PUBLIC HEALTH HONOURS MAJOR
2017 PROJECTS

Make tomorrow better.
ABOUT HONOURS

The Public Health honours is a specialised year of study for those students who have demonstrated a high level of academic achievement in their undergraduate degree. The honours year offers an opportunity to immerse yourself in a research topic under the expert guidance of an academic supervisor, providing you with advanced training in contemporary approaches to health research.

If you have performed well in your undergraduate studies, have a capacity for defining and solving problems, enjoy discussing concepts, and exploring ideas, we encourage you to apply for honours.

Honours has the ability to improve your employment opportunities, as many prospective employees view honours as an indicator of advanced skills and knowledge and an ability to work independently. The completion of an honours year shows that you have persistence, the ability to apply yourself to achieving a complex goal, and are able to manage your time when presented with a large task to complete independently.

Public Health honours students are a select group. If you are successful in your application, we look forward to welcoming you to our stimulating, supportive and growing research community.

YOUR HONOURS COORDINATORS

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INSTRUCTIONS TO STUDENTS

We encourage you to review the available projects listed under the School of Public Health themes in this booklet. We then invite you to contact the academic supervisor responsible for the project to discuss the research project in more detail.

ABOUT THE SCHOOL OF PUBLIC HEALTH

The School of Public Health is the largest of the eight Schools within the Faculty of Health Sciences. We teach and conduct cutting edge, world-class research across three main themes in public health: health promotion and disease prevention; occupation and the environment; and health systems and health economics.

The School of Public Health at Curtin University was established in 1979 and has evolved to become a leader in public health in Australia and the broader Asia-Pacific region. We are driven towards developing, testing and implementing innovative solutions to new and emerging public health issues.

The research undertaken within that school has an international outlook supported by a network of strong relationships with universities across Southeast Asia and Europe, making us an attractive destination for international students wanting to pursue education in public health.
MENTAL HEALTH PROMOTION FOR CULTURALLY AND LINGUISTICALLY DIVERSE GROUPS (CALD)

SUPERVISOR/S
Julia Anwar-McHenry & Simone Kerrigan (Mentally Healthy WA):
Contact: Julia.Anwar.mchenry@curtin.edu.au

PROJECT DESCRIPTION
Modelled on Act-Belong-Commit’s Aboriginal social and emotional wellbeing project, Standing Strong Together in Roebourne, the project would begin with a literature review of what has been done locally, nationally, and international in the CaLD (positive) mental health sector. Scoping research (including surveys and interviews) would be conducted with WA’s CaLD community, current Act-Belong-Commit partners, and potential new partners to determine the relevance of the current Act-Belong-Commit brand and associated resources in promoting mental health to culturally and linguistically diverse groups. Based on any identified gaps, recommendations would be made for new, or changes to existing Act-Belong-Commit resources. These resources would then be adapted, produced, and tested with a number of CaLD focus groups, resulting in a set of new and modified resources for dissemination and promotion in CaLD communities throughout Western Australia.

METHODS
Conduct and write a comprehensive literature review (including an annotated bibliography using Endnote). The development and testing of health promotion resources and materials through the administration of paper-based/online surveys, semi-structured interviews and focus groups. Analysis of both qualitative and quantitative data using software packages such as NVIVO and SPSS.

NECESSARY SKILLS/KNOWLEDGE
Interest in mental health, social marketing, and community-based health promotion. Effective interpersonal, group and public communication and effective written and oral communication. The ability to interact well with people from a wide range of backgrounds, especially people from culturally and linguistically diverse backgrounds. Able to network and build partnerships with a broad range of stakeholders in both the mental health and multicultural sectors. Self-motivated with the ability to work independently and as part of the Mentally Healthy WA team. Current drivers licence and access to a reliable motor vehicle is preferable for data collection purposes.

SIGNIFICANCE
Act-Belong-Commit is a comprehensive health promotion campaign that encourages individuals to take action to protect and promote their own mental wellbeing and encourages organisations that provide mentally healthy activities to promote participation in those activities. This evidence-based campaign was developed primarily from research undertaken by Curtin University into people’s perceptions of mental health and the behaviours they believed protected and promoted good mental health. Specifically, that being active (ACT), having a sense of belonging (BELONG) and having a purpose in life (COMMIT) all contribute to happiness and good mental health. One of the campaign’s primary objectives is to extend the reach of the Act-Belong-Commit message to sub-populations, for example, through the development of culturally specific and appropriate versions of the mentally healthy message for culturally and linguistically diverse populations.
MENTALLY HEALTHY SCHOOLS INITIATIVE EVALUATION

SUPERVISOR/S
Sharyn Burns, Julia Anwar-McHenry, & Phoebe Joyce (Mentally Healthy WA):
Contact: Julia.Anwarmchenry@curtin.edu.au

PROJECT DESCRIPTION
In response to demand from schools wanting to promote the community-based Act-Belong-Commit message, Mentally Healthy WA (MHWA) developed the Mentally Healthy Schools Framework (MHSF) to enable the promotion of positive mental health in a school setting. This honours project will evaluate the impact of the Mentally Healthy Schools Framework (MHSF). Data are currently being collected through the provision of regular process data from partner schools and annual semi-structured interviews with key school contacts. Baseline and follow-up surveys with students/staff and student focus groups are being collected from new and established schools to gain a deeper understanding of the impact of the MHSF on student wellbeing, mental health literacy, and stigma reduction.

METHODS
Conduct and write a comprehensive literature review (including an annotated bibliography using Endnote). Collect primary data through the administration of paper-based/online surveys, conduct semi-structured interviews and/or focus groups. Analysis of both qualitative and quantitative data using software packages such as NVIVO and SPSS. NB This project will involve both the analysis of previously collected data and original data collection.

NECESSARY SKILLS/KNOWLEDGE
Interest in mental health, social marketing, and community-based health promotion. Effective interpersonal, group and public communication and effective written and oral communication. Self-motivated with the ability to work independently and as part of the Mentally Healthy WA team. Current drivers licence and access to a reliable motor vehicle is preferable for data collection purposes. Working with Children Check is required before commencing data collection in schools.

SIGNIFICANCE
Mental health problems adversely affect behaviour and academic performance, which is especially detrimental for young people of school age. While schools are an ideal setting for mental health promotion to children and young people, the effectiveness of school-based mental health interventions is not well established due to a lack of rigorous evaluation. Furthermore, many mental health interventions focus on awareness of early intervention for mental illness, rather than promoting good mental health. In response to demand from schools wanting to promote the community-based Act-Belong-Commit message, Mentally Healthy WA (MHWA) developed the Mentally Healthy Schools Framework (MHSF) to enable the promotion of positive mental health in a school setting. Mentally Healthy WA’s Act-Belong-Commit campaign appears to still be the world’s only comprehensive, population-wide mental health promotion framework that utilises evidence-based universal principles of wellbeing with documented implementation success. This evidence-based campaign was developed primarily from research undertaken by Curtin University into people’s perceptions of mental health and the behaviours they believed protected and promoted good mental health. Specifically, that being active (ACT), having a sense of belonging (BELONG) and having a purpose in life (COMMIT) all contribute to happiness and good mental health.
ACT-BELONG-COMMIT IN RECOVERY

SUPERVISOR/S
Geoffrey Jalleh, Julia Anwar-McHenry, & Katy Wedin (Mentally Healthy WA):
Contact: Julia.Anwarmchenry@curtin.edu.au

PROJECT DESCRIPTION
The Act-Belong-Commit in Recovery project was developed to build the capacity of the mental health workforce to support and mentor consumers to engage in mentally healthy activities. The overall aims of the project are to enhance recovery and prevent relapse by empowering individuals recovering from mental illness to get active, engage in the community and find meaningful things to do. As part of the Recovery project, workshops are targeted to mental health professionals and other support workers who assist consumers in their recovery. The workshops introduce the fundamental principles of the Act-Belong-Commit message, the evidence base for the campaign, the structure and content of the Act-Belong-Commit Guide to Keeping Mentally Healthy, and how it can be used as a positive framework to support consumers in the recovery process. This honours project will build on the success of the pilot project through follow-up evaluation of participants and organisations who took part in the workshops to determine ongoing and longer term impact. Further resource development and testing is also required (to ensure ongoing relevance of the original materials) and an exploration of potential partnership opportunities with alcohol and other drugs and disability services sectors.

METHODS
Conduct and write a comprehensive literature review (including an annotated bibliography using Endnote). The development and testing of health promotion resources and materials through the administration of paper-based/online surveys, semi-structured interviews and focus groups. Analysis of both qualitative and quantitative data using software packages such as NVIVO and SPSS. NB This project will involve both the analysis of previously collected data and original data collection.

NECESSARY SKILLS/KNOWLEDGE
Interest in mental health, social marketing, and community-based health promotion. Effective interpersonal, group and public communication and effective written and oral communication. The ability to interact well with people from a wide range of backgrounds and capacity to network and build partnerships with a broad range of stakeholders in mental health, disability, and alcohol and other drugs sectors. Self-motivated with the ability to work independently and as part of the Mentally Healthy WA team. Current drivers licence and access to a reliable motor vehicle is preferable for data collection purposes.

SIGNIFICANCE
The emphasis on recovery from mental illness largely focuses on psychotherapies and pharmacological intervention, whilst sometimes neglecting simple lifestyle behaviours that can enhance mental health and improve quality of life. The Act-Belong-Commit campaign is a mental health promotion campaign emphasising the importance of being proactive in looking after mental health and wellbeing. This evidence-based campaign was developed primarily from research undertaken by Curtin University into people’s perceptions of mental health and the behaviours they believed protected and promoted good mental health. Specifically, that being active (ACT), having a sense of belonging (BELONG) and having a purpose in life (COMMIT) all contribute to happiness and good mental health.
WHAT’S WRONG WITH JOHN? EVALUATING THE LONG TERM IMPACT OF MENTAL HEALTH FIRST AID

SUPERVISOR/S
Contact: Sharyn Burns: s.burns@curtin.edu.au & Gemma Crawford: g.crawford@curtin.edu.au

PROJECT DESCRIPTION
Mental Health First Aid (MHFA) is an internationally recognised training course that has demonstrated “radical efficiency” at the global level. The training provides participants with the skills to identify and support those who may be developing a mental health problem or in a mental health crisis. Staff from the Collaboration for Evidence, Research and Impact in Public Health (CERIPH) have implemented and evaluated a number of courses over the past few years, including via a randomised control trial with nursing student at Curtin. This project seeks to conduct an evaluation of the impact of the course on Curtin students who have undertaken the course over the past 2 years.

METHODS
This mixed methods study will include an online survey and semi-structured interviews. The project will require the student to develop a quantitative survey and qualitative interview guide to measure the longer term impact of MHFA. Using our database of participants, the student will then implement an online survey and conduct semi-structured interviews with a purposive sample of participants. Data will be analysed and managed using software packages such as SPSS (quantitative) and NVIVO (qualitative).

NECESSARY SKILLS/KNOWLEDGE
Interest in the prevention of poor mental health prevention and the promotion of positive mental health and wellbeing. Interest in mixed methods research. Effective interpersonal (group and public), written and oral communication skills. Self-motivated with the ability to work independently and as part of a small team within CERIPH.

SIGNIFICANCE
Published evaluation of MHFA courses implemented in Australia and internationally have included only short term follow up (up to 6 months). One of the gaps in the evaluation of MHFA is to determine the longer term impact the course has on skills and experiences of those undertaking the training. This study will investigate the retention of knowledge, attitudes and skills over a longer period of time. Importantly the study will investigate if participants have: 1) utilised the skills learned through MHFA, and 2) what their experiences and confidence were in implementing MHFA. The qualitative component of the study will enable these experiences to be explored in more depth. The study will investigate the effectiveness of MHFA in the longer term and if required make recommendations regarding follow up professional development, particularly pertinent to the university environment. There will be opportunity for the successful student to be involved in the publication of journal articles.

EFFECT OF INCREASED SATIETY ON EATING BEHAVIOUR AND DIETARY INTAKE

SUPERVISOR/S
Sebely Pal & Suleen Ho:
Contact: S.Pal@curtin.edu.au

PROJECT DESCRIPTION
Increased satiety or feeling of fullness will impact on how much food a person consumes. If people feel like eating less, how does this affect their food choices and eating behaviour and overall dietary intake. Measure PA, how do they compare to the accuracy and reliability of traditional activity diaries or logs.
MULTI-MORBID CONDITIONS AMONG CARDIOVASCULAR DISEASE PATIENTS

SUPERVISOR/S
Christopher Reid; Tom Briffa (UWA); Si Si; & Crystal Lee:
Contact: Christopher.reid@curtin.edu.au

PROJECT DESCRIPTION
With an aging population and advances in health care, co-existence of chronic diseases/conditions has become more prevalent. Multi-morbidities have strong implications on patients’ health outcomes, greater than simply combining the effects of each disease. Moreover, multi-morbidities usually indicate more complex patterns of health care and extended length of hospital stay. CVD is a leading cause of death and morbidity following cancer across Australia. Numerous studies investigated comorbid conditions among CVD patients and their impacts on patients’ health outcomes including Diabetes, metabolic syndrome, depression and anxiety, anaemia, atrial fibrillation, hypertension, sleep apnoea and chronic kidney disease. The project entails a systematic review and meta-analysis regarding a variety of morbid conditions among CVD patients and their health impacts.

METHODS
Systematic literature search will be conducted to identify studies reporting the prevalence of co-morbid conditions among CVD patients and their impact on patients’ short- and long-term outcomes. Meta-analysis will be performed to combine study results when possible.

NECESSARY SKILLS/KNOWLEDGE
Systematic literature search using Medline and Embase; literature review & data extraction; Meta-analysis (optional); and proper academic writing skills.

MONITORING PHYSICAL ACTIVITY USING DIFFERENT DEVICES

SUPERVISOR/S
Sebely Pal & Suleen Ho:
Contact: S.Pal@curtin.edu.au

PROJECT DESCRIPTION
Physical activity (PA) has traditionally been monitored via activity diaries. Activity monitors make it easier to measure PA, how do they compare to the accuracy and reliability of traditional activity diaries or logs.

CHRONIC PAIN AND OBESITY

SUPERVISOR/S
Sebely Pal & Suleen Ho:
Contact: S.Pal@curtin.edu.au

PROJECT DESCRIPTION
Obese and severely obese adults have been found to be twice and four times as likely respectively, compared to those of normal weight, to report chronic pain. Obesity and chronic pain comorbidity have been reported among patients with osteoarthritis, lower back pain, fibromyalgia, headache, and rheumatoid arthritis. This project seeks to examine the prevalence of pain among obese individuals and the effect of weight loss on the changes in pain.
GENERATION Z: ARE THEY AT RISK OF PREDIABETES AND CARDIOVASCULAR DISEASE?

SUPERVISOR/S
Jacquita Affandi & Natalie Ward (School of Biomedical Sciences):
Contact: jacquita.affandi@curtin.edu.au

PROJECT DESCRIPTION
Young adults (18 - 35 years of age) are often overlooked and understudied, as the prevalence of diabetes, chronic kidney disease (CKD) and cardiovascular disease (CVD) is generally low. However, these diseases start to manifest as they reach their 40’s and 50’s. Hence, we are interested in doing a food, health, lifestyle, smoking questionnaire, do blood pressure testing, single lead ECG, and a simple finger-prick test (glucose/lipids/C-reactive protein) and collect a saliva sample to investigate oral microbiome. These results can be used as a prediction model and extrapolated as a pilot study, in the hopes of increasing awareness and lifestyle changes.

METHODS
Prospective student will be required to recruit participants, administer the questionnaire (health, lifestyle, food frequency), administer anthropometric (height, weight, hip circumference) and blood pressure measurements, administer single-lead ECG (AliveCor) using a mobile phone app, perform finger-prick to test for blood glucose levels, lipids (total cholesterol, triglycerides, HDL, LDL-measured) and C-reactive protein and coordinate collection and storage of saliva samples for further testing (after participant recruitment) for oral microbiome.

NECESSARY SKILLS/KNOWLEDGE
Outgoing and engaging personality, as well as willingness to approach participants. Student will have to undergo mandatory induction at the Healthy Living Clinic and the CHIRI laboratories. Ability to pipette. Experience working in the wet lab is favourable. Student must be willing to perform lab work as designated by supervisors, and able to work independently.

DOES SUCROSE IMPAIR POSTPRANDIAL METABOLISM OF AN ORAL FAT CHALLENGE COMPARED TO GLUCOSE?

SUPERVISOR/S
Tony James & Karin Clark:
Contact: T.P.James@curtin.edu.au

PROJECT DESCRIPTION
The Australian Dietary Guidelines recommend limiting sugar sweetened beverages (SSB) intake as they are energy dense, micronutrient poor, discretionary choices (National Health and Medical Research Council [NHMRC], 2013). However further evidence has accumulated indicating that SSB containing fructose adversely affect cardiovascular risk factors and blood pressure, effects which are not observed with glucose sweetened beverages. The majority of SSB consumed in Australia contain sucrose and hence contain equal proportions of glucose and fructose. With the proliferation of consumption of SSB it is important to determine whether their consumption is associated with increased cardiovascular disease risk and whether differences exist between the type of sugar used in the SSB. The project aims to compare the acute effects of sugar type in SSB on postprandial lipid metabolism in overweight/obese adults.

METHODS
Overweight or obese adults will be recruited from the general public. Volunteers will, on three occasions, be asked to consume one of two different SSB in conjunction with an oral fat load. Postprandial lipid and responses to the test meals will be compared.
DETERMINANTS OF FIBROBLAST GROWTH FACTOR 21 (FGF21) IN AUSTRALIAN ADULTS

SUPERVISOR/S
Soares MJ, Calton EK & Pathak K:
Contact: M.Soares@curtin.edu.au

PROJECT DESCRIPTION
Postprandial metabolism is central to many diet related chronic conditions from obesity to insulin resistance to atherosclerosis. Our modern eating pattern of several meals during the day, hence places us in a postprandial state for most of the 24h day. Depending on meal composition exaggerated glucose and lipid levels can lead to increased inflammation, dysmetabolism and vascular dysfunction. FGF21 belongs to a family of peptides involved in energy and lipid metabolism in the liver. FGF21 is capable of converting white adipose tissue to brown adipose tissue. Following glucose ingestion FGF21 shows a biphasic excursion in plasma; an initial decline within 30 mins followed by a >2 fold increase by 2hr. FGF21 may hence have a role in energy expenditure, glucose and lipid metabolism.

METHODS
Data analysis of collated information on a group of Adults ranging in age, gender, metabolic status and insulin sensitivity. Fasting and 2hr FGF21 has been measured following an oral glucose tolerance test, together with relevant clinical chemistry.

NECESSARY SKILLS/KNOWLEDGE
Excellent statistical knowledge; Advanced literature searching skills; Good writing skills; Ability to integrate biochemistry and physiology knowledge into nutritional determinants of health.

There are other projects that are larger in scope - contact Mario Soares to discuss.

EFFECTS OF MILD COLD EXPOSURE ON ACUTE CHANGES IN BLOOD PRESSURE AND ENDOTHELIAL FUNCTION IN OVERWEIGHT AND OBESE AUSTRALIANS

SUPERVISOR/S
Soares MJ, Pathak K & Reid C:
Contact: M.Soares@curtin.edu.au

PROJECT DESCRIPTION
Morbidity and mortality from CVD increases in the winter months. Cold exposure increases BP via vasoconstriction from activation of the SNS. Moreover, blood pressure falls after a carbohydrate rich meal. This fall is exacerbated in the elderly, those with hypertension and orthostatic hypotension and overall predisposes to postprandial hypotension; a significant clinical and public health disorder. This RCT was primarily designed with a view to understand the thermoregulatory responses to mild cold in residents of Perth WA. There is an excellent opportunity to examine cardio-metabolic responses in this trial.

METHODS
Data analysis of collated information on a group of Adults ranging in age, gender, and adiposity. N=20 adults were exposure to 20, 25 and 27 deg C in random order on different days. Resting blood pressure and endothelial function were measured after a 1 hr exposure to each temperature, and then serially over 2 hr following an OGTT. Fasting and 2hr blood was obtained for relevant clinical chemistry.

NECESSARY SKILLS/KNOWLEDGE
Excellent statistical knowledge and data handing skills. Advanced literature searching skills. Good writing skills. Ability to integrate biochemistry and physiology knowledge into pathogy of CVD.
UNDERSTANDING THE EFFECT OF GENOTYPE AND PLANT GROWTH ENVIRONMENT ON THE NUTRITIONAL PROPERTIES OF SORGHUM GRAIN

SUPERVISOR/S
Stuart Johnson, Janet Bornman (Curtin Business School) & Sarita Bennett (Department of Environment and Agriculture):
Contact: s.johnson@curtin.edu.au

PROJECT DESCRIPTION
Sorghum grain has great potential as global sustainable grain for food security in climate change due to its high temperature and drought tolerance. However, very little is known about the effect of growing sorghum in elevated temperatures on the nutritional properties of its grain. This study will analyse selected nutritional properties of grain from a range of sorghum varieties already grown in a temperature controlled field trial to identify any effects of genotype and temperature of production and their interaction. The findings may help sorghum breeders breed new varieties with improved nutritional properties for production in the elevated temperature expected in climate change.

METHODS
This project is laboratory based and will involve the analysis of levels of nutrients in sorghum grains and the assessment of their protein and starch structure and in vitro digestibility.

NECESSARY SKILLS/KNOWLEDGE
Interest in the role of grains in food and human nutrition; experience in the chemical analysis of foods; good laboratory skills.

COMPARISON OF DIETARY EFFECTS ON SKIN YELLOWNESS IN ASIAN PARTICIPANTS: AN INTERVENTION STUDY

SUPERVISOR/S
Karin Clark & Tony James:
Contact: karin.clark@curtin.edu.au

PROJECT DESCRIPTION
Dietary assessment of fruit and vegetable intake may be highly influenced by subjectivity. Carotenoids contained in fruits and vegetables have the potential to accumulate in the skin, and in Caucasian skin types, skin colour may serve as an objective marker of fruit and vegetable consumption. In Asian skin the relationship between carotenoid intake and skin colour is not as clear. This project will investigate whether a change in fruit/vegetable intake results in changes to skin colour, to determine the usefulness of measuring skin colour as an objective biomarker of fruit/vegetable intake in Asian participants.

METHODS
This study will collect data on usual fruit and vegetable consumption and implement a dietary vegetable intervention. Skin colour measurements will be taken at baseline and following the intervention using portable reflectance spectrophotometer and calculated L*a*b* values.

NECESSARY SKILLS/KNOWLEDGE
Knowledge of Australian foods and dietary analysis. Ability to conduct and/or develop dietary assessment methods, SPSS and Excel analysis skills, literature searching, critical appraisal and scientific writing.
THE IDENTIFICATION OF THE PREVALENT MICROBIAL FLORA WITHIN THE WEST AUSTRALIAN CHICKEN PROCESSING FACILITIES

SUPERVISOR/S
Ranil Coorey, Gary Dykes, Dean Bertolatti & Elna Buys (University of Pretoria)
Industry partner: An Australian poultry processor (due to confidentiality the exact name of the facility cannot be released)
Contact: r.coorey@curtin.edu.au

PROJECT DESCRIPTION
The project will isolate and identify the typical microbial flora within the chicken processing chain in Western Australia and determine their antibiotic resistant characteristics.

IDENTIFY MICROORGANISMS ISOLATED FROM RETAIL CHICKEN PRODUCTS IN WESTERN AUSTRALIA

SUPERVISOR/S
Ranil Coorey, Gary Dykes, Dean Bertolatti & Elna Buys (University of Pretoria)
Industry partner: An Australian poultry processor (due to confidentiality the exact name of the facility cannot be released)
Contact: r.coorey@curtin.edu.au

PROJECT DESCRIPTION
The project will identify already isolated organisms from retail chicken products and determine their heat and antibiotic resistance characteristics.

COMPARATIVE STUDY BETWEEN AUSTRALIA AND SOME SELECTED COUNTRIES IN FOOD SAFETY PRACTICES AND LEGISLATION

SUPERVISOR/S
Ranil Coorey, Gary Dykes, Dean Bertolatti & Elna Buys (University of Pretoria)
Industry partner: University of Pretoria and the AAUN
Contact: r.coorey@curtin.edu.au

PROJECT DESCRIPTION
The study will look at the legislation and practices in the poultry processing industry between Australia and selected countries in Africa. One of the African countries will be South Africa.
DETERMINATION OF STRESS HORMONE LEVELS IN MEAT PRODUCTS

SUPERVISOR/S
Ranil Coorey, Gary Dykes, Dean Bertolatti & Elna Buys (University of Pretoria)
Industry partner: University of Western Australia (this project may have some funding)
Contact: r.coorey@curtin.edu.au

PROJECT DESCRIPTION
The project will validate a developed process in identifying stress hormones and other chemical compounds in animal muscles after slaughter. Some of these compounds may have safety implications to the consumer.

IDENTIFYING ATTITUDES AND BEHAVIOURS REGARDING DIET AMONG PEOPLE WITH MULTIPLE SCLEROSIS

SUPERVISOR/S
Lucinda Black & Andrea Begley
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PROJECT DESCRIPTION
Data from the 2003-2006 Ausimmune Study show that 40% of participants made dietary changes in the first year after a first clinical demyelinating event, with some participants making multiple dietary changes and trying various different types of diets. Such dietary changes included wheat free or gluten free diets, the Swank diet, the Tony Ferguson diet, low glycaemic index, no red meat, vegan, and others. However, it is not clear where the participants obtained their information to support these dietary changes, many of which are scientifically unsubstantiated, costly, and may be hard to implement. There is also little known about how more severe symptoms of MS impact on independent meal preparation and the likelihood of the increased use of convenience and fast foods. We will conduct focus groups and in-depth interviews involving people with early and/or mild MS, people with established and/or disabling MS, and their carers, in relation to diet and healthy eating. The aim is to generate pilot data through community engagement to inform future grant applications in nutrition and MS, including feasible dietary interventions.

METHODS
This project will involve conducting focus groups involving people with early and/or mild MS in relation to diet and healthy eating, and in-depth interviews involving people who have established and/or disabling MS, and their carers. Participants will be recruited with the help of the MSWA community network. The student will be required to travel to MSWA in Perth to help coordinate focus groups, along with experienced staff.

NECESSARY SKILLS/KNOWLEDGE
Excellent interpersonal skills; qualitative research methods.
DEVELOPING A PROTOCOL AND ASSAY TO MEASURE 25-HYDROXYVITAMIN D CONCENTRATIONS IN SALIVA

SUPERVISOR/S
Lucinda Black, Shelley Gorman (Telethon Kids Institute) & Michael Clarke (UWA):
Contact: lucinda.black@curtin.edu.au

PROJECT DESCRIPTION
This projects aims to develop a protocol and assay to measure 25-hydroxyvitamin D (25(OH)D) concentrations in saliva for the assessment of vitamin D status, while maintaining precision and accuracy compared to measuring 25(OH)D concentrations in serum samples. This would provide an easy and painless way to assess vitamin D status in children in population studies, to diagnose vitamin D deficiency in paediatric patients without taking blood, and to regularly monitor vitamin D status during treatment of vitamin D deficiency. We will conduct a validation study in a convenience sample of 50 adults and 50 adolescents, which is a sample size that is feasible, affordable and likely to be sufficient to demonstrate agreement between saliva and serum samples. We anticipate that a validated method to assess vitamin D status in saliva will become widely sought after for studies examining both the prevalence of deficiency and vitamin D status as a risk factor for a wide range of childhood diseases.

METHODS
A convenience sample of 50 adults will be recruited through word of mouth and internal advertising at the Telethon Kids Institute. A further 50 adolescents will be recruited from the outpatient clinic at the Department of Endocrinology and Diabetes, Princess Margaret Hospital (PMH). Participants will have blood collected by a trained phlebotomist and will provide saliva samples according to a standardised written protocol. Bland-Altman plots will be used to visually check agreement between the saliva and serum assays; paired t tests will be used to formally test agreement between assays; and weighted Deming regression models will be fitted to assess any systematic bias between assays. Ethics approval for this project has been obtained from the PMH HREC.

NECESSARY SKILLS/KNOWLEDGE
Strong interpersonal skills to coordinate participant recruitment and appointments. The student will be required to spend time at Telethon Kids Institute and PMH.

IDENTIFYING THE CHEMICAL COMPOSITION AND SAFETY OF SELECTED AUSTRALIAN BUSH FOODS

SUPERVISOR/S
Ranil Coorey, Gary Dykes, Dean Bertolatti & Elna Buys (University of Pretoria)
Industry partner: Swan Valley and Eastern Regions Inc (this project may have some funding)
Contact: r.coorey@curtin.edu.au

PROJECT DESCRIPTION
There are three separate projects available under this topic. The aim of the projects will be to determine the chemical profile of some selected Australian native bush food. The project will specifically look for known plant chemicals hazards.
VITAMIN D STATUS AND DETERMINANTS IN ABORIGINAL POPULATIONS IN AUSTRALIA

SUPERVISOR/S
Lucinda Black, Robyn Lucas (Australian National University) & Glenn Pearson (Telethon Kids Institute):
Contact: lucinda.black@curtin.edu.au

PROJECT DESCRIPTION
Aboriginal people have a high prevalence of chronic kidney disease and the kidney is the major site where the active version of vitamin D is produced. Preliminary results from the Australian Aboriginal and Torres Strait Islander Health Survey 2012-2013 showed that around a quarter of Aboriginal and Torres Strait Islander adults had vitamin D deficiency and were more likely to have a vitamin D deficiency than their non-Indigenous counterparts. Vitamin D deficiency was much more common among Aboriginal and Torres Strait Islander people living in remote areas, where almost 40% were vitamin D deficient. Detailed analyses of vitamin D status and determinants in Aboriginal and Torres Strait Islander people have not yet been conducted. However, detailed confidentialised unit record data from the Australian Aboriginal and Torres Strait Islander Health Survey are available, including vitamin D status assessed using a gold standard assay, and additional data on diet and a range of chronic diseases. These recent data provide an important opportunity to better understand the vitamin D status of Aboriginal populations, the determinants of vitamin D status in these populations, and links to chronic disease.

METHODS
This project involves secondary analysis of the Australian Aboriginal and Torres Strait Islander Health Survey 2012-2013. Data will be accessed through data laboratory sessions at the Australian Bureau of Statistics office in Perth. Vitamin D status will be described, and factors that potentially predict serum 25-hydroxyvitamin D concentrations, such as region, month, obesity, demographics and socio-economic characteristics, will be investigated using multiple linear regression models.

NECESSARY SKILLS/KNOWLEDGE
Using large datasets, experience with SPSS and regression modelling.
DISCOVERING NEW THERAPEUTICS FOR DIABETES MELLITUS UTILISING THE MICROENCAPSULATION TECHNOLOGY

SUPERVISOR/S
Hani Al-Salami (Pharmacy) & Ryu Takechi
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PROJECT DESCRIPTION
Diabetes mellitus is divided mainly into Type 1 and Type 2. Type 1 diabetes occurs when the cells in our pancreas that are responsible for releasing the hormone (insulin) that controls blood glucose, are destroyed by our own immune system. These cells are known as: β-cells and are located in the pancreas. Patients with Type 1 diabetes need to inject insulin every day, in order to control their glucose levels and keep tissues alive. Type 2 diabetes occurs when body tissues become less responsive to insulin and levels of blood glucose are no longer well-controlled. Type 2 diabetic patients take drugs that promote tissues to respond better to insulin and also normalise physiological processes and bring about better control of blood glucose levels and tissues functions. Inflammation has been linked to both types of diabetes and of recently, has shown to exacerbate diabetes symptoms and worsen diabetes-associated complications. Inflammation has also been linked to high levels of bad cholesterol, which is commonly seen in Type 2 diabetic patients. So, both, inflammation and bad cholesterol, play important roles in diabetes development, progression and diabetes-association complications. Accordingly, a novel approach to treating Type 2 diabetes is to utilise an existing drug with well-known anti-inflammatory and anti-bad cholesterol effects, and investigate the drug’s potential useful effects in diabetes. An example of such a drug is probucol.

HYPOTHESIS
A new formulation for probucol which is specially designed to maximise effectiveness, will exert antidiabetic effects through ameliorating inflammation and bad cholesterol.

METHODS
Designs of various formulations of probucol will be carried out using the microencapsulation technology, which is well-established in the supervisors’ lab. The formed microcapsules will be characterised and tested to examine their potential applications in diabetes.

NECESSARY SKILLS/KNOWLEDGE
The supervisors have well-established and ongoing research in the area of drug discovery, biotechnology and diabetes treatment. Thus, the project requires a student who has real interests in lab-based studies, which use living cells and mice/rats based analyses. The supervisors are keen on students who have long-term goal of pursuing research.

SIGNIFICANCE
Diabetes is an epidemic and its prevalence is increasing at an alarming rate, with Australia ranked 6th in the world. The effectiveness of current antidiabetic treatments remains limited and the disease and its complications remain major health burden not only to diabetic sufferers but their carers and the community. Thus, this project has significant implications in terms of advancing our knowledge on potential new treatments that may exert significant benefits to diabetic patients and relief symptoms and complications of the disease.
HEALTH SYSTEMS AND HEALTH ECONOMICS PROJECTS

THE IMPACT OF SERIOUS DISEASE ONSET ON SOCIAL MOBILITY

SUPERVISOR/S
Contact: Rachael Moorin: r.moorin@curtin.edu.au

PROJECT DESCRIPTION
Previous work has demonstrated that the onset of serious illness is associated with a reduction in migration to Perth amongst those living in rural and remote Western Australia. This suggests that rural and remote populations with serious illness appear unable to migrate centrally to access services which they may require for their condition. This previous work was limited by incomplete location data, which included individuals’ location only at study start and study end and hence may miss temporary relocations during treatment. This work was also limited to examining only migration between Perth and rural/remote Western Australia. The aim of this project will be to more fully explore the impact of the onset of serious disease on urban/rural migration and on social mobility in Western Australia.

METHODS
The supervisor currently holds data which include all hospital admissions, emergency department presentations, deaths, and electoral roll records for all West Australians aged 18 and above from the 1980’s up to 2004. The electoral roll data include all changes in postcode. Individual postcodes will be used to determine both remoteness and social disadvantage. Social mobility will be compared between those with and without serious illness, and before and after the onset of disease. Shifts between metropolitan and more remote areas following disease onset will be explored.

NECESSARY SKILLS/KNOWLEDGE
Experience with basic bio statistical techniques, including linear and logistic regression, is essential. Knowledge of or experience with linked administrative health data or health informatics more generally would be beneficial but not essential.

THE VALUE OF CHEMOTHERAPY AT HOME

SUPERVISOR/S
Contact: Suzanne Robinson: suzanne.robinson@curtin.edu.au & Richard Norman: richard.norman@curtin.edu.au

PROJECT DESCRIPTION
Being able to receive treatment at home is of considerable potential value to cancer patients. However, standard methods of assessing the effectiveness and cost-effectiveness of it are not capable of capturing the value the patient places on it. We will run a survey to allow valuation of being able to receive care at home, rather than having to come to hospital for every treatment.

METHODS
A survey called a discrete choice experiment, presenting patient with hypothetical choices to determine what aspects of care are of most value.

NECESSARY SKILLS/KNOWLEDGE
A strong quantitative skill set and experience of using STATA.
GEOGRAPHICAL VARIATION IN CANCER SURVIVAL

SUPERVISOR/S
Contact: Rachael Moorin: r.moorin@curtin.edu.au & David Youens: david.youens@curtin.edu.au

PROJECT DESCRIPTION Recently a growing body of literature is suggesting that there can be substantial variation between geographical regions, even at a relatively small scale, in diagnoses, in the treatments provided for certain conditions and in outcomes of care. These phenomena have been observed even within homogenous, publicly funded systems which aim to provide a consistent quality of care to all. This project will examine variation in cancer survival between regions of Western Australia and across types of cancer for those diagnosed between 1982 and 2011.

METHODS The supervisor currently holds linked administrative data (WA Cancer Registry, WA Death Registry & WA Hospital Morbidity Data Collection) on all incident cancer diagnoses in Western Australia from 1982 to 2011 inclusive. Data include type of cancer, date of diagnosis, postcode of residence at diagnosis, date of death (if relevant), hospital use (from 1997 +) and a range of socio-demographic information. Specific analytical methods used can be agreed by the student and supervisor, and will depend on the student’s level of knowledge and experience.

NECESSARY SKILLS/KNOWLEDGE
This project requires a student who has strong quantitative skills or who is interested in developing these. Experience with biostatistical techniques is essential. Knowledge of or experience with linked administrative health data, coding practices used in Australian hospitals or health informatics more generally would be beneficial but not essential. The project will involve, under close supervision, the manipulation of administrative health datasets to generate datasets for analysis incorporating a range of clinical and socio-demographic information. Throughout the project the student will develop skills in data manipulation and analysis techniques, particularly geo-spatial analysis.

SIGNIFICANCE
This work will identify if and where there are areas of relatively poorer cancer survival, or where improvements in survival over time are unusually low, where further research may be required into explanatory factors and service design.
THE UPTAKE OF HEALTHPATHWAYS ACROSS WESTERN AUSTRALIA – A COMPARISON BETWEEN PERCEPTION AND REALITY

SUPERVISOR/S
Contact: Suzanne Robinson: suzanne.robinson@curtin.edu.au & Richard Varhol: rvarhol@curtin.edu.au

PROJECT DESCRIPTION
HealthPathways, an online portal to assist general practitioners (GP) with patient assessment and referrals has been available in the Perth metropolitan region for nearly a year, with anecdotal suggestions of wide spread utilization and uptake. This project will use a mixed methods approach using data obtained from the Central Referral Service and conversations with general practitioners, to get a more accurate understanding of the current usage. In addition to identifying HealthPathway utilization, you will work with a team to identify and propose methodologies to improve and increase the both awareness and usage throughout the Perth metropolitan region.

METHODS
Using a mixed methods approach (qualitative and quantitative) analysis.

NECESSARY SKILLS/KNOWLEDGE
This project would be suitable for a well-mannered individual who is skilled in project management principles with qualitative assessment and writing / reporting skills who is interested in gaining a further understanding of the primary health care system.

EVALUATION OF UTILIZATION AND IMPACTS OF ALLERGY AND ANAPHYLAXIS CLINICAL PATHWAYS IN PRIMARY CARE USING HEALTHPATHWAYS

SUPERVISOR/S
Contact: Suzanne Robinson: suzanne.robinson@curtin.edu.au & Richard Varhol: rvarhol@curtin.edu.au

PROJECT DESCRIPTION
Assist in the development of a national allergic diseases model of care that will address improved access to care and accurate diagnosis for patients with allergic diseases. The assessment of clinical pathways relating to allergy & anaphylaxis, localised to Western Australia, and made available to GPs on the online HealthPathways portal will assist in the implementation of the National Allergy Strategy.

METHODS
Using a mixed methods approach (qualitative and quantitative) analysis, this project will include analysis of a number of indicators as well as the collection of qualitative information through the conduction of interviews with GPs, including a Statewide improved patient satisfaction survey related to allergy & anaphylaxis management.

NECESSARY SKILLS/KNOWLEDGE
This project would be suitable for a well-mannered individual who is skilled in project management principles with qualitative assessment and writing / reporting skills who is interested in gaining a further understanding of the primary health care system.
PREVALENCE OF EXPOSURE TO OCCUPATIONAL ASTHMAGENS AMONG AUSTRALIAN WORKERS

SUPERVISOR/S
Sonia El-Zaemey and other Occupational Epidemiology Group members.
Contact: Sonia.el-zaemey@curtin.edu.au

PROJECT DESCRIPTION
Occupational asthma is asthma which is caused by exposure to chemicals or dusts at work. There are many different asthmagens including animal fur, acids, and chemicals in paints and glues. Little is known on a national level about the circumstances in which workers are exposed to asthmagens and what would be the most effective preventive measures. The student would choose one of the 27 asthmagen groups we have data on and estimate the current prevalence of work-related exposure to that asthagen, identify the main circumstances of exposure and determine how much use of workplace control measures could be improved.

METHODS
The study will use data from a national cross-sectional survey of Australian workers, Australian Workplace Exposures Study (AWES)-Asthma, which included 4878 participants (2441 male and 2437 female) and collected information on the current prevalence to 277 asthmagens, assembled into 27 groups. The student will analyse these data under supervision and determine the most effective policy or practice changes to improve workers’ health.

NECESSARY SKILLS/KNOWLEDGE
Epidemiology and biostatistics, occupational health.

SHIFTWORK AND COLORECTAL CANCER (CRC) FROM THE WESTERN AUSTRALIAN BOWEL HEALTH STUDY (WABOHS)

SUPERVISOR/S
Terry Boyle & Renee Carey
Contact: terry.boyle@curtin.edu.au

PROJECT DESCRIPTION AND METHODS
The evidence for an association between shiftwork and colorectal cancer (CRC) is limited. The dissertation aims to analyze this possible association using occupational history gathered as part of a case-control study of CRC - The Western Australian Bowel Health Study (WABOHS ) which included 736 females (334 cases and 402 controls) aged between 40 and 70 years. Shiftwork exposure will be estimated by linkage to a job-exposure matrix (JEM). Differences in risk of CRC between relatively low and high exposure to shiftwork will be analysed.

NECESSARY SKILLS/KNOWLEDGE
Epidemiology and biostatistics.
ARE MIGRANT AND FOREIGN-BORN WORKERS AT HIGHER RISK OF WORK-RELATED FATALITIES AND INJURIES THAN NATIVE-BORN WORKERS?

**SUPERVISOR/S**
Contact: Alison Reid: alison.reid@curtin.edu.au & Jun Chih: h.chih@.curtin.edu.au

**PROJECT DESCRIPTION**
Work-related injuries have generally been found to be higher in foreign or migrant workers compared with native-born populations. However, this is not always the case, with some studies showing that risks are higher among native-born workers compared with foreign-born workers. This project will examine the literature on work-related injuries among migrant workers to determine if risks are higher among workers in specific industries, or among different socioeconomic groups of workers, or if risks differ between countries (e.g. Australia and the United States).

**METHODS**
This project involves undertaking a systematic literature review using the PRISMA guidelines. After identifying the relevant literature a meta-analysis will assess whether migrant and foreign-born workers are at increased risk of work-related fatalities and injuries compared with native-born workers, in a range of different scenarios.

**NECESSARY SKILLS/KNOWLEDGE**
A bachelor degree with a high course weighted average (>70). Previous experience undertaking a literature review. Good interpersonal communication skills and time management skills. Knowledge of statistics and interest and willingness to learn new statistical software (e.g. STATA) statistical package.

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DOES BEING PHYSICALLY ACTIVE REDUCE THE RISK OF PROSTATE CANCER?

**SUPERVISOR/S**
Terry Boyle & Lin Fritschi
Contact: terry.boyle@curtin.edu.au

**PROJECT DESCRIPTION AND METHODS**
Physical activity is a modifiable behaviour that is convincingly associated with a reduced risk of several cancers, including colon, postmenopausal breast and endometrial cancers. The association between physical activity and prostate cancer is less clear however, with inconsistent results from the research that has been conducted on this topic. The aim of this study is to investigate the association between physical activity and the risk of prostate cancer, using data from a case-control study that was conducted in Western Australia (604 cases and 471 controls). We are particularly interested in how physical activity over the life course potentially influences prostate cancer risk, and whether specific types of physical activity may be more beneficial than others (e.g., aerobic exercise vs resistance/weight training).

**NECESSARY SKILLS/KNOWLEDGE**
Epidemiology and biostatistics
RECURRENCE OF ADVERSE PREGNANCY OUTCOMES (E.G., STILLBIRTH, PRETERM BIRTH AND FETAL GROWTH RESTRICTION) AND INTERGENERATIONAL EFFECTS RELATED TO SOCIOECONOMIC STATUS.

SUPERVISOR/S
Gavin Pereira & Helen Leonard (Telethon Kids Institute)
Contact: gavin.f.pereira@curtin.edu.au

PROJECT DESCRIPTION
Many complications and outcomes of pregnancy recur in subsequent pregnancies or within families. Only a fraction of this has been explained by genetic studies. This project will identify whether pregnancy outcomes cluster in families and possibly propose a design to ascertain the contribution of socioeconomic/environmental exposures.

METHODS
Use of secondary data i.e. information in health registries. Cross-tabulations of pregnancy outcomes by previous pregnancy history and family history. Assessment of the independent effects of these risk factors using an appropriate statistical method.

NECESSARY SKILLS/KNOWLEDGE
Statistics or a background from a quantitative/computational science (desirable but not mandatory). The student will learn the one of the most powerful open source (free) tools for data analysis used in many settings beyond health e.g., finance, marketing, other basic/applied sciences, in various industries and government.

USING MAPS TO BETTER UNDERSTAND THE GEOGRAPHIC DISTRIBUTION OF HEALTH

SUPERVISOR/S
Gavin Pereira, other Geospatial Health Reference Group members
Contact: gavin.f.pereira@curtin.edu.au

PROJECT DESCRIPTION
This project will use geographic information systems, i.e. mapping software, and spatial analytical techniques to visualise the propensity of health morbidity in Australia. This is important to inform provision of health services, inform participant selection for interventions, and identify environmental hazards. The particular health outcomes, risk and behavioural factors will depend on availability but some data has already been acquired.

METHODS
Map risk factors using a geographic information system, ascertain geographic variation in risk and identify “hotspots” (e.g., suburbs with elevated morbidity risk).

NECESSARY SKILLS/KNOWLEDGE
Some experience with Geographic Information Systems highly desirable. If no GIS experience, the student will need to have a background from a quantitative/computational science. The student will learn to use the leading commercial mapping (and spatial analysis) software.
AIR POLLUTION/HEATWAVES, SHORT PREGNANCIES AND SMALL BABIES

SUPERVISOR/S
Gavin Pereira, Ben Mullins & Brad Zhang
Contact: gavin.f.pereira@curtin.edu.au

PROJECT DESCRIPTION
This will be a study on outdoor exposures (air pollution, elevated temperature) and preterm birth and birth weight.

METHODS
(i) Systematic review and meta-analysis, (ii) Quantify the effects of exposure after accounting for individual predisposition to preterm birth in WA. (iii) Identify socioeconomic gradients in exposure to fine particulate air pollution among a birth cohort in WA.

NECESSARY SKILLS/KNOWLEDGE
Statistics, a background in environmental health/science. The student will learn the one of the most powerful open source (free) tools for data analysis used in many settings beyond health e.g., finance, marketing, other basic/applied sciences, in various industries and government. At the end of the project the student will have undertaken a short but complete analysis, useful preparation for a PhD in Environmental Epidemiology.

LIQUOR OUTLETS AND CRIME AND VIOLENCE IN WA

SUPERVISOR/S
Gavin Pereira, Mil Jacobs & Ori Gudes
Contact: gavin.f.pereira@curtin.edu.au

PROJECT DESCRIPTION
Greater access to alcohol has been associated with alcohol consumption at harmful levels, and detrimental effects on the health and wellbeing of the community. This project will investigate police callouts before and after the establishment of a new liquor store. Data and ethics approval have already been acquired.

METHODS
This student can choose to focus on any aspect of the project: on the spatial component (i.e. use of geographic information systems/maps), statistical/epidemiological approach, the policy implications (i.e. informing licensing decisions based on liquor licence density), or a combination thereof.

NECESSARY SKILLS/KNOWLEDGE
Statistics, Geographic Information Systems, both desirable but not mandatory as the project is flexible. Depending on the focus of the student there will be opportunity to learn the one of the most powerful open source (free) tools for data analysis used in many settings beyond health e.g., finance, marketing, other basic/applied sciences, in various industries and government. Depending on the choice of project, at the end of the project the student will have undertaken a short but complete epidemiological analysis, useful preparation for a PhD in Epidemiology.
PATIENT-SPECIFIC COMPUTATIONAL MODELLING OF HIGH INTENSITY FOCUSED ULTRASOUND HYPERTHERMIA FOR THERMAL ABLATION OF CEREBRAL TUMORS

SUPERVISOR/S
Contact: Abishek Sridhar: abishek.sridhar@curtin.edu.au & Ben Mullins: b.mullins@curtin.edu.au

PROJECT DESCRIPTION
Ultrasound with intensities higher than that used for clinical diagnostics has been shown to have great potential for non-invasive treatments in physio-/occupational-therapy, lithotripsy (for shock based breakup of kidney stones), and more recently sonicated disruption of blood brain barrier for enhanced drug delivery, functional neurosurgery and thermal ablation of cysts and tumors (benign and malignant). The risk and technical difficulty in surgical excision of deep tumors such as in the brain has been a dilatory factor in efficient treatment of such tumors. The ability of high intensity focused ultrasound (HIFU) to non-invasively destroy/ablate a desired localized region occupied by the tumor has been exploited in recent years for several clinical treatments including that for cerebral, breast, liver and prostate cancers. While the application of HIFU is generally guided by magnetic resonance feedback, several aspects such as the influence of localized heating - which may typically result in temperature rises over 40°C - on the surrounding blood vessels or the effects of blood perfusion on the intensity of treatments, that are critical for the estimation of HIFU parameters are currently largely empirical in nature. Accurate computer simulations of the HIFU treatment under patient-specific conditions can provide vital data, which are otherwise inaccessible, for elevated surgical success.

METHODS
The first part of the research would involve collection of representative thermophysical and acoustic data relevant to the HIFU surgery, and generation of a virtual model of a representative cerebral section with an embedded tumor. The second part of the research would involve computer simulations for parametric analysis using an in-house computational software what works within the open-source framework of OpenFOAM.

NECESSARY SKILLS/KNOWLEDGE
Visualization and imagery techniques; will have access to tools for modelling bio-thermo-fluid dynamics; training in data analysis and critical evaluation of research findings.

USING HIGH RESOLUTION SENSOR DATA TO STUDY AND PREDICT ADVERSE THERMAL AND AIR QUALITY EVENTS

SUPERVISOR/S
Ben Mullins, Helen Brown, Krassi Rumchev, Gavin Pereira, Amanda Wheeler
Contact: b.mullins@curtin.edu.au

PROJECT DESCRIPTION
A current project is developing and deploying 50 realtime air quality sensors as part of the smart campus project. This project will use a range of data analysis and statistical modelling techniques to analyse trends in data and give early warning of future adverse events on campus.

NECESSARY SKILLS/KNOWLEDGE
Statistics, a background in environmental health/science. The student will learn to use powerful open source data analysis tools, and work with cutting edge air quality measurement devices.
MEDITATION AND ITS IMPACT ON PREGNANT WOMEN’S HEALTH

SUPERVISOR/S
Contact: Jun Chih: h.chih@curtin.edu.au & Gavin Pereira: gavin.f.pereira@curtin.edu.au

PROJECT DESCRIPTION
While stress reduction can have a positive impact on pregnant mothers and their infant, there is a lack of literature on the effect of mindfulness meditation on physical and mental health of the mothers and their partners. This study will investigate the impact of a 20-week mindfulness meditation program implemented during the early trimester on pregnant mothers and their partners. A secondary aim is to investigate if the impact differs between women who attended face-to-face session and self-administered session through mobile app.

METHODS
A randomized controlled trial will be conducted over 20 weeks with key variables measured by means of validated questionnaires. An online data collection portal will be set up to collate data for analyses. Student will also work with staff from the Curtin University Counselling Services to recruit participants and set up the trial.

NECESSARY SKILLS/KNOWLEDGE
A bachelor degree in health with high course weighted average (>70). Good understanding of scientific principles and experience in planning quantitative research methods. Good interpersonal communication skills and time management skills.

EPIGENETIC MECHANISMS UNDERLYING THE INCREASE OF ASTHMA AND ALLERGY IN CHINESE IMMIGRANTS IN AUSTRALIA

SUPERVISOR/S
Guicheng Zhang, Yong Song, Rachel Huxley & Eric Moses
Contact: brad.zhang@curtin.edu.au

PROJECT DESCRIPTION
This project takes advantage of a ‘natural experimental environment’ (Western environment) in which Chinese immigrants are living and employs novel microRNA and methylation analysis techniques to investigate the epigenetic effects of the Western environment on Chinese immigrants in relation to hayfever and atopy.

METHODS
This is a laboratory study. MicroRNA and DNA methylation will be analysed in our laboratory at the Centre for Genetic Origins of Health and Disease (GOHaD). We have stored samples for the project. The student will analyse these samples under supervision and write papers for publication.

NECESSARY SKILLS/KNOWLEDGE
We have a laboratory and research team to support the study. The project is partly funded by Telethon Perth Children’s Hospital Research Funds. The student will learn laboratory analysis skills and understand epigenetic concepts for complex diseases and conditions. After the program the student should have the knowledge in data analysis and manuscript writing.
**IMMUNE RESPONSE CHANGES IN CHINESE IMMIGRANTS IN A WESTERN ENVIRONMENT**

**SUPERVISOR/S**
Guicheng Zhang, Yong Song, Belinda Hales (Telethon Kids Institute) & Eric Moses  
Contact: brad.zhang@curtin.edu.au

**PROJECT DESCRIPTION**
Immigrants moving from an asthma low-risk environment (such as China) to a high-risk region (such as Australia) will gradually undergo immune function adaptive changes (or loss of immunological memory) as a response to increased and/or decreased exposure to some allergens and pathogens. Thus, the prevalence of asthma and allergies in immigrants from low risk countries gradually increase to the same level as in the local population, or even higher.

**METHODS**
A cross-sectional study to investigate associations of innate immune response and the time living in Australia. We have recruited more than three hundreds of Chinese immigrants. Blood samples have been stored in our lab. The study will analyse these samples under supervision and write papers for publication.

**NECESSARY SKILLS/KNOWLEDGE**
We have established a laboratory at the Centre for Genetic Origins of Health and Disease (GOHaD), jointly supported by Curtin University and the University of Western Australia. The student will learn laboratory analysis skills. After the program the student should have the knowledge in data analysis and manuscript writing.

**MICROBIOME CHANGES IN CHINESE IMMIGRANTS**

**SUPERVISOR/S**
Guicheng Zhang, Yong Song, Gavin Pereira, Gary Dykes & Eric Moses  
Contact: brad.zhang@curtin.edu.au

**PROJECT DESCRIPTION**
We propose to use recently-developed technologies that quantify microbial exposure to identify microbiota that will protect children from developing allergy and asthma in Australia. This project has the potential to provide a clear translational pathway to new treatments that will substantially reduce the prevalence of allergy and asthma in children in Australia and elsewhere.

**METHODS**
We have collected microbiome data using 16S sequencing in Chinese immigrants. The student will analyse these data under supervision and write papers for publication.

**NECESSARY SKILLS/KNOWLEDGE**
We have a research team with experiences in analysing 16S sequencing data to support the study. The project is partly funded by Telethon Perth Children’s Hospital Research Funds. The student will learn skills in analysing high volume data. After the program the student should understand the general concepts of the potential associations of microbiome and human health.
GENETIC AND EPIGENETIC BIOMARKERS FOR FOOD ALLERGY IN CHILDREN

SUPERVISOR/S
Guicheng Zhang, Yong Song, Michael O’Sullivan (PMH), Ben Mullins & Helen Brown
Contact: brad.zhang@curtin.edu.au

PROJECT DESCRIPTION
Globally, food allergy (FA) is an important allergic disease, particularly in children. In Europe, the lifetime prevalence and point prevalence of self-reported FA was reported at around 17% and 6%, respectively. An Australian study found that in an urban environment the prevalence of infant FA was as high as 10%. The worldwide prevalence of FA appears to be rising. In Australia, hospital admissions for food-related anaphylaxis episodes were 4.5 times higher in 2005 than in 1994. In the proposed study we expect to identify several biomarkers in peripheral whole blood that can predict FA phenotypes. The study will improve the understanding of genetic and epigenetic mechanisms for FA.

METHODS
There is an ongoing project: the discovery of biomarkers for predicting oral food challenge outcomes in children with baked egg or peanut allergy, supported by Telethon Perth Children’s Hospital Research Funds. The honours project will be part of the ongoing project. Laboratory analysis for blood samples will be performed for the honours project.

NECESSARY SKILLS/KNOWLEDGE
We have a research team to support the study. The project is partly funded by Telethon Perth Children’s Hospital Research Funds. The student will learn skills in DNA and RNA extraction and do microRNA analysis. After the program the student should understand the general concepts of epigenetics and food allergy.

EXPOSURE TO PARTICULATE AIR POLLUTION IN UNIVERSITY LABORATORIES

SUPERVISOR/S
Krassi Rumchev & Yun Zhao
Contact: k.Rumchev@curtin.edu.au

PROJECT DESCRIPTION
During the last two decades there was increasing concern over the effects of particulate matter (PM) on health. Changes in building design set up to improve energy efficiency make them frequently more airtight and concentrations of air pollutants higher indoors than outdoors. This project aims to assess the concentrations of PM with different size in University laboratories and related health symptoms among laboratory occupants.

METHODS
University laboratories will be monitored for concentrations of particulate matter with different size with and without classes. Indoor temperature, relative humidity and air movement will also be measured. A simple standardised questionnaire will be distributed to gather some basic demographic and health information among laboratory occupants.

NECESSARY SKILLS/KNOWLEDGE
The student will develop skills to monitor air quality, conduct basic statistically analysis and write research paper.
TO IDENTIFY EPIGENETIC BIOMARKERS OF CONGENITAL HEART DEFECTS IN A FAMILY BASED EPIDEMIOLOGY STUDY

SUPERVISOR/S
Guicheng Zhang, Yong Song, Nicholas Pachter (King Edward Memorial Hospital for Women) & Eric Moses
Contact: brad.zhang@curtin.edu.au

PROJECT DESCRIPTION
Methylation is the most important epigenetic mechanism responsible for certain diseases. This epigenetic code is a critical genome regulatory factor and a central modification that has essential roles in cellular processes, embryonic growth and development. We, therefore, believe that aberrant DNA methylation in children with congenital heart defects (CHDs) and their parents might have a role in the development of CHDs. In utero environment, environmental and dietary factors that were reported to be associated with CHDs may induce CHDs through an epigenetic mechanism by altering the DNA methylation. Thus, by comparing the DNA methylation profiles in children with and without CHDs as well as in their parents, we would identify methylation biomarkers for CHDs.

METHODS
The honours project will be part of an ongoing project funded by Telethon Perth Children’s Hospital Research Funds. Laboratory analysis for blood samples will be performed for the honours project. We will investigate microRNAs in children with and without CHDs.

NECESSARY SKILLS/KNOWLEDGE
We have a research team to support the study. The project is partly funded by Telethon Perth Children’s Hospital Research Funds. The student will learn skills in DNA and RNA extraction and do microRNA analysis. After the program the student should understand the general concepts of epigenetics and CHDs.

EXPOSURE TO SILICA AND PREVALENCE OF RESPIRATORY SYMPTOMS AMONG UNDERGROUND MINE WORKERS

SUPERVISOR/S
Krassi Rumchev & Yun Zhao
Contact: k.Rumchev@curtin.edu.au

PROJECT DESCRIPTION
Exposure to respirable crystalline silica has been associated with respiratory illnesses. Silica dust is most commonly produced underground when silica-bearing rock is blasted, drilled or crushed. It can be dispersed by air and vehicular movement and therefore workers not even directly involved in dust-producing activities may be exposed and developed adverse health effects. This project aims to determine the exposure levels of silica and the prevalence of respiratory symptoms among UG mine workers of Western Australia.

METHODS
The study will consist of analysing data already collected and maintained by the Department of Mines and Petroleum.

NECESSARY SKILLS/KNOWLEDGE
The student will develop skills to conduct basic statistically analysis and write research paper.
USE OF PHYSIOLOGICALLY REALISTIC BREATHING PATTERNS TO TEST RESPIRATOR FILTERS

SUPERVISOR/S
Contact: Ryan Mead-Hunter: r.mead-hunter@curtin.edu.au & Ben Mullins: b.mullins@curtin.edu.au

PROJECT DESCRIPTION
The selection of respirators, for use in the workplace, should be performed with reference to AS/NZS 1751: Selection, Use and Maintenance of Respiratory Protective Equipment, and should conform to AS/NZS 1716 Respiratory Protective Devices. However, the test and classification conditions used on respirator filters vary significantly from the conditions they are subject to when in use. Particulate filters for respirators are classified into 1 of 3 classes, P1 which filters at least 80% of particles, P2 which filters at least 94% of particles and P3 which filters at least 99.95% of airborne particles. The classifications, are however, based on testing using a constant flow rate of 95 L/min, which is different from when they are worn by a worker, who breathes in and out in cycles. This means that the flow is not unidirectional and will vary in average flow rate based both on the individual, and the intensity of the work they are performing. The purpose of this work is to test a number of respirator filters, using more realistic breathing conditions to assess if the classifications hold under physiologically realistic conditions.

METHODS
The project will be predominantly laboratory based and will involve generating and classifying both sodium chloride aerosol and oil aerosols, for the purposes of filter testing. Multiple filters conforming to each classification will be tested, first using the standard method to ensure they do in fact meet their respective classifications and then testing clean filters using a series of more realistic flow patterns, corresponding to tidal breathing, working under exertion (considering both rapid shallow breaths and deeper breaths). The project will provide students the opportunity to utilise some of the most advanced aerosol measurement technology available in Australia.

NECESSARY SKILLS/KNOWLEDGE
The project is available to all interested applicants, however, a basic understanding of aerosol classification and respirators would be advantageous.

STUDY OF LUNG PARTICLE CLEARANCE AND THE MULLINS EFFECT USING EXPLANT LUNG TISSUE

SUPERVISOR/S
Ben Mullins & Ryan Mead-Hunter
Contact: b.mullins@curtin.edu.au

PROJECT DESCRIPTION
Understanding the clearance of inhaled air pollutant particles from the lung is very important to occupational hygiene theory and practice. A related issue is the effect mechanical stresses (such as artificial respiration) have on lung tissue. This work will conduct lab-based experiments using explant lung tissue to answer these important questions.

NECESSARY SKILLS/KNOWLEDGE
The project will be largely experimental. The student will learn new techniques including Atomic Force Microscopy and micro/nano mechanical measurement, microscopy techniques and aerosol measurement techniques. The project would be a good pathway to a PhD.
USING COMPUTATIONAL MODELLING TO PREDICT REGIONAL LUNG DEPOSITION AFTER EXPOSURE TO HAZARDOUS PARTICULATES

SUPERVISOR/S
Contact: Ryan Mead-Hunter: r.mead-hunter@curtin.edu.au & Ben Mullins: b.mullins@curtin.edu.au

PROJECT DESCRIPTION
Inhalation is the most common route of exposure to hazardous substances in the workplace. The harmful effects of inhaled particulates are however, not purely determined by the act of being inhaled, rather the location and volume of material deposited. While we expect respirable particles to deposit in different locations to inhalable particles, such broad classifications do not provide detailed information on regional deposition within the respiratory tract. This project will utilise a computational model previously developed by the supervisors to assess regional deposition of a number of different hazardous aerosols that maybe present in the workplace.

METHODS
The modelling will be carried out using the OpenFOAM computational fluid dynamics software package and customised code developed by the supervisors. A series of simulations will be run on the supercomputers located at the Pawsey Centre. A number of different aerosols will be considered, by varying the model input parameters. Results will be compared to available literature data.

NECESSARY SKILLS/KNOWLEDGE
Familiarity with Linux based operating systems is desirable. Basic knowledge of lung physiology and aerosol dynamics would be advantageous.

MEASUREMENT OF NANOPARTICLE DEPOSITION AND CLEARANCE IN A 3D-PRINTED HUMAN LUNG

SUPERVISOR/S
Contact: Ryan Mead-Hunter: r.mead-hunter@curtin.edu.au & Ben Mullins: b.mullins@curtin.edu.au

PROJECT DESCRIPTION
Inhalation is the most common route of exposure to hazardous substances in the workplace. The harmful effects of inhaled particulates are however, not purely determined by the act of being inhaled, rather the location and volume of material deposited. While we expect respirable particles to deposit in different locations to inhalable particles, such broad classifications do not provide detailed information on regional deposition within the respiratory tract. This project will utilise a computational model previously developed by the supervisors to assess regional deposition of a number of different hazardous aerosols that maybe present in the workplace.

METHODS
A series of laboratory experiments will be performed utilising lung airway geometries developed from composite x-ray computed tomography (CT) scans. Aerosols will be generated in the laboratory and introduced to the geometry such that regional deposition can be determined. The result of experiments will be used to validate the results of simulations. The project will involve, manipulating x-ray CT data, construction of the experimental apparatus and the utilisation of a number of common test aerosols.

NECESSARY SKILLS/KNOWLEDGE
A basic knowledge of lung physiology and aerosol dynamics would be advantageous.
META-ANALYSES OF WORKPLACE EXPOSURES AND CANCER

SUPERVISOR/S
Contact: Lin Fritschi & colleagues: lin.fritschi@curtin.edu.au

PROJECT DESCRIPTION
The International Agency for Research on Cancer (IARC) regularly reviews chemicals and other exposures and makes decisions on whether there is evidence that they are carcinogenic to humans. Meta-analyses of the existing data on these chemicals are widely cited and are used in the decision-making process. IARC have developed a list of chemicals that are to be reviewed in the next few years. They include:

- Aspartame and sucralose – artificial sweeteners
- Beta-carotene – vitamin
- Ethyl acrylate – used in production of polymers
- Indium-tin oxide—used in production of liquid crystal displays (LCDs) and touch screens;
- Iron – in food and as supplements
- Methyl tertiary butyl ether (MTBE), ethyl tertiary butyl ether (ETBE)—used as fuel additives
- Nicotine—increasing population exposure via e-cigarettes
- Phenyl and octyl tin compounds—used as antifouling agents
- Physical inactivity and sedentary work
- Opium—addictive narcotic drug
- Welding—common workplace exposure

METHODS
The honours student would choose one of the exposures and undertake a systematic review and meta-analysis of literature relating to that exposure and the risk of specific types of cancer. Skills learnt will include: literature searching; quality assessment; summarizing results; and meta-analysis as well as content knowledge of the topic. See Lin Fritschi in the first instance and a second supervisor will be approached depending on the exposure the student is studying.

NECESSARY SKILLS/KNOWLEDGE
Good writing skills, introductory epidemiology knowledge, logical approach to data are required. Familiarity with occupational chemical use would be useful for some of the topics.

PREVALENCE AND PREDICTORS OF HOUSE DUST MITE IN AUSTRALIAN HOMES

SUPERVISOR/S
Contact: Amanda Wheeler & others: amanda.wheeler@curtin.edu.au

PROJECT DESCRIPTION
A collaboration with the National Asthma Foundation Australia. There is interest in understanding current exposures to house dust mite in Australian homes. This study will conduct measurements of house dust mite and will develop a housing characteristic survey to understand the levels in homes.

METHODS
Conduct and write a comprehensive literature review (including an annotated bibliography using Endnote). Collect primary data through the administration of paper-based/online surveys, conduct mail-out sampling of house dust mite across Australia. Analysis of both qualitative and quantitative data using software packages such as SPSS.

NECESSARY SKILLS/KNOWLEDGE
Good writing skills and a logical approach to data are required. Familiarity with survey design would be useful.
Contact

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