USC RESEARCH SHOWCASE

12 JULY 2017

Partnering for health.
Information for attendees

Venue: Innovation Centre, USC
       90 Sippy Downs Drive, Sippy Downs

Parking: USC has paid parking from 8am – 6pm.
        Information regarding parking can be found at www.usc.edu.au/parking

Rise, and shine.
Welcome to the first University of the Sunshine Coast Research Showcase!

The creation of new knowledge is the most important function that universities play in our society. Research provides USC with an opportunity to create new knowledge that can benefit our society regionally, nationally and internationally – this should be self-evident after today’s showcase! Our performance in research is also critically important to USC’s reputation and standing both nationally and internationally.

Over the last few years, USC’s research portfolio and activities have significantly expanded on the back of many years of groundwork by long-term staff and strategic recruitments by the university. The impact of this growth is obvious with increases in student numbers, income and the range of research disciplines that are acknowledged at ‘world-class’ or ‘above world-class’ at our university.

In previous years, USC has hosted our annual ‘University Research Conference’ during the second week of July as a way to bring students, staff and the community together to raise awareness of the high quality research activities that occur throughout the university. In a good problem to have, it is no longer possible to feature all of these key USC research strengths in a single event.

The showcase planned for today is the natural evolution of the ‘University Research Conference’ and will be the first of a series of events that are designed to feature USC’s research activities across particular ‘themes’. While the size and content of these themes will vary, the generic aim is that these ‘themes’ will be multi-disciplinary and feature work that is making a significant impact on our society. In doing so, we hope that these events will provide an opportunity for:

• USC HDRs and ECRs to gain experience in communicating their research to an audience of discipline experts and ‘lay’ people
• established researchers to outline their research vision for the university in their discipline of expertise
• networking opportunities for researchers across all levels at USC
• engagement with relevant regional and national stakeholders in our areas of research strength at the university.

Thank you for supporting our first USC Research Showcase event. With you, I’m very much look forward to the opportunity to hear about USC’s research across our ever growing areas of research success.

Associate Professor Adam Polkinghorne
Chair, University Research Conference Academic Advisory Committee

Welcome to the USC Health Research Showcase for 2017. USC’s health research profile has continued to grow rapidly and we have many new researchers in the Faculty of Science, Health, Engineering and Education with a focus on Health Research. There is also an exciting space in which increasing numbers of researchers from the Faculty of Arts, Business and Law are bringing their unique contributions to health research.

The main focus of the day is the partnership model USC researchers have developed with researchers, clinicians and manufacturing, educational and health service industry partners. It is generally true in all disciplines that many heads are better than one and many hands make light work. Nowhere is this more important than in healthcare. These exciting presentations give a taste of the extensive programs of research, currently underway, that involve collaboration with a range of partners. The presentations will focus on Health Services, Health Outcomes, Technological Innovation and Translational Research.

A key challenge in the healthcare arena is the lag time between the development of new ideas and the trialing of new inventions (be they drugs, devices or models of service delivery) and the adoption of these new ideas into practice. In some cases, adoption of new technologies or health services can take 15-20 years – this is a major challenge for the 21st century. The key partnerships that are showcased here today are starting to build not only a hothouse for the development of new ideas but the pathways to allow earlier adoption.

I hope you all enjoy this Health Research Showcase and that you use the opportunity to celebrate USC’s successes and to network with other researchers. Most of all I hope the day inspires you and gives you lots of great ideas for your research.

Professor Marianne Wallis
Associate Dean (Health), Faculty of Science, Health, Education and Engineering
# Schedule

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| 9.30 – 9.35am | Welcome to Showcase and housekeeping  
*Associate Professor Adam Polkinghorne, Chair, University Research Conference Academic Advisory Group* |
| 9.35am – 12noon | Session 1: Partnering to improve health services  
*Chair: Professor Marion Gray* |
| 9.35 – 10.05am | Collaboration through health research to improve outcomes for acutely ill older adults – the CEDRIC Project  
*Professor Marianne Wallis* |
| 10.05 – 10.20am | The Queensland Health’s experience in provision of bone-anchored prostheses: the hidden treasure of health services and economic evaluations  
*Adjunct Professor Laurent Frossard* |
| 10.20 – 10.35am | Research that raises the voices of Aboriginal and Torres Strait Islander Health Practitioners  
*Ms Julie-Anne Martyne* |
| 10.35 – 11am | MORNING TEA |
| 11.00 – 11.15am | Nurse Practitioner improving primary care in residential aged care facilities: who pays?  
*Dr Alison Craswell* |
| 11.15 – 11.30am | Using simulation to enhance patient safety and improve quality health outcomes  
*Associate Professor Patrea Andersen* |
| 11.30 – 11.45am | Partnering to improve patient safety: applying systems thinking and human factors methods  
*Dr Natassia Goode* |
| 11.45am – 12noon | The self-reported behaviours and perceptions of Australian paramedics in relation to environmental hygiene in paramedic-led healthcare  
*Mr Nigel Barr* |
| 12 – 1pm | LUNCH |
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*Professor Jeanine Young* |
| 1.30 – 1.45pm | Exploring midwifery and medical management of the third stage of labour in association with postpartum haemorrhage – a prospective cohort study  
*Dr Lauren Kearney* |
| 1.45 – 2pm | Assessment of the concentration of citrate during haemofiltration  
*Dr Chris Anstey* |
| 2 – 2.15pm | The Evolving Role of Molecular Diagnostics for Lung Cancer in Australia  
*Dr Thys Matthew* |
| 2.15 – 2.30pm | Young, inexperienced, and driving tired: An alarming trend amongst our most vulnerable drivers  
*Dr Bridie Scott-Parker* |
| 2.30 – 2.45pm | Analysis of forestry work injuries in five Australian forest companies for the period of 2004 to 2014  
*Dr Mohammad Reza Chaffrayan* |
| 2.45 – 3.10 | AFTERNOON TEA |
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*Chair: Professor Marianne Wallis* |
| 3.10 – 3.25pm | Concordance of copy number loss and down-regulation of tumour suppressor genes: a pan-cancer study  
*Dr Min Zhao* |
| 3.25 – 3.40pm | Is vitamin D status at time of melanoma diagnosis associated with stage of tumour?: Study protocol and recruitment  
*Professor Michael Kimlin* |
| 3.40 – 3.55pm | Effects of acute exercise on endothelial function in abdominal aortic aneurysm patients  
*Dr Tom Bailey* |
| 3.55 – 4.10pm | Analysis and Optimisation of Endovascular Stent-Grafts  
*Dr Damon Kent* |
| 4.10 – 4.25pm | Leg blood flow and skeletal muscle microvascular perfusion responses to exercise in peripheral arterial disease  
*Ms Annelise Lins Meneses* |
| 4.25 – 4.40pm | A role for group G streptococcus in human disease  
*Dr David McMillan* |
| 4.40 – 4.55pm | Microbial, immunological and biochemical factors associated with Chlamydia trachomatis urogenital infections in women  
*Miss Noa Ziklo* |
| 4.55 – 5.10pm | Rapid molecular diagnostic assay for the detection of Chlamydia trachomatis in sexually active women  
*Mr Ameh James* |
| 5.10 – 6pm | POSTER SESSION and NIBBLES / DRINKS |
| 6 – 6.45pm | Keynote presentation: Dr Pua Yong Hao  
*Topic: Collaborative Research in the Clinical Setting* |
| 6.45 – 7.15pm | Panel discussion: “Should USC undertake Health Research”  
*Moderator – Professor Michael Kimlin, USC*  
*Participants:*  
*Dr Pua Yong Hao, Singapore General Hospital  
Dr Margaret Way, Sunshine Coast Hospital and Health Service  
Professor Marianne Wallis, Associate Dean (Health), USC  
Professor Marion Gray, Associate Dean (Research), FoSHEE, USC  
Professor Roland De Marco, DVC (Research and Innovation), USC* |
| 7.15pm | SHOWCASE CONCLUDES |
Session 1: Partnering to improve health services

Chaired by Professor Marion Gray
Associate Dean (Research), Faculty of Science, Health, Education and Engineering, USC

Professor Marianne Wallis
Associate Dean (Health) and Professor of Nursing, School of Nursing, Midwifery and Paramedicine, Faculty of Science, Health, Education and Engineering (for the CEDRIC project team), USC

Collaboration through health research to improve outcomes for acutely ill older adults – the CEDRIC Project

Older people comprise an increasing proportion of emergency department (ED) presentations and have a high incidence of negative outcomes of care. The Care coordination through Emergency Department, Residential aged care and primary health Collaboration (CEDRIC) project was designed to improve healthcare for older people with acute illness, via enhanced primary care in a residential aged care facility and targeted assessment and fast-tracking of care in the Emergency Department.

This research project was a partnership between USC, Sunshine Coast Hospital and Health Service, Sundale, Central Queensland, Wide Bay, Sunshine Coast PHN (Our PHN), Griffith University and QUT. Using program evaluation and retrospective auditing of clinical and financial databases, outcomes were compared before and after the implementation of both a RACF and an ED intervention. In the RACF a Nurse Practitioner candidate worked with RACF staff and general practitioners (GPs) to enhance care for residents with acute illness. In the ED, the nurse-led, physician-championed Geriatric Emergency Department Intervention (GEDI) streamlined care for older adults who presented to ED.

Results indicated that both services reduced length of stay in the ED and the hospital for people over the age of 70 years and consequently reduced costs to the health service. There was no significant difference in risk of mortality or risk of same cause representation to 28 days. Patients not seen by GEDI had a greater risk of readmission up to 28 days. Overall, CEDRIC reduced costs to the health service because of lower length of stay and increased opportunity costs to family doctors, ambulance services and the hospital.

Adjunct Professor Laurent Frossard
Adjunct Professor, USC

The Queensland Health’s experience in provision of bone-anchored prostheses: the hidden treasure of health services and economic evaluations

Some functional issues commonly experienced by individuals with limb amputation can be overcome by surgical implantation of osseointegrated fixation into the residual bone enabling attachment of bone-anchored prosthesis (BAP). In 2013, Queensland Artificial Limb Service (Queensland Health) partnered with USC to establish an innovative project of research focusing on health services and economic evaluations for an equitable provision of BAP.

This presentation will give an overview of the innovations achieved during this project. The objectives will be to present (A) the governmental procedure for provision of BAP, (B) the cross comparison of the costs, (C) and the cost-effectiveness of BAP and compared to typical prostheses.

The procedure for provision of BAP was achieved using an action research study following guidelines for data-driven collaboration and interactive inquiry processes. The cost-comparison was achieved using an observational study comparing historical costs for provision of typical prostheses with simulated costs for BAP. The cost-effectiveness involved retrospective individual case-controlled observational study.

The provision of BAP could be achieved through 7 and 5 processes (22 hours of labour, $3,300 per consumer) during treatment and rehabilitation, respectively. The cost-comparison study showed that the costs were reduced by 18% and 79% for BAP compared to typical prostheses, respectively. The cost-effectiveness showed that the ICER was less than $17,000 per QALY with BAP compared to typical prostheses. BAP was cost-saving and cost-effective for 19% and 88% of the consumers, respectively.

Altogether, this project indicated that BAP could be an acceptable alternative to conventional intervention, at least from a prosthetic care perspective in Australian context.

Published in several distinguished journals, this work is currently regarded as the gold standard worldwide for evidence-based development of policy and economical evaluation of BAP.
**Ms Julie Anne Martyn**  
Senior Lecturer, School of Nursing, Midwifery and Paramedicine, Faculty of Science, Health, Education and Engineering, USC

**Research that raises the voices of Aboriginal and Torres Strait Islander Health Practitioners**

**INTRODUCTION:** This presentation features the study design and research methodologies we used to help highlight the perspective of Aboriginal and Torres Strait Islander Health Practitioners about their continuing education needs. We will share with you what we learned about the ‘best’ (aka ‘Deadliest’) Health Practitioners. We will discuss what methods we used to raise the voices of the Practitioner’s to enable them to describe what a ‘Deadly’ practitioner does to achieve this status. Then we will talk about how we translated what we learned into a self-determined Health Practitioner curriculum for an On Country Continuing Education (CE) program.

**BACKGROUND:** Aboriginal and Torres Strait Islander Health Practitioners play a vital role in the health and wellbeing of Indigenous people. Practitioners need skills and knowledge in primary and secondary healthcare and health promotion. The Aboriginal and Torres Strait Islander Health Practitioner professional is nationally recognised and their registration practice standards require them to complete CE. However, purposefully designed CE programs that focus on their role are rare. Furthermore, Practitioners are in the best position to identify their CE needs for continued employment and registration.

**METHODOLOGY:** Participatory action research was used to enable these Practitioners to identify suitable CE to complement their knowledge and enhance their practice. An appreciative inquiry framework guided the focus group and survey data collection methods and the thematic analysis.

**RESULTS:** The participants were enabled by appreciative inquiry to highlight the knowledge of their CE needs in a positive way. Identifying the ‘Deadliest’ Practitioner has been the basis for developing a self-determined CE program. The Aboriginal and Torres Strait Islander Practitioner CE is being delivered and evaluated throughout 2017.

**CONCLUSION:** Aboriginal and Torres Strait Islander Health Practitioners have specific CE needs. Development of their profession requires focussed attention on their CE needs. Study designs and research methodologies that respect Indigenous ways of knowing, doing and being are necessary to inform future professional development practices for Aboriginal and Torres Strait Islander Health Practitioners.

**Dr Alison Craswell**  
Research Fellow, School of Nursing, Midwifery and Paramedicine, Faculty of Science, Health, Education and Engineering, USC

**Nurse Practitioner improving primary care in residential aged care facilities: who pays?**

**BACKGROUND:** Residents of aged care facilities (ACF) have difficulty accessing general practice (GP) primary health care services. It is recommended that Nurse Practitioners (NP) are utilised in ACFs for primary care provision and yet in Australia, the numbers of ACFs who have an onsite or access to a visiting NP is low. Transfers of residents to hospital places older people at risk of transfer related complications and add to the burden on emergency departments (ED). NPs provide timely access to care and care coordination, reduce transfers to EDs and hospital admissions for residents from ACFs.

**RESEARCH AIM:** This study aimed to describe the residents seen by the NP candidate (NPC) and compare outcomes for residents transferred pre and post NPC implementation. Primary outcomes measure was disposition, length of stay in ED and hospital if admitted, mortality, representation to 28 days and cost.

**METHODS:** The study utilised qualitative and quantitative data via a Structure, Process and Outcome framework. Quantitative data was collected from Queensland Government hospital databases and a bespoke database at the ACF. Aggregated interview data was obtained from staff and residents of the ACF and visiting GPs.

**RESEARCH FINDINGS:** Residents reviewed by the NPC had a much lower risk of ED transfer compared to those with care provided by ACF staff in consultation with NPC (either by phone or in person), reducing cost of ED presentation by $68 (95% CI: $25, $110) per transfer. Cost of ED transfer was less ($62 (95% CI: $12, $111)) compared to transfers from other large RACFs in the region. However, most transfers (61.5%) occurred outside NPC hours. Structure and process outcomes demonstrated the service was highly valued by all stakeholders. The research and clinical collaboration was critical in the success of the project.

**Associate Professor Patrea Anderson**  
Academic Director, Simulation and Visualisation and Associate Professor, Nursing, School of Nursing, Midwifery and Paramedicine, Faculty of Science, Health, Education and Engineering, USC

**Using simulation to enhance patient safety and improve quality health outcomes**

**INTRODUCTION:** The University of the Sunshine Coast partnered with the Sunshine Coast Private Hospital (United Care) to develop a series of simulations reflecting a patient stay journey. The design of the simulations was based on the National Quality Health Service Standards and focused on addressing ISO audit outcomes. Optimal and sub optimal versions of simulation scenarios reflecting patient encounters including; medication administration, infection control and prevention, patient identification and procedure matching, clinical handover and preventing falls were developed and transformed into learning artefacts, and incorporated into annual mandatory professional education for nursing staff during 2016.
METHODS: A mixed method study utilising, quality data (pre and post education intervention), surveys and interviews were used to gather data and evaluate the effectiveness of the education programme using simulation artefacts.

RESULTS: Satisfaction with the education programme, improved understanding of documentation requirements, improved risk management, collaboration and communication amongst teams were ranked highly in evaluations. Quality data highlight the evidence of programme impact of health outcomes with a 73% decrease in falls with injury, 34% decrease in high alert medication error and 61% decrease in infection within 12mths.

CONCLUSIONS: The Video Simulation Project actively promotes a culture of safety and learning that includes engaging with clinicians and others, to share knowledge and practice that supports person-centred care. This presentation will report the project design and results demonstrating how simulation translates in practice and can improve patient safety.

Dr Natassia Goode
Senior Research Fellow, Centre for Human Factors and Sociotechnical Systems, Faculty of Arts, Business and Law, USC

Partnering to improve patient safety: applying systems thinking and human factors methods

The Centre for Human Factors and Sociotechnical Systems and the Sunshine Coast Hospital and Health Service have established a collaborative research partnership focussed on improving patient safety through the application of systems thinking and human factors methods. This area has been recognised as a critical research need in Australia and internationally, and has the potential to directly translate into practice within SCHHS. In this presentation, I will describe the development of the collaboration through two projects. The first project was initiated through discussions with the Safety, Quality and Innovation Unit, where we identified a shared interest in improving the outcomes from clinical incident investigations. This resulted in a small grant funded through Wishlist, which involved the evaluation of current clinical investigation methods. This initial work supported the development of a successful Advance Queensland Fellowship application evaluating the application of sociotechnical systems methods to improve medication safety. This three year program of research involves research partners across the health services and a USC researcher working part-time at SCHHS. We have also integrated research from other programs; a PhD student from an ARC Future Fellow program will use the data to explore medication safety. So far, there has been close collaboration on the project, which has resulted in a better understanding of the constraints of conducting and translating research in this context. The methods used to engage and collaborate with SCHHS will be discussed.

Mr Nigel Barr
Senior Lecturer in Paramedicine, School of Nursing, Midwifery and Paramedicine, Faculty of Science, Health, Education and Engineering, USC

The self-reported behaviours and perceptions of Australian paramedics in relation to environmental hygiene in paramedic-led healthcare

BACKGROUND: Several international studies have found that compliance with environmental hygiene among emergency medical service workers was poor, which may have contributed to the potential transmission of health care-associated infections (HAIs). The aim of this study was to explore the self-reported behaviours and perceptions of Australian paramedics in relation to their environmental hygiene practices in paramedic-led health care. Two research questions were posed. How do Australian paramedics participating in a national online survey describe their behaviours and perceptions (beliefs and attitudes) regarding IPC practices and the transmission of HAIs in paramedic-led healthcare? And, how do the behaviours and perceptions of Australian paramedics regarding IPC practices in paramedic-led healthcare that are reported during focus group discussions triangulate with the findings from the national online survey?

METHODS: A national online survey (n=417; 17% response rate) and 2 semi-structured focus groups (6 per group) were conducted with members of Paramedics Australasia.

RESULTS: While most study participants perceived environmental hygiene to be important, the findings suggested noncompliance with the routine and deep cleaning of ambulances. Participants reported working in ambulances that were visibly dirty and contained blood contamination. Misunderstandings were apparent among the participants about recommended environmental hygiene practices, particularly for the management of blood or body substance spills and the routine cleaning of ambulance interiors and shared medical equipment.

CONCLUSIONS: Improvements to the routine and deep cleaning practices of ambulances by paramedics is required to assist in preventing the potential transmission of HAIs and ensuring overall patient safety and clinical care. This includes researching how to alleviate perceived barriers to performing environmental hygiene during paramedic-led health care.
Session 2: Partnering to improve health outcomes

Chaired by Associate Professor Mathew Summers
Associate Professor, Neuroscience and Mental Health, Faculty of Arts, Business and Law, USC

Professor Jeanine Young
Professor of Nursing, School of Nursing, Midwifery and Paramedicine, Faculty of Science, Health, Education and Engineering, USC

Sustainable strategies to support parents and health professionals in providing evidence-based infant care: A multi-agency collaboration to reduce infant mortality

BACKGROUND: Queensland has experienced one of the highest rates of sudden unexpected deaths in infancy (SUDI) in Australia. Studies have identified deficits in health professional knowledge and practice about Safe Sleeping recommendations, and that many caregivers employ infant care practices which increase the risk of SUDI. Evidence-based, culturally appropriate and practical strategies are required to further reduce preventable deaths.

AIM: The aim is to describe a partnership network established to positively influence outcomes that support, and extend reach of, novel strategies to promote safe sleeping environments for vulnerable babies.

METHOD: This paper will outline international, national, state and local partnerships established in conducting a successful infant mortality research program which has led to translation into service delivery and influenced public health recommendations; and factors contributing to successful development and translation.

RESULTS: Partnerships between the project team, government, nongovernment, not-for-profit and social innovation sectors, and regulatory bodies, have addressed current gaps in evidence. These studies have contributed to a comprehensive research program that has delivered tangible outcomes in terms of culturally appropriate approaches for safe infant care suitable for acute and community settings; and contemporary data to inform future public health recommendations and understanding of socially vulnerable families. Stakeholder collaboration has been integral to research outcomes being translated into service delivery models that are evidence-based, user-friendly, and accessible to clinicians and parents.

CONCLUSION: A collaborative approach involving resource sharing and formalised partnerships between stakeholder groups, supported at local, state and national levels, has facilitated delivery of novel Safe Sleeping initiatives in acute and community settings to benefit vulnerable Queensland babies.

Dr Lauren Kearney
Senior Research Fellow (Maternal and Child Health), School of Nursing, Midwifery and Paramedicine, Faculty of Science, Health, Education and Engineering, USC

Exploring midwifery and medical management of the third stage of labour in association with postpartum haemorrhage – a prospective cohort study

BACKGROUND: Placental birth (or more commonly known as the third-stage of labour) is known as the time from the birth of the baby to the complete expulsion of the placenta and membranes. International studies have demonstrated that there are considerable differences in the way in which care is provided during this time.

A significant complication of the third stage of labour is postpartum haemorrhage (PPH). Despite the routine use of active management of placental birth (current recommendation aimed at reducing PPH), PPH rates in high resource countries continue to rise. Retrospective studies have found an association between physiological third stage care (for low-risk women) and a reduction in PPH. The mounting evidence questioning active management for all women and evidence supporting placental transfusion (delayed cord clamping) to neonates warrants an urgent need to explore how this has impacted upon midwives’ and doctors’ practice and any possible associations this may have with maternal morbidity and adverse events.

METHODS: This research study examined the associations between independent risk factors and postpartum haemorrhage following a vaginal birth, prospectively in a cohort of pregnant women (n=424) in a regional Australian health care service. Three sites participated: a regional hospital; a rural hospital; and an eligible private practicing midwifery service offering home birth.

Findings presented will detail current midwifery and medical third stage management practice, including modifications to active management. Independent variables associated with PPH will be discussed, as too will the process of routine gravimetric measurement of blood loss and the experience of midwives conducting this as routine practice.
**Dr Chris Anstey**  
Director, ICU, Sunshine Coast University Hospital

**Assessment of the concentration of citrate during haemofiltration**

**BACKGROUND:** Critically ill patients requiring extracorporeal renal support are usually treated with continuous renal replacement therapy (CRRT) and regional citrate anticoagulation (RCA) is the preferred method of anticoagulating the extracorporeal circuit. RCA CRRT has been practised in our ICU for approximately 10 years and is rapidly becoming popular internationally as a safe and effective means of attaining extracorporeal circuit anticoagulation. Citrate can accumulate during CRRT and toxicity is currently assessed using a surrogate measurement. The gold standard would be the direct measurement of plasma citrate concentration which, at present, is not routinely available. As RCA is becoming an accepted practice, measurement of the plasma citrate concentration will permit its use in a broader patient population, fine tuning of the prescription, promotion of greater patient safety and may ultimately show broader societal benefits.

**AIM:** This collaborative study between the Sunshine Coast Hospital and Health Service (SCHHS) and the University of the Sunshine Coast (USC) aims to quantify both citrate concentration and the citrate clearance over time in order to establish an expected range and safety margin.

**METHOD:** Patients requiring haemofiltration with RCA will have blood and ultrafiltrate samples collected three times a day for duration of their CRRT and sent for biochemical and acid/base analysis. Routine analyses will be undertaken by QHealth Pathology services whilst sample analysis for citrate will take place at USC. At USC the samples will be analysed to ascertain the plasma concentration of citrate and the clearance of citrate across the haemofilter membrane.

**RESULTS:** Nil to date as the study is yet to begin. We are awaiting final signature of contracts between SCHHS and USC.

**CONCLUSION:** Regular monitoring of citrate concentration over time has not been attempted before and if successful, the assay will be developed to permit real-time bedside use.

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**Mr Thys Matthews**  
Masters by Research Candidate, USC and Sunshine Coast Hospital and Health Service

**The Evolving Role of Molecular Diagnostics for Lung Cancer in Australia**

The landscape of lung cancer treatment has advanced significantly since the introduction of targeted therapies. Clinicians are now often able to define specific oncogenic driver mutations associated with lung cancer and treat their patients with drugs that specifically target them.

The spectrum of molecular changes in lung cancer patients is strongly related to demographics and smoking behaviour. Mutations in both the epithelial growth factor receptor (EGFR) and anaplastic lymphoma kinase (ALK) genes are statistically more likely in young non-smokers and mutations in the Kirsten Rat Sarcoma (KRAS) gene are more frequently associated with a strong smoking history.

To date, there has been no specific analysis of demographic shifting within lung cancer patients of the Sunshine Coast Hospital and Health Service (SCHHS) to anticipate oncogenic mutational prevalence for future treatments.

This study has performed a retrospective review of data associated with lung cancer cases diagnosed and treated at SCHHS between 2010 and 2015. Information was drawn from existing sources including Auslab, Queensland Oncology Online (QOOL), Nambour Lung Multi-Disciplinary Team minutes and SCHHS medical records.

The typical lung cancer patient on the Sunshine Coast is Caucasian, male, elderly and a smoker. This limits the ability to generalise from the experience of the world literature to the Queensland population.

The results concluded from this project predict a steady increase in lung adenocarcinoma in female patients that have never smoked and a decrease in male current smokers. Interestingly, the average age of lung adenocarcinoma patients at the time of diagnosis continues to increase. This could be due to an aging population on the Sunshine Coast and may therefore subside over the coming decade.

As these demographics change, it is likely we will see a different frequency/spectrum of oncogenic driver mutations in lung adenocarcinoma patients on the Sunshine Coast.
Dr Bridie Scott-Parker
Senior Research Fellow, School of Social Sciences, Faculty of Arts, Business and Law, USC

Young, inexperienced, and driving tired: An alarming trend amongst our most vulnerable drivers

BACKGROUND: The considerable road safety risks associated with driving tired are evidenced by its inclusion as a ‘Fatal Five’, with 13% of fatalities in Queensland in 2016 involving fatigue (TMR, 2017).

Driving tired is particularly risky for young novice drivers because not only are they vulnerable to sleep deficits due to social and psychobiological processes, they are also inexperienced in detecting and reacting appropriately to driving hazards.

AIM: To explore the driving-tired behaviour of young novice drivers at two local high schools, including their self-reported behaviours to counter the negative effects of sleepiness while driving.

METHOD: 121 students (59 males) aged 15–17 years completed a survey exploring sleepiness and driving behaviour.

RESEARCH FINDINGS: 31% felt sleepy while driving; 22% continuing driving despite feeling sleepy. Sleepiness while driving was experienced as yawning (55%), more frequent eye-blinks (35%), changing positions (26%) and difficulty concentrating (20%), with maladaptive responses reported (eg, 72% turned on radio; 63% turned stereo volume up; 42% moved around/shook their head).

PRACTICAL IMPLICATIONS: Young drivers continued driving despite being sleepy, suggesting they are not being taught the crash risks of driving tired, and that parents – the most common supervisor of learner drivers – need additional guidance regarding the contribution of sleepiness to crashes. In addition, young drivers and parents alike need guidance regarding alternatives to driving in situations in which the driver – young-and-inexperienced, and older-and-experienced alike – is feeling sleepy.


Dr Mohammad Reza Ghaffariyan
Research Fellow (Forestry), Forest Industries Research Centre, Faculty of Arts, Business and Law, USC

Analysis of forestry work injuries in five Australian forest companies for the period of 2004 to 2014

There is little knowledge available regarding Australian forestry work safety and accident rates. Machine operators and forestry workers are vital parts of the forestry sector and their health and well-being can greatly impact on their work quality and efficiency. To increase our knowledge on forest workers’ safety this project aimed to analyse the frequency, type and root causes of work accidents which occurred within different forestry activities of five industry partners of AFORA over the period from 2004 to 2014. A questionnaire was designed and distributed to the partners to collect the safety incident reports.

Total number of work accidents was 470 for a period of 11 years (a rate of 43 accidents per year). Considering the estimated yearly production rates of the industry partners participated in this project the accident severity rate was 14.40 accidents/million cubic meters of harvested wood. The majority of accidents occurred in harvesting operations (37%) and forest management (30.2%). Based on the results 8.1% of the accidents occurred during firefighting and 24.3% of work accidents occurred in other forestry activities. Main root causes of accidents for different types of activities were personal errors such as lack of PPE, operator error, poor body position and poor applied techniques. Work safety training could be delivered to forestry personnel to minimise accidents caused by personal errors. Back and shoulder (as upper body parts) received the most injuries. To avoid/reduce muscular damages (such as strain and sprain) the workers should be provided with proper ergonomic training.
Session 3: From the bench to the bedside

Chaired by Professor Marianne Wallis, Associate Dean (Health) and Professor of Nursing, School of Nursing, Midwifery and Paramedicine, Faculty of Science, Health, Education and Engineering

Dr Min Zhao
USC Research Fellow, School of Science and Engineering, Faculty of Science, Health, Education and Engineering, USC

Concordance of copy number loss and down-regulation of tumour suppressor genes: a pan-cancer study

Tumor suppressor genes (TSGs) encode the guardian molecules to control cell growth. The genomic alteration of TSGs may cause tumorigenesis and promote cancer progression. So far, investigators have mainly studied the functional effects of somatic single nucleotide variants in TSGs. Copy number variation (CNV) is another important form of genetic variation, and is often involved in cancer biology and drug treatment, but studies of CNV in TSGs are less represented in literature. To meet this demand, we performed a systematic analysis of CNVs and gene expression in TSGs to provide a systematic view of CNV and gene expression change in TSGs in pan-cancer. In total, we identified 1170 TSGs with copy number gain or loss in 3846 tumor samples. Among them, 207 TSGs tended to have copy number loss (CNL), from which fifteen CNL hotspot regions were identified. The functional enrichment analysis revealed that the 207 TSGs were enriched in cancer-related pathways such as P53 signaling pathway and the P33 interactome. By further integrative analyses of gene expression data from the matched tumor samples, we found 81 TSGs with concordant CNL and decreased gene expression. Remarkably, data from the matched tumor samples, we found 81 TSGs with concordant CNL events and decreased gene expression. Remarkably, specifically to MTAP, this concordance was found in 14 cancer types, an observation that is not much reported in literature yet. Further network-based analysis revealed that these 207 TSGs were enriched in cancer-related pathways such as P53 signaling pathway and the P33 interactome. By further integrative analyses of gene expression data from the matched tumor samples, we found 81 TSGs with concordant CNL and decreased gene expression. Remarkably, data from the matched tumor samples, we found 81 TSGs with concordant CNL events and decreased gene expression.

Professor Michael Kimlin
Foundation Chair, Cancer Prevention, Faculty of Science, Health, Education and Engineering, USC

Is vitamin D status at time of melanoma diagnosis associated with stage of tumour?: Study protocol and recruitment

BACKGROUND: Vitamin D is produced primarily by the action of ultraviolet radiation (UVR) on exposed skin. Exposure to UVR is also the greatest risk factor for development of melanoma. There is emerging evidence suggesting that in melanoma patients, vitamin D concentration at the time of diagnosis may be related to melanoma thickness, an important determinant of prognosis.

AIMS: This study aims to investigate if lower serum vitamin D (measured by 25-hydroxyvitamin D (25(OH)D)) at melanoma diagnosis is associated with poorer melanoma prognostic indicators, such as thickness and ulceration. We will also investigate the relationship between lower lifetime sun exposure and melanoma prognosis.

METHODS: This prospective, cross-sectional study is being conducted by USC and Cancer Council Queensland. It aims to recruit 600 participants (newly-diagnosed melanoma patients) through doctors working in skin cancer clinics, dermatologist practices, general family practice clinics and public hospitals in South-East Queensland. Study participants complete a telephone interview and questionnaire on their diagnosis, sun exposure history, melanoma risk factors and dietary vitamin D, give a small blood sample for vitamin D analysis, and provide a saliva sample to assess genetic factors related to vitamin D. Details on tumour characteristics will be extracted from the participants’ pathology report located in the Queensland Cancer Registry.

RESULTS: We currently have over 50 participants, with approximately 40 clinics across South-East Queensland facilitating recruitment for the study (Including Skin Cancer Clinics, Family Practices, Dermatology Practices and Plastic Surgeons, and Public Hospital Dermatology Departments).

CONCLUSION: This study will generate new knowledge about the intriguing possibility that vitamin D can be used as a potential new biomarker of melanoma progression, with an additional possible role in melanoma prevention and treatment.

Dr Tom Bailey
Postdoctoral Research Fellow, School of Health and Sport Sciences, Faculty of Science, Health, Education and Engineering, USC

Effects of acute exercise on endothelial function in abdominal aortic aneurysm patients

Endothelial dysfunction is observed in patients with abdominal aortic aneurysm (AAA), worsens with aneurysm growth, and increases risk of cardiovascular events and mortality. This study aimed to assess the acute effects of moderate and higher-intensity exercise on endothelial function, as assessed by flow-mediated-dilation (FMD), in AAA patients (n=22; 74±6 y) and healthy adults (n=22; 72±5y). Participants undertook three randomised visits, including moderate-intensity continuous exercise (40% peak power output, PPO), higher-intensity interval exercise (70% PPO), and a no-exercise control. Brachial artery FMD was assessed at baseline, 10- and 60-min after each condition. Baseline FMD was lower in AAA patients compared to healthy adults (by 1.10%, 95% CI, 0.72 to 1.48), P=0.007. There were no group differences in the FMD responses after each condition (P=0.387). FMD did not change after the control condition, but increased by 1.21% (95% CI, 0.69 to 1.73, P<0.001) 10 min after moderate-intensity continuous exercise in both groups, and returned to baseline levels after 60-min. Conversely, FMD
decreased by 0.93% (95% CI, 0.41 to 1.44, P<0.001) 10-min after higher-intensity interval exercise in both groups, and remained decreased after 60 min. This study found that the acute response of endothelial function to exercise is intensity-dependent and similar between AAA patients and healthy adults. This suggests regular exercise may improve vascular function in AAA, as it does in health adults. Improved FMD following moderate-intensity exercise may provide short-term benefit. Whether the sustained decrease in FMD following higher-intensity exercise represents additional risk and/or a greater stimulus for vascular adaptation remains to be elucidated.

Dr Damon Kent
Senior Lecturer, School of Science and Engineering, Faculty of Science, Health, Education and Engineering, USC

Presentation: Analysis and Optimisation of Endovascular Stent-Grafts

Endovascular stents are predominantly used to treat Abdominal Aortic Aneurisms. For a stent to function correctly, its deployment force must be sufficient to overcome the drag force of blood flowing through the vessel. Insufficient engagement with the artery wall will potentially lead to stent graft migration, while excessive radial force may increase the risk of leaks or rupture. The aim of this study was to model the mechanical performance during insertion and deployment of an endovascular stainless steel Z spring stent, based on the Zenith design by Cook Medical. Finite element modelling was applied to develop detailed geometry, material and analytical models which were validated against experimental results. A geometry optimised Z spring design was established using a response surface approach to optimise the parameters of the spring section. The experimental results revealed that for large diameter contractions, contact interaction between the spring legs produces a spike in the radial force. Commonly reported models in the literature deal with radial compressions over a shorter range, avoiding the issue of spring leg contact. Preliminary modelling of this contact interaction was able to satisfactorily predict characteristic peak forces close to the experimental results. The stent models developed provide an excellent basis for further improvements to the stent design and performance.

Ms Annelise Lins Meneses
HDR Candidate, School of Health and Sport Sciences, Faculty of Science, Health, Education and Engineering, USC

Presentation: Leg blood flow and skeletal muscle microvascular perfusion responses to exercise in peripheral arterial disease

Peripheral arterial disease (PAD) is characterised by limited blood flow to the lower limbs secondary to atherosclerosis-related occlusions of the conduit arteries. The effect of these occlusions on the skeletal muscle microvascular perfusion is not well described. We aimed to compare leg blood flow and microvascular perfusion in PAD patients and healthy control (CON) participants at rest and in response to leg exercise. PAD (n=12, 69.4±9 years) and CON (n=12, 68.7±7 years) participants completed two 5-min bouts of intermittent isometric plantar-flexion exercise (Intensity: 500N [61±19% max force]). Resting and contraction-by-contraction calf blood flow were measured using strain-gauge plethysmography. Microvascular perfusion of the medial gastrocnemius muscle was assessed at rest and immediately following exercise using contrast-enhanced ultrasound. Resting leg blood flow (PAD: 2.2±1.00, CON: 1.96±0.85 ml 100ml-1.min-1; p=0.52) and microvascular perfusion (PAD: 0.19±0.19, CON: 0.09±0.05 aU/sec; p=0.12) were not significantly different between groups. While the total rise in leg blood flow was similar between groups (PAD: Δ27.98±8.41; CON: Δ31.39±8.68 ml 100ml-1.min-1; p=0.23), the blood flow kinetics were slower in PAD with a smaller initial rise in blood flow (phase-1), and a slower phase-2 response (p=0.05). Microvascular perfusion following exercise was significantly increased in PAD (Δ1.22±0.43 aU/sec) compared to baseline, and tended to be higher in PAD following exercise (p=0.09).

There was a trend (p=0.07) for a greater change in microvascular volume in PAD (Δ9.74±2.50 aU) than CON (Δ3.77±1.06 aU), with no significant differences in microvascular velocity between groups (p=0.55). During plantar-flexion exercise PAD patients demonstrated slower leg blood flow kinetics, but tended to have greater microvascular perfusion than CON participants.

Dr David McMillan
USC Senior Research Fellow, School of Health and Sport Sciences, Faculty of Science, Health, Education and Engineering, USC

Presentation: A role for group G streptococcus in human disease

Streptococcus dysgalactiae subspecies equisimilis (group G streptococcus, GGS) is a Gram-positive bacterium closely related to the human pathogen S. pyogenes (group A streptococcus, GAS). Whilst GAS has been recognised as a major human pathogen for over 100 years, GGS is traditionally considered as a commensal organism, and cause of opportunistic infections. Here we present evidence for a role for GGS in two GAS associated autoimmune diseases, post-streptococcal glomerulonephritis (PSGN) and rheumatic heart disease (RHD).

METHODS: PSGN Study: Serum collected from patients with PSGN, Chronic Kidney Disease (CKD), End-stages Renal Disease (ESRD) and controls was evaluated by ELISA for the presence antibodies that recognise DrsG, a protein only expressed by GGS. RHD study: The Rat Autimmune Valvulitis (RAV) model was used to assess the capacity of the GGS M-protein (Stg480) or whole GAS to induce symptoms akin to RHD, as determined by histological examination of inflammation in heart sections, evaluation of immune responses, and electrocardiographic measurements.

RESULTS: PSGN study: The proportion of PSGN, CKD, and ESRD patients sero-positive for DrsG was significantly higher than that of the corresponding age-matched controls. Since higher rates of seropositivity for anti-DRS-G Abs in the renal disease categories are resultant of previous infections with DRG-G-positive S. dysgalactiae subsp. equisimilis strains, we conclude the seropositivity is an additional risk factor for these renal diseases. RHD study: We demonstrate that Stg480 induces myocarditis and valvulitis in the RAV model. Histological, immunological and functional changes in the hearts of rats exposed to Stg480 or whole GGS were similar to those exposed to GAS. Furthermore, antibody cross-reactivity to cardiac myosin was comparable in both GGS and GAS exposed animals.

Together these results provide additional evidence that GGS, like GAS, is a cause of streptococcal autoimmune diseases.
**Miss Noa Ziklo**  
HDR Candidate, Centre for Animal Health Innovation, School of Science and Engineering, Faculty of Science, Health, Education and Engineering, USC  

**Presentation: Microbial, immunological and biochemical factors associated with Chlamydia trachomatis urogenital infections in women**  

Urogenital C. trachomatis infections continue to be a worldwide health concern, with an estimated 131 million cases occurring annually. The natural course of C. trachomatis infections varies among individuals. While some women apparently acquire a protective immune response, others can become reinfected several times, which can cause development of severe pathology. While the reasons for these differences are unknown, an individual's vaginal microbiota composition and their immune response to induced interferon-gamma (IFN-γ) were suggested to be critical. One hypothesis suggests that if there are indole-producing bacteria in the vaginal microbiota they can assist the Chlamydia to escape the host IFN-γ attack. Our study was conducted in collaboration with Nambour Sexual Health Clinic, where we utilized a cohort of 25 women who were either Chlamydia negative, Chlamydia positive with a single infection, or Chlamydia positive with repeated infection. We characterized their vaginal microbiota composition, cytokine response, kynurenine/tryptophan ratios (kyn:trp; disease marker) and indole concentrations directly from vaginal secretions. We found that C. trachomatis infections were associated with elevated kyn:trp levels, which were significantly higher in women with repeated infection. When we examined the vaginal microbiota, we found that low tryptophan levels were significantly associated with microbiota dysbiosis, which might be related to a higher abundance of indole producers. In addition, we found a trend of higher indole/tryptophan ratios in women with Chlamydia infections. This research demonstrates for the first time in vivo, the association between high kynurenine levels, most likely driven by the host IFN-γ response to Chlamydia infection, while tryptophan depletion was linked to microbiota dysbiosis. Our collaboration with the clinic has provided extensive knowledge to the staff, which has contributed to the ongoing patient education and awareness.

**Mr Ameh James**  
HDR Candidate, Genecology Research Centre, School of Science and Engineering, Faculty of Science, Health, Education and Engineering, USC  

**Presentation: Rapid molecular diagnostic assay for the detection of Chlamydia trachomatis in sexually active women**  

**BACKGROUND:** Sexually transmitted Chlamydia trachomatis often remains untreated because it is either asymptomatic or testing is unavailable in resource limited settings. We have developed a rapid molecular assay that is comparable to qualitative PCR based diagnostics, such as Roche Cobas® 4800 CT/NG, but faster to perform. The assay is based on recombinase polymerase amplification technology with amplified products visualized easily with lateral flow strip (C. trachomatis RPA-LFS). Our approach does not require any significant infrastructure or equipment.  

**AIM:** To develop a rapid diagnostic C. trachomatis assay that is comparable with the gold standard, and could easily be deployed for resource limited clinical laboratories.  

**METHODS:** Thirty one de-identified stored DNA samples extracted from cervicovaginal swab collected from reproductive age women were provided by a sexual health clinic at Nambour hospital, Queensland, Australia. These samples were confirmed to be Chlamydia trachomatis positive with the use of a qualitative based commercial assay, Roche Cobas® 4800 CT/NG. We further quantified the bacteria load with quantitative PCR (qPCR) and compared our newly developed C. trachomatis RPA-LFS with the commercial assay. We also tested de-identified stored High vaginal swabs (HVS) from 124 HIV positive women from Jos University Teaching hospital, Nigeria. These women of reproductive age routinely attend the HIV care and treatment centre, were receiving anti-retroviral therapy, and were referred to the sexually transmitted infection clinic of the centre. These samples were tested using qPCR, PCR-agar gel electrophoresis and C. trachomatis RPA-LFS.  

**RESEARCH FINDINGS:** RPA-LFS showed very good clinical sensitivity, being able to detect as few as 4 copies of C. trachomatis. By comparison with Roche Cobas® 4800 CT/NG testing on 31 vaginal swab samples, RPA-LFS recorded 100.0% true positive and true negative results respectively.
Keynote presentation

Dr Pua Yong Hao, Singapore General Hospital

Dr. Pua received his PhD in Physiotherapy from the University of Melbourne in 2009. He is currently a Principal Physiotherapist at the Singapore General Hospital. He has taught basic research methods to physiotherapists since 2010 and has been a research mentor or co-mentor to several allied health professionals. He is an Associate Editor for the Proceedings of Singapore Healthcare, the Vice-Chairperson of the SingHealth Allied Health Research Committee, and an executive committee member of the Health Services Research Unit, Singapore General Hospital. His main research collaborator is Dr. Ross Clark from the University of Sunshine Coast, and their research focuses on using technology and analytics to improve the assessment and prediction of physical function – particularly in patients with total knee arthroplasty. Past 5 years, he has 43 peer-reviewed publications (15 as first author).

Collaborative Research in the Clinical Setting

Collaborative research performed in hospitals answers both research and clinical questions effectively, and translating research findings into evidence-based practice/policies optimises resources for more cost-effective care. This talk presents 3 observational database projects in allied health currently being undertaken in one of the world’s premier tertiary hospitals, and shows how collaboration is necessary to overcome the problems associated with collecting data consistently and comprehensively on an adequate number of patients. This talk also covers (i) how findings from collaborative research projects can potentially improve patient care, (ii) how the institution and the department have supported collaborative research, and (iii) how practicing clinicians can integrate research and evidence based practice into their daily routines.

Panel discussion

“Should USC undertake Health Research?”

Moderator: Professor Michael Kimlin, Foundation Chair, Cancer Prevention, Faculty of Science, Health, Education and Engineering, USC

Participants: Dr Pua Yong Hao, Singapore General Hospital | Dr Margaret Way, Executive Director Innovation, Quality, Research and Education, Sunshine Coast Hospital and Health Service | Professor Marianne Walls, Associate Dean (Health) and Professor of Nursing, Faculty of Science, Health, Education and Engineering, USC | Professor Marion Gray, Associate Dean (Research), FoSHEE, USC | Professor Roland De Marco, Deputy Vice-Chancellor (Research and Innovation), USC
Research poster presentations

1. Mrs Margaret Hardy
HDR Candidate, School of Health and Sport Sciences, Faculty of Science, Health, Education and Engineering, USC

Poster Presentation: Education for an Ageing Australian Baby Boomers Population

The world population is ageing and it is expected those aged over 60 years will increase from 605 million to 2 billion by 2050 (World Health Organization, 2015), thus presenting health challenges and major implications for education skills and training. Although much has been written about boomers, those born between 1945 and 1966, and their potential impact on public services utilisation, such as health, there is limited research about the potential impact of education on the health of baby boomers. To explore the motivations and benefits of baby boomers, commencing or returning to university study, who wish to combine a passion for learning with optimal mental and physical health, an understanding of the unique characteristics of baby boomers is required, as is the impact of changing societal attitudes to ageing.

2. Mrs Alison Vallejo
HDR Candidate, School of Nursing, Midwifery and Paramedicine, Faculty of Science, Health, Education and Engineering, USC

Bugs, Bioburden and Biofilm: a case study on low-frequency ultrasonic debridement, Polyhexamethylene (PHMB) and antimicrobials on adults with chronic wounds

AIMS: The aim of this study is to describe a case study of a combination therapy using advanced treatments, including low-frequency ultrasonic debridement (LFUD), and an antimicrobial dressing with polyhexamethylene biguanide (PHMB), for adults with chronic wounds.

METHODS: A case study (Yin, 2013) of four case histories of older adults with chronic wounds was undertaken in a specified wound clinic. The Wound Solutions Clinic operates as a joint partnership between Blue Care and the University of the Sunshine Coast. The four participants received ultrasonic debridement and the antiseptic PHMB, with other antimicrobial products. Data collection from multiple sources included: retrospective data from medical records, prospective wound observations and qualitative interviews to assess the acceptability of the dual therapy.

RESULTS: The included cases demonstrate the remarkable improvement observed in previously recalcitrant wounds, as a result of vigorous debridement via LFUD, and subsequent antimicrobial therapies, including PHMB.

DISCUSSION: Approximately 60–85% of chronic wounds contain wound biofilm (James, Swogger, & Wolcott, 2008). Low-frequency ultrasound has been reported to destroy biofilms (Vöigt et al., 2011). However, residual planktonic bacteria can recover and reform into microcolonies in a matter of hours (Wolcott & Rhodes, 2008). PHMB is an effective, safe, and non-resistant biocidal agent (Butcher, 2012) known to reduce microorganisms. This case study indicates that the combination of PHMB and LFUD enhances healing in wounds otherwise non-responsive to care, and is acceptable to patients.

3. Ms Paula Loveday
HDR Candidate, Engage, School of Social Sciences, Faculty of Arts, Business and Law, USC

Flow and well-being: an exploration of Pokémon GO, a mobile augmented-reality exergame

INTRODUCTION: Pokémon GO was released in July 2016 and became the most popular mobile game to date in the USA and has been downloaded over 100 million times worldwide. Pokémon GO is a mobile, augmented-reality exergame in which players walk in the real world to find and collect Pokémon. Pokémon are fictional creatures which appear in the virtual world of the game, i.e. an augmented-reality. The necessity to walk, sometimes considerable distances, is the exergame component of Pokémon GO.

RESEARCH QUESTIONS: It has been suggested that Pokémon GO has mental and physical health benefits for its players, however little empirical research into the game has been conducted to date. We argue that mental health benefits could be explained by players entering the beneficial state of flow while playing. Additionally, we suggest that factors such as game level and nostalgic connection with Pokémon from childhood will predict flow.

METHOD: 202 adult players of Pokémon GO completed an online survey, two months after release. Median distance walked playing the game was 110 kilometres. Average age of participants was 29 years (SD = 9 years). Validated instruments were used for flow and nostalgia.

RESULTS: Multiple regression was used to develop a model which explained 27.1% of the variance in flow levels. Significant predictors of flow were: game level, nostalgia, playing alone, and playing with family.

CONCLUSIONS: The game design used in Pokémon GO provided an appropriate balance between skill and challenge, correlated with increased flow. When designing games to increase well-being, it may be effective to include a nostalgic connection from childhood. The co-operative nature of Pokémon GO has been suggested as an explanation for well-being benefits. Our results, however, suggest that the concentration and focus associated with playing alone provided a greater context for eliciting a flow experience than playing with others.

4. Ms Paula Loveday
HDR Candidate, Engage, School of Social Sciences, Faculty of Arts, Business and Law, USC

Thinking about yourself broadens thoughts

INTRODUCTION: The Best Possible Selves (BPS) is a writing intervention in which participants imagine their life working out in the best possible way and write about what they have imagined. The BPS has been shown to improve physical health, and increase optimism, and positive affect. The Broaden and Build Theory of Positive emotions has been suggested as a mechanism for the efficacy of the BPS via the broadening of thought-action repertoires (TARs).
METHOD: Using an online survey, we conducted a random-controlled trial (n = 141) with three conditions. Content analysis of 1,585 thought-statements was conducted and each was coded to one of five well-being components: hedonic, eudaimonic, psychological, social, and physical. ANOVA was calculated for condition differences in affect, optimism, number, and variety of thought-statements.

RESULTS: ANOVA showed: Participants in the primed-BPS condition emphasised hedonic well-being (p = .002). Participants in the Control condition emphasised physical well-being (p = .001). The BPS participants provided significantly fewer thought-statements and referenced fewer well-being components. There was no condition effect for: eudaimonic, social, or psychological well-being; positive or negative affect; optimism, and number of thought-statements.

CONCLUSIONS: There were no condition differences for positive affect and yet thoughts were broadened for participants in the Control and primed-BPS conditions. We suggest that the specific content on the autobiographical interventions primed participants to exhibit broadened thoughts, rather than positive emotions. The control condition reflected on the last 24 hours and critically evaluated their food and exercise choices – their TARs emphasised physical well-being. The primed-BPS condition reflected on the happier and more satisfactory elements of their life over the last 12 months – their TAR emphasis reflected hedonic well-being. Priming the BPS with a positive-mood induction did not improve efficacy. Our research casts doubt on the broaden hypothesis as an explanation for the efficacy of the BPS.

5. Mr Glenn Holmes
Honours Student, Centre for Human Factors and Sociotechnical Systems, School of Social Sciences, Faculty of Arts, Business and Law, USC

Sports Concussion – Who is in Control?

BACKGROUND: In high speed, contact sports, such as rugby union (rugby), sports concussion has been attracting increasing concern both in Australia and internationally. Most symptoms and signs of concussion resolve naturally, however long-term complications can occur if the injury is not managed appropriately (e.g., McCrory et al., 2013, Partridge & Hall, 2014). This is especially a concern in amateur grades of sport, where it is unclear how consistently a strict concussion management plan is enforced (Hollis et al., 2012, Shuttleworth-Edwards et al., 2008). For improvements to be made to the management of concussion in amateur rugby the factors influencing and interacting within individual sport systems need to be understood.

AIMS: The aim of this research was to use human factors methods to identify the system-wide control structures and performance constraints influencing the management of sport-related concussion in amateur rugby union.

METHOD: Using Leveson’s (2004) Systems-Theoretic Accident Model and Process (STAMP), a STAMP model was developed to identify the actors, management control structures, and interacting factors influencing the management of sport-related concussion in amateur rugby. The STAMP model was then sent to experts for evaluation in a Delphi study. The feedback was utilised to revise the model, which was then returned to the same experts for either approval or rejection.

RESULTS: The key concussion management pathways were identified with 80% agreement with SMEs. Consistent concussion management in amateur rugby was found to have several barriers.

CONCLUSION: The findings of this study have practical implications for the improved management of sport-related concussion in amateur rugby in Australia. Through the identification of the control structures and performance constraints currently impeding the effective management of sport-related concussion, this theory-driven concussion management model has the ability to drive a positive change in improving the safety of sporting participants.

6. Dr Michael Nam
UQ Cardiology PhD Research Fellow, VasoActive Research Group

Myocardial Blood Flow Reserve is impaired in Patients with Aortic Valve Calcification and Unobstructed Epicardial Coronary Arteries

BACKGROUND: Although calcific aortic valve disease (CAVD) is associated with coronary atherosclerosis, it is not known whether early CAVD is associated with coronary microcirculatory dysfunction (CMD). We sought to investigate the relationship between myocardial blood flow reserve (MBFR) – a measure of CMD, and early CAVD in the absence of obstructive epicardial coronary artery disease. We also determined whether this relationship was independent of coronary artery disease (CAD) and hs-CRP, a marker of systemic inflammation.

METHODS: 183 patients with chest pain and unobstructed coronary arteries were studied. Aortic valve calcification score (AVCS), coronary total plaque length (TPL), and coronary calcium score were quantified from multislice CT. MBFR was assessed using vasodilator myocardial contrast echocardiography. Hs-CRP was measured from venous blood using a particle-enhanced immunoassay.

RESULTS: Mean(±SD) participant age was 59.8(9.6) years. Mean AVCS was 68(258) AU. TPL was 15.6(22.2) mm, and median coronary calcification score was 43.5AU. Mean MBFR was 2.20(0.52). Mean hs-CRP was 2.52(3.86) mg/L. Multivariable linear regression modelling incorporating demographics, coronary plaque characteristics, MBFR, and inflammatory markers, demonstrated that age (=-0.05, 95%CI:0.02,0.08, P=0.007), hs-CRP (=0.09, CI:0.02,0.16, P=0.010) and diabetes (=1.03, CI:0.08,1.98, P=0.033), were positively associated with AVCS. MBFR (-0.87, CI:1.44,-0.30, P=0.003), BMI (-=0.11, CI:-0.21,-0.01, P=0.033), and LDL (-0.32, CI:-0.61,-0.03, P=0.029) were negatively associated with AVCS. TPL and coronary calcium score were not independently associated with AVCS when included in the regression model.

CONCLUSION: Coronary microvascular function as determined by measurement of myocardial blood flow reserve is independently associated with early CAVD. This effect is independent of the presence of coronary artery disease and also systemic inflammation.

7. Dr Michael Nam
UQ Cardiology PhD Research Fellow, VasoActive Research Group

The dose–response effect of hyperinsulinemic euglycaemia using insulin–dextrose clamps on myocardial microvascular function

BACKGROUND AND AIMS: Insulin is a potent vasodilator which acts via the endothelial nitrous oxide pathway. Supraphysiological hyperinsulinemic euglycaemia has been shown to increase myocardial blood flow. However the optimal dose of parenteral insulin infusion to exert maximum vasodilatory effect on the coronary microcirculation
is unknown. Therefore, we investigated the relationship between myocardial blood flow reserve (MBFR), a measure of coronary microvascular function, and insulin infusion dose.

**METHOD AND RESULTS:** 21 healthy volunteers (mean age 66 yrs, range 47–79) underwent hyperinsulinaemic euglycemic (HE) clamps for 60 minutes (8, 5, and 8 participants received 0.5, 1.5, and 3.0 mU/kg/min insulin, respectively). Baseline demographic and biochemical indices were similar across all three groups. Low-power real-time myocardial contrast echocardiography with flash impulse imaging was performed using vasodilator dipyridamole stress to quantify MBFR at baseline, and at 60 minutes after commencing the HE clamp. Mean(SD) baseline MBFR values were 2.2(0.4), 2.5(0.2), and 2.6(0.3), and post-insulin MBFR’s were 2.3(0.7), 3.4(0.8), and 2.2(0.3) in the 0.5, 1.5, and 3.0 mU/kg/min dose groups, respectively. This represents an increase in MBFR of 5% and 36% in the 0.5 and 1.5 insulin dose groups, and a decrease in MBFR of 15% in the 3.0 insulin dose group (p=0.89, 0.04, 0.04, respectively).

**CONCLUSION:** We observed a non-linear dose effect of insulin infusion dose on coronary microvascular dilatation in healthy volunteers. Of the 3 insulin doses tested, 0.5 mU/kg/min had no effect, 1.5 mU/kg/min resulted in a 36% increase, and 3.0 mU/kg/min resulted in a 15% decrease, in MBFR.

**8. Dr Katharina Merollini**

**USC Research Fellow, School of Health and Sport Sciences, Faculty of Science, Health, Education and Engineering, USC**

**Costs of Surviving Cancer – a Queensland study (COS-Q)**

**BACKGROUND:** Australia-wide there are currently more than 1 million cancer survivors. A trend of increasing cancer incidence and prolonged survival places a large burden on health care systems. No other Australian study has investigated long-term health and cost outcomes of all cancer survivors in any given state. More specific information is required for the Australian context and economic modelling provides an ideal platform to analyse long-term outcomes of cancer survivors and to predict future health service delivery needs.

**OBJECTIVES:**

1. To quantify health service usage of cancer patients in Queensland over time and to assess differences compared to a matched non-cancer control group.
2. To identify factors associated with higher health service utilisation in the cancer group.
3. To estimate life-time health service usage and costs using economic modelling.
4. To identify opportunities of improvement for future health service delivery.

**METHODS:** All Queensland residents diagnosed with a first primary malignancy from 1997–2015 will form the cohort of interest. By linking state and national healthcare databases we will capture the whole journey of health service contact, including hospital admissions, emergency presentations, healthcare purchasing, death records, cancer registry records, Medicare services and pharmaceuticals. Objectives 1–2 will be addressed by applying rigorous statistical analyses, objectives 3–4 will employ economic models using cohort simulation techniques and probabilistic modelling.

**EXPECTED OUTCOMES:** This study will indicate long-term healthcare costs of cancer survivors in Queensland and identify underlying factors contributing to healthcare expenditures. We will inform policy makers in Queensland/ Australia and facilitate future planning of healthcare resource utilisation to aid efficient health service delivery. This work will also form a body of evidence to highlight the potential impact of cancer prevention on public resources and might lead to more investments in cancer prevention and/or survivorship care to the benefit of both cancer patients and the wider community.

**9. Mr Thys Matthew**

**Masters by Research Student, InFlame, School of Health and Sport Sciences, Faculty of Science, Health, Education and Engineering, USC**

**The Shifting Demographics of Sunshine Coast Lung Cancer Patients**

The landscape of lung cancer treatment has advanced significantly since the introduction of targeted therapies. Clinicians are now often able to define specific oncogenic driver mutations associated with lung cancer and treat their patients with drugs that specifically target them. The spectrum of molecular changes in lung cancer patients is strongly related to demographics and smoking behaviour. Mutations in both the epithelial growth factor receptor (EGFR) and anaplastic lymphoma kinase (ALK) genes are statistically more likely in young non-smokers and mutations in the Kirsten Rat Sarcoma (KRAS) gene are more frequently associated with a strong smoking history.

To date, there has been no specific analysis of demographic shifting within lung cancer patients of the Sunshine Coast Hospital and Health Service (SCHHS) to anticipate oncogenic mutational prevalence for future treatments.

This study has performed a retrospective review of data associated with lung cancer cases diagnosed and treated at SCHHS between 2010 and 2015. Information was drawn from existing sources including Auslab, Queensland Oncology Online (QOOL), Nambour Lung Multi-Disciplinary Team minutes and SCHHS medical records.

The typical lung cancer patient on the Sunshine Coast is Caucasian, male, elderly and a smoker. This limits the ability to generalise from the experience of the world literature to the Queensland population.

The results concluded from this project predict a steady increase in lung adenocarcinoma in female patients that have never smoked and a decrease in male current smokers. Interestingly, the average age of lung adenocarcinoma patients at the time of diagnosis continues to increase. This could be due to an aging population on the Sunshine Coast and may therefore subside over the coming decade.

As these demographics change, it is likely we will see a different frequency/spectrum of oncogenic driver mutations in lung adenocarcinoma patients on the Sunshine Coast.
10. Professor Kim Greaves
Director of Cardiac Research, Sunshine Coast University Hospital

The Thrombolysis in Myocardial Infarction Risk Score in Combination with Presentation High-Sensitivity Troponin Testing in Patients with Suspected Acute Coronary Syndrome

High-sensitivity troponin assays may be used to rule-out acute coronary syndromes in low risk patients with chest pain after a single test taken at presentation to the Emergency Department. Whether the Thrombolysis in Myocardial Infarction (TIMI) score can be used in combination with a single test to facilitate early discharge is unknown.

OBJECTIVES: To evaluate the Limit of Detection of high-sensitivity troponin (T or I) and TIMI score combination rule-out strategy, and establish the optimal TIMI score threshold.

DESIGN: Six international (Australia, New Zealand and United Kingdom) studies; three observational cohorts, two randomized controlled and one intervention trial. Recruitment: November 1, 2007 to January 1, 2015. Adults presenting with chest pain suggestive of cardiac ischemia were included. Participants had a non-ischemic ECG, TIMI score and high-sensitivity troponin (T or I) measured at presentation. For troponin T, 3,159 patients (mean age 59.3 [SD 13.3] years; 1,866 [59.1%] male) were included, and for troponin I 4,532 (mean age 57.2 [SD 13.0] years; 2,964 [59.4%] male).

OUTCOMES: 30-day Major Adverse Cardiac Events adjudicated with serial troponin testing. Secondary outcome: proportion of patients potentially suitable for early discharge.

RESULTS: For troponin T, 376 (11.9%) developed 30-day outcomes and 445 (9.8%) for troponin I. For TIMI 0, sensitivity for 30-day outcomes was 99.5% (95% CI 98.1%-99.9%) with troponin T <5ng/L, and 98.9% (97.4%-99.6%) with troponin I <2ng/L; 17.9% and 21.0% suitable for discharge, respectively. For TIMI≤1 sensitivity was 98.9% (97.3%-99.7%) with troponin T <5ng/L and 98.4% (96.8%-99.4%) with troponin I <2ng/L; 28.1% and 35.7% as suitable for discharge, respectively. For TIMI≤2, meta-sensitivity was 99% with either assay.

CONCLUSION: A rule-out strategy combining a single value below the Limit of Detection of high-sensitivity troponin with the TIMI score is supported. The TIMI score threshold suggested for clinical use is 0.

11. Dr Stephanie Sargent
Sunshine Coast Hospital and Health Service

Relationship between epicardial fat volume and coronary microvascular dysfunction in patients with chest pain and unobstructed coronary arteries

INTRODUCTION: There is an increased incidence of cardiac events in patients presenting with chest pain and unobstructed coronaries (CPUCA). This has been linked to the presence of coronary microvascular dysfunction (CMD). Epicardial fat volume (EFV) has recently been shown to be related to CMD. However, its relative influence in patients with CPUCA is unknown.

PURPOSE: We investigated the correlation between EFV and CMD and whether EFV was associated with Framingham Risk Score (FRS), a recognised predictor of future cardiovascular events.

METHODS: We recruited 134 patients presenting with chest pain with luminal diameter stenosis less than 50% on CTCA. EFV (cm³) was measured through serial slices of parietal pericardium from bifurcation of the pulmonary artery to diaphragm with a range of (~45 -190) Hounsfield Units. Myocardial blood flow reserve (MBFR), a measure of CMD, was measured using vasodilator myocardial contrast echocardiography. Data were analysed for mean (SD) and proportion (%). Correlations were assessed using Pearson’s correlation coefficient. Univariate regression models were constructed using a standard least-square linear technique.

RESULTS: Mean age was 59.2 years (9.8) of whom 49.2% were male. Mean EFV was 137.0 ml (55.4). Mean MBFR was 2.18 (0.53). Intra-observer correlation ranged from R = +0.94 to R = +0.98. EFV and MBFR had a correlation coefficient of R = -0.22. Formal univariate regression modelling revealed a significant regression slope (β = -0.002, P = 0.012) but a poor model fit (R² = 0.04). EFV and FRS had a correlation coefficient of R = +0.35. Formal univariate regression modelling revealed a highly significant regression slope (β = +0.04, P < 0.001) and a better model fit (R² = 0.13).

CONCLUSION: In summary, EFV is independently associated with CMD and also FRS, a recognised predictor of future cardiovascular events.

12. Miss Elise Berber
Honours Student, Centre for Human Factors and Sociotechnical Systems, School of Social Sciences, Faculty of Arts, Business and Law, USC

Performance Pathways in the Sport of Dressage

Australia has had numerous amounts of success at the Olympics in the eventing discipline but have struggled to send a team in the discipline of dressage. One identified potential limitation is the current performance pathway. Performance pathways are important in sport as they give athletes direction in their training and competing, provide opportunities for talented athletes to be recognised and allow athletes to acquire the mental and physical skills needed to achieve success and develop self-confidence and intrinsic motivation. The current literature on performance pathways and talent development is limited in its reductionist approach and the current performance pathway in dressage has also not been objectively evaluated.

The current study aims to identify what the current performance pathways in dressage are, and the barriers and feedback loops that influence progression through performance pathways. Study one will include: Validating a STAMP model of the Australian Dressage Pathways through an adapted Delphi study which includes semi-structured interviews with 15 human factors and equestrian dressage experts. Study Two will include: Identification of barriers to performance within and progression through performance pathway through an online survey. Participants will include approximately 400 individuals involved in Australian Dressage.

The results from the current study will be the first of its kind within Australia and provide the first complete model of dressage performance pathways identifying all the entities that exist within the system and the control relationships between them. The model will assist equestrian stakeholders to understand and describe the current performance pathways and the perceived barriers to current success at the world stage. It may also be used to underpin further performance research, which consequently will improve Olympic and World Equestrian Games success, therefore fostering Australia’s national sporting identity. Direct benefits for individual participants include gaining access to performance pathways system model.
Identification of novel antimicrobial compounds from Australian Myrtaceae species

Plants have been used for their medicinal properties for thousands of years. They produce thousands of structurally diverse secondary metabolites, including aromatic compounds, many of which have antimicrobial activity. However, it has been estimated that only 15% of higher plant species have been phyto-chemically analysed, and even a smaller percentage evaluated for their antibacterial properties.

With the emergence of multiple antibiotic resistant bacterial species, the discovery of antimicrobial compounds from natural sources has regained prominence. The major aim of this study is to comprehensively identify and characterise novel compounds in Australian Myrtaceae species (Eucalyptus, Corymbia, Angophora and Syncarpia) that have antimicrobial activity against multiple ESKEAPE pathogens.

Uniquely, three distinct bioactivity assays will be used to assess antimicrobial activity in extracts from these species. Firstly, standard high-throughput MIC/MBC assays will be used to assess bactericidal and bacteriostatic activity. Secondly, biofilm specific screens will be used to determine if extracts inhibit biofilm formation of selected species. Thirdly, we will use a reporter-gene assay to identify inhibitors of the RegA response regulator of Citrobacter rodentium. Response regulators are exciting antimicrobial targets because the inhibition of key virulence regulators may attenuate the pathogenicity of the target bacteria while leaving the commensal microflora intact. Selected fractions with bioactivity will be further purified, and individual compounds subjected to additional functional assays.

13. Miss Malin Olsson
HDR Candidate, InFlame, School of Health and Sport Sciences, Faculty of Science, Health, Education and Engineering, USC

14. Ms Elizabeth Pressick
HDR Candidate and Exercise Physiologist and Exercise Scientist, Cluster for Health Improvement, School of Health and Sport Sciences, Faculty of Science, Health, Education and Engineering, USC

Poster Presentation: Gibir Galangur Program

The Play sport, live better! research project was inspired by a major issue, that of an ageing world population, low physical activity rates in this population and the subsequent impact on quality of life and health. The research is further motivated by health disparities between Indigenous Australians and their non-Indigenous counterparts resulting in low life expectancy predominantly due to chronic diseases and low physical activity rates. This research has international significance as it seizes a unique opportunity to address worldwide priorities identified by the World Health Organisation.

The objectives of the research are to design and implement a culturally appropriate group-based modified sport program for Indigenous Australian men, and to work collaboratively with Closing the Gap Programs and local government agencies in south-east Queensland to integrate the program into existing Closing the Gap Programs that adds diversity of choice to existing physical activity options.

The Gibir Galangur Program is the outcome of this collaboration and was informed by a systematic literature review that evaluated research into the effectiveness of group-based sport and exercise programs targeting Indigenous adults on anthropometric, physiological and quality of life outcomes.

A computer-based literature search of relevant health databases was conducted. Methodological quality of individual articles was assessed using McMasters University Guidelines and Appraisal Forms for Critical Review for Quantitative Research where results were summarised.

Six articles were identified with critical appraisal scores ranging from 6–12 (from a possible 15 points), with a mean score of 9.6. Five articles were of moderate to good quality. Significant improvements were observed in anthropometric, physiological and quality of life outcomes across all studies.

Elements of successful group-based exercise and sport programs corresponded to global recommendations on physical activity for health for 18 to 64 year olds, and were implemented over a period of time ranging from 12–24 weeks to exhibit results, plus community consultation in developing programs and nutrition education.

15. Miss Rachel Aves
Honours Student, Centre for Human Factors and Sociotechnical Systems, School of Social Sciences Faculty of Arts, Business and Law, USC

Honour Among Thieves: Trust in Dark Net Markets

The trade of stolen or fraudulent identity information in anonymised Dark Net Markets (DNM) is a significant issue with major personal, societal, and economic consequences. Law Enforcement Agencies (LEA) attempt to emulate trustworthy behaviours to infiltrate DNMs and disrupt trust between users to erode the market’s reputation. However, in an online platform dedicated to privacy, identifying trust activities to imitate and target is a difficult task. As such, trust research in the sociotechnical domain of DNMs is limited, especially from a systems perspective. This research aimed to employ the systems theory-based framework Event Analysis of Systemic Teamwork (EAST) to establish how trust mechanisms were communicated through interconnected task, social, and information networks. Uncovering indicator integrity evaluation mechanisms was also key to recommend improvements to LEA monitoring and infiltration tactics.

Results showed some similarities between surface and DNM trust indicators and that trust building was a complex phenomenon involving multiple tasks, agents, and information sources. DNM administrators conveyed trustworthiness by managing a functional, secure platform to facilitate trading of identity-related products between vendors and buyers. Forum and feedback systems were intricately connected in a communication cycle of promise promotion and affirmation regarding product quality and delivery. Indicator integrity was evaluated through demonstrations of ongoing investment in the market and historical evidence of promise fulfilment. Advice on LEA infiltration strategies centred on building a presence in forums and targeting non-human agents for trust disruption to have wider reaching, more effective consequences. Further research opportunities related to deeper DNM engagement and more targeted investigation into feedback mechanisms.
Sedentary behaviour of university students

Sedentary behaviour (SB) is rapidly becoming a major public health priority worldwide, which has been termed the new “smoking” of the 21st century. It is a relatively new risk factor within the public health sector which has already attracted worldwide attention. SB is associated with an increased risk of CVD, diabetes and other illnesses and health problems. SB is commonly defined as any activity in the reclined or seated position that does not increase resting expenditure above the resting metabolic rate (i.e., 1.0–1.5 METS). Common SB include driving, seated school work and screen time.

Currently, most research on SB is focused around children and adolescents, consequently less research is focused on adults, particularly university students. Despite university being a predominately sedentary environment. For example: studying, attending classes, traveling to and from university, as well as sitting and hanging out with other students. There is limited data which exists on the prevalence of SB of university students and where it is occurring. Therefore, a questionnaire was developed to uncover what domains SB is occurring, the barriers and enablers of SB and the socio-demographic attributes of those behaviours.

The questionnaire is based off a well-established survey called SIT-q-7d. However, questions have been altered slightly to fit the research projects aims and additional questions have also been included. This questionnaire will be distributed to all first year and third year equivalent students who attend USC and Bond University. Data has been collected at USC and is currently half way through at Bond University.

Invasion and translocation of uropathogenic Escherichia coli isolated from urosepsis and patients with community acquired urinary tract infection

Uropathogenic E.coli (UPEC) strains have been commonly found in the gut of the same patient at the time of urinary tract infection (UTI). We hypothesised that under such conditions, they may translocate from the gut to blood stream whilst they are causing UTI. To test this hypothesis, 75 E. coli strains representing 75 commonly found clones of UPEC isolated from the blood of hospitalised patients with UTI (urosepsis) (n=22), hospital-acquired (HA) UTI without blood infection (n=24) and 29 E. coli strains isolated from patients with community-acquired (CA)-UTI were tested for their adhesion to, invasion and translocation through Caco-2 cells as well as the presence of 34 virulence genes (VGs) associated with E. coli causing extra-intestinal infection. Whilst there were no differences in the rate and degree of translocation between the groups, urosepsis and HA-UTI strains both showed significantly higher abilities to adhere (P=0.0095 and P<0.0001, respectively) and invade Caco-2 cells than CA-UTI isolates (P=0.0044, P=0.0048, respectively). Urosepsis strains also carried significantly more virulence genes than strains isolated from patients with only UTI and/or CA-UTI isolates. In contrast, the Ag43 allelic gene RS218 was found more commonly in UPEC strains isolated from patients with only UTI and/or CA-UTI isolates. These data indicate that UPEC strains irrespective of their sources are capable of translocating through gut epithelium. However, HA-UTI and urosepsis UPEC have a much better ability to interact with gut epithelium and have far more virulence potential than CA-UPEC that allows them to invade the blood.
19. Dr Martina Jelocnik
HDR Candidate, Centre for Animal Health Innovation, School of Science and Engineering, Faculty of Science, Health, Education and Engineering, USC

On the brink of infectious disease spill-over: From parrots to horses to humans...

Chlamydia psittaci is primarily an avian pathogen that infects wide range of hosts and is responsible for zoonotic transmission to humans causing pneumonia. During 2015–2016, in Scone and Wagga Wagga regions of NSW, it was observed that C. psittaci infects horses, potentially causing reproductive loss and that veterinarians can also contract C. psittaci infection too. Working together with partners from NSW Department of Primary Industries (DPI) and Public Health, we have investigated prevalence and performed molecular epidemiology C. psittaci infections of horses in order to understand the transmission, reservoirs and genetic identity of the infecting strains.

C. psittaci-specific qPCR screening was performed at NSW DPI on more than 300 individual samples taken from approximately 200 equine abortions, studs and mares, and the surrounding environment, while isolation of the organisms was attempted at the Westmead Hospital, NSW. Here at USC, we have performed molecular epidemiology and comparative genomics of the infecting C. psittaci strains.

C. psittaci organisms and DNA were present in the tissues of horses with reproductive loss, with infections being more widespread than previously thought in equine hosts. Molecular typing suggests that all horse strains are ‘identical’ to each other and that they belong to the globally disseminated highly virulent ‘parrot’ clade. The horse strains were also “identical” to the previously described Australian parrot and human C. psittaci strains, indicating ongoing transmission between parrots, horses and humans.

To date, this ongoing research resulted in a paper recently published in Emerging Microbes and Infections, describing the first equine C. psittaci infections and the public health risks in Australia. In addition, here at USC we are also developing rapid C. psittaci diagnostic test to be used at the Point-Of-Care and evaluated at DPI.

20. Professor Patrick Nunn
Professor in Geography, Sustainability Research Centre, Faculty of Arts, Business and Law, USC

Harnessing Spiritual Wellbeing for Effective Climate Change Adaptation in Pacific Islands

Surveys show that >98% of Pacific Island people identify as religious. A recent survey of 1,226 Pacific Island tertiary students found that >80% attend church at least weekly. Spiritual beliefs define contemporary Pacific Island world views bestowing a high degree of mental wellbeing on communities, especially in rural areas, that are grappling with a range of livelihood challenges. Yet responses to many of these challenges are also invariably contextualised within these world views, something many outside agencies often overlook.

Recent research suggests that many interventions for climate-change adaptation in the Pacific Islands for more than thirty years have failed to be either effective or sustained because they have been secular in nature. It is considered likely that engagement with religious agendas and organisations in the Pacific to develop pathways for community-level climate-change adaptation is likely to succeed in embedding this as the need for it becomes ever more exigent.

21. Dr Bridie Scott-Parker
Senior Research Fellow, School of Social Sciences, Faculty of Arts, Business and Law, USC

Understanding Anxiety about Climate Change among Fiji Adolescents

Pacific Island countries are particularly vulnerable to future manifestations of climate change due to high coastline-to-land-area ratios, and high dependence of inhabitants on natural ecosystems. While everyone in the Pacific Islands should participate in climate change adaptation activities, given they are the generation likely to not only bear the burden of climate change, but to lead and live effective climate change adaptation specific to their region, the involvement of youth is critical. Pacific Island youths are often marginalised within traditional decision-making hierarchies, therefore they are typically excluded from participating in meaningful discussions at community and government levels. Discussions were held with 30 adolescents aged 14–18 years in Fiji to explore knowledge and experiences regarding climate change. Participants revealed their dismay at their inability to talk to family—who they consider are not doing enough—about what they consider as appropriate responses to climate change, recommending the help of an authoritative outsider who could speak to their community leaders and family. Discussions also revealed that Fijian youth could not distinguish between changes in the climate and normal weather events, attesting to the importance of climate-change education and awareness-raising efforts within the Pacific Islands more generally.

22. Mrs Roselyn Kumar
Research Assistant, Sustainability Research Centre, Faculty of Arts, Business and Law, USC

Climate Change and Mental Health in Rural Fiji (Southwest Pacific)

People in many parts of the world, especially in poorer (developing) countries, subsist routinely from the lands they occupy and are often only partly within the cash economy. To such people, climate change is less of an economic challenge but rather an issue of survival. It is not something they believe can be overcome with money but rather solutions that assure livelihoods, especially food security. For this reason, the mental health challenges of climate change in such places are often fundamentally different to those in richer countries like Australia. Several studies by the authors (and other collaborators) are exploring these challenges in the Pacific Islands region. This report is from the Fiji Islands where, between 2008 and 2017, relevant data has been collected using semi-structured interviews (in preferred vernacular languages) and focus groups from forty-three rural communities throughout the archipelago.
The researchers found that every community visited had witnessed environmental changes in recent years/decades that it regarded as anomalous. Common examples included shoreline recession, increased lowland flooding, uncertain seasons (and associated fruiting of wild plants). To understand the psychological impacts of these observations, we conducted several in-depth interviews and found that there are indeed high degrees of anxiety. Yet much comfort at an individual level is obtained from people’s spiritual beliefs and religious participation, while much resilience derives from confronting such challenges as a community rather than alone. These insights identify key directions for future research.

23. Ms Sarah Glencross
HDR Candidate, School of Social Sciences, Faculty of Arts, Business and Law, USC

Internet access and IT skills in adults with intellectual disability in Queensland

Rapid growth in internet usage and the prevalence of websites has meant that access to web content is increasingly important for communication, community engagement, and the use of services such as the National Disability Insurance Scheme. It has been argued that individuals who do not use the internet due to lack of physical access or skill are at risk of becoming a ‘web underclass’ who are disadvantaged socially, economically, and civically. This disadvantage is potentially compounded for individuals who already experience a lack of control and opportunity in their everyday lives such as those with intellectual disability (ID). ID is characterised by deficits in general mental abilities such as reasoning, problem solving, and planning. People with ID experience impairments in adaptive functioning which hinder their ability to meet normative standards of personal independence and social responsibility. A person’s level of adaptive functioning can be influenced by factors such as intellectual capability, motivation, and coexisting medical conditions or mental disorders. Consequently, individual needs vary greatly and even when people with ID have physical access to the internet it cannot be assumed they can effectively access content in a way which is equitable with other users. The present research will examine the experience of a representative group of adults with ID in Queensland as they use the internet to access a service. It is intended that the research will indicate the proportion of individuals with ID who have physical access to the internet and the proportion who have the necessary skills to access a website. The research will also focus on participants’ ability to create and memorise a password and the extent to which their attitudes towards the internet can be used to predict their internet usage, these findings will inform the design of future training programs for people with ID.

24. Dr Mark Utting
Senior Lecturer, ICT, School of Business, Faculty of Arts, Business and Law, USC

BioDigital Human

We show the first multi-user interaction app for the USC CAVE. An interactive anatomy program, with multi-user quiz facilities.
Rise, and shine.