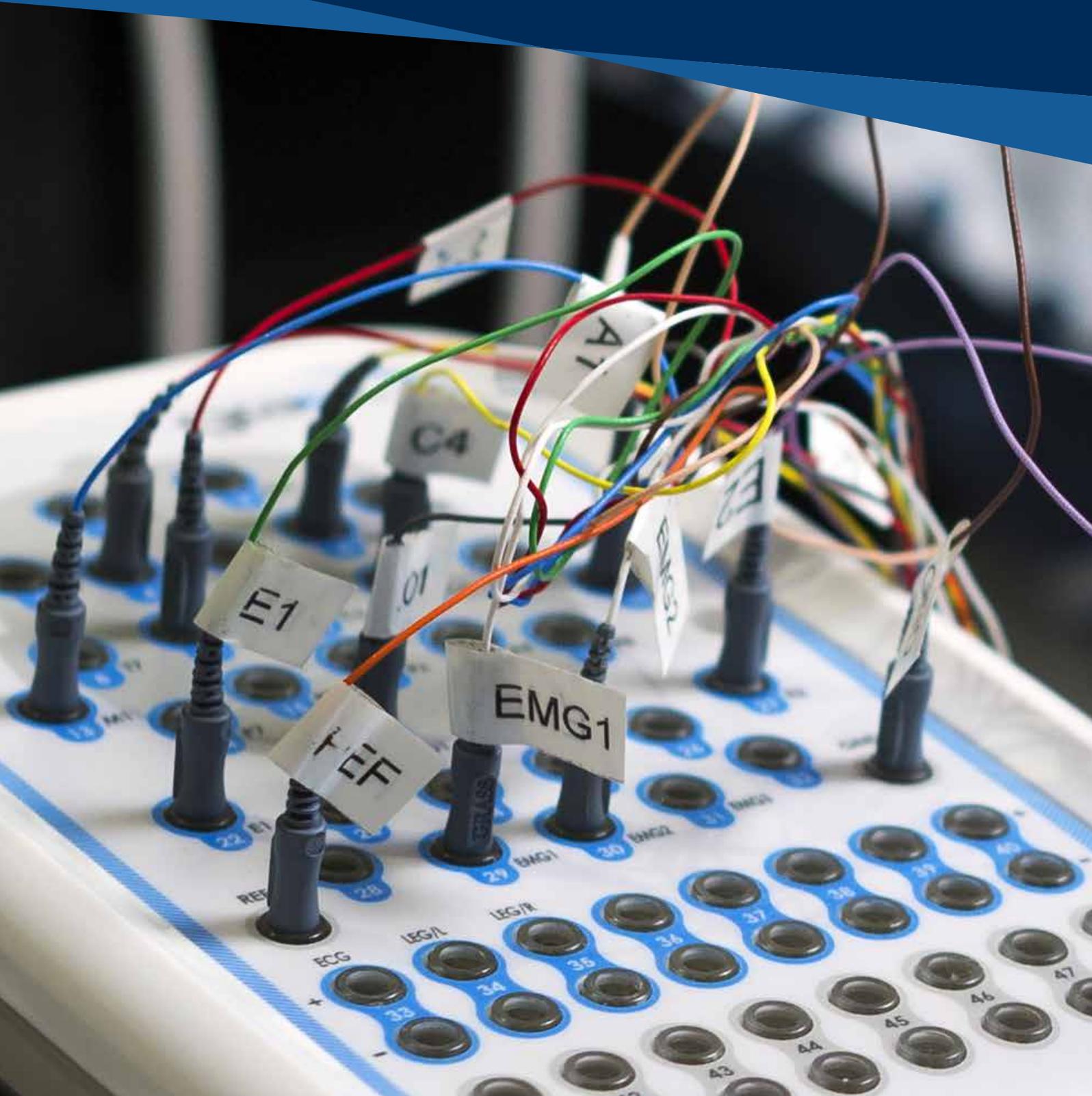


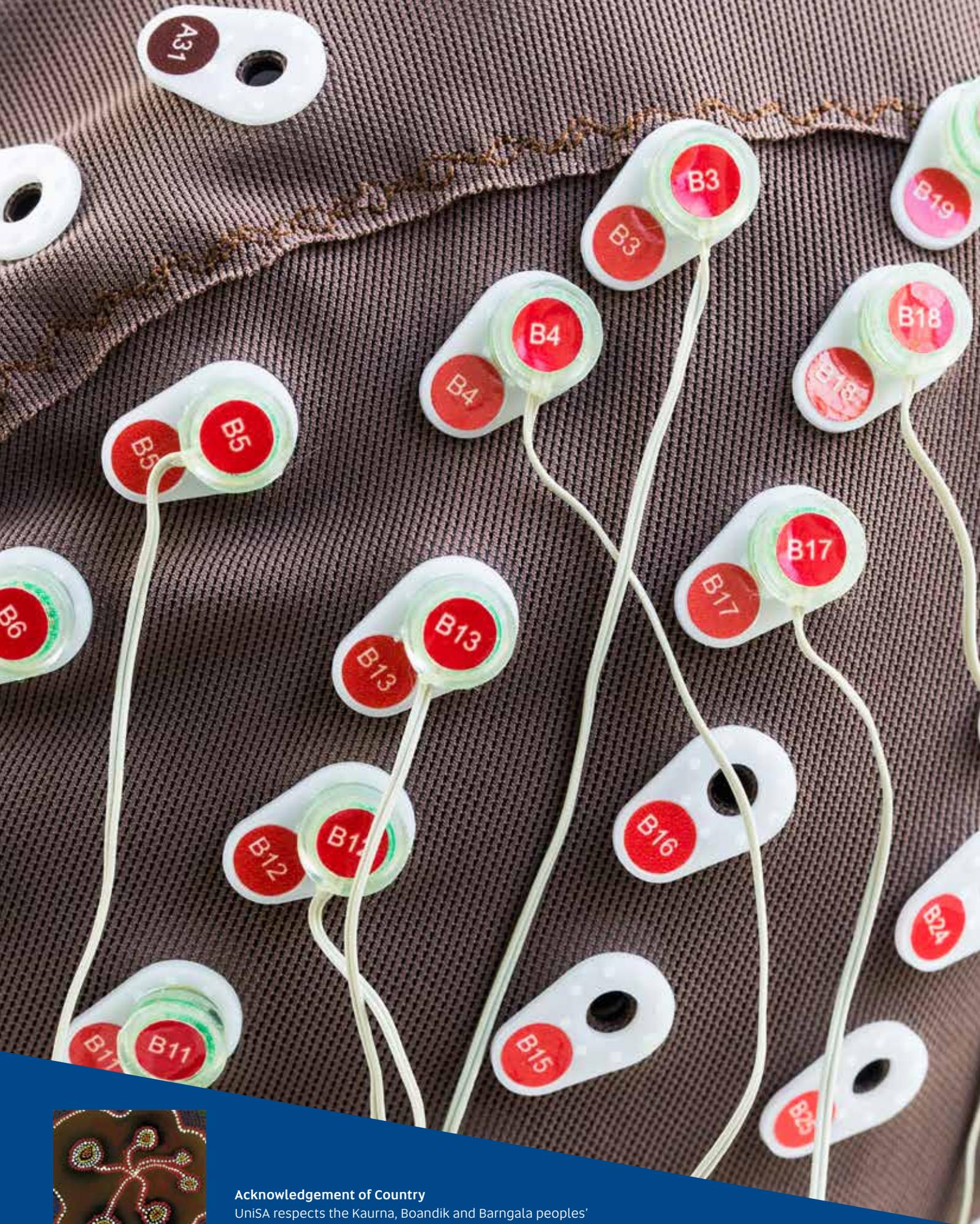


University of
South Australia

Behaviour Brain Body Research Centre

Bringing together expertise in sleep, nutrition and activity.





Acknowledgement of Country

UnISA respects the Kaurna, Boandik and Barngala peoples' spiritual relationship with their country. We also acknowledge the diversity of Aboriginal peoples, past and present.

Find out more about the University's commitment to reconciliation at unisa.edu.au/RAP

WHO WE ARE

THE BEHAVIOUR BRAIN BODY RESEARCH CENTRE (BBB) BRINGS TOGETHER EXPERTISE IN SLEEP, NUTRITION AND ACTIVITY, AND THEIR COMBINED IMPACT ON HEALTHY FUNCTIONING ACROSS THE LIFESPAN.

Behavioural risk factors, including inadequate sleep, poor diet, and lack of exercise, are significant contributors to healthy functioning. Our researchers are working on projects that span from behavioural predictors and interventions to improve foetal health, through school and the working career, to late life.

The BBB Centre encompasses two research laboratories- the Sleep and Chronobiology Laboratory (SCBL), and the Cognitive Ageing and Impairment Neurosciences (CAIN).

Sleep and Chronobiology Laboratory (SCBL)

As one of Australia's premier sleep research facilities, the SCBL is where the latest sleep research is born. Our researchers undertake studies to further extend an understanding and perception of human performance, sleep, fatigue and behaviour.

With a focus on sleep from babies through to the elderly, the lab uses psychophysiological measures such as electroencephalograph (EEG), circadian markers (such as salivary and plasma melatonin and cortisol), cardio-metabolic indicators (including blood glucose and insulin levels), and performance measures (such as cognitive and behavioural tests).

Cognitive Ageing and Impairment Neurosciences (CAIN) Laboratory

CAIN focuses on understanding how and why cognition changes across the lifespan, particularly in late-life, in both health and disease, and the fundamental brain mechanisms underlying these changes. Researchers in CAIN also work to evaluate the effectiveness of interventions to reverse or delay the progression of cognitive impairments.

The lab employs psychophysiological methods such as EEG, eye-tracking and transcranial doppler (TCD), along with cognitive testing.

The BBB team work together to understand the role of sleep, circadian disruption, nutrition, and physical activity in as predictors of:

- > Foetal health
- > Resilient school learners
- > Metabolic disease in shift workers
- > Impairment in high performance environments
- > Cognitive functioning through cancer treatment
- > Early indicators of dementia risk.



WHY WE DO WHAT WE DO

Chronic illness, injury prevention and control are critical health priorities in Australia. Responsible for nine out of 10 deaths, conservatively estimated at \$2.3 million per year, these costs are considered preventable because behavioural risk factors (including inadequate sleep, poor diet, and lack of exercise) are significant contributors to healthy functioning.

Researchers in BBB combine expertise in bio-behavioural predictors and mechanisms that lead to chronic illness and injury. Our work and insights help to:

- > Prevent chronic disease and injury
- > Reduce associated costs
- > Create novel options for intervention using our expertise and focus on psychology and behavioural science.

BBB researchers bring their integrated expertise in sleep and circadian rhythms, nutritional physiology, activity, metabolism, cardiovascular disease, dementia, cancer, biostatistics, and workplace injury and error prevention to work together on projects promoting healthy functioning across the lifespan. The synergy allows us to take a holistic bio-behavioural approach to health in order to address the multifaceted challenges of our end-users.

OUR PEOPLE

The BBB Centre is co-lead by Associate Professor Siobhan Banks and Associate Professor Jill Dorrian.

BBB Leadership team:

Professor Kurt Lushington

Dr Hannah Keage

Dr Tobias Loetscher

Dr Mark Kohler

Dr Amanda Hutchinson

Dr Stephanie Centofanti

Associate Professor Alison Coates

Dr Ashleigh Smith



COLLABORATIONS AND CONSULTANCY

Science for the Workplace

For our partners, the big challenge over the last 20 years has been to keep people safe under conditions of sleep loss. This has been primarily applied in 24/7 industries. The next research frontier for industry is health and wellbeing. In order to study this current big challenge, we need to examine the complex interplay between health behaviours.

The enterprising way we partner pivots on our ability to bring people with different expertise together to answer these big challenges.

Experts from BBB are available for collaborations and consulting work across areas relating to:

- > Shiftwork
- > Fatigue management
- > Industrial relations
- > Human factors
- > Safety management
- > Worker participation
- > Workplace agreements

Our trained and skilled facilitators are able to assist you with strategic planning, intervention and industry development within your area of need.

We also provide practical guidance to organisations, employers, employees and families on how to eliminate or minimise the risks associated with shiftwork.

We have worked with more than 100 major Australian companies and groups including: Defence Sciences Technology Group, Safework SA, SA Health, Bushfire CRC, Valmar Support Services, Harmony Gold Mine, CFMEU and Adelaide City Council. Our international client list is also varied and includes major air, rail and transportation companies.

If you would like to connect with BBB or collaborate, please get in contact to discuss opportunities for collaboration or consultancy.

CASE STUDY ONE

RESILIENT YOUTH AUSTRALIA COLLABORATION

The BBB Centre has been working closely with Resilient Youth Australia, Limited (RYA) - a not-for-profit organisation dedicated to measurably improving the resilience of young people so they can thrive in our communities and world.

RYA uses large-scale data collection and analysis to measurably improve the resilience of young people. To date, they have implemented their approach with more than 180,000 students in year three to 12 across 800 schools in Australia.

The University of South Australia and RYA are currently working on a ground-breaking program of research and training in the evidence-based promotion of bio-psycho-social health in Australian schools for resilient youth development.

Through school visits and presentations to students, parents and teachers, along with students spending time in our on-campus labs, we're working to analyse and publish findings from RYA's data set to inform and share lessons in scientific and community forums.

KEY FINDINGS



Data across >180,000 children, eight-18 years reveals that 25% of year three students text-message at night during the hours of 10pm-6am



This is increased to 83% by year 12



Smartphones in the bedroom rob sleep time, disrupt circadian rhythms, and facilitate communication during the circadian low, impairing communication.



These factors lead to disturbed mental health. The RYA data shows that night time texting frequency correlates with receiving hurtful texts, responding in anger, losing sleep over worry, and depressive symptoms.



However, night time messaging may foster social connection — critical for psychological resilience.



CASE STUDY TWO

VASCULAR CONTRIBUTIONS TO DEMENTIA: PREVENTION IN THOSE AT HIGH-RISK

The BBB has a number of projects centred on vascular contributions to late-life cognitive decline and dementia, run through the CAIN laboratory. Primary modifiable risk factors for late-life dementia are vascular disease and factors such as hypertension, obesity, type II diabetes and high cholesterol, particularly if apparent in mid-life.

Individuals with these conditions are not only at high risk of late-life dementia, but they are also at high risk of requiring cardiovascular surgeries to address accrued heart disease, which puts them at additional dementia risk. 10,000 adults 65 years and over undergo cardiovascular surgeries in Australia each year.

They improve heart function but often leave older adults with delirium, impaired cognitive function and dementia, or higher dementia conversion risk.

What are we looking at?

We are interested in:

- > How can we predict dementia and cognitive consequences of cardiovascular surgeries in older adults, with an emphasis on the role of delirium? And;
- > Can we intervene to reduce dementia risk? We use brain imaging, cognitive, function and physiological measures to capture relevant data.

Why is this work important?

This work is innovative and clinically significant - it identifies and targets prevention strategies in a novel large high-risk dementia group. We know vascular disease/factors are primary modifiable risk factors for dementia; and that individuals with high vascular burdens often require invasive cardiovascular surgery in late-life, which puts them an additional risk of dementia.

What do we know already?

This work with a surgical context has grown from previous studies in community and population cohorts. We have already reported that:

- > Delirium is associated with increased cognitive decline and dementia risk.
- > Cerebrovascular dysfunction is associated with cognitive impairments in late-life.
- > Self-reported sleep characteristics predict cognitive decline in late-life.

TOP 10 SLEEP TIPS

We need seven-eight hours of sleep in order for our bodies to function well. To get the best night's sleep follow these ten tips:

1. Reduce caffeine in the evening before bed time.
2. Temperature in your bedroom should be kept cool.
3. Use block out blinds in your bedroom.
4. Soundproof your bedroom.
5. Unwind without TV.
6. Take technology out of the bedroom.
7. Try to have a consistent sleep / wake schedule.
8. Avoid heavy meals late at night.
9. Avoid smoking.
10. Avoid alcohol.



University of South Australia

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