Metro North Hospital and Health Service

Putting people first

RBWH 2019 RESEARCH REPORT

Queensland Government

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EXECUTIVE DIRECTOR'S MESSAGE

Dr David Rosengren
Executive Director
Royal Brisbane and Women's Hospital

To be a world leader in healthcare delivery, it is essential to find a balance between the relentless demand for clinical excellence, the need to continually probe and challenge with cutting edge research and the need to identify and educate the best fit-for-purpose workforce of the future.

Royal Brisbane and Women's Hospital has an extraordinary legacy in all three pillars of excellence and as our research report for 2019 demonstrates we are continuing our pursuits of research excellence with gusto.

There are many traditional performance metrics associated with research. Publications, research funding, fellowships and higher degree qualifications are but some of the metrics which are showcased in this report. We have delivered outstanding results in all of these metrics.

Great research, however, has little impact if we cannot translate the outcomes into clinical practice improvements. It is essential that the research we undertake drives better patient outcomes and ultimately, a more sustainable health system for the future. It is this continued pursuit of implementation and transformation that will truly shape RBWH as the world leader in healthcare we strive to be.

We all know that we cannot respond to the demand and complex challenges we are facing by simply working harder. We need to find ways to work smarter and our extraordinary team at RBWH are doing just that.

The intellect, ingenuity, passion and persistence of our workforce never ceases to amaze me. As you turn the pages that follow, prepare to be amazed.

RBWH FOUNDATION

Simone Garske
Chief Executive Officer
RBWH Foundation

Being a part of Royal Brisbane and Women's Hospital, and helping it to be the best it can be, is a privilege. We are honoured to support some of the country's most brilliant researchers as well as work with extremely generous individuals and businesses in the community through our fundraising activities.

The generosity of these people and organisations is humbling and we are truly grateful to them for their conviction to invest in the advancement of medical research in order to further improve patient outcomes at our Hospital. RBWH Foundation, and its many supporters, understand that funding is an ongoing issue for researchers. We are, therefore, committed to assisting our researchers in their endeavours by providing funds needed to sustain existing projects and seed funding for the establishment of new projects so the evidence can be gathered to support applications to larger funding bodies.

In the 2018/2019 financial year, the support we received through donations, sponsorships, bequests and participation at our various events, enabled RBWH Foundation to distribute $3,742,072 to a range of different research and patient care initiatives at the Hospital. 2019 was a momentous year for the RBWH Foundation. We were incredibly proud to award $1,337,000 at the Research Grant Awards. A further $920,000 was provided to support research salaries and wages and $307,000 for research project and infrastructure support. The Foundation has also proudly supported the financial administration of clinical trials on campus for many years, and this service is now transitioning back to the Hospital in the coming year. The year also saw a brand-new look for the RBWHF brand including a redesigned logo taking inspiration from nature and symbolising growth, change and giving life. Even our signature purple colour was given a fresh new tone.

Our inaugural 2019 Royal Giving Day was a great success. We were overwhelmed by the generosity from across Australia that resulted in over $524,942 in funds being raised. This amazing contribution will ensure Queenslanders will continue to receive the best possible care and treatment. Throughout the year the RBWH Foundation has supported several events to raise funds for a variety of causes. These include the *'QSuper Butterfly Ball'* supporting the RBWH Neonatal Unit and mothers and babies research, the *'Royal Daytime Do'* for Motor Neuron Disease research and the 'Master Stroke Business Lunch' for stroke research.

2020 marks the 35th anniversary of the establishment of the RBWH Foundation. We thank all our donors, sponsors and event participants for their magnanimous support and we thank the researchers for allowing us to be part of their journey of discovery. We are committed to continuing to build awareness for the incredible research conducted at RBWH and, of course, continuing to grow our support.

The RBWH Foundation Board

BRISBANE DIAMANTINA HEALTH PARTNERS

Wound Care Committee, National Wound Care Workshop 24 September 2019

Brisbane Diamantina Health Partners (BDHP) brings together leading universities, research institutions and healthcare providers focusing on the underpinning of research, education and collaboration for better clinical care and health outcomes.

The partnership has expanded since its establishment in 2014, and currently incorporates Metro North Hospital and Health Service; Metro South Hospital and Health Service; Children's Health Queensland Hospital and Health Service; West Moreton Hospital and Health Service, Mater Misericordiae Ltd; The University of Queensland; Queensland University of Technology; Translational Research Institute; QIMR Berghofer Medical Research Institute; Brisbane South PHN; and Queensland's Department of Health.

As an accredited National Health and Medical Research Council (NHMRC) Advanced Health Research and Translation Centre (AHRTC), BDHP has attracted significant funding from the Federal Government, through several successful grant applications for Medical Research Future Funds (MRFF).

In 2019, BDHP was awarded $4.1 million in funding over three years 2019 – 2021 facilitating funding support for six translational research projects that align with both BDHP, Queensland Health sector and national priorities. This follows its successful bid in late 2018, for over $2M which facilitated the commencement of nine translational research projects. All projects will ensure knowledge is translated with tangible impact for health services and/or patient outcomes and will lead to better models of care and improved clinical practice.

During 2019, BDHP continued to evaluate the BDHP Research Passport Agreement, working closely with legal representatives and Ethics and Governance End Users to improve access to and use of the Agreement across the partnership, to further streamline and harmonise the research process across the partnership.

Throughout 2019, BDHP has continued to work closely with the other NHMRC AHRTCs through the Australian Health Research Alliance on several national initiatives including Health Systems Improvement and Sustainability (HSIS) Framework; Data Drive Healthcare Improvement; Indigenous Research Network and Capacity Building; Community Involvement in Health Research; and a national approach to Wound Care. A National Wound Care Workshop was held in September with representatives undertaking to build on existing achievements and advance the wound care agenda, by working towards a national, integrated approach to wound care that aligns with agreed best practice premised by evidenced costings and robust collaborative research.

BDHP continues to support the AHRA Aged Care Research Translation and Impact network assisting with the preparation of a submission to the Aged Care Safety and Quality Commission and the development of a program proposal which would provide the evidence-based research to inform and guide key reforms necessary to improve Aged Care.

BDHP activities are arranged around nine Themes – Ageing; Brain and Mental Health; Cancer; Chronic Disease; Evidence and Innovation in Clinical care; Immunity, Inflammation, Infection; Maternal and Child Health; Skin and Skin Cancer; and Trauma, Critical care and Recovery. These themes are collaborations between researchers, health professionals and educators who come together to provide innovative solutions to clinical problems. The work of the BDHP Themes progressed further in 2019 with three of the themes hosting events to bring together clinicians and researchers. The nine Themes have collaborated to explore common areas and enablers including data collection, linkages and analytics; clinical research facilitation; implementation and consumer and community involvement.

In summary during 2019, BDHP has encouraged collaboration by:

- Pursuing joint funding opportunities and economies of scale
- Working towards removing or reducing the barriers to collaboration. See research facilitation: https://brisbanediamantina.com/research-and-facilitation/research-passport-services/
- Engaging with a diverse range of stakeholders, including communities and consumers, to share discoveries and establish areas for future investigation
- Using education to build workforce skills and knowledge
- Providing a direct line of communication with the other Advanced Health Research Translation Centres across Australia and the government
- Advocating for system changes and resources to support translational research
- Showing how collaborative research can succeed in the Queensland health system.

Further information about BDHP is available on the BDHP website: www.brisbanediamantina.com.

GRIFFITH**UNIVERSITY**

Prof. Paul Scuffham
Director, Menzies Health
Griffith University

The Menzies Health Institute Queensland (MHIQ) at Griffith University and the Royal Brisbane Women's Hospital (RBWH) have continued to maintain a strong collaboration throughout 2019 and appreciate the opportunity to contribute to enhancing the strong research culture of the RBWH. Innovative clinical research continues to form the foundation of this partnership with clinical trials and joint staff appointments in place to support improvements in patient care across the hospital. Together, the partnership works collaboratively to advance research, clinical care and education across Brisbane and our extended communities.

2019 highlights:

2019 proved to be another exceptional year, with a number of key awards and achievements highlighting the partnership's success. Dr Nicole Marsh was a real star in 2019.

Some of the highlights included:

- HDR completion: Nicole Marsh (May 2019); Supervised by Claire Rickard, Marie Cook and Joan Webster
- AVATAR 2018 Teacher of the Year: Nicole Marsh
- Nicole Marsh, Best poster award "How often are patients experiencing local and catheter-related bloodstream infections within an adult population? A systematic review of peripheral venous catheter complications and failure." 7th International Australasian College for Infection Prevention and Control Conference 2018, Brisbane
- Nicole Marsh, Claire Rickard. Service Line Award, Royal Brisbane and Women's Hospital, Quality Awards Recognising Remarkable Initiative and Excellence in Service (Quarrie Award). Advancement in RBWH Nursing Research. Understanding vascular access outcomes at RBWH
- Nicole Marsh Best paper prize and Best oral presentation at the Australian Vascular Access Society (AVAS) 2019 National Scientific Meeting, Sydney Dr. Nicole Marsh won the prize for her presentation of a Pilot Randomised Controlled Trial of Two Peripheral Intravenous Catheter Insertion Models (Expert Versus Generalist)
- Keith Grimwood "Preventing recurrent respiratory-related hospitalisations in young Indigenous children through regular azithromycin: a multi- centre randomised controlled trial" NHMRC Project Grant $2.78m
- Keith Grimwood. "Improving outcomes of children and young adults with primary ciliary dyskinesia: a multi-centre, double-blind, double-dummy, 2x2 factorial, randomised controlled trial (RCT)" MRFF, $2,375m AIs: Rickard CM, Marsh N.

AVATAR

The partnership between MHIQ and the RBWH founded the Alliance for Vascular Access Teaching and Research (AVATAR) group in 2007. AVATAR continues to conduct world-leading research improving access to veins and arteries for medical treatment.

As a result of this alliance, AVATAR has achieved more than $11 million in research funding, 400+ publications including many large randomised controlled trials, more than 20 honours, masters or PhD completions, and numerous clinical nurses and doctors participating in the research. This work is referenced in global clinical practice guidelines such as those of the USA's Centers for Disease Control, the UK's NHS Infection Prevention Guidelines and the international Standards of Infusion Therapy.

Key highlights:

- NHMRC Partnership Grant. $1,497,197.00. Rickard C, Ullman A, Marsh N, Kleidon T, Keijzers G, Schults J, Cooke M, Byrnes J, Ware R, Cullen L. Difficult peripheral intravenous catheter insertion: Australian considerations for sustainable implementation of ultrasound guided procedures
- Health Service and Implementation Research Award, Metro North 2019 Research Excellence Awards. Nursing and Midwifery Research Centre Vascular Access Research Team: Marsh N, Webster J, Rickard C, Larsen E, August D, Flynn J, Corley A.

ASSOCIATE PROFESSOR KATRINA CAMPBELL

The RBWH and MHIQ continue to jointly support the appointment of Associate Professor Katrina Campbell in her lead role as the strategic health service-wide conjoint in Health Services Research (Allied Health). In this role, she supports Allied Health practitioners build health services research capacity and leads pragmatic clinical and implementation trials measuring patient, health service and economic outcomes.

Current projects include codesign and implementation of nutrition interventions adopting mHealth strategies, including following bariatric surgery at RBWH, developing guiding principles for patient reported measures and core outcome sets in rehabilitation; and leading clinical trials in the area of gut health and kidney disease.

WOUND CARE

Our strong shared interest in wound care continues to flourish, with the following 2019 achievements:

- Completion of the NHMRC-funded "ADding negative pRESSure to improve healING (the DRESSING trial)" (Gillespie B, Chaoyer W, Webster J et al). This trial is the largest in its field and has recruited 2,033 participants
- A new NHMRC funded trial, "Efficacy and Effectiveness of Prophylactic fOam dressings in the prevention of saCral pressure injuries in at-risk hospitalised patients (The EEPOC Trial)" (Gillespie B, Walker R, Chaboyer W et al). This trial is the largest in its field, is poised to commence in early 2020, and will recruit 1,380 participants over 2.5 years
- Both trials will contribute to informing clinical practice.

Griffith University's MHIQ will continue to collaborate with the RBWH to generate translatable research outcomes that improve health and wellbeing for patients and communities alike. The Institute looks forward to working with the Hospital in 2020 to further deliver improvements in research, clinical care and education.

Left to Right: Prof Claire Rickard *(School of Nursing and Midwifery (SONM),* Dr Nicole Marsh *(Nursing and Midwifery Director, Research),* A/Prof Amanda Ullman *(SONM),* Dr Gillian Ray Barruel *(Senior Research Fellow),* Jessica Schults *(Research Fellow),* A/Prof Andrew Bullmer *(School of Medical Science),* Emily Larsen *(Research Fellow),* A/Prof Joshua Byrnes *(School of Medical Science),* Prof Marie Cooke *(SONM),* Tricia Kleidon *(Research Fellow),* Dr Jacob Horobin (*Research Fellow)*

PATHOLOGY**QUEENSLAND**

Prof. Sunil Lakhani
Executive Director Research
Pathology Queensland

The Pathology Queensland Research Office with Professor Sunil Lakhani as Executive Director Research and Dr Irma Gresshoff as Principal Research Officer is establishing the governance processes. The PQ research strategy has been endorsed and in 2020, the process of implementation will begin. PQ will continue to work with its Health and University partners to develop joint academic activities.

Collaborative initiatives within PQ and its partners include *(but are not limited to):*

ANATOMICAL PATHOLOGY:

Breast Cancer (Sunil Lakhani) project in collaboration with RBWH Breast Surgery, Neurosurgery, Oncology and Radiology. The work is supported by NHMRC Program and Project grants to UQ/QIMR collaborative. A pilot clinical trial to test a PET-drug conjugate uptake in Brain Metastases is ongoing at The Herston Imaging Research Facility (HIRF). A genomic innovation project, Q-Improve, to establish pipelines for whole genome sequencing in breast cancer is also under development in conjunction with the breast multidisciplinary team.

Lung cancer (Mahendra Singh, Laxmi Nandkumar and Cytology Department with David Fielding and Peter Simpson) have funding from Cancer Council QLD, Cancer Australia and Australian Genomics to develop next generation sequencing analysis of cytology smears from endoscopic aspirates. The work is ongoing with high impact publication in 'Respiration' in 2019.

CHEMICAL PATHOLOGY:

The Chemical Pathology R&D Unit (Dr Jacobus Ungerer and colleagues) supports collaborative research to improve patient care. Activities include diagnostic testing, data acquisition, laboratory bench work and development of new test methodologies. Core technologies include mass spectrometry and immunochemistry. We collaborate locally, nationally and internationally in the fields of cardiology, emergency medicine, intensive care, renal medicine, gastroenterology, endocrinology and Indigenous Health medicine. Our research has resulted in peer-reviewed publications and changes to clinical practice.

MICROBIOLOGY:

The Microbiology group (Graeme Nimmo and colleagues) participate in the Australian Group on Antimicrobial Resistance surveillance programs for Staphylococcus aureus, Enterococcus and gram-negative bacteraemia – these are a major component of Australia's response to antimicrobial resistance; http://www.agargroup.org/. Prof Nimmo is a member of the editorial boards of Pathology, the European Journal of Clinical Microbiology and Infectious Disease and the Global Journal of Antimicrobial Resistance. Prof Nimmo and David Whiley also oversee an extensive research and development program focusing on microbial diagnostics. This is a joint initiative of PQ and UQ. A key focus is rapid detection of antimicrobial resistance and personalised antimicrobial therapy. The program is supported by various organisations including the NHMRC and the Sasakawa Memorial Fund of the Children's Hospital Foundation. Dr Patrick Harris holds an NHMRC Early Career Research Fellowship and is co-director, with Prof David Paterson, of the Antimicrobial Resistance Centre and MERINO Clinical Trial group at UQCCR. The group work closely with Pathology Queensland in the areas of antimicrobial resistance, genomics for infection control surveillance, rapid diagnostics and clinical trials for patients with bloodstream infections.

HAEMATOLOGY:

The Pathology Qld Transfusion Haematology department (John Rowell and colleagues) is assisting with two studies (FEISTY, PROPHICCY) that measure coagulation status using viscoelastic haemostatic assays, which are performed on ROTEM machines. Further investigations involving the application of ROTEM technology in pregnancy and preclampsia and pre hospital trauma are ongoing. ROTEM testing has been provided by the transfusion laboratory (Blood Bank) at RBWH since June 2014. The Transfusion Unit continues with contribution to Massive Transfusion Registry.

GENETIC PATHOLOGY:

Molecular Genetics has been involved in the following:

- Pathology Queensland has been designated as the service provider for QGHA round 2/3 projects which will facilitate the building of capacity and capability in Genomics within Queensland
- The Molecular Diagnostic Unit is involved in several projects including Lung Cancer Project led by QUT. The unit is also collaborating with Immunology in 'Genetic diagnosis of Severe Combined Immunodeficiency (SCID)'. These projects will further cement the role that pathology plays at the RBWH and across Queensland. New emerging project will include Q-Improve, lymphoma panel testing and rare cancers as part of the inter-state, MoST trial.

IMMUNOLOGY:

Immunopathology has a major ongoing collaboration with James Scott (UQCCR), in autoimmunity and mental health, exploring the role of autoantibodies in first episode psychosis.

QIMR BERGHOFER MEDICAL RESEARCH INSTITUTE

Dr Frank Gannon
Director and
Chief Executive Officer
QIMR Berghofer
Medical Research Institute

It is a pleasure to contribute to the RBWH Annual Research Report. The timeline for this production means that I am writing this message late in 2019. This will be my last occasion to do so as I retire at the end of the year. Having been the Director of QIMR Berghofer for nine years, it is timely to use this as an opportunity to reflect on changes in that time in this location.

At a physical infrastructure level there have been some changes (e.g. our building was completed) but basically, apart from The Herston Quarter, which will soon impact the ecosystem and increase its capacity, the same potential and teams are in place. What has changed however is the extent to which the Herston Precinct is acting in a coordinated manner. Each partner always had their specific role to play. Today this is enriched by an awareness of the benefits of the synergistic collaboration. At QIMR Berghofer our research activities are deeply entwined with those of the hospital. Three of our Programs are headed by clinicians in Metro North and ten of the 68 research groups in QIMR Berghofer are led by neighboring clinicians. In addition, the RBWH conjoint laboratories are housed in our Institute. A significant development for us in 2019 was a search for a new Head of our Mental Health Program which culminated with the appointment of Professor James Scott to that position. James is, of course, a very active clinician in the RBWH.

Our collaboration in the rapidly expanding area of cell therapies has also been significant. Our investment in the Q-Gen Cell Therapy Manufacturing Suite means that GMP facilities for cell therapies are available onsite. Our collaborations with the oncologists in RBWH are very close and we anticipate that our joint efforts to deliver cell therapies to Queensland through RBWH will grow from the initial treatments in 2019 to being a renowned Centre for CAR-T and other Cell Immunotherapies in the future. We also appreciated the fact that our Biostatistics Group provides dedicated, high-quality consulting services to clinical researchers at the RBWH. This is an example of avoiding duplication and making full use of the capacities that are available in Herston. Our Biostatistics Group, led by Dr Gunter Hartel, has the in-depth skill and experience to ensure that the research projects in the clinic are based on solid foundations. In the past year we were also pleased to be able to provide guidance related to the requirements of containment and safety aspects in specialist laboratories at the hospital. The continued discussions between our Ethics Committees and those of the hospital are designed to minimize administrative barriers and alternative interpretations. This is an area of great importance and occasional delicacy. Both parties are committed towards achieving a minimal bureaucracy in the joint activities that we engage in.

Our discussions with the RBWH (and UQ and QUT) in the context of the Herston Precinct Group Board also point to the future. Our involvement in the RBWH Health Care Symposium was another opportunity for us to deepen our engagement. Topics such as the Queensland Genetics Institute are clearly of relevance to QIMR Berghofer given our skills and track record in the area of genetics and the analysis of whole genome sequencing. As a component of the discussions on the multi model cancer centre we bring to the community our immune and cellular therapy skills. Our involvement in the Herston Imaging Research Facility (HIRF) builds on multiple successful grant applications which our researchers have made, and which are delivered through HIRF.

Collectively therefore this is much to celebrate in the research collaborations between QIMR Berghofer and the RBWH. Many examples of these are included in the report. I look forward to monitoring the continued success of our collaborations and Herston in the future.

QUEENSLAND UNIVERSITY OF TECHNOLOGY

Prof. Ross Young
Executive Dean
Faculty of Health QUT Institute

The strong partnership between Queensland University of Technology (QUT) and the Royal Brisbane and Women's Hospital (RBWH) continues to produce tangible service and technological innovations, and policy recommendations with international implications.

The **Cancer Nursing Professorial Precinct** undertook projects involving the vascular access devices registry, proactive palliative care, and care model evaluation. Distinguished Professor Patsy Yates, Director of the **Centre for Palliative Care Research and Education** and Chief Investigator for the NHMRC End-of-Life Care Centre of Research Excellence, continued work to enhance palliative care services.

The **Stroke Nursing Professorial Unit** completed three studies related to: Nurse Practitioner role evaluation, physical activity required to elevate LG3 peptide, image-based tablet app to support communications for patients with aphasia; and produced the eStrokeNav app in partnership with MNHHS and The Stroke Foundation. The **Intensive Care Nursing Professorial Unit** completed studies on incontinence-associated dermatitis and pressure injuries, and participated in national and international prevalence studies. The **Renal Nursing Professorial Unit** collaborated on an evaluation of a General Practitioner-led CKD management program. QUT continues to partner with the NHMRC Chronic Kidney Disease Centre of Research Excellence and the CKD registry.

Team capacity for health services research and workforce development expanded in 2019 with the joint appointments of Nursing Chair, Professor Clint Douglas, and Nursing and Midwifery Director of Education, Professor Robyn-Louise Fox. Major projects included a NHMRC funded trial (ENCORE) to transform nursing assessment protocols, and the RN4CAST Australia study evaluating legislated nurse-to-patient ratios in public hospitals, in collaboration with the University of Pennsylvania.

The **Australian Centre for Health Services Innovation** (AusHSI) continued to provide research, consultancy, training and education on health economics, health systems and services. In 2019 AusHSI developed a toolkit for outcomes-focussed funding decisions, led analysis that saw improved after-hours care, and partnered with QUT's Australian Centre for Health Law Research (ACHLR) on a NHMRC project to support clinical decision-making for care of older people. Seven RBWH staff completed the co-designed Graduate Certificate in Health Science (Health Services Innovation).

The **Jamieson Trauma Institute** (JTI), based at RBWH, involves multiple university, health service and industry partners to advance trauma prevention, research, systems, and clinical management. JTI-QUT links were enhanced in 2019 through the joint appointments of Dr Victoria McCreanor, health economist, and Associate Professor Cate Cameron, injury epidemiologist.

Six new projects commenced research on traumatic brain injury, digital health markers to predict post-traumatic amnesia emergence, personal mobility device injuries, alcohol and injury prevalence at RBWH Emergency Department, prevalence and impact of trauma-related opioid use, and fracture aftercare using digital innovation.

The **Herston Biofabrication Institute** partnership between MNHHS and QUT continued development of its clinical research programs in preparation for its early 2020 opening. The Institute will advance knowledge and technology in 3D scanning, modelling and printing of bone, cartilage and other human tissue to repair tissue that is lost or damaged.

A new joint appointment in 2019 saw Professor Kevin Laupland join the ICU as Director of Research, where he is developing a research program to examine outcomes of critical illness with focus on severe infections. An award-winning interprofessional education and practice program received ongoing commitment in collaboration with QUT Health Clinics to deliver multidisciplinary support to Type 2 diabetes clients, spanning dietetics, exercise physiology, nursing, social work and psychology.

We look forward to ongoing collaborations that advance research innovations, knowledge translation and transfer that continue to strengthen our longstanding partnership with RBWH in 2020 and beyond.

THE UNIVERSITY OF QUEENSLAND

Prof. Elizabeth Eakin
Associate Dean (Research)
Faculty of Medicine
The University of Queensland

Prof. Christina Lee
Associate Dean (Research)
Faculty of Health and
Behavioural Sciences
The University of Queensland

The University of Queensland strongly values its multiple active collaborations with RBWH, many of which are realised through the two health-focused Faculties, Health and Behavioural Sciences (HaBS) and Medicine. UQ is committed to interprofessional and interdisciplinary scholarly activity, as well as to increasing integration between research, teaching, clinical practice, and integrated care. Our partnerships with RBWH are valuable aspects of this commitment.

The School of Dentistry, the School of Clinical Medicine, and the School of Public Health all emphasise research-infused, translational clinical and health promotion education in collaboration with many valued conjoint academics, Academic Title Holders, and other colleagues from RBWH.

Research centres with a strong translational focus include the UQ Centre for Clinical Research; the Burns, Trauma and Critical Care Research Centre; the Perinatal Research Centre; the Centre for Youth Substance Abuse Research; and the RECOVER Injury Research Centre. All these centres focus on developing, evaluating, enhancing and translating evidence-based best practice into standard practice. Funding comes from UQ and from RBWH, as well as from competitive grants, Queensland and Commonwealth Departments of Health, generous philanthropists, and statutory bodies such as the Motor Accident Insurance Commission.

UQ is also a partner with QUT, Queensland Health, and QIMR Berghofer in the Herston Imaging Research Facility (HIRF) located in the CCR building and used by researchers from across Brisbane to support cutting-edge investigation in oncology, clinical neurosciences, musculoskeletal injury and related fields through world-class imaging services.

With the STARS (Surgical Treatment and Rehabilitation Service) building rising out of the ashes of the old Children's Hospital, UQ is an active partner in the development of a world's best practice facility for rehabilitation and day surgery, in which clinical services, clinical education for medical, nursing and allied health professions, and applied research meld seamlessly into a patient-focused, research-infused interprofessional approach to optimal patient wellbeing.

In addition to a number of current and planned research conjoint positions across multiple health disciplines, both Faculties are actively engaged in the MNHHS Clinical Fellowship Program, supporting the research development of clinical staff.

The University looks forward to continuing to strengthen its relationship with RBWH, with the aspiration of working collaboratively with the hospital and within the Brisbane Diamantina Health Partners to achieve evidence-based improvements in research, clinical care and education.

SUCCESSFUL PHD CANDIDATES IN 2019

ALLIED HEALTH PROFESSIONALS

Dr Angela Byrnes

PhD Title: Investigating the nutritional status and care of older (≥65 years) patients on two general surgical wards: A multiphase, action research study.

Month Completed: February 2019.

Summary: Older adults, who are more vulnerable to the deleterious effects of hospitalisation, are increasingly undergoing surgery. The aim of Dr Byrnes thesis was to improve perioperative nutrition care of older general surgical patients by increasing adherence to Enhanced Recovery After Surgery evidence-based practice guidelines. Mixed methods were used in this pragmatic, multiphase Action Research study, which was prospectively informed by an implementation framework. Dr Byrnes thesis outlines new knowledge generated about validity and practicality of measures to assess impact of nutrition interventions in this patient group (handgrip strength, oral intake). Application of implementation theory in practice resulted in improved perioperative nutrition care.

Dr Kylie Matthews

PhD Title: Refeeding syndrome in acute care: Is there a dietetics role?

Month Completed: February 2019.

Summary: With limited research within the field of refeeding syndrome (RFS), dietitians are relying on non-evidenced based recommendations to treat patients. The aim of my thesis was to examine the dietitian's role regarding RFS within acute care. Six studies were conducted, including a cross-sectional survey, a semi-structured interview, a feasibility study for a randomized control trial, a retrospective observational study, a pre-test–post-test study and a case histories study. Overall, this thesis found that adverse outcomes were rare. Therefore, patients at risk of RFS should be treated as patients with malnutrition and provided with higher energy intakes to enhance nutritional rehabilitation.

Dr Julie Adsett

PhD Title: Exercise rehabilitation for people with heart failure.

Month Completed: May 2019.

Summary: Julie completed her PhD studies through Griffith University in 2019. Titled, *"Exercise rehabilitation for people with heart failure,"* this body of work explored concepts relating to exercise adherence in people with stable heart failure. Whilst it is known that exercise training and regular physical activity is beneficial for people with heart failure, recent studies suggest that fewer than 40% of people with heart failure meet recommended guidelines.

Initial studies in Julie's thesis investigated variables associated with exercise participation and exercise outcomes in people recently hospitalised with heart failure. These studies identified potentially vulnerable groups who are less likely to attend exercise rehabilitation programmes and to meet physical activity guidelines, thus presenting opportunity for clinicians to tailor services for best effect. Follow-up studies subsequently examined aquatic exercise training as a potential alternative to traditional land-based (gymnasium) exercise approaches. Results from these studies suggest that in appropriately selected patients, this mode of exercise training is safe, effective and acceptable for people with stable heart failure, thus providing a viable option for assisting these individuals to meet physical activity targets. This body of work has informed clinical practice and has contributed to national guidelines for aquatic physiotherapy. Julie is enormously grateful to her supervisors Prof Norm Morris, Prof Alison Mudge, Dr Jenny Paratz and Dr Suzanne Kuys for their support, guidance and wisdom throughout her candidacy.

SUCCESSFUL PHD CANDIDATES IN 2019 *(CONT)*

CANCER CARE SERVICES

Dr Nicole Gavin

PhD Title: The effect of parenteral nutrition on microbial growth and its influence on catheter-related infection in patients with a central venous access device.

Month Completed: February 2019.

Summary: The overarching aim of this research was to assess the influence of parenteral nutrition (PN) on microorganism growth and infection risk in patients with a central venous access device. New evidence that patients receiving PN containing intravenous fat emulsions (IVFE) are not at higher risk of central line associated bloodstream infection (CLABSI) than patients not receiving PN. This finding is incongruent with previous research suggesting PN is an independent risk factor for CLABSIs. In fact, once mucosal barrier injury laboratory confirmed bloodstream infection cases were removed and survival analysis performed, there were significantly fewer CLABSI in the PN containing IVFE group.

Dr Victoria Ling

PhD Title: Factors that regulate response to chemotherapy in myelodysplastic syndromes and acute myeloid leukaemia.

Month Completed: June 2019.

Summary: Acute myeloid leukaemia (AML) and myelodysplastic syndromes (MDS) are potentially fatal, haematological malignancies derived from abnormal haematopoietic stem cells with enhanced self-renewal and defective differentiation. These diseases are genetically characterised by recurrent chromosomal and molecular driver aberrations, which define disease biology, as well as being prognostically significant by regulating response to therapies. pre-clinical modelling of these genetic mutations in vitro and in vivo, mainly murine, models have shed much light on the biological consequences of these mutations when they occur in humans and their impact on response to conventional or novel treatments. Over the last 5-10 years, clustered regularly interspaced short palindromic repeats (CRISPR) genome editing has improved customisability and efficiency of editing endogenous alleles in order to generate models that more accurately reflect human disease. The work described in this thesis utilises conventional and novel CRISPR models to determine the biological consequences of common mutations in AML and MDS and identify mutations that mediate resistance to chemotherapy in AML. Significantly, a genome-wide CRISPR screen identified defects in the DNA damage response pathway converging on cell cycle arrest as being common mediators of chemoresistance to cytarabine and doxorubicin. This work further provides preliminary evidence that therapeutically enforcing G1/S cell cycle arrest using cell cycle inhibitor, palbociclib, synergises with cytotoxic chemotherapy, with potentially translatable implications to address chemoresistant disease.

Dr Andrea Henden

PhD Title: Anti-leukaemia effects of type I and type III Interferons.

Month Completed: May 2019.

Summary: Interferons are pleotropic cytokines forming an integral part of innate immune responses, and also shaping adaptive immunity. This thesis demonstrates important and clinically translatable roles for type I and type III Interferons in the context of bone marrow transplantation. In murine models type III Interferons are shown to protect from severe graft-versus-host disease through effects on natural killer cells and by protecting intestinal stem cells. Type I Interferons are shown to be an effective and safe adjunct to maximize the immunotherapeutic effect of transplantation in the clinical context of post-transplant relapse.

SUCCESSFUL PHD CANDIDATES IN 2019 *(CONT)*

CANCER CARE SERVICES

Dr Nienke Zomerdijk

PhD Title: The psychosocial impact of donating haematopoietic stem cells on adult related donors.

Month Completed: December 2019.

Summary: Novel innovations in haematopoietic stem cell transplantation have increased the number of siblings who may be eligible to donate and extended the possibility of donation by parents and children, fueling the enthusiasm of transplant physicians and their patients for finding a family donor wherever possible. Despite well-documented physical effects of stem cell donation, far less attention has been focused on the psychosocial impact for family donors. This PhD featured four multi-centre studies which progress understanding of the psychosocial issues raised by family stem cell donation and their needs for information and supportive care. Additionally, this research made an initial step toward generating an evidence-based psycho-educational resource for family stem cell donors.

Dr Diana Whaites
(Nee Binny)

PhD Title: Radiotherapy quality assurance using statistical process control.

Month Completed: July 2019.

Summary: The work presented in this thesis was a step forward in applying statistics to the important problem of monitoring machine performance and quantifying optimal treatment quality assurance in radiotherapy. This research investigated the use of an analytical decision making tool known as Statistical Process Control (SPC) that employs statistical means to measure, monitor and identify random and systematic errors in a process based on observed behaviour. In this research, several treatment machine and planning system parameters were investigated and a method of calculating SPC based tolerances to achieve optimal treatment goals was highlighted in this study.

INTERNAL MEDICINE SERVICES

Dr Anna Weis

PhD Title: Investigating the potential of circulating microRNAs as non-invasive biomarkers in cirrhosis and hepatocellular carcinoma.

Month Completed: May 2019, *University of Queensland.*

Summary: This thesis has identified several differentially-expressed miRNA candidates across a clinically relevant spectrum of CLD and assembled promising panels of miRNAs that warrant further investigation for their diagnostic potential. Preliminary efforts to explore the possible functional roles of two candidates in HCC were unrewarding but further studies can build on these findings by optimising experimental conditions, validating identified miRNA candidates, and testing the prognostic potential of validated miRNAs as clinically-useful non-invasive biomarkers.

SUCCESSFUL PHD CANDIDATES IN 2019 *(CONT)*

INTERNAL MEDICINE SERVICES

Dr Becker Law

PhD Title: Functional characterisation of innate lymphocyte subsets in human kidney disease.

Month Completed: 24th September 2019, *Queensland University of Technology.*

Summary: Chronic kidney disease (CKD) is a complex syndrome characterised by gradual loss of kidney function over time. Irrespective of the initial kidney insult, CKD involves unsuccessful repair of existing injury and exhibits pathological features including tubulointerstitial fibrosis, lymphocyte infiltration, proximal tubular atrophy and hypoxia. For more than a decade there have been no advances in CKD therapeutic options despite our accumulating understanding of lymphocyte-mediated pathogenesis from animal models of kidney disease. This research shifts our focus back on to human lymphocytes, and uncovers several novel immune signature molecules and cellular targets for future development as potential therapeutics and diagnostics in human CKD.

NURSING & MIDWIFERY SERVICES

Dr Nicole Marsh

PhD Title: Prevention of Peripheral Intravenous Catheter Failure.

Month Completed: May 2019.

Summary: This PhD research has revealed the high rate of peripheral intravenous catheter (PVC) failure in acute care hospitals, and extends existing evidence related to PVC failure and identified modifiable risk factors. These results, which include several newly identified risk factors for PVC failure, will inform education programs to improve inserter skill development and clinician management of PVCs to reduce catheter failure. This PhD work has confirmed the feasibility and need for a large, multi-centre randomised controlled trial to test PVC insertion models and provides the first randomised data to support the vascular access specialist model as preferable to the generalist inserter model.

SURGICAL & PERIOPERATIVE SERVICES

Dr Bilal Zahoor
MBBS MPH PhD

PhD Title: Extra-peritoneal Pelvic Packing for Haemorrhagic Pelvic Fracture: A Cohort of Pelvic Injury at a Single Australian Tertiary Referral Center 2010-2016.

Month Completed: December 2019, *University of Queensland.*

Summary: Extra-peritoneal Pelvic Packing (EPPP) is an effective means to stem unrelenting haemorrhage resultant from severe pelvic injury. The mortality benefit of EPPP has been demonstrated in prior studies; a comprehensive qualitative analysis of outcomes concerning EPPP is additionally warranted. Our aims were several-fold: 1) to describe the epidemiology of pelvic fracture managed with EPPP, 2) to investigate the biomarker concentration (serum lactate and base excess) associated with recovery in patients who underwent EPPP and 3) to analyze the mortality benefit of Tranexamic acid as well as rotational thromboelastometry (ROTEM) guided blood transfusion in patients who had their pelvic injury managed with EPPP, at the Royal Brisbane and Women's Hospital (RBWH) in Brisbane, Queensland, Australia. From 2010 to 2016, 39/422 patients admitted to the RBWH for severe pelvic injury were managed with EPPP. Eleven (28%) underwent additional salvage angio-embolization to achieve haemostasis. A Pelvic C-1 fracture was the predominant type of injury observed (49%) with road accidents being the most common cause (41%). Sacral fractures were present in 64.5% of patients. The mean serum lactate decreased by 41% and 56%, at 24-hours and 48-hours post admission, respectively; 59% and 67% of patients had a serum lactate ≤2 mmol/L at 24-hours and 48-hours post-admission, respectively. The mean serum Base Excess decreased by 55% and 64% at 24-hours and 48-hours post admission. ROTEM statistically significantly reduced blood products use. In the same cohort, Tranexamic Acid did not demonstrate any mortality benefit. Overall, a low mortality (18%) was observed amongst patients who underwent EPPP for the management of their severe pelvic injury.

SUCCESSFUL PHD CANDIDATES IN 2019 *(CONT)*

WOMEN'S & NEWBORN SERVICES

Dr Naomi Achong

PhD Title: Insulin requirements in pregnancy and breastfeeding in type 1 diabetes.

Month Completed: March 2019.

Summary: *Not available.*

Dr Kate Goasdoue

PhD Title: Blood-brain barrier disruption in a model of neonatal hypoxic-ischaemic encephalopathy.

Month Completed: September 2019.

Summary: Hypoxic Ischaemic Encephalopathy (HIE) is a serious complication in the period surrounding birth. HIE occurs in 1 to 5 per 1000 live term births in the developed world and can result in death in up to 20% of cases and poor long-term outcomes such as cerebral palsy in 25% of surviving infants. HIE occurs due to an insufficient supply of oxygenated blood delivery to the brain. This initiates an evolving cascade of biochemical events that leads to brain injury. In summary, this thesis has addressed several knowledge gaps regarding the evolution of BBB-disruption following neonatal HI, how BBB-disruption is related to seizures in this syndrome, and if the current standard of care (hypothermia) is attenuating BBB-isruption all in a clinically relevant model of neonatal HIE. Increasing our understanding of the pathological processes that occur following neonatal HI is essential in developing new treatments to improve the outcomes of our vulnerable newborns. Investigating the BBB is a major untapped area of research and a potential avenue for novel treatments.

Dr Annice Kong

PhD Title: The relationship between brain structure assessed using diffusion MRI and function assessed using dense array EEG of very preterm infants and the ability to predict neurodevelopmental outcomes.

Month Completed: November 2018.

Summary: Very preterm infants are at risk of neurodevelopmental impairments including visual and cognitive deficits. Early identification and prognostication of at-risk infants may enable early intervention and support, thus optimising outcomes. Electroencephalography (EEG) and Magnetic Resonance Imaging (MRI) are methods sensitive to aspects of brain maturation and may provide potential predictive biomarkers of deficits.

Aims: To investigate the associations between EEG or MRI at term equivalent age (TEA) and: 1) visual function at TEA; 2) visual function at three months corrected age (CA); and 3) cognitive function at 12 months CA.

Conclusions: EEG and MRI may inform outcomes in very preterm infants. Parietal EEG power and occipital PDC measures are particularly informative on visual outcome at three months CA and dMRI measures (FA and MD) at CC on cognitive outcome at 12 months CA.

Although qEEG and dMRI measures for prognostication remain research tools, future research using larger sample sizes with various EEG and MRI parameters would enable prognostication of outcomes. This would allow accurate early identification of at-risk infants and early intervention and family support.