

# CHARM

CANBERRA HEALTH  
Annual Research Meeting

## PROGRAM

30 July – 2 August 2019

Canberra Hospital Auditorium

*Celebrating Health Research in  
the Canberra Region*



Professor  
Alan Mackay-Sim



Professor  
Patsy Yates



Professor  
Caroline Homer



Professor  
Mark Morrison





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# MESSAGE FROM RACHEL STEPHEN-SMITH MLA, MINISTER FOR HEALTH



It gives me great pleasure to welcome you to the 2019 Canberra Health Annual Research Meeting (CHARM).


In a time of population growth and increasing disease burden, the goal of a sustainable healthcare system is a key area for research. Innovative health research that understands and evaluates ways of closing the gaps between evidence and practice, is critical to global health. CHARM 2019 will explore how interdisciplinary research can contribute to informed decision making and fulfilling this goal.

CHARM continues to be an excellent forum for showcasing health research achievements and supporting the Canberra region community to innovate and maximise the impact and contribution made by our healthcare researchers

CHARM 2019 provides opportunities for networking, collaboration and capacity building for researchers and clinicians in the ACT and beyond.

CHARM has been organised by the ACT Health Directorate Centre for Health and Medical Research, in collaboration with Canberra Health Services and our academic partners. I acknowledge the contribution of each of these institutions as well as the CHARM organising, program and scientific review committees.

I would also like to acknowledge and thank the many sponsors for their generous support of this meeting.





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3 Minute Thesis competition		
Ashleigh d'Arx	Drowning in it: breathing hard or hardly breathing	
Pouya Saeedian	Destiny or design: does preoperative knee kinematics influence postoperative knee kinematics after total knee replacement?	
Emily Rowland	Have you got leaky muscles?	
Luke Bicket	Debilitating hip pain: where are they now?	
Matt Boom	Staying strong with Parkinson's – a matter of measurement	
Claire Williams	Leaked: a female athlete's biggest hurdle	
Rhys Knowles	The Er81 transcription factor in interneuron development	
Jayden Hunter	Greater trochanteric pain syndrome (GTPS) and orthoses: a potential step towards recovery	
Caitlin Howard	Blood, sweat and tears: quantitative image analysis of tendons	
Nathan de Meillon	Parkinson's disease: taking stronger steps in the right direction	
Kevin Tee	Increasing rates of hypospadias in the ACT - approaching penis apocalypse?	
Madhur Chhabra	Going around in circles: bouncing back from knee surgery	
Sandali Seneviratne	Combating the repercussions of reperfusion	
Nicole McDerby	Proximity and partnerships: including pharmacists in Australian aged care homes to improve quality use of medicines	
Rosemary Clifford	Orthorexia nervosa: healthy eating on a disordered level	

Day 1 (Continued)		
30 July: ACT in Profile – big initiatives		
Brendan Tonson-Older	Comparison of standard automated perimetry and multifocal pupillographic objective perimetry (mfPOP) in stroke	
Joshua Bishop	How love triumphs: the attitudes, skills and knowledge of mental health service providers towards lesbian, gay and bisexual clients	
Noorya Ahmed	Can we connect? Modulators in the brain during development.	
Jyoti Paul	Super-resolution retinal imaging with computational adaptive optics	
Changhan Xu, Shelley Gao	Admission platelet-to-lymphocyte ratio (PLR) and lymphocyte-to-monocyte ratio (LMR) – two novel independent predictors of in-hospital mortality in older patients with hip fracture (HF)	
Lithin Louis	Biomolecular interactions could hold the secrets to treat heart attack	
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Distinguished Professor Patsy Yates	Achieving quality palliative care for all	39
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Professor Michael Woods	Improving the availability of palliative care – identifying unmet need at the local level	40
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Rory Maguire	Enabling access to quality end of life and palliative care in a prison setting	42
Margaret Broom	Caring for dying babies and their families: an experience based co-design study	43

## Day 3

### 1 August: ACT research in focus

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Professor Caroline Homer	Maternal health – why it matters	
Oral presentations		
Ben Cooper	Better targeting for moving tumours in radiation therapy	
Yuan Chai	Fast and accurate customized pelvic fixation plate design using 3D modelling and 3D printing	
Diana Perriman	Shape is only a weak predictor of deep knee flexion kinematics in healthy and osteoarthritic knees	
Catherine Galvin	Prediction of the Kellgren-Lawrence Knee Osteoarthritis Severity Grade. A predictive data model using the kinematics of kneeling	
Jeffrey Looi	Increased functional connectivity of the thalamus in patients with Parkinson's disease: clinical pathophysiology of functional compensation	
Devashi Paliwal	Investigating the role of mitochondrial genomic variation in Alzheimer's disease	
Kathleen O'Brien	Risk of behavioural and mental health disorders and developmental delay, in kindergarten boys and girls	
Naomi Clarke	Optimising control programs for soil-transmitted helminth	
Karen Strickland	Supported decision-making to assist older persons experiencing elder abuse: systematic review	
Katherine Angus	Smartphone apps used for breastfeeding and their response to infants experiencing suboptimal feeding	
Dona Dolphus	Improving the care of patients with behavioural and psychological symptoms of dementia (BPSD) in acute care	
Emily Lewis	Adherence to lifestyle intervention in adults with obesity	
Elizabeth Webb	Keeping the pressure on: does compression therapy prevent cellulitis? Results of a randomised controlled trial	
Jane Van	Incidence of atrial fibrillation in stroke work-up patients identified by 24-hour Holter monitoring	



Day 3 (Continued)		
1 August: ACT research in focus		
Rebecca Cesnik	Self-reported physical activity levels and barriers in patients with cancer undergoing chemotherapy in the ACT: a cross sectional study	
Jane Desborough	Un-planned 30 day readmissions for lower limb arthroplasty patients in the ACT: a cross-sectional survey	
Maureen O'Brien	Focus on the living before the dying: advance care planning perspectives amongst those with Parkinson's disease	
Kathryn Speer	Validity and reliability of a photoplethysmography device for measuring heart rate variability in paediatrics	
Claire Pearce	The contested nature of obesity and the role of health services in prevention	
Melinda Choy	Digital health tools and vulnerable populations: how do patients with substance dependence experience eCHAT	
Angelos Sharobeam	Anticoagulant prescribing practices in patients with ischaemic stroke: how much has changed over a decade?	
Sumeet Rai	Characteristic and outcomes of very elderly patients admitted to Australian New Zealand ICUs: a binational, retrospective multi-centre cohort analysis	
Drew Richardson	Incidence of access block and critical boarding of mental health presentations in Australasia	

Day 4		
2 August: ACT research in focus		
Keynote speaker		
Professor Mark Morrison	The gut microbiome – characterising the “x-factor” of Genotype x Environment x Lifestyle interactions affecting our digestive health and wellbeing?	
Oral presentations		
Thiru Prasanna	Metastasectomy and BRAF mutation; an analysis of survival outcome in metastatic colorectal cancer	
Fathima Ayyalil	Platelet function in paroxysmal nocturnal haemoglobinuria	
Lucy Coupland	Rotational thromboelastometry (ROTEM) provides greater insight into bleeding risk than platelet count in thrombocytopenic patients	

Day 4 (Continued)		
2 August: ACT research in focus		
Dan Dan Tian	JNK1 and SOCS3 are implicated in NASH-associated hepatocarcinogenesis	
Viviane Delghingaro-Augusto	Is the islet beta-cell hyper-responsiveness causing obesity-related type 2 diabetes in the high-fat fed NOD. B10 foz/foz mice?	
Daniela Andrea Espinoza Oyarce	The effect of clinical depression and depression comorbid with anxiety on brain structure	
Charmaine Simeonovic	Circulating platelet-neutrophil aggregates represent a peripheral biomarker of type 1 diabetes (T1D) development and account for apparent neutropenia in human T1D	
Jessica Aw	Investigating spatial convergence of diagnosed dementia, depression and type 2 diabetes prevalence	
Sally Hall	Factors associated with clinical practice variation in general practice management of diabetes and coronary heart disease: a systematic review of the literature	
James O'Connor	Intravital imaging reveals distinct anti-parasite activities of antibodies targeting the Plasmodium falciparum circumsporozoite protein	
Mukta Das Gupta	Comparative genomics of E. coli isolated from adult and paediatric patients with inflammatory bowel disease and controls	
Sha Sha	Relative importance of clinical and sociodemographic factors in association with postoperative deaths in colorectal cancer patients in New South Wales: an artificial neural network approach	
Claudia Slimings	Social and community networks influence dietary attitudes in regional New South Wales, Australia	
Louise Brightman	Determining patient attendance, access to interventions and clinical outcomes in a publicly funded obesity program: results from the multi-disciplinary Canberra Obesity Management Service	
Natalia Martin	NLRP3-mediated inflammasome activation by E. coli isolated from patients with and without inflammatory bowel disease	

## Poster Presentations

Geetha Warriar	A 2.5 year experience in endobronchial ultrasound guided transbronchial needle aspiration (EBUS-TBNA) at the Canberra Hospital	
Abbey Frame	Assessment of satisfaction with end of life care at the Canberra Hospital	
Andrew Slattery	An assessment of older adults and food packaging in hospitals	
Caroline Gouws	Phytochemical composition of Australian grown <i>Opuntia ficus indica</i> cladode juice and pomace	
Catherine Galvin	Kinematics of kneeling are associated with patient outcomes, clinical measures and functional tests	
Claire Speer	A review of foods and beverages offered at satellite haemodialysis unit against Nutrition Standards	
Euan McNaughton	False positive serum protein electrophoresis caused by alemtuzumab, obinutuzumab, and tocilizumab	
Maddison Hunter	The relationship between colour, antioxidant and phytochemical properties of a selection of commercially available Australian honeys.	
Marcela Pinto do Nascimento	C-reactive protein assay interference associated with Waldenstrom's macroglobulinaemia	
Monica Armstrong	Comprehensive FISH testing to screen for secondary abnormalities in mantle cell lymphoma: a retrospective study	
Nick Dennett	JUMP into patient experiences	
Nicole McDerby	Proximity and partnerships: controlled pilot trial exploring the feasibility of a residential care pharmacist model	
Rebecca Cesnik	Physical activity levels in patients with cancer undergoing chemotherapy: a systematic review	
Sam Thompson	Improving the nutritional intake of aged care patients on texture modified diets	
Tami Moore	Development of new soup recipes to meet the needs of inpatients in a large tertiary hospital	
Tayne Ryall	An audit of the use of simulation in Australian and New Zealand physiotherapy curricula	
Tayne Ryall	Does the addition of MASK-ED simulation to usual teaching improve clinical performance of physiotherapy students? A randomised trial protocol	

## Poster Presentations (Continued)

Yi-Ying Zeng	A posterior-to-anterior glide of the tibia may be more effective than the traditional anterior-to-posterior glide for increasing knee flexion: a pilot randomised controlled trial	
Elizabeth Paver	Cep17 silver in situ hybridization (SISH) for assessment of suspected molar gestation in paraffin-embedded placental tissues	
Alexander Turbayne	Procedure duration of endoscopic retrograde cholangio-pancreatography: correlations with demographics, indications, findings and outcomes	
Alice Richardson	Spatial analysis of chlamydia pneumoniae and Mycoplasma pneumoniae in the ACT region	
Angela Liao	Consumer expectations of transfusion information	
Angelos Sharobeam	Clinico-pathological dissociation in NMO Spectrum Disorders – TCH Experience	
Ashwathi Krishnan Varikara	Dedifferentiated liposarcoma masquerading as an inflammatory myofibroblastic tumour (IMT) – a case report and review of literature	
Bhim Bahadur Rai	Pattern of vitreo-retinal diseases at the national referral hospital in Bhutan: a retrospective, hospital-based study	
Bhim Bahadur Rai	Comparing retinal thickness and Matrix 10-2 functional testing in diabetic macular oedema	
Yi Ren Bong	The effect of new oral anticoagulants and warfarin on geriatric hip fractures	
Dean Robertson	The Impact of pre-hospital treatment of supraventricular tachycardia on emergency department patient flow	
Drew Richardson	Sustainability of a crowding intervention after three years	
Drew Richardson	Prevalence of alcohol and methamphetamine related presentations in Australasian emergency departments	
Drew Richardson	Effectiveness of a seasonal crowding intervention	
Ekaterina Jovic	Review of fully dilated caesarean sections and instrumental trials in the operating theatre	
Ella Berry	Retrospective review of the treatment and ophthalmic outcomes of severe retinopathy of prematurity at a single centre over 10 years	
Erica Keller	Clinical features of invasive <i>Listeria</i> infection at the Canberra Hospital, ACT, Australia, 1997-2017	





Poster Presentations (Continued)		
Geoffrey Speldewinde	Effectiveness of thermal neurotomy (Simplicity vs monopolar perforaminal) in improving physical and psychological function in sacroiliac joint pain	
Geoffrey Speldewinde	The effects of relieving thoracic zygapophysial joint pain on psychological and physical function	
Geoffrey Speldewinde	A prospective consecutive case series of High Frequency 10 KHZ Spinal Cord Stimulation for chronic pain in a community practice	
James Falconer	Procedural sedation in a tertiary trauma centre: a retrospective audit	
Julia Potter	How pre-analytic handling changes a diagnosis and apparent incidence of disease: gestational diabetes mellitus (GDM)	
Juliana Mai	Trauma and the face of mental illness: are we acting too late?	
Kiran Qayyum	Carboplatin and hypomagnesaemia: is it really a problem?	
Lauren Turner	Sickly or sweet? Factors influencing HbA1C control in a general practice population	
Louise Wei	A Tail of Two Lumens: interventional treatment of vertebral artery transection in a trauma setting, a case presentation	
Mitchell Evans	Open plan and two cot NICU design: Comparing neonatal neurodevelopmental outcomes	
Nicholas Taylor	Stopping haemorrhage by application of rope tourniquet or inguinal compression (SHARC study)	
Nikita Parkash	RCTs: approaching the asymptote?	
Rachael Heath Jeffery	Chronic norovirus infection in common variable immune deficiency- case report and literature review	
Roberto Orefice	Clinical input into information technology interfaces improves clinical outcomes – a case study of vaccinations in pregnancy	
Sarah Gilbert-Moore	Does using automated office blood pressure in a busy renal outpatient clinic as opposed to standard office blood pressure change the antihypertensive management of patients?	
Sewa Rijal	Identifying novel prognostic markers for diffuse large B cell lymphoma (DLBCL)	
Shannon Woodward	Patient delivered partner therapy for chlamydia: patient and partner acceptability	

Poster Presentations (Continued)		
Yi Deng	The problem of aseptic loosening and osteolysis after total joint replacement and the potential role of microRNA	
Ghada Gleeson	Is it time to revive cost-benefit analysis for the evaluation of clinical interventions? Balancing cost and quality in healthcare	
Hanna Suominen	Towards a customer-friendly online form for children with diabetes and their carers to communicate a care plan to a teacher	
Mary Lorraine Mationg	Magic Glasses Philippines: a school-based health education package to prevent soil-transmitted helminth (STH) infections among schoolchildren in the Philippines	
Wendy Beckingham	Vancomycin resistant Enterococcus (VRE) in the intensive care unit (ICU): case classification and patients profile 2014-2018	
Kasia Bail	Documenting patient risk and nursing interventions: a clinical record audit	
Chris Burrows	Specialised stroke nurses in ED improve swallow screening	
Amanda McKie	Understanding nurse's perceptions of sexual dysfunction in people with end stage kidney disease requiring haemodialysis	
Justine Holloway	Physical examination performed on potential organ and tissue donors – a review of current Australian practice	
Nathan D'Cunha	The Simplified Nutritional Appetite Questionnaire is associated with quality of life of people living with dementia	
Nathan D'Cunha	Ten-week adherence to a commercial smartphone application intervention in a clinical sample of older adults	
Farshid Hajati	Mental health services and medications utilisation in the Australian population	
Danielle Cribb	Differential impact of mass and targeted praziquantel delivery on schistosomiasis control in school-aged children: a systematic review and meta-analysis	
Ingrid Fewings	Histological remission (Nancy index) is superior to endoscopic mucosal healing in predicting relapse free survival in patients with ulcerative colitis in clinical and endoscopic remission	
Ingrid Fewings	A double dose of pseudolymphoma: cutaneous intravascular cd30+ pseudolymphoma arising in acral pseudolymphomatous angiokeratoma – a case report	

### Poster Presentations (Continued)

Abera Saeed	Effect of simulated reduction in macular visual field sensitivity on pupillary responses	
Ainsley Davies	Mechanism of immune dysregulation conferred by mutations in NFKB2	
Alireza Zarebidoki	The role of IRF4 in the development of regulatory T cells	
Anusree Lakshmi Sivasdas	MTREC complex and its role in RNA surveillance	
Arti Medhavy	Uncovering the genetic basis of IgG4-related disease: role of a rare variant in the A20 pathway	
Cynthia Mathew	Disruption of XPO1-mediated nuclear export inhibits respiratory syncytial virus (RSV) replication in vitro	
Emily Rowland	Stac3 SH3 domains mediate interaction with skeletal muscle ryanodine receptor, which is abolished with a myopathy-associated mutation.	
Grant Brown	Novel cause of monogenic lupus illuminates disease pathogenesis	
Nathan Reynolds	Exploring cellular mechanisms underlying Autism Spectrum Disorder during a critical period of brain development	
Rasel Barua	Gut microbiome analysis in Crohn's disease patients using 16s rRNA sequencing	
Tenzin Dagpo	Phenotypic characterisation of two divergent sub-strains of NODk mice with varied diabetes penetrance	
Wenbo Ge	Towards objective testing in Parkinson's disease: a systematic literature review of postural sway assessment	
Zhijia Yu	A novel murine model of chronic lymphocytic leukaemia with a heterozygous point mutation in the IRF4 DNA binding domain	
Kathleen O'Brien	Physical activity and risk of behavioural and mental health disorders in kindergarten children	
Amanda Boers	Preventing hospital acquired urinary tract infections in rehabilitation	
Carol Huang	Assessing for obstructive sleep apnoea in a publicly-funded obesity management service	
Carrie Lui	Audit of the utilisation of and compliance with the "open packet/insert straw" diet code across Nepean Hospital	
Deanna Skitt	An innovative self-catering food service model in a mental health rehabilitation setting	

### Poster Presentations (Continued)

Janna Lutze	Investigating the need for a diabetic diet in an inpatient rehabilitation setting	
Michelle Gordon	How effective is rescreening for multi-resistant organisms (MRO) in outpatient clinics?	
Rowan McIntyre	Walking Aid Clinic: establishing a targeted walking aid prescription service in a clinic setting to improve community service accessibility	
Tracy Harb	Mealtimes Matter: the development of a pilot program for families of children with complex sensory-based feeding problems	
Rachel Bilton-Simek	caring@home resources: supporting quality outcomes for in home end of life care	
Nikki Johnston	An evidence-based definition of 'specialist' palliative care – findings from a multidisciplinary Delphi study	



### E-Poster Presentations

Georgia Pike	Delivery and evaluation of the Music Engagement Program for people with Alzheimer's disease and dementia	
Rosemary Young	Gestational diabetes in the ACT: more and more	
Claire Speer	On the path to group-based services: Canberra Hospital Adult Inpatient Eating Disorder Service	
Caroline Gouws	The prevalence and nutrient composition of post-exercise supplements in certified recovery products	
Cameron Moss	An analysis of the motivations of allies who aim for systemic change and collaboration with the consumer movement	
Geoffrey Speldewinde	Effectiveness of thermal neurotomy (Simplicity vs monopolar perforaminal) for sacroiliac joint pain	
Geoffrey Speldewinde	Thoracic zygapophysial joint thermal neurotomy: an additional prospective case series in a community practice	
Kate Reid	Sleep apnoea, vision loss and mortality	
Tracy Harb	Does a maternal low FODMAP diet effect human milk oligosaccharide concentration?	
Xuanning He	Examining the association between cognitive life experience complexity and the rate of changes in cognitive function in late life	

### E-Poster Presentations (Continued)

Lithin Louis	Molecular and cellular role of RNA-binding proteins in cardiac biology and disease	
Rebecca Buckland	A novel method for detecting neutrophil extracellular traps	
Julia Potter	Thyroid function in growing children; the Australian LOOK study	
Hollie Speer	The effects of dietary polyphenols on iron status and CVD risk markers – a systematic review	
Liam Hanlon	Quantum sensing of neuronal signals	
Sarah Shafik	Mechanisms for PfCRT-induced hypersensitivity to quinoline dimers in the malaria parasite	
Shara Ranasinghe	Communication during cancer treatment: exploring the experiences of patients and oncology professionals	
Wendy Beckingham	Hidden figures	
Rhonda Wilson	Safety implications related to the prescription and administration of digital therapies	
Farida Kavata	Clinell Anti-bacterial Hand Wipe trial – Ward 5B	
Yushan Zou	A healthcare wearable for pulsed physiotherapy rehabilitation. Multidisciplinary design of smart clothes	



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Cath Rollinson (Administrative Support)	ACT Health Directorate

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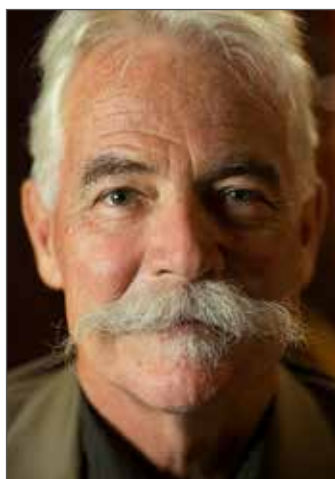
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Rhonda Wilson	University of Canberra
Jeremy Witchalls	University of Canberra
Rosemary Young	Canberra Health Services

# KEYNOTE SPEAKERS

**TUESDAY 30 JULY, 12-1PM**

## PROFESSOR ALAN MACKAY-SIM



2017 AUSTRALIAN  
OF THE YEAR;  
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EMERITUS  
AT GRIFFITH  
INSTITUTE  
FOR DRUG  
DISCOVERY,  
GRIFFITH  
UNIVERSITY

2017 Australian of the Year Alan Mackay-Sim is a neuroscientist and stem cell scientist. His research

career has focused on how the sensory neurons in the nose are replaced and regenerated from stem cells. He is a world leader in spinal cord injury research. He led the Brisbane team in a world-first clinical trial in which the patient's own olfactory cells were transplanted into their injured spinal cord in the first stages of a therapy to treat human paraplegia. Alan established the National Centre for Adult Stem Cell Research in 2006. He developed an adult stem cell bank from over 300 people with different neurological conditions including schizophrenia, Parkinson's disease, mitochondrial mutation disorders, hereditary spastic paraplegia, ataxia telangiectasia and motor neuron disease. These stem cells are used to identify the biological bases of neurological diseases using genomics, transcriptomics, proteomics and cell function assays and this work is leading to new drug therapies. In 2017 Alan received the Distinguished Achievement award from Australasian Neuroscience Society and in 2018 he was awarded the Neil Hamilton Fairley Medal by the Royal Australasian College of Physicians and the Royal College of Physicians (Lond) for Outstanding Contribution to Medicine.

**WEDNESDAY 31 JULY, 12-1PM**

## DISTINGUISHED PROFESSOR PATSY YATES



INSTITUTE  
OF HEALTH  
BIOMEDICAL  
INNOVATION  
(IHBI)  
QUEENSLAND  
UNIVERSITY OF  
TECHNOLOGY

Distinguished Professor Patsy Yates, PhD, RN, FACN, FAAN is jointly appointed as Head, School of Nursing at Queensland University

of Technology, Lead Researcher for the Cancer Nursing Professorial Precinct at Royal Brisbane and Women's Hospital, and Director for Queensland Health's state-wide Centre for Palliative Care Research and Education (CPCRE). She has over 30 years' experience in research, education and clinical practice in cancer and palliative care. She is the immediate Past-President of Palliative Care Australia and is President of the International Society of Nurses in Cancer Care.

Patsy is a Fellow of the American Academy of Nursing and has been inducted into the Sigma Theta Tau International Nurse Researcher Hall of Fame. She was awarded the 2018 ONS Distinguished Researcher Award at the ONS 43rd Annual Congress in the US.



## THURSDAY 1 AUGUST, 12-1PM

### PROFESSOR CAROLINE HOMER

CO-PROGRAM DIRECTOR MATERNAL AND CHILD HEALTH AND CO-WORKING GROUP HEAD GLOBAL WOMEN'S AND NEWBORN'S HEALTH, BURNET INSTITUTE, MELBOURNE; DISTINGUISHED PROFESSOR OF MIDWIFERY, UNIVERSITY OF TECHNOLOGY SYDNEY



Caroline is Co-Program Director of Women and Children's Health and Co-Head for the Women's and Newborn's Health Working Group at the Burnet Institute in Melbourne. She also continues a long association with the University of Technology Sydney as a Visiting Professor of Midwifery.

Caroline has been involved in the

development and evaluation of midwifery and maternal and newborn health services in Australia and in a number of other countries in the Asia Pacific region, including Papua New Guinea, Samoa, Cambodia and Timor Leste.

Since 2008, she has been the Co-Chair of the Expert Advisory Executive for the development of the National Antenatal Guidelines for the Australian Government's Department of Health and is a member of WHO's Executive Guideline Steering Committee – WHO Maternal and Perinatal Health Guidelines.

## FRIDAY 2 AUGUST, 12-1PM

### PROFESSOR MARK MORRISON

CHAIR & GROUP LEADER METAGENOMICS, THE UNIVERSITY OF QUEENSLAND DIAMANTINA INSTITUTE



Mark Morrison joined the University of Queensland in October 2013, located at the Translational Research Institute campus, as chair and principal group leader in microbial biology and metagenomics for the UQ Diamantina Institute. In addition to this role, he now serves as the microbiome science leader for the Translational Research Institute, as well as

science lead for gastrointestinal function with the Princess Alexandra Hospital's Department of Gastroenterology and Hepatology. During his academic tenure in the USA, he led the team that produced the first genome sequences for *Ruminococcus* and *Prevotella* spp., with both genera now widely acknowledged to play a key role in establishing human gut "enterotypes". His abilities to translate genomic and metagenomic datasets into a sound biological framework include a world-first: the metagenome-directed isolation of a "new" bacterium from a species-rich microbial community. He is Australia's science representative to the International Human Microbiome Consortium and the Chinese Microbiome Initiative, and serves on a number of institute and industry advisory boards for microbiome research.



# INVITED SPEAKERS

## PROFESSOR MARK DANIEL

PROFESSOR OF EPIDEMIOLOGY, HEALTH RESEARCH INSTITUTE, UNIVERSITY OF CANBERRA; PROFESSORIAL FELLOW, DEPARTMENT OF MEDICINE, ST VINCENT'S HOSPITAL, THE UNIVERSITY OF MELBOURNE; AND SENIOR PRINCIPAL RESEARCH FELLOW AT THE SOUTH AUSTRALIAN HEALTH AND MEDICAL RESEARCH INSTITUTE



Mark Daniel is Professor of Epidemiology in the Health Research Institute, University of Canberra where he leads the Spatial Epidemiology Group. He is also Professorial Fellow in the Department of Medicine, St. Vincent's Hospital, The University of Melbourne, and Senior Principal Research Fellow, South Australian Health and Medical Research Institute. His career spans

appointments in the United States, Canada and Australia. He has published >200 refereed articles, >20 chapters, and accrued >\$80M in research funding. His research aims to identify the drivers and multi-sectoral levers for policy and practice-level intervention to reduce risk factors and slow rising rates of cardiometabolic diseases.

## PROFESSOR ROSS HANNAN

EXECUTIVE GROUP MANAGER, CENTRE FOR HEALTH AND MEDICAL RESEARCH, ACT HEALTH DIRECTORATE, CENTENARY CHAIR IN CANCER RESEARCH, THE JOHN CURTIN SCHOOL OF MEDICAL RESEARCH, THE AUSTRALIAN NATIONAL UNIVERSITY



Professor Hannan is a NHMRC Senior Principal Research Fellow, ANU Foundation Centenary Chair in Cancer Research, Head of the Department of Cancer Biology and Therapeutics at the John Curtin School of Medical Research, ANU, Canberra, a group leader at the Peter MacCallum Cancer Centre, Melbourne and Executive Director – Research, ACT Health Directorate.

Professor Hannan's research career spans over 20 years of internationally competitive research in Australia and the USA working on the genetic and epigenetic regulation of cancer. Most recently he brought together multi-disciplinary teams of laboratory and clinician researchers and forged industry collaborations to devise 'first in class' cancer therapies that are now in clinical trials for a range of human cancers.

Professor Hannan's achievements have been recognised by his election to the Fellowship of the Australian Academy of Health and Medical Sciences (2017).

In 2017 he was appointed as a Director of the National Breast Cancer Foundation (NBCF) and Chair of NBCF Scientific Advisory Board.

As Executive Group Manager, Centre for Health and Medical Research, Professor Hannan is focused on effective translation of research from fundamental science to the clinical practice; improving patient outcomes by strengthening health services, clinical research, and clinical trials; growing and unlocking health opportunities with data science; and improving investment opportunities for ACT Health Innovations.



## PROFESSOR ELIZABETH GARDINER

DEPUTY HEAD, DEPARTMENT OF CANCER BIOLOGY AND THERAPEUTICS, THE JOHN CURTIN SCHOOL OF MEDICAL RESEARCH, THE AUSTRALIAN NATIONAL UNIVERSITY; SCIENTIFIC HEAD, NATIONAL PLATELET REFERRAL AND RESEARCH CENTRE, THE AUSTRALIAN NATIONAL UNIVERSITY AND THE CANBERRA HOSPITAL



Professor Elizabeth Gardiner is the Deputy Head of the Department of Cancer Biology and Therapeutics in the John Curtin School of Medical Research at ANU, Canberra, Australia. She is Scientific Head of the recently established National Platelet Referral and Research Centre at ANU and The Canberra Hospital. She has published 128 peer-reviewed research

papers, commentaries and reviews in the area of platelet biochemistry and platelet function, particularly relevant to both thrombosis and bleeding in patients. She identified a novel mechanism for shedding of vascular receptors triggered by shear stress, enabling new capabilities in diagnostic and therapeutic reagent development.

She is a Trustee of the Thrombosis and Haemostasis society of Australia and New Zealand (THANZ), a Principal Editor and the Methods Editor of the journal Platelets and is Treasurer of the National Association of Research Fellows (NARF). She sits on the American Society of Hematology (ASH) Scientific Committee on Platelets and the International Society for Thrombosis and Haemostasis Biorheology Scientific Subcommittee. She has held executive roles in the Australian Vascular Biology Society.

## DR AMEE GEORGE

LEAD: ANU CENTRE FOR THERAPEUTIC DISCOVERY, THE JOHN CURTIN SCHOOL OF MEDICAL RESEARCH, THE AUSTRALIAN NATIONAL UNIVERSITY; CO-CHAIR FICTIONAL HIGH THROUGHPUT TECHNOLOGIES NATIONAL SCREENING CONFERENCE



Dr Amee George is a national expert in high-throughput screening technologies, leading the ANU Centre for Therapeutic Discovery at the JCSMR at ANU, and has co-chaired the Functional High Throughput Technologies (FHTTA) national screening conference for the past 5 years. She is an emerging international leader in the areas of nucleolar biology/

surveillance, ribosome biogenesis, ribosomopathies and therapeutic target identification. Amee is CI on Category 2 grants relating to bone marrow failure.

## PROFESSOR ANTONIO TRICOLI

LEAD: NANOTECHNOLOGY RESEARCH LABORATORY, COLLEGE OF ENGINEERING AND COMPUTER SCIENCE, THE AUSTRALIAN NATIONAL UNIVERSITY; GROUP LEADER FUTURE ENGINEERING RESEARCH LEADERSHIP FELLOWSHIP; CO-CHAIR AND ESTABLISHING MEMBER INAUGURAL 2017 ANU GRAND CHALLENGE “OUR HEALTH IN OUR HANDS”



Professor Antonio Tricoli leads the Nanotechnology Research Laboratory in the College of Engineering and Computer Science of the Australian National University. He received his combined bachelor and master in Mechanical and Process Engineering, and thereafter his PhD in the field of Nanotechnology from ETH Zurich. His PhD

thesis received numerous awards including the prestigious HILTI Prize for the most innovative PhD thesis of ETH Zurich in 2010. In September 2012, he joined the Australian National University as a group leader under the Future Engineering Research Leadership Fellowship, and established his group working on the multi-scale engineering and applications of nanostructured materials and devices. He is the author of several book chapters, more than 80 scientific publications and numerous disclosures to non-scientific audiences. His research efforts have been recognized by numerous awards including one of the four Westpac Research Fellowships awarded in 2015 in Australia, supporting the development of wearable devices for melanoma prevention. He is Co-Chair and Establishing Member of the inaugural 2017 ANU Grand Challenge strategic investment “Our Health in Our Hands”, which brings together a multidisciplinary team of scientists from Humanities, Arts and Social Sciences (HASS), and Science, Technology, Engineering and Mathematics (STEM) aiming at transforming the way we manage our health in the near future.

## PROFESSOR MATTHEW COOK

DIRECTOR OF IMMUNOLOGY CANBERRA HEALTH SERVICES, PROFESSOR OF MEDICINE, ANU MEDICAL SCHOOL, AND DIRECTOR OF THE CENTRE FOR PERSONALISED IMMUNOLOGY, THE JOHN CURTIN SCHOOL OF MEDICAL RESEARCH, THE AUSTRALIAN NATIONAL UNIVERSITY



Matthew Cook is Professor of Medicine at the Australian National University (ANU), Director of Immunology at Canberra Hospital and Director of the Centre for Personalised Immunology, an NHMRC Centre of Research Excellence. He is also the founder of Canberra Clinical Genomics, a joint venture between ACT Government and ANU. He is a clinician-scientist

with more than 20 years' experience investigating the pathogenesis of human immunological disease, and more recently, has investigated genome variation as a discovery platform for understanding human immune disease.



## ASSOCIATE PROFESSOR BRUCE SHADBOLT

EXECUTIVE BRANCH MANAGER, CENTRE FOR HEALTH AND MEDICAL RESEARCH, ACT HEALTH DIRECTORATE; ASSOCIATE PROFESSOR, THE AUSTRALIAN NATIONAL UNIVERSITY MEDICAL SCHOOL AND BIOLOGIC DATA SCIENCE INSTITUTE



Associate Professor Shadbolt has combined a career in healthcare services with research to lead the epidemiological and data science directions of the ACT Health Directorate. With university qualifications in science, psychology, mathematics and epidemiology, Associate Professor Shadbolt has a broad understanding of research and its

delivery. His PhD in women's health and social roles using a life course design paved the way for the Australian Women's Longitudinal Study and changes to family and work legislation to support better family-work balance. His research with the Australian National University and ACT Health Directorate has primarily focused on using evaluation, research and data science skills to improve clinical practice. As part of this, evidence-based medicine and translating new evidence into clinical care have been paramount to Associate Professor Shadbolt's endeavours.

## PROFESSOR PENELOPE SCHOFIELD

PROFESSOR OF HEALTH PSYCHOLOGY, SCHOOL OF HEALTH SCIENCES, SWINBURNE UNIVERSITY OF TECHNOLOGY; PROGRAM LEAD: PERSONALISED HEALTH CARE INNOVATION, IVERSON HEALTH INNOVATION RESEARCH INSTITUTE, SWINBURNE UNIVERSITY OF TECHNOLOGY; HEAD OF BEHAVIOURAL RESEARCH, PETER MACCALLUM CANCER CENTRE



A behavioural scientist by training, Penny Schofield was the Director and Scientific Director, Department of Cancer Experiences Research, Peter MacCallum Cancer Centre, Melbourne, Australia for 15 years before her appointment as Professor of Health Psychology at Swinburne University in March 2015. She still maintains her research team at Peter MacCallum Cancer

Centre, as Head of Behavioural Science. She has nearly 30 years' experience in behavioural, psycho-social, quality of life and supportive care research in cancer, particularly randomised controlled trials.

Her research program adopts a comprehensive approach to develop and deliver effective and sustainable interventions that promote self-care, improve emotional and physical outcomes and end of life care for patients with cancer and other chronic illnesses, and alleviate burden on the health system.

## PROFESSOR KATHY EAGAR

PROFESSOR OF HEALTH SERVICES RESEARCH AND DIRECTOR, AUSTRALIAN HEALTH SERVICES RESEARCH INSTITUTE (AHSRI), UNIVERSITY OF WOLLONGONG



Professor Kathy Eagar is Professor of Health Services Research and Director of the Australian Health Services Research Institute (AHSRI) at the University of Wollongong. AHSRI has a team of over 60 researchers and includes eight research centres. Among these are three national patient outcome centres – the Australasian Rehabilitation Outcomes Centre (AROC), the

Palliative Care Outcomes Collaboration (PCOC) and the electronic Persistent Pain Outcomes Collaboration (ePPOC). She has authored over 450 papers on management, quality, outcomes, information systems and funding of the Australia and New Zealand health and community care systems.

## DR KERRI NOONAN

CO-FOUNDER OF THE GROUNDSWELL PROJECT



Dr Kerrie Noonan is a clinical psychologist in palliative care. She is a social researcher with the Caring at End of Life Research Group at Western Sydney University, and is an Investigator on the Death Literacy Index project. This pioneering research has investigated the role of family, friends and neighbours play when someone is dying at home and coined the

term 'death literacy' and the now development of the Death Literacy Index.

Over the past 25 years Kerrie has been working to create a more death literate society, one where people and communities have the practical know-how needed to plan well and respond to dying death and grief. Kerrie has a long-standing interest in community capacity building approaches to death, dying and bereavement, palliative care and how people can build their death literacy. She is the founding executive director of The GroundSwell Project and national initiatives Dying to Know Day, FilmLife Project and ComComHub. She is active in the Compassionate Communities movement internationally.

Kerrie was awarded her PhD in 2018 by Western Sydney University for her study titled Renegade Stories: A study of death workers using social approaches to dying, death and loss in Australia. Kerrie has a Master's degree in Clinical Psychology, a BA (Psychology), and a Grad. Dip. in Systemic Therapy (Family Therapy) and a fellow of the Sydney School for Social Entrepreneurs. My clinical experience involves palliative care, health psychology, loss and grief, pain management, program development and evaluation research.

She sits on the council of Public Health Palliative Care International and is the co-Chair of the Organising Committee for the 6th PHPCI Conference in 2019.





## PROFESSOR IMOGEN MITCHELL

DIRECTOR – ANU MEDICAL SCHOOL,  
SENIOR MEDICAL ADVISOR AT THE  
AUSTRALIAN COMMISSION ON SAFETY  
AND QUALITY IN HEALTH CARE AND  
SENIOR INTENSIVE CARE SPECIALIST  
AT THE CANBERRA HOSPITAL, CANBERRA  
HEALTH SERVICES



Professor Mitchell is an intensive care specialist and is a recognised clinical and health systems researcher, specifically in the development of sustainable processes for managing patient deterioration and end of life care. Professor Mitchell was awarded a Harkness Fellowship in 2013-2014 at Johns Hopkins Bloomberg School of Public Health

studying health systems and health policy and currently provides advice to the Australian Commission on Safety and Quality in Health Care.

## PROFESSOR MICHAEL WOODS

CENTRE FOR HEALTH ECONOMICS  
RESEARCH AND EVALUATION, UNIVERSITY  
OF TECHNOLOGY SYDNEY



Michael Woods is a Professor of Health Economics at the Centre for Health Economics Research and Evaluation (CHERE) at the University of Technology Sydney and Visiting Scholar at the Australian National University. He is on the Board of the Australian Digital Health Agency and a member of the Aged Care Financing Authority.

Professor Woods' research focus is on

aged care reform, the delivery of palliative care and end of life care, improving the efficiency and effectiveness of the health workforce and the economics and financing of health systems.

In 2016 Mike was the Independent Reviewer for COAG Health Council Review of the Workforce Education Accreditation System under NRAS. Professor Woods was previously Deputy Chairman of the Productivity Commission and Presiding Commissioner on over 20 national Inquiries, including Caring for Older Australians, Science and Innovation and Australia's Health Workforce.

Since 2001 Mike has held senior research and policy advisory roles in East and South East Asia, including with the World Bank, the OECD and the former AusAID. Previously he was the Under Treasurer for the Australian Capital Territory.

## NIKKI JOHNSTON OAM MACN

NURSE PRACTITIONER CALVARY'S CLARE HOLLAND HOUSE, INAUGURAL WINNER OF THE HEALTH MINISTER'S AWARD FOR NURSING TRAILBLAZERS 2019, RECIPIENT OF ORDER OF AUSTRALIA MEDAL 2019



Nikki became a registered nurse in 1989 and a Nurse Practitioner in 2008. She was recognised in the 2019 Australia Day Honors as a recipient of a Medal of the Order of Australia for her contribution to nursing and the winner of the inaugural Health Minister's award for Nursing Trailblazers 2019. Finalist in the team of the year Hesta Awards 2019.

Currently working for Calvary Public Hospital Bruce, Clare Holland House, Nikki believes all Australia's deserve access to quality care in their last months of life regardless of their age, diagnosis or where they live. Currently end of life care experiences differ broadly for those living in residential aged care and access to specialist palliative care isn't usual practice.

Nikki has initiated research through the INSPIRED trial which integrates specialist palliative care into residential aged care through the use of Palliative Care Needs Rounds. The trial found that regular rounds identified residents most at risk of dying without an adequate plan in place.

Nikki's approach improves RACF staff confidence in discussing death and dying with families and planning for symptoms and goals of care at end of life. It supports palliative care in RACF and normalizes death and dying, while providing essential anticipatory prescribing and better decision-making leading to planned care for residents.

## DR BRETT SCHOLZ

RESEARCH FELLOW IN THE MEDICAL SCHOOL, ANU COLLEGE OF HEALTH AND MEDICINE, BOARD MEMBER FOR THE ACT MENTAL HEALTH CONSUMER NETWORK



Brett Scholz is a critical health psychologist and research fellow in the ANU Medical School whose work focuses on critical approaches to health organisations and systems. Specifically, his research has three interrelated foci: 1. challenging barriers to consumer leadership of health organisations and systems through reducing discrimination and tokenism, 2. improving

uptake of consumer leadership in health organisations and systems (including services, research, teaching, and policy) by demonstrating the value brought to the sector by consumers in decision-making roles, and 3. Exploring the role of allies (non-consumer stakeholders) in supporting, advocating for, and facilitating consumer leadership in health organisations and systems.



## GERALDINE DOOGUE

PRESENTER ABC RADIO NATIONAL  
SATURDAY EXTRA



Geraldine Doogue is the presenter of ABC Radio National (RN) Saturday Extra which specialises in foreign policy and regional issues. She was previously a reporter for the West Australian, The Australian, 2UE, Channel 10 and the Presenter of ABC RN Life Matters, and host of ABC TV's Nationwide. Geraldine played a central role in ABC TV's coverage of the Gulf War, receiving a

United Nations Media Peace Prize and two Penguin Awards. In 2000 she was awarded a Churchill Fellowship for social and cultural reporting. Geraldine Doogue co-authored Tomorrow's Islam: Uniting Age-Old Beliefs and a Modern World (2005). In 2012 she was awarded a Doctor of Letters honoris causa from Macquarie University. Geraldine is Officer in the Order of Australia for distinguished service on issues involving ethics, values, religion and social change. In August 2014 she released a book published by Text Publishing called The Climb: Conversations with Australian Women in Power.

## DR SUZANNE RAINSFORD

RESEARCH FELLOW,  
RURAL CLINICAL SCHOOL,  
THE AUSTRALIAN NATIONAL UNIVERSITY



Dr Rainsford graduated from the University of NSW (MBBS) and initially practised at the Canberra Hospital. She has been a rural general practitioner in the Snowy Monaro since 1992. In 2014 after gaining her FChPM, she has been employed as a palliative medicine staff specialist at Calvary Public Hospital Bruce Clare Holland House. Dr Rainsford continues to conduct a part-time

private palliative medicine practice in Cooma, NSW. Her interests lie in rural palliative care. Dr Rainsford's PhD thesis was focused on 'The influence of place of death and rural residency on the good death'. She is currently a research fellow at the Rural Clinical School at the ANU.



# DAILY TIMETABLE

DAY 1

## TUESDAY 30 JULY

Day 1: ACT in profile – big initiatives	
9.00	Welcome and introduction, Director-General ACT Health Directorate
9.10	3 Minute Thesis competition – Chair Richard Keegan
	Ashleigh d'Arx – University of Canberra Drowning in it: breathing hard or hardly breathing
	Pouya Saeedian – University of Canberra Destiny or design: does preoperative knee kinematics influence postoperative knee kinematics after total knee replacement?
	Emily Rowland – The Australian National University Have you got leaky muscles?
	Luke Bicket – University of Canberra Debilitating hip pain: where are they now?
	Matt Boom – University of Canberra Staying strong with Parkinson's – a matter of measurement
	Claire Williams – University of Canberra Leaked: a female athlete's biggest hurdle
	Rhys Knowles – The Australian National University The Er81 transcription factor in interneuron development
	Jayden Hunter – University of Canberra Greater trochanteric pain syndrome (GTPS) and orthoses: a potential step towards recovery
	Caitlin Howard – University of Canberra Blood, sweat and tears: quantitative image analysis of tendons
	Nathan de Meillon – University of Canberra Parkinson's disease: taking stronger steps in the right direction
	Kevin Tee – The Australian National University Increasing rates of hypospadias in the ACT - approaching penis apocalypse?
	Madhur Chhabra – The Australian National University Going around in circles: bouncing back from knee surgery
	Sandali Seneviratne – The Australian National University Combating the repercussions of reperfusion
	Nicole McDerby – University of Canberra Proximity and partnerships: including pharmacists in Australian aged care homes to improve quality use of medicines
	Rosemary Clifford – The Australian National University Orthorexia nervosa: healthy eating on a disordered level
	Brendan Tonson-Older – The Australian National University Comparison of standard automated perimetry and multifocal pupillographic objective perimetry (mfPOP) in Stroke

## Tuesday 30 July

### Day 1: ACT in profile – big initiatives (Continued)

	<b>Joshua Bishop</b> – University of Canberra <b>How love triumphs: the attitudes, skills and knowledge of mental health service providers towards lesbian, gay and bisexual clients</b>
	<b>Noorya Ahmed</b> – The Australian National University <b>Can we connect? Modulators in the brain during development</b>
	<b>Jyoti Paul</b> – UNSW Canberra <b>Super-resolution retinal imaging with computational adaptive optics</b>
	<b>Changhan Xu</b> – The Australian National University <b>Admission platelet-to-lymphocyte ratio (PLR) and lymphocyte-to-monocyte ratio (LMR) – two novel independent predictors of in-hospital mortality in older patients with hip fracture (HF)</b>
	<b>Lithin Louis</b> – The Australian National University <b>Biomolecular interactions could hold the secrets to treat heart attack</b>
10.40	Morning Tea
11.00 – 11.50	<b>Big Initiatives – Professor Mark Daniel</b> , University of Canberra <b>The Australian Geospatial Health Lab: rationale, progress, and challenges</b>
12.00	<b>Keynote speaker: Professor Alan Mackay-Sim</b> 2017 Australian of the Year, Professor Emeritus at Griffith Institute for Drug Discovery, Griffith University <b>Patient-derived stem cells – drug discovery in brain diseases</b>
1.00	Networking Lunch
1.50	<b>Big Initiatives – Professor Ross Hannan, Professor Elizabeth Gardiner, Dr Ameer George</b> – Cancer Research in Canberra, philanthropy and the Comprehensive Cancer Centre, Brain Cancer – bench to bedside trials, and Colorectal Cancer Research – update on the latest research in the ACT
2.40	<b>Associate Professor Christine Phillips</b> <b>HealthANSWERS: An update on the bid for a Centre for Innovation in Regional Health</b>
3.00	Health Break / Networking Opportunity (Stretch And Connect)
3.10	<b>ANU Grand Challenge – Professor Antonio Tricoli and Professor Matthew Cook</b> , The Australian National University <b>Our Health in Our Hands: future personalised medical technologies for a sustainable and effective healthcare</b>
4.00	<b>Associate Professor Bruce Shadbolt</b> <b>Health Analytics Research Collaboration (HARC)</b>
4.30	Close

## WEDNESDAY 31 JULY

Day 2: End of life care – past trends, future projections and implications for services	
8.50	<b>Welcome</b>
9.00	<b>Dr Michael Chapman</b> – Palliative Care Specialist <b>Overview of Palliative care in the ACT</b>
9.10	<b>Brendan Moran</b> <b>Dying with purpose, an end of life care experience</b>
9.25	<b>Professor Penny Schofield</b> – Professor of Health Psychology, School of Health Sciences, Swinburne University of Technology; Program Lead: Personalised Health Care Innovation, Iverson Health Innovation Research Institute, Swinburne University of Technology; Head of Behavioural Research, Peter MacCallum Cancer Centre <b>Developing effective, clinically feasible and sustainable models for people receiving palliative care and their families</b>
9.55	<b>Professor Kathy Eagar</b> – Professor of Health Services Research and Director, Australian Health Services Research Institute (AHSRI), University of Wollongong <b>Choices at the end of life: palliative care and other end of life decisions</b>
10.25	<b>Open paper Emily Sisson</b> <b>Environmental preferences of carers and clinicians in acute palliative settings</b>
10.35	Morning Networking Tea
11.00	<b>Open paper Rory Maguire</b> <b>Enabling access to quality end of life and palliative care in a prison setting</b>
11.10	<b>Dr Kerri Noonan</b> – Co-founder of The GroundSwell Project <b>Creating compassionate communities and developing community capacity around palliative care and grief</b>
11.40	<b>Open paper Margaret Broom</b> <b>Caring for dying babies and their families: an experience based co-design study</b>
11.50	Break for keynote livestream set up
12.00	<b>Keynote speaker: Distinguished Professor Patsy Yates</b> – Institute of Health and Biomedical Innovation (IHBI) Queensland University of Technology <b>Achieving quality palliative care for all</b>
1.00	Networking Lunch
1.50	<b>Professor Imogen Mitchell</b> – Director ANU Medical School, Senior Medical Advisor the Australian Commission on Safety and Quality in Health Care and Senior Intensive Care Specialist at Canberra Health Services <b>Dying surrounded by equipment and machines</b>
2.10	<b>Professor Michael Woods</b> – Centre for Health Economics Research and Evaluation, University of Technology Sydney <b>Improving the availability of palliative care – identifying unmet need at the local level</b>
2.30	<b>Professor Diana Slade</b> – Professor of Applied Linguistics, Director Institute for Communication in Health Care, The Australian National University. Dr Suzanne Eggins, Dr Liza Goncharov <b>End of life communication in the intensive care unit (ICU)</b>

**Wednesday 31 July****Day 2: End of life care – past trends, future projections and implications for services (Continued)**

2.50	<b>Nikki Johnston OAM MACN</b> – Nurse Practitioner Clare Holland House, ACT, winner of the inaugural Health Minister's Award for Nursing Trailblazers 2019, recipient of a Medal of the Order of Australia 2019 <b>Better lives and better deaths in aged care through specialist palliative care Needs Rounds: results from a stepped wedge randomised controlled trial</b>
3.05	<b>Dr Brett Scholz</b> – Research Fellow in the ANU Medical School, The Australian National University, Board Member for the ACT Mental Health Consumer Network <b>Consumer leadership in palliative care: redressing power imbalances against experiential expertise</b>
3.30	Health break / Stretch and connect
3.40	<b>ABC Radio National Broadcast panel discussion chaired by Geraldine Doogue</b> <b>Good living and safe dying</b> <b>Panel Members: Dr Kerri Noonan, Professor Imogen Mitchell, Nurse Practitioner Nikki Johnston, Dr Suzanne Rainsford</b>
4.30	<b>Concluding remarks and close</b>
5.00	Poster Viewing Event – Mezzanine Level 3 Building 2 Canberra Hospital

## THURSDAY 1 AUGUST

Day 3: ACT research in focus	
8.55	Welcome
Session 1 This opening session for ACT research in focus explores the use of imaging data in lung, bones and the brain, as well as health and wellbeing in the Canberra community	
9.00	HDR paper: <b>Ben Cooper</b> Better targeting for moving tumours in radiation therapy
9.20	<b>Yuan Chai</b> Fast and accurate customized pelvic fixation plate design using 3D modelling and 3D printing
9.30	<b>Diana Perriman</b> Shape is only a weak predictor of deep knee flexion kinematics in healthy and osteoarthritic knees
9.40	<b>Catherine Galvin</b> Prediction of the Kellgren-Lawrence Knee Osteoarthritis Severity Grade. A predictive data model using the kinematics of kneeling
9.50	<b>Jeff Looi</b> Increased functional connectivity of the thalamus in patients with Parkinson's disease: clinical pathophysiology of functional compensation
10.00	<b>Devashi Paliwal</b> Investigating the role of mitochondrial genomic variation in Alzheimer's Disease
10.10	<b>Kathleen O'Brien</b> Risk of behavioural and mental health disorders and developmental delay, in kindergarten boys and girls
10.30	Morning Networking Tea
Session 2 This session explores many themes related to public health and nursing with an emphasis on infants and the elderly. Keynote speaker Professor Caroline Homer speaking on maternal health	
10.50	HDR paper: <b>Naomi Clarke</b> Optimising control programs for soil-transmitted helminth
11.10	<b>Karen Strickland</b> Supported decision-making to assist older persons experiencing elder abuse: systematic review
11.20	<b>Katherine Angus</b> Smartphone apps used for breastfeeding and their response to infants experiencing suboptimal feeding
11.30	<b>Dona Dolphus</b> Improving the care of patients with behavioural and psychological symptoms of dementia (BPSD) in acute care
12.00	<b>Keynote speaker: Professor Caroline Homer</b> , Co-Program Director Maternal and Child Health and Co-Working Group Head Global Women's and Newborn's Health, Burnet Institute, Melbourne; Distinguished Professor of Midwifery, University of Technology Sydney <b>Maternal health – why it matters</b>
1.00	Lunch

## THURSDAY 1 AUGUST (Continued.)

Day 3: ACT research in focus (Continued)	
Session 3 This session features diverse clinical intervention research	
1.50	HDR Paper: <b>Emily Lewis</b> Adherence to lifestyle intervention in adults with obesity
2.10	<b>Elizabeth Webb</b> Keeping the pressure on: does compression therapy prevent cellulitis? Results of a randomised controlled trial
2.20	<b>Jane Van</b> Incidence of atrial fibrillation in stroke work-up patients identified by 24-hour Holter monitoring
2.30	<b>Rebecca Cesnik</b> Self-reported physical activity levels and barriers in patients with cancer undergoing chemotherapy in the ACT: a cross sectional study
2.40	<b>Jane Desborough</b> Unplanned 30-day readmissions for lower limb arthroplasty patients in the ACT: a cross-sectional survey
2.50	<b>Maureen O'Brien</b> Focus on the living before the dying: advance care planning perspectives amongst those with Parkinson's disease
3.00	<b>Kathryn Speer</b> Validity and reliability of a photoplethysmography device for measuring heart rate variability in paediatrics
3.10	Afternoon tea
Session 4 This session explores clinical service issues at the Canberra Hospital and nationally	
3.30	HDR paper: <b>Claire Pearce</b> The contested nature of obesity and the role of health services in prevention
3.50	<b>Melinda Choy</b> Digital health tools and vulnerable populations: how do patients with substance dependence experience eCHAT?
4.00	<b>Angelos Sharobeam</b> Anticoagulant prescribing practices in patients with ischaemic stroke: how much has changed over a decade?
4.10	<b>Sumeet Rai</b> Characteristic and outcomes of very elderly patients admitted to Australian New Zealand ICUs: a binational, retrospective multi-centre cohort analysis
4.20	<b>Drew Richardson</b> Incidence of access block and critical boarding of mental health presentations in Australasia
4.30	Close

## FRIDAY 2 AUGUST

Day 4: ACT research in focus	
8.55	Welcome
Session 6 Cancer, blood and diabetes – insights from the laboratory for clinicians.	
9.00	<b>Thiru Prasanna</b> – Metastasesectomy and BRAF mutation; an analysis of survival outcome in metastatic colorectal cancer
9.10	<b>Fathima Ayyalil</b> Platelet function in paroxysmal nocturnal haemoglobinuria
9.20	<b>Lucy Coupland</b> Rotational thromboelastometry (ROTEM) provides greater insight into bleeding risk than platelet count in thrombocytopenic patients
9.30	<b>Dan Dan Tian</b> JNK1 and SOCS3 are implicated in NASH-associated hepatocarcinogenesis
9.40	<b>Viviane Delghingaro-Augusto</b> Is the islet beta-cell hyper-responsiveness causing obesity-related type 2 diabetes in the high-fat fed NOD.B10 foz/foz mice?
9.50	<b>Daniela Andrea Espinoza Oyarce</b> The effect of clinical depression and depression comorbid with anxiety on brain structure
10.00	<b>Charmaine Simeonovic</b> Circulating platelet-neutrophil aggregates represent a peripheral biomarker of Type 1 diabetes (T1D) development and account for apparent neutropenia in human T1D
10.10	<b>Jessica Aw</b> Investigating spatial convergence of diagnosed dementia, depression and type 2 diabetes prevalence
10.20	<b>Sally Hall</b> Factors associated with clinical practice variation in general practice management of diabetes and coronary heart disease: a systematic review of the literature
10.30	<b>James O'Connor</b> Intravital imaging reveals distinct anti-parasite activities of antibodies targeting the Plasmodium falciparum circumsporozoite protein
10.40	Morning Networking Tea
Session 7 The gut microbiome in focus – leading research from our community with keynote from Professor Mark Morrison.	
11.00	<b>Mukta Das Gupta</b> Comparative genomics of E. coli isolated from adult and paediatric patients with inflammatory bowel disease and controls

## FRIDAY 2 AUGUST (Continued.)

Day 4: ACT research in focus (continued)	
11.10	<b>Sha Sha</b> Relative importance of clinical and sociodemographic factors in association with postoperative deaths in colorectal cancer patients in New South Wales: an artificial neural network approach
11.20	<b>Claudia Slimings</b> Social and community networks influence dietary attitudes in regional New South Wales, Australia
11.30	<b>Louise Brightman</b> Determining patient attendance, access to interventions and clinical outcomes in a publicly funded obesity program: results from the multi-disciplinary Canberra Obesity Management Service
11.40	<b>Natalia Martin</b> NLRP3-mediated inflammasome activation by E. coli isolated from patients with and without inflammatory bowel disease
12.00	<b>Keynote speaker: Professor Mark Morrison</b> – Chair & Group Leader Metagenomics, The University of Queensland Diamantina Institute <b>The gut microbiome – characterising the “x-factor” of Genotype x Environment x Lifestyle interactions affecting our digestive health and well-being?</b>
1.00	Close (Chair of Program Committee)
6.30	Dinner – Boathouse Restaurant, Barton



# CHARM

**CANBERRA HEALTH**  
Annual Research Meeting



## DAY ONE

### ACT IN PROFILE – BIG INITIATIVES

### ABSTRACTS



## 3 MINUTE THESIS COMPETITION



### Drowning in it: breathing hard or hardly breathing

ASHLEIGH D'ARX

*University of Canberra*

Up to one in four patients following cardiac surgery can develop life threatening lung complications. One factor that may contribute to the development of such complications is inspiratory muscle weakness. There is evidence demonstrating that training the breathing muscles prior to surgery reduces the risk of developing lung complications, but these interventions are not readily implemented. This is because the relationship between breathing muscle strength and lung complications is not known. My study will be the first to focus on this relationship and will inform future research in to preventing lung complications in cardiac surgery.

### Destiny or design: does preoperative knee kinematics influence postoperative knee kinematics after total knee replacement?

POUYA SAEEDIAN

*University of Canberra*

The influence of the preoperative on the postoperative knee movement has not been determined. These movements can hasten the degeneration of the knee implant and lead to revision surgery. Understanding the influence of preoperative knee movement on postoperative knee movement will allow better pre-habilitation to ensure better knee movement after surgery and subsequently ensure the longevity of the implants. For these we use fluoroscopy and shape match modelling to create 4-dimensional picture of the knee pre and postoperatively. Then we are able to measure the differences between the knee movement in these two operative periods.

### Have you got leaky muscles?

EMILY ROWLAND

*The Australian National University*

Muscle contraction in response to input from the brain is mediated by excitation-contraction coupling (ECC). A voltage-gated  $\text{Ca}^{2+}$ -channel in the muscle cell membrane (Cav1.1) responds to membrane depolarisation, resulting in the activation of the Ryanodine receptor (RyR1; in the sarcoplasmic reticulum) through an unknown mechanism. RyR1 then mediates the flow of calcium ions into the cell's interior, triggering muscle contraction. Previous studies have demonstrated the interaction of an adaptor protein, STAC3, with both Cav1.1 and RyR1, implying a role in mediating ECC. Mutations in STAC3 cause debilitating myopathies, and my results indicate one such mutation prompts diminished activation of RyR1.

### Debilitating hip pain: where are they now?

LUKE BICKET

*University of Canberra*

A study exploring the long-term outcomes of greater trochanteric pain syndrome (GTPS). In particular exploring the conditions relationship to decreased bone mineral density and possible link to hip osteoarthritis. The presentation describes the potential consequences of these conditions and the debilitating effects of GTPS on a person's life.

### Staying strong with Parkinson's – a matter of measurement

MATT BOOM

*University of Canberra*

Imagine feeling too weak to get out of bed in the morning. Loss of strength is common in people with Parkinson's, which affects approximately 1% of people over the age of 60. In my research project, I'm investigating whether a hand-held device – called a dynamometer – is a reliable measure of strength for people with this condition.

## Leaked: a female athlete's biggest hurdle

CLAIRE WILLIAMS

*University of Canberra*

Why do girls quit sport? There seems to be a trend of adolescent females reducing their participation in sport. But why? Maybe it is due to stress urinary incontinence.

Stress incontinence is the involuntary loss of urine occurring during exertion or effort such as physical activity, sneezing or coughing. Up to 80% of female athletes experience stress incontinence. However, there is limited research about its presentation in young athletes. We do not know at what age stress incontinence first occurs. What we do know is that stress incontinence can be a barrier to participation in physical activity.

## The Er81 transcription factor in interneuron development

RHYS KNOWLES

*The Australian National University*

This seminar will present our recent research which has revealed a vital role for the Er81 transcription factor during the development of interneurons. We have recently discovered that the removal of Er81 during early embryonic development significantly decreases the resulting number of neurons, which ultimately results in an altered behavioural phenotype. Our methodology utilising advanced genetic, histological and behavioural techniques will be presented including how these techniques are beginning to reveal the role of Er81 in health and pathology. Finally, our plans for future research to comprehensively understand this interesting aspect of neurodevelopment will be discussed.

## GTPS and orthoses: a potential step towards recovery

JAYDEN HUNTER

*University of Canberra*

Greater trochanteric pain syndrome (GTPS) is a prevalent condition in those aged over 50. It is characterised by chronic, regional pain in the lateral hip and has been shown to negatively impact quality of life to a similar level as end-stage hip osteoarthritis. Biomechanical abnormalities have been exhibited by this population during walking and may play a role in worsening the condition further. Therefore, we are investigating whether orthoses can improve gait biomechanics in this population.

## Blood, sweat and tears: quantitative image analysis of tendons

CAITLIN HOWARD

*University of Canberra*

Tendon pain is difficult to treat and typically becomes chronic. Frequent load with inadequate time to recover is thought to be the most common precipitator. However, some people develop tendon pain in the absence of overload, suggesting that another factor may be at play. High blood cholesterol levels are linked to tendon pain, but the nature of this relationship is unclear. My project will use a quantitative image analysis technique to detect changes that occur in tendons before the pain begins. This could help us understand how blood lipid parameters affect tendons.

## Parkinson's disease: taking stronger steps in the right direction

NATHAN DE MEILLON

*University of Canberra*

People with Parkinson's disease (PD) commonly experience difficulties with walking. Historically, the primary motor impairments of PD were considered responsible for these walking difficulties. Recent evidence suggests that people with PD additionally experience a global loss of strength. Strength contributes to walking ability in healthy populations, and we believe that a lack of strength may be contributing to walking difficulties in people with PD. This presentation describes a study that will investigate the correlation between strength and walking ability in people with PD. Knowledge from this study will inform clinical decisions regarding the assessment and treatment of strength in PD.

## Increasing rates of hypospadias in the ACT - approaching penis apocalypse?

KEVIN TEE

*The Australian National University*

Hypospadias is a common congenital anomaly of the penis and there is evidence that the incidence is increasing. In the period 1987-2016, 1 in 150 boys in ACT were born with hypospadias and the incidence increased over time, with more severe forms of hypospadias making up an increased proportion of total hypospadias seen. It is plausible that the increase in incidence and severity is due to environmental factors.

## Going around in circles: bouncing back from knee surgery

MADHUR CHHABRA

*The Australian National University*

Knee arthroplasty is a successful yet costly elective surgical procedure for treating osteoarthritis of the knee. The volume and burden of this procedure and related unplanned readmissions is projected to increase in Australia and globally. There is limited research regarding total knee arthroplasty patients' experiences in hospital and transition to home in relation to unplanned 30-day readmissions. The aim was to examine associations between total knee arthroplasty patients' experiences in hospital and transition to general practice and home, and unplanned 30-day readmissions.

## Combating the repercussions of reperfusion

SANDALI SENEVIRATNE

*The Australian National University*

Reperfusion is considered standard care response for coronary occlusion in heart attacks. Paradoxically, reperfusion increases damage to heart muscles, increasing morbidity and mortality. Thus a strategy to prevent the repercussions of reperfusion is needed. During reperfusion, calcium channels and cardiac mitochondria activity are observed to increase; leading to cardiac hypertrophy and cardiac failure. These cellular components are linked via a giant protein known as AHNK. Thus, using AHNK to inform the design, I was able to create a molecule that is able to target and interfere with this link; and in theory, would combat the issues surrounding reperfusion treatment.

## Proximity and partnerships: including pharmacists in Australian aged care homes to improve quality use of medicines

NICOLE MCDERBY

*University of Canberra*

Maintaining quality use of medicines in nursing home residents is growing increasingly complex due to numerous factors including the growing prevalence of dementia. Including a medicines expert in aged care homes may reduce the risk of medication misadventure for residents. This research explored the feasibility of integrating a clinical pharmacist into an established aged care health team. Our findings have shown that it is feasible, and having an on-site pharmacist yielded numerous clinical for residents and operational outcomes for the organisation and employees. Our work has resulted in commitments from major political parties to improve medication management in aged care.

## Orthorexia nervosa: healthy eating on a disordered level

ROSEMARY CLIFFORD

*The Australian National University*

In the 21st century we are seeing more people becoming overly focused on their diets, the nutritional value of food and just general healthy eating. For most this is not a problem, and even quite beneficial, but for others it's becoming an obsession, resulting in highly restrictive diets, nutritional deficiencies, social isolation and ultimately unhealthy and pathological lifestyles based on the premise of 'healthy eating'. This condition is known as Orthorexia nervosa and is currently being researched in order to determine its status as a distinct eating disorder or an already established eating disorder wearing a new face.

## Comparison of standard automated perimetry and multifocal pupillographic objective perimetry (mfPOP) in Stroke

BRENDAN TONSON-OLDER

*The Australian National University*

Automated perimetry such as Humphrey and Matrix have become the mainstay of clinical practice in characterising visual field damage. Both devices present a stimulus and ask the patient to respond if they see it, decreasing stimulus intensity until no longer detected. A novel new strategy has been to replace the subjective patient perception with the objective autonomic pupillary response using mfPOP. This strategy has been shown to be effective in a number of retinal diseases but is not well characterised in neurological disorders. This study compares standard automated perimetry with pupillographic perimetry in stroke and assesses utility in clinical practice.

## How love triumphs: the attitudes, skills and knowledge of mental health service providers towards lesbian, gay and bisexual clients

JOSHUA BISHOP

*University of Canberra*

Imagine experiencing prejudice, discrimination, rejection and even violence for being yourself. 1 million lesbian, gay and bisexual (LGB) Australians have because of their LGB identity. Sadly, LGB people are 3-4x more likely to suffer anxiety, depression and suicide. Often mental health services demonstrate unfavourable attitudes, skills and knowledge toward LGB people. My thesis asks: why? My thesis seeks to improve the attitudes, skills and knowledge of mental health service providers. Importantly, my research imagines a world where everyone had the attitudes, skills and knowledge to interact with each other. Wouldn't love triumph, in a world like that?

## Can we connect? Modulators in the brain during development

NOORYA AHMED

*The Australian National University*

During early development, the brain goes through a cascade of events to ensure it forms correctly. Understanding how neurons respond to these changes can help us uncover the basis of neurodevelopmental diseases such as autism spectrum disorders and schizophrenia. Imbalances in modulating molecules in the brain such as acetylcholine, dopamine, and serotonin – well known for controlling pleasure and happiness – are at the core of these disorders. However, it is unknown how this arises during development. Our research aims to unravel the way in which neurons connect, and how developmental processes are regulated.

## Super-resolution retinal imaging with computational adaptive optics

JYOTI PAUL

*UNSW Canberra*

Super-resolution retinal imaging technique is a significant tool for clinical applications to diagnose retina-related diseases by presenting a digital view at the back of the human eye. However, the optical properties of the eye, known as aberrations, prevent the direct visualization of retina results in lower resolution imagery that may lead to difficulty in proper diagnosis. An advanced Adaptive Optics (AO) system can solve this problem. This work demonstrates a computational AO technique to obtain and remove aberrations from imaging of retina. This provides an improved resolution and superior support to ophthalmologists for identification of the retinal diseases and disorders



## Admission platelet-to-lymphocyte ratio (PLR) and lymphocyte-to-monocyte ratio (LMR) - two novel independent predictors of in-hospital mortality in older patients with hip fracture (HF)

CHANGHAN XU

*The Australian National University*

We analysed prospectively collected data on 1291 consecutive patients with HF (mean age  $82.9 \pm 8.7$  [SD] years, 73.5% females) in regard to in-hospital outcomes. Multivariate logistic regression (after adjustment for 7 clinical and 10 laboratory variables associated with a fatal outcome on univariate analyses, all  $p < 0.05$ ) showed that PLR  $> 280$  (highest quartile) and LMR  $< 1.1$  (lowest quartile) are independent and significant indicators of in-hospital death (OR 2.3, 95% CI 1.4-3.9,  $p < 0.002$  and OR 2.1, 95% CI 1.2-3.6,  $p < 0.009$ , respectively) with specificity of 75.9% and 75.7%, and negative predictive value of 95.6% and 96.3%, respectively.

## Biomolecular interactions could hold the secrets to treat heart attack

LITHIN LOUIS

*The Australian National University*

According to World Health Organisation, 17.9 million people die each year because of cardiovascular diseases. Calcium channel protein SERCA2a was identified as an important therapeutic target during heart failure. Yet, how SERCA2a function is regulated remains unknown. Recently, we discovered that SERCA2a interacts with RNA in cardiomyocytes. This interaction may modulate its activity as happens in many other RNA-controlled pathways. However, the identity of the RNA(s) and their relevance remain unknown. In my PhD, I will identify SERCA2a interacting RNAs and glean insights into their function. The outcomes will provide new molecular targets and innovative opportunities to improve therapies.

## KEYNOTE SPEAKER

### Patient-derived stem cells – drug discovery in brain diseases

PROFESSOR ALAN MACKAY-SIM

***2017 Australian of the Year, Professor Emeritus at Griffith Institute for Drug Discovery, Griffith University***

After so many years of transgenic animal models, why don't we have any successful disease-modifying drugs for brain diseases? Why have 100's of phase III clinical trials for Alzheimer's disease and motor neuron disease failed? Why are we still using drugs to treat symptoms of schizophrenia and not its causes? Why have cancer researchers been so successful in finding new treatments compared to neuroscientists? Perhaps for brain diseases we need to focus on cells, like cancer researchers, rather than brains, like neuroscientists. Patient-derived olfactory neural stem cells, generated from biopsies of the olfactory organ in the nose, give us a new way to understand brain diseases, including "monogenic" diseases (hereditary spastic paraplegia, familial Parkinson's disease) and polygenic disease (schizophrenia and sporadic Parkinson's disease). With these cells, we use the various "omics" to link disease-associated cell phenotypes with genetic mutations and use these phenotypes for drug discovery. Patient-derived neurons (from induced pluripotent stem cells) are used to validate disease-associated phenotypes.

## INVITED SPEAKERS

### The Australian Geospatial Health Lab: rationale, progress, and challenges

PROFESSOR MARK DANIEL

***Professor of Epidemiology, Health Research Institute, University of Canberra; Professorial Fellow, Department of Medicine, St Vincent's Hospital, The University of Melbourne; and Senior Principal Research Fellow at the South Australian Health and Medical Research Institute***

Geographic information systems (GIS) can provide enormous benefits by supporting routine and strategic decision-making in health and medical care. The Australian Geospatial Health Lab (AGeoH-L) is a unique disease prevention infrastructure being developed through a partnership between the University of Canberra and GIS industry world leader Esri. AGeoH-L innovates the integration of advanced tools for managing, transforming, analysing and visualising spatially-referenced data. Spatial epidemiological analysis then identifies built, social and physical environmental factors that shape risk, disease and outcomes (complications, hospitalisations, death). Geospatial modelling and inferential, multi-level analyses further assess environmental features and risk factors against diseases and outcomes that vary over time and respond (or not) to policy and public health and practice-based intervention. This capability can identify high-priority environmental and population targets and support decision-making for policy and practice-based interventions to efficiently prevent and reduce population disease risks and treatment costs.



## Cancer Research in Canberra, philanthropy and the Comprehensive Cancer Centre, cancer drug repurposing in real time. 3D bioprinting and screening for high throughput drug screening

PROFESSOR ROSS HANNAN<sup>1</sup>, PROFESSOR ELIZABETH GARDINER<sup>2</sup>, DR AMEE GEORGE

1. *Executive Group Manager, Centre for Health and Medical Research, ACT Health Directorate, Centenary Chair in Cancer Research, The John Curtin School of Medical Research, The Australian National University*
2. *Deputy Head, Department of Cancer Biology and Therapeutics, The John Curtin School of Medical Research, The Australian National University; Scientific Head, National Platelet Referral and Research Centre, The Australian National University and The Canberra Hospital*
3. *Lead: ANU Centre for Therapeutic Discovery, The John Curtin School of Medical Research, The Australian National University; Co-Chair Fictional High Throughput Technologies National Screening Conference*

Cancer research in Canberra is at a watershed moment. Professor Hannan will discuss a major new philanthropic campaign headed by ANU, and ACT Health Directorate to establish a state of the art research-led Comprehensive Cancer Centre. The research activities of the Centre will encompass laboratory, clinical, early phase clinical trials and behavioural and population-based cancer research. The Centre will also conduct activities in outreach and education, and provide information on advances in healthcare for both healthcare professionals and the public. A major clinical research focus of the Centre will be the establishment of Australia's first high-throughput facility for screening ex vivo tumours from patients in 3D, to enable cancer drug repurposing in real time. Dr Amee George will describe how she will use the new 3D bioprinting and screening facility to recreate malignant stem cell microenvironments and other pathophysiological environments, for high throughput drug screening.

## Our Health in Our Hands: future personalised medical technologies for a sustainable and effective healthcare

PROFESSOR ANTONIO TRICOLI<sup>1</sup>, PROFESSOR MATTHEW COOK<sup>2</sup>

1. *Lead: Nanotechnology Research Laboratory, College of Engineering and Computer Science, the Australian National University; Group Leader Future Engineering Research Leadership Fellowship; Co-Chair and Establishing Member inaugural 2017 ANU Grand Challenge "Our Health in Our Hands"*
2. *Director of Immunology Canberra Health Services, Professor of Medicine, ANU Medical School, and Director of the Centre for Personalised Immunology, The John Curtin School of Medical Research, The Australian National University*

The unprecedented technological and medical achievements of the 20th century have significantly contributed to improve our quality of life. Yet, the rapid rise of healthcare expenditure is challenging the sustainability of existing health systems. Healthcare costs account for ~18% of the gross domestic product in the USA and 10% in Australia. Explanations for this unsustainable rise in healthcare cost include the burden of chronic disease for which treatment is often targeted at symptoms and complications, rather than underlying causes, and related problems such as toxicity and off-target effects of conventional treatments, poor compliance to treatments, failure to prevent and diagnose disease in its early stages, and failure to stratify patients with similar disease but different risks of disease progression and severity. Furthermore despite growing expenditure, significant health inequities exist with inferior access to healthcare and diagnostic services affecting remote and/or vulnerable populations including Aboriginal and Torres Strait Islander Australians. The considerable expense of new and effective therapies also creates a risk of inequity, and this cost is multiplied when the expensive treatments are administered without sufficient knowledge of which patients and populations will benefit from them. The inaugural Australian National University Grand Challenge "Our Health in Our Hands" aims to personalise medicine, in the broadest sense, which means devising strategies for diagnosing, treating and monitoring the risk of illness, tailored to individual need irrespective of geographical location or social circumstances, to ensure that healthcare can be provided equally and effectively to a rapidly growing world population. In this presentation, we will introduce the key motivation and aims of our research programs, reviewing short- and long-term goals, as well as innovative medical technologies that may play a role in triggering the future digitalization and further personalisation of health care.



## HARC – the Health Analytics Research Collaboration

### ASSOCIATE PROFESSOR BRUCE SHADBOLT

***Executive Branch Manager, Centre for Health and Medical Research, ACT Health Directorate; Associate Professor, The Australian National University Medical School and Biologic Data Science Institute***

HARC is a collaboration between ACT Health Directorate and Canberra Health Services and academic partners focused on health data science, research methods and analytics in both qualitative and quantitative areas. It aims to:

- Drive high quality and efficient research and innovation
- Strengthen strategic partnerships
- Accelerate translation of knowledge to practice and policy

The HARC Management reflects this broad collaboration and supports initiatives such as the HealthANSWERS Partnership and the system-wide research data framework being developed. A major step in the early phase of HARC's stewardship is establishment of the HARC network and novel AI flagship projects that translate knowledge from research into practice and policy. Details on HARC will be further explained, including the draft Research Data Governance Framework and the proposed statistical learning model to operationalise the use of research and data in quality improvement.

# CHARM

**CANBERRA HEALTH**  
Annual Research Meeting



**DAY TWO**

**END OF LIFE CARE – PAST TRENDS,  
FUTURE PROJECTIONS AND  
IMPLICATIONS FOR SERVICES  
ABSTRACTS**



## KEYNOTE SPEAKER

### Achieving quality palliative care for all

DISTINGUISHED PROFESSOR PATSY YATES

**2017 Australian of the Year, Professor Emeritus at Griffith Institute for Drug Discovery, Griffith University**

People who are nearing the end of life deserve the best possible health and support services. The ability of our health systems to deliver quality palliative care for all is increasingly challenged by the growing ageing population, more complex disease trajectories, changing social and family structures, and raised community expectations of modern medicine. Major reforms will be required if we are to ensure that all members of our community receive quality end of life care. These reforms will include innovation in the organisation and delivery of health and social care services to ensure they are responsive to changing disease and sociodemographic profiles. The reforms will also require significant investment in capacity building of health professionals and communities, and a rethink of the way in which we enable consumer preferences and choices to be at the centre of care delivery. Strong leadership at all levels will be critical to the success of these reforms and the quality of care provided to those in our community who are dying.

## INVITED SPEAKERS

### Developing effective, clinically feasible and sustainable models for people receiving palliative care and their families

PROFESSOR PENNY SCHOFIELD

**Professor of Health Psychology, School of Health Sciences, Swinburne University of Technology; Program Lead: Personalized Health Care Innovation, Iverson Health Innovation Research Institute, Swinburne University of Technology; Head of Behavioural Research, Peter MacCallum Cancer Centre**

People with advanced cancer nearing the end of life have an array of physical, psychological, practical and spiritual needs. A recent systematic review identified the most commonly reported needs were: emotional support; fatigue; and information about the benefits and side-effects of treatment. However, there is a paucity of robust evidence-based, psycho-educational interventions to address these needs in the palliative care domain. Interventions which are designed to cater for individuals' unique needs while placing minimal demands on the acute health care setting are urgently required. As a result of extensive intervention development and testing, I have conceptualised a comprehensive framework for the development and delivery of supportive cancer care interventions to ensure that they are effective, clinically feasible and sustainable in this climate of economic constraint. Seven key features required in the development of an intervention in order to achieve effective and easy translation into usual care consist of 1) targeting a cancer type and stage, 2) tailoring to individuals unique needs, 3) promoting self-management, 4) efficient intervention delivery, 5) ensuring evidence-based and theoretical grounding, 6) specifying protocol training and adherence, and 7) confirming stakeholder acceptability. How this model can be applied to the palliative care field will be considered.

## Choices at end of life

PROFESSOR KATHY EAGAR

*Professor of Health Services Research and Director, Australian Health Services Research Institute (AHSRI), University of Wollongong*

This paper will give an overview of death and dying in Australia and will canvass end of life choices. This will include prevention, acute care, advanced care planning, palliative care and voluntary assisted dying. Along the way, it will canvas critical research questions and challenges about end of life care

## Creating Compassionate Communities and developing community capacity around palliative care and grief.

DR KERRI NOONAN

*Co-founder of The GroundSwell Project*

As the need for excellent palliative and end of life care grows in Australia, as does the need for healthcare providers and services to keep engaging with community members. Likewise community members do have know-how about some aspects of end of life and this is under recognised in our medicalised system. This presentation will discuss the public health approach to palliative care, providing an overview of recent research examining death literacy, and this practical know-how about death and loss in Australia and some of the creative community initiatives that are developing to address it.

## Dying surrounded by equipment and machines

PROFESSOR IMOGEN MITCHELL

*Director – ANU Medical School, Senior Medical Advisor at the Australian Commission on Safety and Quality in Health Care and Senior Intensive Care Specialist, Canberra Health Services*

The number of Australians dying each year is just over 160 000 with nearly 40 000 occurring in an intensive care unit. It is likely over half will have received invasive ventilation and vasopressor support and many up to the time of or near their death. Only a handful of these patients will have seen a specialist palliative care team. The challenge we face as a community is appreciating that most deaths are expected and yet we fail to discuss what will be important to us at the time of death and whether intensive care is part of the picture.

## Improving the availability of palliative care – identifying unmet need at the local level

PROFESSOR MICHAEL WOODS

*Centre for Health Economics Research and Evaluation, University of Technology Sydney*

Professor Woods will report on the development of a Palliative Care Performance Framework which could underpin the long-term assessment of the availability and performance of Australia's palliative care services. The value of the Framework lies in its ability to identify unmet need at the local level, assess changes in availability and service performance in each region over time and assess and compare service provision in different regions. The framework has been trialled in two Primary Health Networks; Sydney North and Murray (northern Victoria).

## End of life communication in the ICU

PROFESSOR DIANA SLADE, DR SUZANNE EGGINS, DR LIZA GONCHAROV

*ANU School of Literature, Languages and Linguistics, The Australian National University*

Communication is increasingly being shown to be essential to the delivery of safe and effective patient-centred care. It is particularly important during critical illness and end of life care, as the quality of communication about dying affects not only the care and treatment the patient will receive but also the way in which the dying process is perceived by the patient and family.

The aim of this small exploratory pilot study is to describe and analyse the communication practices between doctors, patients and carers in end of life interactions in the Intensive Care Unit (ICU) at the Canberra Hospital. Specifically, the project will identify ways in which doctors can enhance their communicative practices during end-of-life discussions.

In this paper, we will present our preliminary findings from analysing interviews about end of life communication and audio-recordings of end of life conversations between clinicians and patients/families in the ICU.

## Better lives and better deaths in aged care through specialist palliative care Needs Rounds: results from a stepped wedge randomised controlled trial

NIKKI JOHNSTON OAM MACN

*Nurse Practitioner Clare Holland House, winner of the inaugural Health Minister's Award for Nursing Trailblazers 2019, recipient of a Medal of the Order of Australia 2019*

Specialist palliative care provision for aged care residents is often woefully inadequate, and residents experience high levels of unnecessary hospitalisation. This points to an urgent clinical priority to manage residents' complex needs in the aged care setting. We developed and tested a new approach to provide specialist palliative care in aged care, called Needs Rounds.

## Consumer leadership in palliative care: redressing power imbalances against experiential expertise

DR BRETT SCHOLZ

*Research Fellow in the Medical School, ANU College of Health and Medicine, Board Member for the ACT Mental Health Consumer Network*

Contemporary health policies require meaningful consumer involvement in all stages of service planning, implementation, delivery, and evaluation. A recent systematic review found that the extent to which consumer engagement taking place in palliative care services and systems is not meeting policy requirements. Further, the palliative care sector is not benefiting from the value that brought by more meaningfully partnering with consumers in decision-making processes. One problematic rhetoric relates to the assumption often made that consumers lack capacity to make decisions for services and systems. I will discuss the implications of the current lack of consumer leadership in palliative care and challenge us all to explore ways in which we can work to meaningfully partner with consumers across the sector.

## Good living and safe dying

ABC RADIO NATIONAL BROADCAST PANEL DISCUSSION CHAIRED BY GERALDINE DOOGUE

*Panel members: Dr Kerri Noonan, Professor Imogen Mitchell, Nikki Johnson, Dr Suzanne Rainsford*

Most Australians will at some point in their lives need support to live well with a life-limiting illness. All Australians should be able to experience dying with safety and comfort. Achieving this for all Australians will require considerable planning, engagement and resources. Australia has a strong international reputation in palliative care provision for those who receive it, this is in part due to recognition that good living and safe dying means different things to different people. Living well with a life limiting illness knowing that there will be a safe and comfortable death requires us to enhance our community's influence on and involvement in the end of life care they receive in addition to improving the quality and availability of palliative and end-of-life care healthcare services.

## Environmental preferences of carers and clinicians in acute palliative settings

EMILY SISSON<sup>1,2</sup>, KATHRYN DWANI<sup>1</sup>, SARAH SPILLER<sup>1</sup>, NICHOLAS GLASGOW<sup>2</sup>

1. *Health Care Consumers' Association, Hackett, ACT, 2602*
2. *ANU Medical School, The Australian National University, Acton, ACT, 2601*

[Emily.Sisson@anu.edu.au](mailto:Emily.Sisson@anu.edu.au)

**INTRODUCTION:** Research demonstrates that the architecture, interior design and the ambient features of the clinical setting can significantly improve physical and psychological wellbeing. Most research on end of life care has focused on the hospice setting, whereas, the majority of Australians are likely to die in hospital. Therefore, it is important to understand patients', carers' and health professionals' preferences for end of life care in such settings.

**AIM:** This project aims to identify carer and clinician preferences for the architecture, interior design and ambient features in hospital-based, palliative care areas.

**METHODS:** We identified carer preferences by thematically analysing semi-structured interviews with carers of patients that have received palliative care in the ACT. We are currently interviewing health professionals involved in end of life care about their beliefs in what makes a good environment.

**RESULTS:** Carers preferences for the internal architecture in ACT hospitals align with the literature, and encompass ward design, room design and ambient features. Additionally, carers believe that a dedicated acute palliative care ward would improve the experience. Interviews with palliative clinicians are underway and results are emerging.

**CONCLUSION:** Carers believe that the experience of the palliative patient and their family would be better in a dedicated palliative care ward.

**SIGNIFICANCE:** Currently, there is no dedicated palliative care ward in the ACT public hospital system. However, a recent government inquiry recommended a review of the need for a dedicated palliative care ward in the Canberra Hospital. The results from this research could play a key role in design by ensuring the environment is amenable to both clinicians and patients.

## Enabling access to quality end of life and palliative care in a prison setting

RORY MAGUIRE

*Justice Health Services, Canberra, ACT, 2601*

**INTRODUCTION:** Access to end of life and palliative care services are recognised as a human right for all people. There is however little guidance available to provide such care within a prison setting. With the increasing age of prisoners in the ACT and greater likelihood of complex and advanced illness with multiple co-morbidities along with limited treatment options, there is a need to develop a framework for care to address end of life and palliative care needs in the Alexander Maconochie Centre. Such care should be appropriate, compassionate and timely, and enable detainees to be involved in their end of life care decisions where possible.

**METHODS:** A working group from ACT Corrective Services, Justice Health Services, and Specialist Palliative Care Services reviewed case studies of predicted deaths and the end of life pathways for detainees at the Alexander Maconochie Centre (AMC). An analysis of the Corrections and Health systems was also undertaken to identify factors impacting on end of life and palliative care management of detainees at AMC. Possible solutions were tested against the case studies and identified factors with promising options then explored in light of evidence-based practice and viability of use in the prison setting.

**RESULTS:** A framework for the implementation of end of life and palliative care was developed to guide Corrections, Justice Health staff and Specialist Palliative Care Services in providing quality multidisciplinary end of life and palliative care needs in the AMC. The framework outlines the roles of all parties along with processes to support Justice Health Clinicians to recognising end of life, the terminal phase of life and implement a palliative approach.

**SIGNIFICANCE:** The framework attempts to addresses the challenges of the physical environment, protocols and provides a vehicle to incorporate the values, needs and preferences of detainees and families into care at end of life in small – medium prisons.

## Caring for dying babies and their families: an experience based co-design study

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**INTRODUCTION:** Death is a regular occurrence in neonatal intensive care units (NICU). However there remains a paucity of evidence to inform the development of services and education for staff caring for dying babies and their families.

**AIMS:** This study aimed to develop an education and support package for Neonatal Staff based on staff and family experience.

**METHODS:** experience based co-design (EBCD) methodology has been used to facilitate collaborative work with staff and service users.

- Phase 1: Explored parent and staff experiences of death in the NICU through, surveys, observational sessions and one on one interviews to identify key 'touch-points.'
- Phase 2: Staff and parent feedback sessions were held using the touch-point video to elicit key elements of improvement.
- Phase 3: Established working groups to develop strategies and processes related to these elements.


**RESULTS:** Baseline surveys were returned by 66 staff. 4 observational sessions of clinical care in the NICU and 18 filmed qualitative interviews with staff and bereaved families were conducted. A 40 minute touch-point video that considered five key themes was developed: caring for and supporting the family unit, creating family memories, family and staff grief, family support after discharge and caring for staff. Parent and Staff feedback sessions identified three key elements of service improvement: 1) staff education program, 2) leadership and communication, and 3) family memory box and resources

**CONCLUSION:** This study has shown the benefits of engaging parents and staff in the development of relevant education and support resources.


**SIGNIFICANCE:** This study is unique and ground-breaking, using EDCD to develop educational and support resources when considering neonatal bereavement.

# CHARM

CANBERRA HEALTH  
Annual Research Meeting



## DAY THREE ACT RESEARCH IN FOCUS ABSTRACTS





## KEYNOTE SPEAKER

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### Maternal health – why it matters

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#### PROFESSOR CAROLINE HOMER

Co-Program Director Maternal and Child Health and Co-Working Group Head Global Women's and Newborn's Health, Burnet Institute, Melbourne; Distinguished Professor of Midwifery, University of Technology Sydney

When maternal health suffers, so does the health of others. Improving the health of childbearing women is essential for improving their own health and wellbeing and that of their children, families and the community. Pregnancy is a critical time to access women and their families, identify strengths and potential health challenges and support women to be able to start motherhood strong and confident with a healthy baby. In Australia, maternal health generally gets little attention despite 300,000 babies being born each year and the vast majority of babies born in hospitals.

There is now high level evidence that there are a range of models of care and ways of providing maternity services that are good for women and health systems in terms of staff satisfaction and cost effectiveness. These include midwifery continuity of care, especially for Aboriginal and Torres Strait Islander women and families where there are still considerable gaps to be addressed. The ability to improve care and services while reducing cost is critical to building, developing and maintaining sustainability in health care.

This presentation will also address a number of other issues that currently affect maternal health in Australia including a persistently high caesarean section rate, little change in rates of stillbirth, a workforce shortage especially in rural and remote settings and a critical need to engage and consult in a meaningful way with consumers.

## Better targeting for moving tumours in radiation therapy

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**INTRODUCTION:** Creating a movie loop of lung tumour motion to aid radiation therapy can improve accuracy but it "costs" more x-ray imaging dose.

**AIMS:** Respiratory triggered four-dimensional cone-beam computed tomography (RT 4D CBCT) is a novel technique conceived in this work with the aim to investigate the trade-off between x-ray imaging dose and clinical efficacy in this circumstance.

**METHODS:** Nine breathing traces were used to compare the performance of images acquired using the novel RT 4D CBCT against the images acquired using conventional. Image quality metrics and clinical lung tumour trajectories were calculated and compared for both techniques.

**RESULTS:** Comparing the two techniques, trajectories varied by only 0.7 mm or less for all cases except 1 case where variation was 1.3 mm. Image quality was slightly worse for two of three tests, and was not significantly different of one of three tests. On the average, 50% less imaging dose was required using the novel RT 4D CBCT technique.

**CONCLUSION:** RT 4D CBCT requires less x-ray imaging dose compared to conventional techniques to yield equivalent clinical information about lung tumour trajectories.

**SIGNIFICANCE:** Lung cancer patients with mobile tumours in the lung can benefit with the proposed RT 4D CBCT technique because it gives the treatment staff and doctors the same clinical information to hit the tumour target using around 50% less x-ray imaging dose.

## Fast and accurate customized pelvic fixation plate design using 3D modelling and 3D printing

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The mismatch of complex geometries between the patient's pelvis and standard fixation devices causes bleeding, intra-abdominal injuries, and death, in which surgical realignment and stabilisation are strongly considered. The geometrical matching in the current clinical practice is through the mirroring of the non-fractured hemi-pelvis for the fractured pelvic.

We identified and converted the anatomical geometries of a patient's pelvis from 13 patients of a CT image directory to a 3D model, and virtually superimpose hemi-pelvises using iterative closet algorithm. This allowed us to investigate the geometrical differences of these models from the patients. We further used the fracture registration technique and 3D printing to design customised fixation plates using the re-stitched fracture model for attachment, and compared the attachment with that in the mirrored non-fractured hemi-pelvis.

We summarised the high deviation regions between hemi-pelvises in each case, and drew a colour map on a hemi-pelvis that identified the areas which had a high possibility to be symmetrically different. The result showed that the greatest possibility of high deviation areas was the summit of acetabular rim, where 7 out of 13 cases exhibited high deviations greater than 4 mm. The customised fixation plates showed the implants had lower geometrical deviation when attached onto the re-stitched fracture side than onto the mirrored non-fractured bone.

The 3D modelling and printing techniques provide innovative approach increasing the accuracy in fabricating surgical implants, improving the reconstructive surgery and reducing the risk of a second intervention.

## shape is only a weak predictor of deep knee flexion kinematics in healthy and osteoarthritic knees

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**INTRODUCTION:** Tibiofemoral shape influences knee kinematics but little is known about the effect of shape on deep knee flexion kinematics.

**AIM:** To examine the association between tibiofemoral joint shape and kinematics during deep kneeling in patients with and without OA.

**METHODS:** 61 healthy participants and 58 patients with end-stage knee OA received a CT of their knee. Participants completed full flexion kneeling while being imaged using single-plane fluoroscopy. Six-degree-of-freedom kinematics were measured by registering a 3D-static CT onto 2D-dynamic fluoroscopic images. Statistical-shape modelling and bivariate-functional principal component analysis (bfPCA) were used to describe variability in knee shape and kinematics, respectively. Random-Forest-regression models were created to test the ability of shape to predict kinematics controlling for BMI, sex and group.

**RESULTS:** The first 7 modes of the shape model up to three modes of the bfPCAs captured >90% of the variation. The ability of the random-forest models to predict kinematics from shape were low, with no more than 50% of the variation being explained in any model. Furthermore, prediction errors were high, ranging between 24.2% and 29.4% of the data.

**CONCLUSION:** Variations in bony morphology of the tibiofemoral joint were weakly associated with the kinematics of deep-knee flexion. The models only explained a small amount of variation in the data with high error rates indicating that additional predictors need to be identified. The lack of relationship between shape and kinematics was surprising given previous reports.

**SIGNIFICANCE:** These results contribute to the clinical understanding of knee kinematics and potentially the expectations placed on high-flexion TKR design.

## Prediction of the Kellgren-Lawrence Knee Osteoarthritis Severity Grade. A predictive data model using the kinematics of kneeling

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**INTRODUCTION:** We have previously shown that knee osteoarthritis (KOA) changes six-degree-of-freedom (6DOF) kneeling kinematics, and we now propose that conversely, kneeling kinematics can be used to identify KOA severity.

**AIM:** We aimed to develop a predictive data model that determines KOA severity, using the kinematics of kneeling.

**METHODS:** Healthy (n=74) and KOA (n=83) participants were recruited. The Kellgren-Lawrence (KL) grade was determined for each participant using CT. 6DOF kinematics were captured using CT to fluoroscopy during a full cycle of kneeling. The kinematics were quantified using Orthovis© 3D/2D multi-modal image-registration and the Grood and Suntay reference system.

A predictive model of KOA severity using kneeling kinematics was developed using data-mining and machine-learning following the Cross-Industry Standard Practice for Data-Mining (CRISP-DM) protocol. The model was built using 60% of data, tested using 20% of data, and finally validated using 20% of data.

**RESULTS:** Our predictive classification and regression (C&RT) decision tree model demonstrates that kneeling kinematics can predict KOA severity as defined by KL grade. The final analysis showed a stable model with an overall accuracy of 98.89% (training), 100% (testing) and 100% (validation).

**CONCLUSIONS:** Our model predicts a KL grade of 0 to 4 and can distinguish between KL0 and KL1. This is the first time that both asymptomatic and symptomatic kneeling knee kinematic data has been analysed in this way and suggests that maximum flexion is a significant predictor for KOA severity.

## Increased functional connectivity of the thalamus in patients with Parkinson disease: clinical pathophysiology of functional compensation

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**INTRODUCTION:** Parkinson's disease (PD) affects 2-3% of the population over the age of 65. Cell loss in the substantia nigra results in dopamine depletion to the nuclei of the striatum, impacting the functioning of cortico-basal ganglia-thalamo-cortical circuits.

**AIMS:** The role of the thalamus within this circuitry warrants further explication due to the key role the structure plays in a range of motor, behavioural and sensory functions.

**METHODS:** Using advanced brain magnetic resonance imaging analytic methods we examined the functional connectivity of motor and prefrontal subdivisions of the thalamus to investigate how cortico-basal ganglia-thalamo-cortical circuitry might be influenced in patients with PD (n = 32), relative to controls (n = 20),

**RESULTS:** PD subjects showed significant increases in functional connectivity between the motor thalamus and the supplementary motor area, and also between the prefrontal thalamus and the dorsolateral prefrontal cortex, cingulate cortices, anterior prefrontal cortex and nuclei of the basal ganglia. A morphological investigation of the thalamus found no significant volumetric or surface-based alterations to the thalamus in PD.

**CONCLUSION:** Our results indicate that PD is associated with increases in functional connectivity of the thalamus with important motor, cognitive and limbic areas of the brain, independent of any morphological alterations to the structure.

**SIGNIFICANCE:** Increases in thalamic functional connectivity may be indicative of a compensatory functional mechanism in PD due to pathological alterations to cortico-basal ganglia-thalamo-cortical circuitry.

## Investigating the role of mitochondrial genomic variation in Alzheimer's disease

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**INTRODUCTION:** Alzheimer's disease (AD) is a debilitating neurological condition affecting ~50 million people worldwide, with the global prevalence predicted to triple by 2050, and no cure or effective treatment to-date. Its multifactorial aetiology and polygenic nature mandates the need to move beyond the classical 'amyloid cascade' model to explore other potentially causal pathological processes. Several lines of evidence from genetic, biomolecular, cell biology, clinical endophenotypes, animal, and epidemiological studies suggest a plausible role of mitochondrial dysfunction in mediating, driving, initiating or contributing to various AD-related pathologies. However, our understanding of these mechanistic pathways is limited.

**AIMS:** The overarching objective of this study is to enhance our understanding of the functional and causal role of allelic variation and expression of genes in mitochondrial-associated biological pathways on AD pathology.

**METHODS:** We evaluated the association between polygenic scores for nuclear-encoded mitochondrial genes grouped by known mitochondrial pathways and AD risk and AD endophenotypes. Regression analysis is currently being performed to investigate the interactive effects between these pathway-specific scores and mitochondrial genome haplogroups on AD risk. Causal associations between the gene expression of nuclear-encoded mitochondrial genes and AD risk and associated endophenotypes will also be examined using Transcriptome-wide Mendelian Randomisation analysis.

**RESULTS:** Initial analyses indicate significant associations of mitochondrial pathway-specific polygenic-scores with AD risk, including mitochondrial transmembrane transport and ATP-synthesis coupled proton-transport.

**SIGNIFICANCE:** This study provides insights into the mitochondrial biological pathways which may play a significant role in facilitating AD pathology. This could inform strategies for drug design and development, specifically targeting mitochondrial genes and pathways.

## Risk of behavioural and mental health disorders and developmental delay, in kindergarten boys and girls

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**INTRODUCTION:** Mental health disorders and developmental delay and disability have a significant impact in Australian society and risks start early in life.

**AIMS:** To explore risk of behavioural and mental health disorders and developmental vulnerability in early childhood.

**METHODS:** Descriptive statistics and logistic regression analysis of the 2014-2016 Kindergarten Health Check (KHC), an annual survey of all children enrolled in their first year of primary education in the Australian Capital Territory.

**RESULTS:** 15,040 (90.3% of all enrolled) children completed the KHC during 2014-2016. 709 (4.8%) were at clinically significant risk of behavioural and mental health disorders from the Strengths and Difficulties Questionnaire (SDQ) and 1,553 children (10.4%) were at significant risk of developmental delay or disability from the Parents' Evaluation of Developmental Status (PEDS) questionnaire. Predictors of risk included Aboriginal and Torres Strait Islander status (SDQ OR 2.73, 95% CI 1.79-4.17; PEDS OR 2.19, 95% CI 1.56-3.07), male sex (SDQ OR 1.78, 95% CI 1.48-2.15; PEDS OR 2.10, 95% CI 1.85-2.38) and relative socioeconomic disadvantage (SDQ OR 1.87, 95% CI 1.39-2.51; PEDS OR 1.29, 95% CI 1.07-1.56).

**CONCLUSION:** Boys were at greater risk of clinically significant behavioural and mental health problems and developmental vulnerability compared to girls. Children of Aboriginal and Torres Strait Islander background were also at greater risk than other children.

**SIGNIFICANCE:** Programs and support in early childhood directed at children with greater vulnerability may help mitigate the risks of developing clinically significant behavioural and mental health problems, and the impact of developmental delay or disability.



## Optimising control programs for soil-transmitted helminths

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**INTRODUCTION:** Soil-transmitted helminths (STH) are intestinal worms that cause significant morbidity worldwide. World Health Organization (WHO) STH control guidelines focus on large-scale school-based deworming programs, in which anthelmintic medications are delivered regularly to school-aged children.

**AIM:** The aim of my thesis is to provide empirical evidence to guide the optimisation of STH control programs, by addressing several key evidence gaps.

**METHODS:** I conducted a network meta-analysis, comparing efficacy of 20 anthelmintic drug regimens. I conducted a second meta-analysis, comparing the impact of community-wide and child-targeted deworming. I analysed results from two community-based trials in Timor-Leste: the (S) WASH-D for WORMS pilot study comparing community-wide and child-targeted STH control programs, and the WASH for WORMS randomised controlled trial comparing a community-wide WASH and deworming program to deworming alone.

**RESULTS:** Several drug combinations, including albendazole–ivermectin and albendazole–oxantel pamoate, were found to be more efficacious than the current standard treatment against *Trichuris trichiura*, a challenging STH to control. Compared to child-targeted programs, community-wide STH control programs led to greater STH prevalence reduction among children, in both meta-analysis and the (S)WASH-D for WORMS study. The WASH for WORMS study found no additional impact of a community WASH intervention on STH infections above that achieved by deworming over a two-year period.

**CONCLUSION AND SIGNIFICANCE:** The findings presented in my thesis provide robust evidence for policymakers. Specific recommendations for STH control programs are the inclusion of drug combinations and the expansion to community-wide deworming. Complementing deworming with WASH interventions is also important, although additional impact on STH may not be apparent for some time.

## Supported decision-making to assist older persons experiencing elder abuse: systematic review

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**INTRODUCTION:** World Health Organisation estimates 10 percent of older adults experience elder abuse, highlighted as a serious human rights issue. The Australian Government suggests 'supported decision making' (SDM) to advocate for this group: which recognises the equal right to make decisions and have those decisions respected, and demands affected persons be supported to do so. This contrasts with substitute decision making and the restrictive binary interpretations of 'legal capacity'. The enactment of, and effectiveness of SDM is less clear.

**AIMS:** Explore evidence on the effectiveness of SDM for older people experiencing elder abuse.

**METHODS:** A systematic review conducted in accordance with Preferred Reporting Items for Systematic Review and Meta-Analyse guidelines (PRISMA). Primary empirical studies in English since 2008 were subject to content analysis by two independent researchers regarding research on supported decision making in: older people; people with mental illness; or intellectual disabilities.

**RESULTS:** 509 articles were identified, with 20 meeting inclusion criteria. Analysis revealed four themes: personal and environmental factors; relationship between decision maker and support person; information and training; and models and frameworks to aid assessment.

**CONCLUSIONS AND SIGNIFICANCE:** Supported decision making was considered effective in the limited studies available, but its provision is a complex and multifactorial process that requires a deep understanding of the person, their social context, emotional, cognitive and overall health status. Decision-making experience, co-existing conditions and emotional factors were found to be significant contextual factors which could either enable or inhibit supported decision-making. Time investment in the relationship, risk management and influence considerations were particularly important for the training of professional supporters.

## Smartphone apps used for breastfeeding and their response to infants experiencing suboptimal feeding

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**INTRODUCTION:** For Australian women wanting to breastfeed, smart phone applications (apps) are a convenient, cheap and easy source of support. However, while many women use breastfeeding apps, little is known about their functionality and how apps respond to women facing breastfeeding challenges.

**AIMS:** This study explores what information and/or guidance is offered to women using breastfeeding apps when their baby shows suboptimal feeding patterns.

**METHODS:** Evaluation Research exploring the information-seeking of breastfeeding women as decision makers in infant care, using the novel walk-through method to audit algorithms used by breastfeeding apps. Using a virtual baby profile inspired by a published case study, seven popular breastfeeding apps will be investigated. Adequacy of feeding and the accuracy of any information given will be assessed against the International Lactation Consultant Association Guidelines for the Establishment of Exclusive Breastfeeding. Content analysis of the guidance generated by the apps will examine their effectiveness in supporting breastfeeding intent and self-efficacy.

**RESULTS:** There is potential for a broad array of information and guidance offered to women, and little is currently known about app content. Researchers expect to capture and codify the information and identify existing gaps.

**CONCLUSION:** Breastfeeding apps are not intended to replace a skilled clinician. However, when breastfeeding women are supported with appropriate guidance seeking help or referral, there is potential for early intervention and subsequent improved outcomes for neonates.

**SIGNIFICANCE:** Results of this study will inform recommendations to app developers for the improvement of breastfeeding apps. Moreover, dissemination of findings to clinicians will support tailoring of care and education provided to women.

## Improving the care of patients with behavioural and psychological symptoms of dementia (BPSD) in acute care

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**INTRODUCTION:** Dementia is an increasingly common comorbidity in hospital. Up to 75% of patients will experience behavioural and psychological symptoms of dementia (BPSD), which are expressions of unmet need such as agitation. It is unknown how many patients with BPSD are cared for at Canberra Hospital.

**AIMS/ QUESTION:** Improve care of people who are admitted to the Acute Care of the Elderly ward who have complex behavioural care needs.

**METHODS:** Clinical leaders implemented action research from 2017-2018. Administrative data on patient behaviours and demographics were utilised to improve admission assessment. Mixed methods staff surveys regarding cognitive impairment training, confidence, and feedback on challenges and strategies were used to tailor ward education programs.

**RESULTS:** Canberra Hospital patients with dementia doubled between 2010-2017 at the Canberra Hospital. The majority (61%) were admitted to non-geriatric wards. Patients who were admitted to the Geriatric Special Care Unit (N=65, 2018) met multiple aspects of the BPSD criteria: high falls risk (82%), agitation (69%), restlessness (55%), wandering (46%), increased confusion (29%), verbal aggression (37%), anxiety (28%), physical aggression (23%), loud vocalisation (20%), and hallucinations (11%). The underlying diagnosis for these patients were dementia (23%), delirium (12%), both (45%) or neither (20%). Some (21%) staff had completed Predict, Assess and Respond Training (PART). Surveyed staff (N=14) were less confident in caring for BPSD (14% very confident) than for people with dementia (36%).

**CONCLUSION AND SIGNIFICANCE:** The successful ward-specific implementation could be complemented by hospital-wide education programs regarding cognitive impairment screening, disease treatments and behaviour management in order to address the complex needs of this increasing population.





## Adherence to lifestyle intervention in adults with obesity

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**INTRODUCTION:** The use of technology holds great promise as a mechanism for disseminating and supporting lifestyle intervention programs, allowing services to offer additional patient-provider contact, support and motivation, via a time and cost effective platform.

**AIMS/QUESTION:** To explore the efficacy of using telephone calls and text message as adjunctive tools to support a community-based obesity management program.

**METHODS:** This eight-month randomised cross-over trial recruited 61 adults enrolled in a publicly funded obesity management service (OMS). Participants were randomly assigned to receive telephone and text message support in addition to standard OMS care, or standard OMS care alone. After four months, participants crossed over to the alternative sequence. The technological support was grounded in behaviour change theory. Outcome measures included diet, physical activity, anthropometry, self-efficacy and treatment self-regulation.

**RESULTS:** Telephone and text message support improved lifestyle intervention adherence and clinical outcomes when compared to standard care. Participants who received the intervention in the first 4-month period lost 4.87kg, compared to no weight loss (+0.38kg) in the standard care only group. There was no evidence to indicate an optimal timing of the intervention, with both groups achieving significant results.

**CONCLUSIONS:** The results suggest a high degree of promise for the incorporation of telephone and text message support as adjunctive tools to support community-based obesity management services.

**SIGNIFICANCE:** Given the real-world context of the study, the findings make an important contribution to both research and clinical realms by informing possible improvements to obesity management service delivery, as well as to the broader field of services targeting health behaviour change.

## Keeping the pressure on: does compression therapy prevent cellulitis? Results of a randomised controlled trial

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**INTRODUCTION:** Chronic oedema is a strong risk factor for cellulitis. Expert consensus advises compression therapy to prevent cellulitis recurrence in individuals with chronic oedema, however there is little supporting evidence.

**AIMS:** To determine if compression therapy delays recurrence of lower limb cellulitis in patients with chronic oedema.

**METHODS:** A randomised controlled trial with cross-over was conducted involving participants with lower limb chronic oedema and recurrent cellulitis. Using concealed allocation, 84 participants were randomised into the intervention (compression) or control (no compression) group. The main outcome measure was time to onset of cellulitis, with 6 monthly follow-up for up to 3 years or until 45 episodes of cellulitis occurred. Following an episode of recurrent cellulitis, control group participants crossed over to the intervention group. A planned interim analysis was performed by an external statistician following 23 episodes of cellulitis, resulting in early cessation of the trial.

**RESULTS:** After 23 episodes of cellulitis, a log-rank test showed a highly significant ( $p=0.002$ ) group difference in favour of the intervention group. 17/43 (40%) control group participants experienced recurrence, compared to 6/41 (15%) intervention group participants; number needed to treat = 4 [95% CI 2-15]. Based on time to recurrence, the hazard ratio was 4.42 [95% CI 3.87-4.96].

**CONCLUSION:** In patients with chronic oedema and recurrent cellulitis, compression therapy is highly effective in delaying cellulitis recurrence.

**SIGNIFICANCE:** Patients with chronic oedema and recurrent cellulitis should receive compression therapy as standard care to delay cellulitis recurrence. Translation of this evidence into practice could reduce the burden of cellulitis for sufferers and healthcare systems around the world.

## Incidence of atrial fibrillation in stroke work-up patients identified by 24-hour Holter monitoring

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**INTRODUCTION:** Atrial fibrillation (AF) is a common arrhythmia which accounts for 20% of all stroke causes. Early detection is vital for appropriate initiation of anti-coagulation therapy. Holter monitors (HM) are routinely applied to stroke work-up patients to detect AF. Despite the routine use of HM for AF detection, limited evidence exists on the diagnostic yield of these devices in detecting this arrhythmia.

**AIMS:** Assess the diagnostic yield of HM for the detection of AF in stroke work-up patients.

Evaluate patient demographics including age, gender, and cardiac disease parameters such as burden of ectopic beats, as predictive risk factors for AF and whether these could permit individualized and focused targeting of HM.

**METHODS:** A retrospective evaluation of stroke work-up patients who had a 24-hour Holter monitor was performed over a four-year period which included 820 male and female subjects. Data was analysed using descriptive statistics and the exact chi-squared ( $\chi^2$ ) test.

**RESULTS:** 25 patients were positive for AF which gave a diagnostic yield of 3%. Increased age and presence of AF was found to have a statistically significant association ( $p=0.032$ ), however stratifying patients by gender ( $p=0.287$ ), atrial ectopic burden ( $p=0.303$ ) and ventricular ectopic burden ( $p=0.561$ ) did not significantly predict a presence of AF.

**CONCLUSION:** There is a low diagnostic yield of 24-hour Holter monitoring in detection of AF for stroke work-up patients. Further research is needed to identify appropriate duration, individualization and targeting methods for HM for the detection of AF.

**SIGNIFICANCE:** There is potential for monitoring procedures and referrals to be more targeted and individualised to increase clinical utility.

## Self-reported physical activity levels and barriers in patients with cancer undergoing chemotherapy in the ACT: a cross Sectional Study

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**INTRODUCTION:** Research suggests patients undergoing chemotherapy are not participating in sufficient physical activity (PA) despite numerous known benefits. Clinical Oncology Society of Australia recommends exercise be embedded as standard care in patients with cancer.

**AIM/QUESTION:** The primary objective was to identify self-reported PA levels in patients undergoing chemotherapy in the ACT and compare to WHO PA Guidelines for aerobic activity and resistance exercise (RE).

**METHODS:** A study specific validated questionnaire and a modified Godin-Shepherd Leisure Time Physical Activity Questionnaire was distributed at the three outpatient chemotherapy sites within ACT, Australia (Canberra Region Cancer Centre, Zita Mary Clinic and National Capital Day Chemotherapy and Infusion Unit) over a four-week period.

**RESULTS:** 111 surveys were collected. Respondents primarily were diagnosed with cancers of the digestive system (27.03%) or breast cancer (22.52%). Few respondents reached aerobic PA guidelines (10.81%). Men were significantly more likely ( $p<0.05$ ) to participate in light intensity aerobic exercise and RE than females. 30.63% reported receiving no education whereas other respondents reported education from a variety of sources. Those who received education from an Accredited Exercise Physiologist (AEP) were significantly more likely to reach RE guidelines than other sources of education ( $p<0.05$ ). Lack of time and motivation were barriers significantly related to decreased levels of high intensity PA ( $p<0.05$ ).

**CONCLUSION:** Patients undergoing chemotherapy in the ACT are not participating in enough PA. Men were more likely to participate in light intensity PA and RE.

**RELEVANCE:** Clinicians in the ACT must incorporate PA education into cancer care. AEP's may be useful in increasing RE levels and must consider relevant patient barriers.

## Unplanned 30-day readmissions for lower limb arthroplasty patients in the ACT: a cross-sectional survey

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**BACKGROUND:** Limited research has examined orthopaedic patients' transition from hospital to home in the context of unplanned 30-day readmissions, an indicator of hospital quality and safety.

**AIM:** We developed The ACT Transition from Hospital to Home Orthopaedic Survey to examine associations between individual, hospital and general practice variables and unplanned 30-day readmissions.

**METHODS:** Patients from ACT Health and Calvary Public Hospital Bruce ( $n=487$ ), and Orthopaedics ACT and Calvary Private Hospital Bruce ( $n=795$ ), attending their 6-week post-lower limb arthroplasty consultation between 1 February 2018 and 31 January 2019 ( $n=1282$ ) were invited to complete the survey. Multiple logistic regression analysis was conducted to estimate the odds ratio for risk of readmission.

**RESULTS:** The overall response rate was 64% ( $n=827$ ), 5% of whom were readmitted within 30 days of discharge. After controlling for age and gender, patients who had hip surgery were significantly more likely to be readmitted within 30 days than those who had knee surgery (OR=3.37, 95% CI: 1.32 – 8.59,  $p=0.01$ ). Compared with patients who felt well rested on discharge, those who did not feel well rested were significantly more likely to be readmitted within 30 days (OR=3.23, 95% CI: 1.33-7.88,  $p=0.01$ ). Compared with patients who attended rehabilitation for 1 week, those who attended for 4 weeks or longer (OR=0.23, 95% CI: 0.07 – 0.59,  $p=0.01$ ) were significantly less likely to be readmitted within 30 days.

**SIGNIFICANCE:** Facilitating adequate rest in hospital has important implications for patients' recovery, as does attending post-surgical rehabilitation classes. Differences in outcomes for patients having hip as opposed to knee surgery are of interest for future research.

## Focus on the living before the dying: advance care planning perspectives amongst those with Parkinson's disease

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**INTRODUCTION:** Those with Parkinson's disease may be unable to make decisions, or to communicate, due to limited speech or cognition as their disease progresses. Thus, they are encouraged to make future health care decisions in advance, based on their values and preferences. This is despite the lack of evidence regarding experiences of advance care planning (ACP) amongst this cohort, to guide health professionals.

**QUESTION:** How do people living with Parkinson's, in the Australian Capital Territory, understand and experience ACP as their disease progresses from their own perspectives.

**METHODS:** A qualitative, exploratory design was used. Semi-structured interviews were conducted with 8 patients engaged with a specialist Parkinson's nursing service in the Australian Capital Territory. Data was interpreted using self-determination theory.

**RESULTS:** A sense of relatedness helped participants to maintain social life, foster social learning in preparation for deterioration and death and also informed decisions about end of life care. These decisions extended to funerals, wills and legacies. Self-mastery to manage life and social activities was important to participants to promote authentic choice for future health care. The choices participants made for their future health care preferences were not in pursuit of individual autonomy but were broader in scope to include leaving legacies, alleviating burdens, or not choosing at all as an act of resistance.

**CONCLUSION:** Losses individuals experience due to advancing disease need to be understood in the context of their social life and not just as a medicalised journey towards physical death.

**SIGNIFICANCE:** Participants' experiences of ACP alert us to the broader context of their lives rather than the narrow focus of their disease.

## Validity and reliability of a photoplethysmography device for measuring heart rate variability in paediatrics

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**INTRODUCTION:** Heart rate variability (HRV) is an accepted method for determining autonomic nervous system activity and cardiovascular risk in various populations. Electrocardiograms (ECG) are accurate for HRV measurement in adults and children. However, ECG HRV measurement is costly and often inaccessible. Recently, commercially available HRV devices have been developed. Many devices use photoplethysmography (PPG) which predicts interbeat (R-R) intervals from readings taken at the forearm, wrist or finger. PPG systems have been validated for use in adults but not young children.

**AIMS/QUESTION:** This study endeavoured to determine the validity and reliability of a PPG system to measure paediatric HRV.

**METHODS:** A validity and test-retest design compared two HRV devices: 1) finger PPG monitor; 2) chest strap. Sixteen pre-schoolers (3–5 years old) were recruited. Short-term resting R-R intervals were recorded for all HRV domains. Participants were measured on 3 days between 8–10am. Paired t-tests, effect sizes and Bland-Altman analyses determined the validity of the PPG system. Relative and absolute reliability were calculated.

**RESULTS:** No HRV parameters were valid for the PPG system whilst heart rate (HR) and R-R intervals demonstrated some reliability. The chest strap yielded moderate (0.50–0.75) to good (0.75–0.90) relative reliability with R-R intervals and SD1/SD2 showing the best results. The strap displayed better absolute reliability with RMSSD, R-R intervals and HR showing the lowest values (TEM% < 12%).

**CONCLUSION:** Use of the chest strap and not PPG in young children is encouraged for valid and reliable HRV.

**SIGNIFICANCE:** These parameters can be used to track exercise and lifestyle interventions in young children aged 3–5 years old.

## The contested nature of obesity and the role of health services in prevention

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**INTRODUCTION:** A major risk factor for many chronic diseases is being obese. However, obesity prevention is not routinely integrated into health services due to practical barriers such as time and cost. This study examined other factors that impact on health services delivering obesity prevention from the perspective of those working within the health system.

**RESEARCH QUESTION:** What are the key factors which enable or hinder the incorporation of obesity prevention interventions for adults into secondary health services?

**METHODS:** Grounded theory was used to analyse interviews with health staff from different levels of a health service (health policy, service management, clinical practice).

**RESULTS:** Health system models of care based on the disease centric medicalised paradigm emphasise treatment over prevention. The framing of prevention as a matter of individual choice and the shared perceptions of obesity which lead to stigma, were identified as significant barriers to developing the health services role in obesity prevention.

**CONCLUSION:** Obesity is a chronic condition which impacts people in different ways. The barriers to obesity prevention may be more readily overcome if the obesity prevention goals of health services prioritised improving overall health and wellbeing rather than a focus on weight reduction. In conjunction with enhanced population health approaches, individual prevention should aim to address the root causes of someone's weight and focus on removing the roadblocks which may limit capacity for self-management.

**SIGNIFICANCE:** These findings add to a growing body of literature which uses systems thinking to highlight that how we frame obesity impacts on the delivery of successful obesity prevention.

## Digital health tools and vulnerable populations: how do patients with substance dependence experience eCHAT?

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**INTRODUCTION:** The growing use of digital health tools is expected to progressively improve health outcomes. However, literature is scarce on how these tools affect the patient experience, especially of vulnerable population groups, including those affected by substance dependence.

The electronic Case-finding and Help Assessment Tool (eCHAT) was designed as a digital health screening survey. eCHAT is usually completed in a general practice waiting room on a tablet computer with results seen by the doctor at point of care.

**AIM:** To understand the patient experience of a digital health tool, eCHAT, in patients with substance dependence.

**METHODS:** Qualitative data analysis of interviews with patients and doctors at a general practice in Australia for patients with substance dependence. The transcriptions were processed by inductive thematic analysis by two coders and several wider team coding meetings.

**RESULTS:** Interviews were undertaken with 12 patients and 2 doctors. Some patients felt eCHAT helped them communicate more honestly and efficiently with their doctor. Some patients found some questions confronting. Others felt that the restricted answer options limited their ability to properly tell their story. The final themes were reduction of stigma, restricted answers and the patient story, patient-related response factors, efficiency, security and privacy.

**CONCLUSIONS:** eCHAT has the potential to help vulnerable patients to engage more with their doctors, but particular attention needs to be paid to appropriate patient consent and clarity regarding the role of eCHAT within the broader health service.

**SIGNIFICANCE:** Population-specific research into the vulnerable patient experience of digital health is critical to ensuring digital health tools effectively improve their health outcomes.



## Anticoagulant prescribing practices in patients with ischaemic stroke: how much has changed over a decade?

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**BACKGROUND/AIMS:** Atrial fibrillation (AF) is a major cause of ischaemic stroke. The role of anticoagulation in ischaemic stroke patients with AF is well established. A study at our institution conducted 10 years ago identified that warfarin was underutilised in patients with AF. Direct oral anticoagulant (DOAC) therapy has subsequently been introduced and is now in widespread use. We aimed to review (i) the prevalence of AF, (ii) the percentage of patients anticoagulated for AF on admission, (iii) details of anticoagulant use on discharge, and (iv) accuracy of dosing of DOAC therapy on discharge.

**METHODS:** Retrospective analysis of 658 patients admitted to the Canberra Hospital Stroke Unit with a discharge diagnosis of stroke or TIA over the two-year period from October 2016 to September 2018.

**RESULTS:** 163/658 (25%) patients had AF (28% in the previous study). 34 (21%) of these were newly diagnosed with AF during their admission. 75/129 (58%) patients with pre-existing AF were underdosed or not treated on admission (68% in the previous study). 107/130 (82%) eligible patients were appropriately anticoagulated on discharge (90% in the previous study). 82/115 (71%) treated patients were prescribed a DOAC. 8/82 (10%) patients on DOAC therapy were discharged with a sub-therapeutic dose without obvious explanation.

**CONCLUSION:** Whilst there has been an overall increase in use of anticoagulants, anticoagulation is still underutilised in many patients with AF. The audit of DOAC therapy has demonstrated that many patients are inappropriately underdosed, generating a significant and unnecessary increased risk of future stroke.

**SIGNIFICANCE:** This study identifies the need for further education regarding anticoagulant prescribing and management.

## Characteristic and outcomes of very elderly patients admitted to Australian New Zealand ICUs: a binational, retrospective multi-centre cohort analysis

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**INTRODUCTION:** There is conflicting evidence about the anticipated rise in critical care admissions for the elderly population and the predicted ability of services to meet the demand.

**AIMS:** To characterise and compare trends in ICU admission and outcomes and resource utilisation for critically ill very elderly patients ( $\geq 80$  years old) compared to the younger cohort ( $<80$  years old) admitted to all Australian New Zealand (ANZ) intensive care units (ICUs).

**METHODS:** Retrospective multi-centre cohort analysis from over 180 ANZ ICUs over an 11-year period (2006 – 2016).

**RESULTS:** The very elderly patients with a mean (SD) age of 84.8 (3.6) years accounted for 15% of all adult ICU admissions with a 46% cumulative increase between 2006 and 2016. The very elderly had a higher rate of admission from chronic care facility (2.4% vs 0.8%,  $p<0.001$ ), higher co-morbid burden (29% vs 24%,  $p<0.001$ ) and higher severity of illness [APACHE III scores (without age component) of 45.6 +/- 23.7 vs 42.1 +/- 24.8,  $p<0.001$ ]. Hospital (16.1% vs 8.1%,  $p<0.001$ ) and ICU mortality (8.9% vs 5.4%,  $p<0.001$ ) was higher in the very elderly cohort. The reduction in mortality was proportionately greater in the  $\geq 80$  years (-0.80% vs -0.37%,  $p<0.001$ ). Over half (55%) of the very elderly cohort were discharged home with 16.5% discharged to chronic care.

**CONCLUSION:** The very elderly cohort was sicker, had a higher co-morbid disease burden with higher mortality with survivors more likely to be discharged to a chronic care facility.

**SIGNIFICANCE:** Results will allow appropriate planning and delivery of health care services to this vulnerable population.

## Incidence of access block and critical boarding of mental health presentations in Australasia

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**BACKGROUND:** Mental health patients have been shown to have a higher incidence of access block awaiting admission. One possible confounder is the need for longer assessment.

**AIM:** This study aimed to determine the incidence of access block and critical (24 hour) boarding in Australasia.

**METHODS:** Binational survey in which accredited EDs reported data for 7 days from 31 Oct 2018. Admissions were defined as those to inpatient wards and adolescents as under 18. Access block was defined as a total ED time of greater than 8 hours for an admitted patient and critical boarding as greater than 24 hours.

**RESULTS:** 50 EDs provided full data comprising 52071 presentations and 12585 admissions (24.2%) including 2699 mental health presentations (5.2%) and 711 (26.3%) admissions. In 8112 adolescents, access block rates were 8.2% (95%CI 6.7-10.0) in those without mental health presentations and 41.7% (95%CI 22.8-63.1) in those with mental health. In adults access block rates were 33.2% (95%CI 32.4-34.2) without mental health and 42.6% (95%CI 38.9-46.5) with mental health, critical boarding rates were 1.8% (95%CI 1.6-2.1) and 8.4% (95%CI 6.5-10.8) respectively. In Australia the odds ratio for adult access block in mental health cases was 1.5 (95%CI 1.3-1.7) and for critical boarding 4.7 (95%CI 3.5-6.4), but in New Zealand differences were not significant.

**CONCLUSION:** Patients with mental health presentations are disproportionately likely to experience access block in Australian EDs and much more likely to experience critical 24 hour stays.

**SIGNIFICANCE:** This is strong evidence of discrimination against mental health presentations in the bed management process rather than any effect of patient complexity.





**CANBERRA HEALTH**  
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**DAY FOUR**  
**ACT RESEARCH IN FOCUS**  
**ABSTRACTS**



## KEYNOTE SPEAKER

### The gut microbiome – characterising the “x-factor” of Genotype x Environment x Lifestyle interactions affecting our digestive health and well-being?

#### PROFESSOR MARK MORRISON

*Chair & Group Leader Metagenomics, The University of Queensland Diamantina Institute*

The microbiome is a new frontier in biomedical research. It is the fusion of the traditional fields of medical microbiology (pathogenesis and epidemiology) with environmental microbiology and ecology (the study of microbial diversity and function in their natural environment). The “omics” era has catalyzed human microbiome research and the emergence of the concept that “gut dysbiosis” is a hallmark of disease. New insights establishing interrelationships between diet, the gut microbiota, and changes in host metabolic and/or immune response have been realised. Animal models have also provided evidence that many diseases once thought to be “non-communicable” are either transmissible, or can be attenuated, via the “transplant” of the gut microbiota. As such, more than a decade of basic research has further shown that the gut microbiome is a functional, dynamic and modifiable interface between our genes, the environment we live in, and the lifestyle and dietary choices we make.

However, and despite the optimism for the translation of the microbiome into medicine, much still remains uncharted and uncharacterised within the human microbiome. Indeed, much of the gut microbiome is still genetic and biological “dark matter”: both as genes identified by DNA/RNA sequencing but not yet ascribed functionality, as well as “new” microbes not yet cultured. Here I will provide an overview of our innovations in sampling and microbiome characterisation as part of ongoing clinical studies of digestive diseases and disorders, which aspire to shine light on microbial dark matter; with a view to better understand whether and how the microbiome underlies the pathophysiology of these conditions, and their improved diagnosis and treatment.

## ORAL PRESENTATIONS

### Metastasectomy and BRAF mutation; an analysis of survival outcome in metastatic colorectal cancer

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**INTRODUCTION:** Surgical resection of oligometastases improves survival in metastatic colorectal cancer (mCRC). It is unclear whether such benefit is consistently observed for BRAF V600E mutant (MT) and wild type (WT) mCRC.

**AIMS/QUESTION:** This is a retrospective study to explore the influence of BRAF mutation status on survival outcomes after metastasectomy.

**METHODS:** Data collected from two large databases in Australia (Treatment of Recurrent and Advanced Colorectal Cancer [TRACC] and South Australian Cancer Registry).

**RESULTS:** 513 patients who had undergone metastasectomy were identified. BRAF MT 6%. Median age 63. Metastasectomy rate was lower in BRAF MT (13 v 27%). Median overall survival (OS); BRAF MT v WT: 25.7 v 48.5 months (HR 1.95; 1.18-3.22). In a multivariate model, OS differences were not statistically significant. Right primary tumour, intact primary, >1 metastatic sites at diagnosis, non-R0 resection, peritoneal metastases and synchronous metastases were independent predictors of worse OS. Among 364 patients with recurrence free survival (RFS) data there was no difference between BRAF MT and WT (16 v 19 months, p=0.09). Rate of downsizing was higher with triplet chemo than doublet +/- bevacizumab or doublet/EGFR in BRAF WT (50 v 30%) as well as MT (33 v 11%).

**CONCLUSION:** Median OS was > 2 years in BRAF MT V600E after metastasectomy in this study consistent with an OS benefit. OS did not differ after metastasectomy between BRAF MT and WT in a multivariate model.

**SIGNIFICANCE:** Presence of BRAF MT should not impact patient selection for metastasectomy

## Platelet function in paroxysmal nocturnal haemoglobinuria

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**INTRODUCTION:** Paroxysmal nocturnal haemoglobinuria (PNH) is a rare acquired clonal haematopoietic stem cell disorder, characterised by haemolytic anaemia, thrombosis and bone marrow failure. Thrombosis is considered a major cause for high morbidity and mortality in PNH patients.

**AIMS:** To characterise the platelet function in PNH and understand the role of platelets in thrombotic complications.

**METHODS:** Whole blood was collected from five patients with PNH and compared with healthy donor (HD). We report the results of flow cytometry used for evaluating surface levels of platelet proteins and detection of platelet activation using P selectin, Annexin binding and GSAO as markers.

**RESULTS:** Among 5 patients age ranging 26yrs to 59yrs, two of them had clinical history of thrombosis. The platelet surface levels of GP1BA, GPIIB/IIIa, GPVI and ADAM10 were decreased in PNH patients. Levels of P-selectin on platelets from PNH patients and HD were not significantly different under resting and activated conditions. P-selectin levels increased after activation of GPVI or PAR-1 alone or combined. Annexin V binding to platelets from PNH patients or HD showed no significant differences under resting or activated conditions. Dual positive events for P selectin expression and GSAO binding (procoagulant platelets) were also not significantly different.

**CONCLUSION:** Flow cytometry data from this small group of PNH patients with highly variable clinical characteristics did not identify a unifying platelet lesion. Mechanisms other than platelet activation may be contributing to increased thrombosis in these patients.

**SIGNIFICANCE:** Understanding the mechanism of thrombosis in PNH is important in optimising treatment strategies in this rare condition.

## Rotational thromboelastometry (ROTEM) provides greater insight into bleeding risk than platelet count in thrombocytopenic patients

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**INTRODUCTION:** Thrombocytopenia has many underlying causes that require time to delineate. The clinician's principal concern is avoiding a haemorrhagic episode, however, platelet count is an unreliable predictor of bleeding risk. Rotational thromboelastometry (ROTEM) is a bedside whole blood coagulation analyser that provides significant information on clot formation and lysis within minutes.

**AIMS:** Assess ROTEM value in predicting bleeding risk in thrombocytopenic patients ( $\leq 50 \times 10^9/L$ )

**METHODS:** Blood was collected into Na-citrate and analysed within 4 hr. INTEM, EXTEM, FibTEM and NATEM assays were performed on a ROTEM Delta machine. Data was analysed using PRISM software.

**RESULTS:** Clot formation time and maximum clot formation in the INTEM, EXTEM and NATEM assays correlated highly with platelet count, however, the relationship weakened when platelets were  $\leq 20 \times 10^9/L$ . An outlier was detected with a platelet count  $> 20 \times 10^9/L$  but poor clot formation – the FibTEM A10 was low and subsequent testing confirmed fibrinogen deficiency. FibTEM A10 proved a strong surrogate indicator of fibrinogen levels with a correlation of  $r=0.93$ ,  $p<0.0001$ .

Platelet function can be assessed from the calculated value 'EXTEM-A10 minus FibTEM-A10' or 'whole-clot minus fibrin-clot at 10 min'. This value, unlike platelet count, accurately reflected bleeding status in thrombocytopenic patients.

**CONCLUSIONS:** In contrast to a platelet count, ROTEM provides functional information on whole blood coagulation and its components within 15 mins of blood collection and identifies thrombocytopenic patients at a greater risk of bleeding.

**SIGNIFICANCE:** The study results indicate that ROTEM analysis provides significant additional important information for the clinician and should be included in the routine assessment of thrombocytopenic patients.

## JNK1 and SOCS3 are implicated in NASH-associated hepatocarcinogenesis

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**INTRODUCTION:** Hepatocellular carcinoma (HCC) is an increasingly recognised complication of patients with non-alcoholic steatohepatitis (NASH) cirrhosis. We have previously reported the role of c-Jun NH2-terminal kinase 1 (JNK1) in the context of obesity, hyperinsulinaemia and diabetes in the foz/foz murine model of NASH.

**AIMS:** In this study, we investigate the role of JNK1 in the pathogenesis of NASH-associated HCC.

**Methods:** HCC incidence, intraperitoneal glucose tolerance test (ipGTT) and serum alanine aminotransferase (ALT) levels were determined in male, diethylnitrosamine (DEN)-treated wild-type (Wt), foz/foz, Jnk1<sup>-/-</sup>, and Jnk1<sup>-/-</sup>foz/foz (double knockout, DKO) mice at 6 months. Immunoblotting using whole liver lysates were performed.

**RESULTS:** At 6 months 80% foz/foz and 25% Wt DEN-treated mice developed HCC; all Jnk1<sup>-/-</sup> and DKO DEN-exposed animals remained tumour-free (0% HCC). While hyperinsulinaemia and abnormal ipGTT were observed in obese DEN-treated foz/foz mice, this phenotype was rescued in both Jnk1<sup>-/-</sup> and DKO mice. Serum ALT levels (marker of liver injury) were significantly increased in DEN-treated foz/foz vs Wt mice, Jnk1<sup>-/-</sup> and DKO mice. While SOCS3 was clearly expressed in Wt and Jnk1<sup>-/-</sup>, it was barely detectable in foz/foz mice. Notably, SOCS3 expression was renewed in DKO animals. Proliferative (PCNA, Cdk2, Cyclin D1) and apoptotic markers (p53, p21, PARP, Bcl-xl, cytochrome C), c-Myc, PI3K/AKT/mTOR expression in normal and dysplastic liver surrounding HCC were similar between foz/foz, Jnk1<sup>-/-</sup>, DKO and Wt animals.

**CONCLUSION:** JNK1 and SOCS3 are potential drivers of liver carcinogenesis in a murine model of NASH and HCC.

## Is the islet beta-cell hyper-responsiveness causing obesity-related type 2 diabetes in the high-fat fed NOD.B10 foz/foz mice?

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**INTRODUCTION:** Female NOD.B10 and Balb/c mice when challenged by genetic obesity (foz) and high-fat diet (HFD) develop obesity by 12-weeks of age, but only the NOD.B10 mice develop type 2 diabetes (T2D) and profound hyperinsulinaemia.

**AIMS:** To investigate the islet beta-cell function in response to a 5-day HFD challenge (HFDC) and the effects of fasting (short-term islet b-cell rest) followed by refeeding on insulinaemia on NOD.B10 and Balb/c foz/foz mice.

**METHODS:** NOD.B10 and Balb/c (WT and foz/foz) mice were submitted to dietary intervention: (i) 5-days HFDC (25% fat) at 8-weeks of age or (ii) 8-weeks of HFD (25% fat) feeding (4-12 weeks of age), followed by fasting/refeeding (16h/5-days) period. Body weight, fed-blood glucose and plasma chemistry were determined.

**RESULTS:** 5-day HFDC promoted in the NOD.B10 foz mice excessive weight gain and early development of hyperinsulinaemia prior to the development of hyperglycaemia. After 8-weeks of HFD, NOD.B10 foz/foz mice compared to Balb/c counterparts were hyperglycaemic (12.5±1.8 vs 6.8±0.2mmol/l) and markedly hyperinsulinaemic (27.1±6.2 vs 4.2±0.1ng/ml, respectively). A significant reduction in hyperglycaemia (7.5±0.9 mmol/L) and a dramatic fall in insulinaemia (1.5±0.5ng/mL) was observed after 16h-fasting in the NOD.B10 foz/foz mice. Augmented glucose and insulin levels were observed only 2-days after refeeding (13.25±0.5mmol/L and 24.7±8.9ng/mL, respectively). Insulin:C-peptide ratios were two-fold-higher in NOD.B10 compared to Balb/c HFD-fed foz/foz mice in the fed-state, suggesting possible differences in insulin clearance.

**CONCLUSION:** Insulin hypersecretion in response to HFD develops very early in the NOD.B10 foz/foz mice. Islet b-cell rest with prolonged overnight fasting dramatically reverses profound hyperinsulinaemia in these mice.

**CLINICAL RELEVANCE:** These findings may have relevance to dietary management of obesity-related hyperinsulinaemic states and T2D.

## The effect of clinical depression and depression comorbid with anxiety on brain structure

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**INTRODUCTION:** Except for hippocampus, structural differences associated with depression have not been confirmed in other regions. Anxiety comorbidity has been inconsistently assessed, and may explain discrepancies in previous findings.

**AIMS/QUESTION:** To investigate the link between depression, anxiety comorbidity, and brain structure.

**METHODS:** This systematic review with meta-analysis followed PRISMA guidelines (PROSPERO: CRD42018089286). Cochrane Library, MEDLINE, PsycINFO, PubMed, and Scopus (inception to September 2018) were searched for magnetic resonance imaging case-controlled studies reporting volumes in healthy and clinically depressed adult individuals. Bibliographies and reviews were also examined. Studies with less than 40 participants were excluded to limit small study bias. Mean volumetric differences (MD) were summarised using meta-analyses and demographics, depression factors, and segmentation procedure were assessed as potential moderators using meta-regressions.

**RESULTS:** 112 studies were included in meta-analyses, assessing 4,911 healthy and 5,934 depressed participants. Depressed individuals with no comorbidity presented significantly lower volume in putamen, right pallidum, thalamus, grey matter, and intracranial volume; with largest effects in hippocampus (6.8%, MD: 0.204 95%CI: 0.085–0.323 ml). Depressed individuals with comorbid anxiety presented significantly higher volume in amygdala (3.6%, MD: -0.062 95%CI: -0.099–-0.025 ml). Volume effects were greater in individuals with late-onset and multiple episodes of depression. Gender moderated ICV reductions.

**CONCLUSION:** Depression-related differences in brain structure were modulated by the presence of anxiety comorbidity, chronicity of symptoms, and onset of illness. Effective, tailored treatments are paramount to improve long-term mental health, and prevent premature cognitive decline.

**SIGNIFICANCE:** Future studies should consistently examine the effect of comorbidity to elucidate the independent effect of depression and anxiety.

## Circulating platelet-neutrophil aggregates represent a peripheral biomarker of Type 1 diabetes (T1D) development and account for apparent neutropenia in human T1D

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**INTRODUCTION:** Platelet-activated neutrophils promote autoimmune diseases and induce tissue damage via the release of neutrophil extracellular traps (NETs). Mild neutropenia and a decline in platelets correlate with T1D-onset in humans.

**AIMS:** To examine platelet-neutrophil interactions during T1D development in NOD mice and humans.

**METHODS:** Platelet-neutrophil aggregates (PNAs) were analysed by flow cytometry in peripheral blood and islets of NOD females at 2-18 wks and at T1D onset. B6SJL females were used as non-autoimmune controls. Immunofluorescence microscopy was used to detect citrullinated histone (CitH3) and myeloperoxidase (MPO) as indicators of NETs in pancreas sections and %+ve islets was determined. Peripheral blood PNAs were measured in autoantibody (Aab)-ve (n=20), Aab+ve (n=8), T1D (at diagnosis; n=16), T1D (< 1 yr; n=3) and healthy control (n=22) paediatric donors (5-16 years).

**RESULTS:** A significant elevation of PNAs (% neutrophils bound to platelets) in blood and islets correlated with the initiation of T1D autoimmunity in NOD mice (at 3-4 wks) and with MPO+ve or CitH3+ve islets and islet/beta cell damage at 10-12 wks and T1D-onset. Circulating PNAs in Aab+ve and T1D-onset children were 2.3 and 3.1-fold higher, respectively, than controls but declined post-T1D onset. Circulating neutrophil levels negatively correlated with PNA levels (P=0.02).

**CONCLUSION:** The dynamic profile of islet PNAs resembled the PNA pattern in NOD blood and correlated with islet-associated NETosis and inflammation. The increase in PNAs during T1D development in humans results in apparent mild neutropenia.

**SIGNIFICANCE:** Platelets may aid the activation and migration of neutrophils to islets in T1D. Circulating PNAs represent a novel biomarker of beta cell damage and T1D development.



## Investigating spatial convergence of diagnosed dementia, depression and type 2 diabetes prevalence

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**INTRODUCTION:** Evidence suggests a strong association between dementia, depression and type 2 diabetes (T2D), with comorbid depression and T2D being a risk factor for dementia.

**AIMS:** To determine the impact of individual, lifestyle and contextual factors on these three diseases. Additionally, to examine the geographic variation of each disease and identify significantly high and low clusters and areas where these conditions spatially convergence.

**METHODS:** Cross-sectionally obtained general practice data from west Adelaide, Australia was used in our analyses. A multilevel modelling logistic regression was used to quantify the impact of individual and neighbourhood levels risk factors on the prevalence of these three diseases. Getis-Ord Gi method was used to identify hot (high risk) and cold (low risk) spot areas and convergence regions.

**RESULTS:** 1.4% of active patients in west Adelaide aged 45 and above were diagnosed with dementia, 9.6% with depression and 13.3% with T2D. Comorbidity was significant in all three diseases. Elderly age (55+ years) was significantly associated with diagnosed dementia and T2D. Hyperlipidaemia, hypertension and lower socioeconomic status were significantly associated with diagnosed T2D and depression. The spatial distribution of each disease varied across west Adelaide. Two large clusters of convergence hot spots for the three diseases were identified.

**CONCLUSION:** Spatial convergence of diagnosed dementia, diabetes and depression prevalence was observed in west Adelaide Australia. These diseases had shared associations with individual, lifestyle and contextual factors.

**SIGNIFICANCE:** This study is highly significant for informing policymakers to design targeted prevention interventions and policy planning in primary health care settings.

## Factors associated with clinical practice variation in general practice management of diabetes and coronary heart disease: a systematic review of the literature

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**INTRODUCTION:** Clinical practice variation (CPV) is a pervasive problem in health care, and the focus of emerging quality measurement and improvement initiatives in general practice. Despite a large volume of literature describing CPV across multiple settings and problems, studies are often poorly theorised with limited conceptual frameworks.

**AIMS/QUESTION:** This systematic literature review sought to develop a theoretical framework for understanding variation in measures of chronic disease management in general practice.

**METHODS:** A structured search of online databases and grey literature repositories was conducted using specified inclusion criteria. Empirical studies that investigated explanatory models and factors associated with variation in the management of diabetes and coronary heart disease were identified and screened for quality and relevance. The review included quantitative studies published internationally between 1993 and 2018.

**RESULTS:** Eighty-five articles were included, exploring variation at patient, provider and practice/clinic level. CPV was generally poorly explained. Explanatory models were likely to be substantially more complex, contextualised and interactional than previously considered. Predictive factors and models for CPV varied between measures and across disease states, even for the same patient and provider populations. Outcome measures were most commonly associated with practice and patient level factors, while process measures were relatively more influenced by provider and system level factors.

**CONCLUSION:** An overarching narrative framework was derived, describing associated factors at four levels of abstraction: environmental, practice or facility, provider and patient.

**SIGNIFICANCE:** These are exploratory results, and the proposed framework represents a coherent, empirically derived, synthesis of existing studies of CPV in general practice which can be further tested against available data.



## Intravital imaging reveals distinct anti-parasite activities of antibodies targeting the *Plasmodium falciparum* circumsporozoite protein

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**INTRODUCTION:** Malaria is currently responsible for 219 million new infections annually and of those, 435,000 are fatal. The parasite *Plasmodium falciparum* is spread throughout South-East Asia and Africa with almost 90% of the world's malaria infections occurring in Africa. Current vaccine strategies rely on generating antibodies against the circumsporozoite repeat region on the surface of the parasite to prevent migration to the liver and traversal through hepatocytes prior to establishing active infection. Disappointingly in human trials, this protection is partial and short lived.

**AIMS/METHODS:** The recent identification of junctional CSP regions have highlighted the importance of CSP 'shedding' and its necessity for hepatocyte traversal. While some antibodies seem to bind to the repeat region and immobilise the parasite via opsonisation, others seem to prevent invasion and traversal of hepatocytes. Intravital microscopy of the liver has allowed us to demonstrate the binding capacity and behaviour of several ideal antibodies which bind to both the repeat region (mAb10) and the junctional region of the CSP protein (CIS43).

**RESULTS:** While both mAb10 and CIS43 bind to the sporozoite in vivo, they are qualitatively and quantitatively different in their mechanism of binding and protection. mAb10 causes a reduction in sporozoite motility and induces the same fragmentation via opsonization observed in vitro. Interestingly, CIS43 demonstrated greater inhibition of invasion but less opsonization.

**CONCLUSION AND SIGNIFICANCE:** This data shows that these antibodies exhibit different modes of action which opens the door to the synergistic action of these antibodies in preventing liver stage infection resulting in more diverse and effective vaccine designs to increase protection against malaria.

## Comparative genomics of *E. coli* isolated from adult and paediatric patients with inflammatory bowel disease and controls.

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**INTRODUCTION:** Several lines of evidence implicate bacteria in the pathogenesis of inflammatory bowel disease (IBD), and *Escherichia coli* is one of the leading candidate triggers.

**AIMS:** Our aim was to identify genes of *E. coli* associated with IBD.

**METHODS:** This study involved whole genome comparisons of 179 *E. coli* strains, isolated from 64 Crohn's disease (CD) patients, 18 ulcerative colitis (UC) patients, and 19 controls. These isolates were obtained from different tissues and sources, such as aphthous ulcers, lymph nodes and intestinal mucosa. We used A5 MiSeq to assemble sequences, PROKKA for annotation, ROARY for pan-genome analyses, and SCOARY to assess phenotype-genotype relationships. We determined the serotype, sequence type (ST), virulence genes, plasmids, bacteriophage, CRISPRs, capsules, bacteriocins, and antibiotic resistance genes for each strain.

**RESULTS:** CD-associated *E. coli* were phylogenetically diverse. The most abundant *E. coli* phylogroup was B2 and the most common ST was ST95. The *E. coli* UTI89 plasmid was significantly associated with paediatric CD isolates compared with controls. Based on total gene content, CD isolates were significantly associated with particular genes associated with adhesion, the toxin-antitoxin system, plasmid partitioning, conjugation transfer, and signal recognition when compared to controls. Genes associated with adhesion and invasion and peroxide scavenging were significantly associated with lymph node *E. coli* isolates from CD patients.

**CONCLUSION:** Our findings suggest that CD-associated *E. coli* are associated with genes involved in adhesion, and the lymph node strains have properties that allow them to survive intracellularly, within phagolysosomes.

**SIGNIFICANCE:** This study provides insights into the potential role of *E. coli* in the pathogenesis of IBD.

## Relative importance of clinical and sociodemographic factors in association with postoperative deaths in colorectal cancer patients in New South Wales: an artificial neural network approach

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**INTRODUCTION:** Comorbidities in colorectal cancer patients complicate hospital care and their relative importance to postoperative deaths is largely unknown.

**Aim:** This study was conducted to examine a range of clinical and sociodemographic factors in relation to postoperative deaths in colorectal cancer patients and identify whether these contributions would vary by severity of comorbidities.

**METHODS:** The multicentre retrospective cohort study used the complete census of New South Wales inpatient data to select colorectal cancer survivors admitted to public hospitals for acute surgical care, who underwent procedures on digestive system during July 2001-June 2014. The primary outcome was in-hospital death at the end of acute care. Multi-layer perceptron and back-propagation neural networks were used to quantify relative importance of a wide range of clinical and sociodemographic factor in relation to postoperative deaths, stratified by severity of comorbidities.

**RESULTS:** Of 6288 colorectal cancer patients, approximate 58.3% (n=3699) had severe comorbidities. 464 (7.4%) died in hospitals. The performance for ANN models was superior to logistic models. Comorbid musculoskeletal, healthcare complications, mental disorders, as well as socioeconomic factors including rural residence, and private insurance status, as well as longer time-to-surgery, to a greater extent, contributed to postoperative deaths in hospitals.

**CONCLUSION:** Targeting specific comorbidities including musculoskeletal disorders and postoperative complications, as well as the appropriate time-to-surgery and socioeconomic disadvantages seem to be essential for improve outcomes.

**SIGNIFICANCE:** Identification of factors contributing to postoperative deaths in colorectal cancer patients can help to develop patient-centred strategies to meet their complex needs during acute surgical care as well as improve resource provision and prevent postoperative deaths.

## Social and community networks influence dietary attitudes in regional New South Wales, Australia

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**INTRODUCTION:** Rural populations in Australia have a higher prevalence of lifestyle-related diseases, including obesity and cardiovascular disease, than urban residents. Economic and social resources are important determinants of health inequalities, including dietary patterns.

**AIMS/QUESTION:** The aim of this study was to identify relationships between social and economic factors, dietary attitudes, and fruit and vegetable intake for people living rurally in Australia.

**METHODS:** A community-based cross-sectional survey of 326 adults (median age 57 years, 64.4% female) living in rural South-East New South Wales was undertaken. Participants completed a questionnaire on fruit and vegetable consumption, dietary attitudes, social networks, location of social activities, and socioeconomic indicators. Multivariable regression analysis was used to analyse associations with (i) fruit and vegetable consumption, and (ii) a healthy diet attitude score.

**RESULTS:** The odds of eating  $\geq 1$ -2 cups/day of fruit increased by 13% for each unit increase in dietary attitude score (odds ratio [OR] = 1.13; 95% confidence interval [CI] = 1.03-1.23;  $p=0.01$ ); a similar association existed for eating  $\geq 3$ -4 cups/day of vegetables. Greater social network diversity was associated with a healthier dietary attitude score (0.07 points per connection, 95% CI=0.01-0.12;  $p=0.02$ ). For women, the dietary attitude score was 1.97 points higher (95%CI = 0.93-3.00;  $p<0.001$ ) for those who socialised regularly in small towns (compared to never, rarely or sometimes).

**CONCLUSIONS:** Greater fruit and vegetable intake was predicted by healthier dietary attitudes, which in turn were related to social networks rather than economic factors.

**SIGNIFICANCE:** Opportunities for health promotion activities to improve dietary habits exist through engaging with local community social networks.

## Determining patient attendance, access to interventions and clinical outcomes in a publicly funded obesity program: results from the multi-disciplinary Canberra Obesity Management Service

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**INTRODUCTION:** Multi-disciplinary specialist services have a crucial role in the management of obesity. As demand for these services increases, so too does the need to monitor individual service performance and compare outcomes across multiple sites.

**AIM:** To assess outcomes from the publicly-funded Canberra Obesity Management Service.

**METHODS:** A descriptive observational study was conducted on new patients who attended an initial medical review from July 2016-June 2017. Baseline characteristics, co-morbidities, attendance, service utilisation and outcomes were collated through to June 2018.

**RESULTS:** Of the 162 patients identified, 64% continued to attend beyond initial medical review. Dietetics was the most commonly accessed allied health service followed by exercise physiology and psychology. Very low energy diet was the most commonly trialled intensive intervention followed by pharmacotherapy and bariatric surgery. Mean baseline weight for those who continued beyond initial medical review was 142.0±26.6kg, with a mean weight change of -6.2±10.2kg and a mean body weight change of -5%. Clinically significant weight loss was achieved in 36% of these patients, with a further 47% achieving weight stabilisation. Mean Depression, Anxiety and Stress Scale scores and mean Epworth Sleepiness Scale scores decreased. Polysomnography referrals were made for 37% of all patients, 77% of whom were diagnosed with obstructive sleep apnoea.

**CONCLUSION:** The majority of patients achieved weight reduction or weight stabilisation with continued engagement with the service. Obesity Management has other additional benefits beyond weight reduction.

**SIGNIFICANCE:** This study may serve as an example for data collection, individual service monitoring and comparison across multiple obesity services.

## NLRP3-mediated inflammasome activation by E. coli isolated from patients with and without inflammatory bowel disease

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**INTRODUCTION:** The interaction between the intestinal microbiome and the host immune system is critical to the pathophysiology of the inflammatory bowel diseases (IBD). Dysregulated inflammasome activation has been linked with intestinal inflammation. Furthermore, *Escherichia coli* has been implicated in IBD.

**AIMS/QUESTION:** To characterise NLRP3-dependent inflammasome activation by *E. coli* isolates from the intestine of IBD and non-IBD patients.

**METHODS:** A total of 36 genotyped *E. coli* strains; 23 isolated from IBD patients and 13 from non-IBD patients, were analysed. Bone marrow-derived macrophages (BMDMs) were isolated from wild-type (WT) and NLRP3<sup>-/-</sup> mice and co-cultured with each of the 36 *E. coli* strains. Protein extracts were analysed by western blot for pro-caspase and the activated caspase-1 p20 subunit. Supernatant was taken for ELISA analyses of IL-1β, IL-18, TNFα, IL-6, and KC.

**RESULTS:** NLRP3-mediated activation of caspase-1 results in cleavage of the precursor pro-inflammatory cytokines, pro-IL-1β and pro-IL-18 into their mature forms. Mature caspase-1 (p20 subunit) was observed in WT macrophages for 18/23 IBD isolates and 8/13 non-IBD isolates, and absent in NLRP3<sup>-/-</sup> macrophages. Of the 8 non-IBD *E. coli* strains that activated caspase-1, 4 had a pathogenic phenotype. Elevated IL-1β was detected in all 18 IBD isolates, and 7/8 non-IBD isolates where p20 was observed. *E. coli* strain genome comparison, using SCOARY, revealed two bacterial genes associated with caspase-1 activation.

**CONCLUSION:** A majority of *E. coli* strains activated the NLRP3 inflammasome, and two *E. coli* genes associate with this activation. Further testing of commensal strains is warranted.

**SIGNIFICANCE:** We have further characterised the immune response to *E. coli* isolated from IBD patients.

# CHARM

**CANBERRA HEALTH**  
Annual Research Meeting



## POSTER PRESENTATIONS



## 1. A 2.5 year experience in endobronchial ultrasound guided transbronchial needle aspiration (EBUS-TBNA) at the Canberra Hospital

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**OBJECTIVE:** To evaluate the usefulness of EBUS-TBNA of hilar and mediastinal nodes in the staging of malignancies, determine the diagnostic accuracy, and utility of immunohistochemistry and molecular studies on cell block (CB) material prepared from cytology specimens.

**METHODS:** A total of 83 EBUS-TBNA performed over a 2.5 year period were included in this study. Rapid onsite evaluation (ROSE) was performed by cytology scientists on all cases and slides were prepared with residual material used for cell block (CB) preparation. The CB were evaluated for diagnostic adequacy for immunohistochemistry (IPX) and molecular studies.

**RESULTS:** Among 83 EBUS-TBNA cases analysed, there were 80 (96%) diagnostic cases. These included 22 (26%) cases of sarcoidosis; 23(27%) cases of malignancy; 32(38%) cases showing no malignant cells and 6 (7%) cases were non diagnostic for cytological assessment. EBUS-TBNA was performed in a total of 41 (48%) cases for staging of previously known malignancies. Majority of the staging cases showed PET positivity and 14 (34%) showed metastatic malignancies; 5 (12%) cases showed granulomatous inflammation; 18 (43%) cases showed no malignant cells and 4 (9%) cases were non diagnostic. Out of the 23 malignant diagnoses, 16 (69%) had adequate material in the CB for IPX to confirm diagnoses as well as molecular studies for targeted therapies.

**CONCLUSION:** EBUS-TBNA is a reliable method used for staging of lung cancers and other malignancies. The diagnostic utility of this procedure has improved with ROSE, ensuring that adequate material is collected for CB preparation, immunophenotyping and microbiological analyses and for molecular studies.

## 2. Assessment of satisfaction with end of life care at the Canberra Hospital

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**INTRODUCTION:** With an increase in institutionalised dying and the rising ageing population in Australia, quality end of life (EOL) care is of increasing significance. The literature suggests factors which predict quality EOL care include; communication between health professionals, patients and relatives, involvement of relatives in the decision-making process, as well as spiritual and psychological care.

**AIMS/QUESTION:** The purpose of this study is to assess satisfaction with EOL care at the Canberra Hospital (TCH), as reported by bereaved relatives.

**METHODS:** Using purposive sampling, relatives of deceased patients will be invited to complete a modified version of The Canadian Health Care Evaluation Project survey, which assesses EOL care across a range of illness management, communication and well-being domains.

**RESULTS:** It is hypothesised that overall satisfaction with EOL care will be reported as moderate but show substantial variation. Scores regarding communication and next of kin involvement are predicted to be lower than other domains. Previous studies have found that relatives of younger patients and female patients are generally more satisfied with EOL care, and bereaved relatives of patients with a religious affiliation are less satisfied.

**CONCLUSION:** Whether these patterns are replicated in the current setting will be of interest.

**SIGNIFICANCE:** The results of this study will establish an understanding of current EOL practice at TCH, as well as inform the development of interventions to improve EOL and palliative care services at TCH.



### 3. An assessment of older adults and food packaging in hospitals

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**INTRODUCTION:** Malnutrition and its associated detrimental health outcomes are a growing issue within Australian hospitals, especially for older adults. Understanding the causal factors influencing malnutrition in a hospital setting is crucial for the design and implementation of effective intervention strategies.

**AIMS:** This study aimed to demonstrate the influence of food packaging on dietary intake; to determine if dexterity influences ability to open breakfast packages; and to investigate the decanting of meals as an intervention strategy.

**METHOD:** Fifty-nine older adult inpatients within orthopaedic, cardiology, endocrinology, respiratory, and rheumatology wards at the Canberra Hospital participated in dexterity testing, meal time observation, nutritional assessment, and a weighed food record. Data has been collected for two years of the three-year study. A mixed model linear analysis was examined to compare the energy and protein intakes by older adults when provided with sealed, opened and decanted meals.

**RESULTS:** The results conveyed that the decanted condition promoted the highest dietary intakes. Dexterity was observed to have strong, positive correlations with the opening time and the number of attempts to open food packages. However, no correlation was evident between dexterity; when defined as above or below the normative population value, and energy and protein intakes by older adults at breakfast.

**CONCLUSION:** This quantitative study provides evidence of associations between packaging difficulty, dexterity, and dietary intake.

**SIGNIFICANCE:** Food packaging is an important consideration for improving dietary intake of patients in the hospital setting.

### 4. Phytochemical composition of Australian grown *Opuntia ficus indica* cladode juice and pomace

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The *Opuntia ficus indica* (OFI) cacti is drought resistant and known for its fruit, the prickly pear. The 'cladode' (cacti-leaf) is also edible but under investigated. The phytochemical composition of the commercially grown cladode as a cold-pressed juice and pomace (methanolic extraction 70%v/v) were analysed for; titratable acidity (TA; %); antioxidant characteristics; free radical scavenging activity (DPPH) and antioxidant capacity ((FRAP), Trolox equivalents (TE)) and bioactive composition; Total Phenolic (TP; Folin-Ciocalteu; Gallic acid equivalents. (GAE)) and Flavanol (TF; AlCl<sub>3</sub>; Catechin equivalents (CE)) content. Descriptive statistics and differences (independent t-tests, assuming equal variances) between juice and pomace were determined via SPSS (v23; IBM). Juicing of the cladode yielded 31.62% juice, containing a TA of 0.365±0.065%. The juice contained; TP 1212±1069µg<sub>GAE</sub>, TF 113±8.74µg<sub>CE</sub>; DPPH 1064±12.2µM<sub>TE</sub>, FRAP 867±57.7µM<sub>TE</sub> and vitamin C 0.193±0.216mg, where the pomace contained; TP 54.17±0.210µg<sub>GAE</sub>, TF 23.06±1.05µg<sub>CE</sub>; DPPH 915±1.39µM<sub>TE</sub> and FRAP 433±3.79µM<sub>TE</sub>. Significant differences (P<0.001) between juice and pomace were observed for TP, TF, DPPH, CUPRAC and FRAP, where the juice contained consistently higher contents. Therefore, the composition of the cladode juice indicates that it's a good source of phytochemicals and highlights the potential for development of new food products.

## 5. Kinematics of kneeling are associated with patient outcomes, clinical measures and functional tests

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**INTRODUCTION:** Little evidence connects better patient outcomes with knee-arthroplasty design. Examining pre-operative scenarios may deepen our understanding of the relationship between kinematics and clinical symptoms. Deep kneeling requires high flexion and is essential for many activities.

**AIMS/QUESTION:** We examined associations between clinical and functional scores with six-degrees-of-freedom (6DOF) kinematics of kneeling.

**METHODS:** Recruited participants aged 20 to 90 years with healthy (n=67) and osteoarthritic knees (n=56), were examined using imaging, outcome surveys and clinical tests. 6DOF kinematics were captured using CT to fluoroscopy and quantified using Orthovis© 3D/2D multi-modal image-registration and the Grood and Suntay reference system. Scores collected included: Oxford-knee-score (OKS), assessment-of-quality-of-life (AQoL-8), pain-visual-analogue-scale, American-knee-society-score (KSS), 5-times-sit-to-stand, timed-up-and-go, ten-meter-walking-test, and six-minute-walking-test. Step-wise-regression models analysed the kinematic data at discrete flexion angles, sampled throughout the kneeling cycle.

**RESULTS:** Maximum flexion (MaxFlex) was associated with all outcome scores and functional tests except 5-times-sit-to-stand ( $p < 0.01$ ). Increased MaxFlex was associated with increased posterior translation ( $p < 0.0005$ ) and external rotation ( $p < 0.05$ ). MaxFlex and varus explained 53% of OKS variance, 47% pain-visual-analogue-scale and 52% of KSS. MaxFlex alone explained 21% of timed-up-and-go and 19% of ten-meter-walking-test. MaxFlex and superior translation explained 33% of six-minute-walking-test. Superior translation between 120° and MaxFlex explained 12% of 5-times-sit-to-stand. Internal/external rotation at 100° and 120° flexion explained only 6.1% of KSS knee score, and 4.9% of pain-visual-analogue-scale, respectively.

**CONCLUSION:** The healthy knee group had consistently better outcome scores; more flexion, posterior translation and external rotation, and less varus and less superior translation at the end of range.

**SIGNIFICANCE:** These findings challenge the relative importance of external rotation in achieving high flexion.

## 6. A review of foods and beverages offered at satellite haemodialysis unit against Nutrition Standards

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**INTRODUCTION:** Canberra Health Services provides food and beverage options to clients receiving haemodialysis at Canberra Community Dialysis Centre (CCDC). Clients receiving haemodialysis require specific dietary requirements to maintain health and optimise treatment. The nutritional value of foods and beverages provided in these units has not been compared with Agency for Clinical Innovation (ACI) Nutrition Standards for Renal Disease<sup>1</sup> since their publication in 2011.

**AIM:** To improve foods and beverages offered to CCDC clients to be 100% compliant with ACI Nutrition Standards for Renal Disease within 6 months.

### METHODS:

1) Assess the nutritional composition of items provided to CCDC against the ACI Nutrition Standards and identify alternative options that are compliant.

2) Seek consumer feedback on preferences for food and beverage options via attendance at consumer representative meeting and face-to-face evaluations with clients.

**RESULTS:** 30% (4/13) of sandwich options met Nutrition Standards however accounting for client preferences resulted in 0% of sandwiches being consumed met standards. 100% (4/4) of beverage options and 20% (1/5) of snacks options offered and consumed met Nutrition Standards. The nutrient values of concern were predominantly excessive sodium and inadequate protein contents.

Alternative compliant options were identified however consumer feedback was inconsistent with >50% clients indicating preference for current options which do not meet nutrition targets.

**CONCLUSION:** The proposed outcome is to offer a variety of foods and beverages which either meet ACI Nutrition Standards or align with client preferences. Clients will have access to 100% compliant options alongside their current options.

**SIGNIFICANCE:** Client's preferences may not align with clinical guidelines however allowing clients to be primary decision makers is the priority.



## 7. False positive serum protein electrophoresis caused by alemtuzumab, obinutuzumab, and tocilizumab

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**INTRODUCTION:** The use of serum protein electrophoresis to identify monoclonal antibodies, or paraproteins, is a key component of the diagnosis and monitoring of monoclonal gammopathies such as multiple myeloma. Therapeutic monoclonal antibodies, particularly elotuzumab and daratumumab, have previously been shown to cause false positive results on serum electrophoresis. This can complicate the management of patients with these malignancies, and presents a risk of describing a monoclonal band in patients who do not have a plasma cell dyscrasia. Many other drugs from this class have not yet been investigated for this type of interference.

**AIMS/QUESTION:** To investigate whether alemtuzumab, tocilizumab, and obinutuzumab could cause false positive results on serum electrophoresis and to define their electrophoretic mobility for future reference.

**METHODS:** Electrophoresis was performed on samples of alemtuzumab, tocilizumab, and obinutuzumab using the Helena gel system used for routine analysis of patient samples at ACT Pathology.

**RESULTS:** All three therapeutic monoclonal antibodies investigated were indistinguishable from paraproteins both by visual inspection and densitometric trace. Obinutuzumab migrated in the gamma region, while alemtuzumab and tocilizumab migrated in the far gamma.

**CONCLUSION:** Alemtuzumab, tocilizumab, and obinutuzumab all have the capacity to cause false positive results on serum electrophoresis.

**SIGNIFICANCE:** Spurious identification of a paraprotein could complicate the management of patients receiving these therapeutic agents. Clinicians requesting serum electrophoresis on patients receiving a “-mab” should note this in the request to reduce the risk of misinterpretation. Comparison of patient electrophoretograms to the agent in question and/or comparison of pre- and post-infusion electrophoretograms may aid in separating spurious results from those associated with true malignancies.

## 8. The relationship between colour, antioxidant and phytochemical properties of a selection of commercially available Australian honeys

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Honey is the supersaturated sugar solution produced from the pollen and nectar of plants, with its composition and appearance largely influenced by surrounding floral sources and its geographic origin. Honey exhibits a range of potential health benefits, which is proposed to be a result of its composition. This study investigated a selection of commercially available Australian honeys and potential associations between colour and the relatively unexplored phytochemical composition, including antioxidant characteristics. Commercially available Australian honey samples (n=42) were analysed for: colour intensity (Spectrophotometric method;  $ABS_{450^\circ}$ ; mAU); phytochemical content: Total Phenolic Content (TPC; Folin-Ciocalteu; Gallic Acid Equiv. (GAE)) and Total Flavonoids (TFC;  $AlCl_3$ ; Catechin Equiv. (CE)); and antioxidant characteristics (DPPH, CUPRAC, FRAP; Trolox Equiv. (TE)). Colour intensity was positively correlated with each phytochemical; TPC and TFC (Both  $P$ 's<0.001), and each of the individual antioxidant characteristics (All  $P$ 's<0.05). The findings of this study indicate that the more colour intensive (darker) honeys contained higher concentrations of phytochemicals and displayed higher potential antioxidant activity. Conclusively, honey has been determined as a potential proxy measure for antioxidant and phytochemical quantification in commercially available Australian honeys. Additionally, the phytochemical and antioxidant characteristics that have been identified for these commercial honey samples have the potential to provide therapeutic benefits to consumers.

## 9. C-reactive protein assay interference associated with Waldenstrom's macroglobulinaemia

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**INTRODUCTION:** Interferences in immunoassay are always a potential problem as the false results generated can lead to misdiagnosis and treatment.

**AIMS/QUESTION:** We aimed to rule out a CRP assay interference secondary to IgM paraproteinaemia.

**METHODS:** CRP was measured using the Abbott latex-enhanced immunoturbidimetric assay. Dilutions were performed using saline 0.9% solution. Analysis pre- and post-treatment with 2-mercaptoethanol (2-MCE) was carried for CRP, rheumatoid factor (RhF) and  $\beta$ 2-microglobulin ( $\beta$ 2-M) to assess interference with other latex-enhanced immunoturbidimetric methods. A serum sample from a patient with no suspicion of assay interference was used as control for CRP.

**RESULTS:** Initial CRP result was 1185 mg/L (reference interval <5 mg/L). Serial dilutions of 1:5, 1:10, 1:100 and 1:1000 provided corrected concentrations of 1050, 800, 240 and <200 mg/L respectively. After addition of 2-MCE, measured CRP was 40 mg/L with control results of 150 mg/L before and 135 mg/L after treatment. Percentage reductions in CRP concentrations correspond to 96% in the patient and 10% in the control. The analyser initially did not generate results for RhF and  $\beta$ 2-M due to abnormal reaction kinetics. Subsequent to 2-MCE treatment, these were 70 IU/L and 1.8 mg/L respectively.

**CONCLUSION:** Non-linear dilution and significant decrease of CRP concentration following treatment with 2-MCE compared to control are suggestive of assay interference. This hypothesis is corroborated by the interference detected for RhF and  $\beta$ 2-M. Immunoglobulin-induced latex agglutination is a proposed mechanism for the interference, leading to falsely elevated readings.

**SIGNIFICANCE:** Scientist, pathologists and clinicians should remain vigilant in order to suspect and identify possible assay interferences when clinically implausible results are seen.

## 10. Comprehensive FISH testing to screen for secondary abnormalities in mantle cell lymphoma: a retrospective study

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**BACKGROUND:** Mantle cell lymphoma (MCL) is a subtype of B-cell non-Hodgkin lymphoma (B-NHL) characterised by a reciprocal t(11;14) translocation and relatively poor prognosis. The translocation results in up-regulation of CCND1 and is caused by juxtaposition of the gene to IGH in 95% of cases. Detection of t(11;14) by fluorescent in situ hybridisation (FISH) is widely used in diagnosis. Secondary changes such as MYC translocation and loss of TP53 can identify sub-groups of patients associated with poor prognosis and aggressive disease. We therefore aimed to perform a comprehensive FISH panel to identify secondary changes in a cohort of MCL samples.

**METHODS:** FISH studies were performed on five t(11;14) positive archived MCL samples i.e. fixed cell suspensions from bone marrow or lymph node cultures. The probe panel was designed to identify abnormalities seen in other B-NHL and utilised Metasystems FISH probes to detect rearrangements of BCL6, MYC, and BCL2, and copy number changes of ATM, TP53, CEP12 and DLEU. Two cytogeneticists analysed 50-200 nuclei (200 where available, in accordance with NPAAC guidelines).

**RESULTS:** Overall, 14 secondary changes were observed. Gain of BCL6 was observed in 2 cases, gain of BCL2 in 1 case, and gain of MYC in 2 cases. Loss of TP53 was observed in one case, and loss of both DLEU1 and LAMP1 was observed in 2 cases. This study has shown that secondary cytogenetic changes are commonly identified by FISH in patients with MCL. Given the reported prognostic significance of these, expansion of FISH testing may be of value.

## 11. JUMP into patient experiences

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**INTRODUCTION:** A patient pain education day, Journey into Understanding and Managing Pain (JUMP) was offered at the Canberra Hospital's Pain Management Unit (PMU) from 2012-2018. JUMP offered foundational knowledge about chronic pain and self-management skills in a group-based setting.

**AIMS/QUESTION:** This project aimed to evaluate the impact and outcomes of JUMP by reviewing attendance data and extensive qualitative and quantitative participant feedback to inform future service development.

**METHODS:** An audit of JUMP attendance data was conducted. Subsequently, patient feedback collected via standardised feedback forms were analysed. Mean rating scores were calculated for the five quantitative feedback items, and statistical analysis was undertaken to determine any differences by year in patient experiences. Finally, qualitative comments relating to the most useful aspects of JUMP, suggestions for improvement, and other feedback were analysed using thematic analysis.

**RESULTS:** Over seven years, 1735 patients attended JUMP, with 1090 (63%) giving feedback. Quantitative analysis revealed overwhelmingly positive feedback with a total average rating of 4.5/5, with no differences in ratings by year. Qualitative feedback highlighted the importance to patients of understanding pain and learning self-management skills. Additionally, many participants noted the benefits of participating in a group with others with shared experiences and non-judgemental facilitation by staff. Suggestions for improvement included practical concerns including room set-up and session length.

**CONCLUSION:** A group-based pain education program delivered to over one thousand patients has been consistently highly regarded and acceptable to patients, and learnings from patient experiences of this session can inform future service development.

**SIGNIFICANCE:** Group-based pain education is a valuable and efficient clinical service for patients.

## 12. Proximity and partnerships: controlled pilot trial exploring the feasibility of a residential care pharmacist model

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**INTRODUCTION:** Quality of medicine use in residential aged care homes (RACH) is a serious issue in Australia. Existing systems to prevent medication-related miscommunication have been identified as inadequate in preventing mishap, particularly for managing hospital transitions and acute needs. Providing an additional barrier in the form of an onsite medicines expert may be a fruitful solution.

**AIMS:** To investigate the feasibility of integrating a residential care pharmacist (RCP) into an established RACH.

**METHOD:** A non-randomised controlled pilot design was used with the RCP trialled at a single RACH, and a parallel control site received usual care and services only. The RCP worked at the intervention site for 2 consecutive days for the duration of the 6-month intervention period. Baseline and follow up data were collected prior and following the intervention period.

**RESULTS:** The RCP documented 300+ activities with the most frequently conducted activities were quality improvement activities, providing pharmaceutical opinion, and comprehensive medication reviews. The RCP contributed to significantly ( $p < 0.01$ ) increased uptake in employee influenza vaccinations. The RCP significantly improved documentation of allergies and adverse drug reactions at the intervention site ( $p < 0.01$ ), no difference observed at the control site. Mean time spent on medication rounds per resident reduced from 4.8 minutes per resident to 3.2 minutes per resident per round ( $P < 0.05$ ). The RCP documented an ability to manage medication problems associated with transitions of care, preventing potential adverse outcomes.

**CONCLUSIONS:** Clinical pharmacist inclusion in RACH teams is feasible.

**SIGNIFICANCE:** This is the first Australian trial of in-home pharmacists, and replication is being sought nationwide.

### 13. Physical activity levels in patients with cancer undergoing chemotherapy: a systematic review

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**INTRODUCTION:** Cancer is a leading cause of death and disability in Australia. Physical activity (PA) can improve chemotherapy side effects, survival rates and treatment adherence, however evidence suggests that patients undergoing treatment are not active enough.

**AIMS/QUESTION:** This review aims to identify whether patients undergoing chemotherapy achieve World Health Organisation PA guidelines, and successful interventions used to increase PA.

**METHODS:** Intervention and observational studies that met the eligibility criteria were included in this review. Databases searched included CINAHL complete, PubMed, Cochrane Library, EMBASE, AMED, Joanna Briggs Institute, OVID Medline and Google Scholar. All articles were assessed two authors to determine eligibility and risk of bias (ROB).

**RESULTS:** 17 studies were included in the review (10 randomised control trials, 5 pre-post and 2 cross-sectional studies). Validated tools appropriate to each study design were used to assess ROB. Overall ROB for the review was poor-fair. Studies report only 0% to 86% of individuals undergoing chemotherapy are meeting PA guidelines. Interventions differed in the PA measures used, cancer types, intervention type and intervention length. As a result, determining the most appropriate intervention design was not possible.

**CONCLUSION:** Despite the benefits of PA, patients undergoing chemotherapy are not meeting the PA guidelines. Studies found some exercise interventions successfully increased PA levels. Counselling sessions did not increase PA levels, however further research is required in this area.

**SIGNIFICANCE:** Clinicians should therefore consider patient preference and available resources to increase PA. Further research is required to determine the most effective way to increase PA levels.

### 14. Improving the nutritional intake of Aged Care patients on texture modified diets

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**INTRODUCTION:** Improving the nutritional intake of Aged Care patients on texture modified diets

**AIM:** To increase the consumption of texture modified diet mid meal snacks compared by implementing a mid meal provision of high energy and protein items which meet the Nutrition Standards for the texture modified diets. To improve, or maintain patient satisfaction ratings on choice, appearance, taste and overall satisfaction, from their respective baseline measures.

**METHOD:** A mixed method approach was taken. (1) A comparison was made between existing texture modified mid meal provision and Nutrition Standards. (2) Baseline and secondary waste audits were completed to establish patient mid meal consumption. (3) Consumer surveys were conducted for feedback on mid meal choices, appearance, taste, overall satisfaction and barriers to intake. Mid meals were assessed for compliance with the Nutrition Standards to meet >500kj, >2g protein and a minimum of 2 daily options.

**RESULTS:** Following the implementation of additional mid meal choices on the texture modified diets waste audit data showed a small increase in consumption of 5-10% compared to baseline. A patient satisfaction survey indicated that the mid meal options rated high across all areas. The main barriers to intake identified as feeding assistance and patients with acute illness.

**CONCLUSIONS:** A review of the texture modified mid meals has given aged care patients more choice at mid meals, increased nutrition intake, patient satisfaction and compliance with Nutrition Standards. Areas that require further review are feeding assistance at mid meals.

**CLINICAL SIGNIFICANCE:** Increased mid meal options on texture modified diets leads to increased nutrition consumption and patient satisfaction.

## 15. Development of new soup recipes to meet the needs of inpatients in a large tertiary hospital

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**INTRODUCTION:** To aid recovery and prevent malnutrition, patients should be offered appealing high protein and energy options. Use of powdered soup bases in the hospital setting poses concerns for allergen risk, palatability and affordability. Designing soups from fresh ingredients creates the opportunity to overcome these barriers.

**AIMS:** Develop and pilot cost-effective, appealing soup recipes using fresh ingredients that meet ACI Guidelines, contain minimal allergens and meet standards for moderately thick fluids.

**METHODS:** Soup recipes were developed using fresh ingredients and analysed using FoodWorks for compliance against Agency Clinical Innovation (ACI) Guidelines for Band 1 (>5g protein and >360kJ per 180mL serve). Soups were cooked, chilled, plated and re-thermed as per current procedures. Using the Taste-Test Tool, soups were evaluated for appearance, aroma, taste, texture, thickness and satisfaction by staff and consumers. Results were used to inform recipe revision, retrial and further evaluation. Costings were calculated and compared to existing recipes.

**RESULTS:** All recipes were more cost-effective and met Band 1 ACI guidelines. Taste test scores for fresh soup recipes were higher than existing soup recipes for Appearance, Aroma, Taste and Texture. Recipes contained fewer allergens so could be offered to more patients.

**CONCLUSION:** This project demonstrates that creating nutritious, affordable and appealing soups within a tertiary hospital kitchen environment using fresh ingredients is possible. Challenges lie in achieving thickness targets using only fresh ingredients.

**SIGNIFICANCE:** Soups are often selected by ill and elderly patients and are an important and familiar option on hospital menus. Improving nutritional profile and palatability is therefore a step towards addressing malnutrition and aiding recovery.

## 16. An audit of the use of simulation in Australian and New Zealand physiotherapy curricula

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**INTRODUCTION:** Simulation has been used in healthcare education for decades, particularly in medicine and nursing. It is an efficient form of education for communication-based skills through to high-risk, low-frequency technical skills. It is unclear whether simulation is being used in physiotherapy curricula.

**AIMS:** The aims were to establish whether simulation is being used in physiotherapy university curricula; what forms are being used for training and assessment; the evidence academics are using to inform use of simulation, and any enablers or barriers for simulation use.

**METHODS:** A descriptive design involving an electronic survey was used. Thirteen closed and open-ended questions were included. Participants were academics from universities across Australia and New Zealand offering physiotherapy degrees (n = 22). Distribution and data analysis were undertaken in Qualtrics.

**RESULTS:** Fourteen responses were received. All respondents used simulation. Role play, standardised patients and low/medium fidelity simulation were the most common. 93% of respondents reported there was evidence for using simulation in classroom-training. 58% of respondents indicated there was evidence for simulation-based assessments. Enablers to simulation included: university support, increased safety for patients, students' enjoyment. Barriers included: cost, time, lack of resources, and reliance on key staff.

**CONCLUSIONS:** Simulation is being used in physiotherapy student education. It is unclear which form of simulation is best, and it potentially varies depending on what skill is being taught or assessed.

**SIGNIFICANCE:** Academics were positive about simulation, but further research is required to justify the time, and resources that simulation requires.



## 17. Does the addition of MASK-ED simulation to usual teaching improve clinical performance of physiotherapy students? A randomised trial protocol.

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**INTRODUCTION:** Simulation use in physiotherapy has increased over the last decade, but often with a focus on replacing clinical time. Little is known about the impact of classroom-based simulation on clinical performance. One Australian university has commenced using MaskED in the physiotherapy curriculum, however its impact on clinical performance has not been investigated. MASK-EDTM is a hybrid form of simulation where a lecturer dons a silicon mask and plays the role of a “patient”. Classroom-based MASK-EDTM has not been investigated in a neurological context, nor has its impact on clinical performance.

**AIM:** To investigate the impact of classroom-based simulation on physiotherapy student work integrated learning scores.

**METHODS:** A randomised cluster trial introducing MASK-EDTM into the neurological physiotherapy tutorials at UC is being conducted. The intervention group will be exposed to MASK-EDTM on 5 occasions while the control group will continue role play. Outcome measures include results from their Rehabilitation Practicum Assessment of Physiotherapy Practice (APP), written examinations, practical examinations, and a satisfaction survey. This study is powered to detect a 0.5/5 mark difference on the APP, requiring a sample size of 120.

**RESULTS (ANTICIPATED):** It is anticipated that practise with a MASK-ED TM character will result in equal or better performance when compared to role play.

**CONCLUSIONS:** The results of this project could improve physiotherapy teaching and enhance the evidence base for simulation to train students prior to clinical placement.

**SIGNIFICANCE:** An improved understanding of the impact of classroom-based simulation will help optimise teaching strategies in physiotherapy curricula, in turn potentially leading to reduced failure rates on work integrated learning.

## 18. A posterior-to-anterior glide of the tibia may be more effective than the traditional anterior-to-posterior glide for increasing knee flexion: a pilot randomised controlled trial

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**INTRODUCTION:** Limited knee flexion is a consequence of injury or osteoarthritis. Manual therapy treatment may need to be changed based on current medical imaging analysis of knee motion.

**AIMS:** To compare posterior-to-anterior (PA) and anterior-to-posterior (AP)-directed mobilisations to increase knee flexion and provide data to inform a subsequent full-scale randomised controlled trial (RCT).

**METHODS:** This study was a pilot study preparatory to a double-blinded, parallel RCT. Adults with <120° knee flexion, without inflammatory arthritis or previous surgery to the stiff knee, were randomised into two groups. Participants received four sessions of PA- or AP-directed mobilisations to the proximal tibia and a corresponding home exercise program. Outcomes were knee flexion measured using a dual-sensor inclinometer, Visual Analogue Scale for pain, Patient Specific Functional Scale (PSFS) and the Knee injury and Osteoarthritis Outcome Score (KOOS).

**RESULTS:** Twenty-nine participants were randomised (PA n=14; AP n=15). The PA-directed intervention resulted in greater flexion ROM gain than AP-directed intervention (Mean gain 16.3° vs. 8.6°, 95% CI of the difference 0.8 to 14.5; p=0.028). No between-group differences were found for pain, PSFS or KOOS. Based on these data, a future RCT with 80% power would need 33 participants in each group.

**CONCLUSION:** Preliminary evidence suggests that a PA-directed mobilisation may be more effective than the traditional AP-directed mobilisation for increasing knee flexion. A full-scale RCT to test these findings is warranted.

**SIGNIFICANCE:** Clinicians may consider performing a PA-directed mobilisation to increase knee flexion in patients with knee stiffness.

## 19. Cep17 silver in situ hybridization (SISH) for assessment of suspected molar gestation in paraffin-embedded placental tissues

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**INTRODUCTION:** Correct differentiation between complete hydatidiform mole, partial mole and non-molar hydropic abortus in products of conception is important for determining risk of gestational trophoblastic disease. Complete molar gestations are diploid (di-paternal origin) and show absence of staining for p57 which is maternally imprinted. P57 staining cannot distinguish between partial mole and hydropic abortus, but partial moles show triploidy (three copies of all chromosomes). A variety of techniques can be used to assess triploidy including routine cytogenetics, microarray and flow cytometry, but these assays are either unsuitable for paraffin embedded tissue, costly and/or involve a delay in diagnosis.

**AIMS:** To determine whether automated SISH for chromosome 17 centromere is a reliable method for rapidly confirming a suspected diagnosis of partial mole in paraffin-embedded placental tissues.

**METHODS:** Paraffin sections from a range of complete moles, partial moles and non-molar gestations with previous flow cytometry results were hybridized for chromosome 17 centromere using automated Ventana Inform silver in situ hybridization (SISH) kit. Blinded counting of >20 cytotrophoblastic cells from each case was undertaken to determine whether triploidy could be reliably confirmed. Cut-offs were established to allow for effects of nuclear truncation.

**RESULTS:** SISH for cep17 could reliably distinguish between diploid and triploid gestations, showing complete concordance with flow cytometry results.

**CONCLUSION:** Combined with immunohistochemistry for p57, cep17 SISH can provide definitive classification of suspected molar gestation within a single day.

**SIGNIFICANCE:** Adoption of this method into routine practice will permit reliable and more rapid classification of molar gestations.

20. This poster has been withdrawn



## 21. Procedure duration of endoscopic retrograde cholangiopancreatography: correlations with demographics, indications, findings and outcomes

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**INTRODUCTION:** Prolonged procedure time may be important in determining endoscopic retrograde cholangiopancreatography (ERCP) complications. Although there has been data detailing adverse outcomes with prolonged surgical procedures there is little information published about prolonged ERCPs.

**AIM:** To compare demographics, indications, findings and complications of prolonged ERCPs when compared with ERCPs of shorter duration.

**METHODS:** A database of 2572 consecutive ERCP procedures performed over 10-years (2008-2018) by a single endoscopist at a tertiary referral centre was analysed. Demographics, indications, complications and findings were correlated with procedure duration. Procedures were divided into those less than 50 minutes and those greater than 50 minutes. This data was analysed using multivariate regression.

**RESULTS:** From the multivariate analysis of the 2572 cases, only older age (67.5yrs vs 61.9yrs) and being an emergency case (RR 3.32) were statistically significant pre-procedure risk factors for the procedures taking greater than 50 minutes. ERCP indication, previous sphincterotomy and gender did not predict procedure time. Of the patients who had procedures >50 minutes, failed biliary access was more frequent (RR 4.17). Biliary stricture was the only finding found to be over-represented in the >50 minutes group (RR 3.64). There was a trend for procedures >50 minutes to be associated with subsequent pancreatitis (RR1.22 p0.274) and unplanned hospitalisation (RR1.43 p0.06)

**CONCLUSIONS:** Failed biliary access, advanced age, biliary strictures and being an emergency case were associated with procedure time >50 minutes with a trend towards an association with unplanned hospitalisation.

**SIGNIFICANCE:** These findings have implications for resource utilisation and anaesthetic support with respect to patients receiving ERCPs.

## 22. Spatial analysis of Chlamydia pneumoniae and Mycoplasma pneumoniae in the ACT region

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**INTRODUCTION:** Respiratory diseases chlamydia pneumoniae (Cp) and mycoplasma pneumoniae (Mp) are a common cause of pneumonia and bronchitis in adults and children. In the ACT, both conditions are seasonal and vary geographically.

**AIMS:** The aim of this project is to discover patterns of results in routine pathology testing that identify subgroups and sublocations in the population that are at high risk of these infections, relative to the average population.

**METHODS:** This paper presents the results of data mining on over 8000 tests for Cp and Mp carried out in the ACT since 1997. Logistic regression is applied to the data, along with data mining algorithms such as decision trees and support vector machines. Inputs include demographic information and biomarkers from routine pathology. Spatial analysis is also employed, with inputs including postcode linked to Census information such as socio-economic status.

**RESULTS:** The logistic regression shows that age, liver function markers and blood cell counts all contribute to prediction of a positive assay. The spatial analyses reveal both geographic variation and the presence of hotspots and coldspots of infection. Limitations of the input data, particularly postcode, mean that the hotspot identification remains an avenue for further research.

**CONCLUSION:** The seasonal variation and geographic variation in Cp and Mp diagnoses in the ACT region are clear from the statistical modelling.

**SIGNIFICANCE:** A clear understanding of the geographic variation of Cp and Mp can aid health workforce planning. Knowledge of hotspots and coldspots identified through the spatial analysis are also of significant benefit to planners and clinicians alike.

## 23. Consumer expectations of transfusion information

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**INTRODUCTION:** Fresh blood product transfusion requires patient education for fully informed consent and written consumer information is frequently used. Few studies have examined patient's desires regarding written and verbal transfusion information provided.

**AIMS/QUESTION:** To understand consumer needs for transfusion information.

**METHODS:** Semi-structured interviews were conducted with healthcare consumers of transfusion information from various Canberra Hospital clinical departments. Transcripts were coded to qualitatively compare the nature and extent of content and opinions regarding transfusion information through thematic analysis.

**RESULTS:** Seven major themes were identified from interviews with 15 patients: healthcare engagement, purpose, explanation of transfusion information, information delivery method, accessibility of information, transfusion safety, and benefits. Participants agreed that risks, benefits and the transfusion procedure should be explained. Due to links with factors impacting consumer engagement including patients' deference to practitioner's decisions, overload of information and emotional burdens of the hospital environment, consumers valued the ability of information provided to help them understand the procedure, but not as a decision-making tool. Consumers cited preference for verbal discussion and open conversation with treating teams over written information.

**CONCLUSION:** Written material plays a supplementary role to verbal provision of transfusion information. Information provided should be tailored to individual patients and utilise simple, succinct explanations. Vulnerable patients relied upon expert opinion rather than question prescriber's decisions.

**SIGNIFICANCE:** These findings will be used to redesign transfusion information at the Canberra Hospital and may be employed at the bedside when discussing transfusion with patients and carers. There may have implications for consumer information in other settings.

## 24. Clinico-pathological dissociation in NMO Spectrum Disorders – TCH Experience

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**INTRODUCTION:** Neuromyelitis optica spectrum disorders (NMO-SD), are a group of rare inflammatory central nervous system disorders, characterised by recurrent attacks of optic neuritis and/or myelitis. A growing body of literature describes 20-30% of NMO-SD patients do not have detectable antibodies.

**METHODS:** We describe 3 patients at our institution over a 1 year period, with features of NMO-SD, predominant spinal cord and brain lesions but paucity of visual symptoms or optic neuritis. One patient was MOG antibody positive. They received Plasma exchange and/or IV methyl prednisolone.

**RESULTS:** Patient 1 presented with urinary retention, lower then upper limb paresis. Her upper limb strength improved following 2 courses of plasma exchange; poor recovery of lower limbs. Patient 2 presented with lower limb weakness and urinary retention. She similarly responded to plasma exchange, with partial improvement of her lower limb weakness. Patient 3 presented with urinary incontinence and upper limb weakness. She improved with IV methylprednisolone treatment, MOG antibody positive but NMO antibody negative. All patients had demyelinating cervical cord lesions on MRI. Of note, patients 1 and 2 were negative for NMO and MOG antibodies, had a more severe clinical phenotype and poorer treatment response, than patient 3.

**CONCLUSION:** These antibody negative atypical patients presented with a more severe phenotype and poorer therapeutic response. However the more typical antibody (MOG) positive patient had a milder presentation, and responded better to treatment.

**SIGNIFICANCE:** Antibody status may not correlate with severity of phenotype, or prognosis, and antibody negative patients should be treated presumptively.

## 25. Dedifferentiated liposarcoma masquerading as an inflammatory myofibroblastic tumour (IMT) – a case report and review of literature

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**INTRODUCTION:** The dedifferentiated component of a well-differentiated liposarcoma (WDL) shows a wide histologic variation. Herein, we describe a dedifferentiated liposarcoma with inflammatory myofibroblastic tumor-like (IMT-like) changes. Awareness that dedifferentiated liposarcoma can have prominent IMT-like features can help to prevent misdiagnosis.

**AIMS:** To present a case report and literature review on a dedifferentiated liposarcoma with IMT-like changes.

**METHODS:** A 77 year old male presented with a parotid/masseter mass. The core biopsy was diagnosed as IMT. The excision specimen of the parotid/masseter mass showed a solid, encapsulated, yellow tumour (42x35x33mm). Histologically, the tumour showed two distinct morphology. The central part of the tumour showed bizarre large atypical cells with a brisk inflammatory component composed of neutrophils, eosinophils and plasma cells. The peripheral part of the tumour showed atypical adipocytes of varying size with occasional recognisable lipoblasts. A wide range of immunohistochemistry stains including ALK performed were all negative. The FISH detected MDM2 amplification. On retrospective analysis the core biopsy appeared to have been taken from the central portion of the tumour.

**RESULTS AND CONCLUSIONS:** A final diagnosis was given as a WDL with a dedifferentiated component, masquerading as an IMT.

In conclusion, this case illustrates that unequivocal areas of WDL are necessary in diagnosing histological variants. Careful sampling of adipose tissue in and around the tumour for microscopic evidence of WDL, which can be subtle, is essential to prevent a misdiagnosis.

**SIGNIFICANCE:** Dedifferentiated liposarcoma is a more aggressive tumour and awareness that dedifferentiated liposarcoma can have prominent inflammatory myofibroblastic tumour like features can help prevent misdiagnosis.

## 26. Pattern of vitreo-retinal diseases at the national referral hospital in Bhutan: a retrospective, hospital-based study

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**INTRODUCTION:** The developing VR service in Bhutan is challenged by limited human resources, accessibility to tertiary eye-care services, and difficult terrain. Knowing the disease pattern becomes more important for policy making.

**AIMS:** To quantify the pattern of vitreo-retinal (VR) diseases at the national referral hospital in Bhutan to inform eye-care policy.

**METHODS:** We reviewed all new patients over three years from the retinal clinic of the hospital. Demographic data, presenting complaints and duration, treatment history, associated systemic diseases, diagnostic procedures performed, and final diagnoses were quantified.

**RESULTS:** The 2,913 new cases were aged  $47.2 \pm 21.8$  years. 1,544 (53.0%) were males. Housewives (953, 32.7%) and farmers (648, 22.2%) were the commonest occupations. Poor vision (41.9%), screening for diabetic and hypertensive retinopathy (13.1%), referral (9.7%), sudden vision loss (9.3%), and trauma (8.0%) were the commonest presenting symptoms. Coexistent diabetes and hypertension were the most common associated systemic diseases. Haematological tests (31.8%), OCT (27.4%), refraction (9.9%), B-scan (8.7%), fundus photography (8.0%) and MRI (3.8%) were the most commonly performed diagnostic tests. Hypertensive retinopathy (18.9%) was the commonest VR disease, followed by refractive errors (16.7%), diabetic retinopathy with macular edema (15.8%), and AMD (11.0%). Retinal detachment was more prevalent in females (83 vs. 41,  $p=0.007$ ).

**CONCLUSIONS:** The prevalence of non-communicable diseases like diabetes and hypertension and their complications affecting retina were high. We found disparity in presentation between genders and rural-urban settings.

**SIGNIFICANCE:** Sustained effort and robust coordination among the eye-care professionals, government and non-governmental organisations are critical for optimising VR services, especially as rates of diseases such as diabetes and hypertension grow.

## 27. Comparing retinal thickness and Matrix 10-2 functional testing in diabetic macular oedema

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**INTRODUCTION:** Diabetic macular oedema (DMO) is commonly managed based upon visual acuity (VA) and retinal thickness. But the patients with early-stage off-centre macular oedema and good VA also had significant central sensitivity loss, suggesting we should more often include functional testing in our decision making for the treatment. We conducted this study to do point by point comparisons of OCT macular thickness and Matrix 10-2 data in early off-centre DMO.

**METHODS:** We tested both eyes of 23 Type-2 diabetes (T2D) patients with mild off-centre DMO in at least one eye. Matrix 10-2 perimetry, with its 2x2 degree stimuli, assessed the function. The Spectralis 8x8 macular thickness grid data was mapped to the 44 10-2 regions to allow point-to-point structure-function analysis.

**RESULTS:** Of 23 patients, 14 were males. The mean age was  $60.6 \pm 9.7$  years, diabetes duration  $11.4 \pm 7.7$  years, HbA1c  $7.62 \pm 1.43$ , and ETDRS VA  $82.5 \pm 6.5$  (20/25). The median Martrix MD and PSD were -14.7 and 6.0 (median  $p=0.005$ ). Central maximum thickness was  $320 \pm 27$   $\mu$ m. For the central 16 10-2 points for left and right eyes, of thicker and thinner than median thickness locations, the correlation with sensitivity ranged from  $0.07 \pm 0.16$  to  $-0.38 \pm 0.25$ , only 9 of 48 (18.8%) correlations being significant.

**CONCLUSION:** There was little correlation between retinal thickness and significant sensitivity loss, indicating functional loss preceded the structural change. The functional testing may be useful in diagnosing early complications even before the structural and clinical changes.

## 28. The effect of new oral anticoagulants and warfarin on geriatric hip fractures

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**INTRODUCTION:** Anticoagulation use is a leading cause for delayed time to surgery (TTS). The introduction of new oral anticoagulants (NOACs) are especially concerning as they are irreversible.

**AIMS/QUESTIONS:** This study aims to investigate the trends in NOACs and warfarin use amongst hip fracture patients and their effect on in-hospital outcomes.

**METHODS:** A retrospective cohort study of all operatively treated hip fractures patients aged over 60 years at the Canberra Hospital from 2013-2017. Primary outcomes were TTS, length of stay (LOS), and in-hospital mortality. Secondary outcomes included myocardial infarction, stroke, thromboembolism, pneumonia, and urinary tract infection, acute kidney injury, and delirium.

**RESULTS:** 1525 operatively treated hip fractures were identified. Of these, 75 patients were on NOACs (4.9%) and 130 (8.5%) were on warfarin. The prevalence of NOACs amongst hip fracture patients increased rapidly in the study period (0.4% to 9.6%,  $R^2=0.98$ ) and has superseded warfarin. In-hospital mortality rates of patients on NOAC or warfarin were more than double than patients with no anticoagulation. Delayed surgery >48 hour and LOS were comparable between NOAC and warfarin, and both were significantly more than patients with no anticoagulation. Subgroup analysis showed that NOAC patients who had delayed surgery >48 hours experienced higher rate of complications.

**CONCLUSION:** Anticoagulation use is associated with increased in-hospital mortality, TTS, LOS, and medical complications.

**CLINICAL SIGNIFICANCE:** The prevalence of NOAC use is rapidly increasing, and NOACs appear to have a similar complication profile to patients on warfarin.

## 29. The Impact of pre-hospital treatment of supraventricular tachycardia on emergency department patient flow

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**INTRODUCTION:** Broadening the scope of ambulance services is one possible way to help ease the burden placed on emergency departments (ED) due to overcrowding. Many Australian Capital Territory (ACT) paramedics have advanced practice scopes allowing for pre-hospital interventions.

**AIMS/QUESTION:** This study aims to identify the effect that pre-hospital treatment of supraventricular tachycardia (SVT) has on length of stay for non-admitted patients in the Canberra Hospital's (TCH) ED, under the hypothesis that pre-hospital treatment from paramedics will shorten a patient's ED stay.

**METHODS:** Patients presenting to TCH ED over a five-year period (2014-2018) were assessed for inclusion. Patients were included when diagnosis of rapid, regular, narrow complex tachyarrhythmia of over 120bpm could be confirmed on ECG. Patients were excluded in the case of pregnancy, admission to non-emergency medical unit (EMU) ward, or when SVT was not the primary diagnosis.

**RESULTS:** 267 patients were included, with 114 brought in by ambulance (BIBA) and 153 by private car (PC). BIBA and PC groups were similar, with average age overall being 59 in both groups.

**CONCLUSION:** BIBA patients were more likely to be admitted to the EMU for short stay than PC patients ( $p < 0.02$ ). It was also demonstrated that, on average, reverted BIBA patients spent almost one hour longer in EMU than PC patients.

**SIGNIFICANCE:** This study is significant because it warrants further investigation into the reasons behind this discrepancy between the two groups, as well as further comparison between BIBA and PC groups in the setting of other medical conditions and interventions.

## 30. Sustainability of a crowding intervention after three years

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**BACKGROUND:** Multiple interventions have been shown to reduce ED crowding but few have been subject to long term follow-up. This study aimed to describe the effect of a crowding intervention over three years.

**METHODS:** Prospective observational study over three consecutive 52-week years with two years historical controls in Canberra Hospital which undertook a previously reported successful hospital-wide multimodal crowding intervention at the start of 2016. All ED presentations from 1-Jan-2014 were included with primary analysis by year. Major outcome measures were standard ED indicators: presentations, Did-not-wait (DNW), 4-hour and 24-hour performance, waiting time within established triage indicators, access block (more than 8 hours in ED) and mean daily occupancy.

**RESULTS:** Daily presentations grew 2.6% 2014-2015 but irregularly at 5.8% annualized during the intervention years due to a major increase throughout 2016 and an exceptionally large winter quarter in 2017. Mean occupancy with patients waiting for inpatient beds fell significantly but returned to pre-intervention trend: in consecutive years it was 7.0, 7.2, 4.7, 6.9 and 8.5. Four-hour performance improved significantly but returned to baseline after 3 years and similar patterns occurred in the other major indicators of access block and waiting time. DNW fell then rose but did not return to baseline: 5.5%, 5.4%, 3.1%, 3.3%, 3.9% and 24-hour stays also remained below baseline.

**CONCLUSIONS:** This initially successful intervention demonstrated limited effect after 3 years with only DNW and 24-hour stays not returning to baseline in the presence of major growth.

**SIGNIFICANCE:** This prospective long term study of a hospital wide quality intervention suggests ongoing work is needed to maintain sustainability.



### 31. Prevalence of alcohol and methamphetamine related presentations in Australasian emergency departments

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**BACKGROUND:** Alcohol and methamphetamine are recognised as major contributors to emergency department (ED) workload.

**AIM:** To identify the point prevalence of presentations due to these drugs in a large sample of Australasian emergency departments (EDs).

**METHODS:** Binational voluntary survey of all 138 adult/mixed EDs accredited for training by the Australasian College for Emergency Medicine plus 20 non-accredited EDs in Australia and New Zealand. The survey instrument was completed by clinical staff at 02:00 on 16 December 2018, with fax, telephone and email follow up. Cases of dual intoxication were ascribed to the clinically predominant effect.

**RESULTS:** 125 EDs answered (79.1%, 95%CI 71.8-85.0) covering all regions and role delineations and identifying 3434 patients in EDs, of whom 447 presented due to alcohol (13.0%, 95%CI 11.9-14.2) and 89 due to methamphetamine (2.6%, 95%CI 2.1-3.2). No methamphetamine cases were reported among 49 patients in the 12 private hospitals, and 1 case among 93 in the 11 other non-accredited hospitals. In public accredited hospitals, alcohol-related presentations ranged between jurisdictions from 8.9% (95%CI 7.1-11.2) in Victoria to 18.0% (95%CI 14.5-22.2) in New Zealand, but methamphetamine rates were 6.0% (95%CI 4.0-9.1) in Western Australia, 2.5% (95%CI 1.9-3.2) in other Australian States and 0.7% (95%CI 0.2-2.3) in New Zealand.

**CONCLUSION:** The point prevalence of alcohol-related conditions was around 1 in 7 of all patients in EDs with minor regional variation across public hospitals. Methamphetamine-related conditions accounted for around 1 in 40 patients, but with major regional variation.

**SIGNIFICANCE:** This indicates the proportion of ED workload due to these recreational drugs and is the first such comparative binational study.

### 32. Effectiveness of a seasonal crowding intervention

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**BACKGROUND:** Interventions for emergency department (ED) crowding may be difficult to assess because of seasonal and staffing factors.

**AIM:** To assess the effectiveness of the hospital-wide winter plan in the Canberra Hospital.

**METHODS:** Prospective cohort study of all treated in the Acute area covering 15 weeks before (control) and after the start of the 2018 winter plan (intervention). Days were grouped into quintiles by mean occupancy with patients waiting for beds ("boarders") and the did-not-wait (DNW) and wait to see doctor of more than 2 hours (Wait>2h) were calculated for each quintile. The intervention included an increase of 50 inpatient beds, an increase in ED Acute spaces of 12 and an extra 4 short-stay beds. Primary outcome was the relationship between boarding quintiles and performance (DNW and Wait>2h).

**RESULTS:** There were 10105 control and 10295 intervention presentations (+2%) associated with a highly significant reduction in boarders (-19%) and better 4-hour discharges (+20%), 24-hour stays (-52%), DNW (-32%) and Wait>2h (-31%). In the lowest quintiles, control DNW was 1.2% [95%CI 0.8-1.8] and intervention 1.0% [0.6-1.5] but in the highest 3.1% [2.4-4.0] and 1.7% [1.2-2.3] respectively, indicating a reduced slope in the relationship. For Wait>2h figures indicated a reduced intercept but similar slope. 10-day mortality was unchanged (113 vs 109 deaths), 16 control and only 4 intervention deaths had Wait>2h (P=0.006).

**CONCLUSIONS:** Additional inpatient beds were associated with a marked reduction in delays, additional ED spaces with significant improvement in the relationship between boarders and ED function.

**SIGNIFICANCE:** This study indicates marked improvement in patient flow can be achieved with a seasonal intervention.



### 33. Review of fully dilated caesarean sections and instrumental trials in the operating theatre

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**INTRODUCTION:** Fully dilated caesarean sections (c/s) associated with increased risk of maternal and neonatal morbidity, causing implications on future pregnancy and delivery. Recent data suggests that about 50% of fully dilated c/s performed without attempting instrumental delivery.

Presence of consultants during instrumental trial may improve perinatal outcomes and decrease rate of fully dilated c/s: implemented for 12+ months at Canberra Hospital.

**AIM:** Assess outcome of fully dilated c/s and trials of instrumental births in operating theatre (OT) in 2018.

**METHODS:** Retrospective study of trials and fully dilated c/s performed February-September 2018.

**RESULTS:** 2219 deliveries, 105 trials (4.7%):

- Primigravidas: 81.
- Multigravidas: 24 (14 attempted VBAC).

Mode of delivery: Forceps 51; Vacuum 15; NVD 1; c/s without trial 21; c/s after failed trial 17.

All groups similar characteristic and equal representation of low risk women.

C/s after failed instrumental trial, more likely to have BMI>30 (52.9%). Neville Barnes Forceps preferred instrument with higher success than vacuum.

Ultrasound underutilised before trials (43.8%).

Regional anaesthesia used for c/s and trials (92%).

Patients chosen correctly for trial in OT – only 5.7% cases were failed trials on birthing suite.

Consultants present 87.6%. As expected: high rate of PPH (57%).

Rates of other complications: shoulder dystocia 4.4%, OASIS injury 14.9%, readmission 3.8%, return to OT 2.8%.

Higher neonatal morbidity in successful instrumental group (Erb's palsy 1, Facial palsy 2, subgaleal haematoma 3, Apgars<7 at 5 mins 2).

**CONCLUSION:** Increased consultant attendance resulted in good maternal neonatal outcomes at fully dilated caesarean. Complication rates remained high in instrumental group.

**SIGNIFICANCE:** Reliable assessment of change in practice.

### 34. Retrospective review of the treatment and ophthalmic outcomes of severe retinopathy of prematurity at a single centre over 10 years

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**BACKGROUND:** Retinopathy of prematurity (ROP) is a sight-threatening disease of premature babies (PBs).

**AIM:** To describe the ophthalmic outcomes and follow-up of treated and untreated severe ROP (>stage III) at the Canberra Hospital.

**METHODS:** Retrospective chart review of babies born from 2007-2016 (10 years), <29 weeks gestational age (GA) who developed severe ROP. Ophthalmic outcomes were assessed at 1, and 3 years.

**RESULTS:** Of 315 screened PBs, 43 developed severe ROP and 25/43 (58%) had adequate follow-up data. Seventeen of 25 (68%) received laser treatment and 8/25 (32%) were conservatively managed. There was no significant difference in GA between groups, however birthweight (BWt) was significantly lower in the treated group (GA 25.5 vs 25.8 weeks  $p=0.56$ ; BWt 700g vs 826g  $p<0.05$ ). A visual acuity of <6/18 at 1-year and 3-years for treated group was 6/22 eyes (27%) and 6/22 eyes (27%) respectively, and for the untreated group 0/16 eyes (0%) and 2/8 eyes (25%). These values were not statistically different ( $p=0.2$ ;  $p=0.9$ , respectively). At 3-years, 6/17 (35%) treated PBs were wearing glasses, while no conservatively managed PBs required glasses. Two of 17 (12%) treated PBs developed myopia (spherical equivalent  $\leq -6$  dioptres) at 3-years. Across the treated group follow-up period 5/17 (29%) developed amblyopia, 8/17 (47%) developed strabismus and 2/17 (12%) had ophthalmic surgery.

**CONCLUSION:** The ophthalmic outcomes of severe ROP remain difficult to predict. Routine follow-up of PBs in our cohort is sub-optimal.

**SIGNIFICANCE:** To reduce the risk of sight-threatening ophthalmic complications it is vital that comprehensive patient review occurs on a consistent basis: a management consideration for all ROP-treatment centres.

### 35. Clinical features of invasive *Listeria* infection at the Canberra Hospital, ACT, Australia, 1997-2017

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**INTRODUCTION:** Invasive listeriosis is a rare but life-threatening infection which carries a case fatality rate of up to 50%. Certain risk groups have an increased incidence and mortality rate. Clinical features of invasive *Listeria* infection were compared with existing international published research.

**AIMS/QUESTION:** To determine whether risk factors, clinical presentation, treatment and outcomes of admissions involving invasive *Listeria* infection at the Canberra Hospital are congruent with international analyses.

**METHODS:** This study was designed as a retrospective cohort study of patients with invasive listeriosis derived from the Canberra Hospital. The records of these patients were examined, data were collected and compared with published research.

**RESULTS:** All patients, except one, had at least one risk factor which predisposed them to invasive listeriosis. The case fatality rate was 33.3% and mortality appeared to be associated with advanced age, a higher Charlson Comorbidity Index, and lack of appropriate empiric treatment.

**CONCLUSION:** The clinical picture of listeriosis at the Canberra Hospital is similar to that in published research. The risk factors for this cohort matched that of published research, and the case fatality rate in this study is comparable to case fatality rates published elsewhere. Appropriate empiric therapy is essential for decreasing mortality rates and *Listeria*-appropriate therapy should be included in early therapy for suspected bacteraemia and meningitis.

**SIGNIFICANCE:** This study shows the importance of appropriate empiric therapy in the treatment of invasive listeriosis to reduce patient mortality.

### 36. Effectiveness of thermal neurotomy (Simplicity vs monopolar perforaminal) in improving physical and psychological function in sacroiliac joint pain

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**INTRODUCTION:** Sacroiliac joint denervation by thermal neurotomy to improve physical and psychological function by alleviating sacroiliac joint pain remains an area open to further research.

**AIMS:** To compare the effectiveness of two techniques, Simplicity and monopolar perforaminal, to influence physical and psychological function by denervating painful sacroiliac joints.

**METHODS:** This was a retrospective clinical audit of prospectively gathered data at Capital Pain and Rehabilitation Clinic, Canberra, Australia of 96 thermal neurotomies in 73 patients with sacroiliac joint pain 2012-2017. Post neurotomy scores in comparison to baseline scores in Functional Rating Index (FRI), Depression Anxiety and Stress Scale (DASS 21) and Patient Specific Functional Scale (PSFS) were used as outcome measures with >12-month follow-up.

**RESULTS:** Mean changes in FRI for monopolar perforaminal was a reduction of 6.897 ( $p < 0.000$ ) and for Simplicity 6.464 ( $p = 0.000$ ). Mean changes in PSFS for monopolar perforaminal was an increase of 0.214 ( $p = 0.000$ ) and Simplicity 0.964 ( $p = 0.054$ ). Mean changes in DASS-D for monopolar perforaminal was a reduction of 3.000 ( $P = 0.051$ ) and Simplicity 1.429 ( $p = 0.274$ ). Mean changes in DASS-A for monopolar perforaminal was a reduction of 1.517 ( $p = 0.114$ ) and Simplicity 1.107 ( $p = 0.201$ ). Mean changes in DASS-D for monopolar perforaminal was a reduction of 4.483 ( $p = 0.003$ ) and Simplicity 2.607 ( $p = 0.058$ ).

**CONCLUSION:** Successful treatment of pain of itself leads to improvement in an individual's physical functional capabilities and contributes to improvement in pain-related mental health issues.

**SIGNIFICANCE:** This research contributes to the existing evidence surrounding the efficacy of thermal neurotomy and Sacroiliac joint pain.

### 37. The effects of relieving thoracic zygapophysial joint pain on psychological and physical function

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**INTRODUCTION:** There are techniques for diagnosing thoracic zygapophysial joint pain, and it is feasible to undertake percutaneous thermal neurotomy of the medial branch nerves of such identified painful joints to relieve this pain.

**AIMS:** To determine to what extent relieving painful thoracic zygapophysial joints can improve physical and psychological function.

**METHODS:** This was a retrospective audit of consecutive prospectively gathered data at Capital Pain and Rehabilitation Clinic, Canberra, Australia of patients with thoracic joint pain 2009-2018.

Outcome measures were mean difference between pre and post neurotomy scores in Functional Rating Index (FRI), Depression Anxiety and Stress Scale (DASS 21) and Patient Specific Functional Scale (PSFS). The thermal neurotomy was undertaken by a single, after 2 positive diagnostic intra-articular blocks. Where possible patients were encouraged to engage in physical reactivation and address psychological issues, but due to the common issues of time, cost, availability, and effort required these measures are infrequently taken up by patients.

**RESULTS:** Of 54 complete data sets the mean change in FRI was a reduction of 9.476 ( $p=0.000$ ), an increase in PSFS of 0.19 ( $p<0.563$ ), a reduction of DASS-D of 2.810 ( $p=0.001$ ), a reduction in DASS-A of 1.948 ( $p=0.005$ ) and reduction in DASS-S of 3.103 ( $p=0.002$ ). Small to large effect sizes were identified.

**CONCLUSION:** The findings demonstrate that reducing the nociceptive output from these painful joints will of itself assist in improving the individual's physical and psychological function.

**SIGNIFICANCE:** This research contributes to the growing evidence of thermal neurotomy for relieving thoracic zygapophysial joint pain.

### 38. A prospective consecutive case series of High Frequency 10 KHZ Spinal Cord Stimulation for chronic pain in a community practice

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**INTRODUCTION:** Efficacy of spinal cord stimulation (SCS) particularly of paresthesia-free 10kHz in the real world is often debated.

**AIMS:** To evaluate effectiveness of HF10-SCS (High Frequency 10 KHZ – Spinal Cord Stimulation) for various chronic pain conditions in a typical non-affiliated, provincial multidisciplinary private pain practice setting.

**METHODS:** 64 patients underwent a HF-SCS trial. Those reporting a successful trial phase ( $\geq 50\%$  pain relief) were offered implant with a permanent Nevro HF10 system. Outcomes were collected prospectively and consecutively with a mean follow up range of 9-75 months. Results are presented as success rates.

**RESULTS:** 64 patients trialed and 50 were implanted:

- FBSS: 24 implanted, 21 achieved  $>50\%$  relief (9 achieved  $>80\%$  relief),
- Non-surgical back pain: 13 implanted, 11 achieved  $>50\%$  relief, (9  $>80\%$ )
- Painful peripheral neuropathies (mixed): 5 implanted, the 5 known achieved  $>80\%$  relief,
- Chronic daily headache: 5 implanted, 5  $>50\%$  relief (4  $>80\%$ )
- CRPS (foot): 2 implanted, both  $>50\%$  (1  $>80\%$ ).
- 1 chronic itch (PRV 21 years) implant  $>95\%$  relief,
- 1 traumatic paraplegia: at-level T11 neuropathic pain, trial failed.

**CONCLUSION:** The findings demonstrate that implanted HF-SCS had an outstanding 90% success rate for reliable, safe and effective  $>50\%$  relief (and 58% for  $>80\%$  relief) of a wide variety of intrusive pain conditions. The average duration 28 months at last follow-up, range of 9-74 months.

**SIGNIFICANCE:** Efficacy in the non-neuropathic conditions supports the evidence that neuromodulation is modifying central sensitisation, or nociplastic factors and not by the commonly held view of neuropathic pain factors per se.

### 39. Procedural sedation in a tertiary trauma centre: a retrospective audit

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**INTRODUCTION:** Procedural sedation complications are common in Australasian Emergency Departments

**AIM:** To compare procedural sedation complications between the Canberra Hospital Emergency Department (TCH ED) and the available Australasian literature and to determine if sedation associated complications were amenable to simple intervention.

**METHODS:** All procedural sedations performed over two and half years in TCH ED were retrospectively reviewed. Complications were defined as per the previous comparable Australasian study, as those events requiring an intervention.

**RESULTS:** 1793 sedations were reviewed; 1125 (63%) for orthopaedic procedures, 'other' 276 (a collection of painful procedures), 208 suturing and 169 DC cardioversions. The median age was 29 years with 538 (30%) children under the age of 16 years. The complication rate in the initial six-months was 4.0% dropping to 1.3% after multiple education sessions before rebounding to 3.1% in the last six-months. The overall complication rate was 3.1 % (95%CI 2.3-4.0) which is significantly lower ( $P<0.0001$ ) than the comparable previous major Australian study (7.2%, 95% CI 6.2-8.2). There was significantly less use of Midazolam (10.3% vs 23.8%  $p<0.00001$ ) and Morphine (1.5% vs 7.9%  $p<0.00001$ ). There was one case of laryngospasm requiring intubation but subsequently discharged at baseline, otherwise no recorded major adverse events.

**CONCLUSION:** Procedural sedation at TCH ED has a complication rate less than that previously reported and this may be due to evolution of the agents used. The complications seem to be readily amenable to education around prevention, but the benefit of these education sessions appears to decay over time.

**SIGNIFICANCE:** Demonstrates the on-going evolution and safety of ED procedural sedation.

### 40. How pre-analytic handling changes a diagnosis and apparent incidence of disease: gestational diabetes mellitus (GDM)

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**INTRODUCTION:** The diagnosis of gestational diabetes mellitus (GDM) is based on the 75 g OGTT and using criteria recommended by ADIPS glucose concentrations on samples collected at  $t=0h$ ,  $+1h$  and  $+2h$  post-glucose ingestion, all have diagnostic significance. As the diagnosis is so important in obstetric management, we instituted strict conditions around collection of all samples during OGTT.

**METHODS:** Routine practice has been to collect venous blood into fluoride tubes and transport samples in a timely manner to the laboratory at the end of the OGTT. In July 2017 stricter handling of glucose samples was instituted, with requirement to centrifuge fluoride tubes within 10 minutes of collection.

**RESULTS:** In the 29 months prior to change in collections, 7509 OGTT were undertaken with an incidence of GDM of 11.9% overall. After the mandated centrifugation, the average over 9 months increased to 20.9%. This increased incidence is predominantly due to a significant increase in fasting concentrations  $\geq 5.1$  mmol/L (4.2% to 10.1%,  $K2$  129.4  $p<0.001$ ), with a lesser increase at the 1-hr point  $\geq 10.0$  (1.5% to 2.7%,  $K2$  16.4  $p<0.001$ ).

**CONCLUSION:** We have inadvertently doubled the diagnosis of GDM in the population of ACT by implementing strict pre-analytic handling. It is well known that glucose stability is an issue, but the consequences for individual patient management are profound. In addition it raises serious questions about variable collection practices in all studies hitherto and development of the published criteria. Although the latter studies recommended handling processes they are very difficult to enforce.

## 41. Trauma and the face of mental illness: are we acting too late?

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**INTRODUCTION AND AIMS:** Mental illness is no longer an invisible illness as self-harm and suicidality become increasingly prevalent amongst the major trauma population. This study aimed to evaluate management of mental health trauma patients and rates of mental illness-related trauma recidivism.

**METHODS:** This is a retrospective audit of 1032 (>18 years old) patients who presented to the Canberra Hospital Trauma Service from January to December 2018, who sustained major trauma, or minor trauma with significant mechanism of injury or required beyond three days of hospital stay.

**RESULTS:** Mental illness was prevalent in 22% (226 of 1032) of the trauma population, of which 16% (37) had been injured or died due to self-harm or suicide. Patients who self-harmed or attempted suicide and able to communicate were asked whether pre-hospital crisis support was sought in 14% (4 of 29) of cases, all of whom stated they did not seek help, leaving 86% (25) without being asked the question. Inpatient interventions offered to those applicable involved consultation-liaison psychiatry in all cases (31), psychiatry unit admission in 42% (13), social work in 39% (12), and clinical psychology in 13% (4). Follow-up recommendations for patients discharged home included community services in 85% (23 of 27), while crisis support services and general practitioner review were each recommended in 52% (14) of cases. The rate of mental illness-related trauma recidivism was 59% (22 of 37).

**CONCLUSION, SIGNIFICANCE:** Multidisciplinary management of mental health trauma patients must be improved to reduce trauma recidivism, injury severity, economic burden and long-term disability. This study guides future research to explore effective preventative interventions.

## 42. Carboplatin and hypomagnesaemia: is it really a problem?

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**INTRODUCTION:** Hypomagnesaemia is a common side effect of cisplatin treatment leading to standardised pre-hydration protocols with magnesium. Carboplatin has essentially replaced cisplatin in the treatment of ovarian/peritoneal/tubal cancer (OC) due to similar efficacy and improved toxicity. Anecdotally, hypomagnesaemia following carboplatin occurs commonly, however there are very little data regarding this issue.

**AIMS:** To quantify the incidence of hypomagnesaemia in patients receiving carboplatin-based chemotherapy for OC; explore a dose-response relationship with carboplatin and assess potential confounding variables.

**METHODS:** A retrospective single-centre review of patients receiving carboplatin-based chemotherapy as first/second line OC treatment between 2012 - 2018 was performed. Data on patient and disease characteristics, potential confounders, carboplatin dose, pre- and post-cycle electrolyte levels, and magnesium replacement were collected. Analyses included repeated measures ANOVA,  $\chi^2$  and logistic regression.

**RESULTS:** Of 144 patients, 104 (72%) had at least one hypomagnesaemia event, 11/104 grade 2 and 11/104 grade 3/4 in severity. Multivariate analysis controlling for gastrointestinal issues, renal impairment and confounding medications showed a significant association between magnesaemia and carboplatin dose ( $P<0.001$ ). Vomiting/diarrhoea and confounding medications were associated with hypomagnesaemia ( $p=0.019$  and  $p=0.028$  respectively). 119 interventions for hypomagnesaemia episodes were recorded.

**CONCLUSION:** Though most cases of hypomagnesaemia were low grade and of questionable clinical significance, hypomagnesaemia remains a common finding in carboplatin-based chemotherapy for OC. The clinical impact of magnesium replacement for such a widespread issue remains unclear and warrants further study to allow for the development of standardised guidelines.

**SIGNIFICANCE:** This study is the first to report such a high incidence of hypomagnesaemia in carboplatin patients and highlights the need for further research.



### 43. Sickly or sweet? Factors influencing HbA1C control in a general practice population

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**INTRODUCTION:** Type II diabetes mellitus (T2DM) is a widespread disease associated with systemic complications, as well as significant morbidity and mortality. Management effectiveness over a 3-month period is measured using glycated haemoglobin (HbA1C).

**AIMS/QUESTION:** Is glycaemic control influenced by patient-specific factors, co-existing medical conditions, and the nature of the treatment protocol and medication regimens?

**METHODS:** We selected patients aged 20-75 years with T2DM presenting to a local GP practice over a 12-month period. Based on Diabetes Australia guidelines, HbA1c was defined as well-controlled (<7%), borderline (7-8%), or poorly-controlled (>8%). Demographics included age, sex, body mass index (BMI), comorbidities, medication count and regimen, drinking/smoking status, and insulin status. Polypharmacy was defined as ≥8 medications. We used SPSS One-Way Analysis of Variance Analyses (ANOVA) for continuous variables and Kruskal-Wallis and  $\chi^2$  for binary variables, with Bonferroni corrections for multiple comparisons.

**RESULTS:** Average HbA1c was 7.4%, with 45.9% of patients under 7%. There was a significant between-groups difference in number of anti-diabetic agents ( $p > .001$ ), which on post-hoc analysis was between well-controlled and borderline groups, and well-controlled and poorly-controlled groups. Kruskal-Wallis and  $\chi^2$  tests were significant for insulin status between well-controlled and poorly-controlled groups.

**CONCLUSION:** As expected, patients with poor glycaemic control (HbA1c >8%) were more likely to use insulin, and to be on more medications than those with good glycaemic control (HbA1c <7%). The majority of patients had reasonable HbA1c control, however, exclusion of diet-controlled diabetes likely underestimated glycaemic control in this sample.

**SIGNIFICANCE:** Risk factors for glycaemic control are multifaceted and may not be accessible within commonly used demographic variables.

### 44. A Tail of Two Lumens: interventional treatment of vertebral artery transection in a trauma setting, a case presentation

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**INTRODUCTION:** Penetrating vertebral artery injuries are rare, however, are associated with high morbidity and mortality. As the vertebral artery is surrounded by a bony canal, it is relatively inaccessible by open surgery. We present a case of vertebral artery transection managed successfully by endovascular vessel sacrifice.

**AIMS/QUESTION:** This case presentation aims demonstrate the viability of endovascular management of penetrating vertebral artery injuries, explore approach considerations for this method, raise awareness of its utility, and demonstrate the need for high quality computed tomography (CT) imaging when assessing neck trauma

**METHODS:** Case report of vertebral artery sacrifice as management of traumatic vertebral artery transection by penetrating injury. A 34 yr old male presented with bleeding from a penetrating neck injury. A CT Angiogram suggested discontinuity of the vertebral artery, however due to lack of contrast extravasation this was misinterpreted and the wound was explored surgically. When vertebral artery injury was identified the vessel was tamponaded with digital pressure and the patient was transferred to the angiography suite, where he underwent successful antegrade and retrograde coil occlusion of each end of the transected vessel. Postoperative MRI showed no brain ischaemia.

**RESULTS:** Successful endovascular occlusion of a transected vertebral artery. Patient recovered with no neurological deficits.

**CONCLUSION:** Vertebral artery injuries, though rare, should be considered in penetrating neck trauma, and assessed with CT Angiography. Due to difficult access by open surgical approach, there is movement towards endovascular repair as the preferred management method of these injuries.

**SIGNIFICANCE:** This case highlights the utility of the endovascular approach for management of traumatic vertebral artery injuries.



## 45. Open plan and two cot NICU design: comparing neonatal neurodevelopmental outcomes

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**INTRODUCTION:** Currently there are no conclusive findings on the impact of different neonatal intensive care unit (NICU) designs on neonatal long term neurodevelopmental outcomes.

**AIM:** Compare neurodevelopmental outcomes in neonates admitted to a two-cot and open plan NICU at a corrected age of 36 months.

**METHODS:** A retrospective audit was undertaken in infants <32 weeks or weighed < 1500 grams at birth (n=428). Eligible infants were divided into two groups: Open Plan (July 2010-June 2012), and Two-cot (January 2013-December 2014). Primary outcomes included cognitive, language and motor function using neurodevelopmental scores (Bayleys-III), categorised as none/minimal functional impairment (> -1 SD), mild functional impairment (-1 to -2 SD), moderate to severe functional impairment (< -2 SD). Bayleys-III data was obtained with approval from follow-up files and the Clinical Record Information Databases. Demographics included: birth weight, gestational age, total hours spent on ventilation, total days admitted, necrotising enterocolitis, intraventricular haemorrhage and sepsis. Statistical analysis used SPSS 25, chi-square tests were completed and a p<0.05 was considered significant.

**RESULTS:** Study results showed no difference in neonatal morbidities or perinatal characteristics between groups. Functional impairment data was obtained for 114/214 (55.7%) open plan infants and 118/212 (55.6%) two-cot. No significant difference was demonstrated between the two groups for cognitive (p = 0.140), language (p = 1.69) or motor (p = 1.58) developmental scores at 36 months corrected.

**CONCLUSION:** Change in NICU design did not result in a significant difference in neurodevelopmental outcomes.

**SIGNIFICANCE:** Two-cot NICU design is only one factor to consider when describing a model of care that promotes long term neurodevelopmental outcomes.

## 46. Stopping haemorrhage by application of rope tourniquet or inguinal compression (SHARC study)

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**INTRODUCTION:** Shark attacks are increasing in frequency in Australasia and worldwide. The most common mode of death for those surviving the initial attack, is exsanguination from lower limb trauma. There is currently no readily available, effective bystander provided method of providing external haemorrhage control for lower limb trauma.

**AIMS:** The primary objective of this study is to determine if a first aid technique using manual inguinal pressure provides superior reduction in popliteal artery flow to application of a makeshift surf leg rope tourniquet. Secondary research objectives are to measure the modifying effect of wearing a wetsuit and of thigh circumference in the efficacy of this intervention.

**METHODS:** This study used Doppler ultrasound to record the reduction in popliteal artery peak flow velocity created by surfboard leg rope tourniquet and by inguinal region external compression in healthy volunteer subjects with and without a wetsuit. Leg circumference, gender and age data was also collected.

**RESULTS:** Inguinal compression resulted in a mean reduction of popliteal flow velocity of 89.1% 95% CI [82.6%, 95.6%] compared to Leg rope application 36.65% 95%CI [24.35%, 48.95%] ; p<.0001. There was no significant influence by the wetsuit (Inguinal Compression 91% vs Inguinal Compression with Wetsuit 87 % p=.43; Leg Rope 41% vs Leg Rope with Wetsuit 32% p=.29)

**CONCLUSION:** This study has shown that an easily taught first aid technique can reliably completely stop or substantially reduce blood loss in the setting of a lower limb injury.

**SIGNIFICANCE:** With an education campaign, inguinal compression could be widely taught as a practical and lifesaving beachside first aid technique.

## 47. RCTs: approaching the asymptote?

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**INTRODUCTION:** RCTs for conventional medicines could be approaching asymptotically a limit imposed by patient and drug variation. This limit might be breached with precision medicines – characterised by reduced therapeutic pleiotropy, although this benefit might be limited when they are evaluated in patients enrolled according to conventional diagnostic categories. In personalised medicine, precision treatments are tailored to patients according to knowledge of the disease mechanism.

**METHODS:** To explore these assumptions, therapeutic trial outcomes reported in original *New England Journal of Medicine* articles during the intervals: 2003-4, 2010-11 and 2017-18 were surveyed. Clinical trials were compared, involving conventional therapeutics, precision medicines, defined as those that target small molecules or disease-specific pathways, and personalised medicine, in which precision medicines were evaluated in subjects selected on the basis of knowledge of the drug target.

**RESULTS:** A total of 398 studies were included: 211 conventional, 144 precision and 43 personalised. Over the 2003-2018 intervals, the proportion of personalised studies increased, from 3.3% to 12.5% to 13.5%. The proportion of studies within the conventional, precision and personalised groups that met the primary outcome was 65.1%, 86.1% and 97.7%, respectively.

**CONCLUSION:** The proportion of precision medicine trials reaching primary outcome is increasing, while the converse is true for conventional medicines. Currently, precision medicines are usually evaluated where subjects are selected according to diagnosis, not mechanism of disease.

**CLINICAL SIGNIFICANCE:** The therapeutic benefit of conventional medicines is approaching a limit, precision medicines offer fresh advances, and at present there is an opportunity to evaluate efficacy of these drugs in the populations for which the drug is intended.

## 48. Chronic norovirus infection in common variable immune deficiency- case report and literature review

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**INTRODUCTION:** Norovirus, a member of the Calici viruses, is an unenveloped positive stranded RNA virus. Patients with immunodeficiency including common variable immune deficiency (CVID) have been reported to have an increased risk of chronic and severe norovirus infection. [1] Norovirus enteropathy may result in villous atrophy and malabsorption.

**AIMS:** To present a case report and relevant literature review on common variable immune deficiency (CVID) enteropathy.

**METHODS:** A 57-year-old female presented with diarrhoea and weight loss on a background of common variable immune deficiency (CVID). Endoscopy and colonoscopy revealed abnormal nodular duodenal mucosa. Gastric body, antral, duodenal and terminal ileum biopsies were performed and sent for histopathological examination in our department of pathology. The duodenal sample showed villous shortening and crypt hyperplasia, with increased intraepithelial lymphocytes and a mild increase in chronic inflammatory cells in the lamina propria. There was an absence of plasma cells and no Giardia or viral inclusions were noted.

**RESULTS AND CONCLUSIONS:** The extent of inflammatory infiltrate within the lamina propria of the duodenum was less than expected for coeliac disease. In addition the absence of plasma cells was in keeping with CVID. All duodenal biopsies demonstrated histological features of CVID enteropathy which has been linked to chronic norovirus infection. This case illustrates the potential for chronic norovirus infection in patients with CVID. [1]

**SIGNIFICANCE:** Recognition of this condition is critical to the institution of appropriate therapy.

### REFERENCES:

- 1 Woodward J, Gkrania-Klotsass E, Kumararatne D. Chronic norovirus infection and common variable immunodeficiency. Clin Exp Immun 2017; 188: 353-62.

## 49. Clinical input into information technology interfaces improves clinical outcomes – a case study of vaccinations in pregnancy

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**INTRODUCTION:** Pertussis and Influenza infections have serious implications to the obstetric population. Altering interfaces of electronic medical records to improve the typically low vaccination rates in our obstetric population has not yet been studied.

**AIM:** To determine whether using a mandatory field in an electronic health record would improve compliance with an important quality indicator in maternity care, namely antenatal pertussis and influenza vaccination rates.

**METHODS:** Two cohorts of women who delivered at the Canberra Hospital between 1-31 July 2015 and 1-31 July 2017 were compared for compliance with the quality indicator of antenatal pertussis and influenza vaccinations. The single point of difference between time points was programming the electronic health record so the clinician could not close the patient file unless they inserted an answer into the box asking whether vaccinations had been performed or declined. Data was audited and percentage compliance rates were compared.

**RESULTS:** A total of 275 and 299 women delivered in the two audit periods. There were no significant differences in maternal or neonatal characteristics between the two audits periods except for maternal age (33.3 years versus 31.5 years;  $p=0.001$ ). Pertussis vaccination rates almost doubled between audit periods (52.7% versus 91.4%,  $p<0.0001$ ). Influenza vaccination rates more than doubled between periods (35.0% versus 79.8%,  $p<0.0001$ )

**CONCLUSION:** Introducing an electronic prompt or mandatory field into an electronic health record system significantly increased uptake of pertussis and influenza vaccination rates in pregnant women.

**SIGNIFICANCE:** Mandatory fields in electronic medical records may have a role in increasing the compliance with other steps considered best practice in maternity health care.

## 50. Does using automated office blood pressure in a busy renal outpatient clinic as opposed to standard office blood pressure change the antihypertensive management of patients?

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**INTRODUCTION:** Recent large trials have demonstrated mortality or stroke benefit for tight BP control in high risk patients. BP measured in these trials have been by the automated office method (AOBP), rather than the standard face-to-face method used at hospital outpatients (SOBP).

**AIMS/QUESTION:** We sought to assess how much difference switching to the automated office method would make to antihypertensive management in a hospital renal outpatient clinic.

**METHODS:** All patients attending renal outpatients have their BP measured. When time was available the clinic nurse used both the AOBP and SOBP methods. Measurement alternated so that half of those approached had SOBP measured first. A BP target of  $<130/80$  mmHg was presumed if participants fitted current international guideline recommendations (eGFR  $<60$  not on dialysis, or proteinuria  $>1\text{g/day}$ ).

**RESULTS:** Median age of the 35 participants was 68 (IQR 40 to 73), 23 were male, 4 were on regular dialysis and the non-dialysis participants had median eGFR of  $36\text{ mL/min/1.73m}^2$  (IQR 22 to 56). Estimated proteinuria  $>1\text{g/day}$  was present in 14 and 23 had eGFR  $<60\text{ mL/min/1.73m}^2$ . Systolic and diastolic SOBP was non-significantly  $1/0.7$  mmHg higher than AOBP (95% CI  $-5/-3$  to  $2/1$ ). The overall mean AOBP in the 35 participants was  $139.8/79$  (std deviation  $24/12$  respectively). Measurement of AOBP would theoretically have led to a change of management in 3 (9%) of participants.

**CONCLUSION:** In an outpatient setting, measurement of AOBP rather than SOBP results in slightly lower mean BP recordings.

**SIGNIFICANCE:** Based on guideline recommendations, AOBP would have led to a change in antihypertensive management of 9% of patients.

## 51. Identifying novel prognostic markers for diffuse large B cell lymphoma (DLBCL)

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**INTRODUCTION:** Diffuse large B cell lymphoma (DLBCL) is the commonest lymphoma that is highly aggressive where one-third of the patients relapse despite effective treatment.

**AIM:** To identify novel prognostic markers that can help guide therapeutic options and predict outcomes for DLBCL

**METHODS:** We used flow cytometry to characterize the proportion of total B cells and various B-cell subpopulations in the bone marrow (N=47) and peripheral blood (N=54) of 75 DLBCL patients at diagnosis and studied their impact on survival. We also analysed NGS data available for 55 de novo DLBCL patients looking at mutations in 45 genes related to the disease to identify novel genetic signatures that could be associated with overall survival.

**RESULTS:** High % of anergic B cells in the bone marrow (>13.9%) characterised as having CD21(-/low)/CD38-expression, was found to be associated with significantly shorter overall survival ( $p=0.020$ ) and appeared to be an independent marker of prognosis in a Cox regression analysis ( $p=0.01$ ) alongside the established Revised International Prognostic Index (R-IPI) score ( $p=0.007$ ).

We have also identified a novel signature consisting of 3 genes that can be used in combination with the (R-IPI) score as a prognostic tool for predicting overall survival in DLBCL ( $p=0.001$ ).

**CONCLUSION:** BM microenvironment and genetic heterogeneity may be used as prognostic markers in DLBCL.

**SIGNIFICANCE:** We have identified two novel markers of prognosis that if validated with larger studies can be used to guide therapy and predict outcomes for DLBCL.

## 52. Patient delivered partner therapy for chlamydia: patient and partner acceptability

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**INTRODUCTION:** *Chlamydia trachomatis* is a significant public health concern due to incidence and adverse outcomes. Australian guidelines recommend patient delivered partner therapy (PDPT) for contacts, however it is not widely prescribed due to varying legislation. This project, undertaken in the ACT where legislation does not preclude PDPT prescription, explored acceptability of PDPT for treatment of chlamydia contacts.

**AIM:** To determine if PDPT provides an acceptable and effective method of testing and empiric treatment for partners of index patients with chlamydia infection.

**METHODS:** From November 2015 – February 2017 patients treated for chlamydia or pelvic inflammatory disease who stated their partners would have difficulty accessing treatment were offered PDPT. Phone consultation, registration and medical record documentation for partners was undertaken at the time of index patient visit and PDPT, information, pathology form and specimen container were provided. Post interventional questionnaire was completed by phone.

**RESULTS:** Of 40 index patients, 38 were contacted to complete the evaluation. 100% reported their partner took the medication; 92% the same day they were treated and 8% within 3 days. All would use PDPT again. 40 partners received PDPT and 73 % (29) were contacted to complete the post intervention questionnaire. 100% of partners took the medication without adverse events and all stated they would use PDPT again. Six (15%) chlamydia specimens were returned.

**CONCLUSION:** PDPT is a safe, simple and useful chlamydia treatment option that enables prompt partner treatment. PDPT is acceptable to both index and partners and should be an option if legislation allows. Partners are unlikely to seek testing when provided with PDPT.

### 53. The problem of aseptic loosening and osteolysis after total joint replacement and the potential role of microRNA

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**INTRODUCTION:** Total joint replacement is extremely successful. However, there remains a significant number of patients who experience complications. Osteolysis and aseptic loosening make up 45.3% of all revision procedures in Australia. The current diagnostic strategies are limited and the only successful therapeutic option is revision surgery. MicroRNA (miRNA) are small, non-coding RNAs which are involved in regulation. They have been implemented in the pathogenesis of many diseases including cancer, diabetes and hepatitis.

**AIMS:** We aim to identify the miRNA regulatory network in the pathogenesis of osteolysis to identify potential biomarkers or therapeutic targets.

**METHODS:** Adult patients undergoing revision THA for osteolysis will be included. Age and gender matched controls groups are primary THA patients and trauma patients. Total RNA and miRNA will be isolated from blood, soft-tissue and bone samples using commercial RNA isolation kits. RNA quality and quantity will be measured and RNA sequencing will be conducted. Targetscan will be used to predict the miRNA-mRNA interactions and RT-PCR will be used to validate mRNA expression and Western Blot will be used to validate protein expression.

**RESULTS:** Various studies have identified miRNA relevant to osteolysis in animal models, including miR-21 and miR-130b. There have not been any published studies on human tissues on this topic.

**CONCLUSION:** The numbers of total joint arthroplasty are increasing significantly, therefore there remains a need for the identification of biomarkers and therapeutic targets for aseptic loosening and osteolysis.

**CLINICAL SIGNIFICANCE:** miRNA can potentially be used as a novel biomarker in the diagnosis of osteolysis and a novel drug target for future therapeutics.

### 54. Is it time to revive cost-benefit analysis for the evaluation of clinical interventions? Balancing cost and quality in healthcare

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**INTRODUCTION:** Economic evaluation of healthcare interventions provides rational guidelines to policy makers for maximisation of their efficiency. Two leading methodologies in that area are cost-utility analysis (CUA) and cost-benefit analysis (CBA).

**QUESTION:** CUA is based upon the use of a non-money metric to measure changes in health state utility while CBA uses a money metric to measure such changes. But do these two methods give consistent results? This research investigates this question using data from a trial of a new multidisciplinary clinic for the management of road traffic crash injuries.

**METHODS:** Utility weights for use in the CUA were derived from SF-36 responses for all trial participants. The monetary measures of benefit for use in the CBA were based on the value of damages awarded to trial participants whose claims were successful. The implications of the CUA results for the economic efficiency of the intervention were investigated by comparing these results with implied threshold values of cost per QALY for public funding in the Australian healthcare system. The implications of the CBA results were derived using net benefit calculations.

**RESULTS:** The CUA and CBA results are compared in the context of the expected methodological and policy related conclusions.

**CONCLUSION:** Both methods produce different results and may result in contradicting policy recommendations.

**SIGNIFICANCE:** A broad approach to economic evaluation of compensable conditions needs to be developed.



## 55. Towards a customer-friendly online form for children with diabetes and their carers to communicate a care plan to a teacher

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**Introduction:** Diabetes management plans for affected children can assist their school in managing the issues experienced by patients in a holistic manner. These care plans must cater to and be understood by the child, parents/guardians, teachers, and required healthcare professionals, each with their own set of user needs. Current paper-based forms that are in standard use fail to leverage the capabilities of online technology.

**AIMS/QUESTION:** to create a prototype of a dynamic online form that assists of children with diabetes to communicate a diabetes care plan for their child to the teacher.

**METHODS:** The qualitative/quantitative customer-driven development model and value-sensitive design were followed to conduct user evaluations through workshops and interviews.

**RESULTS:** The developed web service provides authenticated access to a database, which maintains pre-approved content and stores current data for each child's plan. Its access is required by parents/guardians and healthcare professionals from anywhere; teachers' access is anticipated to remain unchanged, via a signed paper printout provided by the child's parent/guardian.

**CONCLUSION:** The final prototype, evaluated by 2 endocrinologists, 4 registered nurses/nurse educators, and 1 parent, has been well-perceived by most participants. In particular, the parent mediation, though important, is well covered in the form. Main areas of future development lie in extending the evaluation to schools; providing flexibility for the numerous form variations and updates in glucose management technology; and accommodating events outside the school.

**SIGNIFICANCE:** This study sets the foundation for creating an easy-to-understand diabetes school plan electronically.



## 56. Magic Glasses Philippines: a school-based health education package to prevent soil-transmitted helminth (STH) infections among schoolchildren in the Philippines

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**INTRODUCTION:** The soil-transmitted helminths (STH) are significant public health concern globally. Mass drug administration (MDA) of antihelminthic drugs to at-risk populations is still the main strategy for control. However, MDA, as a stand-alone intervention, does not prevent reinfection. Accordingly, complementary measures to prevent re-infection, such as improvements in hygiene through health education or improved sanitation, are required to augment the effectiveness of MDA for sustainability.

Our research team developed and evaluated (via a cluster RCT) the impact of a video-based health educational intervention package on STH incidence, knowledge and hygiene behaviour in Chinese primary school children aged 9-10 years. Results showed a 50% decrease in the incidence of STH infection (OR = 0.5, 95% CI 0.35-0.7, P<0.0001) in the intervention schools compared with the control schools (published in the New England Journal of Medicine). This provided proof of principle that the health educational package widens student knowledge and changes behaviour, resulting in fewer STH infections.

**AIMS/QUESTION:** To evaluate the potential for up-scaling of this health educational package as a universal school-focused educational tool to form part of multi-component sustainable STH control program, we assessed the generalisability of our earlier findings in different geographical settings with a greater force of infection and in different ethnic groups.

**METHODS:** In 2016, we undertook a cluster RCT involving >2000 schoolchildren in Laguna Province the Philippines. Here we will detail the results from the "Magic Glasses: Philippines" trial.

**CONCLUSION/SIGNIFICANCE:** This study will provide an evidence base for translation of our health educational package into public health policy and practice in the Asian region and beyond.

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## 57. Vancomycin resistant *Enterococcus* (VRE) in the intensive care unit (ICU): case classification and patients profile 2014-2018

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**INTRODUCTION:** Number of Vancomycin resistant *Enterococci* (VRE), patients identified as colonised at Canberra Health Services (CHS) in ICU increased from 45 in 2014 to 89 in 2018. Colonised patients are at serious risk of morbidity and infected patients are at higher risk of mortality particularly in immunocompromised patient (e.g. HIV or chronic renal failure).

**AIMS/QUESTION:** Infection Prevention and Control Unit (IPCU) collected data from 2014-2018 to investigate whether VRE patients identified as community acquired had access to healthcare and/or antibiotics exposure less than three months prior to their VRE detection.

**METHODS:** Using a retrospective data review over a five year period (2014-2018) using a pre-determined set of definitions used to classify patients who developed *Clostridium difficile* could be applied to determine if VRE was either community acquired or health care acquired.

**RESULTS:** Using the definitions it was determined that greater than 70% had some healthcare intervention within the past three months prior to admission. Approximately 50% of patients admitted to CHS were from other hospitals or healthcare facilities.

**CONCLUSION:** Using the definitions for *Clostridium difficile* can be easily applied to other organisms to determine accepted definitions of community acquired and healthcare acquired.

**SIGNIFICANCE:** if an effective antimicrobial stewardship program was a national program that the number of multi resistance organisms could be reduced.

## 58. Documenting patient risk and nursing interventions: a clinical record audit

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**INTRODUCTION:** The use of the 'nursing process' (assessment, planning, intervention and evaluation) is required by professional registration and health service accreditation bodies. Yet international research has revealed that documentation systems remain poor in the capture of these key components of patient care.

**AIMS/QUESTION:** The aim of this study was to identify the quality and completeness of the 'nursing process' present in nursing documentation, comparing written and electronic documentation in an Australian acute care facility.

**METHODS:** This is a small retrospective exploratory study. Clinical records (N = 20) were randomly chosen from a time period when an information system was trialled and compared to a time period of 'usual documentation' on a busy medical ward. This sample size provided a rich representation of complexity, while maintaining manageability of data collection and analysis accuracy.

**RESULTS:** The case and control time periods were comparable, with non-significant differences in age, gender and primary diagnoses. There was minimal difference between usual documentation and digital documentation when examining assessment and planning comprehensiveness scores; number of nursing interventions identified. However, there was a significant improvement in the trial information system in the identification and documentation of patient risks ( $p=0.01$ ), including skin integrity, and medication risks. Additionally, the trial system was more likely than usual documentation to contain nursing interventions to address identified risks (such as regular turning and pharmacist review) documented as completed ( $p=0.01$ ).

**CONCLUSION AND IMPLICATIONS:** Documentation of interventions addressing patient risk is needed in hospital documentation systems; this digital approach trialled at Canberra Hospital demonstrated improved capture of this information.

## 59. Specialised stroke nurses in ED improve swallow screening

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**BACKGROUND:** Swallowing difficulty (dysphagia) is common in acute stroke patients (37-78%). It is associated with increased mortality and morbidity, as well as longer hospital admission. Up to 10% of these dysphagic patients will suffer complications such as aspiration pneumonia. Most stroke patients present to the emergency department (ED). Early swallow screening has the potential to prevent patients with dysphagia from being given oral medication, fluids or food, any of which could lead to aspiration and further complications. Swallow screening is not uncommonly missed in ED for several reasons. We wondered whether the introduction of an Acute Stroke Nurse (ASN) at our institution would increase the proportion of acute stroke patients receiving swallow screening.

**METHOD:** Details of all stroke and TIA patients presenting in 2018 were retrieved from our institution's stroke register to determine (a) whether a swallow screen had been performed using the ASSIST tool, and (b) whether an ASN had been involved in their care in the ED.

**RESULTS:** 382 patients were included in the audit. An ASN was involved in the care of 177 (46.3%) while 205 (53.7%) had no ASN input. 50 patients (13.1%) did not receive an ASSIST. Of these, 37 (74.0%) occurred in the group without ASN involvement, representing 18.0% of the total of 205, compared to 13 (26.0%) in those seen by an ASN, representing 7.3% of the total of 177 ( $P<0.001$ ).

**CONCLUSION:** ASN involvement in ED stroke care significantly increased the proportion of acute stroke patients receiving swallow screening in ED.

## 60. Understanding nurse's perceptions of sexual dysfunction in people with end stage kidney disease requiring haemodialysis

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**INTRODUCTION:** Sexual dysfunction is considered a consequence of end stage kidney disease (ESKD) and is likely to be under reported, under treated and overlooked as treatment is mainly focused on ESKD. Do renal nurses feel confident and competent to address sexual dysfunction in people with ESKD receiving haemodialysis (HD) treatment?

**AIMS:** To describe the protocol for a study investigating renal nurses' understanding and perceptions of sexual dysfunction, and exploring sexual dysfunction in people with ESKD receiving HD.

**METHODS:** In this exploratory mixed methods study, phase one will entail a systematic scoping review of nursing assessment and interventions related to sexual dysfunction and a cross-sectional survey of renal nurses working in HD units to measure attitudes, assessment, knowledge and skills, and experience in addressing sexual wellbeing of patients. Phase two will then focus on adults receiving HD to identify if sexual dysfunction is occurring and whether it has an impact on their lives. This phase will also determine if sexual wellbeing is addressed by renal nurses. Data will be collected and analysed separately for each phase then integrated using descriptive interpretation to provide a better understanding of sexual dysfunction.

**RESULTS:** Results of research are unavailable as this is a protocol of a study

**CONCLUSION:** Unable to be provided as results not yet available

**SIGNIFICANCE:** This study will provide an in-depth understanding of renal nurse's attitudes towards sexual dysfunction in patients with ESKD, their practices aimed at addressing sexual dysfunction in this population, and whether the needs of the patient are being met.

## 61. Physical examination performed on potential organ and tissue donors – a review of current Australian practice

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**INTRODUCTION:** Physical examination of organ and tissue donors is considered essential to mitigate risks to, and optimise outcomes for transplant recipients.

**AIMS/QUESTION:** To determine current practice of performing a physical examination on potential organ and tissue donors in Australia.

**METHODS:** All (125) Donor Coordinator roles in Australia were invited to participate in a cross-sectional survey based research project to determine their current practice of performing the examination.

**RESULTS:** There were 75 recorded survey responses resulting in a 60% response rate. Majority of the participants perform a mean 11 examinations per year and have an intensive care background. There were 8% of participants who agreed that practice is consistent around the country. Inconsistencies were observed in the assessment techniques used during the examination, such as palpation. Specific physical examination training and education has been provided to 77% of participants. When an abnormality is identified, 66% of participant's consulted the treating intensive care team in the first instance. There were 18 (24%) respondents who reported experiencing cessation of a donation due to an abnormality identified during the physical examination, with current or previously removed melanoma the most reported finding.

**CONCLUSION:** This study has found many components of the physical examination are being performed inconsistently. Expected practice for performing the physical examination must be ascertained through consultation with donation and transplantation specialists to inform a consistent approach to national guideline and staff training and education development.

**SIGNIFICANCE:** This is the first study on the donor physical examination in Australia and possibly the world that aims to mitigate risk to transplant recipients.

## 62. The Simplified Nutritional Appetite Questionnaire is associated with quality of life of people living with dementia

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Poor appetite has been identified as a common problem for older people that may impact their overall quality of life (QoL). In particular, people living with dementia (PLWD) with reduced appetite are at a greater risk for weight loss and nutritional deficiencies that can contribute to increased mortality. To investigate the relationship between appetite and QoL, the four-item Simplified Nutritional Appetite Questionnaire (SNAQ) and a 29 item health-related QoL questionnaire (DEMQOL) was administered to 24 PLWD (14 female) aged 84.7 years ( $\bar{A} \pm 7.58$ ) living in residential care or receiving respite day care. The mean SNAQ score was 15.6 ( $\bar{A} \pm 1.97$ ) out of a possible 20.0 indicating that participants were not at a significant risk of weight loss within the next six months. Mean score on the DEMQOL was 85.7 out of a possible 112 points representing moderate QoL. Results from a multiple linear regression revealed that increased appetite is associated with a higher QoL ( $B = 3.664$ , CI 95%: 1.38, 5.95;  $p = 0.003$ ) independently of sex. The SNAQ is a simple tool that may be a useful instrument to monitor wellbeing and QoL for PLWD in aged-care settings. Confirmation of these results in larger prospective studies are needed.

## 63. Ten-week adherence to a commercial smartphone application intervention in a clinical sample of older adults

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The rapid surge in the use of technology has revealed potential for smartphone applications to assist with management of chronic disease in aging populations. However, little data exists surrounding the daily use of a smartphone application by a clinical population of older adults. In the present study, 50 individuals (46 female) aged between 50 and 77 years (mean age=63.1  $\bar{A} \pm 7.67$ ) and living with arthritis, were recruited to use a photoplethysmography-based commercially-available smartphone application (HRV4Training) to measure heart rate variability to assist with disease management. In total, 45 participants had access to compatible smartphones and were instructed on how to use the application within five minutes of waking for ten weeks (70 days). Six participants either withdrew from the study or were excluded due to technological issues. Of the compliant participants ( $n=39$ ) their average use was 51.5 days (73.6%), with measurements taken at the incorrect time on 3.64 days (5.20%). The median use was 60 days. At the end of the study, 44.0% of participants reported finding the application helpful, and 43.9% as neither helpful nor unhelpful in managing their condition. The findings highlight challenges associated with application-based interventions for older adults including smartphone compatibility issues with older models and attrition due to illness or technology issues. Future health based smartphone applications should consider the needs of older adults as users of this technology. The inclusion of features such as reminder messages, alerts or prompts, may promote user engagement and has the potential to improve self-management of health conditions in this population.

## 64. Mental health services and medications utilisation in the Australian population

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**INTRODUCTION:** We study mental health services and medications usage in the Medicare Benefit Schedule (MBS) and Pharmaceutical Benefit Scheme (PBS) administrative data.

**AIMS/QUESTION:** Finding groups of patients with similar utilisation patterns.

**METHODS:** We create individual level utilisation patterns describing the sequence of mental health services and medications, extracted from the MBS and PBS data, respectively. We propose an Extended Inter-Spike Interval metric to estimate the pairwise distances between the individuals' utilisation patterns. Then, we develop a split-and-merge Partitioning Around Medoids algorithm to cluster the study population and discover "interesting" utilisation patterns. To better understand the extent to which particular personal characteristics impact an individual utilisation pattern, we perform descriptive and multivariate analyses with gender, age, state of residence, and concessional status as covariates.

**RESULTS:** We find that mental health patients can be grouped into 10 clusters with distinct and interpretable utilisation patterns. The largest cluster (27.1% of the study population) is composed of individuals who only visit general practitioners and take psycholeptics medications for a short period of time. The smallest cluster (4.4% of the study population) contains individuals that have occasional visits with general practitioners, and regularly utilise both psycholeptics and psychoanaleptics medications over long periods of time.

**CONCLUSIONS:** MBS and PBS administrative data provide useful insights in the type of utilisation patterns displayed by users of mental health services and medications, providing insights on whom to target and how to structure services for different groups of individuals.

**SIGNIFICANCE:** Analyses of this type provides insights on whom to target and how to structure services for different groups of individuals.

## 65. Differential impact of mass and targeted praziquantel delivery on schistosomiasis control in school-aged children: a systematic review and meta-analysis

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**INTRODUCTION:** Schistosomiasis is a widespread public health concern in the poorest regions of the world. The principal control strategy is regular praziquantel administration to school-aged children. With calls for the elimination of schistosomiasis as a public health problem, expanding praziquantel delivery to all community members has been advocated.

**AIMS/QUESTION:** This study aims to summarise existing literature and examine the differential effects of mass and targeted praziquantel distribution on schistosomiasis prevalence and intensity in school-aged children.

**METHODS:** We searched biomedical literature databases to identify papers that reported schistosome prevalence before and after praziquantel administration, either to children only or to all community members. We used inverse variance weighted generalised linear models to examine the impact of mass versus targeted drug administration on prevalence reduction, and weighted boxplots to examine the impact on infection intensity reduction.

**RESULTS:** In total, 34 articles were eligible for systematic review and 28 for meta-analysis. Results of generalised linear models showed no detectable difference between mass and targeted treatment strategies on prevalence reduction in school-aged children for *Schistosoma mansoni* (odds ratio 0.47, 95%CI 0.13–1.68, p=0.227) and *Schistosoma haematobium* (0.41, 95%CI 0.06–3.03, p=0.358). Box plots also showed no apparent differences in intensity reduction between the two treatment strategies.

**CONCLUSION:** The results do not support the hypothesis that community-wide treatment is more effective than targeted treatment at reducing schistosomiasis infections in children.

**SIGNIFICANCE:** Further field-based studies comparing mass and targeted treatment are required to address such factors as insufficient treatment coverage, persistent infection hotspots and unmeasured confounders. This may assist in optimising control programs.



## 66. Histological remission (Nancy index) is superior to endoscopic mucosal healing in predicting relapse free survival in patients with ulcerative colitis in clinical and endoscopic remission

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**INTRODUCTION & AIM:** Current treatment targets in ulcerative colitis (UC) aim at mucosal healing assessed clinically and on endoscopy; however, many patients continue to have histological activity. There is a paucity of data in the use of histological activity as a therapeutic goal for patients with UC. Our aim was to assess histologic remission using the Nancy histological index (NI) as a predictor of future relapse in UC patients in endoscopic and clinical remission.

**METHODS:** A retrospective analysis of patients with UC attending the IBD clinic at the Canberra Hospital was performed. Of the 184 patients who underwent colonoscopy from 2009-2017, 74 were found to be in clinical and endoscopic remission. The biopsy slides for these patients were assessed by two pathologists and scored using the NI. The predictive factors associated with relapse were then analysed.

**RESULTS:** Compared to patients with histological activity, those in histological remission demonstrated a significantly longer relapse free survival ( $P = <0.0001$ ). On multivariate analysis, only histological remission demonstrated a significantly longer relapse free survival, and remained an independent predictor of future clinical relapse ( $p = 0.002$ ).

**CONCLUSION & SIGNIFICANCE:** Histological remission independently predicts significantly longer relapse free survival compared to clinical and endoscopic remission suggesting that it may be a superior therapeutic target. Long term prospective studies are needed to determine whether histological remission improves clinical and patient reported outcomes.

## 67. A double dose of pseudolymphoma: cutaneous intravascular cd30+ pseudolymphoma arising in acral pseudolymphomatous angiokeratoma – a case report

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Cutaneous intravascular CD30+ pseudolymphoma is a rare entity with only a handful of cases reported thus far in the literature. This case study reports a patient who presented with a non-healing wound of the forearm, which on excision biopsy was found to have the histological features of an acral pseudolymphomatous angiokeratoma, also known as papular angiolymphoid hyperplasia. Distended lymphatics within the lesion were filled with a monotonous population of intermediate sized lymphocytes with distinct nucleoli and considerable associated apoptotic debris. Immunoperoxidase staining showed almost uniform staining for CD4 and around 50% staining for CD30. The occurrence of cutaneous intravascular CD30+ pseudolymphoma has previously been reported in the setting of a regressing keratoacanthoma of the cheek<sup>1</sup> and has been associated with chronic inflammation after trauma<sup>2</sup>. In this case the finding was interpreted as a florid reactive hyperplasia with the recommendation for follow up and T-cell clonality studies should recurrence occur. To our knowledge, no recurrence has occurred 20 months post initial presentation. Awareness of this benign cutaneous lymphoproliferation as a reactive process is necessary in distinguishing it from malignant intravascular T-cell lymphomas.



## 68. Effect of simulated reduction in macular visual field sensitivity on pupillary responses

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**INTRODUCTION:** Multifocal pupillographic perimetry (mfPOP) is a proposed alternative to standard visual perimetry, having potential to detect early and highly diagnostic central retinal dysfunction. A better understanding of pupillary responses and gain-control in the central field will improve disease detection.

**AIMS/QUESTION:** To quantify the changes in pupillary responses across the visual field caused by simulated reductions in central visual field sensitivity.

**METHODS:** Twelve 80 s mfPOP stimulus variants were presented to 24 normal subjects aged  $23.2 \pm 2.9$  years. Test-region luminances of macular ( $\pm 10.4^\circ$ ) and wide-field ( $\pm 30^\circ$ ) stimulus layouts were reduced by either 50% or 100% to simulate diffuse or dense retinal lesions of 1-6 mm. Response waveforms were estimated and linear regression performed to assess differences in standardised constriction amplitudes (AmpStd) between test-regions with normal and reduced luminance.

**RESULTS:** Significant ( $p < 0.005$ ) reductions in constriction amplitudes were seen in all test-regions where luminance was reduced by 100%, with the exception of the 1 mm ( $\pm 1.7^\circ$ ) simulated scotoma in the 1-6.5° central test-regions of the wide-field stimulus layout. Where the scotoma didn't exclude the entire test region, or luminance was reduced by 50%, results were mixed. Mean AmpStd in the dense scotoma test-regions was 1.2  $\mu$ m, range [-12.1 13.8] and somewhat larger in the diffuse regions: 24.4  $\mu$ m [4.5 45.0]. Mean for normal test-regions was 39.8  $\mu$ m [19.1 69.2].

**CONCLUSION:** Reduced constriction amplitudes were observed that were consistent with level of simulated dysfunction but should be considered in the context of pupillary-gain.

**SIGNIFICANCE:** These results will allow more accurate estimation of function in retinal disease.

## 69. Mechanism of immune dysregulation conferred by mutations in NFKB2

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**INTRODUCTION:** NF-kappaB transcription factors play an integral role in development of an effective immune system. NFKB2 encodes p100, a precursor protein which must be processed via the proteasome to its active DNA-binding form p52. Our lab co-discovered a novel primary immunodeficiency characterised by mature B cell deficiency with hypogammaglobulinemia, alopecia and recurrent infections. Whole exome sequencing revealed a heterozygous missense mutation in NFKB2. This study aims to elucidate the variable B cell defects observed across human NFKB2 mutations. We hypothesised they are due to differences in the abundance of noncanonical NF-kappaB proteins p100/p52 and RelB.

**METHODS:** Flow cytometry and western blot protein analysis was performed on splenocytes from a murine NFKB2 allelic series and RelB-deficient mouse line. Cellular and biochemical phenotypes were compared to determine the contribution of noncanonical NF-kappaB proteins to B cell development. Co-immunoprecipitation was used to investigate changes in binding of p100 and RelB.

**RESULTS:** Mutations in p100 confer variable defects in processing of p100 to p52. These mutations reduce phosphorylation of p100 and encourage formation of the kappaBsome. The kappaBsome is a multi-protein complex which inhibits noncanonical NF-kappaB signalling by keeping proteins in the cytoplasm. Reduced signalling via p52 confers a decrease in mature splenic B cells. Increased kappaBsome formation leads to developmental arrest at the CD93+ transitional B cell stage and decreased expression of CD21 on mature B cells.

**CONCLUSION:** Our results suggest that faulty p100 processing changes the abundance of multiple NF-kappaB factors which each contribute to distinct abnormalities in B cell development.

## 70. The role of IRF4 in the development of regulatory T cells

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**INTRODUCTION:** Interferon regulatory factor 4 (IRF4) is a crucial transcription factor with essential functions in different effector T cells. Regulatory T cells (Tregs) are a specialized subpopulation of T cells which suppress immune responses to maintain homeostasis and self-tolerance.

**AIMS/QUESTION:** Can a gain of function (GOF) mutation in IRF4 alter differentiation into Tregs?

**Methods:** In vitro T cell differentiation assays to generate different Th cell subsets from naïve T cells of wild-type (WT), GOF-IRF4 mutant (Irf4<sup>pt/pt</sup>) and IRF4 deficient (Irf4<sup>-/-</sup>) mice.

**RESULTS:** Naïve T cells with a homozygous GOF mutation in IRF4 show increased differentiation into IL4-producing Th2 cells and reduced differentiation into Tregs contrasting with the findings in IRF4 deficient T cells. Interestingly, the Treg reduction in IRF4 GOF T cells can be reversed by adding anti-IL4 to the Treg cell culture and conversely, adding IL4 to WT Treg cultures reduces the differentiation into Tregs.

**CONCLUSION:** These findings indicate that IRF4 regulates Treg differentiation in an IL4-dependent manner. Ongoing work is focusing on the suppressive capacity of these Treg cell population in vitro and in vivo.

**SIGNIFICANCE:** These results demonstrate a previously unknown role of IL4 on the differentiation of Tregs and how IRF4 can alter the cytokine profile of different T helper cell subsets.

## 71. MTREC complex and its role in RNA surveillance

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**INTRODUCTION:** Eukaryotic genomes are pervasively transcribed. However, these pervasive transcripts such as cryptic unstable transcripts (CUTs) are rapidly degraded by the RNA surveillance machinery. The molecular mechanism of the selective recognition and degradation of these transcripts is not well understood. In *Schizosaccharomyces pombe* the evolutionarily-conserved 11-subunit MTREC complex is responsible for detecting CUTs and aberrant mRNAs and targeting them to the nuclear exosome for degradation. But the mechanism by which MTREC complex is recruited to different subclasses of CUTs is not understood and forms the central question of my thesis titled MTREC complex and its role in RNA surveillance.

**METHODS:** To learn more about the biochemical composition of MTREC complex, I use tandem affinity purifications followed by mass spectrometry analysis. RNA expression analysis is done through RT-PCRs and RNA-seq. MTREC complex has been shown to have 5 sub-modules. To further characterise the individual contributions of *S.pombe* MTREC complex sub-modules I make point mutations that disrupt specific interactions, enabling mapping of the genome-wide RNA-protein interactions of individual MTREC complex subunits through in vivo cross-linking and cDNA analysis (CRAC).

**RESULTS:** Mass spectrometry analysis reveals the proper integration of the interaction mutant. RNA-seq. data showed a stabilisation of meiotic mRNAs and CUTs in the MTREC mutants compared to the wild type, demonstrating that each submodule plays a crucial role in the surveillance of RNA transcripts.

**CONCLUSION:** The role of MTREC complex in RNA surveillance is becoming increasingly clear. Each submodule plays role in selective recognition and targeting of these transcripts for degradation.

## 72. Uncovering the genetic basis of IgG4-related disease: role of a rare variant in the A20 pathway

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**INTRODUCTION:** IgG4-related disease (IgG4-RD) is an immune-mediated condition of unknown aetiology characterised by systemic fibroinflammatory lesions. Approximately 60% of patients have increased serum IgG4 and IgG4+ plasma cells in the lesions which typically affect pancreatic and salivary gland tissue. Recently, the expansion of T-follicular helper (Tfh) cells has been associated with disease. To date, gene variants that contribute to IgG4-RD in humans have not been identified. Advances in next generation sequencing enable identification of previously undetectable disease-associated nucleotide variants. Characterising pathogenic effects of variants can unveil the molecular pathways involved, leading to targeted therapies. Through whole exome sequencing we identified a rare genetic variant within the A20-pathway in a proband with IgG4-RD. We investigated the consequence of this mutation in vivo to determine its involvement in pathogenesis.

**METHODS:** The mutation's impact on lymphoid cell distribution was investigated via flow cytometry of splenocytes from CRISPR/Cas9-edited mice carrying the orthologous variant. Enzyme-linked immunosorbent assay was performed on mice sera to determine serological abnormalities, and histopathology was assessed following haematoxylin and eosin staining of exocrine tissues.

**RESULTS:** Homozygous mutant mice had increased frequencies of plasma cells, Tfh cells, germinal center and switched-memory B cells compared to wildtype littermates. The mutant mice also had increased serum antinuclear antibody and IgG titres, and exhibited inflammatory foci in salivary glands consistent with the proband's disease.

**CONCLUSION & SIGNIFICANCE:** We provide evidence that a rare variant identified in a proband with IgG4-RD, causes hallmarks of disease in mice. Further studies into the mechanism through which this variant drives pathogenesis could help tailor pathway-specific therapies for patient subgroups.

### 73. Disruption of XPO1-mediated nuclear export inhibits respiratory syncytial virus (RSV) replication in vitro

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**INTRODUCTION:** RSV is a leading cause of hospitalization due to acute lower respiratory infection especially in infants and young children. Currently available options (Palivizumab and Ribavirin) for preventing and treating RSV are limited to select populations in high-resource settings (WHO, 2017). Obligate parasites such as viruses subvert host proteins for completion of viral lifecycles and are potentially a viable target with high efficacy against a range of viruses that are dependent on the same viral proteins. The nuclear exporter protein, Exportin-1 (XPO1 or CRM1) is the sole protein that mediates the transit of nearly 200 protein and RNA molecules across the nuclear membrane into the cytoplasm. The aim of this study was to characterize the efficacy of specific XPO1 inhibitors against RSV and screen selected plant extracts for possible anti-RSV and anti-XPO1 activity.

**METHODS:** Western blotting to analyse protein expression; immunoplaque assays to determine viral titre; live-cell confocal imaging to image transfected cells; confocal microscopy to analyse subcellular localization of viral proteins; and LDH-assay to determine cytotoxicity.

**RESULTS:** Treatment with KPT 335 had the following effects: (1) significant reduction in the amount of XPO1 in the treated cells, (2) statistically significant retention of NES-carrying proteins in the nucleus of the treated cells, and (3) significantly reduced RSV replication in a dose- and time-dependent manner. The cytotoxicity and antiviral efficacy of Valtrate, Acetoxychavicol acetate, Plumbagin, Piperlongumine, Curcumin, 18-beta-glycyrrhetic acid and Thymoquinone, were determined.

**CONCLUSIONS:** Treatment with SINE compounds had a selective effect on XPO1 and on the downstream pathways regulated by the transporter. In contrast the plant-derived XPO1 inhibitors are likely to have a broad range of effects on more than one pathway, with XPO1 being one of their targets. This research provides a pipeline of candidates for future drug development.

### 74. Stac3 SH3 domains mediate interaction with skeletal muscle ryanodine receptor, which is abolished with a myopathy-associated mutation

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Generation of skeletal muscle contraction in response to neural instructions is mediated by excitation contraction coupling (ECC). Changes in the membrane potential of the muscle cell are coupled to Ca<sup>2+</sup> release from the sarcoplasmic reticulum (SR) via Ca<sup>2+</sup> channels embedded in the plasma and SR membranes (Cav1.1 and RyR1 respectively). However, Cav1.1 and RyR1 are not coupled by direct interactions between the proteins, suggesting an additional component of ECC transmits the conformational changes of Cav1.1 to RyR1. Recently, an adaptor protein, Stac3, was implicated in ECC, and mutations of this protein (including S280N in a myopathy identified in New Zealand) provoke diminished ECC and a range of pathologies in patients (including muscle weakness and malignant hyperthermia susceptibility). Stac3 is composed of two SH3 domains, a cysteine-rich domain and a poly-glutamate domain, and the SH3 domains are known to interact with Cav1.1. However, no data has yet detailed a complementary association with RyR1. Thus, it remains unclear if Stac3 is the portended 'missing link'. Our work exploited a suite of biophysical and electrophysiological approaches, exposing the interaction of Stac3 with RyR1. This interaction was demonstrated to be primarily mediated through the first SH3 domain, but was augmented in the presence of the second. Furthermore, the S280N mutation destabilised Stac3 and diminished its activation of RyR1. Therefore, we are the first to propose Stac3 interacts with RyR1 to mediate its coupling to Cav1.1, and suggest the disruption of this interaction with a pathological mutation contributes to the development of associated myopathies.

## 75. Novel cause of monogenic lupus illuminates disease pathogenesis

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**INTRODUCTION:** Systemic lupus erythematosus (SLE) is a chronic autoimmune disease of uncertain aetiology and a well-established genetic basis. Females are nine times more likely to be affected than males. SLE is thought to be polygenic, although an increasing number of monogenic causes are being described. To date, there is no cure for this disease and current treatments often fail to treat the most serious manifestations. Better understanding of disease pathogenesis is critical for identification of more effective therapies.

**METHOD:** We have performed whole genome sequencing of probands with severe childhood-onset disease and have identified a novel cause of monogenic SLE. After identifying a de novo mutation in a proband, we subsequently identified additional SLE patients with damaging variants in the same gene. Using CRISPR/cas9 we have generated a mouse model carrying the orthologous de novo variant.

**RESULTS:** These mice develop lupus-like disease with an increased female to male bias. Disease and cellular manifestations include ANAs, thrombocytopenia, splenomegaly, increased Tfh cells, spontaneous germinal centres, activated CD4 and CD8 T cells, reduced marginal zone B cells and B1a cells, and accumulation of plasmablasts. We have also identified an epistatic interaction between the de novo variant and a second rare variant present in the proband and validated this in mice: mice carrying both human variants develop a more severe phenotype.

**CONCLUSION:** Insights into the mechanism underpinning lupus development will be presented.

**SIGNIFICANCE:** These discoveries and bespoke mouse models of human lupus provide an opportunity to trial targeted therapies that may be effective in the patients.

## 76. Exploring cellular mechanisms underlying Autism Spectrum Disorder during a critical period of brain development

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After being linked to a number of neurodevelopmental pathologies, we investigated the developmental changes to the activity and expression of a neurokinin receptor throughout early postnatal development in the striatal cholinergic system. It was hypothesised that there would be differences in the expression and activity of the receptor between postnatal day 6 and postnatal day 30. We utilised in vitro electrophysiology, pharmacology, immunohistochemistry, and calcium imaging to explore this premise. We found that expression of the receptor was different across many postnatal developmental stages in the striatum. Moreover, agonist application resulted in altered expression of the receptor, with different effects found at different stages of development. Moreover, the effects of pharmacological manipulation upon activity were more evident in early postnatal stages, with increases in spontaneous firing rate, spike kinetics, and calcium activity more prominent within this age group. These results aid us in better understand the pathophysiology of neurodevelopmental disorders.



## 77. Gut microbiome analysis in Crohn's disease patients using 16s rRNA sequencing

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**INTRODUCTION:** We recently showed that the initial Crohn's disease (CD) lesion, the aphthous ulcer (AU), does not lack bacterial diversity. Aphthous ulcers overlie the follicle associated epithelium (e.g. Peyer's patches [PP]). Lack of gut bacterial diversity ('dysbiosis') is associated with more advanced CD tissues. In our initial study, we used DNA as the template for microbial community analysis, but cDNA provides a proxy for viable bacteria, and so we use this here.

**AIMS:** To determine whether or not viable microbial communities of aphthous ulcers differ to that of Peyer's patches.

**METHODS:** We obtained aphthous ulcers and adjacent mucosa from CD patients, and Peyer's patches and adjacent mucosa from controls. We reverse transcribed RNA into cDNA and prepared a 16SrRNA gene sequencing library using the Illumina Miseq platform. The raw data (fastq files) were processed and analysed using the open source bioinformatics software, Mothur V.1.40.4.

**RESULTS:** In CD samples, we observed an increased abundance of Proteobacteria, which is consistent with many other findings of CD microbiome studies. In contrast to the previous study, PP samples were found to be more homogenous than AU samples.

**CONCLUSION:** Our findings differ from our earlier study, this may be due to using cDNA for this study or that we need to analyse more samples

**SIGNIFICANCE:** We are characterizing the viable microbial communities of the initial CD lesion, which may assist in finding a bacterial trigger of CD.

## 78. Phenotypic characterisation of two divergent sub-strains of NODk mice with varied diabetes penetrance

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**INTRODUCTION:** NODk compared to NOD (non-obese diabetic) mice carry a low risk H2k-MHC haplotype for autoimmunity, making it type 1 diabetes (T1D) resistant. Two NODk sub-strains differ in their type 2 diabetes (T2D) susceptibility with high-fat (HF) feeding: O-NODk mice are T2D-prone; whereas RF-NODk mice (a refreshed sub-strain derived from backcrossing onto NOD/Lt mice) are T2D-resistant.

**AIM:** To characterise the phenotype of the two NODk mice strains, focusing on time-course to diabetes development, pancreatic histology features and islet  $\beta$ -cell function.

**METHODS:** From weaning until 8-24 weeks of age, O-NODk and RF-NODk male mice were fed normal-chow (NC, 5% fat) or HF-diet (24% fat). Serial measures of body weight and non-fasted blood glucose were performed. Mice were sacrificed at 8-weeks for in-vitro glucose-stimulated insulin secretion (GSIS) or at 24-weeks for blood chemistry and histological analysis of the pancreas.

**RESULTS:** HF-fed O-NODk mice developed accelerated weight gain and severe hyperglycaemia, while RF-NODk maintained normoglycaemia. Only HF-fed O-NODk mice developed abnormal glucose tolerance with marked basal hyperinsulinaemia. GSIS was elevated in HF-fed O-NODk compared to RF-NODk at 16mM glucose with both, fatty-acids ( $5.4 \pm 0.5$  vs  $4.0 \pm 0.2$ , respectively,  $p < 0.001$ ) and IBMX-stimulation ( $6.6 \pm 0.5$  vs  $4.85 \pm 0.2$ , respectively,  $p < 0.01$ ). Histological analysis revealed no pancreatic insulinitis in any group, but lipid deposits and some sites of perivascular inflammation were seen in the HF-fed mice of both sub-strains.

**CONCLUSION:** T2D-prone O-NODk mice have enhanced insulin secretion prior to T2D development, compared to T2D-resistant RF-NODk mice. Mechanisms involved in insulin hypersecretion and its relevance to diabetes pathogenesis warrant further investigation.

**SIGNIFICANCE:** Therapeutic agents promoting reduction in islet hyper-responsiveness may have benefits effects in T2D prevention.



## 79. Towards objective testing in Parkinson's disease: a systematic literature review of postural sway assessment

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**INTRODUCTION:** Parkinson's disease (PD) is associated with increased mortality and reduced quality of life. There is currently no accurate objective measure for use in diagnosis or assessment of severity. Analysis of postural sway may help in this regard.

**AIMS/QUESTION:** To determine which features of postural sway best differentiate patients from controls, and if experimental conditions affect this.

**METHODS:** Five databases were searched for articles that examined postural sway in both PD patients and controls. An effect size (ES) was derived for every feature reported in each article, which was then tabulated against how many experiments it was used in, data sampling rate, and experimental conditions.

**RESULTS:** 441 papers were initially retrieved, of which 31 met the requirements for analysis. The most commonly-used features were not the most effective (e.g. the most common feature, PathLength, had an ES of  $0.47 \pm 0.14$ . The least common feature, TotalEnergy, had an ES of  $1.78 \pm 0.66$ ). Decreased sampling rate was associated with decreased ES (e.g. ES of PathLength lowered from 1.12 at 100 Hz to 0.40 at 10 Hz). Being off medication was associated with increased ES (e.g. ES of PathLength was 0.21 on medication, and 0.83 off medication).

**CONCLUSIONS:** Some measures of postural sway are better able to distinguish PD patients from controls than others, and can be enhanced by using a higher sampling rate and studying patients off medication.

**SIGNIFICANCE:** These results will inform future studies looking at postural sway in PD and contribute to the aim of finding an objective marker of the disease.

## 80. A novel murine model of chronic lymphocytic leukaemia with a heterozygous point mutation in the IRF4 DNA binding domain

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**INTRODUCTION:** Chronic lymphocytic leukaemia (CLL) composes a third of leukaemia cases. The pathogenesis of CLL is diverse and includes many different driver mutations. One gene mutated in a subset of patients is the transcription factor (TF) IRF4. Although IRF4 and CLL are associated with each other, the mechanism of this association remains unclear. Although many drugs have been developed to improve patients' survival, CLL has no curative treatment in most cases. A key challenge in the field is the development of relevant mouse models that can be used for the development of new drugs and new treatment strategies. Here we describe a novel CLL mouse model with a heterozygous point mutation in the IRF4 DNA binding domain (Irf4point/+). IRF4 is a key transcription factor for B cell, T cells and macrophages.

**AIM:** Description of a new murine model for CLL.

**METHODS:** Characterization of CLL development in Irf4point/+ mice.

**RESULTS:** Irf4point/+ mice develop CLL with a median onset of 180 days. Median survival is 417days, replicating the long indolent phase observed in human CLL. 2 out of 4 mice tested showed increased expression of BCL2, replicating the heterogeneity of phenotypes observed in human patients.

**CONCLUSION:** We demonstrate the causal role for a GOF variant in IRF4 in the development of CLL. This is the first mouse model for CLL based on a single point mutation in a transcription factor and mimics many findings of human patients. Our new model will allow the development and evaluation of new drugs.

## 81. Physical activity and risk of behavioural and mental health disorders in kindergarten children

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**INTRODUCTION:** Physical activity can lessen the burden of some chronic diseases, and increased activity has been associated with lower rates of some mental health disorders, although information is inconsistent for younger children.

**AIMS:** To estimate the association between physical activity and risk of behavioural and mental health disorders in early childhood.

**METHODS:** Descriptive statistics and logistic regression analysis of the 2014–2016 Kindergarten Health Check (KHC), an annual screen of all children enrolled in their first year of primary education in the ACT.

**RESULTS:** 15,040 (90.3 % of all enrolled) children completed the KHC during 2014–2016. 8,340 (61.7%) met physical activity targets and 709 (4.8%) were at clinically significant risk of behavioural and mental health disorders. Predictors for risk of behavioural and mental health disorders were Aboriginal and Torres Strait Islander status (OR 2.73, 95% CI 1.79–4.17), relative socioeconomic disadvantage (quintile 1 vs quintile 5, OR 1.87, 95% CI 1.39–2.51), and male sex (OR 1.78, 95% CI 1.48–2.15). Average daily exercise was not significant, despite the highest levels of physical activity being reported in boys, Aboriginal and Torres Strait Islander children, and those from more disadvantaged areas.

**CONCLUSION:** Aboriginal and Torres Strait Islander children, boys, and children from the most disadvantaged socioeconomic group were at greatest risk of clinically significant behavioural and mental health problems, despite having the highest levels of reported physical activity.

**SIGNIFICANCE:** Physical activity is important for preventive health but interventions focussed on addressing inequalities rather than healthy lifestyles may have a greater impact on children's wellbeing.

## 82. Preventing hospital acquired urinary tract infections in rehabilitation

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**INTRODUCTION:** ACT Health's Quality Strategy 2018-2028 identifies safety as a priority area calling for a reduction in hospital acquired infections (HAI). The Independent Hospital Pricing Authority estimates that in Australian hospitals 8.6% of total episode costs can be attributed to HAI. Patient experience can be significantly impacted with a HAUTI, which often adds to pain, confusion, additional antibiotic use and an associated increased LOS estimated at 1-4 days. Baseline data indicated that the rehabilitation ward (CHS) had a HAUTI rate of 11% (n=31) for 2017. Could a multidisciplinary project team decrease HAUTI rate in rehabilitation utilising an improvement science approach?

**AIM/QUESTION:** Reduce the incidence of HAUTI in the Rehabilitation ward at CHS from an average of 11% to <7% by March 2019

**METHODS:** Improvement science methodologies were utilised with rapid tests of change PDSA's. Implementation of data monitoring tools, catheter maintenance bundle, new products, safety calendar and peri-care nurse education over 1 yr.

### RESULTS:

- HAUTI decreased from 11% to 4%
- 98% compliance with Catheter maintenance bundle
- Projected savings per annum \$122, 000 and up to 80 bed days

**CONCLUSION:** Improvement Science methodology is an effective approach to improvement in rehabilitation nursing practice.

Education and process change in nursing practice is an effective strategy to decrease HAUTI's in rehabilitation.

**SIGNIFICANCE:** Decreased HAUTI's results in cost and bed day savings. Clinical policy and procedure regarding catheter maintenance bundle and nurse education are effective strategies for decreasing HAUTI's in rehabilitation. Data on nurse sensitive patient safety indicators should be routinely provided to nurses on the ward to inform process improvement.

83. This poster has been withdrawn

## 84. Assessing for obstructive sleep apnoea in a publicly-funded obesity management service

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**Introduction:** Obesity is the main driver for obstructive sleep apnoea (OSA), with the incidence in severe obesity reported to be as high as 78%. OSA negatively impact on health and quality of life. Timely diagnosis and management are crucial.

**Aims:** This study quantifies the prevalence of OSA, PSG referrals rates and prevalence of new OSA diagnoses.

**Methods:** A retrospective observational study was performed on new patients from July 2016 to June 2017. Prevalence of pre-existing OSA was collated along with PSG referral rates and new OSA diagnoses. Epworth Sleepiness Scale (ESS) scores were compared using simple descriptive analyses.

**Results:** Of 162 patients, 27% had a pre-existing diagnosis of OSA. A further 37% were referred for PSG following physician assessment. 53 underwent PSG and 46 (86.7%) received a new OSA diagnosis with 7 declining PSG. Obesity hypoventilation syndrome (OHS) was detected in 17%. Therapy was commenced in 36/46 (78%) for OSA, but 10/36 (28%) subsequently ceased therapy. Mean ESS score pre-PSG was 8/24 and at 12 months post-PSG was 6/24. Compared to previous data, PSG referrals increased from 11% to 37% whilst new OSA diagnoses remained similar.

**Conclusions:** The minimum OSA prevalence in our cohort is 55%. The increased rate of PSG referrals suggests that our service now has a higher level of suspicion for co-morbid OSA. The prevalence of pre-existing OSA along with the new diagnoses has led to OSA being the most common co-morbidity in our cohort.

**Significance:** OSA remain unrecognised in other healthcare settings. This highlights in the importance of OSA screening in obesity services.

## 85. Audit of the utilisation of and compliance with the “open packet/insert straw” diet code across Nepean Hospital.

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**INTRODUCTION:** The “open packet/insert straw” diet code was designed to help increase food accessibility via opening packages for patients.

**AIM:** To audit the identification, utilisation, and compliance of the “open packet/insert straw” diet code in order to provide improved food and fluid access to patients.

**METHODS:** This was a mixed-methods, cross-sectional study at Nepean Hospital (NSW, Australia) during March 2019. Quantitative data was collected by observational audit; while qualitative data was obtained via focus groups with food service staff and surveys of ward clerks, nurse unit managers, and clinical nurse educators. Descriptive analysis was performed for categorical variables via Microsoft Excel. Responses from focus groups and open-ended questions from surveys were analysed by researchers.

**RESULTS:** The “open packet/insert straw” code was utilised in approximately 8% of patients in Nepean Hospital. A total of 744 meals were audited. Among 436 (58.6%) meals, food service staff were unable to provide assistance during meal delivery due to various unavoidable barriers (e.g. patient asleep, patient rejected help). Of the 308 meals audited for compliance by food service staff, compliance of the “open packet/insert straw” code was determined to be 48.4%.

**CONCLUSION:** Low utilisation of the diet code, suboptimal identification of need for meal assistance, and poor clarity of staff roles and responsibilities were the main findings.

**SIGNIFICANCE:** This study highlighted the need for increased staff education, including development of a more extensive procedure to address roles of the multi-disciplinary team, and ongoing regular audits to monitor ongoing compliance to ensure patients receive optimal access to foods and fluids.

## 86. An innovative self-catering food service model in a mental health rehabilitation setting

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**INTRODUCTION:** A self-catering food service model was implemented within an adult mental health rehabilitation unit. This unique model allows consumers to prepare and cook their own meals using fresh ingredients and recipes delivered to a ward pod kitchen.

**AIMS/QUESTION:** The project aimed to assess the adequacy and acceptance of the model, within a quality improvement framework.

**METHODS:** Mixed methods were employed to assess:

- 1) Menu and recipe compliance with the ACI Standards for Consumers of Inpatient Mental Health Services (Standards),
- 2) 24 hour dietary intake recall and meal patterns analysis, and
- 3) Semi-structured interviews of stakeholders exploring the model by content analysis.

**RESULTS:** The model achieved 78% compliance with the Standards. Dietary intake data (n=4) was variable. Some consumers met, and exceeded, key nutrient recommendations (energy, protein, fat, sodium and vitamin C). Others did not achieve adequate intakes for important nutrients (fibre). Lunch was found to be mostly consumed outside of the unit, and breakfast frequently skipped. Emergent themes suggested consumers were satisfied with the model, practical support for the model was lacking, and evening meal recipes/instructions required clarity.

**CONCLUSION:** The self-catering model was well received, while opportunities to further enhance the model were illuminated. Recommendations for the next quality cycle phase are: provision of staffing assistance for consumers at breakfast and lunch, creation of user-friendly recipe cards, and modification of evening meals to cater for special dietary requirements.

**SIGNIFICANCE:** The authors believe this innovative model to be the first employed within an adult mental health rehabilitation setting that aims to holistically support nutritional outcomes and independent living skills acquisition.

## 87. Investigating the need for a diabetic diet in an inpatient rehabilitation setting

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**INTRODUCTION:** Diabetes is a prevalent co-morbidity in hospital inpatients. Historically, the restrictive “1800 kcal ADA diet” was prescribed for diabetes management in the hospital setting. Recent literature suggests that a more liberalised diet may reduce the risk of malnutrition in hospitals, especially for older patients.

**AIMS/QUESTION:** We investigated the extent to which a rehabilitation hospital general menu meets the needs of patients with diabetes, and facilitates self-management, using a mixed-methods approach. The menu was compared against two relevant hospital menu guidelines, meal ordering patterns (foods and key nutrients) of patients with diabetes (n= 7) were assessed, and meal services were observed to provide context to the meal ordering data.

**RESULTS:** The general menu achieved 85% compliance with the ACI Nutrition Standards for adult inpatients and 66% compliance with the ACI diabetes-higher energy guidelines. The average carbohydrate content of ordered main meals was high (breakfast 73g, lunch 64g, dinner 82g). All patients chose a low GI options at breakfast, however 71% also chose a high GI option. From meal service observations, several items’ serve sizes did not match the data available from the meal ordering system.

**CONCLUSION AND SIGNIFICANCE:** It is possible to meet the needs of patients with diabetes in a rehabilitation setting with a general menu. Recommendations to enhance nutrition outcomes for patients with diabetes in a rehabilitation setting include the development of resources to accompany patient meal ordering, inclusion of low GI and higher protein options at breakfast, and utilisation of the allied health assistant (AHA) workforce to deliver evidence-based education consistent with self-management and client centred care.

## 88. How effective is rescreening for multi-resistant organisms (MRO) in outpatient clinics?

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**INTRODUCTION:** CHS has a procedure for appropriate screening and management of patients identified with a multi-resistant organism (MRO). However, screening often does not occur once the patient is discharged. Over the past 2 years an informal arrangement with one outpatient clinic saw a number of patients rescreened, resulting in a cancelled or updated alert in their clinical profile. This program was expanded during the early part of 2019.

**AIM:** To increase the number of up-to-date MRO results across CHS to advise on patient bed allocation and isolation.

**METHODS:** Seven nursing led clinics (Vascular, Orthopaedics, Urology, Ear Nose and Throat, Fracture, Plastics and Oro-Maxillofacial) are involved. An outpatient MRO list is populated from the patient management system for the following week. The Infection Prevention and Control Unit compiles a pathology form for the appropriate screening to take place based on the MRO status of patient.

**RESULTS:** Over the trial period a total of approximately 800 patients attended an appointment where there was an opportunity to rescreen for the identified MROs. In the first 5 weeks, 22 patients were rescreened out of a potential 140 and their alerts updated. Based on national criteria, four patients are considered MRO free and their alerts have been closed.

**CONCLUSION:** The rescreening of MRO patients is effective across CHS and saw increase in the up-to-date results across the seven clinics.

**SIGNIFICANCE:** Screening of MRO patients provides up-to-date results that can inform nursing and medical staff on the most appropriate treatment for patients in regards to the isolation and treatment of their MRO.



## 89. Walking Aid Clinic: establishing a targeted walking aid prescription service in a clinic setting to improve community service accessibility

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**INTRODUCTION:** Referrals for mobility assessment and mobility aid prescription represent 40% of all domiciliary (home visit) physiotherapy referrals to Community Care Program Physiotherapy (CCPT). These referrals were routinely actioned with home visit appointments, which took 115 minutes of Physiotherapist's time. Patients were unable to access the prescribed walking aid on the day of assessment, increasing their risk falling. Allied Health Assistants (AHAs) in CCPT were not utilising their skillset in gait aid provision.

**AIMS/QUESTION:** Improvement of current service by instigating a Walking Aid Clinic (WAC).

Improve patient safety

**METHODS:** The WAC was proposed and trialled over a six month period. It was a 'one stop shop' clinic-based model, co-located with the Equipment Loan Service (ELS), where walking aids were available to loan at the time of the appointment. The WAC also utilised an AHA to provide the prescribed walking aid. The physiotherapist's time was measured pre and post implementation of the WAC to measure efficiency. A Patient Evaluation Survey was developed to measure satisfaction with the WAC.

**RESULTS:** Results showed a 39% reduction in the physiotherapist's time and high patient satisfaction with the service.

**CONCLUSION:** A clinic-based model for conducting mobility assessments and gait aid prescription is more efficient than providing individual home visits. Having both Physiotherapists and AHAs running the clinic better utilises AHAs skillset and further improves efficiency for the Physiotherapist. Patients were highly satisfied with this new service delivery model.

**SIGNIFICANCE:** The 'one stop shop' model enables patients to be assessed and provided with a mobility aid on the same day, improving safety and reducing falls risk.

## 90. Mealtimes Matter: the development of a pilot program for families of children with complex sensory-based feeding problems

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**INTRODUCTION:** Currently, the Child Development Service (CDS) offers assessment, referral and linkages for children aged 6 years and younger, which includes speech and occupational therapy. Children who require intervention are referred to a community-based NDIS partner. There are no dietetic services provided through the CDS. Children requiring dietetic support are often referred to Canberra Health Services without the benefit of an integrated interdisciplinary approach. This may limit the effectiveness of nutrition support for these families, since very often feeding problems result from complex sensory processing problems.

**OBJECTIVES:** To determine an evidenced-based interprofessional approach to assisting families with complex sensory-based feeding problems.

**METHODS:** A series of meetings and 'round table' discussions were held between dietitians from the Women, Youth and Children's Community Health Programs WYCCHP and the Canberra Hospital (TCH) nutrition teams with the aim to improve access to interprofessional services for families of children with complex sensory-based feeding problems. These meetings resulted in the development of a gap analysis and project brief outlining options for evidenced-based programs was developed. The Mealtimes Matter approach was chosen since it focusses on capacity building and empowering parents to become their child's 'therapist' within a supportive group setting. Together, the managers of the WYCCHP nutrition and CDS occupational therapy teams agreed on a collaboration for implementing the project. The project received funding under Allied Health Research Grants; implementation is currently underway.

**RESULTS & SIGNIFICANCE:** Preliminary results suggest that the majority of parents found the program helpful and useful. The Mealtimes Matter program has the potential to reduce the burden on Canberra Health Services.



## 91. caring@home resources: supporting quality outcomes for in home end of life care

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The majority of Australians say they would prefer to be cared for and, if possible, to die at home, however, more than 50% die in hospital. Many people, in the terminal stage, are admitted to in-patient facilities because their symptoms cannot be adequately controlled at home. Carers, when appropriately educated, are competent, can safely manage breakthrough symptoms using subcutaneous medicines and that in bereavement they reflect that they are pleased they assumed the role of quasi-professional carer.

caring@home, an Australian Government funded project, has produced resources for organisations, healthcare professionals and carers to support carers to help manage breakthrough palliative symptoms safely using subcutaneous medicines. caring@home resources, applicable to all jurisdictions in Australia, include:

- Guidelines for the handling of palliative care medicines in community services developed by NPS MedicineWise
- A template example policy and procedure for organisations to tailor and guide the operational implementation of the resources
- The palliMEDS app for prescribers
- Online education modules for nurses concerning training of carers
- A comprehensive caring@home package for carers that contains step-by-step guides, a diary, videos, a practice demonstration kit and a colour coded labelling system.

ACT is trialling the use of these resources currently within Home Based Palliative care team.

As part of providing anticipatory prescribing in a timely way this team began using an Emergency Medication Kit in 2012. Along with this kit many carers were taught how to give breakthroughs' the nurses had drawn up for them. Up until now there was no purpose made educational material and there was no consistent way of guiding carers through this process. After being involved in developing the educational material it was a natural conclusion to pilot the caring@home materials within the Home Based Palliative care team. As part of a QI project the team has been utilising the material for a month- the presentation will update the ACT on the current feedback regarding these materials.

## 92. An evidence-based definition of 'specialist' palliative care. Findings from a multidisciplinary Delphi study

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**INTRODUCTION:** There is at present no evidence-based definition or agreement about what constitutes specialist palliative care (as opposed to palliative care delivered by non-specialists). An agreed definition is needed to effectively determine the workforce required, their clinical skill mix, and to clarify roles and expectations to mitigate risks in not adequately providing services to patients with life-limiting conditions.

**AIM:** To develop a consensus-based definition of how specialist palliative care differs from that provided by non-specialists.

**METHODS:** A Delphi study, involving qualitative interviews and two questionnaire cycles. Thirty-one clinicians participated in interviews, with 27 completing questionnaires.

**RESULTS:** Consensus was gained on 75 items which define specialist palliative care and distinguish it from the work done by non-specialists. The final consensus definitions will be presented for both specialist and non-specialist palliative care, spotlighting expected and novel conceptualisations of practice.

**CONCLUSION:** The data suggest that referral to specialist palliative care be triggered when care needs are complex. This is, to our knowledge, the only evidence-based definition of specialist palliative care in existence, and it should be used to inform service organisation, workforce allocation and clinician/patient expectations.

# CHARM

**CANBERRA HEALTH**  
Annual Research Meeting



## E-POSTER PRESENTATIONS



## 1. Delivery and evaluation of the Music Engagement Program for people with Alzheimer's disease and dementia

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**INTRODUCTION:** Alzheimer's disease and dementia are prevalent conditions globally. People with Alzheimer's disease and dementia commonly experience mental health problems, negative emotional states, and behavioural disturbance. Music therapy has previously been used in this population to improve symptoms of mental health problems; however, there is a paucity of evidence-based programs that also explore positive outcomes such as overall quality of life, social outcomes, as well as the acceptability and sustainability of these programs.

**AIMS/QUESTION:** This project aims to evaluate the effectiveness of the specialised Music Engagement Program (MEP) in improving quality of life, wellbeing, and depression symptoms, in aged-care residents with Alzheimer's disease and dementia. The project also aims to determine how the MEP could be applied and maintained on a broader level throughout the aged-care community.

**METHODS:** The intervention took place over 8 weeks in an aged-care facility for people living with dementia in Canberra, Australia. Weekly 45-60-minute group singing sessions were led by a music facilitator.

**RESULTS:** The program was successfully delivered over 8 weeks, completed in April 2019. Interviews with staff and family members are currently being completed in May-June 2019.

**CONCLUSION:** This study can provide an indication of the feasibility of the MEP in enhancing the mental health and wellbeing of individuals with Alzheimer's disease and dementia.

**SIGNIFICANCE:** Audience members can learn about a specialised music program, and what effects it may have for an aged-care residential facility. This topic is highly relevant to the implementation of programs to enrich and improve mood, and quality of life of care home residents.

## 2. Gestational diabetes in the ACT: more and more

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**INTRODUCTION:** In 2015, the introduction of new diagnostic criteria for gestational diabetes mellitus (GDM) resulted in a 39% increase in women with GDM being referred to the CHS Diabetes in Pregnancy Service (CHSDIPS). In response, CHSDIPS adjusted its service delivery model, including dietitian only review after group education and increased insulin start sessions.

**AIM:** To examine ongoing trends in the numbers of GDM referrals to CHSDIPS, numbers needing insulin therapy and the characteristics of this cohort.

**METHODS:** Patient information is recorded on a tab in ACTPas attached to the patient appointment. A report of this data from 1 Jan 2017 to 31 March 2019 is analysed along with clinic lists to ascertain the number of women attending insulin start groups.

**RESULTS:** 807 women were referred to CHSDIPS in 2017 and 915 in 2018 (a 13% increase). In the first quarter of 2019 there were 315 referrals. Forty-five percent had a family history of diabetes, 16% had GDM in a prior pregnancy and 49% were started on insulin. The average BMI was 28 kg/m<sup>2</sup>. Diagnosis based on fasting BGL alone increased from 32% in 2017 to 36% in 2018.

**CONCLUSIONS:** The number of women referred to the CHSDIPS and consequently the number requiring insulin therapy continues to grow. Risk factors identified for these women are consistent with other GDM populations.

**SIGNIFICANCE:** While the CHSDIPS has improved the group education and review process, there has not been an increase in resourcing for the CHSDIPS. This study provides an update on the service demand and will assist with future planning.

### 3. On the path to group-based services: Canberra Hospital Adult Inpatient Eating Disorder Service

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**INTRODUCTION:** The implementation of a standardized pathway for adult inpatients with eating disorders addressed the complex medical and psychological factors of their care. Further enhancements to the program to ensure better integration of services, sustainability, ongoing education and training were required.

**AIMS/QUESTIONS:** We identified opportunities to improve our patients' health care experience and within an acute medical setting we targeted evidence-based approaches to actively engage our patients in their ongoing recovery.

**METHODS:** To increase access to holistic supportive care and break the social isolation within an acute setting, we commenced group-based lunches addressing supported weight increase via nursing supervision. Further, we introduced group therapy sessions using cognitive remediation training to improve practising distress tolerance skills with others. Sessions and services provided were evaluated by patients, based on the Maudsley Eating Disorder Service, and by nursing staff using a specifically designed questionnaire which included Likert scale and open ended questions.

**RESULTS:** Post session patient evaluations reported both group mealtimes and therapy sessions within an acute medical setting having positive impact on their perceived support to manage social isolation. Staff reported improved confidence to support patients and skill development associated with providing new model of group-based supportive care.

**CONCLUSION:** Providing opportunities to accommodate active engagement in a controlled environment aided further participation towards recovery and promoted social re-integration. Improved patient care experience also positively impacted staff involvement and promoted insight into their own skill development which can promote improved health care services and patient outcomes.

**SIGNIFICANCE:** Provision of structured specialised care is supporting active participation in recovery for this complex patient population.

### 4. The prevalence and nutrient composition of post-exercise supplements in certified recovery products

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Athletes are consuming sports supplements to promote recovery from intense exercise. However, there is conflicting evidence surrounding the benefits of recovery supplements consumed in periods post-exercise. This study aimed to identify the number and compositional characteristics of certified commercially-available products by 'Informed-Sport' based on manufacturers suggested consumption during "post- (exercise, workout or training)" periods. A systematic search of the product websites (n=739), identified 39 (5.3%) products to use the wording of "post" on either; 'front-of-label', 'product directions' or within the product website's description or instructions. Of these, 36 were identified as powders, 2 as bars and 1 as a gel product. The mean energy was 1453±282 (kJ/100g) for powders, 1553±217 (kJ/100g) for bars, and 478 (kJ/100g) for the gel product. By macronutrient, the highest average protein content were in powders (46.2±28.0/100g), while carbohydrates were most prevalent in bars (26.5±12.0/100g). In total, 25 of the 36 powdered products were protein based supplements. The most common 'other-ingredients' included glutamine (n=22) and leucine (n=20) across all products. Conclusively, powder-based products are the most prominent and most-marketed commercially-available certified as safe post-exercise recovery supplements. There is currently opportunity for development of certified post-exercise bars and gels to enhance recovery.

## 5. An analysis of the motivations of allies who aim for systemic change and collaboration with the consumer movement

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**INTRODUCTION:** Non-consumers can make contributions as allies to the mental health consumer movement.

**AIMS/ QUESTION:** The current study explores the motivations of allies, specifically on their motivations to collaborate with consumers and target systemic change when providing support.

**METHODS:** Semi-structured interviews were held with 11 participants identified as allies to the consumer movement. Interview data were examined using a synthesis of inductive and deductive thematic analysis.

**RESULTS:** The findings indicated the motivations of allies could be understood in relation to three themes: social justice values, witnessing support for consumers, and perceptions of valuable consumer contributions. Participants discussed no single primary motive, instead reporting a combination.

**CONCLUSION/SIGNIFICANCE:** The motives identified have implications for allies' involvement in and mobilisation with the consumer movement. Allies using their power and influence to make opportunities for consumer empowerment might improve mental health policy, services, and academia.

## 6. Effectiveness of thermal neurotomy (Simplicity vs monopolar perforaminal) for sacroiliac joint pain

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**INTRODUCTION:** Sacroiliac joint innervation remains an unknown quantity and hence the relevance of lateral branch thermal neurotomy to alleviate sacroiliac joint pain remains controversial.

**AIMS:** To compare the success rates of two techniques, Simplicity and monopolar perforaminal to denervate painful sacroiliac joints.

**METHODS:** This was a Retrospective Clinical Audit of prospectively gathered data at Capital Pain and Rehabilitation Clinic, Canberra, Australia of 96 thermal neurotomies in 73 patients with sacroiliac joint pain 2012-2017. After sacroiliac joint pain was diagnosed by dual-positive intra-articular fluoroscopic intra-articular injections. 41 patients underwent 47 monopolar perforaminal neurotomies and 32 underwent 49 Simplicity, with >12-month follow-up. The outcome measure was 'good to complete' change of >50% in Numerical Rating Scale of pain for >6 months.

**RESULTS:** Follow-up data was available for 80 (83%) of the 96 procedures. An overall success rate of >6months relief occurred in 69% of procedures (39% complete >75% relief and 30% good 50-75% relief) when both groups were combined. This reduced to 57% by worst-case analysis. The group-based success rates were 71% in the Simplicity group, 65% in the Standard group, with overlapping confidence intervals.

**CONCLUSION:** Thermal neurotomy techniques demonstrated a 69% success rate in reduction of sacroiliac joint pain for more than 6 months equally by Simplicity or perforaminal monopolar techniques.

**SIGNIFICANCE:** The innervation of the SIJ itself, as opposed to the posterior SIJ complex, remains uncertain. Until this is resolved case series such as this support a pragmatic option that will be helpful to many with a painful sacroiliac joint.

## 7. Thoracic zygapophysial joint thermal neurotomy: an additional prospective case series in a community practice

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**INTRODUCTION:** There are techniques for diagnosing thoracic zygapophysial joint pain, and it is feasible to undertake percutaneous thermal neurotomy of the medial branch nerves of such identified painful joints.

**AIMS:** Determine to what extent thermal neurotomy of thoracic zygapophysial medial branch nerves can provide useful pain relief.

**METHODS:** A retrospective audit of consecutive prospectively gathered data at Capital Pain and Rehabilitation Clinic, Canberra, Australia of patients with thoracic joint pain 2009-2018. This is an additional 10 years of data to that published earlier by the author [1]. The outcome measure was 'good to complete' change of >50% in Numerical Rating Scale of pain for >3 months. Results are presented as success rates. The thermal neurotomy was undertaken by a single practitioner at four target points for each medial branch nerve, after 2 positive diagnostic intra-articular blocks.

**RESULTS:** Of 54 complete data sets the success rate for >75% relief was 26% and for 50-75% relief for 3 months or more an additional 20% for the known outcomes, total success rate of 46% (36%-60%, 95%CI). The mean NRS pain change was 6.5 to 4.1 ( $p < 0.001$ ).

**CONCLUSION:** This additional consecutive case series continues an earlier case series to show that large numbers of patients with thoracic zygapophysial joint pain will obtain useful and often complete pain relief for neurotomy-concordant periods of time.

**SIGNIFICANCE:** This research supports the existing evidence regarding the use of thoracic zygapophysial joint thermal neurotomy to reduce nociceptive output in painful joints.

**REFERENCES:** Outcomes of percutaneous zygapophysial and sacroiliac joint neurotomy in a community setting. Speldewinde GC, Pain Med 2011; 12(2):209-18.

## 8. Sleep apnoea, vision loss and mortality

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A retrospective case series of 51 patients with non-arteritic ischaemic optic neuropathy (NAION) is offered, in which the prevalence of obstructive sleep apnoea (OSA) is an astonishing 94%.

Even more concerning, the prevalence of severe OSA in this group is 69%. The management implications of these findings are discussed, especially the six-fold increase in all-causes mortality attributable to untreated severe OSA. The overview of OSA which is provided also highlights the extent to which it remains an undiagnosed – and therefore untreated – global epidemic.



## 9. Does a maternal low FODMAP diet effect human milk oligosaccharide concentration?

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**INTRODUCTION/AIMS:** Human milk oligosaccharides (HMOs) play a key role in the establishment of the infant gut microbiome. Our aim was to determine the effect of a two-week maternal low FODMAP (LF) diet on the concentration of selected breastmilk oligosaccharides.

**METHOD:** Thirty mothers were randomised to either LF diet or a cow's milk and hen's egg free (CMP/Egg) diet for two-weeks. Eliminated foods were re-introduced ad libitum in the week following the intervention period. Breast milk samples were collected before, during and after the intervention period. The samples were analysed for changes in selected HMOs across the study period using high-performance liquid chromatography with tandem mass spectrometry.

**RESULTS:** A linear mixed model analysis was performed to determine changes in HMO concentration between diet groups. Interesting non-significant patterns of change were found between the diet groups. The most striking change was found for lactodifucotetraose (LDFT) ( $p=0.092$ ). For mothers in the LF group, LDFT concentration was reduced by 12.2% during the intervention period and increased sharply during the re-introduction of high FODMAP foods. For mothers in the CMP/Egg group, concentrations of LDFT remained stable during the intervention phase, and decreased during the re-introduction phase.

**CONCLUSION/SIGNIFICANCE:** The reduction in LDFT concentration in breast milk found here for the mothers consuming the LF diet may have the potential to modulate the infant gut microbiome and hence functionality since LDFT is a key bifidogenic HMO. Caution should be used when interpreting these findings due to the small sample size. More robust findings may be found in future studies with larger sample sizes.

## 10. Examining the association between cognitive life experience complexity and the rate of changes in cognitive function in late life

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**INTRODUCTION:** 15.7% of the Australian population is aged over 65. Ageing has an impact on the brain, hence age-related cognitive decline has increasingly attracted research attention. The challenge is to uncover factors that can influence the difference between normative and pathological cognitive decline. People with more cognitively demanding lifestyles have been shown to experience a lower rate of cognitive decline in late life.

**AIMS:** To investigate the impact of life complexity on the rate of change in cognitive abilities in late life.

**METHODS:** This presentation will focus on the theoretical underpinnings and preliminary findings of this project in progress. The analysis will focus on the relationship between variables related to current cognitive lifestyles, like leisure activities, and variables related to cognitive performance. Data from Alzheimer's Disease Neuroimaging Initiative are used for analysis in pathological decline. The collection of cognitive life experience variables will be dimensionally reduced with principal component analysis. The association is likely to be analysed with a type of linear model based on beta distribution. The effect of brain atrophy, cognitive reserve, and brain reserve will be controlled in the analysis of relationship.

**SIGNIFICANCE:** Potential findings may guide the further development of lifestyle interventions focusing on cognitive decline in late life. We will discuss the utility of examining the change of cognitive functions independently from the brain atrophy. This approach may assist in an ultimate goal of more accurately constructing dementia diagnosis based on cognitive performance.

## 11. Molecular and cellular role of RNA-binding proteins in cardiac biology and disease

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RNA binding proteins (RBPs) play a critical role in determining the fate of the cell through the post-transcriptional regulation of their interacting RNA. Several of these RBPs have been identified to be associated with pathological conditions such as neuropathies, metabolic disorders, muscular atrophy and cancer. The RNA interactome capture in cardiomyocytes identified hundreds of novel RBPs including calcium channel protein- sarco(endo)plasmic reticulum calcium ATPase 2a (SERCA2a) and various metabolic enzymes. Although remarkable experimental progress has been made in identifying the RBPs, the precise role played by them in (patho)physiology remains vague. For instance, RNA binding domain of SERCA2a when mutated, leads to the skin disorder known as Darier's disease. However, the interacting RNA substrate and the cellular repercussions caused when this interaction is affected has not yet been understood. Here we try to aim at closing this knowledge gap by identifying the interacting RNA of critical RBPs like SERCA2a, Aconitase, Isocitrate dehydrogenase and Malate dehydrogenase through approaches similar to UV crosslinking and immunoprecipitation followed by high-throughput sequencing. Unravelling RNA-RBP interaction networks can provide new insights into cardiomyocyte development, biology, and pathophysiology.

## 12. A novel method for detecting neutrophil extracellular traps

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**INTRODUCTION:** One of the most intriguing functions of Neutrophils is the production of Neutrophil Extracellular Traps (NETs), which are formed when neutrophils extrude DNA and cytotoxic proteins in a web-like structure. Whilst this process, known as NETosis, allows neutrophils to trap and kill pathogens, it has also been linked to multiple autoimmune and autoinflammatory disorders.

One issue in the study of NETs is the ability to consistently and accurately detect and quantify them. Many detection methods rely on microscopy, which is not optimal for large scale screening, or DNA detection, which can be non-specific. Recently, methods relying on detecting NET associated proteins with flow cytometry have been developed.

**METHODS:** Here we describe an innovative, quick and inexpensive flow cytometry method to detect DNA decondensation in cells. DNA decondensation and expansion is detectable with flow cytometry, using pulse-shape analysis. Cells normally contain highly condensed DNA, producing a high and narrow shaped fluorescent pulse, while decondensed DNA produces a wider and lower pulse.

**RESULTS:** Neutrophils produce a higher proportion of wide populations after stimulation with NET-inducing stimuli, consistent with the DNA decondensation expected during neutrophil NETosis. These populations were only observed in granulocytes, validating the specificity of this method.

**CONCLUSION:** Here we describe a promising, relatively inexpensive and unbiased method for detecting neutrophils undergoing NETosis. This method can be used in both mice and humans and thus, in future, may provide a useful diagnostic technique for NET related diseases.

### 13. Thyroid function in growing children; the Australian LOOK study

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Auto-immune thyroid disease is common in the first world. In a recent study of apparently healthy adults 18% of men and 34% of women had raised thyroid antibodies (Hickman et al, 2017). However, little is known about the development of, or significance of the presence of antibodies in children. We are undertaking longitudinal studies in children between the ages of 8 and 16 years of thyroid function and antibody concentrations in children who participated in the LOOK (lifestyle of our kids) study in the ACT. The study enrolled more than 850 8-year old children when commenced in 2005.

**METHODS:** All assays for TSH, fT4, anti-TPO and anti-TG were undertaken on the Abbot Architect. Samples had been stored at -80 deg C.

**RESULTS:** Median concentrations of TSH decreased from 1.84 mU/L for 8 year-old children to 1.68 for 16 year-olds with changes similar for boys and girls with 97.5 percentile varying between 3.8 and 4.2 over the 8 years. Median fT4 concentrations declined slightly over the same time (14.7 to 13.3 pg/L). Antibodies to both thyroid peroxidase (anti-TPO) and thyroglobulin (anti-TG) were detected in all participants by the age of 10 years.

**CONCLUSIONS:** The data suggest that TFT in growing children are different to those we have previously published for adults (median of 1.3 mU/L and 97.5 percentile of 3.3). However, these have not been adjusted for the presence of circulating antibodies.

### 14. The effects of dietary polyphenols on iron status and CVD risk markers – a systematic review

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Diet is identified as one of the most important factors associated with the development of cardiovascular disease (CVD) risk, and supplementation with dietary polyphenols may result in their suppression. Polyphenols, while possessing cardioprotective qualities, are proposed to reduce the amount of absorbed iron potentially increasing CVD risk markers. This systematic review assesses the relationship between polyphenol consumption, CVD risk markers and iron status. Following the PRISMA 2015 guidelines, searches were performed in five electronic databases (PubMed, Cochrane Library, SCOPUS, Web of Science and CINAHL). Only randomised, double-blind, placebo-controlled human trials that investigate the effects of polyphenol supplementation on inflammatory markers of CVD, and the consequent effect on iron absorption were included. A total of 1392 records were identified, with only 3 studies meeting the inclusion criteria. The studies included 280 participants and utilised a range of foods rich in variety of polyphenols (olive oil, bilberry juice, cherries).

The polyphenolic content (0.27-761 mg/100g) were provided between 28-91 days of treatment. All included studies assessed polyphenol intake on lipid profile, inflammatory markers and antioxidant properties, generally finding a significant positive effect ( $P < 0.05$ ). Major findings included an increase in HDL-C ( $p = 0.018$ ), while plasma CRP ( $p = 0.027$ ) and IL-6 ( $p = 0.037$ ) decreased. There were no changes in haemoglobin reported in any of the studies ( $p > 0.05$ ). Therefore, consumption of foods rich in polyphenols are of potentially valuable therapeutic benefit however larger, well controlled clinical trials are needed to address the role of polyphenols and iron in CVD development.

## 15. Quantum sensing of neuronal signals

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Measuring electromagnetic fields of neurons has been the hallmark of understanding modern neuroscience. Advances in this field can lead to practical means of diagnosing and treating a variety of neurological disorders. To achieve this the following problem must be addressed: how do we develop new technologies that can probe the nanoscopic electromagnetic fields of the neuron whilst reducing various forms of toxicity which kill the cell? We provide a novel technology for neuronal signal measurement with the application of the nitrogen vacancy centre (NV). The NV is an atomic level defect in diamond which has unique quantum properties that allow for highly sensitive measurements of neuronal electric and magnetic fields with nano-scale spatial resolution in a way which minimises toxic effects on the cells.

In our research we fabricated nanoscopic diamond pillars of varying geometries and neurons were cultured upon them. From this work, the ideal pillar geometry can be designed which maximises sensitivity, minimises phototoxicity and maximises growth. In conjunction with the growth experiment, we are developing a theoretical model which predicts the neuron electromagnetic fields. This work is useful as current models cannot predict the fields at a nanoscopic level. The models will help to optimise the nano-pillar design as well as provide insights into fundamental neuron electrophysiology.

This work provides a necessary analysis of the capacity of the NV centre to measure neuronal signals in a way that has unprecedented high levels of sensitivity, spatial resolution as well as low levels of cell toxicity. It potentially opens the door for a whole new understanding of neuronal signalling.

## 16. Mechanisms for PfCRT-induced hypersensitivity to quinoline dimers in the malaria parasite

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**INTRODUCTION:** In acquiring resistance to one drug, many pathogens and cancers become hypersensitive to other pharmacons. This phenomenon, known as 'collateral sensitivity', could be exploited to combat drug resistance and delay the emergence of resistance to new drugs. However, the mechanisms that underlie drug hypersensitivity in otherwise drug-resistant cells are unknown.

**RESULTS:** I will present mechanistic explanations for collateral drug sensitivities induced by mutations in the malaria parasite's chloroquine resistance transporter (PfCRT). Mutant PfCRT isoforms confer resistance to chloroquine (CQ) and related quinolines by transporting these drugs away from their targets. But these isoforms also increase parasite sensitivity to many structurally-diverse drugs, including quinine homodimers (Q2). The additional killing effect of the Q2 drugs in CQ-resistant parasites has been attributed to their potent inhibition of CQ-resistance-conferring isoforms of PfCRT (PfCRTCQR). That is, through their ability to bind extremely tightly to the substrate-binding site of PfCRTCQR, the Q2 drugs could block the normal function of PfCRT (which is essential for parasite survival) and thereby gain extra antiparasitic activity against CQ-resistant parasites.

**METHODS AND CONCLUSION:** We are undertaking both in vitro and in situ assays (the *Xenopus* oocyte expression system and parasite-based assays) to measure the ability of Q2 drugs to block the transport of PfCRT's natural substrates and thus establish whether PfCRT is itself a druggable target. Moreover, by examining the interactions of PfCRT with a new generation of Q2 drugs, as well as homodimers of hydroxyl-CQ and primaquine, we will uncover the properties that enable the Q2 drugs to exhibit heightened activities against CQ-resistant parasites.

## 17. Communication during cancer treatment: exploring the experiences of patients and oncology professionals

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A cancer diagnosis involves radical changes in a person's life. The concept of patient centred care (PCC) has evolved in the health care system to allow service users a 'voice' in their care and to enhance quality care for patients and their loved ones. Studies related to health care providers' communication needs have concluded that PCC can impact patient outcomes and is positively associated with PCC. Recent studies have shown that cancer patients report dissatisfaction and difficulty in their communication with their oncology professionals (OP).

It is important to have supportive and optimal communication for patients to make informed treatment choices that enhance their quality-of-life. Therefore, this study aimed to explore communication experiences between patients and OP during cancer treatment.

This study adopts a social constructionist worldview to understand the ways in which individuals make sense of their experiences. The study is at its preliminary stage and uses semi-structured interviews with cancer patients and OP's. Few of the topics explored were their pre-conceived notion of the disease, current notion of the disease, the communication process, information received, information platforms used, and support provided. By using reflexivity and thematic analysis the study has identified, at times lack of communication during treatment stage does happen and it has had some challenging affects.

Factors such as lack of time, and patient's vulnerable state of mind, contributes to the lack of communication during cancer treatment stage. By identifying kinds of factors that help or hinder quality communication during cancer treatment, this study hopes to contribute evidence to support the development of strategies to improve PCC.

## 18. Hidden figures

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**INTRODUCTION:** In 2018 Canberra Health Services collected a total of 18 337 blood culture samples. The number of contaminated blood cultures rates were below the national average of 3%. False positive blood cultures correspond to higher medical costs, unnecessary use of antibiotics, increase in length of stay which has the potential to cause economic impact on ACT Health Directorate.

**AIM:** To determine the actual cost of a blood culture from the time the decision is made to collect a blood culture to the point that a clinician has a positive or negative result.

**METHOD:** Collecting data on the cost of equipment to collect the blood culture, labour cost, increase length of stay as a result of the blood culture, laboratory equipment cost, data analysis as well as cost of antibiotics. Information for the costing's was collected from a number of sources.

**RESULTS:** False positives can result in costs of the health dollar in excess of one million dollars in any one year. However, blood cultures remain an effective diagnostic test for clinicians where a patient is suspected of having serious infections.

**CONCLUSION:** By reducing blood culture collections has the potential to reduce the burden to the healthcare dollar. Therefore, extensive education must be implemented as well as ensuring processes are standardised.

**SIGNIFICANCE:** Over a period of time once the blood cultures processes are standardised and education program is implemented then the contamination rate should decrease in turn making a saving of the health dollar.

## 19. Safety implications related to the prescription and administration of digital therapies

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**INTRODUCTION:** Patient safety implications are associated with the prescription and administration of digital therapies.

**AIM:** The familiar 'rights of medication administration' provides a useful framework to consider safe administration of digital therapies. For example, the right prescription and administration of the right digital therapy to the right person, for the right condition, with the right dose/ at the right time and, using the right (route) platform or device matched to the person's health, social and digital literacy status. The right evidence should guide digital health practice, ensuring that there are no adverse side effects, or unintended harms. Monitoring interactions to assess if the right effect (therapeutic outcome) has been achieved after administration.

**METHOD:** Our literature review indicated that human computer interaction (HCI) design elements of digital therapeutics are important considerations to enhance the safe administration of digital therapeutics.

**RESULTS:** Scientific understanding informs which platforms and devices are best suited to particular health conditions, age groups, developmental stages, digital literacy abilities and preferences. For example, font size, colours, text, image, animation, voice, accent, tone, and volume all play a role in the accurate administration of the dose of the therapeutic intervention. The screen experience of the user conveys the intervention dose and influences whether sufficient exposure, engagement or adherence to the intervention is likely to produce a therapeutic outcome.

**CONCLUSION:** Equipping health professionals to evaluate the efficacy and efficiencies of quality digital therapies are critical for advancing health care.

**SIGNIFICANCE:** Implementation of digital therapies in routine care should be based on evidence to support safe practice.



## 20. Clinell Anti-bacterial Hand Wipe trial – Ward 5B

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**INTRODUCTION:** Health care professionals are the main recipients of hand hygiene education, but patients also play a fundamental role in reducing the risk of infection acquisition and transmission whilst in hospital (Kuan-Sheng et al., 2013). This study trialled the use of Clinell Anti-microbial Hand Wipes on Ward 5B at Canberra Health Services, an acute teaching and tertiary referral hospital.

### AIMS:

1. Engage and empower patients to become active participants in ensuring safe care through hand hygiene.
2. Improve health care worker hand hygiene compliance through the inclusion of patients in the hand hygiene care process.

**METHODS:** The trial was conducted over a 12 day period with the assistance of the food services team. A total of 57 participants, and 7 non-participants; of which, three (3) individuals withheld participation consent in the trial period, and another four (4) participants were excluded due to comprehension and communication difficulty.

**RESULTS:** Clinell hand wipes were provided on patient meal trays to facilitate proper hand hygiene procedures prior to the meal. This trial demonstrated a positive outcome in infection prevention as patients were provided the means to fully participate in reducing health care associated infections, through their own hand-hygiene.

**CONCLUSION AND SIGNIFICANCE:** The trial concluded that providing education, products and promotional tools to directly engage patients in performing hand hygiene can create a culture that accepts and recognises the importance of patients own hand hygiene in the reduction of healthcare acquired infection.

## 21. A healthcare wearable for pulsed physiotherapy rehabilitation. Multidisciplinary design of smart clothes

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Some sub-health at a lower level requires physical therapy for alleviating the symptoms. 'Poor blood circulating' affects an increasingly broad segment of the people who have a sedentary lifestyle; a portable wearable instrument is needed to treat people for physical therapy to alleviate symptoms of lower limb arteriosclerosis or eliminate the pain. Wearable technologies offer promising benefits in the management of chronic diseases for someone who has problems moving or someone who wants do rehabilitation at home. This research proposes adopting a design anthropology perspective when considering the design of wearable smart clothes for the elderly. The research will analyse the different textile materials and at the same time, based on empathy, manufacture a wearable device to prevent hardening of the arteries for the people who have the problem of poor blood circulation. The research process is based on design anthropology and it is designed to create clothes in close collaboration with healthcare, textile design and electronics technology, which demonstrate the feasibility of the proposed solution.

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## WORKSHOPS

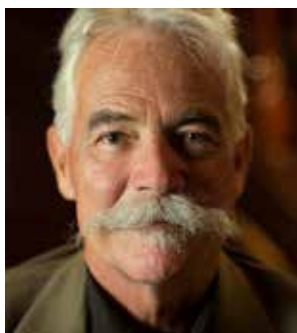




## Special workshop event Q&A with Professor Alan Mackay-Sim

Monday 29 July 2019, 2-4pm

Building 19, Conference Room 1, The Canberra Hospital



### Professor Alan Mackay-Sim

Professor Mackay-Sim will be running a **student workshop at CHARM**.

**Advanced project students and Medical Students Years 1-4** are encouraged to attend and spend time with this internationally renowned researcher. This is your chance to ask questions and connect with our distinguished guest. **Places are limited to 20.**

To register, email [preclinical.research@act.gov.au](mailto:preclinical.research@act.gov.au)  
Registration is essential as spaces are limited.

#### Publications

<https://www.ncbi.nlm.nih.gov/pubmed/30094183>  
<https://www.ncbi.nlm.nih.gov/pubmed/30065201>  
<https://www.ncbi.nlm.nih.gov/pubmed/27574816>

#### Web links

<https://www.youtube.com/watch?v=Y3l0WZOzvY>  
[https://www.youtube.com/watch?v=z\\_ywZ9qfwCE](https://www.youtube.com/watch?v=z_ywZ9qfwCE)  
<https://www.youtube.com/watch?v=C-NfQap31dU>

Professor Alan Mackay-Sim is the Professor Emeritus at Griffith Institute for Drug Discovery, Griffith University, Brisbane. Professor Mackay-Sim was the Australian of the Year in 2017 for his work in neuroscience and stem cell science.

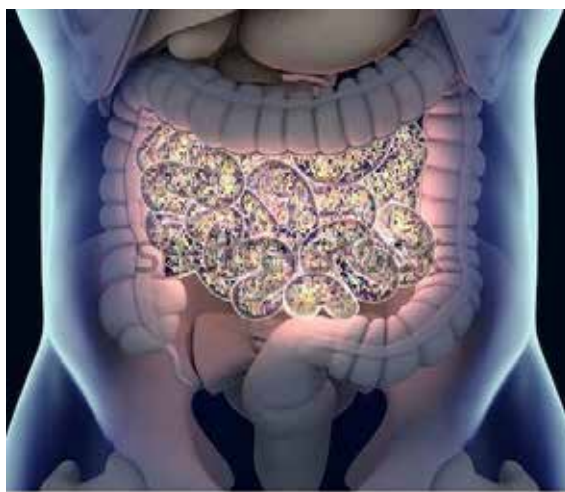
Professor Mackay-Sim's research career has focused on how the sensory neurons in the nose are replaced and regenerated from stem cells. He is a world leader in spinal cord injury research. He led the Brisbane team in a world-first clinical trial in which the patient's own olfactory cells were transplanted into their injured spinal cord in the first stages of a therapy to treat human paraplegia.

Professor Mackay-Sim established the National Centre for Adult Stem Cell Research in 2006. He developed an adult stem cell bank from over 300 people with different neurological conditions including schizophrenia, Parkinson's disease, mitochondrial mutation disorders, Hereditary Spastic Paraplegia, ataxia telangiectasia and motor neuron disease. These stem cells are used to identify the biological bases of neurological diseases using genomics, transcriptomics, proteomics and cell function assays and this work is leading to new drug therapies. In 2017 Professor Mackay-Sim received the Distinguished Achievement award from Australasian Neuroscience Society and in 2018 he was awarded the Neil Hamilton Fairley Medal by the Royal Australasian College of Physicians and the Royal College of Physicians (Lond) for Outstanding Contribution to Medicine.



## ACT Health invites you to the **Gut Microbiome Workshop**

Monday 29 July, 1-3pm, Canberra Hospital



Your gut microbiome is the community of trillions of microbes that inhabit your gastrointestinal tract. These microbes affect your response to medications, your weight, and your behavior, and have been implicated in numerous diseases, including diabetes, cancer, and the inflammatory bowel diseases.

In this workshop, gut microbiome expert, Dr Claire O'Brien from the Australian National University (ANU) will provide students with an understanding of the normal gut microbiome, and factors that dynamically change our microbiome, including diet and disease.

Following the workshop presentation, students will have the opportunity to visit one of the research laboratories at Canberra Hospital.

For more information on CHARM visit  
[health.act.gov.au/research/charm-2019](http://health.act.gov.au/research/charm-2019)



WE ARE PROUD TO BRING YOU

## **CHARM Heart Foundation Workshop**

# **Quality Improvement in Healthcare: Why it matters and global challenges**

**MONDAY 29TH JULY 2019**

**1 P.M. - 3 P.M.**

**THE CANBERRA HOSPITAL AUDITORIUM, LEVEL 2  
YAMBA DRIVE GARRAN ACT 2605**

### **PRESENTER:**

**Emma Thomas**, PhD student, Melbourne School of Population  
and Global Health, University of Melbourne and  
Senior Heart Health Coordinator, Heart Foundation

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ACT Health Directorate Chief Allied Health Office and University of Canberra Award for the Best Allied Health Oral Presentation

ACT Health Directorate Research Ethics Committee Award for the Best Higher Degree Research Presentation

Canberra Hospital Private Practice Fund Award for the Best Clinical Research Poster

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Prestantia Award for Palliative Care Research

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Australian Catholic University Award for the Best Nursing or Midwifery Research Poster

Australian Catholic University Award for the Best Nursing or Midwifery Research Oral Presentation

HARC award for the most Impactful Research Paper

CHARM 3 Minute Thesis Winner

Smartleasing Award for CHARM 3 Minute Thesis Second Place

Smartleasing Award for CHARM 3 Minute Thesis Third Place





## NOTES

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