Contents
Forewords .................................................................................................................................................. 3
Introduction by Professor Michael Berk .................................................................................................. 4
The Epi-Centre for healthy ageing – Professor Julie Pasco ................................................................. 5
Bipolar disorder research – Professor Michael Berk .............................................................................. 5
Drug safety – Associate Professor Seetal Dodd ....................................................................................... 6
Clinical trials division – Dr Olivia Dean ................................................................................................ 7
Psychiatric disorders and co-morbidity – Dr Lana Williams ................................................................. 9
Prevention of common mental disorders – Associate Professor Felice Jacka .................................... 10
Social equity, chronic disease and healthcare utilisation – Dr Sharon Brennan-Olsen ..................... 11
Precision Medicine: Genetically guided antidepressants – Associate Professor Ajeet Singh .......... 12
Determining the risk factors for musculoskeletal disorders and conditions in the Australian population – Dr Kara Holloway ......................................................... 12
Inflammatory and neurotrophic biomarkers in bipolar disorder and schizophrenia – Dr Brisa Fernandes .................................................................................................................. 13
Links between anxiety and smoking – Dr Steven Moylan ................................................................. 14
Our PhD candidates .................................................................................................................................. 15-1521
Ongoing funding for 2015 ..................................................................................................................... 21-22
Successful grants 2015 ........................................................................................................................ 22-23
Awards 2015 ........................................................................................................................................... 23
International and national collaborations ............................................................................................... 24
Publications 2015 .................................................................................................................................... 25-256
Books and chapters 2015 ...................................................................................................................... 26
Conference presentations 2015 ........................................................................................................... 37-45
Contact details ........................................................................................................................................ 46
Forewords

2015 has been a great year for the IMPACT SRC, most notably for Director Michael Berk who received numerous prestigious awards including being named as one of Thomas Reuters most highly cited researchers as well as becoming a Fellow of the Australian Academy of Health and Medical Sciences. His success is largely in part to the excellent staff and students within the Centre and I wish them well for another busy and productive year in 2016.

Professor Lee Astheimer
Deputy Vice Chancellor, Research
Deakin University

IMPACT SRC has had a very successful year even by its own high standards. Of particular note the excellent staff members have been acknowledged by a number of prestigious awards. I would like to make special mention of Professor Michael Berk for his leadership and mentoring of the research programme and for this to be recognised with international awards. Well done Michael and your team, thank you for your significant contributions in 2015

Professor David Ashbridge
Chief Executive Officer
Barwon Health

IMPACT SRC is a medical research group with an international reputation, in a regional setting. Prof Michael Berk leads the group that, over this last year, has accomplished a great deal. At the review day this year, the Advisory Board was very impressed with what has been and achieved and sees important opportunities going forward.

Professor Michael Berk is to be congratulated on his award of the 2015 Brain & Behavior Research Foundation (USA) Colvin Prize for Bipolar Mood Disorder Research, a prestigious international award in his area of research.

The Advisory Board is in the process of developing a multi-level program of philanthropic support centred on the excellent work of the IMPACT SRC and drawing attention to its work of international standing. In particular we are developing a program for corporate organisations in mental health.

Trevor M Clark OAM
Director Autism Co-operative Research Centre
Chair, IMPACT SRC Advisory Board
Introduction by Professor Michael Berk

The IMPACT SRC remains committed to the generation of results that make a direct contribution to the health of the population, and in 2015 we had a number of notable successes. In particular we completed the first study suggesting that simply improving diet might have antidepressant effects. We are completing the first study of minocycline, an antibiotic with anti-inflammatory properties in depression and the first study of a combination of nutraceutical agents that boost mitochondrial energy generation to potentially treat bipolar depression.

A number of members of the team had particular successes:

1. Sarah Dash, PhD candidate was awarded a Top-Up Scholarship, by the Collaborative Research Centre for Mental Health (CRC), 2015.
2. Dr Brisa Fernandes, post-doctoral research fellow, won Best Early-Career Researcher Poster at the 2015 Australasian Society for Bipolar and Depressive Disorders (ASBDD) conference.
3. Melanie Ashton, PhD candidate, was awarded the 2015 ASBDD/Lundbeck Neuroscience Scholarship.
4. Dr Olivia Dean, post-doctoral research fellow, was awarded the 2015 ASBDD/Servier Depression Research Grant.
5. Sue Lauder, PhD candidate, won the Best Early-Career Researcher Oral Presentation at the 2015 ASBDD conference.
6. Dr Sharon Brennan-Olsen, post-doctoral research fellow, was awarded the 2015 Professor Philip Sambrook Award at the Australian and New Zealand Bone and Mineral Society conference (ANZBMS).
7. Dr Lana Williams, post-doctoral research fellow, was awarded a NHMRC project grant for her work investigating bone health in bipolar disorder.
8. Emma Gliddon, PhD candidate, was awarded the inaugural Past District Governor Geoff Betts Early Mental Health Researcher Award from the Rotary Club of Geelong, as well as a Grant-in-Aid for the 2015 Society for Mental Health Research conference.
9. Dr Shae Quirk, post-doctoral research fellow, was awarded the Faculty of Health HDR Publication Award for her thesis submitted in 2015.
10. Prof Michael Berk was listed as an ICI highly cited researcher and won the Brain and Behaviour Foundation Colvin Award.
11. Dr Sharon Brennan-Olsen, post-doctoral research fellow, received a NHMRC Career Development Fellowship.
12. A/Prof Felice Jacka, post-doctoral research fellow, received a NHMRC Career Development Fellowship.
13. Aswin Ratheesh, PhD candidate, was awarded an early career researcher oral communication award from the Australasian Society of Bipolar and Depressive Disorders conference.

We would like to thank Deakin University and Barwon Health for their continuing support.
Professor Julie Pasco is Deputy Director of the IMPACT SRC and Director of the Epi-Centre for Healthy Ageing.

Her population-based research focuses on understanding the progression of chronic metabolic and musculoskeletal disorders including obesity, diabetes, osteoporosis and sarcopenia, and the nexus between physical and mental health. An important component of this program of epidemiological research is to facilitate knowledge transfer from research into clinical practice and into the community.

At the heart of the Epi-Centre for Healthy Ageing lies the Geelong Osteoporosis Study (GOS) which is complemented by the GOS Fracture Grid, and the studies known as Vitamin D in Pregnancy (VIP) and Ageing, Chronic Disease and Injury (ACDI).

The GOS is a prospective cohort study, which was designed to describe the health burden of osteoporosis and identify risk factors for fragility fracture, and has evolved over time to study a broad range of chronic disorders. The study is set in the Barwon Statistical Division. For more than two decades the GOS has prospectively documented comprehensive clinical and environmental data for large contemporary cohorts of young, middle-aged and elderly men and women, producing a unique resource for investigating aspects of both physical and mental health.

The GOS Fracture Grid is an ongoing, comprehensive repository that documents incident fractures as they occur in the Barwon Statistical Division. For twenty years this unique dataset has been recording fracture case details according to fracture site, age, sex and date. Data from the GOS Fracture Grid provide a unique evidence base for describing the epidemiology of fractures and for monitoring changes in patterns of fracture for an entire population.

The VIP study started in 2002 when pregnant women were recruited from Geelong Hospital’s antenatal clinic and provided blood samples for vitamin D assessment. Their babies were measured at birth and at age one. The mother-child pairs are now being recalled to see if maternal vitamin D status during pregnancy impacts on muscle and bone growth, fat distribution and behaviour in the children as they reach upper primary school age.

The ACDI commenced this year, with an overall objective of describing the pattern of chronic disease and injury throughout western Victoria. Data are currently being abstracted from existing health and administrative databases and collated for the twenty-one Local Government Areas in the region in terms of age, sex, socioeconomic status and remoteness. The data will be used to establish and target the appropriate allocation of resources, care transition needs and to deal with burden of disease and injury.

Nested within the Epi-Centre for Healthy Ageing are the units of Musculoskeletal Epidemiology (led by Dr Kara Holloway), Social Epidemiology (led by Dr Sharon Brennan-Olsen) and Psychiatric Epidemiology (led by Dr Lana Williams).
Mood disorders are a primary focus of the IMPACT Strategic Research Centre.

We aim to answer the question of which potential mood stabilising agents have the best neuroprotective properties after a first-episode of mania. In the study, individuals who have had a first-episode of mania were randomised to receive either lithium or quetiapine and were followed up for a year using brain imaging and neuropsychology to determine which agent best protects the brain. The data suggests that lithium is superior on measures of clinical symptoms, neurocognition and brain imaging, reinforcing its primary role in the disorder.

A further focus is on carer-burden in bipolar disorder and depression. A treatment intervention for carers of people with bipolar disorder has been developed, and a parallel resource for carers of people with depression is being completed. Having shown that N-acetylcysteine (NAC) effectively treats negative symptoms of schizophrenia, the symptoms of depression in bipolar disorder and reduces depression in unipolar disorder, we have just completed a study showing that it assists with smoking cessation. We are partnering on replication studies in bipolar disorder and schizophrenia. We have just completed a large NHMRC and CRC funded project to definitively study the efficacy of NAC in bipolar depression, as well as a cocktail of mitochondrially active agents. The latter study is a proof of concept trial of the notion that there is a primary abnormality in mitochondrial energy generation in bipolar disorder – these data will be available in 2016.

Together with Dr Sue Tye from the Mayo Clinic, we are developing a novel animal model of bipolar disorder using deep brain stimulation, to examine changes in energy generation in models of both depression and mania. We are grateful for the partnership with Professor Abbas Kouzani from Science, Engineering and Built Environment who leads the development of novel DBS and optogenetic devises for preclinical study, a critical element in this program of research.

Professor Ken Walder from the MRR SRC has developed a drug discovery program for diabetes by looking at the gene expression signature of existing agents, and finding new potential treatments that target this gene expression signature. We have developed an NHMRC supported analogous drug discovery program for bipolar disorder in partnership with Professor Walder, and are extending this method to drug discovery in schizophrenia. Lastly, we had surprising success in a pilot clinical trial of Garcinia Mangostana Linn. (mangosteen) in the treatment of schizophrenia, and are replicating this finding schizophrenia in a more definitive Stanley funded grant with John McGrath from Queensland and extending these findings to explore its efficacy in bipolar disorder.
Drug safety

The large range of medications available for the treatment of mental illness have helped improve the lives of thousands, perhaps even millions of people. These agents have helped people manage their illnesses, prevented or reduced the recurrence of illness and controlled symptoms of illness. Although people with mental health difficulties have benefited greatly from modern drug treatments, these treatments are also known to have risks. Researchers at IMPACT SRC work to understand and reduce the risks and to improve the risk-to-benefit ratios for drug treatment of mental illness.

Central to our work in drug safety, we have investigated treatment emergent adverse events in clinical trial data and in other databases. Using adverse event data from clinical trials of duloxetine for major depression we have investigated the complexity of the placebo and nocebo effect, which are important confounders when investigating adverse events. This work was published the Journal of Clinical Psychiatry earlier this year. Further work is currently underway using clinical trial data from studies of olanzapine for bipolar disorder. Meta-analyses of lurasidone clinical trials are also planned.

We are also conducting studies evaluating the neuroprotective properties of conventional and novel treatments. These studies may provide a new treatment objective for people with mental illness, preventing the worsening course of the illness rather than simply reacting to the symptoms of the illness. This new approach to treatment in mental health may ultimately lead to both better mental health and better drug safety outcomes. Chronic, treatment resistant stages of illness are typically associated with higher doses of treatment and drug combinations. If this can be averted through our neuroprotective strategies then drug safety will be improved.

In March 2015 Associate Professor Dodd argued for the pro case in a debate titled “Staging should be applied to major psychosis and mood disorders” presented at the 23rd European Congress of Psychiatry, Vienna, Austria. We have also published several papers on oxidative, nitrosative and inflammatory stress, which is core to the topic of neuroprotection, neuroprogression and illness staging.

We have been involved in the publication of guidelines, which assist clinicians to make well-informed and balanced treatment decisions. These include publications regarding the safe use of drugs for the evidence-based treatment of various mental illnesses as well as publications about safe treatments in special populations, such as pregnant and breastfeeding women. A major international collaboration to produce antidepressant safety guidelines is currently in progress.

Highlighting our role in this drug safety, Associate Professor Seetal Dodd currently holds the position of Editor-in-Chief of the scientific journal Current Drug Safety, which he has held since 2009.
Clinical trials division

There is a great need for new therapies for people with mental health disorders. Our Clinical Trials Division is currently focusing on evidence based, adjunctive pharmacotherapies to provide greater recovery for individuals with a variety of psychiatric disorders. The central program of the Division explores the repurposing of existing agents, based on their known biological profiles, to attempt to reduce the symptoms experienced by those with psychiatric disorders. In an iterative approach, the Division incorporates biological sampling (blood samples) and preclinical investigations in collaboration with Laura Gray and Kay Hasebe, PhD candidate, to both identify relevant mechanisms of action for therapeutic targets and better understand the underlying pathophysiology of the illnesses. Our current trials focus on adjunctive therapies to modulate oxidative biology, inflammation, neurogenesis and mitochondrial dysfunction; all factors that are believed to be important in the pathology of many psychiatric illnesses.

The current studies are focusing on people with depression, both major depression and those with bipolar disorder, currently experiencing symptoms of depression. Additionally, we have a collaborative study involving the Deakin University/Barwon Health partnership, investigating NAC as a treatment for post-operative cognitive decline (involving PhD candidate David Skvarc in collaboration with lead investigator, Dr Andrew Marriott). These multi-centre trials involve centres located in Australia as well as an international site in Thailand in collaboration with Prof Michael Maes and Associate Professor Buranee Kanchanatawan.

The current trials include a new study that extends our previous work with N-acetylcysteine (NAC). This clinical trial involves three treatment arms, a placebo arm, a NAC-alone arm and a combination arm incorporating NAC with other nutraceuticals, believed to alter mitochondrial function. There is mounting evidence to suggest that the symptoms of bipolar disorder are partially driven by changes in our energy powerhouses, the mitochondria. By adding-on nutraceuticals that target mitochondrial function, we are hoping that the symptoms of bipolar disorder may be improved.

In another world-first study, we are investigating an antibiotic, minocycline, as a potential adjunctive antidepressant treatment. In addition to being antimicrobial, minocycline has anti-inflammatory properties that may be beneficial for the symptoms of depression. We are also currently investigating the potential of two other anti-inflammatory agents to treat youth depression; rosuvastatin and aspirin. Similar to the minocycline trial, these agents have properties that may be useful in treating youth depression. The benefit of utilising existing agents is that they have known safety profiles with expected side effects and available following completion of the trials, making the IMPACT SRC trials particularly attractive to participants.

We have recently completed two trials investigating adjunctive NAC treatment, showing that NAC may be useful for depression. We are currently analysing the results from our recently completed trial for children with autism. We hope to have results available for public dissemination soon. The Clinical Trials Division currently has a register open to anyone who has a psychiatric disorder and would be interested in taking part in our studies. If you would like more information regarding the register, please contact Dr Olivia Dean – (03) 4215 3300.
Psychiatric disorders and co-morbidity

Mood, anxiety and personality disorders impose huge costs, both on the individual and the community, yet we have an incomplete understanding of their impact on lifestyle, social and in particular medical factors.

Over the past years, Dr Williams has been developing a program of research investigating medical, lifestyle and social outcomes associated with mood, anxiety and personality disorders. This research has been conducted in conjunction with the Geelong Osteoporosis Study (GOS), a large epidemiological study involving a population-based sample of ~ 3000 randomly-selected men and women.

This research has revealed associations between mood and anxiety disorder and a range of medical conditions including osteoporosis, irritable bowel syndrome, atopic disorders, pain and cardiovascular diseases. Associations between mood and anxiety disorders and lifestyle factors such as smoking and physical activity and social factors such as area based socioeconomic status and quality of life have also been explored. A wide range of social, psychological and biological factors such as the presence of inflammation and/or oxidative stress are being investigated, which may explain these associations. Complementing this work is a case-control study of bipolar disorder, designed to identify associated lifestyle and physical co-morbidities.

Cornerstone to this program is our work investigating the interplay between psychiatric disorders, the medications used to treat these disorders and bone health, which has attracted extensive project funding and personal awards. This project engages experts from the fields of psychiatry, bone biology, epidemiology and translation worldwide to provide a comprehensive understanding of this clinically important but neglected issue. To date, we have found depression to be associated with reduced bone mineral density, affect bone quality and increase the risk of fracture by over 60%. We were also one of the first to show that the SSRI group of antidepressants may increase the risk for osteoporosis and that these agents, in vitro, have marked intra class differences in their effects on bone. The effects of psychoactive drugs on physical health is under further review in a study known as PROFRAC and these relationships are being investigated at the cellular level with collaborators in the laboratories at Barwon Biomedical Research, Deakin University and in Lyon, France.

Overall this large program of work generates important information that can be used to provide an insight into the interaction between physical and mental health. It is an invaluable resource for collaborative studies and student projects. Existing collaborations include Norwegian University of Science and Technology, University of Eastern Finland, Institute of Functional Genomics of Lyon, Sapienza Università of Rome, University of Manitoba, which allows for further investigations and replication in even larger population based studies.
Prevention of common mental disorders

Depression and anxiety are highly prevalent conditions, and the burden they impose on individuals and the community is enormous. In our research unit we have developed a highly innovative program of research that examines how our lifestyles (diet, physical activity and smoking) interact with our risk for mental health problems. This is being done with the ultimate goal of developing an evidence-based public health message for the primary prevention of these common mental disorders.

Associate Professor Felice Jacka leads the Division of Nutritional Psychiatry Research within the IMPACT SRC and is also the president of the ‘International Society for Nutritional Psychiatry Research’ (ISNPR). In 2015, the ISNPR strengthened its profile internationally via the publication “Nutritional medicine as mainstream in psychiatry” in Lancet Psychiatry, as well as by publication of the official ISNPR consensus statement in World Psychiatry, the third ranking journal in psychiatry research.

Among others, Associate Professor Jacka also published key papers including dietary recommendations for the prevention of depression, a systematic review of randomised controlled trials of dietary interventions and depression outcomes, a comprehensive assessment showing that healthy diets do not have to be more expensive than unhealthy diets, and the first study to document associations between dietary patterns and hippocampal volume in humans. Along with the ISNPR statements, this latter study received worldwide media coverage.

In 2015, the Nutritional Psychiatry Division also built collaboration with the APC Microbiome Institute in Ireland at University College Cork. This institute is recognised as the world leader in the topic of microbiota-gut-brain-axis research and this collaboration has resulted in an application to the NHMRC for the first RCT of probiotics in major depression, led by Associate Professor Jacka.

Collaboration with the Murdoch Children’s Research Institute has also seen the development of a highly innovative intervention focused on diet in pregnancy. In this study, Associate Professor Jacka will work with leading epigeneticists, paediatric immunologists and the expert team at the APC to examine the potential impact of dietary improvement in pregnancy on microbiota, epigenetics, inflammation and other relevant biomarkers believed to be linked to the risk for mental and neurodevelopmental disorders in children.

Finally, in April 2015 recruitment was finalised for a world’s first trial that aims to answer the important question “If I improve my diet, will my mental health improve?” The final assessment will take place in October and the results will be generated and published soon after.
Social equity, chronic disease and healthcare utilisation

A disproportionate disease burden occurs in disadvantaged and vulnerable populations; indeed, the social gradient of chronic disease and healthcare utilisation has never been as prominent, even in high income countries such as Australia. The program of research undertaken within the Health Inequalities Division of Epidemiology (HIDE) investigates mechanisms that facilitate inequalities in health to bring them ‘out of hiding’. We address the complex, multifactorial pathways between social context, chronic diseases and healthcare utilisation, and more recently have focused on investigating biological mechanisms that might underpin health inequalities.

Dr Brennan-Olsen leads the multifaceted program of research encompassed within HIDE. She is also Associate Editor for BMC Musculoskeletal Disorders, and Conjoint Research Fellow with the Institute of Healthy Ageing, Australian Catholic University.

In 2015 Dr Brennan-Olsen initiated novel investigations aimed at explaining the well-documented social gradient of disease; this work focuses on associations between cumulative disadvantage across the life-course and biological mechanisms for disease onset including heightened inflammatory states and DNA methylation, amongst others. This new field of research is supported by an exciting new collaboration established during 2015 between Deakin University, and the University of Western Australia, University of Manitoba (Canada), McGill University (Canada), University of Cantabria (Spain), King’s College (UK), University of Glasgow (UK), and Loyola University (USA). This new alliance will enable a cross-disciplinary approach that extends from basic science through to population health, in a manner that is globally unique. This work resulted in Osteoporosis Australia and the Australian and New Zealand Bone and Mineral Society awarding Dr Brennan-Olsen the prestigious 2015 Professor Philip Sambrook Award.

During 2015, a focus was maintained on translating a number of recommended preventive health guidelines into easily accessible messages for the general population, which involved novel collaborations between HIDE and disadvantaged community groups. This work resulted in the development of visual tools to communicate preventive health behaviours, whilst avoiding dependence on literacy or language abilities of the intended audience. One example of this work was an oversized jigsaw that visually ‘pieced together’ preventive lifestyle behaviours related to osteoporosis prevention, and was employed on World Osteoporosis Day. Another example was a ‘Fracture Stack’ that involved regional Primary School children; this work resembled a ‘stack’ of plaster casts that was indicative of the 750 fractures that occur in the Geelong region each month. The Fracture Stack was implemented in public space for during Healthy Bones Action Week. For her work engaging disadvantaged populations in knowledge translation, Dr Brennan-Olsen was awarded the Vice Chancellor’s Early Career Research Award for Excellence in Ideas.
Precision Medicine: Genetically guided antidepressants

Genetically guided prescribing (precision medicine) may help sooner match patients to effective tolerable medication. Precision medicine has been identified as a priority area of medical research globally given its potential for improved patient outcomes and reduced costs of care. Exponential cost reductions in genotyping via automation have seen genotyping prices drop from tens of thousands of dollars to (for some gene panels) under AUD$100 in just the last few years. Should clinical utility be demonstrated for superiority of genetically guided prescribing over traditional trial and error prescribing, it’s likely the technology will see rapid clinical uptake.

Stemming from an international multi-centre candidate gene association study (CGAS) examining the role of polymorphisms of the blood brain barrier (BBB) efflux pump P-glycoprotein (ABCB1) for remission predictive utility (n=113); a post-doctoral study has been conducted, led by Dr Singh (results in analysis). It supports the earlier finding that the dose of antidepressant needed to remit from major depression correlates with ABCB1 genotype. Additionally, it seems another BBB transporter ABCC1 may also be relevant to antidepressant dosing.

Dr Singh hopes to elucidate the pharmacogenetic keys to the BBB – a big task. His inspiration comes from seeing the reality of trial and error prescribing in clinical practice, with hopes to reduce this process and speed patient recovery through precision medicine. Dr Singh is an advisor to both government and industry groups on precision medicine, and hopes to help spearhead translation of the technology into the real world.

Determining the risk factors for musculoskeletal disorders and conditions in the Australian population

Dr Kara Holloway, Postdoctoral Research Fellow, joined the IMPACT SRC, School of Medicine, Deakin University in July 2013. She completed a Postdoctoral qualification at The University of Adelaide in May 2013 on the history of tuberculosis, with a focus on skeletal and epidemiological methodologies. She is also an Editorial Associate for the Journal of Comparative Human Biology.

Dr Holloway is currently working on assessing epidemiology and risk factors of musculoskeletal disorders using data from a number of projects. These include the Geelong Osteoporosis Study (GOS), Geelong Osteoporosis Fracture Grid and the new Ageing, Chronic Disease and Injury Study (ACDI). Her aims are to determine the risk factors associated with morbidity and mortality of musculoskeletal disorders (such as fracture or joint replacement) as well as to provide important and useful outcomes for prevention and treatment.

Kara has published five first-author manuscripts this year in good quality, peer-reviewed journals such as Calcified Tissue International, Osteoporosis International, Bone and Archives of Osteoporosis. She has another two manuscripts in the process of publication. This year, Kara’s work has been presented at many conferences, both national and international including Ballarat, Hobart, the United States and Abu Dhabi (United Arab Emirates).
Inflammatory and neurotrophic biomarkers in bipolar disorder and schizophrenia

Bipolar disorder, major depressive disorder and schizophrenia are severe and prevalent disorders, and the burden that they impose on individuals and the society is enormous, together being responsible for 50% of the global burden due to mental illnesses. One of the major reasons for that is that their pathophysiology remains relatively unknown. Lately, the search for blood markers — or biomarkers — in psychiatry has been recognised as a major endeavour in the development of a personalised approach in mental illness. Some of the primary goals of personalised medicine include establishing accurate diagnosis and predicting response to treatment.

Dr Brisa Fernandes’ main research field concerns the discovery and application of such biomarkers. She joined IMPACT SRC in 2014, and since then the quality of her contribution to the field can be seen by the analyses of inflammatory and neurotrophic biomarkers in bipolar disorder and schizophrenia, which culminated in three major publications in Molecular Psychiatry, the first ranking journal in psychiatry, as well as in BMC Medicine, a well-known journal of general medicine. The results have demonstrated that C-reactive protein and brain-derived neurotrophic factor are biomarkers of disease activity in bipolar disorder, major depressive disorder and schizophrenia, capable of assessing the severity of the symptoms in those conditions. This is being done with the ultimate goal of developing a personalised medicine for these common mental disorders.

It is anticipated that the implementation of validated biomarker tests will not only improve the diagnosis and more effective treatment of persons with mental illnesses but ultimately improve prognosis and disease outcome. For continuing the pursuit of her goals, Dr Fernandes was awarded the 2015 Alfred Deakin Research Fellowship from Deakin University for two years.
Links between anxiety and smoking

Anxiety disorders and cigarette smoking commonly occur together. Given the widely known impact of cigarette smoking as a risk factor for the development of other health issues (e.g. cardiovascular disease, lung disease etc.), it is prudent to assess the impact of smoking on the development of anxiety disorders.

This project aimed to assess the association between cigarette smoking and anxiety disorder development, with a focus on how smoking may affect the expression of anxiety in the community. The project has taken data from three different population based studies: The Geelong Osteoporosis Study, the Tracing Opportunities and Problems in Childhood and Adolescence (TOPP) Study and the Norwegian Mother and Child Cohort (MoBA). In addition, the project has also incorporated a review of the literature to ascertain what particular biological pathways may underpin any observed effects.

To date, the project has led to four publications in journals BMC Medicine, PLoS ONE and Brain & Behavior, with a publication under review. The results so far have demonstrated a robust association between smoking and the later development of anxiety, particularly when exposure occurs during rapid developmental phases such as gestation and adolescence. The project has now been completed.

This project has provided new insights into the development of normal and pathological anxiety throughout the developmental periods, and how cigarette smoking may interfere with this process. These insights are now being used to inform anti-smoking campaigns, and also, as a template for further understanding of what influences the development of anxiety disorders.
Our PhD candidates

MOODSWINGS 2.0 ONLINE INTERVENTION

Our research team are continuing their international collaboration with Stanford University, after successfully obtaining funding from the National Institute of Mental Health (NIMH) to further evaluate the MoodSwings 2.0 online self-help program for bipolar disorder (www.moodswings.net.au).

The MoodSwings program offers adjunctive psychosocial tools, information and peer support to help manage bipolar disorder. We have developed three different versions of the MoodSwings 2.0 program, and we are conducting a randomised controlled trial to determine whether there are any differences in outcomes between a discussion only version, an information version (psychoeducation), and a more intensive Cognitive Behavioural Therapy (CBT) version.

A total of 304 participants are involved in the MoodSwings 2.0 trial. Our participants are mostly from Australia and the United States, however we have participants from 27 countries in total. Follow up assessments are ongoing for this study, and we anticipate the completion of the study in 2016.

EVALUATING DISCUSSION ENGAGEMENT IN AN ONLINE SELF-HELP PROGRAM FOR BIPOLAR DISORDER (www.moodswings.net.au)

There is growing evidence supporting the use of online adjunctive psychosocial interventions in the treatment of bipolar disorder. Several studies to date have included peer discussion boards, however none of these studies have specifically evaluated the role these boards play in terms of outcomes and attrition, or the influence the level of participant engagement may have on psychosocial variables. This project assesses peer discussion forums included in the MoodSwings 2.0 program (described above). This project evaluates the impact of discussion board engagement on psychosocial outcomes (such as social support, quality of life and stigma) as well as intervention adherence, and attempts to identify key differences between active and passive discussion board users. A qualitative analysis will also be conducted to determine common themes within the discussion board content.

Data collection for this study is complete, and results are anticipated in 2016.

REDOX BIOLOGY AND AUTISM

This study investigated the efficacy of N-acetylcysteine (NAC) as a treatment for children with autism. Autism is a pervasive developmental disorder, comprising impairments in communication and social interaction, as well as repetitive or stereotyped behaviours or interests. Recent evidence has shown children with autism to have imbalances in their antioxidant defences, resulting in oxidative stress and cellular damage. It has been shown that the primary antioxidant in the brain, glutathione, is decreased in these children. This study investigated the effects of NAC, a glutathione precursor, on symptoms and behaviour in 102 children with autistic disorder, aged 3-10 years. The double blind, randomised controlled trial was completed in early 2014 and found that there was no significant effect of NAC on any behavioural outcome in this sample, compared to placebo. A journal article and Kristi-Ann’s doctoral thesis describing the findings are currently in preparation.
A COMPARISON OF NEUROCOGNITIVE FUNCTIONING IN FIRST EPISODE MANIA PATIENTS TREATED WITH QUETIAPINE VS. LITHIUM: A 12 MONTH FOLLOW UP

The notion of complete inter-episodic recovery in bipolar disorder has been challenged in recent years. Evidence has indicated that cognitive impairments exist during both the acute and euthymic phases of illness. However, the cognitive functioning of individuals during the early stages remains under investigated. The usual treatment for mania is a mood stabiliser such as lithium, and/or atypical antipsychotics such as quetiapine. The purpose of this study was to increase our understanding of the effects of lithium and quetiapine monotherapy on cognitive changes caused by the early stages of the disease process. An extensive cognitive assessment was conducted on 41 first episode mania participants and 21 demographically matched healthy controls, over a 12-month follow-up period. All FEM participants were aged between 15-25 years and were recruited from Orygen Youth Health and Monash Health sites. Data collection and analysis have been completed. Two chapters from my PhD thesis have been published in peer-reviewed journals, including a systematic review on cognitive impairment in first episode mania, and the main empirical paper, which compared the effects of lithium and quetiapine monotherapy on the trajectory of cognitive functioning in people following a first episode of mania. In addition, two more papers on cognitive functioning in first episode mania relative healthy controls have been submitted for publication in peer-reviewed journals. I have presented my research at 5 conferences, 4 national and 1 international, and have co-authored 6 other peer-reviewed publications.

TARGETING MATERNAL AND INFANT GUT HEALTH THROUGH THE PRENATAL DIET

Samantha’s PhD study explores the relationship between prenatal diet quality and maternal and infant gut health. A healthy diet during pregnancy is recommended for maternal health and infant development. The gut microbiome is modifiable by diet; and emerging evidence indicates that early life gut health is important for brain and immune system development and function. Samantha’s PhD hypothesises that prenatal diet quality will be associated with gut health in mothers and infants. In 2016, she will undertake a randomized controlled trial to evaluate the potential for a prenatal dietary intervention targeting gut health to influence microbial diversity and abundance, and short chain fatty acids in mothers and infants after birth. The results may be relevant to future research aiming to target the microbiome as a potential risk factor for non-communicable diseases.

Samantha is undertaking the first year of her PhD, having started in February 2015 with IMPACT SRC. She is based at the Murdoch Children’s Research Institute in Melbourne hosted within the Early Life Epigenetics team. Samantha comes to her PhD with prior research experience, having worked as a research fellow with the Deakin Centre for Rural Emergency Medicine. She holds a Master of Human Nutrition from Deakin University (2014), and a Bachelor of Computer Science from Wollongong University (2004).
Our PhD candidates continued…

PERSONALITY DISORDERS IN THE COMMUNITY

Individuals with personality disorders, suffer from a range of longstanding difficulties with interpersonal relating, self-organization, emotional instability, and problematic behaviours. Yet the prevalence of those living with personality disorder in Australian is not well understood. Just under half of all people with psychiatric disorders also have a co-existing chronic physical illness. However, personality disorder and the associated risks for physical health conditions have not been thoroughly investigated.

From a public health perspective it is essential to plan for and anticipate the health care needs of the Australian population, and for bridging the gap between physical and psychiatric health systems. However the current mental and medical help-seeking behaviours of Australians living with personality disorder are largely unknown. The aim of this project was to investigate the prevalence of personality disorders in Australian women participating in the Geelong Osteoporosis Study (GOS) as well as the associations with physical health conditions and utilisation of mental and physical health-related services.

Our team has now collected data from the female arm of the GOS. This project identified that approximately one in five women had one or more personality disorders in the community, with significant mental and physical comorbidity. Individuals with personality disorders also utilised a greater number of mental and physical health-related services than women without these disorders. Recognizing the disability attributable to personality disorders in the community is essential for anticipating and planning healthcare needs.

DESCRIBING THE DISEASE BURDEN AND HEALTH SERVICE UTILISATION ASSOCIATED WITH DIABETES MELLITUS AND CANCER IN WESTERN VICTORIA

The current trends of fertility, life expectancy, migration and the expected growth in regional populations will contribute to an increased need for chronic disease-related health services in these areas in the future. In order to inform policy and adequately plan improved delivery of health services, it is vital to establish the health service needs of the population. Such information could assist in developing innovative models of care to address the health service needs of an ageing population as well as reducing the demand by implementing effective prevention strategies. The Ageing, Chronic Disease and Injury (ACDI) study was launched in 2015 to address this need in western Victoria.

My doctoral project forms part of the ACDI study and aims at describing the burden of diabetes and cancer in western Victoria and the associated health service utilisation. Data will be obtained from chronic disease registers (Victorian Cancer Registry, National Diabetes Services Scheme etc.) and estimates of burden (incidence, prevalence and mortality) will be reported by age, sex and location of residence. Associations between disease burden, health service use and socioeconomic status, remoteness and accessibility to health services will be investigated.

Currently, a manuscript describing socio-demographic characteristics of the region is under review. Furthermore, an abstract describing cancer incidence rates in western Victoria was accepted at the Western Alliance Academic Health Science Centre symposium and I had the opportunity to present my findings there. The process of acquiring data from the National Diabetes Services Scheme, Medicare Australia and hospital admission records will continue over the next a few months and the results will be published in peer-reviewed journals.
THE USE OF MACHINE LEARNING AND DATA MINING IN THE DEVELOPMENT OF A CLINICAL RISK INDEX FOR DEPRESSION

In Australia, depressive and anxiety disorders are increasingly common, seemingly affecting people of younger and younger ages. The impact of these psychological disorders on both the individual and society is far-reaching; with a detrimental impact upon the psychological, social and economic elements of everyday life. The aim of this research study is to use machine learning and data mining techniques to identify risk factors for depression so as to develop a clinically useful tool for predicting depression.

A theoretical large-scale data mining techniques using machine learning algorithms have promise in the analysis of large epidemiological datasets. This year I developed a hybrid methodology, amalgamating multiple imputation, a machine learning boosted regression algorithm and logistic regression, to identify key biomarkers associated with depression in a large epidemiological study. The method was found to be a useful tool for detecting three biomarkers associated with depression for future hypothesis generation: red cell distribution width, serum glucose and total bilirubin. I presented this research at the Oceania Stata Users statistical group, as a poster at the Society for Mental Health Research (SMHR) 2015 Conference and the manuscript is currently being reviewed for publication. My current investigation involves the utilisation of machine learning to identify lifestyle clusters associated with depression to be integrated in the final depression risk index.

ANTECEDENTS OF AGED CARE SERVICE UTILISATION IN A SAMPLE OF OLDER AUSTRALIANS: PROSPECTIVE DATA LINKAGE USING GOVERNMENT ADMINISTRATIVE RECORDS

The purpose of my PhD project is to develop risk profiles for aged care service utilisation among older men and women living in the community. In this project, I am investigating clinical risk factors and lifestyle-related exposures that increase the risk for homecare services and residential aged care. The study method involves data linkage between information collected over a period of twenty years from participants enrolled in the Geelong Osteoporosis Study (GOS) and government administrative records. The burgeoning older population in Australia poses a significant challenge to the aged care system, and avoiding or delaying the use of aged care services is likely to have downstream social and economic benefits. This research will provide a sound evidence base that will inform public health messages about healthy ageing and maintaining independence.

DYSGLYCAEMIA IN WOMEN

Lelia was enrolled as a PhD candidate with the IMPACT SRC team in August 2014. She joins our team from Brazil after completing a Bachelor of Nursing and a Masters in Nursing, with a focus on diabetes. She has also worked in the Public Health sector as a registered nurse for a number of years.

Her research interests include diabetes, gestational diabetes, obesity and metabolic syndrome. Her PhD project, supervised by Professor Julie Pasco, Dr Mark Kotowicz and Dr Kara Holloway, is focussed on diabetes and pre-diabetes in female participants of the Geelong Osteoporosis Study. She will be describing the epidemiology of diabetes and pre-diabetes in the Barwon Statistical Division. In addition, she will also be determining risk factors for developing diabetes as well as investigating associations between diabetes and mental health, healthcare utilisation, fractures and mortality.
BIOLOGICAL PATHWAYS THAT MEDIATE THE LINK BETWEEN DIET AND DEPRESSION

The relationship between diet and mental health has now been demonstrated across age groups and various geographic locations; however, there is still a lack of understanding as to which biological pathways are directly and indirectly involved. There are several systems that are known to be associated with both dietary patterns and mood, and are proposed to mediate this relationship. Recent literature has pointed to the inflammatory nature of some common mental disorders, and there is evidence that the origin of this inflammation, at least in part, may be in the gut.

The colonisation of the gut microbiome begins in very early life, and its composition is influenced by genetic, environmental and lifestyle factors. While there seems to be a ‘core’ composition of the gut microbiome that is passed on from our mothers and determined by early life factors, a proportion of this bacterial population is modifiable. The composition can be modified by factors such as stress and antibiotic use, however the largest and most lasting alterations in gut microbiome result from habitual diet. It’s understood that poor quality ‘Western’ diets are associated with inflammation. New investigations also demonstrate that poor quality diets may be linked to poor gut bacteria diversity, and compromised function of the epithelial mucosal barrier, often termed ‘Leaky Gut’.

‘Leaky Gut’ occurs when bacterial molecules exit the digestive system and enter the bloodstream; this evokes an immune-inflammatory response. This chronic activation of the immune and inflammatory systems is a risk factor for a variety of disorders, including common mental disorders. This project aims to investigate the mediating role of these biological systems in the diet-depression association. The Dietary Inflammatory Index (DII), a new measure developed by our collaborators in the US, is used to convert complex dietary information to a score that estimates the inflammatory potential of a diet. This project will be using the DII, in combination with a range of inflammatory, gut health & stress biomarkers to elucidate important mediating biological mechanisms. By understanding the influence of changes in diet and/or mood on a variety of inflammatory biomarkers, including those linked to the health of the gut, we hope to better understand and identify some of the possible mechanisms to guide the development of targeted dietary prevention or intervention strategies.

DISSOCIATION AND CHANGES IN THE PERCEPTION OF TIME

This doctoral study aims to combine a number of research methods to better understand how the perception of time is altered in psychiatric disease. It has involved an ongoing collaboration between Barwon Health, Barwon Medical Imaging, the University of Melbourne and the Department of Physiology, Development and Neuroscience at the University of Cambridge. In particular, the research focuses upon changes in the perception of the “flow” of time and ordering of events.

Over the last year, reports have been prepared for submission regarding the fMRI and behavioural findings of the research. Most recently we have found evidence that patients with bipolar disorder exhibit changes in temporal perception and timing performance which accompany mood alterations. In particular, manic symptoms, as measured by the Young Mania Rating Scale, correlated with increased rates of misordered temporal judgements.

These findings continue the process of unravelling the neurological foundations of time perception. Our studies have shown that changes in time perception accompany mood changes in bipolar disorder and that we can measure the changes in brain activity that accompany specific time estimation measures. Importantly there is a strong linkage between time perception and dissociative symptoms which we hope to explore further in different populations with mental illness.
GESTATIONAL VITAMIN D AND DEVELOPMENT IN OFFSPRING

A significant number of Australian women, including those of reproductive age, have low vitamin D levels. Gestational vitamin D insufficiency is a cause for concern, not only for the maternal health, but because it also exposes the offspring to insufficiency during potentially critical stages of development. It is known that vitamin D deficiency in infancy and childhood affects bone health and muscle function. It is thus an important public health issue to determine whether gestational vitamin D levels impact upon musculoskeletal and other areas of health in the offspring.

The Vitamin D in Pregnancy (VIP) study’s initial findings showed impaired growth and development in offspring born to vitamin D deficient mothers. The study is currently in its final stages of recruitment for its 10 year follow-up phase and aims to determine whether these observed effects are transient or maintained into childhood.

Results of other observational studies have, to date, been conflicting and currently much conjecture exists with regards to optimal vitamin D levels during pregnancy for ideal offspring development. It is hoped that results from this study will add to the growing evidence base and used to formulate an evidence-based healthcare approach to vitamin D recommendations throughout pregnancy.

THE WORLD HEALTH ORGANISATION DEFINES HEALTH LITERACY AS ‘THE COGNITIVE AND SOCIAL SKILLS WHICH DETERMINE THE MOTIVATION AND ABILITY OF INDIVIDUALS TO GAIN ACCESS TO, UNDERSTAND AND USE INFORMATION

It has been estimated that up to a quarter of the Australian population may have sub-optimal health literacy; this is important as there is a growing body of evidence linking low health literacy with a wide range of poor health outcomes.

While there is a great deal of evidence regarding the role of health literacy in the prevention and management of a number of chronic conditions, currently very little data is available relating to health literacy and musculoskeletal conditions. This project aims to address the current knowledge gap using data from the Geelong Osteoporosis Study (GOS) and the Vitamin D in Pregnancy (VIP) Study.

Health literacy measures are currently being undertaken in both cohorts using the Health Literacy Questionnaire (HLQ), which generates detailed health literacy profiles assessing participants across a range of skills and abilities.

Participant health literacy profiles will be analysed, alongside data already collected (including osteoporosis related clinical measures, health service utilisation and lifestyle information) in order to understand the health literacy strengths and weaknesses of those at greatest risk of developing osteoporosis.

With a better understanding of the health literacy strengths and weaknesses of those at greatest risk we will be better placed to develop interventions that are likely to be of most value in reaching those in greatest need.
Our PhD candidates continued...

**BONE MATERIAL STRENGTH INDEX: A NEW METHOD FOR DETERMINING THE MATERIAL PROPERTIES OF BONE**

As people get older, their bones become weaker and more susceptible to fracture. Current techniques used for estimating the strength of the bone usually involve assessing bone mineral density (BMD). However, BMD measurements alone do not elucidate the risk of fracture because the largest absolute number of osteoporotic fractures occurs in people with a moderate reduction in bone mass (osteopenia). Several other clinical factors such as genetics, history of fracture, cardiovascular diseases, smoking, obesity, alcohol consumption, muscle mass, physical activity and medications (such as glucocorticoids) can also contribute independently to the risk of fracture. Consequently, there is a need to directly assess the ability of the bone to resist fracture.

My project involves the use of a device known as 'Osteoprobe'. It is a novel, hand-held device designed for clinical measurements of bone material properties in situ. The Osteoprobe is a reference point indentation instrument that quantifies the ability of bone to resist the growth of cracks and this is expressed as the bone material strength index (BMSi). This material property of bone, which is a component of bone quality, should be useful for determining bone strength and ability to resist fracture.

I will be measuring BMSi in a cohort of men as part of their 10-year follow-up assessment. Age-specific reference ranges for BMSi for men will be generated and correlations between the BMSi and other indices of bone quality and strength will be quantified. The relationships between the BMSi, health behaviours, socio-demographics and fracture risk will also be explored.

The results of this study may lead to new ways of exploring how specific lifestyle factors and pharmaceutical interventions impact the mechanical properties of bone. Using a novel instrument which can assess the susceptibility of bone to fracture, we can begin to study how physical activity, smoking, medications, diet and other lifestyle factors can contribute to bone strength. Furthermore, clinicians will be able to use the Osteoprobe to make decisions about the best pharmaceutical treatments for their patients.

**Ongoing funding for 2015**


Ongoing funding 2015 continued...


Successful grants 2015

1. ASBDD/Servier depression research grant. Dr Olivia Dean, post-doctoral research fellow. $30,000.

2. ASBDD/Lundbeck 2015 Neuroscience Scholarship. Melanie Ashton, PhD candidate. $30,000.

3. ANZBMS Travel Grants. Dr Kara L. Holloway, post-doctoral research fellow. $250.

4. Alfred Deakin Post-doctoral Research Fellowships. Dr Kara Holloway, Dr Brisa Fernandes, post-doctoral research fellows. ($78,146 in 2016, $80,967 in 2017, $10,000 project funding).


Internal IMPACT SRC grants:

6. Epigenetic pathways: Implications for social disparities in osteoporotic fracture? Dr Sharon Brennan-Olsen, post-doctoral research fellow. $4,000.


8. The efficacy of adjunctive Garcinia mangostana Linn for bipolar depression: A 6-month double-blind, randomised, placebo controlled trial. Dr Olivia Dean, post-doctoral research fellow. $20,000.
9. The epidemiology burden and comorbidity of personality disorders in Australia. Dr Lana Williams, post-doctoral research fellow. $20,000.

10. M-CSF and the risk for fracture. Prof Julie Pasco. $10,000.

11. Minocycline as an adjunctive treatment for unipolar depression. Dr Olivia Dean, post-doctoral research fellow. $17,049.


Awards 2015

1. Sarah Dash, PhD candidate was awarded a Top-Up Scholarship, by the Collaborative Research Centre for Mental Health (CRC), 2015.

2. Dr Brisa Fernandes, post-doctoral research fellow, won Best Early-Career Researcher Poster at the 2015 Australasian Society for Bipolar and Depressive Disorders (ASBDD) conference.

3. Melanie Ashton, PhD candidate, was awarded the 2015 ASBDD/Lundbeck Neuroscience Scholarship.

4. Dr Olivia Dean, post-doctoral research fellow, was awarded the 2015 ASBDD/Servier Depression Research Grant.

5. Sue Lauder, PhD candidate, won the Best Early-Career Researcher Oral Presentation at the 2015 ASBDD conference.

6. Dr Sharon Brennan-Olsen, post-doctoral research fellow, was awarded the 2015 Professor Philip Sambrook Award at the Australian and New Zealand Bone and Mineral Society conference (ANZBMS).

7. Dr Lana Williams, post-doctoral research fellow, was awarded a NHMRC project grant for her work investigating bone health in bipolar disorder.

8. Emma Gliddon, PhD candidate, was awarded the inaugural Past District Governor Geoff Betts Early Mental Health Researcher Award from the Rotary Club of Geelong, as well as a Grant-in-Aid for the 2015 Society for Mental Health Research conference.

9. Dr Shae Quirk, post-doctoral research fellow, was awarded the Faculty of Health HDR Publication Award for her thesis submitted in 2015.

10. Prof Michael Berk was listed as an ICI highly cited researcher and won the Brain and Behaviour Foundation Colvin Award.

11. Dr Sharon Brennan-Olsen, post-doctoral research fellow, received a NHMRC Career Development Fellowship.

12. A/Prof Felice Jacka, post-doctoral research fellow, received a NHMRC Career Development Fellowship.

13. Aswin Ratheesh, PhD candidate, was awarded an early career researcher oral communication award from the Australasian Society of Bipolar and Depressive Disorders conference.
International collaborations with IMPACT SRC

Universidad Complutense, Madrid, Spain.
Stanford University, CA, United States.
Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil.
University of Toronto, ON, Canada.
Hospital Santa Maria, Lisbon, Portugal.
Harvard Medical School, MA, United States.
McGill University, Montreal, Quebec, Canada.
Loyola University Chicago, Maywood, IL, USA.
University of Glasgow, Glasgow, Scotland.
University of Eastern Finland.
Guanyan Medical University, China
Oxford University.
University of Barcelona.
University College Cork.

Université Paris-Est, Paris, France.
Universidad de Antioquia, Medellín, Colombia.
Universidade Estadual de Londrina, Paraná, Brazil.
University of Bergen, Norway.
Shiraz University of Medical Sciences, Shiraz, Iran.
University of Manitoba, Winnipeg, Canada.
University of Cantabria, Santander, Spain.
Edward Hines Jr VA Hospital, Hines, IL, USA.
Chulalongkorn University, Thailand.
Norwegian University of Science and Technology
Norwegian Institute of Public Health.
Cambridge University.
Lausanne University Hospital.
University of Glasgow.

National collaborations with IMPACT SRC

City of Greater Geelong, Geelong.
The University of Melbourne, Parkville.
Orygen, The National Centre of Excellence in Youth Mental Health.
Australian Catholic University, Melbourne.
The University of Western Australia, Nedlands, Western Australia.
Menzies Research Institute, Hobart, Tasmania.
Queensland University of Technology, Brisbane.
James Cook University, Townsville.
Swinburne University, Melbourne.
The Black Dog Institute, Sydney.
The Brain and Mind Research Institute, Sydney.
Australian National University, Canberra.

G21 Alliance, Geelong.
Florey Institute of Neuroscience and Mental Health.
Monash University, Clayton.
Sir Charles Gairdner Hospital, Nedlands, Western Australia.
The University of Sydney, Sydney.
The University of Queensland, St Lucia.
University of Queensland Diamantina Institute, Wooloongabba.
Murdoch Children’s Research Institute, Parkville.
University of New South Wales, Sydney.
The CADE clinic, Sydney.
QIMR Berghofer Medical Research Institute, Brisbane.
The Australian Institute for Musculoskeletal Sciences, Melbourne.


45. Fernandes BS, Steiner J, Bernstein HG, Dodd S, Pasco JA, Dean O, Nardin P, Goncalves CA, Berk M. C-Reactive Protein is increased in schizophrenia but is not altered by antipsychotics: meta-analysis and implications. Molecular Psychiatry (Accepted 27th May 2015 –published online 14/7/2015).


65. Nunes SOV, Piccoli de Melo LG, Pizzo de Castro MG, Barbosa DS, Vargas HO, Berk M, Maes M. Atherogenic index of plasma and atherogenic coefficient are increased in major depression and bipolar disorder, especially when comorbid with tobacco use disorder. Journal of Affective Disorders. 2015;172:55-62.


133. Stuart AL, Pasco JA, Jacka FN, Berk M, Williams LJ: Falls and depression in men - A population-based study. [accepted to Journal of Mens Health 09/09/15].

134. Williams LJ, Jacka FN, Pasco JA, Coulson C, Quirk SE, Stuart AL, Berk M. The prevalence and age of onset of psychiatric disorders in Australian men [accepted ANZJP 1/10/15].


144. Peters AT, Shesler LW, Sylvia L, Magalhães PVS, Miklowitz DJ, Otto MW, Frank E, Berk M, Dougherty DD, Nierenberg AA, Deckerbach T. Medical burden, body mass index and the outcome of psychosocial interventions for bipolar depression. ANZJP. 2015.


Publications 2015 continued...


Books and chapters 2015

## Conference presentations 2015

<table>
<thead>
<tr>
<th>Event</th>
<th>Presentations</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOHaD Society Melbourne. Melbourne, Australia. 17-19 April 2015.</td>
<td>- Jacka FN. Predictors of child and adolescent mental health - can we make a difference? How, what and when?</td>
</tr>
<tr>
<td>ACNEM Nutrition in Medicine conference. Melbourne, Australia. 02-03 May 2015.</td>
<td>- Berk M. Depression is an inflammatory disease but where does the inflammation come from, and how can we change this? (Plenary)  - Jacka FN. Developmental Origins of Mental Health and Brain Function: focus on diet in the preconception and antenatal periods. (Plenary)</td>
</tr>
<tr>
<td>In-FLAME. Marburg, Germany. 02-04 June 2015.</td>
<td>- Jacka FN. Inflammation, the microbiome and the brain: Diet as anti-aging strategies in early life. (Keynote, invited meeting).</td>
</tr>
</tbody>
</table>
**Conference presentations continued…**

<table>
<thead>
<tr>
<th>Event</th>
<th>Presentations</th>
</tr>
</thead>
</table>
| **International Society for Bipolar Disorders Conference.**           | • Gliddon E, Lauder S, Berk L, Cosgrove V, Grimm D, Dodd S, Suppes T, Berk M. Discussion board engagement in the MoodSwings 2.0 online self-help program for bipolar disorder.  
• Lauder S, Cosgrove V, Gliddon E, Grimm D, Dodd S, Suppes T, Berk M. MoodSwings 2.0: An online intervention for bipolar disorder.  
• Cosgrove V, Grimm D, Gliddon E, Lauder S, Dodd S, Berk M, Suppes T. Ethical dilemmas of participant safety monitoring in online clinical research.  
| Toronto, Canada. 03-06 June 2015.                                     |                                                                              |
| **2015 Mental Health in Schools Conference.**                        | • Jacka FN. Diet Quality and Mental Health in Children and adolescents: Updates and New Directions. (Keynote) |
| Sydney, Australia. 11-12 June 2015.                                   |                                                                              |
| **12th World Congress of Biological Psychiatry (WFSBP).**            | • Berk M. Neurocognitive and functional impairment in mood disorders.  
• Berk M. Cognitive neuroscience. 002 Clinical Assessment of Neurocognition - the basis for improved clinical outcomes.  
• Berk M. The comorbidity of mental & bone health a fracture line ready to break.  
• Berk M. Depression: basic/clinical. 004 Treating bipolar disorder in the real world integrating comorbidity into treatment decisions. |
| **I Jornada Internacional de Psicogeriatría, Medicina Psicosomática y Psiquiatría de Enlace. Pontificia Universidad Javeriana. Bogota, Colombia. 21 June 2015.** | • Dodd S. Reconceptualización de psicosis y trastornos de ánimo con estadaje. |
Conference presentations continued…

<table>
<thead>
<tr>
<th>Event</th>
<th>Presentations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Royal Australia and New Zealand College of Psychiatrists (RANZCP).</td>
<td>• Berk M. From neuroprogression to Neuroprotection: new treatments for mood disorders.</td>
</tr>
<tr>
<td>Tasmania, Australia. 06 July 2015.</td>
<td></td>
</tr>
<tr>
<td>Western Alliance Symposium. Ballarat, Australia. 21 August 2015.</td>
<td>• Brennan-Olsen SL, Williams LJ, Pasco JA. The social gradient of osteoporosis and osteoarthritis: Effective conduits to elucidate social-structural factors associated with disease and health service utilisation. (Oral)</td>
</tr>
<tr>
<td></td>
<td>• Pasco JA, Foulkes C, Brown K, Doolan BJ, Brennan SL. A conduit between epidemiological research and regional health policy. (Poster and panel)</td>
</tr>
<tr>
<td>European College of Neuropsychopharmacology (ECNP). Amsterdam, The</td>
<td>• Berk M. Epidemiology of suicide in bipolar disorder (Sycrest symposium).</td>
</tr>
<tr>
<td>Netherlands. 29 August – 01 September 2015.</td>
<td></td>
</tr>
<tr>
<td>17-18 September 2015.</td>
<td></td>
</tr>
</tbody>
</table>
### Conference presentations continued…

<table>
<thead>
<tr>
<th>Conference</th>
<th>Presentations</th>
</tr>
</thead>
</table>
| **STATA conference.**  
Canberra, Australia.  
(Oral)                                                             |
| **XVIII National Congress of Psychiatry – Spain.**  
24-26 September 2015.                                                   | • Jacka FN. Inflammation, microbiota and brain: the diet as a prevention strategy at the beginning of life.  
(Invited oral)                                                        |
| **15th International Federation for Psychiatric Epidemiology (IFPE).**  
Bergen, Norway.  
07-10 October 2015.                                                    | • Jacka FN. The epidemiology of nutrition and mental health and the potential for prevention.  
(Opening plenary)                                                     |
(Poster)                                                               |
|                                                                          | • Pasco JA, Williams LJ, Brennan-Olsen SL, Berk M, Jacka FN. Milk consumption and the risk for incident MDD.  
(Oral)                                                                 |
(Oral)                                                                |
|                                                                          | • Williams LJ, Pasco JA, Jackson H, Kiropoulos L, Stuart AL, Jacka FN, Berk M. Depression as a risk factor for fracture in women: cross sectional and longitudinal evidence.  
(Oral)                                                                 |
(Plenary)                                                               |
| **American Society for Bone and Mineral Research (ASBMR).**  
Seattle, Washington, USA.  
(Sponsored by Sharon Brennan-Olsen).  
(Poster)                                                               |
(Sponsored by Mark Kotowicz).  
(Poster)                                                                |
(Sponsored by Julie Pasco).  
(Poster)                                                               |
<table>
<thead>
<tr>
<th>Event</th>
<th>Presentations</th>
</tr>
</thead>
</table>
• Jacka FN. Developmental origins of obesity workshop. Panellist on “cohorts, trials and future directions”. |
| **The Australasian Marcé Society 2015 Conference.** Adelaide, Australia. 22-24 October 2015. | • Jacka FN. Developmental Origins of Mental Health and Brain Function: focus on diet in the preconception and antenatal periods. (Keynote) |
| **The Ancestral Health Society of New Zealand (AHSNZ).** Queenstown, New Zealand. 23-25 October 2015. | • Jacka FN. The critical importance of diet to mental health across the lifespan. (Closing keynote) |
| **Royal Australian and New Zealand College of Psychiatry – Victorian Branch Conference.** Melbourne, Australia. 25 October 2015. | • Dean OM. Square pegs for round holes? Repurposing medical treatments for psychiatry. (Invited speaker) |
| **Australian and New Zealand Bone and Mineral Society (ANZBMS).** Hobart, Tasmania, Australia. 01-04 November 2015. | • Yousif D, Bucki-Smith G, Morse A, Kotowicz M, Pasco J, Holloway K. Lower limb fractures at a regional university hospital. (Poster)  
• Hyde NK, Hosking SM, Brennan-Olsen SL, Wark JD, Bennett K, Morse AG, Pasco JA. Gestational vitamin D status and offspring bone mass at age 10-12 years. (Poster)  
• Pasco JA, Mohebbi M, Holloway KL, Brennan-Olsen SL, Kotowicz MA. Musculoskeletal decline and mortality: prospective data from the Geelong Osteoporosis Study. (Poster)  
• Stuart AL, Quirk SE, Pasco JA, Berk M, Brennan-Olsen SL, Williams LJ. Quantitative heel ultrasound in bipolar disorder: A case control study. (Poster) |
Conference presentations continued...

<table>
<thead>
<tr>
<th>Conference</th>
<th>Presentations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>33rd Brazilian Congress of Psychiatry.</strong> Florianopolis, Brazil. 04-07 November 2015.</td>
<td>• Jacka FN. Diet as a modifiable risk factor and treatment option for depressive illness. (Plenary)</td>
</tr>
</tbody>
</table>
| **Australian Society for Bipolar & Depressive Disorders (ASBDD).** Sydney, Australia. 6-8 November 2015. | • Williams LJ, Pasco JA, Hodge JM, Berk M. Mood disorders, psychotropic use and bone health. (Oral)  
• Dodd S. Can we identify which patients are most likely to have a nocebo response? Results from meta-analyses of the placebo arms of clinical trials.  
• Gliddon E, Lauder S, Berk L, Berk M. Discussion Board Engagement in the MoodSwings 2.0 Online Intervention for Bipolar Disorder. (Oral)  
• Fernandes B. C-Reactive Protein as a Biomarker in Bipolar Disorder: a Systematic Review and Meta-analysis. (Oral)  
• Fernandes BS, Berk M. Peripheral brain-derived neurotrophic factor (BDNF) as a biomarker in bipolar disorder: a meta-analysis of 52 studies. (Poster)  
• Fernandes BS, Dodd S, Dean O, Berk M. N-acetyl cysteine decreases depressive symptoms and improves functionality: a systematic review and meta-analysis. (Poster)  
• Berk M. Novel therapies for psychiatric disorders: from translation to implementation. (Opening address)  
• Dean O. Minocycline: antibiotic to antidepressant. (Invited Speaker)  
Chair – ECR open communication session  
• Lauder S. Hot and manic, cold and depressed: Associations between meteorological changes and mood transitions in bipolar 1 disorder. (Oral) Continued... |
### Conference presentations continued...

<table>
<thead>
<tr>
<th>Location</th>
<th>Presentations</th>
</tr>
</thead>
</table>
| Australian Society for Bipolar & Depressive Disorders (ASBDD). Sydney, Australia. 6-8 November 2015. | • Williams LJ, Pasco JA, Hodge JM, Berk M. Mood disorders, psychotropic use and bone health. (Oral)  
• Dodd S. Can we identify which patients are most likely to have a nocebo response? Results from meta-analyses of the placebo arms of clinical trials.  
• Gliddon E, Lauder S, Berk L, Berk M. Discussion Board Engagement in the MoodSwings 2.0 Online Intervention for Bipolar Disorder. (Oral)  
• Fernandes B. C-Reactive Protein as a Biomarker in Bipolar Disorder: a Systematic Review and Meta-analysis. (Oral)  
• Fernandes BS, Berk M. Peripheral brain-derived neurotrophic factor (BDNF) as a biomarker in bipolar disorder: a meta-analysis of 52 studies. (Poster)  
• Fernandes BS, Dodd S, Dean O, Berk M. N-acetyl cysteine decreases depressive symptoms and improves functionality: a systematic review and meta-analysis. (Poster)  
• Berk M. Novel therapies for psychiatric disorders: from translation to implementation. (Opening address)  
• Dean O. Minocycline: antibiotic to antidepressant. (Invited Speaker)  
Chair – ECR open communication session  
• Lauder S. Hot and manic, cold and depressed: Associations between meteorological changes and mood transitions in bipolar 1 disorder. (Oral) |
| World Congress on Developmental Origins of Health and Disease (Doha). Cape Town, South Africa. 08-11 November 2015. | • Hyde NK, Brennan-Olsen SL, Wark JD, Moloney DJ, Bennett K, Pasco JA. Is smoking during pregnancy adversely affecting offspring bone development? (Mini poster/oral)  
• Hyde NK, Brennan-Olsen SL, Pasco JA. Maternal dietary mineral intake during gestation and the association with infant crown-heel length. (Mini oral/poster) |
<table>
<thead>
<tr>
<th>Event</th>
<th>Presentations</th>
</tr>
</thead>
</table>
• Yousif D, Bucki-Smith G, Morse A, Kotowicz M, Pasco J, Holloway K. Lower limb fractures at a regional university hospital. (Poster)  
• Gliddon E, Lauder S, Berk L, Berk M. Discussion board engagement in the MoodSwings 2.0 online intervention for bipolar disorder.  
• Gliddon E, Martini T, Lauder S, Berk L, Dodd S, Berk M. The online audience: User characteristics from the MoodSwings online self-help program for bipolar disorder.  
• Stuart AL, Quirk SE, Pasco JA, Berk M, Brennan-Olsen SL, Williams LJ. Quantitative heel ultrasound in bipolar disorder: A case control study. (Poster)  
• Burke LM, Berk M, Pasco JA, Williams LJ. The Kuebler-Ross legacy: Progressing the field of death, dying, grief, and loss. |
| Society for Mental Health Research (SMHR). Brisbane, Australia. 02-04 December 2015. | • Dodd S. Can we identify which patients are most likely to have a nocebo response? Results from meta-analyses of the placebo arms of clinical trials.  
• Stuart AL, Quirk SE, Brennan-Olsen SL, Pasco JA, Lane SE, Berk M, Williams LJ. Utilisation of mental health-related services in females with mood and anxiety disorders: Data from a population-based study.  
• Burke LM, Berk M, Pasco JA, Williams LJ. The Kuebler-Ross legacy: Progressing the field of death, dying, grief, and loss. |

Continued...
<table>
<thead>
<tr>
<th>Conference presentations continued...</th>
</tr>
</thead>
</table>
| **Society for Mental Health Research (SMHR).**  
Brisbane, Australia.  
02-04 December 2015.  
Continued... |
| • Dimpall JF, Pasco JA, Berk M, Williams LJ, Dodd S, Jacka FN, Meyer D. Can data mining and machine learning help us find biomarkers associated with depression in epidemiological studies? |
| • Gliddon E, Lauder S, Berk L, Berk M. Discussion board engagement in the MoodSwings 2.0 online intervention for bipolar disorder. |
| • Williams LJ. Depression as a risk factor for fracture: cross sectional and longitudinal evidence. |
| • Dean OM. Antibiotics in Psychiatry. |
| • Berk M. Something old, something new, something borrowed: Not so blue? |

| **International Diabetes Epidemiology Group (IDEG).**  
Vancouver, Canada.  
05-06 December 2015. |
| • Harding JL, Nedkoff L, Shaw JE, Magliano DJ, on behalf of the ANZDCC group. Differences in absolute and relative risks for CVD mortality among various low and high risk groups: exploring the phenomenon. |

| **Genetics Symposium.**  
Herzenberg Nexus.  
Stanford University.  
Palo Alto, California, USA.  
16-18 December 2015. |
| • Berk M. Biomarkers as targets for novel therapies for neuropsychiatric disorders |
IMPACT SRC Contacts

Professor Michael Berk, Health Education Research Building (HERB) Level 3, rear of Kitchener House, 285 Rylie Street, PO Box 281
Geelong Victoria 3220 Australia
Phone: +61 3 4215-3330, Fax: +61 3 4215-3491
email: mikebe@barwonhealth.org.au

Professor Julie Pasco, Health Education Research Building (HERB) Level 3, rear of Kitchener House, 285 Rylie Street, PO Box 281
Geelong Victoria 3220 Australia
Phone: +61 3 4215-3331, Fax: +61 3 4215-3491
email: juliep@barwonhealth.org.au

Brianna Doolan, Communications Officer and Research Assistant
Email: impactsrc@deakin.edu.au
Website: https://www.deakin.edu.au/research/impact
Follow us on Twitter: @IMPACTSRC

Original photographs by G Berk