




2021-2022 STUDENT PROJECT HANDBOOK


HONOURS | MASTERS | PhD





Menzies School of Health Research

2021-2022 Student Project Handbook



As one of Australia's leading medical research institutes dedicated to improving the health and wellbeing of Aboriginal and Torres Strait Islander people, and a leader in global and tropical research into life-threatening illnesses, Menzies School of Health Research continues to translate its research into effective partnerships and programs in communities across Australia and the Asia-Pacific region.

With a history of over 35 years of scientific discovery and public health achievement, Menzies continues its endeavour to break the cycle of disease and to reduce health inequities in Australia and the Asia-Pacific region, particularly for disadvantaged populations.

In partnership with Charles Darwin University, Menzies School of Health Research delivers high quality research degrees to PhD, Master by Research and Honours students. Our students are supported and mentored by world-class researchers in their respective research fields.

This booklet contains a list of currently available research projects for students in a range of research areas of indigenous health, global and tropical health, infectious diseases and child health. Students studying at Menzies School of Health are enrolled through Charles Darwin University.

More information about eligibility criteria and how to apply can be found on Charles Darwin University webpage . To find out more about scholarship opportunities available and application process please contact researchdegrees@menzies.edu.au

MENZIES DIVISIONS

WELLBEING
AND
PREVENTABLE
CHRONIC
DISEASES

CENTRE FOR
CHILD
DEVELOPMENT
AND
EDUCATION

GLOBAL AND
TROPICAL
HEALTH

CHILD HEALTH

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Iron Infusion in Haemodialysis Study: Intravenous Iron Polymaltose For Indigenous Patients with High Ferritin Levels on Haemodialysis (INFERR); A Prospective, Open-Label, Blinded Endpoint, Randomised Controlled Trial

WELLBEING AND PREVENTABLE CHRONIC DISEASES

MASTER BY RESEARCH

PhD

The INFERR study explores the safety and effectiveness of giving intravenous iron to Aboriginal and Torres Strait Islander patients on haemodialysis with anaemia, high ferritin (a marker of both iron levels and inflammation) and low blood levels of iron.

This treatment will potentially benefit the majority of haemodialysis patients in the Northern Territory (NT) who are currently receiving routine iron treatment, but for whom the safety and efficacy of treatment remains poorly defined.

A recent, large scale, multicentre, prospective, open label, blinded endpoint clinical trial from the UK (PIVOTAL) confirmed the safety and efficacy of high dose IV Iron (400mg of iron once a month). This provides the best evidence for standard iron treatment in people on dialysis. Most importantly, there were no differences in adverse effects such as increased risk of infections. However, the exclusion of patients with high ferritin makes the results of this trial difficult to extrapolate to dialysis patients in the NT given that the majority (> 80%) would have a ferritin higher than 700µg/L. This reinforces the need for a clinical trial to assess the safety and efficacy of IV iron in haemodialysis patients within the NT with high ferritin.

This study will generate evidence to underpin a part of routine care and to ensure we use IV iron appropriately for the benefit of Aboriginal and Torres Strait Island dialysis patients in the NT.

The MSc/PhD student will play a core part in this project and participate in all relevant aspects of the conduct of a large clinical trial. The focus of the PhD could be to address a range of planned analyses of key study outcomes using quantitative biostatistical methods; or to use qualitative methods to explore critical issues around engagement of Aboriginal and Torres Strait Islander Australians in clinical trial research.

Prof Alan Cass

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Supporting mental health and social wellbeing among men from migrant and refugee backgrounds resettling in the Northern Territory

WELLBEING AND PREVENTABLE CHRONIC DISEASES**MASTER BY RESEARCH****PhD**

Research exploring migrant and refugee men's mental health in Australia is scarce. However, preliminary research indicates that the social determinants of physical and mental illness among migrant and refugee men is higher than Australian-born men. Other research tells us that men are less likely than women to seek help when they are experiencing mental health issues. Migrants in Australia and globally are more likely to experience barriers to accessing healthcare, employment and social services, which may adversely affect mental health and wellbeing, particularly among recent migrants as they navigate new expectations and cultural norms. Barriers in accessing services are often attached to people's migrant and citizenship statuses, which determine their legal rights associated with work, education, healthcare and social security benefits. Additionally, migrants and refugees, particularly from non-English speaking countries, can also experience linguistic and/or cultural barriers when resettling in Australia.

This project aims to expand and deepen understandings about the complex mental health and wellbeing challenges that men from migrant and refugee backgrounds resettling in the Northern Territory experience. It will explore what services and supports are available to refugee and migrant men in the Northern Territory to meet their mental health and wellbeing needs and identify strategies and programs that are effective in this space. Partnering with mainstream and targeted mental health services working with migrants, the project proposes a participatory action research (PAR) approach with organisations to develop and adapt models of support to meet the needs of different cohorts of this population (young/old; urban/remote; different ethnicities, education levels, and English competencies).

There will be flexibility for the student to develop and adapt their research methods, likely through a combination of focus groups that follows an iterative approach to data collection and analysis, in collaboration with the partnering organisations. The supervisory team has connections to service providers and organisations working with migrant and refugee populations in the Darwin region. It is expected that the student will leverage these established relationships, however there is also space to develop new connections.

Prof James Smith

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Confident and Healthy Aboriginal Males Program (CHAMP): The development and piloting of a strengths-based health promotion program for young Aboriginal males in the Northern Territory

WELLBEING AND PREVENTABLE CHRONIC DISEASES

MASTER BY RESEARCH

PhD

This project aims to develop a culturally-responsive and gender-sensitive outreach health promotion program to engage young Aboriginal and Torres Strait Islander males aged 16-25 (respectfully summarised to Aboriginal). It will draw upon the findings of a recently completed Lowitja Institute funded research project focused on understanding health literacy among young Aboriginal males in the Northern Territory as the basis for program design (Smith et al 2019). This project will involve the co-development of a series of interactive health promotion modules pertinent to the lives of young Aboriginal males living in regional and remote Australia. Aboriginal Elders and respected male community mentors will guide all aspects of program design and delivery. The flexible program design

will include modules that can be delivered as standalone sessions or as a more comprehensive program delivered over an extended period. The modules will be interactive and involve a combination of face-to-face and online engagement consistent with emerging global men's health promotion evidence from Australia, Canada and the United States. Based on the Lowitja project findings, module topics will include: 'staying strong'; doing things 'right way'; valuing cultural identity; valuing positive personal/family relationships; engaging role models and social support; seeking-help and accessing health services; reducing violence and preventing injuries to self and others; minimising the harms of alcohol and other drugs; engaging in safe sex and respectful relationships; and being a good father/parent. The development of the program will be iterative and involve a partnership between Menzies School of Health Research (Menzies), Darwin Indigenous Men's Service (NT), and the Australian Indigenous HealthInfoNet. The program will be piloted in a community-based setting in Darwin, with evaluation findings used to refine the program design.

Prof James Smith

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Developing a culturally-responsive online social and emotional wellbeing education and support program for young Aboriginal and Torres Strait Islander males

WELLBEING AND PREVENTABLE CHRONIC DISEASES

MASTER BY RESEARCH

PhD

Age-appropriate, gender-sensitive, and culturally-responsive programs are essential for promoting the social and emotional wellbeing (SEWB) and mental health of vulnerable populations. Such programs have potential to reduce the health and social inequities these populations face. In Australia, very few digital health promotion programs are tailored towards the unique needs of young Aboriginal and Torres Strait Islander males, despite their disproportionate experience of SEWB concerns. This project involves the adaptation and trial delivery of an evidence-based online intervention known as the Young Black Men, Masculinities, and Mental Health (YBMen) project. YBMen is a mental health and social support program facilitated through a private social media group (e.g. Facebook/Instagram) originally developed for young Black college men in the US. It pays specific attention to intersections between age, gender and culture. Our intervention involves the adaptation and contextualisation of the US program to meet the SEWB needs of young Aboriginal and Torres Strait Islander males in WA and the NT that are currently attending high school or university, with potential for scaling to include other state/territory jurisdictions over the longer term.

Prof James Smith

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Sportsmanship in young Australian male athletes: the role of competitiveness, motivational orientation, and perceived purposes of sport

WELLBEING AND PREVENTABLE CHRONIC DISEASES

MASTER BY RESEARCH

PhD

Competition and sportsmanship are inextricably linked. Sports psychologists distinguish between two “orientations” that people have toward competition: task orientation (intrinsic participation goals) and ego orientation (extrinsic participation goals). Competitors with strong task orientation focus on setting personal performance goals that are part of larger goals. To individuals with strong ego orientations, winning is achieved by all means and at all costs, even if it means cheating or hurting their opponents. Both constructs exist simultaneously in individuals; however, the relative degree of each construct varies.

When ego orientation is dominant, sportsmanship takes the back seat. Unfortunately, today’s sport culture, especially the model of professional sports, enhances this view of competition and thereby undermines the development of sportsmanship in young athletes. Instead, attempts to cheat, taunting, and head butting have become normalised in some sports. When youth sport participants are constantly exposed to such models, they subsequently show little sportsmanship and respect for their opponents. Anecdotal evidence suggests that sportsmanship and friendly rivalries are easier for girls than boys - winning matters to girls, but they are not consumed by it in the same way boys can be.

There is a growing concern over the apparent increase in incidents of abuse and harassment by sports players in Australia. The limited research into the factors that influence sportsmanship, especially among younger male athletes, is extremely dated and is now lacking in Australia. This pilot study aims to extend the theoretical foundation of sportsmanship research by examining measures of competitiveness, motivational orientation, and perceived purposes of sport participation as predictors of sportsmanship in a sample of young male participants in sports, with a view to scale it as a future longitudinal study.

Prof James Smith

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Understanding psycho-social factors influencing physical activity behaviour among Australian adolescents

WELLBEING AND PREVENTABLE CHRONIC DISEASES**MASTER BY RESEARCH****PhD**

In modern society, the level of sedentary behaviour is expanding and related to poorer health outcomes such as overweight and obesity, cardiovascular diseases, type 2 diabetes and other adverse health outcomes. In contrast, the health benefit and preventive role of regular physical activity in chronic diseases and psychological health have been observed in numerous studies. The literature also demonstrates a relationship between psycho-social factors and physical activity in improving health outcomes. Thus, understanding these aspects of physical activity constitutes a high priority in health and sport science research. Adolescents are considered priority population groups in such research because physical activity behaviour is connected to early childhood models, and puberty are transitional life periods presenting various challenges. Behavioural science approaches include methods and ideas of different disciplines such as psychology, sociology, communication and medicine to support a deeper understanding of physical activity behaviour.

This project aims to understand the influence of sociological and psychological factors on physical activity behaviour among adolescents in Australia. The potential variable of interest will include social influences, social support, life goals, life satisfaction, competitiveness, value orientation, motivation, psychosocial health, and social attitudes.

The project will use a longitudinal study design and follow-up participants to identify the changes in their behaviour over time and established temporal associations between the variables of interest. The student will also have the opportunity to further develop ideas and concepts associated with behavioural health science, as it relates to physical activity. Depending on interest, the student will also have an opportunity to conduct secondary data analysis of existing datasets or carry out cross-cultural comparisons. Study results will inform targeted health promotion programs and practices aiming to increase physical activity level and evolve a long-term positive attitude of a physically active lifestyle among adolescents in Australia.

Dr Noemi Tari-Keresztes

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Social media and risky alcohol use among young male Australian university students

WELLBEING AND PREVENTABLE CHRONIC DISEASES

MASTER BY RESEARCH

PhD

Despite population declines in alcohol use, young people still drink at levels that put them at risk of alcohol-related harm, with males drinking more than females. There is genuine cause for concern regarding alcohol and youth as the age at which most people transition from high school to university coincides with the age of those most likely to drink at risky levels and thus are more vulnerable to alcohol-related harm. Gender norms shape the drinking behaviours of Australian youth, with young males having higher rates of risky health practices (e.g., harmful use of alcohol) and also a reluctance to engage in preventive health behaviours.

The alcohol industry utilises social media (SM) for alcohol promotion, with youth being the target audience. There exists a relationship between exposure to SM alcohol-related content and drinking, especially among young males. Most of the related international and scant Australian work has been limited by being only observational and with cross-sectional data. Thus, this study would be the first to explore baseline prevalence and predictors of engagement with SM alcohol marketing and its relationship with alcohol use, and the emergence of these relationships over time (i.e., over the first year of university), among the target group.

The overall aim of this mixed-methods (an online survey and co-design workshops) project is to generate new knowledge about how the relationship between exposure to and engagement with SM alcohol marketing, and alcohol use compounds over time, in an effort to minimise harm from alcohol use among young male university students in Australia.

Dr Himanshu Gupta

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Investigating the influence of marketing on sports betting among young men living in Australia

WELLBEING AND PREVENTABLE CHRONIC DISEASES

MASTER BY RESEARCH

PhD

There has been a significant increase in the amount of marketing for sports betting products in Australia, including significant increases in advertising spend by online bookmakers. Marketing strategies for sports betting extend beyond traditional marketing platforms and include more contemporary forms such as social media platforms and commercial sports sponsorship.

Young men appear to be the target market for sports betting companies, with a range of marketing and promotional strategies used to both appeal to and reach this audience. Limited research indicates that gambling advertising increases the likelihood of gambling, may increase already high levels of gambling, and is likely to make it more difficult for problem gamblers to gamble less or not gamble at all.

Sport betting advertisers seek to build and develop upon existing cultural symbols, behaviours, and contexts, with an aim of embedding their product within these behaviours and creating new sub-cultures and identities associated with that product. Gambling industry through its marketing, associates sports betting with the culturally-valued aspects of being a sports fan - including masculinity, mateship, support for your team, fan loyalty, thrill, winning, and power. These marketing tactics, which are so closely aligned with such a valued cultural activity in sports, may have an influential impact on individual and peer group identities associated with gambling on sports.

There exists limited Australian research that has explored how marketing strategies influence gambling attitudes and consumption intentions, and the range of strategies that are used to reduce the risks posed by marketing to different population sub-groups. The overall aim of this qualitative study is to understand how marketing impacts gambling behaviours of young Australian male sports bettors in order to develop strategies that will minimise systemic gambling into the future.

Dr Noemi Tari-Keresztes

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How can Australian Football League clubs help men aged 35-65 improve their health by losing weight, becoming more active, and maintaining these changes long-term? A feasibility and pilot randomised controlled trial

WELLBEING AND PREVENTABLE CHRONIC DISEASES

MASTER BY RESEARCH

PhD

Overweight and obesity are highly prevalent among Australian men. Professional sports settings can be instrumental in engaging men in weight loss programmes; the Football Fans in Training programme delivered in professional UK football clubs was successful and cost-effective in helping men lose weight and maintain in the long-term.

The Australian Football League (AFL) is a potentially attractive setting to engage men in a weight loss programme. The aim of this project (Aussie-Football Fans In Training (Aussie-FFIT)) is to develop, pilot, and evaluate the feasibility of a weight loss intervention for overweight/obese middle-aged men, delivered in AFL settings in the Northern Territory of Australia, to promote weight loss and healthier lifestyles and determine its suitability for a future randomised control trial. Outcomes will include programme uptake, attendance, changes in lifestyle, and weight variables to inform power calculations for a future definitive trial, fidelity of programme delivery, acceptability, satisfaction with the programme and perceptions of effectiveness. There is also potential to determine trial feasibility and potential to gather cost-effectiveness data.

Dr Himanshu Gupta

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Return to Country: A national platform study to return Indigenous renal patients home

WELLBEING AND PREVENTABLE CHRONIC DISEASES

MASTER BY RESEARCH

PhD

End-stage kidney disease (ESKD), when dialysis or a kidney transplant is required to maintain life, has a devastating impact on Indigenous patients and their families.

In remote communities, rates of ESKD are 15 or more times higher than amongst non-Indigenous Australians of the same age and sex, and people need to relocate to distant urban centres to take up dialysis.

Community-based dialysis or a kidney transplant allows a patient to return to live in their community.

Indigenous Australians have very low rates of such community-based treatment: a third the non-Indigenous chance of home-based dialysis treatment, and a quarter (overall) the non-Indigenous chance of a kidney transplant.

This multicentre mixed methods registry-based prospective interventional study is led by a team of Indigenous and non-Indigenous researchers who bring renal specialist, community-controlled health service and patient perspectives to inform research design, conduct and translation. It is characterising the socioeconomic, environmental, health service and biomedical factors driving the health outcomes and patterns of health service utilisation experienced by Indigenous Australians with ESKD in 13 tertiary renal services around the country, and will test if health service changes to address these identified barriers can get more people home for treatment.

This national collaboration, addressing a key priority in health service delivery - How to help Indigenous Australians get treatment at home - is essential to improve access to best-practice care.

Yomei Jones

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What Matters 2Youth (WM2Youth)

WELLBEING AND PREVENTABLE CHRONIC DISEASES

PhD

WM2Youth aims to develop a nationally-relevant, strengths-based wellbeing measure for Aboriginal and Torres Strait Islander youth aged 12-17 years to inform clinical and policy decision making. The WM2Youth measure will be grounded in the experiences, values and culture of Aboriginal and Torres Strait Islander youth and will be scored using their preferences.

The WM2Youth project is led by Professor Gail Garvey, Wellbeing & Preventable Chronic Disease Division, Menzies School of Health Research. The project commenced in February 2021 and is fully funded by an Indigenous Health Research MRFF Grant. The project will use a four-phase mixed methods design, following principles for ground-up development of preference-based measures.

The first phase of the project is a large qualitative exploration to identify components of wellbeing for Aboriginal and Torres Strait Islander youth. During this phase over 200 young people from across Australia will be engaged via our partner organisations to participate in a PhotoVoice project about their wellbeing or to participate in one of our workshops to develop draft wellbeing statements. We are seeking a PhD student will work under the supervision of our experienced researchers to undertake components of this qualitative phase.

Dr Kate Anderson

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Live Strong, COVID-Safe and frailty free after starting dialysis project- a qualitative study to explore the perceptions of clients, and health staff

WELLBEING AND PREVENTABLE CHRONIC DISEASES

MASTER BY RESEARCH

Top End Renal Services delivers a holistically focused New Start Dialysis Transition Program (NSDTP) on the Royal Darwin Hospital campus. Over 16-week's, adults who recently started chronic maintenance dialysis, are supported to with education, service navigation support and clinical optimisation from a multidisciplinary care team.

Menzies has partnered with Top End Renal Services New Start Dialysis Transition Program, and undertaking a mixed-methods evaluation of the New Start Dialysis Transition Program- Live Strong COVID-safe Frailty Free after Starting Dialysis Project Live Strong, COVID-Safe and frailty free after starting dialysis - Menzies.

Our team are seeking a Darwin-based qualitative research team member for the Live Strong COVID-safe Frailty Free after Starting Dialysis Project. This is an ideal project suited for an MPH or Honours candidate. We are seeking a team member discover how adults who have recently started dialysis define the ways to Live Strong, COVID-safe and Frailty free, using interviews in focus group and approximately 25 individual participants. The qualitative research team member will be supported by a Study Reference Group, and other Project structures available at Menzies, and the senior qualitative scientist, Dr Anne-Marie Eades, based at Curtin University.

By first identifying key patient-defined themes about ways to Live Strong, we will consolidate themes into key messages for use as patient-led curriculum in brief videos and booklets within NSDTP. This will enable patients as peers to give direct and best recommendations for living strong COVID-safe and Frailty free.

Assoc Prof Jaqui Hughes

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Sara Zabeen

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Diabetes in Pregnancy (reducing diabetes related risks for Aboriginal and Torres Strait Islander women and communities)

WELLBEING AND PREVENTABLE CHRONIC DISEASES

PhD

We are seeking talented candidates who wish to apply for a PhD. You should ideally have a background and interest in Aboriginal and Torres Strait Islander child and maternal health, health service delivery and models of care, provision of culturally appropriate care and qualitative research methods. Your research will be part of the work of the Diabetes across the Lifecourse: Northern Australian Partnership, and specifically related to the Diabetes in Pregnancy team. Aboriginal and Torres Strait Islander Peoples are strongly encouraged to apply.

There are a range of opportunities for PhD students within the work of the Diabetes in Pregnancy program, which is implementing a participatory action research study with five sites across the Northern Territory and Far North Queensland. Opportunities may include participating in the implementation of co-design workshops or the study's evaluation.

The candidate will be required to live in Northern Australia for the duration of this project and undertake relevant cultural awareness and methodological training as required.

Prof Louise Maple-Brown

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Improving models of care for Aboriginal and Torres Strait Islander children and youth with type 2 diabetes

WELLBEING AND PREVENTABLE CHRONIC DISEASES

PhD

We are seeking talented candidates who wish to apply for a PhD. You should ideally have a background and interest in Aboriginal and Torres Strait Islander child and youth health, health service delivery and models of care, provision of culturally appropriate care and qualitative research methods. Your research will be part of the work of the Diabetes across the Lifecourse: Northern Australian Partnership. Aboriginal and Torres Strait Islander Peoples are encouraged to apply.

This qualitative PhD project will explore the appropriateness of enhanced models of care for Aboriginal and Torres Strait Islander youth with type 2 diabetes across Northern Australia. There are a range of opportunities for PhD students within this work including exploring the role of families in caring for youth with type 2 diabetes. The candidate will be required to live in Northern Australia for the duration of this project and undertake relevant cultural awareness and methodological training as required.

Prof Louise Maple-Brown

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Understanding the impact of the Banned Drinker Register and other alcohol policies in the Northern Territory

WELLBEING AND PREVENTABLE CHRONIC DISEASES

MASTER BY RESEARCH

PhD

This project is part of a comprehensive evaluation of the impacts of alcohol policies in the NT (Learning from Alcohol policy Reforms in the NT [LEARNT]). LEARNT provides important information for policy makers, treatment agencies and key stakeholders within the NT, nationally and internationally. One of the key focuses of the LEARNT project is evaluating the impact of the Banned Drinker Register (BDR) which involves placing identified problem drinkers onto a register which prohibits the consumption, possession or purchase of alcohol for a period of at least three months. A key part of the BDR is the use of identification (ID) scanners linked to the Register at all alcohol takeaway outlets, with a statutory form of ID scanned for every customer. This intervention is unique in its focus on individualised control of problems around packaged liquor.

LEARNT is a multicomponent mixed-methods study, involving analyses of epidemiological and linked data (police, emergency departments, child protection, hospital admissions, AOD treatment, school attendance), as well as qualitative data from key stakeholders and people who have been placed on the BDR, and their families and communities to understand how people perceive the BDR to have impacted on their attitudes and behaviours including substance use; their experiences of the health and justice system; social cohesion and family/kinship relationships; access to alcohol and drug treatment. We are also interested in whether there are unintended consequences of the BDR for individuals, their family members or the broader community.

The student's project could focus on alcohol availability and harmful outcomes; alcohol use outcomes for Aboriginal and Torres Strait Islander people; the cumulative impact of alcohol policies on high-risk drinkers and their families or a different topic relevant to the study's aims, negotiated with the study investigators and supervisors.

Cassandra Wright

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Evaluation of housing repair and maintenance program in NT remote Aboriginal communities

WELLBEING AND PREVENTABLE CHRONIC DISEASES

PhD

The student will work with a project to monitor and evaluate the activities, outputs and outcomes of the Healthy Homes program. Adequate housing is fundamental to health and well-being. The Northern Territory (NT) and Australian governments have invested significant funding to overcome the challenge of providing adequate housing for NT Aboriginal people living in town camps and remote communities.

The NT Government has established the Healthy Homes program to deliver an enhanced approach to preventive and cyclical housing repairs and maintenance across remote communities and selected town camps, to ensure that houses' health hardware is functioning to support the nine Healthy Living Practices in the National Indigenous Housing Guide.

Menzies School of Health Research has been contracted by the NT Government to monitor and evaluate the activities, outputs and outcomes of the Healthy Homes program.

Prof David Thomas

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TACTICS

Targeted Approaches To Improve Cancer Services
for Aboriginal and Torres Strait Islander Australians

TACTICS Centre for Research Excellence

The vision of the Centre for Research Excellence (CRE) in Targeted Approaches to Improve Cancer Services for Aboriginal and Torres Strait Islander Australians (TACTICS) is to improve cancer outcomes for Aboriginal and Torres Strait Islander people and their communities. The TACTICS CRE is achieving this vision through an Indigenous-led program of innovative, high-quality, applied research aimed at improving a broad range of cancer-related health services.

TACTICS is funded by the National Health and Medical Research Council (NHMRC) from 2019-2023 and administered at Menzies School of Health Research (Menzies).

A core component of TACTICS is building capacity in the health research workforce by training future research leaders, practitioners, and research users. The program is building the capacity of Indigenous and non-Indigenous early-career researchers to carry out innovative, collaborative, outcomes-focused work in partnership with Indigenous people.

The TACTICS CRE is offering scholarships to support PhD candidates and Masters of Research students. Several projects have been outlined below for potential candidates; however, we also encourage the design and development of new projects consistent with any of the TACTICS program's three key areas:

1. Increase cancer prevention and early detection through immunisation and screening;
2. Improve diagnosis and treatment through health service innovation; and
3. Provide appropriate care to enhance psychosocial wellbeing of Indigenous cancer survivors, their partners and carers across the cancer continuum.

For more information on the TACTICS CRE visit www.tactics-cre.com

Adverse Cardiovascular Events After Cancer for Aboriginal and Torres Strait Islander people

TACTICS CENTRE FOR RESEARCH EXCELLENCE

MASTER BY RESEARCH

PhD

Cardio-oncology is a new clinical field that aims to prevent, monitor, and treat cardiovascular disease (CVD) among people who have been diagnosed with cancer. This project aims to use a combination of epidemiological, health economic, and qualitative methods to provide the first comprehensive Australian evidence of:

1. The prevalence of pre-existing and treatment-induced CVD in people diagnosed with cancer and its effect on their clinical course, outcomes and health care use and costs.
2. Variations in the above between under-served populations (Aboriginal and Torres Strait Islander people, migrants to Australia, and people living in non-urban and/or the most socioeconomically disadvantaged areas) and other Australians.
3. Patients' and health professionals' experiences of cancer treatment-related decision-making in the context of heightened cardiovascular risk.

Such information is necessary to develop optimal and equitable cardio-oncological care in Australia.

The aims will be achieved through the epidemiological analysis of linked administrative data (Cancer Registry, Hospital, Emergency and Death Registrations data) and in-depth qualitative interviews with patients and health professionals. Under the supervision of Professor Gail Garvey, Professor Joan Cunningham, and Dr Abbey Diaz, the successful student will lead a review of the literature, data collection, management and analysis, and write-up of scientific manuscripts that will contribute towards their thesis. The successful student will also be expected to engage in professional activities and dissemination of research findings, such as the presentation of their work at scientific and community meetings.

For more information on the TACTICS CRE visit www.tactics-cre.com

Prof Gail Garvey

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Prof Joan Cunningham

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Cancer survivorship: exploring lifestyle factors and health behaviours among Aboriginal and Torres Strait Islander cancer survivors

TACTICS CENTRE FOR RESEARCH EXCELLENCE

MASTER BY RESEARCH

PhD

Increasing our understanding of the survivorship issues in Aboriginal and Torres Strait Islander cancer survivors is an identified national research priority. The aim of this study is to gain an in-depth understanding of cancer survivorship through exploring the influence of lifestyle factors and behaviours on the health and wellbeing of Indigenous cancer survivors. In partnership with cancer services we will recruit Aboriginal and Torres Strait Islander cancer survivors to:

- Describe Indigenous peoples' levels of, and changes in, behavioural risk factors for cancer (e.g. physical activity; fruit, vegetable intake; and smoking) after cancer diagnosis;
- Identify the social-ecological factors (e.g. demographic, cultural, clinical, and geographical) associated with negative and positive behaviour modification in Indigenous people after a cancer diagnosis;
- Identify potential culturally appropriate interventions

This study will inform existing programs and future research activities to inform culturally appropriate survivorship care for Aboriginal and Torres Strait Islander cancer survivors. The successful student will also be expected to engage in professional activities and dissemination of research findings, such as the presentation of their work at scientific and community meetings.

For more information on the TACTICS CRE visit www.tactics-cre.com

Prof Gail Garvey

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Prof Joan Cunningham

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Mapping patterns of care in cancer patients

TACTICS CENTRE FOR RESEARCH EXCELLENCE

MASTER BY RESEARCH

PhD

As screening and treatment services for cancer improve, more individuals are living with a cancer diagnosis. As such, understanding the costs associated with a cancer diagnosis is becoming of greater interest. This project will help to understand cancer patient's engagement with the healthcare system, as well as understanding the costs associated with a cancer diagnosis in Australia. Students will work within a dataset containing all cancer diagnoses between 2011-2015 in Queensland, as well as admitted patient and emergency department service use, MBS and PBS records until 2018 to identify different treatment pathways for cancer patients (e.g. surgery, radiotherapy, chemotherapy). Costs associated with service use will also be identified, including out-of-pocket costs and costs to the healthcare system. With the large dataset available, this project has the potential to be suited to a Masters or PhD level of study, and would be appealing to anyone interested in working in the big data space. There is also a strong desire to explore the pathways of Aboriginal and Torres Strait Islander cancer patients, so being interested in Indigenous health is desirable.

Location of Project: Menzies Brisbane Office

For more information on the TACTICS CRE visit www.tactics-cre.com

Dr Daniel Lindsay

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TACTICS CRE – New Projects to be developed

We encourage the design and development of new projects consistent with the TACTICS program's three key areas:

- 1 Increase cancer prevention and early detection through immunisation and screening;
- 2 Improve diagnosis and treatment through health service innovation; and
- 3 Provide appropriate care to enhance psychosocial wellbeing of Indigenous cancer survivors, their partners and carers across the cancer continuum.

Please contact Dr Bronwyn Morris Bronwyn.Morris@menzies.edu.au to discuss your project ideas and to identify potential TACTICS supervisors.

For more information on the TACTICS CRE visit www.tactics-cre.com

Using Big Data to understand life course trajectories for young Territorians

CENTRE FOR CHILD DEVELOPMENT AND EDUCATION

PhD

The Population Health and Wellbeing program at the Centre for Child Development and Education undertakes large scale population studies, using statistical and epidemiological methods, to describe the impact of multiple factors on the life course trajectories of children and young people. Central to the research program is a data repository with linked records for the same individual across many domains that include health, education child protection and justice. The current repository contains de-identified information for more than 370,000 individuals across 24 datasets. The repository allows analysis of the influences on life-course development from before birth to young adulthood, with the opportunity for the inclusion of intergenerational, family and community influences. The research program has strong links to policy makers and service providers and has an emphasis on research to inform practice.

The repository provides the opportunity for PhD studies across a wide range of topics which include but are not limited to the following areas:

- Optimising education outcomes
- Understanding juvenile offending and recidivism
- Assessing the effectiveness of interventions in health, education, child protection and youth justice
- Predictive modelling for multiple outcomes
- Mapping development pathways from birth to adulthood
- Assessing the impact of alcohol and family violence on child development

Prof Steve Guthridge

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The MECSH Evaluation Project

The MECSH evaluation project is funded by the Northern Territory Government Department of Health from 2019-2024 and includes researchers at Menzies/CCDE and the College of Indigenous Futures, Arts and Society (CIFAS) at Charles Darwin University.

MECSH is an evidence-based program of sustained nurse home-visiting intended for mothers from pregnancy through their child's third year. It is being implemented by four remote Aboriginal Community Controlled Health Services, Miwatj Aboriginal Health; Katherine West Health Board; Sunrise Health Aboriginal Corporation and Anyingingyi Health Aboriginal Corporation. It is a complex program involving development of systems of nursing practice, collaboration with social care workers and Aboriginal community-based practitioners and the formation of partnerships between practitioners, parents and their families.

The evaluation project will investigate a number of areas of the MECSH program and maternal and child health services, including the implementation and delivery of MECSH services, the long- and short-term outcomes for children, the perspectives of mothers and their families and the cultural context of delivery of a safe and effective service. The evaluation aims to develop reports and methods that can contribute to ongoing quality assurance initiatives for use by health services.

Parents' perspectives on child development, parenting and care: the social and cultural context of maternal and infant care in remote communities

CENTRE FOR CHILD DEVELOPMENT AND EDUCATION

PhD

The MECSH program of nurse home-visiting is being implemented for Aboriginal mothers in remote communities. The Evaluation will investigate determinants of outcomes of care for mothers and their babies in the social and cultural context of remote NT communities. This project will involve qualitative or mixed methods of investigation to understand the social and cultural context and determinants of parenting and its contribution to children's development and early learning. The project will involve work with community-based research associates in multiple communities. It will study experiences of remote Aboriginal mothers during pregnancy and childbirth, their use of maternal and child health services, understandings of child development and social and cultural influences on parenting. Mixed methods using formal questionnaires, exploratory focus groups or structured interviews are proposed.

Prof Gary Robinson

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Supporting maternal and infant health in remote communities: Capacity building for improved outcomes

CENTRE FOR CHILD DEVELOPMENT AND EDUCATION

PhD

MASTER BY RESEARCH

This project will be located within the framework of the evaluation of the MECSH program of sustained nurse home-visiting for Aboriginal mothers and their infants in remote communities. It will investigate determinants of processes of capacity building to support the MECSH program in remote NT communities and the development of specific elements of the model of care: for example, the roles of MECSH Nurses, Social Care Practitioners, and Aboriginal Community practitioners in engagement and delivery of quality services. It will involve qualitative or mixed methods of investigation of the outcomes of training and support for practitioners and the determinants of successful engagement of remote Aboriginal mothers during pregnancy and after the birth of their children.

Prof Gary Robinson

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Epidemiological study of outcomes of maternal and infant healthcare in four remote regions of the NT

CENTRE FOR CHILD DEVELOPMENT AND EDUCATION

PhD

This project will be located within the framework of the evaluation of the MECOSH program of sustained nurse home-visiting for Aboriginal mothers and their infants in remote communities. It will be responsible for quantitative investigation of outcomes of the implementation of the MECOSH program in remote NT communities utilising health services and administrative data from multiple sources. It may contribute to mixed methods investigation of specific components of the MECOSH program evaluation. Depending on timing of commencement, there are opportunities in at least two study areas:

1. Study of the first years of MECOSH implementation (2020-2023), investigating program implementation, participant characteristics, health service utilisation, and key indicators of maternal and child health outcomes;
2. Data linkage study of medium- and longer-term outcomes of maternal and child healthcare before and during implementation of the MECOSH program from 2013-2023.

Prof Steve Guthridge

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What do fathers want? Understanding fatherhood and parenting in remote communities

CENTRE FOR CHILD DEVELOPMENT AND EDUCATION

PhD

There have been many disruptions to the role of fathers in Aboriginal communities, and today, fatherhood is characterised by great uncertainty. External family services are most likely to engage fathers in respect of problems like family violence, substance misuse, etc., but offer little to enhance father's wellbeing and to build their capacity as parents. In many remote communities there is interest in re-envisioning fatherhood and strengthening fathers' pride and confidence in their role, partly by reclaiming a sense of tradition, and partly by building new strengths, especially with respect to the capacities of young men as fathers.

Menzies and CDU are currently evaluating the MECSH program of maternal and early childhood services in remote communities in the East Arnhem, Big Rivers and the Barkly regions. This project will be undertaken in collaboration with the MECSH evaluation in some of the participating communities. It will explore fathers' role in parenting and family wellbeing with a particular emphasis on young fathers, their relations with partners and their contribution to raising their children. Factors affecting fathers' wellbeing and influencing their parental role, their relations with partners and effects on early child development can be explored. The project may include quantitative research, including analysis of healthcare data and some use of surveys or questionnaires linked to sampling within the larger evaluation project. However, it is to be anticipated that the process of community engagement and development of qualitative strategies including conversation and participant observation over time will form a substantial component of this project.

Prof Gary Robinson

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CCDE Resilient Youth/Suicide Prevention

CENTRE FOR CHILD DEVELOPMENT AND EDUCATION

In 2012, CCDE led consultations to develop Australia's National Aboriginal and Torres Strait Islander Suicide Prevention Strategy (Australian Government, May 2013). Subsequently, our researchers began to develop a community-based suicide prevention project called the Indigenous Youth Life Skills Development. This was followed by the Skills for Life program, which was funded by the NHMRC targeted call for Indigenous suicide prevention 2014-2020. Skills for Life has gathered data on resilience and psycho-social wellbeing for over 700 remote Indigenous middle school students aged 12-14 years in 5 secondary schools. Analysis for publication and to support further research is ongoing, and the program is expanding to additional remote and boarding schools. In addition to development of strengths-based programs to promote resilience, CCDE researchers conduct research into risk factors and interventions to reduce harm. From 2013, the team conducted a study of presentations to emergency departments with suicidal thoughts and behaviours and in 2018-2019, the team was commissioned by the Centre for Best Practice in Indigenous Suicide Prevention to develop best practice guidelines for psychosocial assessment of Indigenous persons presenting to hospitals. Research at the population level includes quantitative investigation of risks and outcomes for young people utilising linked data within the Child and Youth Development Research Program. Mixed methods studies using both community level and agency data are supported.

Teachers' and students' perspectives of social-emotional learning in remote Indigenous schools

CENTRE FOR CHILD DEVELOPMENT AND EDUCATION

PhD

MASTER BY RESEARCH

This project will be based on collaboration with one or more remote schools to evaluate the implementation of Skills for Life in the classroom and to develop mixed methods using questionnaires, exploratory focus groups and structured interviews are proposed. Continuing investigation of youth resilience and well being will be explored in relation to teacher self-efficacy and teaching practices and whole-school initiatives. Opportunities to work with schools in the Northern Territory and/or far north Queensland are available.

Prof Gary Robinson

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Immunological correlates of melioidosis survivors

GLOBAL AND TROPICAL HEALTH

MASTER BY RESEARCH

PhD

Melioidosis is caused by the bacterium *Burkholderia pseudomallei* and is predominately a disease of tropical climates, especially in Southeast Asia and northern Australia where it is widespread. The bacteria causing melioidosis are found in contaminated water and soil. Melioidosis was first described in 1912 in Burma as a newly recognised glanders-like disease of humans. Reports from other Southeast Asian countries soon followed. While only first described in Australia from 1949, melioidosis is endemic across tropical northern Australia, with the highest incidence rates of disease globally being reported from urban Darwin, although total case numbers are higher in Thailand. The Darwin Prospective Melioidosis Study (DPMS) commenced at Menzies School of Health Research (Menzies) and Royal Darwin Hospital (RDH) on 1 October 1989, prospectively documenting all melioidosis cases in the tropical Top End of the Northern Territory, Australia. As of 1 November 2020, there have been 1,196 culture-confirmed melioidosis cases, with 134 (11%) deaths. We have detailed epidemiological and clinical data on all cases and one or more (~5,000 total) *Burkholderia pseudomallei* (Bp) isolates stored from 1,156 (97%) DPMS cases. We also have stored serum samples on the DPMS with 300 plus serum samples from consented patients available for melioidosis research.

This project aims to investigate the clinical data collected from patients who have survived a melioidosis infection and compare it to immunological correlates, which are biological markers such as disease-specific antibodies which correlate with protection against disease and which are measurable with immunological assays. Menzies has a collaboration between Menzies Melioidosis Program and Northern Arizona University Keim Laboratories which has successfully characterized antibody responses to *Burkholderia pseudomallei* (Bp) in humans using a machine called the MAGPIX. Major antigens eliciting antibodies during melioidosis have been identified and ongoing analysis is looking at patterns of antigen response that correlate with severity and outcomes of melioidosis.

The Master by Research/PhD student will join the Melioidosis programme at Menzies and working with a multidisciplinary team (clinical, laboratory and genomics team) to research Immunological correlates of melioidosis survivors.

Mark Mayo

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The occurrence of the melioidosis agent *Burkholderia pseudomallei* in the Darwin urban environment

GLOBAL AND TROPICAL HEALTH

MASTER BY RESEARCH

PhD

Melioidosis is caused by the bacterium *Burkholderia pseudomallei* and is predominately a disease of tropical climates, especially in Southeast Asia and northern Australia where it is widespread. The bacteria causing melioidosis are found in contaminated water and soil. Melioidosis was first described in 1912 in Burma as a newly recognised glanders-like disease of humans. Reports from other Southeast Asian countries soon followed. While only first described in Australia from 1949, melioidosis is endemic across tropical northern Australia, with the highest incidence rates of disease globally being reported from urban Darwin, although total case numbers are higher in Thailand. The Darwin Prospective Melioidosis Study (DPMS) commenced at Menzies School of Health Research (Menzies) and Royal Darwin Hospital (RDH) on 1 October 1989, prospectively documenting all melioidosis cases in the tropical Top End of the Northern Territory, Australia. As of 1 November 2020, there have been 1,196 culture-confirmed melioidosis cases, with 134 (11%) deaths. We have detailed epidemiological and clinical data on all cases and one or more (~5,000 total) *Burkholderia pseudomallei* (Bp) isolates stored from 1,156 (97%) DPMS cases. We also have 600 human Bp isolates from Australian and international collaborators, 645 animal Bp isolates and from our environmental studies ~8,000 Bp soil and water isolates and ~5,000 near-neighbour *Burkholderia* isolates.

This project aims to add to our existing knowledge of the presence of bacterium *Burkholderia pseudomallei* in the Darwin urban environment. It will enhance previous environmental sample, testing and analysis and help us to understand the ecological niches that exist in an urban setting. Further analysis examining the geographical associations and genomic similarities between clinical and environmental isolates will allow for better understanding of melioidosis source attribution in Darwin and may help to develop public health measures mitigating against the infection in other endemic regions.

The Master by Research/PhD student will join the Melioidosis programme at Menzies and working with a multidisciplinary team (clinical, laboratory and genomics team) will be using various microbiological, molecular and genomic approaches to understand the nature of *Burkholderia pseudomallei* in the Top End of Australia.

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Whole genome analysis of *Burkholderia pseudomallei* from animal and environmental samples in the Northern territory

GLOBAL AND TROPICAL HEALTH

MASTER BY RESEARCH

PhD

Melioidosis is caused by the bacterium *Burkholderia pseudomallei* and is predominately a disease of tropical climates, especially in Southeast Asia and northern Australia where it is widespread. The bacteria causing melioidosis are found in contaminated water and soil. Melioidosis was first described in 1912 in Burma as a newly recognised glanders-like disease of humans. Reports from other Southeast Asian countries soon followed. While only first described in Australia from 1949, melioidosis is endemic across tropical northern Australia, with the highest incidence rates of disease globally being reported from urban Darwin, although total case numbers are higher in Thailand. The Darwin Prospective Melioidosis Study (DPMS) commenced at Menzies School of Health Research (Menzies) and Royal Darwin Hospital (RDH) on 1 October 1989, prospectively documenting all melioidosis cases in the tropical Top End of the Northern Territory, Australia. In endemic areas, melioidosis has also been identified in a wide array of animal species. Certain animals are acknowledged to be particularly susceptible to infection and disease, including goats, sheep, camels and alpacas. Cases have also been reported in domestic pets and native wildlife, with the animals often having prior ill health. Exotic animals imported to zoos in endemic regions appear especially at risk, most notably primates, including iconic species such as gorillas.

This project main aim is to analyse the whole genome sequences (WGS) of *Burkholderia pseudomallei* isolates from animals and environmental samples (soil and water). The environmental samples have been collected during environmental investigations to find the potential source of the animal case/s in the Northern Territory. WGS analysis will help use not only compare animal and environmental isolates but enable further understanding of how this relates to human cases in an endemic region.

The Master by Research/PhD student will join the Melioidosis programme at Menzies and working with a multidisciplinary team (field, clinical, laboratory and genomics), will be using various microbiological, molecular and genomic approaches to understand animal melioidosis in the Northern Territory.

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Epidemiology and clinical management of non-tuberculous mycobacteria in the Northern Territory: a cohort study

GLOBAL AND TROPICAL HEALTH

MASTER BY RESEARCH

A range of mycobacteria other than *Mycobacterium tuberculosis* complex (tuberculosis) and *Mycobacterium leprae* (leprosy) are known to cause disease in humans – these are collectively known as non-tuberculous mycobacteria (NTM). Previous reports have suggested that the incidence of NTM disease is increasing, however our understanding of the epidemiology of NTMs is limited. The clinical management of NTM disease is complex, requiring prolonged treatment with several anti-mycobacterial agents. There is limited evidence available to guide decisions on when to initiate treatment, when to cease it, and which agents to include in the treatment regimen.

The aim of this study is to:

- Describe the current epidemiology of NTM disease in the Northern Territory, and
- Describe the clinical management of NTM disease in the Northern Territory, including duration of treatment, anti-mycobacterial agents used and treatment outcomes

Laboratory data will be used to identify the cohort of cases of NTM disease in the Northern Territory between 2010 and 2017. Demographic, clinical, treatment and outcome data will then be obtained from the patients' medical records. A descriptive analysis of the epidemiological features of NTM disease and clinical management of patients will then be undertaken.

This project will provide an opportunity for the student to develop skills in management of complex clinical data and descriptive data analysis using their choice of statistical software (SPSS, Stata or R, +/- Q-GIS). We anticipate that the student would undertake data collection, cleaning and analysis and prepare a manuscript for publication in a peer reviewed journal.

Dr Chris Lowbridge

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Gametocytes and malaria in pregnancy: prevalence and effects of prevention

GLOBAL AND TROPICAL HEALTH

MASTER BY RESEARCH

Pregnant women in malaria-endemic areas are more vulnerable to malaria than non-pregnant women because of changes in existing immunity. Pregnant women harbour higher density infections, and may harbour higher densities of gametocytes, the sexual parasite stages taken up by the *Anopheles* spp. mosquito upon a blood meal. As such, pregnant women may represent an important reservoir for malaria transmission. This is of particular concern as some tools used in current efforts to eliminate malaria cannot be used in pregnant women because of safety concerns; these include their participation in some types of mass drug administration, or treatment with primaquine or ivermectin. To date, the role of pregnant women for malaria transmission remains unclear. Furthermore, the impact of malaria prevention strategies on gametocyte carriage and dynamics requires further assessment to ensure that these reduce infection burden and infectiousness.

In this study, we will examine existing literature containing information on gametocyte prevalence in pregnant women (*Plasmodium falciparum*). Additionally, information will be collected on the effect of preventive measures on gametocytaemia; these preventive measures would include insecticide-treated net use, intermittent preventive treatment with an antimalarial, intermittent screening and treatment, and chloroquine prophylaxis.

Studies included will be surveys (prevalence), trials evaluating impacts of preventive measures on gametocytaemia, or studies which present gametocytaemia by preventive measure. If possible, a control group may be used, such as gametocytaemia among children or a non-pregnant adult population. The effect of malaria treatment in pregnancy on gametocytaemia will not be evaluated, given the availability of a recent individual participant data analysis on this topic.

Data will be extracted and matched with an indicator of malaria transmission intensity (malaria atlas project) and analysed using meta-analysis; if sufficient information is available, meta-regression will be used to understand factors affecting gametocytaemia in pregnancy.

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Comparative genomics of bacteria: derivation and utilisation of polymorphisms sets optimised for informative power

GLOBAL AND TROPICAL HEALTH

HONOURS


MASTER BY RESEARCH

PhD

The genomics revolution has transformed microbiology. The technical and economic accessibility of whole genome sequence analysis has resulted in the generation of very large volumes of genome sequence data. A single typical experiment can now involve whole genome analysis of hundreds or even thousands of microbial isolates. This has not simply impacted research. Genetic analysis (genotyping) methods that involved sampling a small proportion of the genome have been fundamental to public health driven microbiological surveillance. Such methods were also used in the clinical setting, to support inference of clinically relevant phenotype, and inform the practice of infection control. In large part, these genotyping approaches have been, or are being, replaced by whole genome analysis. There is an irony in this. The massive genome-wide data accumulated in the genomics revolution can inform the design of highly optimised and efficient genotyping methods. These may involve the interrogation of very small numbers of genetic polymorphisms, and be very cheap. Genotyping methods based on these could potentially used for very throughput and cost effective microbial surveillance, direct analyses of clinical material, in point of care/field instrumentation, or in resource poor contexts.

We are asking the following questions:

1. What is the most robust, and user friendly bioinformatic pipeline for deriving and testing resolution optimised SNP sets that can be developed? The SNP sets are derived from comparative genome-wide data from microorganisms. Our current focus is on bacterial pathogens of particular relevance to the Northern Territory. A pipeline has already been established, and this has involved the construction of new bioinformatics software. We are at the stage of refining the SNP mining algorithms, and streamlining and automating the pipelines for in-silico testing the informative powers of SNP-sets in diverse data-sets.
2. What is the relationship between algorithms designed to yield sets of polymorphisms optimised for surveillance, and algorithms that yield genetic polymorphisms that directly confer phenotypes of interest? This is a deep question. Addressing this requires knowledge of a range of current comparative genomic techniques that are designed to yield genetic determinants for phenotypes of interest. Typically, such methods are termed genome-wide association studies.
3. How can the knowledge gained in addressing questions 1 and 2 be best applied to the development of specific genotyping applications? This involves translation of the bioinformatic work into lab techniques.



The above questions can define projects that are aligned with the interests and experience of the student, and current imperatives in infectious disease relevant research in the NT. There are options for projects that are completely computer-based, and there are options for translation of this into working laboratory methods.

This would interest students with an interests and competencies in:

- Computer science/coding
- Infectious disease, particularly in disadvantaged populations, and the potential for microbial genetic analysis and surveillance to inform interventions.
- Genetic analysis technology.

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Dr Deb Holt

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Early life microbiome, immune development and susceptibility to acute respiratory infection

CHILD HEALTH

MASTER BY RESEARCH

PhD

We are recruiting for a Masters/PhD student project within part of a research program that aims to achieve sustainable improvements in the respiratory health of Aboriginal children.

Background: Indigenous children have a high burden of early infectious disease. A growing body of research shows the early life gut microbiome shapes future immune function and health. Exposure to antibiotics, preterm birth, C-section, and bottle feeding are shown to influence the composition of the infant gut microbiota increasing the risk of ARI. Understanding the relationship between the gut microbiome and infant susceptibility to infectious disease is an essential stepping stone toward larger studies and clinical trials of microbiome modifying factors such as probiotics. These simple interventions could have profound benefits for Indigenous child health.

Hypothesis: Early life events can alter the neonatal gut microbiome, impacting immune development and the risk of acute respiratory infection (ARI) in the first year of life.

The aims of this pilot study are to describe associations between the neonatal gut microbiome and:

1. Upstream drivers: Antibiotic exposure, gestation at birth, mode of delivery and mode of feeding
2. Downstream outcomes: Oral and nasopharyngeal (NP) IL-22 levels, NP pneumococcal carriage, ARIs

Project outline: We propose a pilot microbiome study among a cohort of NT Indigenous infants. Nested within the D-Kids RCT (NHMRC 1138604; HREC 2018-3160) the clinical team are collecting faecal samples from consented infants at both birth and 4 months of age. Following stool DNA extraction, shotgun metagenomic sequencing will be conducted at the Australian Genome Research Facility. Microbiota (MetaPhlan2, Kraken2) and functional (KEGG) profiles will be produced using established pipelines.⁷ Non-stool sampling, microbiology, systemic immunology assays and clinical data generated by the funded D-Kids trial and will contribute to the analysis.

Dr Michael Binks

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The role of human microbiome in paediatric respiratory disease: Using -omics technologies to identify new ways to diagnose airway infections in young children

CHILD HEALTH

MASTER BY RESEARCH

PhD

Respiratory infections in children are believed to occur across a disease continuum that extends from acute lower respiratory infections such as pneumonia or bronchiolitis, through to protracted bacterial bronchitis (PBB) and subsequent bronchiectasis. This continuum is believed to be driven by repeated cycles of lower airway infection and inflammation which eventually result in irreversible tissue damage and progressive loss of lung function. Antibiotics are used to treat acute symptoms and to prevent exacerbations; however, infections in a subset of children are recalcitrant to standard therapies. Long courses (up to two years) of continuous antibiotic therapy are used to prevent acute exacerbations among children with bronchiectasis. Although important to bronchiectasis clinical management, prolonged antibiotic treatment risks emergent antibiotic resistance.

Achieving better prevention and clinical management of acute and persistent respiratory infections requires deeper understanding of the pathobiological drivers of the disease, including microbial, inflammatory and immune processes. Our multi-disciplinary team is working together to translate the findings of clinical studies (including randomised controlled trials) and basic science research into new ways to prevent, diagnose and treat respiratory infections in children.

In this laboratory and bioinformatics-based study, -omics technologies and machine learning techniques will be used to identify biomarkers that can distinguish bacterial profiles associated with endobronchial infection in PBB. The student will also determine whether airway biomarker profiles could be used to identify children at risk of persistent respiratory infections and/or progression to more severe disease. The study will be based in Darwin, with potential opportunities for some components to be undertaken at the laboratories of our international collaborators.

Dr Robyn Marsh

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Characterising *Ornithobacterium hominis* interactions with respiratory bacteria and host responses

CHILD HEALTH

MASTER BY RESEARCH

PhD

Background: The microbiome of the upper airways is a critical determinant of respiratory and hearing health. Earlier microbiome studies characterised the complex bacterial communities that reside in the upper airways of children and revealed the presence of a new bacterial species called *Ornithobacterium hominis*. In 2019, researchers at Menzies were the first in the world to culture this new bacterium.

O. hominis is one of only two *Ornithobacterium* species to have been discovered. The second species, *O. rhinotracheale*, is found in the upper airways of birds and is associated with pneumonia in poultry. It is not yet known whether *O. hominis* contributes to respiratory infections in humans; however, microbiota studies have shown *O. hominis* carriage can be both prevalent and persistent in paediatric populations with high rates of pneumonia. Further evidence is emerging from our 2020 pilot study which has shown *O. hominis* interacts with other bacteria present in the human respiratory microbiome. No studies to date have examined interactions between *O. hominis* and human cells.

Project outline: The overarching objective of our work is to determine whether *O. hominis* may directly or indirectly affect diseases processes that result in middle ear and/or lower airway infections in children. The specific aims of this study are to: i) characterise mechanisms underlying interactions between *O. hominis* and other members of the respiratory microbiome; ii) determine whether *O. hominis* adheres to respiratory epithelial cells; and iii) determine whether *O. hominis* can induce an inflammatory response.

Dr Robyn Marsh

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What is the role of *Moraxella catarrhalis* in chronic lung disease in children?

CHILD HEALTH

HONOURS

MASTER BY RESEARCH

PhD

Chronic suppurative lung disease (CSLD) is responsible for a high burden of paediatric disease and for some children, reduced life expectancy. *Moraxella catarrhalis* is one of the three major respiratory bacterial pathogens, yet its role in paediatric CSLD has received little attention. We are looking for Honours, Masters and PhD students who are interested in a program of work incorporating a selection of the following projects:

- a. Perform systematic reviews
- b. Use whole genome sequence data to improve *M. catarrhalis* diagnostics
 1. Determine reliability of commonly used phenotypic methods for identifying *M. catarrhalis*
 2. Develop a sensitive and specific diagnostic PCR target for *M. catarrhalis*
- c. Use whole genome sequence data to study *M. catarrhalis* global epidemiology
 1. Assess the population structure of *M. catarrhalis* global genomes using phylogenetics with Bayesian analysis
 2. Develop a core genome MLST scheme for enhanced typing and surveillance of *M. catarrhalis*
- d. Use whole genome sequence data to investigate the virulence and antimicrobial resistance determinants in *M. catarrhalis*
 1. Perform GWAS on *M. catarrhalis* isolates from asymptomatic carriage and paediatric CSLD to identify disease correlates
 2. Analyse antimicrobial resistance determinants in *M. catarrhalis*
- e. Use microbiomic data from lower respiratory specimens and in vitro assays to investigate the role of *M. catarrhalis* in polymicrobial CSLD
 1. Investigate the relative prevalences of *M. catarrhalis*, other Moraxellaceae, and closely related genera in carriage versus CSLD-associated lower respiratory specimens, and across different disease states
 2. Perform interaction assays to identify the potential role of *M. catarrhalis* and other Moraxellaceae in modulating growth and virulence of other respiratory species in polymicrobial infections

Significance: This program of work will develop accurate *M. catarrhalis* diagnostic tests; facilitate epidemiological studies and surveillance for *M. catarrhalis* carriage, disease and antimicrobial resistance; improve understanding of *M. catarrhalis* pathogenesis and potential vaccine targets; improve understanding of polymicrobial CSLD, and potentially elucidate alternative therapies for testing.

Assoc Prof Heidi Smith-Vaughan

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Better management of paediatric bronchiectasis

CHILD HEALTH

MASTER BY RESEARCH

PhD

The Centre for Research Excellence (CRE) in preventing and managing bronchiectasis, especially in Aboriginal and Torres Strait Islander Children is led by the Menzies School of Health Research and funded by the National Health and Medical Research Council. The CRE is offering a postgraduate scholarship to support outstanding candidates to undertake a research higher degree in areas related to the CRE, specifically bronchiectasis management.

The overall aim of the scholarship and the associated research program is to reduce the burden of bronchiectasis, especially for Aboriginal and Torres Strait Islander Children, through clinical research and translation of findings. Bronchiectasis is a major cause of chronic lung disease and its prevalence among Northern Territory First Nations children is very high. Current management is dependent on regular physiotherapy, airway clearance, regular exercise, optimal nutrition, reduced environmental exposures and timely vaccinations. Personalised management plans have been shown to be beneficial for managing childhood asthma, and it is likely that personalised bronchiectasis management plans would also benefit children with bronchiectasis.

The PhD student will play a key role in the conducting and analysing a randomised clinical trial to assess the benefits of personalised bronchiectasis management plans. In addition, the student will join the CRE and will nationally collaborate on similar projects.

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