5527261, 1-8. doi: 10.1155/2021/5527261

## Journal Articles (RBWH staff in bold)

10. Vaezipour A, Oviedo-Trespalacios O, Horswill M, Rod JE, **Andrews N**, Johnston V, and Delhomme P (2021). The impact of chronic pain on driving behaviour: a systematic review. Pain, Publish Ahead of Print (3), e401-e416. doi: 10.1097/j.pain.0000000000002388

## Keynote or Plenary Lectures given in 2021

Date	Title
07/2021	<b>Paul Gray</b> was session chair at the conjoint meeting between the Australian Society of Anaesthetists National Scientific Meeting 2021 and QLD ACE Meeting
04/2021	<b>Paul Gray</b> was session chair at the annual scientific meeting of the Australian Pain Society. The session was a focused symposium on Clinical Yarning "Talkin with white fellas...is a pain": clinical yarning to overcome barriers to health professionals communicating with Aboriginal and Torres Strait Islander patients with chronic pain. Presenters included Matthew Bryant, Ivan Lin and Jermaine Isua.
04/2021	<b>Nicole Andrews</b> was an invited speaker at the annual scientific meeting of the Australian Pain Society, reporting on outcomes from the on Cops for kids Clinical Research Grant, titled Designing an engaging pain self-management app suitable for all ages.