

# Research and Teaching Reports

---

## A message from the Research Committee

In what has been a challenging year for research at Calvary Mater Newcastle due to the COVID-19 pandemic there still have been many areas of focus and achievement.

### Focus areas included:

- Reviewed and updated the Calvary Mater Newcastle Translational Research Strategic Plan (2021-2023).
- Developed a suite of Calvary Mater Newcastle Research Standard Operating Procedures (SOPs).
- Staff development activities included: Project Management Fundamentals for Research and Clinical Trial Workshop and embedded Economist Community of Practice.
- Consumer engagement in research, including a presentation by Sarah Lukemann – Hunter Cancer Research Alliance (HCRA) Community Engagement Coordinator.
- Developed a suite of governance memos and templates to ensure a robust governance system within the hospital including resources for researchers on Calvary Connect (intranet).

### Achievements included:

- The Hunter New England Cancer Clinical Research Network (CCRN) was named the winner of the 2020 NSW Premier's Award for Outstanding Clinical Trials Unit.
- After an extraordinary 22 years of fundraising for oncology researchers at the Mater, the Coalfields Cancer Support Group decided to call time on their fundraising. To recognise this remarkable group of fundraisers the hospital held a thank you morning tea in June 2021. Over this time the group have raised \$667,000 in donations for the hospital which has provided funding through the Coalfields Cancer Support Group Equipment Grant that is awarded to oncology researchers on an annual basis at our Celebration of Service.



# Research Grants awarded

The hospital's Research Development and Engagement (ReDE) Committee was delighted to be able to offer grant opportunities in 2020-21 through the Coalfield Cancer Support Group Equipment Grant, James Lawrie Grant, Jane Reid Harle Grant, Margaret Mitchell Grant and the HCRA Clinical Cancer Research Infrastructure Fund.

The funding recipients in 2020-21 were:

## **Coalfields Cancer Support Group Equipment Funding**

- Dr Jayne Gilbert, Medical Oncology – Medical oncology research laboratory safe storage and computer equipment, \$4,320.75.

## **James Lawrie Grant**

- Dr Minh Thi Tieu, Hubert Hondermarck, Radiation Oncology – Prognostic implications of nerve density in head and neck cancer, \$29,989.90.

## **Jane Reid Harle Grant**

- Dr Jennette Sakoff, Jayne Gilbert, Janice Aldrich-Wright, Hiren Mandaliya, Medical Oncology – A cluster-bomb approach for the treatment of ovarian cancer, \$24,332.00.

## **Margaret Mitchell Grant**

- Dr Tim Walker, Dr Kate Naphthali, Dr Michael Potter, General Medicine – Defining treatment limiting gastrointestinal side effects of checkpoint inhibitor therapy in advanced cancer, \$23,375.00.
- Allison Fraser, Cathy Odelli, Dr Mahesh Kumar, Dr Chris Wratten, Dr Minh Thi Tieu, Dr Fiona Day, Yuvnik Trada, Yolanda Cox, Laurie-Anne Minslow, Talisha Varoxis, Nutrition and Dietetics, \$25,000.00.

## **HCRA Clinical Cancer Research Infrastructure**

- Madhu Garg, Medical Oncology – Support for HPLC infrastructure used in therapeutic drug monitoring of patients with cancer, \$8,499.98
- Dr Jayne Gilbert, Medical Oncology – Essential equipment for the harvesting and storage of patient ascites samples, \$9,113.84

The ReDE Committee would like to acknowledge and thank the assessors and review panel members for their time and commitment to providing expert scientific reviews and invaluable advice for funding distribution.

## Department Research

### DEPARTMENT OF CONSULTATION-LIAISON PSYCHIATRY

#### JOURNAL ARTICLES/PUBLICATIONS

1. Clover, K., Lambert, S.D., Oldmeadow, C., Britton, B., King, M.T., Mitchell, A.J., Carter, G.L.  
  
Apples to apples? Comparison of the measurement properties of hospital anxiety and depression-anxiety subscale (HADS-A), depression, anxiety and stress scale-anxiety subscale (DASS-A), and generalised anxiety disorder (GAD-7) scale in an oncology setting using Rasch analysis and diagnostic accuracy statistics. (*Current Psychology* 2020; <https://doi.org/10.1007/s12144-020-00906-x>)
2. Walton C J, Bendit N, Baker A L, Carter G L, Lewin T J.  
  
A randomised trial of Dialectical Behaviour Therapy and the Conversational Model for the treatment of Borderline Personality Disorder with recent suicidal and/or non-suicidal self-injury: An effectiveness study in an Australian public mental health service. (*ANZJP* online first June 2020; <https://doi.org/10.1177/0004867420931164>)
3. Forbes E, Baker AL, Britton B, Clover K, Skelton E, Oultram S, Oldmeadow C, McCarter K. Non-pharmacological approaches to procedural anxiety reduction for patients undergoing radiotherapy for cancer: systematic review protocol. *BMJ Open* 2020; 10:e035155. doi: 10.1136/bmjopen-2019-035155
4. Dayle Raftery, Peter J. Kelly, Frank P. Deane, Amanda L. Baker, Isabella Ingram, Melvin Goh, Dan I. Lubman, Greg Carter, Alyna Turner, Olivia M. Dean, Barbara Sinclair, Rebecca McKetin.  
  
Insight in Substance Use Disorder: A Systematic Review of the Literature (*Addictive Behaviors* Volume 111, 2020; <https://doi.org/10.1016/j.addbeh.2020.106549>).
5. Alison K. Beck , Amanda L. Baker, Gregory Carter, Christopher Wratten, Judith D. Bauer, Luke Wolfenden, Kristen McCarter, Ben Britton.  
  
Assessing Adherence, Competence and Differentiation in a Stepped-wedge Randomised Clinical Trial of a Complex Behaviour Change Intervention (*Nutrients* 2020, 12(8), 2332; <https://doi.org/10.3390/nu12082332>)
6. McKetin, R., Quinn, B., Higgs, P., Berk, M., Dean, O.M., Turner, A., Kelly, P.J., Lubman, D.I., Carter, G., Baker, A.L., Manning, V., Thomas, T., Bathish, R., Raftery, D., Saunders, L., Wrobel, A., Meehan, A., Sinclair, B., Reid, D., Arunogiri, S., Hill, H., Cordaro, F. and Dietze, P.M.  
  
Clinical and demographic characteristics of people who smoke versus inject crystalline methamphetamine in Australia: Findings from a pharmacotherapy trial. (*Drug Alcohol Review* 2020; doi:10.1111/dar.13183 online first)
7. Eliana Brehaut, Dipika Neupane, Brooke Levis, Yin Wu, Ying Sun, Ankur Krishnan, Chen He, Parash Mani Bhandari, Zelalem Negeri, Kira E. Riehm, Danielle B. Rice, Marleine Azar, Xin Wei Yan, Mahrugh Imran, Matthew J. Chiovitti, Nazanin Saadat, Pim Cuijpers, John P. A. Ioannidis, Sarah Markham, Scott B. Patten, Roy C. Ziegelstein, Melissa Henry, Zahinoor Ismail, Carmen G. Loiselle, Nicholas D. Mitchell, Marcello Tonelli, Jill T. Boruff, Lorie A. Kloda, Anna Beraldi, Anna P. B. M. Braeken, Gregory Carter, Kerrie Clover, Ronán M. Conroy, Daniel Cukor, Carlos E. da Rocha e Silva, Jennifer De Souza, Marina G. Downing, Anthony Feinstein, Panagiotis P. Ferentinos, Felix H. Fischer, Alastair J. Flint, Maiko Fujimori, Pamela Gallagher, Simone Goebel, Nathalie Jetté, Miguel Julião, Monika Keller, Marie Kjærgaard, Anthony W. Love, Bernd Löwe, Rocio Martin-Santos, Ioannis Michopoulos, Ricard Navines, Suzanne J. O'Rourke, Ahmet Öztürk, Luis Pintor, Jennie L. Ponsford, Alasdair G. Rooney, Roberto Sánchez-González, Marcelo L. Schwarzbold, Michael Sharpe, Sébastien Simard, Susanne Singer, Jon Stone, Ka-Yee Tung, Alyna Turner, Jane Walker, Mark Walterfang, Jennifer White, Andrea Benedetti, Brett D. Thombs.  
  
Depression Prevalence using the HADS-D Compared to SCID Major Depression Classification: an Individual Participant Data Meta-Analysis (*Journal of Psychosomatic Research*. 2020 Dec;139:110256. doi: 10.1016/j.jpsychores.2020.110256. Epub 2020 Sep 23. September 2020)
8. Benedetti A, Levis B, Rücker G, Jones HE, Schumacher M, Ioannidis JP, Thombs B, DEPRESSion Screening Data (DEPRESSD) Collaboration. An empirical comparison of three methods for multiple cutoff diagnostic test meta-analysis of the Patient Health Questionnaire-9 (PHQ-9) depression screening tool using published data vs individual level data. *Research Synthesis Methods*. 2020 Nov;11(6):833-48.
9. Jo Robinson, Katrina Witt, Michelle Lamblin, Matthew Spittal, Greg Carter, Karin Verspoor, Andrew Page, Gowri Rajaram, Vlada Rozova, Nicole Hill, Jane Pirkis, Caitlin Bleeker, Alex Pleban, Jonathan Knott.  
  
Development of the Victorian Self-harm Monitoring System. (online first December 2020 *International Journal of Environmental Research and Public Health*; <https://doi.org/10.3390/ijerph17249385>)
10. Vanessa Hus Bal, Hosanna Kim, Bennett L. Leventhal, Gregory Carter, Yun-Joo Koh, Mina Ha, Ho-Jang Kwon, Patricia Hong, Young Shin Kim.  
  
Parent-reported suicidal ideation in three population-based samples of school-aged Korean children with Autism Spectrum Disorder (ASD) or elevated social problems. (accepted *Archives of Suicide Research*, December 2020).
11. Fischer F, Levis B, Falk C, Sun Y, Ioannidis JPA, Cuijpers P, Shrier I, Benedetti A, Thombs BD, and the DEPRESSion Screening Data (DEPRESSD) PHQ Collaboration. Comparison of different scoring methods based on latent variable models of the PHQ-9: an individual participant data meta-analysis. (*Psychological Medicine*, 1-12. doi:10.1017/S0033291721000131)
12. Andrew Page, Piamee Bandara, Trent Hammond, Garry Stevens, Greg Carter.  
  
Impact Of Covid-19 Physical Distancing Policies On Incidence Of Intentional Self-Harm In Western Sydney (*Australasian Psychiatry* published online: May 3, 2021. <https://doi.org/10.1177/10398562211010808>)
13. Neupane D, Levis B, Bhandari PM, Thombs BD, Benedetti A, DEPRESSion Screening Data (DEPRESSD) Collaboration. Selective cutoff reporting in studies of the accuracy of the Patient Health Questionnaire-9 and Edinburgh Postnatal Depression Scale: Comparison of results based on published cutoffs versus all cutoffs using individual participant data meta-analysis. *International Journal of Methods in Psychiatric Research*. 2021 May 12:e1870.
14. Gale L, McGill K, Twaddell S, Lewin T, Whyte I, Carter G.  
  
Hospital-treated deliberate self-poisoning patients: drug-induced delirium and clinical outcomes (*ANZJP* May 2021; <https://doi.org/10.1177/00048674211009608>)
15. He C, Levis B, Riehm KE, ... Clover, K... et al. The accuracy of the Patient Health Questionnaire-9 algorithm for screening to detect major depression: An individual participant data meta-analysis. *Psychotherapy and psychosomatics*. 2020;89(1):25-37.
16. McGill K, Spittal M, Bryant J, Lewin T, Whyte I, Madden C, Carter G.  
  
Comparison of Accredited Person and Medical Officer discharge decisions under the Mental Health Act of NSW: a cohort study of deliberate self-poisoning patients (*ANZJP* May 2021; DOI: 10.1177/00048674211009613)
17. Yin Wu; Brooke Levis; Ying Sun, MPH; Chen He; Ankur Krishnan; Dipika Neupane; Parash Mani Bhandari; Zelalem Negeri; Andrea Benedetti; Brett D. Thombs and the DEPRESSion Screening Data (DEPRESSD) HADS Group  
  
Accuracy of the Hospital Anxiety and Depression Scale Depression Subscale

(HADS-D) to Screen for Major Depression: Systematic Review and Individual Participant Data Meta-analysis. (BMJ April 2021;373:n972; doi: <https://doi.org/10.1136/bmj.n972>)

18. Alison Beck; Amanda Baker; Gregory Carter; Laura Robinson; Kristen McCarter; Christopher Wratten; Judy Bauer; Luke Wolfenden; Benjamin Britton

Is Fidelity to a Complex Behaviour Change Intervention associated with Patient Outcomes? Exploring the Relationship between Adherence, Competence and the Nutritional Status of Intervention Patients in a Successful Stepped-wedge Randomised Clinical Trial of Eating As Treatment (EAT)" (Implementation Science 16, 46 April 2021; <https://doi.org/10.1186/s13012-021-01118-y>)

19. Dayle Raftery, Peter J. Kelly, Frank P. Deane, Gregory Carter, Olivia M. Dean, Dan I. Lubman, Alyna Turner, Rebecca McKetin

Cognitive insight, medication adherence and methamphetamine cessation in people enrolled in a pharmacotherapy trial for methamphetamine use (Drug and Alcohol Dependence (online first) May 2021; DOI: 10.1016/j.jsat.2021.108473)

20. McKetin R., Dean OM, Turner A, Kelly PJ, Quinn B, Lubman DI, Dietze P, Carter G, Higgs P, Sinclair B, Reid D, Baker AL, Manning V, te Pas N, Thomas T, Bathish R, Raftery DK, Wrobel A, Saunders L, Arunogiri S, Cordaro F, Hill H, Hall S, Clare P, Mohebbi M, Berk M..

N-acetylcysteine (NAC) for methamphetamine dependence: A randomised controlled trial. (accepted EClinical Medicine June 2021; <https://doi.org/10.1016/j.eclinm.2021.101005>)

21. Occhipinti, J.A., Skinner, A., Carter, S., Heath, J., Lawson, K., McGill, K., McClure, R. and Hickie, I.B. Federal and state cooperation necessary but not sufficient for effective regional mental health systems: insights from systems modelling and simulation. Scientific Reports, 11(1), 1-12. 2021 doi: 10.1038/s41598-021-90762-x

22. Drake, J., Walker, M., Gallant, N., Sturgess, E. & McGill, K. Caring for the caring professionals within a cancer hospital: Research into compassion fatigue, burnout, and distress. Australian Social Work. Accepted - March 2021. <https://doi.org/10.1080/0312407X.2021.1944235>

## CONFERENCE PRESENTATIONS

1. Sophia Wooldridge

Psycho-Oncology patient satisfaction with rapid transition to telehealth in response to COVID-19  
Hunter Cancer Research Symposium, 5 November 2020 at Newcastle Town Hall.

2. Gregory Carter

E-mental health approaches to suicide prevention in clinical and non-clinical populations: benefits, harms, and ethical considerations

Keynote Address. E-mental health International Conference (Virtual Conference), December 2020

3. Gregory Carter

Intervention trials and outcomes for DSH after-care: Zelen, stepped wedge, historical controlled and propensity score designs.



- Invited Presenter. IASP Australasian Research Meeting (Virtual meeting), February 2021
4. Gregory Carter
 

Ketamine in Mental Health Disorders

Invited lecture Network 4 Trainee Education Day (Emergency Department). Port Stephens, October 2020.
  5. Gregory Carter
 

The Emerging Role of Ketamine in Mental Health Disorders – Emergency Department and Suicidality

Invited lecture in Network 4 Physician Conference (Emergency Department). Port Stephens, October 2020.
  6. Katie McGill
 

NSW Accredited Persons Program (Mental Health Act, NSW)- Comparison of Accredited Person and Medical Officer clinical assessment and discharge decisions for patients admitted for deliberate self-poisoning.

Presenter, Centre for Brain and Mental Health Research- Postgraduate conference, November 2020.
  7. Gregory Carter
 

Medical interventions: hospitalisation, pharmacotherapy and electroconvulsive therapy (Topic 2.2)

Invited Lecture. Griffith University: Course 7006. Comparative Analysis of Different Approaches to Suicidal Behaviour. Online. Newcastle, April 2021.
  8. Katie McGill
 

SPA Early Career Researcher Workshop

Invited presenter and panel member. Suicide Prevention Australia- national conference, April, 2020.
  9. Gregory Carter
 

What are the requirements for a public health approach to suicide prevention?

Invited Lecture: Suicide Prevention Symposium: Clinical, Research and Policy perspectives. Menzies School of Health Research, Casuarina Campus. NT. 16 June 2021.
  10. Katie McGill
 

Bridging the gap: Evidence into practice in suicide prevention

Invited presenter, Menzies School of Health Research, Northern Territory, June 2021.
  11. Wooldridge S, Clover K, Plant C, Prowse E, Ward S, Carter GL.
 

Psycho-oncology patient satisfaction with rapid transition to telehealth in response to COVID-19.

Clinical Oncology Society of Australia Annual Scientific Meeting 2020; (online teleconference). Asia-Pacific Journal of Clinical Oncology 2020 Nov 1 (vol. 16, pp. 27-28).
  12. Clover K, Lambert SD, Oldmeadow C, Britton B, King MT, Mitchell AJ, Carter GL.
 

Convergent and criterion validity of PROMIS depression and anxiety measures relative to legacy measures and structured diagnostic interview in cancer patients.

ANZ PROMIS symposium, 30 June 2021, 3-4.30pm
- ### CONFERENCE POSTERS
1. Vainnavi Thirugnanasundralingam, Melissa Stieler, Cassidy Campbell, Peter Pockney, Kalpesh Shah, Lachlan Gan, Matthew Spittal, Gregory Carter, Lachlan Gan, Matthew Spittal, Gregory Carter. Somatic Symptom Disorder (SSD) and Abdominal Pain: Prevalence, Diagnostic Accuracy, Co-Morbidity and Relationship to Opioid Prescribing
 

Talking Poster (Virtual Presentation due to COVID). ASGBI Congress 2020 (Association of General Surgeons of Britain and Ireland, July 2020).
- ### RESEARCH FUNDING/GRANTS
- **2018 NHMRC APP1152952**

Centre Of Research Excellence In Suicide Prevention: CRESPII

CIs: Christensen H, Venkatesh S, Boydell K, Shand F, Harvey S, Batterham P, Calear A, Carter G, Larsen M, Robinson J.

\$2,499,557.28 over three years (2019-2021)
  - **2018 National Health and Medical Research Council - APP1157757**

Prescribed medicine use and healthcare contacts before suicide: Detecting opportunities for prevention using population-based linkage of routinely collected data

CIs: Kate Chitty, Jennifer Pilgrim, Andrea Schaffer, Rose Cairns

Als: Nicholas Buckley, Sallie-Anne Pearson, Gregory Carter, Andrew Page, Jacques Raubenheimer, Claire Wylie

\$354,526 over three years
  - **2018 Australian Rotary Health**

Optimising caring contact: Using text messages to support people after a suicide attempt

CIs: Mark Larsen, Fiona Shand, Kirsten Morley, Philip Batterham, Sofian Berrouiguet, Paul Haber, Greg Carter, Helen Christensen (Als Justin Chia, Richard Henshaw, Dean Martin)

\$13,3793 over 2 years (1 Jan 2019- 31 Dec 2020)
  - **2018 Suicide Prevention Australia (NHMRC Gap Funding)**

Preventing repeated self-poisoning: A brief therapy text message intervention

Investigators: Larsen, Shand, Morley, Carter, Kapur

\$523,614 Duration: 3 years (Jan 2019 – Dec 2021)
  - **2019 Australian Government Department of Health**

National Leadership in Suicide Prevention Research Project

Pirkis J, Robinson J, Reifels L, Bassilios B, Spittal M, Reavley N, Gunn J, Carter G, Lubman D, Milner A, Kolves K, Krysinska K, Phelps A, Sutherland G, Grant L, Minas H.

\$1,200,000 over three years (2019-2021) 2020 Australian Government Department of Health, MRFF.
  - **2019 Suicide Prevention Research Fund**

Pilot RCT of an online program for carers of people after a suicide attempt.

Sally Fitzpatrick, Frances KayLambkin, Jaelea Skehan, Katie McGill.

\$100,000 over 12 months (2020).
  - **2019 University of New England Seed Funding**

Risk and resilience following exposure to suicide.

Myfanwy Maple, Navjot Bhullar, Philip Batterham, Katie McGill

\$12,000 over 12 months (2020)
  - **2019 Hunter Medical Research Fund.**

Preventing suicide in Australian men- the Aviva project.

Frances KayLambkin, Brian Kelly, Katie McGill, Jenny Geddes, Milena Heinsch, Dara Sampson

\$20,000 over 12 months (2020).
  - **2020 Million Minds Mission Suicide Prevention - APP1200195**

Developing a Comprehensive Care Pathway For those at Risk of Suicide But Not in Care: The Under the Radar Project.

CIs: Helen Christensen, Samuel Harvey, Gregory Carter, Svetha Venkatesh, Katherine Boydell, Henry Cutler, Ian Kneebone, Toby Newton-John, Jin Han, Kit Huckvale.

\$3.7M over 5 years (2020-2024)
- ### CLINICAL TRIALS
- Alison Jones, Greg Carter, Ian Whyte, Andrew Page, Naren Gunja, Christopher Ryan, Graham Gould, Garry Stevens.
- SMS SOS: Effectiveness of SMS text messages

in improving survival and rehabilitation rates of deliberate self-harm patients and reducing re-presentation of DSH patients to hospital.

Multicentre trial: Westmead, Nepean and Blacktown Hospitals

Trial recruitment closed and 2 year follow-up completed. Analysis of results underway.

#### ANY OTHER RELEVANT MATERIAL

##### Research higher degree students

- Dr Katherine McGill, PhD Candidate, School of Medicine and Public Health, Faculty of Health and Medicine, University of Newcastle. (Supervisor: G Carter)  
Using Sentinel Unit Data to Inform Clinical Practice for Hospital-Presenting Deliberate Self-Harm
- Dr Melissa Stieler, PhD (Surgical Science) Candidate, School of Medicine and Public Health, Faculty of Health and Medicine, University of Newcastle. (Supervisor: G Carter)  
Somatic Symptom severity and Undifferentiated Abdominal Pain; Prevalence, Diagnostic Accuracy and Comorbidity  
Successfully passed PhD Confirmation process February 2021.
- Cynthia Coombe, PhD candidate. School of Medicine and Public Health, Faculty of Health and Medicine, University of Newcastle. (Supervisor: G Carter)  
Indigenous Suicide Prevention. NHMRC funded PhD Scholarship.  
Candidature confirmed for Semester 2, 2021. University of Newcastle.

- Alison Beck, PhD Candidate, School of Medicine and Public Health, Faculty of Health and Medicine, University of Newcastle. (Supervisor: G Carter)

Translating Motivational Interviewing and Behaviour Change Techniques into Dietetic Interventions.

- Todd Heard, Masters of Clinical Psychology, Charles Sturt University. (Supervisor: Katie McGill)

The ripple effect, silence and powerlessness: Hidden barriers to discussing suicide in Australian Aboriginal communities. Awarded degree, December 2020.

- Erin Forbes, PhD Candidate, School of Medicine and Public Health, Faculty of Health and Medicine, University of Newcastle. (Supervisor: A/Prof. Kerrie Clover)

Innovative Interventions to Address Procedure Related Anxiety in Patients Undergoing Radiotherapy.

##### RHD student Awards

- Dr. Katherine McGill – CMN Research Manager Suicide Prevention and PhD candidate  
Winner- Best Presentation- Centre for Brain and Mental Health Research Postgraduate Conference 2020.  
University of Newcastle.
- Dr. Katherine McGill – CMN Research Manager Suicide Prevention and PhD candidate  
Faculty Best Confirmation Higher Degree Research Award for 2020.  
University of Newcastle
- Dr. Katherine McGill – CMN Research Manager Suicide Prevention and PhD candidate

CHMW Three Minute Thesis Competition Outcome 2021 – Winner for School of Medicine and Public Health. University of Newcastle.

##### RANZCP Scholarly Projects

- Dr Lindsay Gale – 2016-2021  
Hospital-treated deliberate self-poisoning patients: drug-induced delirium and clinical outcomes  
Passed April 2021
- Dr Anitha Dani and Dr Srilaxmi Balachandran – 2020- 2022  
Prevalence of depression and predictors of discharge to a psychiatric hospital in young people with hospital-treated deliberate self-poisoning at a sentinel unit in NSW.

## Haematology

### OVERVIEW

The Haematology Unit engages in both clinical and laboratory-based research. Clinicians and nurses are actively involved in research directed at improving patient care, while the department also supports dedicated laboratory and clinical trials teams. The staff specialists are committed to providing quality training to haematology registrars.

Many of the staff hold conjoint appointments with the University of Newcastle and engage in teaching undergraduate medical students and supervising higher research degrees. The Unit is fortunate to have strong community support and is grateful for all the generous donations received in 2020-21.



The ongoing COVID-19 pandemic has made things particularly challenging for staff and students over the past year.

#### HAEMATOLOGY CLINICAL TRIALS

- **Unit Manager: Michele Gambrell**
- **Clinical Trial Coordinators: Tara Novak, Marguerite Hughes, Nick Stankovich, Cheryl Cairney, Klara Jakimovski, Leanne DeGroot, Maree Jarret, Katie Oleksyn, Jo Smart and Wendy Johnson**
- **Data Managers: Alesia Ogradnik, Alex Hoffman and Natasha Winters**
- **Administrative/Finance Officers: Patricia Rozanski and Karen Kincaid**
- **Laboratory Technical Officer: Kylie Cox**

Over the past year the Haematology Clinical Trials Office has activated nine new clinical trials across a range of haematology malignancies including Acute Myeloid Leukaemia, Myelofibrosis, Multiple Myeloma, Mantle Cell Lymphoma and Diffuse Large B-Cell Lymphoma. In February 2021, the unit recruited a participant to an intensive Phase 1 Pharmacokinetics study and was also the top recruiting site for an Australasian Leukaemia and Lymphoma Group (ALLG) AML study.

Of all the open trials/registries (including those open to recruitment and those closed to recruitment but with participants either on treatment or in follow-up) being managed in 2020-21, all are either administered by the ALLG, the Australasian Myeloma Research Consortium (AMaRC), sponsored by pharmaceutical companies or investigator initiated.

The Trial's team of clinical trial coordinators has grown sufficiently over the past few years that they have needed to organise the trial coordinators into teams. The red team, led by Jo Smart, specialises in AML, Myelofibrosis and clotting disorders and the blue team, led by Nick Stankovich, specialises in Lymphoma, Myeloma and Chronic Leukaemia.

Significant work has been carried out on moving more source record documentation away from the participant's medical record and various other paper-based documentation onto the site's electronic medical record, ARIA.

The unit has commenced 'The AML Project', which aims to track all patients in the region with AML to determine the area's survival rates and treatment preferences. The project has involved the site designing their own database using a secure web-based software platform for Research Electronic Data Capture (REDCap), and has the unit working more closely with the University of Newcastle and the Hunter Medical Research Institute. The project has also increased recruitment in several local investigator-led studies.

In the 2021-22 period the unit will continue to grow, expecting to recruit to a CAR-T study and continuing to open and recruit to studies for various Haematology diseases.

#### BONE MARROW STEM CELL TRANSPLANT RESEARCH

**Dr Philip Rowlings, Dr Sam Yuen, Louisa Brown, Hong Zhang, Linda Welschinger, Geordie Zauanders**

Patient transplant data is reported to the Australian Bone Marrow Transplant Recipients Registry (ABMTRR) as part of Australian Bone Marrow Transplant (BMT) research and development. This data is also part of the Asia Pacific Bone Marrow Transplant (APBMT) research group. The CMN Unit is the lead site on the ethics application for data collection of the NSW BMT Network, a subgroup of the Agency for Clinical Innovation (ACI) of the Clinical Excellence Commission (CEC), of the NSW Ministry of Health.

#### VENOUS THROMBOEMBOLISM AND TRANSFUSION RESEARCH

**Dr Ritam Prasad, Dr Kate Melville, Dr Jillian De Malmanche, and Dr Anoop Enjeti**

Practise changing audits and interventions have been important contributions in these areas with Dr Anoop Enjeti as chair of the Area Transfusion Committee and Dr Melville as chair of the Area Venous Thromboembolism (VTE) Committee. Dr Melville is also involved in Obstetric Haematology. Dr Bryony Ross, who was until this year a key member of the transfusion and VTE research, has moved to the Children's Hospital in Westmead but will continue to have ongoing connections within the department. We thank her for her enthusiastic involvement in transfusion and thrombosis research.

Dr Enjeti was part of two major advisory groups that arose in response to the COVID-19 pandemic. The THANZ Thrombosis Thrombocytopenia Syndrome (TTS) Advisory Group for post Astra Zeneca associated vaccine thrombosis played an important role in developing national consensus



testing and clinical management strategies (<https://www.thanz.org.au/documents/item/591>). This group played a crucial role in advising NSW Health, the Australian Technical Advisory Group on Immunisation, and the Therapeutic Goods Administration on issues surrounding vaccine-associated thrombosis complications. He also led the clinical management of this rare complication within Hunter New England and provided specialist and general practitioner education on these issues. Dr Enjeti was also part of the national COVID-19 clinical evidence taskforce contributing to development of evidence based thromboprophylaxis guidelines for COVID-19 infections.

#### LABORATORY RESEARCH - THE HUNTER HAEMATOLOGY RESEARCH GROUP

**Assoc Prof Lisa Lincz, Fiona Scorgie, Dr Anoop Enjeti, Dr Ritam Prasad**

The Haematology Research Laboratory conducts studies into haematological cancers and disorders of coagulation, with a primary interest in circulating microvesicles. The laboratory is linked to the University of Newcastle and offers training to encourage students to enter this area of research. This year, ever changing COVID restrictions and university campus lockdowns proved challenging for both staff and students attempting to complete laboratory based research. With added complications of overseas shipment shortages, the group all had to adjust, adapt and modify experiments based on what time and equipment was available.

As always, the group maintains strong collaborations with researchers nationally and internationally through memberships with various societies: Australasian Leukaemia and Lymphoma Group (ALLG), Thrombosis and Haemostasis society of Australia and New Zealand (THANZ), International Society on Thrombosis and Haemostasis (ISTH); Berlin-Bernhard-Münster Paediatric Acute Lymphoblastic Leukaemia (BFM-ALL); as well as through individual collaborations with researchers at the Universities of Tasmania and Melbourne, as well as the Royal Hobart Hospital and Austin Health; Children's Cancer Institute, Randwick; and locally with the departments of Molecular Medicine (NSW Health Pathology-JHH), Clinical Toxicology and Pharmacology (CMN), Medical Oncology (CMN), Radiation Oncology (CMN), Hunter Medical Research Institute, and the School of Biomedical Sciences and Pharmacy (University of Newcastle).

The group is working towards the establishment of a Hunter based translational research program in the area of Myelodysplasia and Acute Myeloid Leukemia. This endeavour involves strong collaboration between haematology clinicians, researchers, and clinical trials teams, together with researchers at the University of Newcastle and Hunter Medical Research Institute. As part of this project, Dr Enjeti, as chair of the MDS Working Party of the ALLG, launched the ALLG Myelodysplasia Registry in June 2021.

#### RESEARCH HIGHER DEGREES

Dr Asma Ashraff was awarded Master's in Epidemiology from the University of Newcastle for her research project on real world experience with Azacitidine in MDS.

#### UNDERGRADUATE MEDICAL STUDENT PROJECTS (UNIVERSITY OF NEWCASTLE)

Everyone counts. A Wilesmith, A Bruce, G Elton, R Mullen, M De Leur. Supervised by A Enjeti, B Ross, L Lincz

FISH'ing for Prognosis in MGUS. J Eather, D Chia, S Lim. Supervised by A Enjeti, N Berry, L Lincz

#### RESEARCH FUNDING

The 2021 Medical Research Support Program grant from Hunter Cancer Research Alliance. Salary for research a laboratory scientist. Anoop K Enjeti, \$21,600.

2021 Race Oncology grant. An open label Phase II study of high dose Bisantrene with cytarabine arabinoside (AraC) or low dose Bisantrene with Azacitidine or Inqovi (decitabine) for treatment of relapsed or refractory Acute Myeloid Leukemia (R/R AML) patients with extramedullary disease (BISantrene for Extramedullary leukaemia ChemoTherapeutics; BISECT). Anoop K Enjeti, \$117,936

The 2021 Thrombosis and Haemostasis Society of Australia and New Zealand Science and Education trust. Establishing a screening test for complement mediated lysis to help diagnose atypical haemolytic uremic syndrome. Lisa Lincz, Fiona Scorgie, Kent Chapman, Ritam Prasad, \$18,480

#### CONFERENCE AND MEETING PROCEEDINGS

(including results of clinical trials in which CMN haematology patients were participants)

#### American Society of Hematology

Mollee, P., J. Reynolds, **W. Janowski**, H. Quach, P. Campbell, S.D. Gibbs, S. Lee, J. D'Rozario, K. Taylor, T. Cochrane, C.T. Wallington-Beddoe, F. Kwok, N. Weber, I.H. Kerridge, H. Weston, P.J. Ho, N. Horvath, F. Yuen, and A. Spencer, A Randomized Study of Bortezomib, Cyclophosphamide and Dexamethasone Induction (VCD) Versus VCD and Daratumumab Induction Followed by Daratumumab Maintenance (VCDD) for the Initial Treatment of Transplant-Ineligible Patients with Multiple Myeloma (AMaRC 03-16). *Blood*, 2020. 136(Supplement 1): p. 4-5.

#### American Society of Clinical Oncology

Byrd, J.C., P. Hillmen, P. Ghia, A.P. Kater, A.A.A. Chanan-Khan, R.R. Furman, S.M. O'Brien, M.N. Yenerel, Á. Illés, N.E. Kay, J.A.G. Marco, A.R. Mato, J.F. Seymour, S. Leprêtre, S. Stilgenbauer, T. Robak, P. Patel, K. Higgins, S. Sohoni, and W. Jurczak, First results of a head-to-head trial of acalabrutinib versus ibrutinib in previously treated chronic lymphocytic leukemia. *Journal of Clinical Oncology*, 2021. 39(15\_suppl): p. 7500-.

Sharman, J.P., M. Egyed, W. Jurczak, A. Skarbnik, J.M. Pagel, M.K. Kamdar, T. Munir, G. Corbett, L.M. Fogliatto, Y. Herishanu, V. Banerji, S.E. Coutre, P. Walker, K. Karlsson, P. Ghia, A. Janssens, W.G. Wierda, P. Patel, M.H. Wang, and J.C. Byrd, Acalabrutinib ± obinutuzumab versus obinutuzumab + chlorambucil in treatment-naive chronic lymphocytic leukemia: Elevate-TN four-year follow up. *Journal of Clinical Oncology*, 2021. 39(15\_suppl): p. 7509-.

Usmani, S.Z., E. Terpos, **W. Janowski**, H. Quach, S. West, D. Williams, E.J. Dettman, G. Ferron-Brady, K. Luptakova, and I. Gupta, DREAMM-9: Phase III study of belantamab mafodotin plus VRd versus VRd alone in transplant-ineligible newly diagnosed multiple myeloma (TI NDMM). *Journal of Clinical Oncology*, 2020. 38(15\_suppl): p. TPS8556-TPS.

#### European Hematology Association

Usmani, S., E. Terpos, **W. Janowski**, H. Quach, S. West, D. Williams, E.J. Dettman, G. Ferron-Brady, K. Luptakova, and I. Gupt. DREAMM-9: Phase III study of belantamab mafodotin plus VRd vs. VRd alone in transplant-ineligible newly diagnosed multiple myeloma (TI NDMM). in *EHA Library*, 06/12/20; 297954; PB2038. 2020.

Facon, T., S.K. Kumar, T. Plesner, R.Z. Orlowski, P. Moreau, N. Bahlis, S. Basu, H. Nahi, C. Hulin, H. Quach, H. Goldschmidt, M. O'Dwyer, A. Perrot, C.P. Venner, K. Weisel, J.R. Mace, N. Rajje, M. Tiab, M. Macro, L. Frenzel, X. Leleu, T. Ahmadi, J. Wang, R.V. Rempelbergh, C.M. Uhlar, B. Tromp, M. Delioukina, J. Vermeulen, and S.Z. Usmani, Overall survival results with daratumumab, lenalidomide, and dexamethasone versus lenalidomide and dexamethasone in transplant-ineligible newly diagnosed multiple myeloma: Phase 3 MAIA study. *EHA Library*. Facon T. 06/12/21; 330171; LB1901, 2021.

**Sillar, J.**, M.V. Nieves, and L. Munshi. Survival outcomes in patients with acute myeloid leukemia presenting with hyperleucocytosis. in *EHA Library*. Sillar J. 06/09/21; 325245; EP485. 2021.

#### ADVISORY/BOARD MEMBERSHIP

**Sam Yuen** - Executive Committee, NSW BMT Network of the Agency for Clinical Innovation, NSW Health

**Philip Rowlings** - Editorial Board of the *Journal of Blood Cell Therapy*

Board of Directors, Australia Leukaemia and Lymphoma Group

Emeritus Member, Asia Pacific Blood and Marrow Transplant Group

**Anoop Enjeti** - Co-chair, Acute Leukaemia Working Party, ALLG

Chair, MDS Working Group, ALLG

President and Executive council member Thrombosis and Haemostasis Society of Australia and New Zealand (THANZ)

Chief Examiner Haematology Royal College of Pathologists of Australasia (RCPA) and on the Board of Examination and Assessment (RCPA)



Executive member RACP /RCPA Combined Joint College Training Program

Member, Biomarkers and Targeted Therapy Committee of HCRA

Member, Evidence based Guidelines (EviQ) Committee, NSW Cancer Institute (NSW CI)

Member, NSW Haematology Teaching Committee

**Ritam Prasad** - Member, Australian Haemophilia Centre Directors organisation Executive Committee

**Wojt Janowski** - Member, ALLG Myeloma Subcommittee

Deputy Chair, CCRN Steering Committee

Member, HCRA Clinical Trials Strategic Planning Committee

Member, Australasian Myeloma Research Consortium Steering Committee

Member, eVIQ Haematology Reference Group

**Lisa Lincz** - Member, CMN Translational Research Advisory Committee

Member, CMN Research Development and Engagement Committee

**Cathie Milton** - CMN, Collection Facility Director Apheresis

Member, ACI BMT Network Nurses Group

Member, District Patient Blood Management Committee, HNELHD

Member, NSW eHealth, Blood and Blood Products Design Focus Group

**Louisa Brown** - Member, ACI BMT Network long term follow-up working group

**Fiona Scorgie** - Chairperson, CMN Occupational Health and Safety Committee

Member, CMN Mission and Values Committee

## PUBLICATIONS

- Bhurani, M., L. Admojo, C. Van Der Weyden, R. Twigger, A. Bazargan, H. Quach, A. Zimet, L. Coyle, J. Lindsay, D. Radeski, E. Hawkes, G. Kennedy, I. Irving, N. Gutta, J. Trotman, J. Yeung, L. Dunlop, M. Hua, P. Giri, **S. Yuen, S. Panicker, S. Moreton, L. Khoo, A. Scott, D. Kipp, A. McQuillan, C. McCormack, M. Dickinson, and H.M. Prince**, Pralatrexate in relapsed/refractory T-cell lymphoma: a retrospective multicenter study. *Leuk Lymphoma*, 2021. **62**(2): p. 330-6.
- Birgersson, M., M. Chi, C. Miller, J.S. Brzozowski, J. Brown, L. Schofield, O.G. Taylor, E.A. Pearsall, J. Hewitt, C. Gedye, **L.F. Lincz**, and K.A. Skelding, A Novel Role for Brain and Acute Leukemia Cytoplasmic (BAALC) in Human Breast Cancer Metastasis. *Front Oncol*, 2021. **11**: p. 656120.
- Bond, D.R., H.J. Lee, and **A.K. Enjeti**, Unravelling the Epigenome of Myelodysplastic Syndrome: Diagnosis, Prognosis, and Response to Therapy. *Cancers (Basel)*, 2020. **12**(11).
- Campbell, S., J. Mason, **R. Prasad, H. Ambrose**, S. Hunt, and H. Tran, Acquired haemophilia and haemostatic control with

recombinant porcine factor VIII: case series. *Intern Med J*, 2021. **51**(2): p. 215-9.

- Chapman, K., R. Prasad**, S. Mohammed, and E.J. Favaloro, 2B or not 2B? A diagnosis of von Willebrand disease a lifetime of 86 years in the making. *Blood Coagul Fibrinolysis*, 2021. **32**(3): p. 229-33.
- Corboy, G., J. Othman, L. Lee, A. Wei, A. Ivey, P. Blombery, R. Agarwal, C. Fong, A. Brown, H. Scott, C. Grove, A. Louw, **A. Enjeti**, H. Iland, C. Paul, S. Bohlander, P. Kakadia, M. Horan, and W. Stevenson, Laboratory quality assessment of candidate gene panel testing for acute myeloid leukaemia: a joint ALLG / RCPAQAP initiative. *Pathology*, 2021. **53**(4): p. 487-92.
- Facon, T., S. Kumar, T. Plesner, R.Z. Orłowski, P. Moreau, N. Bahlis, S. Basu, H. Nahi, C. Hulin, H. Quach, H. Goldschmidt, M. O'Dwyer, A. Perrot, C.P. Vener, K. Weisel, J.R. Mace, N. Raje, M. Attal, M. Tiab, M. Macro, L. Frenzel, X. Leleu, T. Ahmadi, C. Chiu, J. Wang, R. Van Rampelbergh, C.M. Uhlar, R. Kobos, M. Qi, and S.Z. Usmani, Daratumumab plus Lenalidomide and Dexamethasone for Untreated Myeloma. *N Engl J Med*, 2019. **380**(22): p. 2104-15.
- Favaloro, E.J., S. Mohammed, R. Vong, W. McVicker, **K. Chapman**, P. Swanepoel, G. Kershaw, N. Cai, S. Just, L. Connelly, **R. Prasad**, T. Brighton, and L. Pasalic, Verification of the ACL Top 50 Family (350, 550, and 750) for Harmonization of Routine Coagulation Assays in a Large Network of 60 Laboratories. *Am J Clin Pathol*, 2021.
- Lillicrap, T., C.B. Keragala, D.F. Draxler, J. Chan, H. Ho, S. Harman, B. Niego, E. Holliday, C.R. Levi, C. Garcia-Esperon, N. Spratt, P. Gyawali, A. Bivard, M.W. Parsons, J. Montaner, A. Bustamante, I.F. Cadenas, G. Cloud, J.M. Maguire, **L. Lincz**, T. Kleinig, J. Attia, S. Koblar, M.A. Hamilton-Bruce, P. Choi, B.B. Worrall, and R.L. Medcalf, Plasmin Generation Potential and Recanalization in Acute Ischaemic Stroke; an Observational Cohort Study of Stroke Biobank Samples. *Front Neurol*, 2020. **11**: p. 589628.
- Makhija, K., K. Chapman**, and **R. Prasad**, A case report of successful transition from argatroban to warfarin using DOAC-stop in heparin induced thrombocytopenia (HIT). *Pathology*, 2021.
- Makhija, K., L.F. Lincz, K. Attalla, F.E. Scorgie, A.K. Enjeti, and R. Prasad**, White blood cell evaluation in haematological malignancies using a web-based digital microscopy platform. *Int J Lab Hematol*, 2021.
- McCaughan, G., P. Di Ciaccio, M. Ananda-Rajah, N. Gilroy, R. MacIntyre, B. Teh, R. Weinkove, J. Curnow, J. Szer, **A.K. Enjeti**, D.M. Ross, S. Mulligan, J. Trotman, M. Dickinson, H. Quach, P. Choi, M.N. Polizzotto, C.S. Tam, P.J. Ho, M. Ku, G. Gregory, S. Gangatharan, G. Hapgood, T. Cochrane, C. Cheah, S. Gibbs, A. Wei, A. Johnston, M. Greenwood, H.M. Prince, M. Latimer, L. Berkahn, J. Wight, T. Armytage, and N. Hamad, COVID-19 vaccination in

haematology patients: an Australian and New Zealand consensus position statement. *Intern Med J*, 2021. **51**(5): p. 763-8.

- Murray, H.C., **A.K. Enjeti**, R.G.S. Kahl, H.M. Flanagan, **J. Sillar**, D.A. Skerrett-Byrne, J.G. Al Mazi, G.G. Au, C.E. de Bock, K. Evans, N.D. Smith, A. Anderson, B. Nixon, R.B. Lock, M.R. Larsen, N.M. Verrills, and M.D. Dun, Quantitative phosphoproteomics uncovers synergy between DNA-PK and FLT3 inhibitors in acute myeloid leukaemia. *Leukemia*, 2021. **35**(6): p. 1782-7.
- Tam, C.S., T. Robak, P. Ghia, B.S. Kahl, P. Walker, **W. Janowski**, D. Simpson, M. Shadman, P.S. Ganly, L. Laurenti, S. Opat, M. Tani, H. Ciepluch, E. Verner, M. Šimkovič, A. Österborg, M. Trněný, A. Tedeschi, J.C. Paik, S.B. Kuwahara, S. Feng, V. Ramakrishnan, A. Cohen, J. Huang, P. Hillmen, and J.R. Brown, Zanubrutinib monotherapy for patients with treatment naïve chronic lymphocytic leukemia and 17p deletion. *Haematologica*, 2020. Online ahead of print.
- Vogel, J.P., B. Tendal, M. Giles, C. Whitehead, W. Burton, S. Chakraborty, S. Cheyne, T. Downton, D. Fraile Navarro, G. Gleeson, A. Gordon, J. Hunt, J. Kitschke, S. McDonald, N. McDonnell, P. Middleton, T. Millard, M. Murano, J. Oats, R. Tate, H. White, J. Elliott, V. Roach, and C.S.E. Homer, Clinical care of pregnant and postpartum women with COVID-19: Living recommendations from the National COVID-19 Clinical Evidence Taskforce. *Aust N Z J Obstet Gynaecol*, 2020. **60**(6): p. 840-51.
- Zinzani, P.L., I.W. Flinn, **S.L.S. Yuen**, M.S. Topp, C. Rusconi, I. Fleury, K. Le Dú, C. Arthur, B. Pro, G. Gritti, M. Crump, A. Petrich, D. Samineni, A. Sinha, E.A. Punnoose, E. Szafer-Glusman, N. Spielewoy, M. Mobasher, K. Humphrey, M. Kornacker, and W. Hiddemann, Venetoclax-rituximab with or without bendamustine vs bendamustine-rituximab in relapsed/refractory follicular lymphoma. *Blood*, 2020. **136**(23): p. 2628-37.
- Bond, D.R., K. Uddipto, **A.K. Enjeti**, and H.J. Lee, Single-cell epigenomics in cancer: charting a course to clinical impact. *Epigenomics*, 2020. **12**(13): p. 1139-51.

## MEDICAL ONCOLOGY RESEARCH (MOR)

### MOR TRIALS:

- Clinical Trial Manager:** Kim Adler
- Clinical Trial Coordinators:** Kirrilee Askew, Kelly Barker, Kerrie Cornall, Jennifer McFarlane, Louise Plowman, Gail Walker, Emily Munn, Megan Walker, Caitlyn McHugh, Patrick Skippen and Suma Santhosh
- Finance:** Alison Leonard—England
- Ethics Specialists:** Catherine Johnson and Allison Kautto
- Data Management:** Jessica Aldcroft, Anthony Morrison, Jieqi Guo and Maya Hassim

- **Laboratory Technicians: Alison Pickup and Jieqi Guo**
- **Clinical Trial Fellows: Dr Tin Quah and Dr Sarah Zardawi**

With Australia now a “preferred country” for many clinical trials – MOR Trials has had a very busy year with a vast range of clinical trials for cancer patients of the Hunter on offer.

Over the past year MOR opened 24 new clinical trials to recruitment across the Hunter New England Health District - covering breast, colorectal, gastroesophageal, lung, melanoma, ovarian, prostate, mesothelioma and non-melanoma skin cancer. As of 1 July 2021, 45 trials were actively recruiting participants, 4 trials remained on hold and another 5 trials were pending approval to commence. These trials were a mixture of phase 1b, II & III cooperative group, pharmaceutical sponsored studies and investigator initiated studies.

Overall 209 patients were offered the opportunity to participate in a clinical trial. Of these, 126 have been enrolled into a clinical trial.

The team also said a fond farewell to Sue Brew. Sue worked in cancer research at Calvary Mater Newcastle for 26 years. In that time she has made a major contribution to cancer trials in the Hunter and guided many cancer patients through their cancer journey while on a clinical trial. During this time Sue was also an invaluable member on the Hunter New England Human Research Ethics Committee and a board member of the Australian & New Zealand Gynecological Oncology Group (ANZGOG). The team thanks her for her commitment to cancer research and wish her every success and happiness in the future, she will be missed by patients and staff.

#### MOR EXPERIMENTS

- **Director of MOR Laboratory and Chief Hospital Scientist: Dr Jennette Sakoff**
- **Hospital Scientists: Dr Jayne Gilbert and Madhu Garg**
- **Technical Officer: Alesia Ogrodnik**

The MOR Laboratory encompasses the Experimental Therapeutics Group. The aim of the unit is to improve outcomes for cancer patients undergoing chemotherapy. The main areas of research include (i) the development of new small molecules for the treatment of cancer, (ii) identifying ways to reducing clinical toxicity to chemotherapy and (iii) implementing therapeutic drug monitoring in order to optimise chemotherapy dosing. The drug development program primarily targets brain, pancreatic, ovarian and breast cancers, while studies of clinical toxicity and drug monitoring span all tumour types.

During 2020-21 the unit expanded upon its research on the role of the Aryl Hydrocarbon Receptor pathway in cancer, with an additional three publications detailing the effectiveness of small molecules on this pathway. Scholarly output analysis of the past five years now places the unit in the top 50 authors worldwide studying this signalling pathway (data from Scopus July 2021). Indeed, one of the small molecules discovered by this team to activate this signalling pathway is now commercially available as a research tool from eight multinational chemical-reagent organisations. The team has now expanded its portfolio to examine the development of inhibitors of this pathway, for the potential treatment of pancreatic cancer.



The research facility continues to culture ovarian cancer cells harvested from the ascites fluid from patients at Calvary Mater Newcastle with ovarian cancer. This fluid would normally be discarded, however, it contains a plethora of cancer cells that are cultured and used to test the effectiveness of new platinum-based drug combinations. The fluid itself is also invaluable when used to study the tumour microenvironment and the effect of various stimuli on tumour growth.

The therapeutic drug monitoring skills of the unit are popular and ever expanding. The unit routinely screen blood samples for 5FU metabolism from an array of cancer patients throughout Australia. 5FU is an old drug and a very effective drug, however, failure to metabolise it properly results in potentially devastating outcomes. This analysis is used to predict those patients more likely to experience this problem before they receive treatment. The unit has expanded its collaboration with University of Wollongong on a Phase 1B study of a novel FU/LV formulation for GI Cancer. The unit continues to collaborate on an international project, FUSAFE2 (France), examining the genetic code of a critical gene involved in the metabolism of 5FU. This analysis will be performed on hundreds of samples from around the globe including 60 from colorectal cancer patients here in the Hunter. As the only facility in Australia and the Asia Pacific providing therapeutic drug monitoring of mitotane in blood from patients with adrenocortical carcinoma, the unit continues to receive numerous requests each year for services.

While the COVID-19 global pandemic continues, sadly, many of the philanthropic supporters and consumer groups of the team have been unable to interact and provide the much needed consumer and financial support.

## PUBLICATIONS

1. Clinical activity of durvalumab for patients with advanced mismatch repair-deficient and repair-proficient endometrial cancer. A nonrandomized phase 2 clinical trial Antill Y, Kok P, Robledo K, Lombard JM on behalf of the Australia New Zealand Gynaecological Oncology Group (ANZGOG), et Journal for ImmunoTherapy of Cancer 2021;9:e002255. doi: 10.1136/jitc-2020-002255
2. Impact of prior (neo)adjuvant trastuzumab (NAT) exposure on the efficacy of HER2-targeted therapy for metastatic breast cancer. Kanjanapan Y, Lok SW, Gibbs P, De Boer R, Yeo B, Greenberg S, Barnett F, Knott L, Richardson G, Wong R, Nottage M, Collins IM, Torres J, Lombard J, Johns J, Harold M, Malik L. Breast Cancer Res Treat. 2020 Nov;184(1):87-95. doi: 10.1007/s10549-020-05825-w. Epub 2020 Aug 10. PMID: 32779037
3. Nerve growth factor and its receptor tyrosine kinase TrkA are overexpressed in cervical squamous cell carcinoma Faulkner S, Griffin N, Rowe CW, Jobling P, Lombard JM, Oliveira SM, Walker MM, Hondermarck H. FASEB Bioadv. 2020 Jun 30;2(7):398-408. doi: 10.1096/fba.2020-00016. eCollection 2020 Jul. PMID: 32676580
4. Gedye, C. How to Feel Bad., J.Clin.Oncol., epub Aug 6 2021.
5. Pathmanandavel S, Crumbaker M, Yam AO, Nguyen A, Rofe C, Hovey E, Gedye C, Kwan EM, Hauser C, Azad AA, Eu P, Martin AJ, Joshua AM, Emmett L. 177Lutetium PSMA-617 and idronoxil (NOX66) in men with end-stage metastatic castrate-resistant prostate cancer (LuPIN): Patient outcomes and predictors of treatment response of a Phase I/II trial. J Nucl Med. 2021 Jul 29; jnumed.121.262552. doi: 10.2967/jnumed.121.262552. PMID: 34326127.
6. Bintrafusp alfa (M7824), a bifunctional fusion protein targeting TGF- $\beta$  and PD-L1: results from a phase I expansion cohort in patients with recurrent glioblastoma. Khasraw M, Weller M, Lorente D, Kolibaba K, Lee CK, Gedye C, I de La Fuente M, Vicente D, Reardon DA, Gan HK, Scott AM, Dussault I, Helwig C, Ojalvo LS, Gourmelon C, Groves M. Neurooncol Adv. 2021 Apr 9;3(1):vdab058. doi: 10.1093/oaajnl/vdab058. eCollection 2021 Jan-Dec.
7. Business as unusual: medical oncology services adapt and deliver during COVID-19. Travers A, Adler K, Blanchard G, Bonaventura T, Charlton J, Day F, Healey L, Kim S, Lombard J, Mallesara G, Mandaliya H, Navani V, Nordman I, Paterson R, Plowman L, Quah GT, Scalley M, Shrestha P, Taylor B, van der Westhuizen A, Zhang B, Gedye C, Lynam J. Intern Med J. 2021 May;51(5):673-681. doi: 10.1111/imj.15217.
8. Gedye C. Cancer Heterogeneity Chapter 13, The Basic Science of Oncology, Sixth Edition. McGraw-Hill Education / Medical, Chicago 05 Mar 2021 (Chapter).
9. ENZA-p trial protocol: a randomized phase II trial using prostate-specific membrane antigen as a therapeutic target and prognostic indicator in men with metastatic castration-resistant prostate cancer treated with enzalutamide (ANZUP 1901). Emmett L, Subramaniam S, Joshua AM, Crumbaker M, Martin A, Zhang AY, Rana N, Langford A, Mitchell J, Yip S, Francis R, Hofman MS, Sandhu S, Azad A, Gedye C, McJannett M, Stockler MR, Davis ID; Australian, New Zealand Urogenital, Prostate Cancer Trials Group (ANZUP), the ENZA-p investigators. BJU Int. 2021 May 24. doi: 10.1111/bju.15491.
10. A Novel Role for Brain and Acute Leukemia Cytoplasmic (BAALC) in Human Breast Cancer Metastasis. Birgersson M, Chi M, Miller C, Brzozowski JS, Brown J, Schofield L, Taylor OG, Pearsall EA, Hewitt J, Gedye C, Lincz LF, Skelding KA. Front Oncol. 2021 Apr 22;11:656120. doi: 10.3389/fonc.2021.656120. eCollection 2021.
11. Safety and Efficacy of Atezolizumab in Understudied Populations with Pretreated Urinary Tract Carcinoma: Subgroup Analyses of the SAUL Study in Real-World Practice. Merseburger AS, Castellano D, Powles T, Llorca Y, Retz M, Voortman J, Huddart RA, Gedye C, Van Der Heijden MS, Gurney H, Ong M, de Ducla S, Pavlova J, Fear S, Sternberg CN. J Urol. 2021 Aug;206(2):240-251. doi: 10.1097/JU.0000000000001768. Epub 2021 Apr 9.
12. Hofman MS, Emmett L, Sandhu S, Iravani A, Joshua AM, Goh JC, Pattison DA, Tan TH, Kirkwood ID, Ng S, Francis RJ, Gedye C, Rutherford NK, Weickhardt A, Scott AM, Lee ST, Kwan EM, Azad AA, Ramdave S, Redfern AD, Macdonald W, Guminski A, Hsiao E, Chua W, Lin P, Zhang AY, McJannett MM, Stockler MR, Violet JA, Williams SG, Martin AJ, Davis ID, [177Lu]Lu-PSMA-617 versus cabazitaxel in patients with metastatic castration-resistant prostate cancer (TheraP): a randomised, open-label, phase 2 trial. Lancet February 11, 2021 DOI:https://doi.org/10.1016/S0140-6736(21)00237-3
13. Bouche G, Gedye C, Meheus L, Pantziarka P. Drug repurposing in oncology. Lancet Oncol. 2020 Dec;21(12):e542. doi: 10.1016/S1470-2045(20)30561-1.
14. Oral THC: CBD cannabis extract for refractory chemotherapy-induced nausea and vomiting: a randomised, placebo-controlled, phase II crossover trial. Grimison P, Mersiades A, Kirby A, Lintzeris N, Morton R, Haber P, Olver I, Walsh A, McGregor I, Cheung Y, Tognola A, Hahn C, Briscoe K, Aghmehsheh M, Fox P, Abdi E, Clarke S, Della-Fiorentina S, Shannon J, Gedye C, Begbie S, Simes J, Stockler M. Ann Oncol. 2020 Aug 13;S0923-7534(20)39996-8. doi: 10.1016/j.annonc.2020.07.020.
15. Navani V, Graves MC, Marchett GC, Mandaliya H, Bowden NA, van der Westhuizen A, 'Overall survival in metastatic melanoma correlates with pembrolizumab exposure and T cell exhaustion markers.', Pharmacol Res Perspect, 9 e00808 (2021) DOI 10.1002/prp2.808
16. Ngo DTM, Williams T, Horder S, Kritharides L, Vardy J, Mandaliya H, Lynam J et al., 'Factors Associated with Adverse Cardiovascular Events in Cancer Patients Treated with Bevacizumab', JOURNAL OF CLINICAL MEDICINE, 9 (2020) [C1] DO 10.3390/jcm9082664
17. Holland I, Bakri YM, Sakoff J, Zaleta Pinet D, Motti C, van Altena I. Bioactive  $\alpha$ , $\beta$ -conjugated 3-keto-steroids from the Australian brown alga *Cystophora xiphocarpa*. Phytochemistry 188:112798, 2021.
18. Sun J, Ambrus JJ, Russell CC, Baker JR, Cossar PJ, Pirinen MJ, Sakoff JA, Scarlett CJ, McCluskey A. Targeting the S100A2-p53 interactions with a series of novel 3,5-bistrifluoromethylbenzene sulfonamides:

- Synthesis and cytotoxicity. ChemMedChem. 2021 May 27.
19. Sun J, Baker JR, Russell CC, Cossar PJ, Pham HNT, Sakoff JA, Scarlett CJ, McCluskey A. Novel cytotoxic 1,2,3-Triazoles as potential new leads targeting S100A2-p53 Complex. ChemMedChem. 2021 May 27.
  20. Baker JR, Russell C, Gilbert J, McCluskey A and Sakoff JA. Amino alcohol acrylonitriles as broad spectrum and tumour selective cytotoxic agents. RSC Medicinal Chemistry. 12(6):929,2021.
  21. Baker JR, Pollard BL, Lin AJS, Gilbert J, Paula S, Zhu X, Sakoff JA, and McCluskey A Modelling and phenotypic screening of NAP-6 and 10-Cl-BBQ, AhR ligands displaying selective breast cancer cytotoxicity in vitro" ChemMedChem. 16(9):1499-1512,2021
  22. Gilbert J, De Iulius GN, McCluskey A and Sakoff JA. A novel naphthalimide that selectively targets breast cancer via the arylhydrocarbon receptor pathway. Scientific Reports. 10(1): 13978, 2020.
  23. Baker JR, Russell CC, Gilbert J, Sakoff JA and McCluskey A. Amino alcohol acrylonitriles as activators of the aryl hydrocarbon receptor pathway, an unexpected MTT phenotypic screening outcome. ChemMedChem. 15(6):409-505, 2020.
  24. Prachi Bhawe 1, Lalit Pallan 2, Georgina V Long 2 3, Alexander M Menzies 2 3, Victoria Atkinson 4, Justine V Cohen 5, Ryan J Sullivan 5, Vanna Chiarion-Sileni 6, Marta Nyakas 7, Katharina Kahler 8, Axel Hauschild 8, Ruth Plummer 9, Claudia Trojaniello 10, Paolo A Ascierto 10, Lisa Zimmer 11, Dirk Schadendorf 11, Clara Allayous 12, Celeste Lebbe 12, Andrea Maurichi 13, Mario Santinami 13, Severine Roy 14, Caroline Robert 14, Thierry Lesimple 15, Sapna Patel 16, Judith M Versluis 17, Christian U Blank 17, Adnan Khattak 18, Andre Van der Westhuizen 19, Matteo S Carlino 2 20, Mark Shackleton 21 22, Andrew Haydon 2. Melanoma recurrence patterns and management after adjuvant targeted therapy: a multicentre analysis
  25. Griffin, C., Vilain, R., King, S., Nixon, S., Gooley, A., Bray, S, Lynam J, Walker MM, Scott RJ, Paul, C. (2021). Mind Over Matter: Confronting Challenges in Post-Mortem Brain Biobanking for Glioblastoma Multiforme. Biomarker Insights, 16. doi:10.1177/117727192111013359
  26. Powles, T., van der Heijden, M. S., Castellano, D., Galsky, M. D., Loriot, Y., Petrylak, D. P, Lynam J, . . . Su, Y. L. (2020). Durvalumab alone and durvalumab plus tremelimumab versus chemotherapy in previously untreated patients with unresectable, locally advanced or metastatic urothelial carcinoma (DANUBE): a randomised, open-label, multicentre, phase 3 trial. The Lancet Oncology, 21(12), 1574-1588. doi:10.1016/S1470-2045(20)30541-6
- ### CONFERENCE POSTERS
1. **Gender P, Blanchard G, Healey L, Liversidge L.** Improving the management of chemotherapy/ Immunotherapy Adverse Drug reactions in the outpatient setting.
  2. **Kepreotis M, Graham L.** Nursing and Midwifery Conference May 2021: Management of Constipation in the Oncology Setting- Constipation Risk Assessment Tool (CRAT)
  3. **Sakoff J; Gilbert J;** Baker J; and McCluskey A. The aryl hydrocarbon receptor pathway and breast cancer. ASIA-PACIFIC JOURNAL OF CLINICAL ONCOLOGY. Volume: 16 Pages: 34-35 Supplement: 6 Special Issue: SI Meeting Abstract: PP15 Published: NOV 2020
  4. ASCO and ANZGOG 2021: **Tumour-associated immune cells and progression free survival in advanced endometrial cancer (EC), results from the PHAEDRA Trial (ANZGOG 1601).** Deborah Smith, Kristy P Robledo, Sonia Yip, Michelle M. Cummins, Peey-Sei Kok, Yeh Chen Lee, Michael Friedlander, Sally Baron-Hay, Catherine Shannon, Jermaine Coward, Philip Beale, Geraldine Goss, Tarek Meniawy, Janine Lombard, Amanda B. Spurdle, John Andrews, Martin R Stockler Linda Mileshekin and Yoland Antill, on behalf of Australia New Zealand Gynaecological Oncology Group (ANZGOG).
  5. ANZGOG 2021: **THE IMPACT OF OBESITY ON THE MANAGEMENT OF EARLY-STAGE ENDOMETRIAL CANCER.** Betty Zhang, Tony Bonaventura, Yvette Ius, Janine Lombard



## CONFERENCE ORAL PRESENTATIONS

Prostate Cancer – AstraZeneca Patient Advocacy Exchange Biomarker and Mutation Testing meeting, May 2021. **Lynam J**

Chair of Testicular Cancer Multidisciplinary Masterclass – Australian and New Zealand Urogenital and Prostate Cancer Trials Group (ANZUP) Annual Meeting 2020. **Lynam J**

## GRANT FUNDING

- 2020 University of Newcastle, FHEAM Pilot grants. Does Precision Exercise Increase Brain Cancer Tumour Perfusion? A pilot study, **Gedye C, Lynam J, Valkenborghs S, Ramadan S, James E**; \$9,950.
- 2021 CINSW Translational Cancer Research Capacity Building Grant, \$7,000,000, with NSW Regional Health Partners.
- O'Brien M, McCluskey A, and **Sakoff J** (2020) Investigation of quinazolinone based tubulin polymerisation inhibitors. University of Newcastle PRC Drug Development Seed Funding. \$9,000.
- Baker J, **Sakoff J**, and McCluskey A (2020). Development of Azo-phenylacrylonitriles as selective AhR antagonists. University of Newcastle PRC Drug Development Seed Funding. \$9,000.
- Sakoff J, Gilbert J, Mandaliya H** (2020). Co-culturing patient derived ascetic fluid with traditional ovarian cancer cell lines: A model for drug resistance. University of Newcastle PRC Drug Development Seed Funding. \$8,900.
- Sakoff JA** and Ackland SP (2021). MRSP Infrastructure support for Experimental Therapeutics Group. Hunter Cancer Research Alliance. \$21,600.
- Sakoff JA, Gilbert J, Aldrich-Wright J, and Mandaliya H** (2021). A cluster-bomb approach for the treatment of ovarian cancer. Jane Reid Harle Grant Scheme. CMN. \$24,322.
- Garg MB, Day F, Lynam J**, (2020) Support for HPLC infrastructure used in therapeutic drug monitoring of patients with cancer, HCRA Clinical Cancer research Fund, \$8,499.
- Garg MB, Ackland SP**, (2020) To determine pharmacokinetics (PK) of 5-Fluorouracil in Phase I study of infusional and bolus schedules of Deflexifol, a novel 5-fluorouracil and leucovorin formulation, after failure of standard treatment. Destamma Investments Pty Ltd, Austinmer, NSW \$22,095.
- Garg MB, Ackland SP**, (2021) Additional samples analysis for pharmacokinetics (PK) of 5-Fluorouracil in Phase 1 Study of Deflexifol in patients with advanced malignancy after failure of standard treatment. Destamma Investments Pty Ltd, Austinmer, NSW \$8,843.

11. **Garg MB, Ackland SP**, (2021) Pharmacokinetics (PK) analysis for Leucovorin in Phase 1 Study of Deflexifol, a novel 5-fluorouracil and leucovorin formulation, in patients after failure of standard treatment. Destamma Investments Pty Ltd, Austinmer, NSW \$27,530.

12. **Van der Westhuizen A and Sverdlow A.** Research grant: \$18,182 JHH Charitable Trust Fund - awarded for Clinical Trial: ACE-IT001.

## OTHER

**Chair-Elect:** Advanced Training Committee in Medical Oncology – Royal Australasian College of Physicians (RACP) - Lynam J

## DEPARTMENT OF RADIATION ONCOLOGY

Despite the challenges of the COVID-19 pandemic, the Department of Radiation Oncology continues to integrate a strong research priority alongside clinical service delivery. The rise of virtual meetings has taken some getting used to, but our profile continues to grow, both nationally and further afield. Some key highlights include:

- Publication of the RAVES clinical trial in the Lancet Oncology, which has shown that it is safe to monitor men who've had surgery for prostate cancer rather than treating all high risk men with immediate post-operative radiotherapy.
- 66 participants enrolled onto a range of potentially practice changing clinical trials, with 50 of these being CINSW portfolio trials.
- Establishment of the MRI Meta-project, which provides a platform to streamline research associated with our MRI scanner.
- Several of our clinical and research staff continue to work on research higher degrees with departmental support.
- Submission of AAPM Task Group 307 report (Prof Peter Greer, Vice-chair) – "The Use of EPIDs for Patient-Specific IMRT and VMAT QA". It is a measure of Peter's standing in the field that he was invited to take a leading role with this highly influential North American based group.
- Our trial coordination team centrally running two randomized multicentre studies.
- A mix of investigator initiated and industry sponsored clinical trials.
- Publication of the SPARK clinical trial validating very accurate treatment delivery for prostate cancer and leading to these approaches now entering standard clinical practice.
- HNELHD (of which the Radiation Oncology Clinical Trial Unit is a part of) were the recipients of the NSW Premiers Award for Outstanding Clinical Trials for 2020.

## PUBLICATIONS

- Marcello, M., Denham, J. W., Kennedy, A., Haworth, A., Steigler, A., Greer, P. B., . . . Ebert, M. A. (2020). Increased Dose to Organs in Urinary Tract Associates With Measures of Genitourinary Toxicity in Pooled Voxel-Based Analysis of 3 Randomized Phase III Trials. *Frontiers in Oncology*, 10, art 1174. (Jul)
- Olaciregui-Ruiz, I., Beddar, S., Greer, P., Jornet, N., McCurdy, B., Paiva-Fonseca, G., . . . Verhaegen, F. (2020). In vivo dosimetry in external beam photon radiotherapy: Requirements and future directions for research, development, and clinical practice. *Physics and Imaging in Radiation Oncology*, 15, 108-116. (Jul)
- Keall P, Nguyen DT, O'Brien R, Hewson E, Ball H, Poulsen P, Booth J, Greer P, Hunter P, Wilton L, Bromley R, Kipritidis J, Eade T, Kneebone A, Hruby G, Moodie T, Hayden A, Turner S, Arumugam S, Sidhom M, Hardcastle N, Siva S, Tai KH, GebSKI V, Martin J. Real-Time Image Guided Ablative Prostate Cancer Radiation Therapy: Results From the TROG 15.01 SPARK Trial. *Int J Radiation Oncology Biol Phys*. 2020 Jul 1;107(3):530-538. (Jul)
- Marcello, M., Denham, J. W., Kennedy, A., Haworth, A., Steigler, A., Greer, P. B., . . . Ebert, M. A. (2020). Relationships between rectal and perirectal doses and rectal bleeding or tenesmus in pooled voxel-based analysis of 3 randomised phase III trials. *Radiotherapy and Oncology*, 150, 281-292. (Sep)
- Mir, R., Kelly, S. M., Xiao, Y., Moore, A., Clark, C. H., Clementel, E., Corning, C., Ebert, M., Hoskin, P., Hurkmans, C. W., Ishikura, S., Kristensen, I., Kry, S. F., Lehmann, J., Michalski, J. M., Monti, A. F., Nakamura, M., Thompson, K., Yang, H., Zubizarreta, E., Andratschke, N., Miles, E., Organ at risk delineation for radiation therapy clinical trials: Global Harmonization Group consensus guidelines, *Radiotherapy and Oncology*, Volume 150, 2020, Pages 30-39, (Sep)
- Gholizadeh, N., Simpson, J., Ramadan, S., Denham, J., Lau, P., Siddique, S., . . . Greer, P. B. (2020). Voxel-based supervised machine learning of peripheral zone prostate cancer using noncontrast multiparametric MRI. *Journal of Applied Clinical Medical Physics*. (Oct)
- Hewson, E. A., Nguyen, D. T., O'Brien, R., Poulsen, P. R., Booth, J. T., Greer, P., . . . Keall, P. J. (2020). Is multileaf collimator tracking or gating a better intrafraction motion adaptation strategy? An analysis of the TROG 15.01 Stereotactic Prostate Ablative Radiotherapy with KIM (SPARK) trial. *Radiotherapy and oncology: journal of the European Society for Therapeutic Radiology and Oncology*. (Oct)
- Frank Verhaegen, Gabriel P. Fonseca, Jacob G. Johansen, Luc Beaulieu, Sam Beddar, Peter

- Greer, Nuria Jornet, Gustavo Kertzscher, Boyd McCurdy, Ryan L. Smith, Ben Mijnheer, Igor Olaciregui-Ruiz, Kari Tanderup, Future directions of in vivo dosimetry for external beam radiotherapy and brachytherapy, *Physics and Imaging in Radiation Oncology*, Volume 16, 2020, 18-19 (Oct)
9. Caillet V, Zwan B, Briggs A, Hardcastle N, Szymura K, Prodreka A, O'Brien R, Harris BE, Greer P, Haddad C, Jayamanne D, Eade T, Booth J, Keall P. Geometric uncertainty analysis of MLC tracking for lung SABR. *Phys Med Biol*. 2020 Dec 2;65(23):235040. (Nov)
  10. Dowling JA, O'Connor LM. Deformable image registration in radiation therapy, *Journal of Medical Radiation Sciences* 67(4):257-259 01 Dec 2020 (Dec)
  11. Al-ledani O, Ribbons K, Gholizadeh N, Lechner-Scott J, Quadrelli S, Lea R, Andronesi O, Ramadan S., Spiral MRSI and tissue segmentation of normal-appearing white matter and white matter lesions in relapsing remitting multiple sclerosis patients, *Magnetic Resonance Imaging* 74:21-30 2020 (Dec)
  12. Marcello, M., Denham, J. W., Kennedy, A., Haworth, A., Steigler, A., Greer, P. B., Holloway, L. C., Dowling, J. A., Jameson, M. G., Roach, D., Joseph, D. J., Gulliford, S. L., Dearnaley, D. P., Sydes, M. R., Hall, E., Ebert, M. A., Reduced Dose Posterior to Prostate Correlates With Increased PSA Progression in Voxel-Based Analysis of 3 Randomized Phase 3 Trials, (2020) *International Journal of Radiation Oncology Biology Physics* 108(5): 1304-1318 (Dec)
  13. Kneebone, A., Fraser-Browne, C., Duchesne, G. M., Fisher, R., Frydenberg, M., Herschtal, A., Williams, S. G., Brown, C., Delprado, W., Haworth, A., Joseph, D. J., Martin, J. M., Matthews, J. H. L., Millar, J. L., Sidhom, M., Spry, N., Tang, C. I., Turner, S., Wiltshire, K., Woo, H. H., Davis, I. D., Lim, T. S., Pearse, M., Adjuvant radiotherapy versus early salvage radiotherapy following radical prostatectomy (TROG 08.03/ANZUP RAVES): a randomised, controlled, phase 3, non-inferiority trial, *The Lancet Oncology*, Volume 21, Issue 10, 2020, Pages 1331-1340, ISSN 1470-2045, [https://doi.org/10.1016/S1470-2045\(20\)30456-3](https://doi.org/10.1016/S1470-2045(20)30456-3).
  14. Gao, F., Griffin, N., Faulkner, S., Li, X., King, S.J., Jobling, P., Denham, J.W., Jiang, C.C., Hondermarck, H., The Membrane Protein Sortilin Can Be Targeted to Inhibit Pancreatic Cancer Cell Invasion, (2020) *American Journal of Pathology*, 190 (9), pp. 1931-1942, DOI: 10.1016/j.ajpath.2020.05.018
  15. Delahunt, B., Murray, J.D., Steigler, A., Atkinson, C., Christie, D., Duchesne, G., Egevad, L., Joseph, D., Matthews, J., Oldmeadow, C., Samaratunga, H., Spry, N.A., Srigley, J.R., Hondermarck, H., Denham, J.W., Perineural invasion by prostate adenocarcinoma in needle biopsies predicts bone metastasis: Ten year data from the TROG 03.04 RADAR Trial, (2020) *Histopathology*, DOI: 10.1111/his.14107
  16. Perkins T, Lee D, Simpson J, Greer P, Goodwin J., Experimental evaluation of four-dimensional Magnetic Resonance Imaging for radiotherapy planning of lung cancer, *Physics and Imaging in Radiation Oncology* 17:32-35 01 Jan 2021 (Jan)



17. Shaw M, Lye J, Alves A, Hanlon M, Lehmann J, Supple J, Porumb C, Williams I, Geso M, Brown R., Measuring the dose in bone for spine stereotactic body radiotherapy, *Physica Medica* 01 Jan 2021 (Jan)
18. Mahmood S, Bollipo S, Steele S, Bristow RG, Choudhury A, Oakland K, Martin J., It's All the RAVE: Time to Give up on the "Chronic Radiation Proctitis" Misnomer, *Gastroenterology* 160(3):635-638 01 Feb 2021 (Feb)
19. Jessica Lye, Stephen F Kry, Joerg Lehmann "Dosimetric considerations with FFF beams" in "Radiation Therapy Dosimetry: A Practical Handbook" edited by Arash Darafsheh, CRC Press ISBN: 978-1138543973, 1st Edition (February 23, 2021)
20. Lim SB, Zwan BJ, Lee D, Greer PB, Lovelock DM. A novel quality assurance procedure for trajectory log validation using phantom-less real-time latency corrected EPID images. *J Appl Clin Med Phys.* 2021 Mar;22(3):176-185. doi: 10.1002/acm2.13202. Epub 2021 Feb 26. PMID: 33634952; PMCID: PMC7984475. (Mar)
21. Zwan, B.J., Caillet V., Booth J.T., Colville E., Fuangrod T., O'Brien R., Briggs A., O'Connor, D.J., Keall, P.J., Greer, P.B., Toward real-time verification for MLC tracking treatments using time-resolved EPID imaging, *Medical Physics*, 248(3): 953-964, 2021 (Mar)
22. Wang, Y., Tadimalla, S., Rai, R., Goodwin, J., Foster, S., Liney, G., Holloway, L., Haworth, A. Quantitative MRI: Defining repeatability, reproducibility and accuracy for prostate cancer imaging biomarker development (2021) *Magnetic Resonance Imaging*, 77, pp. 169-179. (Apr)
23. Chourak, H., Barateau, A., Mylona, E., Cadin, C., Lafond, C., Greer, P., Dowling, J., Jean-Claude-Nunes, Crevoisier, R.D., Acosta, O. Voxel-wise analysis for spatial characterisation of pseudo-ct errors in MRI-only radiotherapy planning (2021) *Proceedings- International Symposium on Biomedical Imaging*, 2021-April, art. no. 9433800, pp. 395-399. (Apr)
24. Keall, P.J., Sawant, A., Berbeco, R.I., Booth, J.T., Cho, B., Cerviño, L.I., Cirino, E., Dieterich, S., Fast, M.F., Greer, P.B., Munck af Rosenschöld, P., Parikh, P.J., Poulsen, P.R., Santanam, L., Sherouse, G.W., Shi, J. and Stathakis, S. (2021), AAPM Task Group 264: The safe clinical implementation of MLC tracking in radiotherapy. *Med. Phys.* 48(5): e44-e64 (May)
25. Kry SF, Lye J, Clark CH, Andratschke N, Dimitriadis A, Followill D, Howell R, Hussein M, Ishikawa M, Kito S, et al., Report dose-to-medium in clinical trials where available; a consensus from the Global Harmonisation Group to maximize consistency, *Radiotherapy and Oncology* 159:106-111 01 Jun 2021 (Journal article) (Jun)
26. Calvo-Ortega, J.-F., Greer, P.B., Hermida-López, M., Moragues-Femenía, S., Laosa-Bello, C., Casals-Farran, J, Validation of virtual water phantom software for pre-treatment verification of single-isocenter multiple-target stereotactic radiosurgery (2021) *Journal of Applied Clinical Medical Physics*, 22 (6), pp. 241-252 (Jun)
27. Kry, S.F., Lye, J., Clark, C.H., Andratschke, N., Dimitriadis, A., Followill, D., Howell, R., Hussein, M., Ishikawa, M., Kito, S., Kron, T., Lee, J., Michalski, J., Filippo Monti, A., Reynaert, N., Taylor, P., Venables, K., Xiao, Y., Lehmann, J. Report dose-to-medium in clinical trials where available; a consensus from the Global Harmonisation Group to maximize consistency (2021) *Radiotherapy and Oncology*, 159, pp. 106-111. (Jun)
28. Forbes, E., Baker, A. L., Britton, B., Clover, K., Skelton, E., Oultram, S., Oldmeadow, C., McCarter, K. Non-pharmacological approaches to procedural anxiety reduction for patients undergoing radiotherapy for cancer: systematic review protocol (2020). *BMJ Open*, 10:e035155. doi:10.1136/bmjopen-2019-035155
29. Beck, A. K., A. L. Baker, G. Carter, L. Robinson, K. McCarter, C. Wratten, J. Bauer, L. Wolfenden and B. Britton (2021). "Is fidelity to a complex behaviour change intervention associated with patient outcomes? Exploring the relationship between dietitian adherence and competence and the nutritional status of intervention patients in a successful stepped-wedge randomised clinical trial of eating as treatment (EAT)." *Implement Sci* 16(1): 46.
30. Beck, A. K., A. L. Baker, G. Carter, C. Wratten, J. Bauer, L. Wolfenden, K. McCarter and B. Britton (2020). "Assessing Adherence, Competence and Differentiation in a Stepped-Wedge Randomised Clinical Trial of a Complex Behaviour Change Intervention." *Nutrients* 12(8).
31. Fraser, A., C. Odelli, B. Britton, M. Kumar, F. Day, M. T. Tieu and C. Wratten (2020). "Gastrostomy dependency trends over 15 years of patients at a large tertiary referral center following the insertion of a prophylactic gastrostomy for chemoradiation for mucosal head and neck cancer." *Asia Pac J Clin Oncol* 16(5): e198-e206.
32. Jeans, C., B. Brown, E. C. Ward, A. E. Vertigan, A. E. Pigott, J. L. Nixon and C. Wratten (2020). "Comparing the prevalence, location, and severity of head and neck lymphedema after postoperative radiotherapy for oral cavity cancers and definitive chemoradiotherapy for oropharyngeal, laryngeal, and hypopharyngeal cancers." *Head Neck* 42(11): 3364-3374.
33. Jeans, C., E. C. Ward, B. Brown, A. E. Vertigan, A. E. Pigott, J. L. Nixon, C. Wratten and M. Boggess (2021). "Association between external and internal lymphedema and chronic dysphagia following head and neck cancer treatment." *Head Neck* 43(1): 255-267.
34. Young, R. J., B. Solomon, J. Corry, C. Angel, L. Kenny, S. Porceddu, C. Wratten, A. Macann, J. E. Jackson, A. Herschtal and D. Rischin (2020). "Validation of local p16 testing for determination of human papilloma virus status eligibility on a low risk oropharyngeal cancer trial- A Trans-Tasman Radiation Oncology Group study." *Oral Oncol* 110: 104988.
35. Shaw, M., Lye, J., Alves, A., Hanlon, M., Lehmann, J., Supple, J., Porumb, C., Williams, I., Geso, M., Brown, R. Measuring the dose in bone for spine stereotactic body radiotherapy (2021) *Physica Medica*, in press
36. Richardson, M., Skehan, K., Wilton, L., Sams, J., Samuels, J., Goodwin, J., Greer, P., Sridharan, S., Martin, J. Visualising the urethra for prostate radiotherapy planning (2021) *Journal of Medical Radiation Sciences*, in press (Jul)
37. Raith A, Ehr Gott M, Fauzi F, Lin K-M, Macann A, Rouse P, Simpson J, Integrating Data Envelopment Analysis into radiotherapy treatment planning for head and neck cancer, *European Journal of Operational Research* (in-press)

#### CONFERENCE PRESENTATIONS

1. Lehmann, J., Hussein, M., Siva, S., Moore, A., Standen, T., Subramanian, B., Greer, P., Clark, C. H., "Differences in sensitivity of Patient Specific Quality Assurance systems to clinically relevant treatment delivery errors – results from the SEAFARER study" *Engineering Physical Sciences in Medicine (EPSM) 2020*, virtual, oral presentation
2. Lehmann, J., Pedersen, T., Wolf, J., Wilfert, A., "Surface Image Guided Radiation Therapy Implementation", *Engineering Physical Sciences in Medicine (EPSM) 2020*, virtual, oral presentation
3. Kron, T., Lonski, P., Lehmann, J., "Timely review of electronic portal images in a multicentre clinical trial of deep inhalation breath hold in breast cancer patients" *Engineering Physical Sciences in Medicine (EPSM) 2020*, virtual, oral presentation
4. Brown, R., Lye, J., Shaw, M., Crane, R., Briggs, A., Cooper, S., Shirley, B., Turk, A., Lehmann, J., Skehan, K., Begg, J., Rai, R., Booth, J., Baines, J., "Audit development for online adaptive radiotherapy for MRI and CBCT based systems" *Engineering Physical Sciences in Medicine (EPSM) 2020*, virtual, oral presentation
5. Lye, J., Alves, A., Shaw, M., Kadeer, F., Supple, J., Cole, A., Lehmann, J., Brown, R., "IMRT and VMAT deliveries with FFF fields assessed with end-to-end dosimetry audit" *Engineering Physical Sciences in Medicine (EPSM) 2020*, virtual, oral presentation

6. Greer P.B. (2020) Prediction of EPID-based VMAT patient-specific quality assurance results, Engineering and Physical Sciences in Medicine (EPSM), virtual, oral presentation, November 2020
7. Greer P.B. (2020), Investigation of an improved method for EPID-based IMRT and VMAT patient-specific quality assurance, Engineering and Physical Sciences in Medicine (EPSM), virtual, oral presentation, November 2020
8. Lim, S. B., Tsai, C. J., Greer, P., Fuangrod, T., Coffman, F., Lee, N., . . . Lovelock, D. M. (2020). Comparison of Patient Reported Xerostomia Risk and the Fluence-based Decision Support Metric. In *INTERNATIONAL JOURNAL OF RADIATION ONCOLOGY BIOLOGY PHYSICS* Vol. 108 (pp. S79). ELECTR NETWORK: ELSEVIER SCIENCE INC.
9. Calvo Ortega, J. F., Greer, P., Hermida-Lopez, M., Moragues-Femenia, S., & Casals-Farran, J. (2020). Pre-treatment verification of multi-target SRS using a virtual water phantom. In *RADIOTHERAPY AND ONCOLOGY* Vol. 152 (pp. S706-S707).
10. Vasina, E., Greer, P., & Lehmann, J. (2020). Verification of new software for assessment of the quality of deep inspiration breath hold (DIBH) in radiotherapy of breast cancer. Real-time measurements of the lung depth with radiotherapy phantoms. In *ASIA-PACIFIC JOURNAL OF CLINICAL ONCOLOGY* Vol. 16 (pp. 42-43). WILEY.
11. Szwec, S., Greer, P., Lee, D., Barnes, M., Hernandez, V., Saez, J., . . . Sun, B. (2020). Statistical analysis of EPID-based VMAT patient-specific quality assurance and investigation of contributing factors. In *ASIA-PACIFIC JOURNAL OF CLINICAL ONCOLOGY* Vol. 16 (pp. 39). WILEY.
12. Cassell, C., Ortega, J. B., Lee, D., Kong, N., & Greer, P. (2020). Real-time analysis for verification of external beam radiotherapy. In *ASIA-PACIFIC JOURNAL OF CLINICAL ONCOLOGY* Vol. 16 (pp. 18-19). WILEY.
13. Lehmann, J., Hussein, M., Siva, S., Moore, A., Standen, T., Subramanian, B., . . . Clark, C. H., Sensitivity assessment system to improve quality in radiation oncology treatments, (2020). Rapid-Fire Presentation Abstracts. In *ASIA-PACIFIC JOURNAL OF CLINICAL ONCOLOGY* Vol. 16 (pp. 17). WILEY. doi:10.1111/ajco.13472
14. Choi, J. H., Welsh, J., Chalup, S., & Greer, P. (2020). Automatic generation of synthetic CT and bulk anatomical density map using deep learning for MRI-only radiotherapy treatment planning. In *ASIA-PACIFIC JOURNAL OF CLINICAL ONCOLOGY* Vol. 16 (pp. 23). WILEY.
15. Gholizadeh, N., Greer, P., & Goodwin, J. (2020). Assessment of GlucoCEST MRI acquisition and clinical potential. In *ASIA-PACIFIC JOURNAL OF CLINICAL ONCOLOGY* Vol. 16 (pp. 33-34). WILEY.
16. Phonlakrai, M., et al., Deconvolution analysis to quantify liver function and generate parametric maps using low temporal resolution dynamic contrast-enhanced MRI with Gadoxetic acid disodium in focal liver cancer patients. In *ASIA-PACIFIC JOURNAL OF CLINICAL ONCOLOGY* Vol. 16 (pp. 39). WILEY.
17. Lehmann, J., Hussein, M., Standen, T., Siva, S., Moore, A., Subramanian, B., . . . Clark, C. (2019). Toward Safe Delivery of Radiation Therapy-Assessment of the Sensitivity of Clinically Used Patient-Specific Quality Assurance Methods. In *ASIA-PACIFIC JOURNAL OF CLINICAL ONCOLOGY* Vol. 15 (pp. 23). WILEY.
18. Martin, J., Sidhom, M., Pryor, D., Tang, C., Hayden, A., Miller, A., . . . Tomaszewski, J. (2021). Against the motion rebuttal: Brachytherapy Boost for Prostate Cancer- A Diminishing Solution. In *RADIOTHERAPY AND ONCOLOGY* Vol. 158 (pp. S20). ELSEVIER IRELAND LTD
19. Niazi T, Williams S, Davis ID, Stockler MR, Martin AJ, Bracken K, Roncolato F, Horvath L, Martin J, Lim TS, et al. DASL-HiCaP: Darolutamide augments standard therapy for localized very high-risk cancer of the prostate (ANZUP1801)-A randomized phase III double-blind, placebo-controlled trial of adding darolutamide to androgen deprivation therapy and definitive or salvage radiation. *JOURNAL OF CLINICAL ONCOLOGY*. LIPPINCOTT WILLIAMS & WILKINS. 39: 2 pages. 20 Feb 2021 (Conference)
20. Rischin, D., M. King, L. Kenny, S. Porceddu, C. Wratten, A. Macann, J. E. Jackson, M. Bressel, A. Herschtal, R. Fisher, T. Fua, C. Lin, C. Liu, B. G. M. Hughes, M. McGrath, L. McDowell and J. Corry (2021). "Randomised trial of radiotherapy with weekly cisplatin or cetuximab in low risk HPV associated oropharyngeal cancer (TROG 12.01)- a Trans-Tasman Radiation Oncology Group study." *Int J Radiat Oncol Biol Phys*.

#### GRANTS

1. Greer P, Hunter Medical Research Institute, HMRI Support Grant, HMRI RSP Seed Funding Grant – Verification of online adaptive therapy, 2020, (\$25,000)
2. Greer P, Hunter Cancer Research Alliance – MRSP Funding, 2021, (\$21,600)
3. Martin J, Day F – PALEO Clinical Trial, Varian Medical Systems 2021-22 (\$170,000)

#### RESEARCH HIGH DEGREE

1. Dr Adam McNeilly, PhD, University of Newcastle, *Investigations of an EPID-based dose reconstruction method for applications in MRI-Linac radiotherapy*, March 2021

#### CLINICAL TOXICOLOGY AND PHARMACOLOGY

The department is involved in undergraduate and postgraduate teaching and has a very active research program. This was shown by the 36 articles published in refereed journals and six papers presented at international or national conferences in 2020-21. Topics included drug-induced QT prolongation, treatment of paracetamol poisoning, the management of behaviourally disturbed adults, relative toxicity of drugs in overdose and an extensive series of publications on venoms and antivenoms from the Clinical Toxicology Research Group.