UNSW SYDNEY

Centre for Healthy Brain Ageing (CHeBA)

Annual Report **2023**

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Co-Directors' Report

For the first time in history, the number of Australians over the age of 65 have overtaken the younger population aged under 15.

This year has been yet another significant one for the Centre for Healthy Brain Ageing (CHeBA), maintaining our steadfast vision to find answers to dementia's most complex challenges, and prioritising research that enhances population-level healthy brain ageing and guides us towards better clinical care for those in need.

In 2023, we announced the appointment of Ita Buttrose AC OBE as Chair of our newly established Advisory Committee, had major success with a National Institutes of Health grant and launched a first major national study investigating whether there has been a generational change in brain health.

We once again saw an expansion in the size of our group, steady research output and continued publication of our research in pre-eminent journals, as well as active engagement with the community through public forums and fundraising activities.

For the first time in history, the number of Australians over the age of 65 have overtaken the younger population aged under 15. This demographic shift has many ramifications including reduced workforce participation, greater dependence on welfare and increased burden of disease. We acknowledge the Australian Treasury's Intergenerational Report, which paints a clear and challenging picture of Australia in 40 years' time, with the ageing population our greatest demographic change. Over the next 35 years, the size of this group of older Australians will double and make up a whopping 23% of the population.

All of this indicates a requirement for increased attention to research into the ageing brain and its associated disorders.

We are pleased to announce a total of $12.5 million in grant funding success through major bodies including the National Health Institutes, and $1.3 million in philanthropic support for our Centre. We are extremely grateful to the individual donors, Foundations, fundraisers and corporates that have given us this support, which allows us to expand our research in ageing and dementia, and open new frontiers.

We remain exceptionally grateful for the continuing support of Aria Restaurant and KPMG Sydney, both partners of The Dementia Momentum since its launch in 2015. It is largely due to The Dementia Momentum initiative that CHeBA has been able to develop a global epidemiology of dementia, with collaborators from 40 countries across all continents, with the potential to deal with the inequity in dementia research that currently exists internationally.

We gratefully acknowledge our colleagues and other supporters for their enduring enthusiasm toward CHeBA. Research projects examining the ageing brain are mostly long and slow processes; we appreciate our highly skilled and dedicated team of researchers who continue to provide new insights into brain ageing.

We pay tribute to Angie Russell, CHeBA's diligent and highly capable Centre Manager from its inception until June this year and thank her successor Sophia Dean for stepping into the breach. We acknowledge the efforts of Heidi Douglass and the fundraising, communications and events team she leads, and thank them for dedicating themselves to such a valuable research cause.

It is largely through the extraordinary efforts of a devoted team of researchers and support staff that our work at CHeBA is so successful and rewarding.

2024 will no doubt be another big year for CHeBA. We expect the results of the Maintain Your Brain Trial to be published, the Centre for Research Excellence in Vascular Cognitive Disorders to gather pace, our consortia to receive a boost in activity, the Dementias Platform Australia to grow, our public forum re-established post-COVID-19, and several other exciting new developments.

We would like to assure our partners, collaborators and supporters that we will continue to deliver on our goals and work toward overcoming the global challenge of Alzheimer's disease and other dementias.

Professor Henry Brodaty AO

Professor Perminder Sachdev AM

About the Centre

The Centre for Healthy Brain Ageing (CHeBA) is a premier research institution within the Discipline of Psychiatry & Mental Health and UNSW Medicine & Health. It is headed by internationally acclaimed leaders in the field of brain ageing, Scientia Professor Henry Brodaty AO and Scientia Professor Perminder Sachdev AM.

Our Vision

Our vision is to achieve, through research, healthier brain ageing and better clinical care of age-related brain diseases.

Our Mission

Our mission is to conduct innovative research and provide the empirical basis to prevent and treat dementia and achieve healthy brain ageing for all Australians.

Our Aims

The Centre aims to conduct multidisciplinary research into ageing in health and disease and be involved in knowledge dissemination and translational research. The Centre focuses in particular on the following aims:

- Determine the pathways of normal and abnormal brain ageing in the community.
- Identify risk factors for and protective factors against abnormal brain ageing.
- Develop strategies for prevention of cognitive decline with ageing.
- Promote global collaborations to develop knowledge and further research into brain ageing.
- Understand the behavioural as well as the cognitive and functional manifestations of brain ageing.
- Translate relevant research findings into practice.
- Determine the prevalence of age-related neurodegenerative and cerebrovascular disorders.
- Identify biomarkers for brain disorders.
- Investigate the pathophysiology of brain diseases so that novel treatments can be discovered.
- Conduct treatment trials of new drugs and non-pharmacological strategies.
- Conduct educational activities for the workforce involved in the care of the elderly, especially those with dementia.
- Design models of assessment and care using the latest research evidence.
- Develop research programs in special populations, e.g., young-onset dementia, dementia in intellectual disability.
- Improving diagnosis, post-diagnostic care and long-term community and residential care.
- Improving quality of practice for GPs, memory clinics and hospitals through research and through establishing the Australian Dementia Network and Registry.

Our Functions & Goals

Build capacity and research capability for age-related research, in particular brain research.

Support the development and sharing of infrastructure for research across different Centres, Schools and Faculties of UNSW Sydney.

Build relationships between the Centre and other similar centres in Australia and overseas.

Build relationships between the Centre and the industry involved in the treatment and care of the elderly.

This will be achieved through:

Strengthened collaborative research programs among staff and partners locally, nationally and internationally, supported by increased peer-reviewed grants and commissioned research.

Development of specialised research facilities and laboratories that place the Centre at the forefront of brain ageing research nationally and internationally, to achieve the highest quality research and advance the Centre's attractiveness to prospective researchers of excellence.

Extensive linkages with practitioners and policy makers at local, state and national levels to improve relevance and impact of research.

Increased numbers and quality of skilled researchers undertaking research and evaluation activities in this field.

Enhancing numbers of postgraduate research students.

Exercising enhanced influence via dissemination and transfer of research findings through publications, presentations and forums with a focus on academic, practitioner and policy maker audiences.

2023 Centre Highlights

CHeBA's vision is to achieve, through research, healthier brain ageing and better clinical care of age-related brain diseases.

Assessing Generational Change to Reduce Dementia Impact

On World Alzheimer's Day this year, CHeBA launched a first-ever national study investigating whether there has been a generational change in brain health following major increases in the number of Australians aged 65 and over.

The study is exploring the possibilities of unidentified risk factors for dementia and re-evaluates previously established risk factors. It will ascertain what changes have occurred in the next generation of 70-90 year olds across four health domains – physical, psychological, social and cognitive/brain health – by repeating comprehensive assessments of a defined older population and of associated health services.

This project is expanding upon the previous 14-year Memory and Ageing Study, which confirmed known risk factors for cognitive decline such as age, heart disease, other cardiovascular risks including high blood pressure, high cholesterol and poor diet. The research also reported that poorer smelling ability and poor social health defined by the number of social connections were linked to dementia.

Novel approaches are being incorporated into the new study, including recently developed blood tests for Alzheimer's disease, digital biomarkers, computerised neuropsychological assessments and blood pressure measurements, evaluation of new risk factors for dementia and new tools for measuring resilience, all in order to better target preventative strategies.

As well as examining risk factors, the research will consider whether the incidence of new cases is changing. Ultimately this will help health bureaucrats plan for Australia's ageing population, services for the older people and aged care facilities.

140 research volunteers without dementia and born between 1933 and 1953 had signed up by end 2023, with a total of 1,500 participants from Sydney's Wentworth and Kingsford Smith electorates needed to complete the study. The project was officially launched by Co-Director Professor Henry Brodaty and CEO of HammondCare and former NSW Premier, Mike Baird, at a supporters lunch hosted by Aria Restaurant Sydney.

Ambassador PJ Lane, Professor Henry Brodaty and Mike Baird

Ita Buttrose AC OBE Appointed Chair of Advisory Committee

This year we were honoured to announce Ita Buttrose AC OBE as the Chair of CHeBA's Advisory Committee.

Chancellor of UNSW Sydney David Gonski AC said the appointment marked an historic moment for CHeBA.

"We are at a tipping point in our population where for the first time there are more older Australians than children under 15. This is one reason why Alzheimer's disease and other dementias are a national health priority and makes the work of CHeBA even more important than previously. This work will undoubtedly be assisted by a strong and active Advisory Committee which is greatly enhanced by Ita's appointment," said David Gonski AC.

Ms Buttrose said that CHeBA has already established itself as a pre-eminent Centre in brain ageing research, and she was pleased to take on the role of Chair to support the vision of CHeBA's Co-Directors and their research team.

"With the last decade indicating substantial developments in neuroscience, there is more hope given to the possibility that we may be in a position to prevent and treat Alzheimer's disease and other dementias," says Ms Buttrose, who will lead an impressive Advisory Committee and provide strategic direction to the Centre.

Advisory Committee

Ita Buttrose AC OBE (Chair)

Immediate Past Chair, Australian Broadcasting Corporation (ABC), 2013 Australian of the Year and first female Editor-in Chief of the Sydney Daily and Sunday Telegraph

Barbara Cail AO

Immediate Past Executive Chair, Rala Information Services, Founding President of Chief Executive Women and Governor of The Smith Family

David Greatorex AO

Co-Founder of ResMed and Past Chair of SecureNet, State Bank of NSW, Managing Director of Capita and Chair and Managing Director of IBM NZ. Former Adjunct Professor at Wollongong and Macquarie Universities

Anita Jacoby AM

Chair, ABC Advisory Council, media executive, author and one of Australia's most awarded television producers, and leading advocate for women in media

Joseph D'Agostino

Director, D'Agostino Solicitors, Property Law and Commercial Litigation Solicitor of the Supreme Court of NSW and High Court Australia

Professor Kimberlie Dean

Head, UNSW Sydney Discipline of Psychiatry and Mental Health

John Gray

Senior Partner in the Corporate and Commercial team at Hall and Wilcox, specialising in Technology and Intellectual Property

Peter Joseph AM

Chairman, Black Dog Institute, The Ethics Centre and Director of Tonic Health Media. Former Chairman of St Vincents and Mater Health Sydney

Dr Dagmar Schmidmaier AM

Publishing Specialist with The Book Adviser, former CEO and State Librarian of the State Library of NSW and former Chair of the War Widows Guild of Australia

Professor Peter Schofield AO

Honorary Professor, UNSW Sydney and NeuRA (Neuroscience Research Australia), former President of the Australasian Neuroscience Society and Interim Director of the NHMRC National Institute for Dementia Research

Diagnosing Vascular Cognitive Impairment and Dementia

A review led by Dr Satoshi Hosoki and published in *Nature Reviews Neurology,* suggested that the research pace into understanding biomarkers for the diagnosis of vascular cognitive impairment and dementia needs to be accelerated.

Vascular cognitive impairment and dementia (VCID) is the second most common cause of dementia, accounting for at least 20% of all diagnoses. Although advances have been made in Alzheimer's disease and dementia, progress in identifying molecular biomarkers for accurate diagnosis of VCID has been relatively limited. Diagnostic precision for VCID relies largely on clinical information and neuroimaging, which are not as specific as molecular biomarkers.

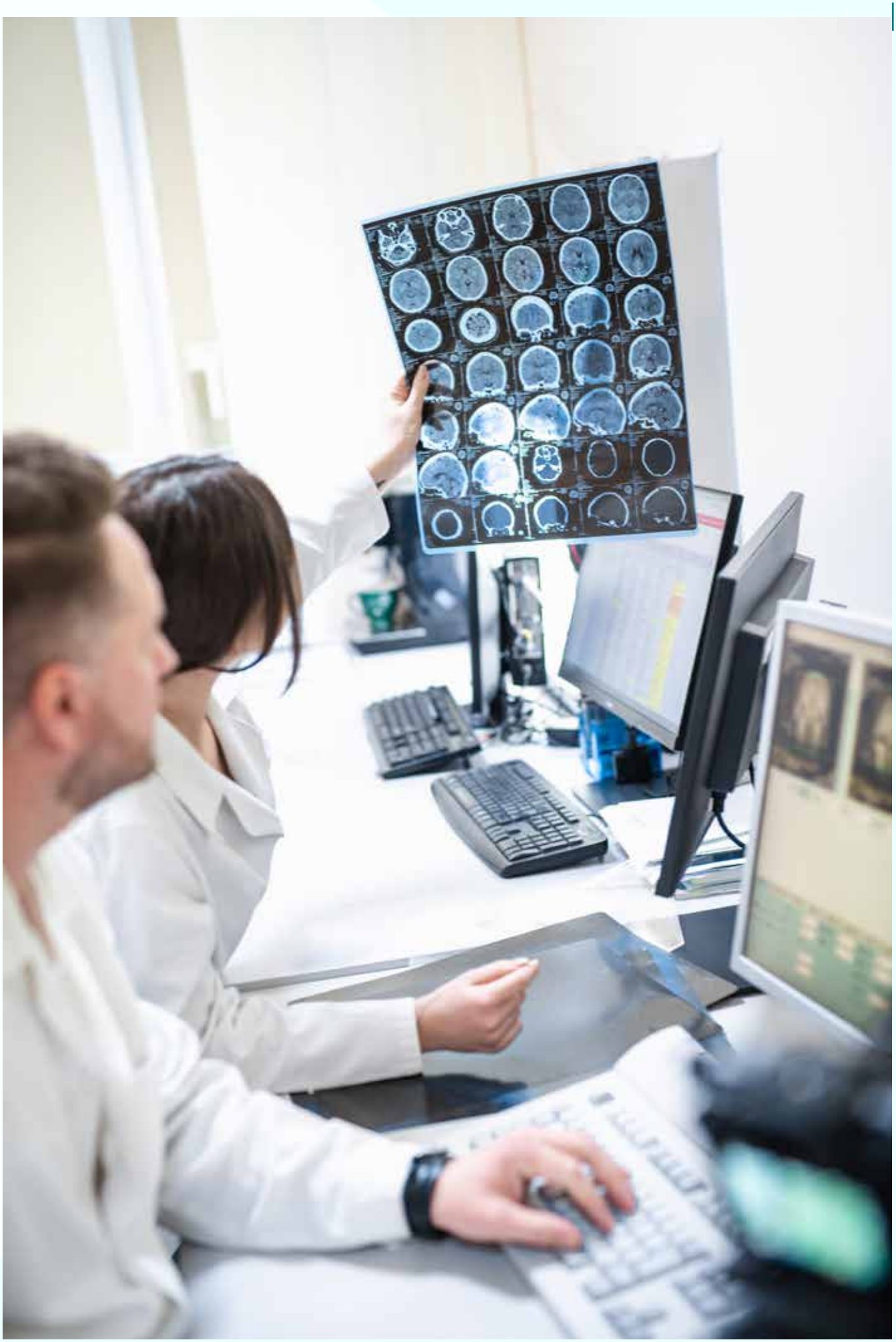
The review examined current knowledge of molecular biomarkers and considered their potential in the clinical management of the condition. It looked at the roles of large and small vessel disease in VCID, and considered the underlying pathophysiological processes that lead to vascular brain damage – including arteriolosclerosis, haemorrhage, blood-brain barrier breakdown, inflammation and oxidative stress – and assessed the key molecules in each of these processes, looking at their potential as biomarkers for VCID.

Professor Perminder Sachdev, said that due to the complexity of VCID and to meet the challenge of biomarker-based diagnosis, development should focus on using multiple biomarkers in combination.

Dr Satoshi Hosoki is a Visiting Fellow from the National Cerebral and Cardiovascular Center in Osaka, Japan.
DOI/10.1038/s41582-023-00884-1

Dr Satoshi Hosoki and Professor Perminder Sachdev

Members of CHeBA research team with Dr Hosoki



Funding Success to Further Develop the Global Epidemiology of Dementia

CHeBA is a world leader in the bringing together multiple studies from around the world to further develop the epidemiology of dementia, deal with the global inequity in such research, and expedite outcomes for dementia on the international stage. Dementia has been referred to as the next pandemic that has already begun, with 50 million families affected worldwide and a cost to the global economy of $1.3 trillion in 2020. Intervention on modifiable risk factors provides the best hope for reducing the incidence and/or delay the onset of dementia.

The Cohort Studies of Memory in an International Consortium (COSMIC) is a CHeBA-led consortium and a global effort toward this goal. It is perfectly positioned to achieve major goals set by the World Health Assembly's Global Action Plan on the public health response to dementia, including evidence-based practice for dementia risk reduction, early and appropriate diagnosis, and global equity in research.

This year, CHeBA was awarded over $7.2 million over five years (2023-2028) from the National Institutes of Health, USA, to harness the power of this unique consortium to map globally the 12 modifiable risk factors of dementia identified by the 2020 Lancet Commission, document the diverse epidemiology of dementia internationally, and better understand ethnic differences in the genetics and biomarkers for dementia.

Announced by the National Institute on Aging, the grant will allow the expansion of our international research collaboration within COSMIC, specifically to study novel risk and resilience factors such as the built and economic environments, air pollution, sleep, nutrition, social health – including social activity and network size, quality of social engagement and loneliness - and frailty. Over a five-year period, the incidence of Mild Cognitive Impairment and dementia will be documented in diverse regions and risk models for dementia in specific populations developed. The team will also map the risk and protective factors for dementia and estimate their burden around the world, with an emphasis on under-represented populations so that population-specific risk indices for dementia can be developed to aid the global campaign to prevent dementia.

The grant funding will also support the examination of cerebrovascular disease and vascular risk factors by harmonising neuroimaging biomarkers, and study genetic markers in non-European populations, as well as investigate the potential of plasma biomarkers for Alzheimer's disease in diverse populations.

The grant will also support further development of the Dementias Platform Australia (DPAU) in partnership with the DPUK.

Professor Sachdev said the funding would allow a lasting impact on the epidemiology of cognitive ageing and dementia.

The collaborative team on this grant includes the Davos Alzheimer's Collaborative (DAC), Dementias Platform UK (DPUK), Alzheimer's Disease Data Initiative (ADDI), Global Brain Health Institute (GBHI), Institute of Health Metrics and Evaluation (IHME).

Good Social Connections Linked to Better Brain Health

In 2023 we continued our research into social connection, with research led by social health expert Dr Suraj Samtani indicating that spending time with loved ones can have significant health benefits as we age.

The analysis, published in *Alzheimer's & Dementia: The Journal of the Alzheimer's Association,* looked at the link between social connections in older people and the risk of Mild Cognitive Impairment (MCI), dementia and mortality. The results of 13 international studies, which followed people aged 65 years and above over long periods of time, were pooled together.

Dr Samtani said that it is known from previous research that social connections are important for our health and being isolated puts us at higher risk of dementia and death. The goal with this research was to find which social connections are protective from dementia and death.

Results were obtained from studies in low, middle and high-income countries across the world. These included Australia, North America, and several nations in Europe, South America, Asia and Africa. The study population is more diverse than previous meta-analyses, which have mainly focused on North America and Europe.

The researchers analysed information about the social connections of the study participants, and then addressed whether the participants developed MCI or dementia, or passed away, during the study periods. They controlled for other variables which could influence these outcomes including age, sex, education level, lifestyle factors and other chronic diseases.

Amongst the study participants, good social connections were associated with a lower risk of MCI, dementia and death.

The researchers recommend that we prioritise social connection to reduce risk of cognitive decline and live longer. DOI/10.1002/alz.13072

Our Groups

The strength of CHeBA continues to be in its multi-disciplinary approach, as it addresses ageing-related brain diseases through the latest work in epidemiology, clinical research, neuroimaging, genetics and genomics, proteomics and other innovative approaches.

Epidemiology

The Epidemiology Group is studying the patterns, causes, risks, protective factors and effects of neurocognitive disorders, in particular dementia, in older populations in Australia and internationally. The group analyses longitudinal cohorts from CHeBA's own studies – the Sydney Memory and Ageing Study, the Older Australian Twins Study, the Sydney Centenarian Study and the Sydney Stroke Study – as well as from international studies participating in consortia, including those led by CHeBA, COSMIC, STROKOG and International Centenarian Consortium for Dementia (ICC-Dementia). A new cohort was initiated in 2023 for the uncommon genetic disorder that leads to stroke and vascular dementia – the Australian Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy (CADASIL) cohort (AusCADASIL). A Global CADASIL Consortium (GCC) is being developed. An important aspect of this work is genetic epidemiology, which uses various approaches including genome-wide association studies and Mendelian randomisation methods to examine risk factors for dementia and other neurocognitive disorders. CHeBA also participates in other international consortia, which include IGEMS, ENIGMA, CHARGE, EADB and BRIDGET.

Group Leaders: Professor Perminder Sachdev, Professor Henry Brodaty

Staff: Dr Nicole Kochan, Dr Karen Mather, Dr John Crawford, Dr Anbupalam Thalamuthu, Dr Darren Lipnicki, Dr Vibeke Catts, Dr Suraj Samtani, Dr Katya Numbers, Jessica Lo, Dr Adam Bentvelzen, Dr Danit Saks, Fleur Harrison

Professor Henry Brodaty AO & Professor Perminder Sachdev AM, Group Leaders

Dr Karen Mather, Group Leader

Genomics & Epigenomics

The aim of this Group is to identify and better understand the genomic, epigenomic and transcriptomic factors associated with human ageing and longevity, with a focus on the brain and dementia. We examine these questions using data from several CHeBA studies including the Sydney Memory and Ageing Study, the Older Australian Twins Study, the Sydney Centenarian Study and the Brain Ageing Study. We have collected whole genome sequencing, genotyping, epigenetic and gene expression data for many of our study participants. Our group has many collaborations with national and international research groups and consortia. We are also using data from biobanks, such as the UK Biobank, and other accessible data sources. The findings of this work have facilitated the identification of novel genes and pathways that contribute to human traits, including brain structure, leading to new insights into the underlying biology. This year one of our students completed her PhD thesis on the genetic and epigenetic factors of exceptional longevity. Working with national and international collaborators, Dr Mary Revelas published three peer-reviewed papers and presented her work at four conferences. The results of this research suggest cardiovascular and metabolic health play important roles in reaching an exceptional age.

Group Leader: Dr Karen Mather

Staff: Dr Anbupalam Thalamuthu, Dr Sumangali Gobhidharan, Sri Chandana Kanchibhotla

Students: Dr Mary Revelas, Dr Adith Mohan, Jessica Lazarus, Abdulsalam Toyin Ademola, Annabel Matison, Fatemeh Amjadimoheb, Kathleen Irina, Arjun Appavoo S/O Sambanthamoorthy

Neuroimaging

The Neuroimaging Laboratory (NiL) is an interdisciplinary research group comprising staff members and research students with diverse backgrounds, including engineering, computer science, data science, psychology and medicine. We are dedicated to studying the ageing process of the human brain. Utilising neuroimaging techniques, our aim is to enhance our understanding of brain ageing pathways. Our research, in turn, will contribute to advancements in prediction, diagnosis, and treatment of ageing-related brain diseases. We focus on computational neuroanatomy and using MRI for structural, functional, and physiological imaging of the ageing brain. Recently, we have concentrated on studying cerebrovascular burden. This includes our investigation of blood brain barrier permeability using dynamic contrast-enhanced MRI and cerebrovascular reactivity using CO2 challenge.

The NiL is dedicated to harnessing the potential of AI, particularly deep learning, in our research endeavours. In 2023, our research using deep learning continued to focus on two main areas: estimating 'brain age' and developing 'normative modelling'. This normative modelling allows us to map individual differences at the level of a single subject in relation to a reference model. Such advancements represent a crucial step toward 'personalised medicine', facilitating the development of tailored strategies to promote healthy brain ageing.

This year we were privileged to host Visiting Fellow Dr Satoshi Hosoki from National Cerebral and Cardiovascular Center, Osaka, Japan, whose review article examining the roles of large and small vessel disease in vascular cognitive impairment and dementia, was published in *Nature Reviews Neurology.* DOI /10.1038/s41582-023-00884-1

Group Leader: Associate Professor Wei Wen

Staff: Dr Jiyang Jiang

Casual Staff: Shizuka Hayashi, Mai Phuong Ho, Keshuo Lin, Nikita Keshena Husein

Students: Chao Dong, Shizuka Hayashi, Keshuo Lin, Mai Phuong Ho, Nikita Keshena Husein

Visiting Fellows: Dr Satoshi Hosoki, Dr Jing Du

Dr Jing Du was awarded her PhD in August 2023 after spending three and half years with NiL.

Dr Jiyang Jiang is one of seven Fellows awarded the William H. Gates Sr. Fellowship from the Alzheimer's Disease Data Initiative in 2023. Over a two-year period, Dr Jiang will focus specifically on developing robust prediction models for dementia in low- and middle-income countries, using machine learning models.

Associate Professor Wei Wen, Group Leader

Dr Jiyang Jiang

Professor Perminder Sachdev AM, Group Leader

Neuropsychiatry

The Neuropsychiatry Group is a collaborative group composed of staff from CHeBA and the Neuropsychiatric Institute (NPI) at the Prince of Wales Hospital, Sydney. The NPI is a tertiary referral unit that specialises in the diagnosis and treatment of cognitive and psychiatric disorders associated with medical and neurological illnesses. It is unique in Australia in bringing together expertise within Psychiatry, Neurology, Neuropsychology, Neurophysiology and Neurosurgery to bear upon complex diagnostic issues. The Neuropsychiatry Group is at the forefront of diagnostic research into neuropsychiatric disorders, in particular dementia, drug-induced movement disorders, Tourette syndrome, functional neurological disorders, and mental illness associated with epilepsy, and the use of brain stimulation for treatment. The Group also provides important education services for clinicians and trainees. In 2023, the Mindgardens Functional Neurological Disorders (FND) Clinic became fully operational under the leadership of Dr Adith Mohan, and >50 patients were assessed and treated. Alongside this, an Australian consortium of FND clinics – CARE FND – was established with the objective to harmonise data collection and develop a national FND cohort. An application for a Centre for Research Excellence in FND was submitted to the NHMRC Medical Research Future Fund scheme.

Group Leader: Professor Perminder Sachdev

Staff: Dr Adith Mohan, Dr Rebecca Koncz, Emily Sedlacek-Swift, Dr Nicole Kochan, Dr Michael Connors, Dr Matt Paradise, Dr Matt Lennon, Dr Lucia Chinnappa-Quinn

Neuropsychology

The Neuropsychology Group investigates the cognitive changes associated with age-related neurocognitive disorders and dementia and compares this with cognition characteristic of healthy brain ageing. An important aim of our research is the development of sensitive, efficient, and accurate methods and tools for measuring cognitive decline and for monitoring treatment response in intervention studies. To this end, we are investigating the use of computerised cognitive tests, optimising brief and targeted cognitive batteries for a variety of disorders and purposes, developing normative tools, and identifying the most appropriate cognitive instruments for individuals from culturally and linguistically diverse backgrounds. We have strong collaborative links with the many researchers at CHeBA and other research groups in Australia and internationally, and our group provides expertise in cognition and neuropsychological assessment for studies with older adult populations. Ultimately, our aim is translation of our findings into better care for all individuals with neurocognitive disorders, by improving diagnostic practices enabling early identification and timely implementation of appropriate interventions, and by improving the experience for individuals undergoing cognitive assessment.

Group Leader: Dr Nicole Kochan

Staff: Dr Adam Bentvelzen, Dr John Crawford

Honorary Associates: Dr Ben Lam, Dr Karen Croot

Student: Zara Page

Dr Nicole Kochan, Group Leader

Molecular Biomarkers

In 2023 the Molecular Biomarkers Group was heavily focused on Vascular Dementia, as a result of Professor Sachdev's successful NHMRC CRE funding for the "Vascular Contributions to Dementia" project. Post-doctoral fellow Dr Danit Saks joined CHeBA in 2023 as the study co-ordinator for the AusCADASIL study, which is the first study of genetically associated vascular dementia to be established in Australia. Dr Tharusha Jayasena has been dedicated to coordinating multiple international collaborations which will provide data and blood samples for the study of vascular cognitive impairment and dementia (VCID) biomarkers. Together with PhD candidate Gurpreet Hansra, Dr Jayasena has identified ~20 biomarkers of VCID based on a meta-analysis of the literature, for which they are currently establishing targeted multiplex assays. Dr Tessa Helman is exploring the possibility of using exosomes for biomarker discovery. A major publication highlight for 2023 was the paper by CHeBA Visiting Fellow Dr Satoshi Hosoki titled "Molecular biomarkers for vascular cognitive impairment and dementia" published in *Nature Reviews Neurology*. This paper was coauthored by several group members and represents a collaboration of CHeBA with local and international organisations, including National Cerebral and Cardiovascular Center Japan, Keck School of Medicine California USA, Cardiovascular Research Institute New York USA, Victor Chang Cardiac Research Institute Australia, St Vincent's Clinical School, Australia, Royal Melbourne Hospital Australia and the Sahlgrenska Academy Sweden.
DOI/10.1038/s41582-023-00884-1

Group Leader: Dr Anne Poljak

Staff: Professor Perminder Sachdev, Dr Tharusha Jayasena, Dr Satoshi Hosoki, Dr Vibeke Catts, Dr Danit Saks, Dr Tessa Helman, Dr Gurjeet Kaur Virk, Dr Fatemeh Khorshidi

Student: Gurpreet Hansra

Dr Anne Poljak, Group Leader

Clinical & Care

With the expansion of our clinical arm, we aim to improve assessment and care for people living with dementia and those at risk. Through research and innovation, there is great hope for the future.

Clinical & Care Executive Summary

A significant component of our vision at CHeBA is impact on the improvement of diagnosis, post-diagnostic care and long-term community and residential care. Central to our clinical focus is the improvement of the quality of practice for GPs, memory clinics and hospitals through research and through setting up the Australian Dementia Network and Registry.

ADNeT

Throughout 2020 – 2021, CHeBA researchers worked with colleagues in the Australian Dementia Network (ADNeT) to develop the first Australian Memory and Cognition (MC) Clinic guidelines, which were published in 2021. These Guidelines are based on the overarching principles of person-centred care, equity and respect, and provide consensus-based, best-service recommendations for MC Clinics. They identify standards for the assessment and post-diagnostic support and care that should ideally be provided by MC Clinics. Since publishing, an implementation pilot was run to receive feedback on the Guidelines. Further consultation was also conducted with experts in the areas of Dementia and Intellectual Disability and Dementia in Culturally and Linguistically Diverse communities to develop additional standards specific to these population groups.

In 2023, combined feedback was used to revise the Guidelines, which are due to be published on the ADNeT website in 2024. An auditing process for MC Clinics on the Guidelines is also being developed throughout 2024, with the expectation that it will be implemented in the future, to uniformly raise the quality of assessment and post-diagnostic care for all MC Clinic patients in the future.

Guidelines are available online:

Clinician Guide: https://memoryandcognitionclinic.com.au/wp-content/uploads/2021/11/ADNeT-Memory-and-Cognition-Clinic-Guidelines.pdf

Client Guide: https://memoryandcognitionclinic.com.au/wp-content/uploads/2021/11/ADNeT-Memory-and-Cognition-Clinic-Guidelines-Client-Guide.pdf

CHeBA's Co-Directors Professor Henry Brodaty and Professor Perminder Sachdev are clinicians as well as researchers, leading research programs that span the full range of research from the bench to the bedside and into the community.

Australian Dementia Network
REGISTRY. CLINICS. TRIALS.

mindgardens
Neuroscience Network

Mindgardens FND Clinic

The Mindgardens Functional Neurological Disorders (FND) Clinic, funded by a translational research grant, was established in August 2022 by CHeBA Research Fellow Dr Adith Mohan. Based at the Neuropsychiatric Institute at the Prince of Wales Hospital, the FND Clinic provides a 6-month comprehensive assessment and care plan, with an embedded 6-week interdisciplinary intervention offered to suitable patients. It is the first clinic of its kind in NSW.

In the clinic's first 15 months, 115 referrals were received, with 81 patients (70%) accepted and a 16% attrition rate. Sixty-one patients completed initial assessment, with 29 included in the 6-week intervention. A baseline profile paper is being drafted for submission. At the 3-month follow-up (n=42), there was an improvement compared to baseline across all assessed domains, with the 6-month follow-up (n=30) showing maintenance or further improvement across the majority of domains relative to 3-month follow-up. Patient feedback after the 3-month follow-up was overwhelmingly positive.

The Clinical Alliance for Research and Education in Functional Neurological Disorders (CARE FND), a consortium of FND clinics across Australia and New Zealand, was subsequently established. Funded through a Maridulu Budyari Gumal, Sydney Partnership for Health, Education, Research and Enterprise (SPHERE) grant, the consortium aims to develop standardised care pathways and establish the needs of FND patients in Australia and New Zealand. A scoping study was conducted to review the current care models of participating specialised FND clinics, with a summary paper submitted for publication. The consortium is also developing a naturalistic cohort of FND patients through harmonisation of data collection and a linked data repository.

CARE FND hosted the inaugural FND symposium in November 2023, directed at practicing FND clinicians and translational researchers, with 198 attendees from Australia, New Zealand, Singapore and Malaysia. Given the success of the symposium, we expect to host this annually should funding enhancement be achieved.

Future directions of the FND Clinic include development of educational resources for use by clinicians in primary care, inpatient and emergency department settings, and capacity building in NSW regional and remote health workforce via telehealth outreach. The team will establish a national FND Community of Practice as an opportunity for clinicians to share their expertise and knowledge.

Dr Adith Mohan, FND Clinic Head

Highlights:

- Collected one of Australia's largest longitudinal FND data sets
- Established world first FND binational consortium across Australia and New Zealand
- Obtained continued funding secured for another year of the clinic, totalling $300,000 over 2 years (and $80,000 from SPHERE for CARE FND)

Grace Corkhill's life has been transformed after being assessed and treated in the FND Clinic

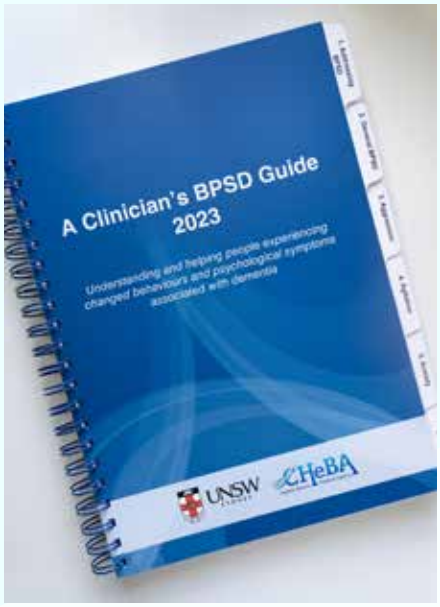
The FND Clinic gave 21-year-old Grace Corkhill a new lease on life.

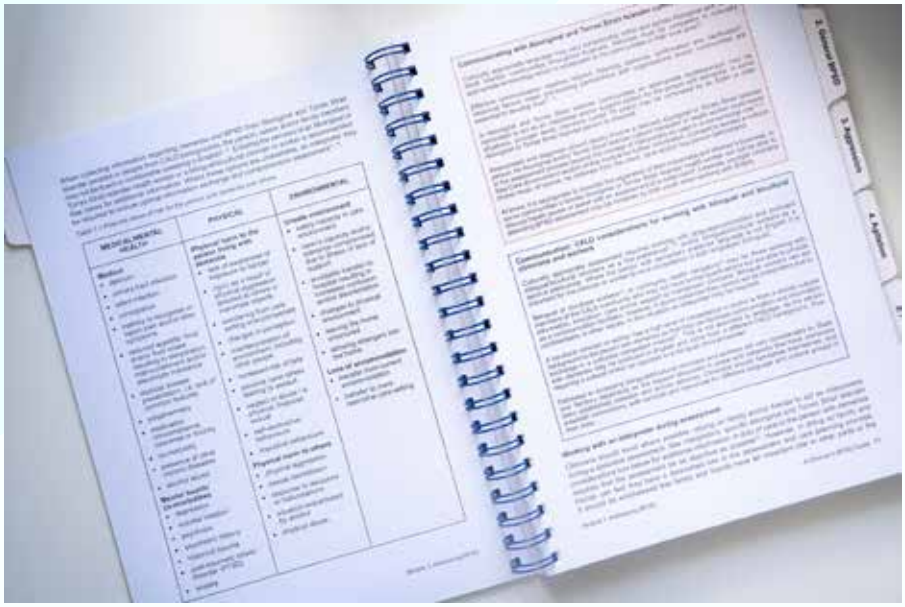
Grace, who lives in regional New South Wales, had a cerebral artery aneurysmal rupture in 2013 which caused a stroke. She was then diagnosed with epilepsy and developed FND in part related to the original trauma of her significant health issues. She said the disorder had manifested in intermittent, involuntary attacks of shakes in her limbs and body, which left her housebound and terrified.

Head of the Clinic Dr Adith Mohan said that "In Grace's situation and in the absence of intervention, her symptoms would likely have become persistent and made living her life more difficult".

A key component of the one-stop shop Clinic is an additional research component also led by Dr Mohan through CHeBA, which is addressing the fundamental gap in information and education for patients and their clinicians around FND.

Grace is now back at work, has re-engaged socially and is exercising daily, and feels in control of her life because of the treatment she received.





Behaviour Management

In 2023 we launched the Dementia Behaviour Management Apps; a digital knowledge share, which provides easy access to strategies for clinicians in the field, community care staff and family carers in the home when they are presented with behavioural and psychological symptoms of dementia. Accessibility to these guides is a game-changer for care and the resource is free.

Behaviour and Psychological Symptoms of Dementia Guide for Clinicians

CHeBA was commissioned by NSW Health to update ***'Management of Behaviours and Psychological Symptoms associated with Dementia (BPSD)', a*** Handbook for NSW Health Clinicians providing services for people experiencing BPSD, which is available online:

Full Guide: A Clinician's BPSD Guide 2023

Summary Guide: A Clinician's BPSD Field Guide 2023

Behaviour and Psychological Symptoms of Dementia Guide for Clinicians App

The App was developed to provide guidance for clinicians in their role of assisting residential aged care facility staff, community care staff and family members caring for persons living with dementia, who present with behavioural and psychological symptoms.

This App provides summary information relevant to the most commonly presenting behavioural and psychological symptoms of dementia (BPSD) and is based on the document *A Clinician's BPSD Guide 2023.* The App is available at:

A Clinician's BPSD Guide on the App Store (apple.com)

A Clinician's BPSD Guide - App on Google Play

Care4Dementia App

This App was developed to provide information and support for carers in their role of caring for persons with behavioural changes that can occur in dementia. Information on what these behaviours look like, why they might be happening and what you can do to help is included for those behaviours most commonly reported by carers. Understanding why behavioural changes are occurring can help to manage the behaviour.

Compatible with smartphone and tablet, this App is part of suite of resources based on the *DBMAS Behaviour Management – A Guide to Good Practice: Managing Behavioural and Psychological Symptoms of Dementia.* The App is available at:

CareForDementia on the App Store (apple.com)

CareForDementia - App on Google Play

Future Vision

Within our clinical focus, we are extremely proud to have established a strong, internationally competitive research portfolio. We have influenced clinical policy, especially in the areas of vascular dementia and the neuropsychiatric symptoms of dementia. While Professor Henry Brodaty and Professor Perminder Sachdev have been involved individually in the delivery of clinical care and previously in the conduct of drug trials, this was not done as a CHeBA initiative.

As we look to the future of Alzheimer's disease and other dementias, a strong focus for our future vision is the expansion of our clinical arm to deliver high quality assessment and care for individuals either with dementia or at risk of developing it. A CHeBA Memory Clinic would provide tertiary level consultations for complex cases, cases with early onset dementia, and persons with dementia complicated by neuropsychiatric symptoms.

Such a Clinic would also assess and manage individuals who are at high risk of dementia. Our vision is for the development of the latest biomarkers – including new blood tests, CSF examination and specialised PET imaging, and to have the capacity to administer the latest drugs for the treatment of Alzheimer's disease and other dementias, as well as provide planning strategies across the spectrum of decision-making and behaviour management. We expect that a clinical trials unit would emerge and put CHeBA at the forefront of providing a high-quality clinical service for dementia in Sydney and nationally.

The year ahead will also see a strong focus on the examination of social determinants of health in relation to dementia in Australia from a broad perspective and develop strategies to enhance social well-being in individuals and the population at large so as to improve brain health and delay or prevent dementia.

Genetic Risk for High Blood Pressure Associated with Poorer Cognitive Function

Hypertension impacts over 1 billion individuals worldwide and is the most prevalent risk factor for cognitive decline.

New research led by Dr Matt Lennon found that genetic risk for higher blood pressure even in those in their 40s and 50s may contribute to poorer cognitive function.

Previously, the literature generally indicated that the cognitive effects of high blood pressure were not seen until late in life. This research found that there are subtle but real changes several decades earlier.

However, the relationship of blood pressure with brain function is complex. Those with a genetic predisposition to higher blood pressure had significantly better reaction time, particularly males.

The study suggests that future prevention strategies for cognitive decline may be more targeted and personalised based on an individual's genetic risk for high or low blood pressure, as well as their age and sex. DOI/10.1161/HYPERTENSIONAHA.123.21612

Apathy May Predict Progression to Dementia

A three-year study has shown that apathy increases in Mild Cognitive Impairment and may predict progression to dementia.

The research was conducted across nine memory clinicals across Australia, with 185 patients – all of whom had a diagnosis of Mild Cognitive Impairment.

Mild Cognitive Impairment is considered an intermediate stage between normal ageing and dementia, though not all people progress in their cognitive impairment, and some even revert to normal.

The findings, in combination with other recent research, suggest that apathy is a marker for poor clinical outcomes in older people and across different neurocognitive disorders. The research also indicates the need to distinguish apathy and depression, with depression appearing less closely tied to the progression to dementia. DOI:10.1017/S1041610222001089

CHeBA-led Consortia

By leveraging our international network we can produce more robust statistical models and expedite outcomes in dementia research.

COGNISANCE:

Dr Meredith Gresham, Project Coordinator

Co-designing dementia diagnosis and post-diagnostic care

In 2019 CHeBA commenced an ambitious international project designed to improve clinicians' communication of dementia diagnosis, challenge negative stereotypes about dementia and to stimulate help seeking by patients and families in the first year following a diagnosis of dementia.

The project, led by Professor Henry Brodaty and Dr Meredith Gresham, involved ten universities in five countries – Australia, Canada, Netherlands, Poland and the UK, and formative research began in 2020. Survey results with 309 people across the five countries indicated that internationally, communication of a dementia diagnosis was not reliably delivered in a compassionate and helpful way. Referrals to post-diagnostic supports and services, where available, were not routinely made. Across the five countries few people with dementia (22%) or carers (35%) received a care plan.

To address these findings, each country brought together a diverse group of people; those living with dementia (15 people), family carers (38) and health and social care professionals (42) to co-design a website and social marketing campaign to promote change and provide targeted, practical information and knowledge for each group. Views of the 95 co-designers and five research teams were synthesised into an international brand, 'Forward with Dementia' (FWD). [www.forwardwithdementia.org]

Australia led website content development and provided an evidence-based framework for social marketing campaigns. Each country developed unique campaigns, based on in-depth knowledge of local context. During the 9-month campaign, there were approximately 124,945 page views across all countries' FWD websites. The campaign was evaluated by 544 participants (401 surveys and 143 interviews) and reported engagement across a range of campaign activities, including reading information about receiving and coping with a diagnosis, evidence-based interventions, stories about how people with a dementia diagnosis overcame stigma and found meaningful participation in life activities, and news items. Internationally, over 2,000 people attended webinars and educational events (n=2,076), and over 21,000 printed materials were distributed.

A 'playbook' was produced outlining how to deliver similar campaigns. Evaluation findings indicate that the FWD campaign provides positive support, which is valued by people who have recently received a dementia diagnosis and their family. In addition, the campaign provided health and social care providers with a new source of information and tools to use and share with their clients.

The Forward with Dementia Playbook is to be published and released internationally early in 2024. The Playbook provides guidance for other countries interested in adapting FWD for their population. Alzheimer's Disease International and Alzheimer Europe will be key promoters of the Playbook.

Highlights:

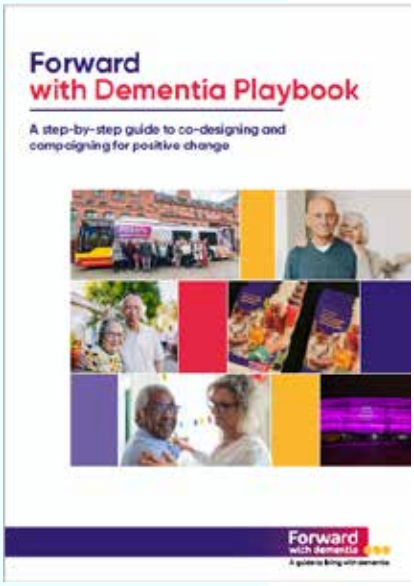
- Blending the science and art of health promotions by using formative research and analysis of local context to underpin work, then applying evidence-based models of co-design, clinical guideline implementation, determination of target audiences and delivery methods to produce positive influence on attitudes and behaviours of medical practitioners, people with dementia and their families.
- Developing new, inclusive and engaging research methods for people with dementia, led by consortium member Associate Professor Lyn Phillipson from University of Wollongong, projective interviewing techniques were developed to assist people with dementia express their thoughts and feelings about diagnosis and support, without the pressure of having to recall their own experiences in detail.
- Using comprehensive user testing to improve principles and guidelines for web engagement by people with dementia and older people in the community. Participants in the Australian evaluation of the website indicated that the site is easy to navigate, practical, and that it maintains a welcome, positive tone related to dementia.

Staff: Professor Henry Brodaty, Dr Meredith Gresham, Nora Wong

Collaborators: Professor Lee-Fay Low, Professor Yun-Hee Jeon (University of Sydney), Associate Professor Lyn Phillipson (University of Wollongong)

International Project Partners: University College London and Newcastle University UK; Maastricht Universit, Netherlands; Wroclaw Medical University, Poland; and McGill University, University of Waterloo and New Brunswick University in Canada

Students: Jacky Zheng, Issra Allam (jointly supervised with University of Sydney)



Forward with dementia

COSMIC

Dr Darren Lipnicki, Study Coordinator

Beginning in 2012, COSMIC (Cohort Studies of Memory in an International Consortium) combines data from population-based longitudinal cohort studies to identify common risk factors for dementia and cognitive decline. There are 55 official member studies, from 39 countries across six continents.

COSMIC has produced 24 publications to date and there are 21 current projects. COSMIC collaborates with international groups, including the Institute for Health Metrics and Evaluation (IHME) at the University of Washington and the Davos Alzheimer's Collaborative (DAC).

COSMIC currently has 54 member studies from 39 nations, including 35 studies from low- and middle-income countries. With its global reach, open sharing of data and diverse network of researchers, COSMIC is creating a truly global epidemiology of dementia that is needed to meet the ambitious goals of the World Health Assembly.

New projects:

1. ENIGMA Clinical Endpoints group: harmonization of cognitive domain scores (Dr Emily Dennis, University of Utah)
2. Neuropsychiatric symptoms and risk of dementia in older adults with ethno-racial diversity (Professor Dae Jong Oh; Sungkyunkwan University School of Medicine, Korea)
3. Impacts of cerebrovascular burden in vascular cognitive impairment across ethnicities: East Asians and Whites (Nikita Husein, CHeBA)
4. Investigating the relationships between polygenic risk scores and dementia and related phenotypes across and within populations of different ancestry (Dr Karen Mather and Dr Anbupalam Thalamuthu, CHeBA).

   This will be the first of many genetic studies proposed by the COSMIC Genetics Working Group, established in 2023.
5. Predicting all-cause dementia risks in low- and middle-income countries using machine learning models (Dr Jiyang Jiang, CHeBA).

Highlights:

- Five more years of funding was awarded by the National Institutes of Health, National Institute on Aging (NIA).
- Five new publications.
- Five new projects started.

Staff: Professor Perminder Sachdev, Dr Darren Lipnicki, Dr John Crawford, Professor Henry Brodaty, Dr Suraj Samtani, Associate Professor Wei Wen, Dr Jiyang Jiang, Dr Nicole Kochan, Jessica Lo, Dr Vibeke Catts, Rory Chen, Dr Karen Mather, Dr Anbupalam Thalamuthu, Dr Ashleigh Vella, Dr Amit Kumar

Students: Dr Matthew Lennon, Annabel Matison, Nikita Keshena Husein, Keshuo Lin

Treating Blood Pressure in Late Life Helps Prevent Dementia

Using the power of big data from CHeBA's COSMIC collaboration, researchers have uncovered that people over the age of 60 who are treated for their high blood pressure have a 26% lower risk of dementia compared to those who are untreated.

The study highlighted that dementia risk was substantially reduced in the treated hypertension group throughout late life. The study is the largest of its kind to date, utilising data from 34,519 individuals across 15 different countries including Australia, USA, Brazil, China, Italy, Central African Republic and Nigeria.

Mid-life hypertension increases risk of all types of dementia by around 60% and Alzheimer's disease by 25%.

Lead author Dr Matthew Lennon said the findings were critical for GPs and family physicians and will have an impact on blood pressure management guidelines.
DOI:10.1001/jamanetworkopen.2023.33353

SHARED

Dr Suraj Samtani, Study Coordinator

Social Health and Reserve in the Dementia Patient Journey (SHARED)

Aims:

1. Examine the variance in cognitive function explained by social health (marital status; social network size; frequency of interactions; social support received and provided; independence in daily functioning; loneliness; quality of relationships), beyond that explained by APOE*4, demographic variables, baseline cognitive function and physical health.
2. Study the trajectory of social health as individuals progress from MCI to dementia (latent growth class analysis).
3. Investigate the pathways that mediate the relationship between social and cognitive health (brain reserve as indicated through MRI, health behaviours, physiological factors, psychological factors) using structural equation modelling.
4. Examine the variance in social health explained by cognitive function, physical health and APOE*4.

Findings:

We published a meta-analysis paper exploring the associations between social connections and risk of mild cognitive impairment, dementia and early mortality in Alzheimer's & Dementia (DOI/10.1002/alz.13072).

We harmonised data from 13 longitudinal ageing studies (12 from COSMIC) with social connection data (N= 36 271). After controlling for known risk factors for dementia, we found that being in a relationship, weekly community engagement, weekly family/friend interactions and never feeling lonely reduced our risk of mild cognitive impairment. At least monthly family/friend interactions and having a confidante reduced our risk of dementia. Living with others, at least yearly community engagement and having a confidante reduced our risk of early mortality. Our results provide specific evidence that can be used by policy makers to advocate for change and health professionals to prescribe social activities for healthy ageing.

Key messages:

- Stay socially, physically and mentally active for healthy ageing.
- Try to see family or friends at least once a month.
- When you're stressed, talk to someone you trust about your feelings.
- Take part in community activities such as volunteering, lawn bowls, cultural meetings and music groups.

Staff: Dr Suraj Samtani, Professor Henry Brodaty, Professor Perminder Sachdev, Gowsaly Mahalingam, Dr Ben Lam, Dr Darren Lipnicki

Other investigators: Contributing COSMIC study leaders and associates, and SHARED consortium associates

STROKOG

Jess Lo, Study Coordinator

Cognitive Function after Stroke

New research led by CHeBA Research Associate Jess Lo, published in *Neurology*, examined the change in cognitive performance shortly after stroke, and whether this predicts long-term cognitive outcomes. DOI/10.1212/WNL.0000000000207281.

STROKOG is an international consortium of longitudinal studies of cognitive disorders following stroke, TIA, or small vessel disease. Led by Professor Perminder Sachdev, it is the first international effort to harmonise work on post-stroke dementia.

Highlights:

1. Three new studies joined STROKOG from countries previously not represented:

- Stroke Registry Study of Taipei Veterans General Hospital from Taiwan
- Risk Assessment of Cnm-Positive Streptococcus mutans in Stroke Survivors (RAMESSES) from Japan
- ICTUS Cog Aragón from Spain

We now have 40 international studies from 21 countries participating in STROKOG.

2. New STROKOG publications published in high impact journals:

We published a paper in *Neurology* titled 'Short-term Trajectories of Poststroke Cognitive Function: A STROKOG Collaboration Study'. The project was led by Jess Lo and we found that cognitive performance at about three months after stroke is a good predictor of long-term cognitive outcome, and that older age, lower levels of education, diabetes, large artery strokes and greater stroke severity are risk factors for lower cognitive performance over the first year. DOI/10.1212/wnl.0000000000207281

Dr Lena Oestreich from the University of Queensland examined the comorbidity and interactions of neurobehavioral syndromes using nine STROKOG studies. Her paper was recently accepted by Psychiatry and Clinical Neurosciences and will be published in 2024.

There are six other ongoing STROKOG projects led by CHeBA researchers and external researchers.

3. Successful in-person and online STROKOG meetings:

Two online meetings were held in November with a total of 21 members from Africa, Asia, Europe and Australia joining us. These meetings were well attended, constructive and helped the team plan for the future of STROKOG.

STROKOG also participated at the VasCog conference held in Gothenburg, Sweden 14–16 September, and presented their work in the session 'International Consortia to address the Global Challenge of VCI'. An in-person STROKOG meeting was also held at the conference, which encouraged greater future engagement and collaboration.

Staff: Professor Perminder Sachdev, Jess Lo, Dr John Crawford, Dr Darren Lipnicki

Longitudinal Studies

The best method to investigate the determinants of healthy ageing is to study cohorts of people over time. Our longitudinal studies have provided many insights into ageing and dementia and are influential internationally.

Maintain Your Brain

Developing effective and scalable strategies to prevent or delay dementia is a priority.

To date, dementia risk reduction interventions have had limited benefit and require in-person visits. Online approaches are more scalable and feasible to deliver at a population level, no multimodal online intervention has yet demonstrated efficacy.

The study aims to reduce cognitive decline with ageing using an online package of interventions delivered intensively for 12 months, followed by monthly boosters for 24 months. The team developed Maintain Your Brain (MYB), an online multidomain lifestyle intervention, comprising 2-to-4 individually tailored modules, targeting physical activity, nutrition, computerised cognitive training and anxiety-depression management, delivered via a custom-built web application.

Our randomised controlled trial conducted over three years aimed to determine if MYB could maintain cognition in community-dwelling dementia-free persons aged 55–77 years.

Of 6,104 participants who completed all baseline assessments and were eligible, 3051 were randomly allocated to active personalised coaching modules (intervention) and 3053 to receive static information-based modules (control).

Both groups improved over three years; the intervention group improved significantly more.

CHeBA has applied for funding to implement Maintain Your Brain nationally.

Staff: Professor Henry Brodaty, Professor Perminder Sachdev, Tiffany Chau, Fleur Harrison, Megan Heffernan, Juan Carlo San Jose

This is the first successful purely online program and demonstrated the greatest benefit yet reported worldwide. MYB is scalable; delivered at a population level, it could delay the onset of dementia by one year, which could reduce the prevalence of dementia by 10% or 5 million people globally.

Older Australian Twins Study

Dr Amanda Selwood, Study Coordinator

In 2023, a total of seven articles were published in scientific journals describing findings made using OATS data, including papers focusing on factors contributing to exceptional longevity and the cognitive health of super-agers; the genetics of metabolism and genetic influences on consumption of fruit and vegetables; as well as genetic and environmental factors contributing to cognitive decline and to brain pathology.

OATS Online Journey 2 was completed in early 2023 by a total of 170 participants, including 12 new participants from NSW, SA, ACT and WA recruited as part of the OATS Online media launch in November 2021. The OATS Online Journey 2 assessments included more detailed questions about traumatic brain injury, sleep apnoea risk, female hormone use, resilience, and social and emotional loneliness; as well as a new telephone assessment for all participants to better estimate their cognitive status. Participants without an informant (a spouse or close relative or friend who know them well) also completed the Self-Rated Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs) by telephone. Once all willing participants had concluded Journey 2 assessments, data was downloaded and all data collected from Baseline through to OATS Online Journey 2 continue to be entered, cleaned and released for analysis through the CHeBA Research Bank.

In 2023, seven applications for access to OATS data from researchers based at CHeBA, UNSW Sydney and at other universities were received and approved. Work has started to refine measures in blood samples that reflect pathology observed in brain scans, including the amyloid PET scans many OATS participants underwent, as well as in postmortem brains donated by research participants.

This year 12 PhD students, one Masters and one Independent Learning medical student, used OATS data in their thesis projects. Completions in 2023 included Dr Jing Du, Dr Abdullah Alqarni, Dr Andrew Affleck, Dr Mary Revelas and Dr Annette Spooner, who submitted their PhD theses; Kathleen Irena who submitted her Masters' thesis; and Arjun Appavoo, who submitted his Independent Learning thesis. Ongoing PhD students include Toyin Abdusalam, Chao Dong, Annabel Matison, Ella Hopkins and Shizuka Hayashi.

Our contribution to the IGEMS (Interplay of Genes and Environment across Multiple Studies) consortium also continued in 2023, with OATS data contributing to a paper describing how environmental factors play a larger role than an individual's genetic code in our ability to remember everyday events as we age. The paper published in the journal *Intelligence* was co-authored by OATS researchers Dr Teresa Lee and Dr Vibeke Catts. DOI/10.1016/j.intell.2023.101759

OATS acknowledges funding from the National Health and Medical Research Council and The Dementia Momentum. OATS also gratefully acknowledges the contribution of Twins Research Australia, who facilitated the initial recruitment of OATS participants. The ongoing

support of OATS' participants, project staff and many collaborators in Australia and worldwide is greatly appreciated.

Staff: Professor Perminder Sachdev, Professor Henry Brodaty, Dr Vibeke Catts, Professor Julian Troller, Dr Karen Mather, Dr Anbupalam Thalamuthu

Dr Teresa Lee, who led the assessment of neuropsychological function (e.g. memory, attention, executive function) in OATS participants, retired from research in 2023. The team thank Dr Lee for her invaluable contribution to the study and wish her all the best for the future.

Students: Toyin Abdusalam, Chao Dong, Annabel Matison, Ella Hopkins, Shizuka Hayashi

Highlights:

- After 16 years of assessment of brain ageing in older twins (65+ years), OATS ceased participant assessments in 2023.
- Data from OATS continues to be accessed by students and researchers within Australia and internationally.
- Work has started to refine measures in blood samples that reflect pathology observed in brain, including MRI scans, amyloid PET scans and in postmortem brains donated by research participants.

Researching Twins to Better Understand Memory Decline

As people age, they often worry about declining memory and other cognitive abilities. This is generally referred to as subjective cognitive complaints (SCC). Previous research has shown that some of these individuals indeed progress to mild cognitive impairment and dementia when followed up over several years; however, the majority do not.

Research led by Dr Amanda Selwood studied over 300 twin pairs from CHeBA's Older Australian Twins Study with the aim of examining the correlations between these complaints and memory ability, and the influence of personality type and mood on these relationships.

The findings indicated that subjective cognitive complaints are moderately heritable – meaning that these complaints are partly influenced by genetic factors. They also found that, when memory performance, mood and personality were factored in, these complaints were linked to memory performance via a genetic pathway and linked to mood via an environmental pathway.
DOI: 10.3233/JAD-221008

Sydney Centenarian Study

The Sydney Centenarian Study (SCS) was launched in 2007, with 445 Sydney residents aged 95 and above recruited, until the study went on hiatus at the end of 2020. The overall aim of SCS is to identify factors that are important to longevity and maintenance of cognitive, physical and mental health. The study now has had at least 265 participants who have reached 100 years or older, including one super-centenarian who reached 110 years of age. Some of our participants completed six research assessments over the course of three and a half years.

In 2023, three articles were published in scientific journals describing findings made using SCS data. These have included papers focusing on factors contributing to exceptional longevity and the cognitive health of super-agers; and brain compensation as an explanation for how individuals in extreme old age maintain normal cognitive functioning.

Throughout this year, applications for access to SCS data from researchers based at CHeBA, UNSW Sydney and at other universities were received and approved. Collaborative work with Swedish researchers has started to measure candidate blood biomarkers of dementia that reflect pathology observed in brain MRI scans, as well as in post-mortem brains donated by SCS participants. Work on examining the prevalence, risk and protective factors for dementia in the SCS cohort, as well as cognitive decline over time, is also ongoing.

There was continuing high community interest in centenarians in 2023. SCS was represented by Professor Perminder Sachdev, as well as former participant, 98-year-old Patricia Segal, as part of a panel of experts on ageing at the event "How to grow old well and try not to die", held as part of Vivid Sydney 2023.

Dr Karen Mather gave a presentation on centenarians as models of healthy ageing to the War Memorial Hospital Health Promotion Group, Sydney.

Dr Mather also detailed her research on the epigenetic factors linked to longevity at the Australian GeneMappers Conference in Hobart and at the Garvan Institute of Medical Research in Sydney.

Our contribution to the International Centenarian Consortium of Dementia (ICC-Dementia) also continued in 2023, with SCS data contributing to a world-first study looking at the global prevalence of dementia in the exceptionally old. The paper, published in the journal *Alzheimer's & Dementia*, harmonised data from 4,427 participants from 18 studies. DOI/10.1002/alz.12828

In 2023, four PhD students used SCS data in their thesis projects. Completions in 2023 included Dr Mary Revelas and Dr Andrew

Affleck, who submitted their PhD theses. Dr Revelas received the Deans Award for an Outstanding PhD Thesis for her work on the genetics of exceptional longevity. Ongoing PhD students include Chao Dong and geriatrician Dr Alice Powell, who commenced an exciting new project on cognitive "super-ageing".

Highlights

1. Data on the prevalence of dementia in centenarians and near centenarians from 18 studies in 11 countries were published, providing for the first time a picture of dementia at the extreme end of life across the globe.
2. Two PhD students using data from the Sydney Centenarian Study completed their candidatures, one of whom received the Deans Award for Outstanding PhD Thesis.
3. Work has started to measure blood biomarkers of dementia that reflect pathology observed in brains of Sydney Centenarian Study participants, among other CHeBA cohorts.

Staff: Professor Perminder Sachdev, Professor Henry Brodaty, Fleur Harrison, Dr Karen Mather, Dr Vibeke Catts, Associate Professor Wei Wen, Dr Nicole Kochan, Dr John Crawford, Dr Anbupalam Thalamuthu, Dr Jiyang Jiang

Super-ageing: defining exceptional cognitive ability in late-life

Research led by Dr Alice Powell on how 'super-ageing' is defined could ultimately inform strategies to help prevent the development of dementia.

Super-agers have been shown to have healthier lifestyles, and, from a genetic standpoint, lower rates of the protein associated with Alzheimer's disease. Currently, there is not a consistent approach to measuring cognitive super-ageing. Most studies consider super-ageing based on memory performance that is equivalent or comparable to that of a younger adult range, but very few examine other aspects of cognition or the maintenance of high-level abilities over time.

The review, published in the *International Journal of Geriatric Psychiatry,* showed that discrepancies in the definition of a 'super-ager' need to be addressed, in order to increase the value of research insights gained from studying this extraordinary population. DOI/10.1002/gps.6034

MAS2 Team - Dr Amanda Selwood, Professor Henry Brodaty, Tiffany Chau, Dr Katya Numbers

Sydney Memory & Ageing Study

In 2023, the Memory and Ageing Study team initiated a significant new phase with the introduction of the Memory and Ageing Study – Part 2 (MAS2). This development was a testament to the success and impact of the original Memory and Ageing Study (MAS1), which was conducted from 2005 until the end of 2020. MAS1, renowned as one of Australia's most extensive and enduring single cohort studies on ageing, achieved global acclaim for its detailed data collection spanning nearly 15 years. This ground-breaking research provided invaluable insights into the multifaceted nature of brain ageing, encompassing sociodemographic, clinical, neuropsychological, neuroimaging, biochemical, genetic and proteomic factors. To date, MAS1 data has been published in 211 articles in top scientific journals and has contributed to over 40 PhD Theses, 13 of which were published in 2023.

Our contribution to the COSMIC (Cohort Studies of Memory in an International Consortium) consortium continued in 2023, with MAS1 data contributing to two papers published by COSMIC researchers and co-authored by MAS1 researchers Professor Henry Brodaty, Professor Perminder Sachdev, Dr Darren Lipnicki and Dr Katya Numbers. In 2023, MAS1 data was the foundation for a successful UNSW Faculty of Medicine Collaborative Grant Scheme application looking at the relationship between hearing and cardiovascular health. This application was led by early career researcher, Dr Isabella Tan from the George Institute, who was joined by MAS team members Professor Henry Brodaty and Dr Katya Numbers as co-investigators. This project highlights the ongoing successful collaborations between CHeBA and leading research institutions facilitated by MAS1 data. Finally, in 2023, MAS1 data was presented as a talk by MAS team

member Dr Katya Numbers, as part of a Featured Research Session (FRS) at the prestigious Alzheimer's Association International Conference (AAIC), the world's largest forum for the dementia research community.

The goal for MAS2 in 2024 is to build upon and broaden the foundational discoveries of MAS1. Equipped with a new cohort and cutting-edge methodologies, MAS2 is set to investigate new questions and hypotheses. This ambitious project is supported by a significant NHMRC grant exceeding $3.3 million and will play a critical role in deciphering the complexities of cognitive health, as it evolves across different generations. The experiences of each generation shape their cognitive, physical, psychological and social wellbeing in distinct ways. Although there have been improvements in education, healthcare and employment, the overall impact on cognitive and physical health in later life remains unclear. MAS2 seeks to explore how various lifestyle factors influence cognitive health and dementia risk, considering the potential generational shifts in these factors. Understanding the determinants of good health and quality of life, along with the risk factors for poor health, is essential for devising effective health services and preventative strategies.

Highlights

- Contributed data to 13 articles published in top scientific journals, including two COSMIC consortium papers.
- Data formed the foundation for a successful UNSW Faculty of Medicine Collaborative Grant Scheme application between the George Institute and CHeBA.
- Data presented as part of a Featured Research Session at AAIC 2023, the world's largest and most prestigious Alzheimer's and dementia conference.

Staff: Professor Henry Brodaty, Professor Perminder Sachdev, Dr Nicole Kochan, Associate Professor Wei Wen, Dr Karen Mather, Dr John Crawford, Dr Ben Lam, Dr Katya Numbers, Dr Vibeke Catts

PhD Students: Abdullah Alqarni, Dr Alice Powell, Annabel Matison, Choa "Catherine" Dong, Fatemeh Khorshidi, Fleur Harrison, Gurjeet Kaur Virk, Dr Jing Du, Dr Mary Revelas, Dr Matthew Lennon, Mohammad Alghamdi, Nithin Manchery, Premilla Chinnappa-Quinn, Dr Russell Chander, Shizuka Hayashi, Sophie Chen, Dr Tharusha Jayasena, Toyin Abdulsalam, Zara Page, Zixuan Yang

Honours Students: Jason Chen, Mansimran Loyal

Students, Achievements & Awards

PhD Completions

Dr Andrew Affleck

Effects of anti-hypertensive medications on Alzheimer and cerebrovascular disease brain pathology

Supervisor: Professor Perminder Sachdev

Dr Jing Du

Investigation of cerebrovascular burden using neuroimaging techniques in ageing brains

Jing also received a UIPA (University International Postgraduate Award) for her PhD

Supervisors: Associate Professor Wei Wen and Dr Jiyang Jiang

Dr Rebecca Koncz

The relative genetic and environmental contributions to amyloid deposition in the brains of older adults: amyloid imaging using the twin design

Supervisor: Professor Perminder Sachdev

Dr Mary Revelas

The genetics of exceptional longevity and successful ageing

Supervisor: Dr Karen Mather

Dr Annette Spooner

Early detection of Alzheimer's disease using machine learning

Supervisors: Professor Arcot Sowmya (School of Computer Science & Engineering) and Professor Perminder Sachdev

Dr Abdullah Alqarni

Sex differences in risk factors for white matter hyperintensities in non-demented older individuals

Supervisor: Associate Professor Wei Wen

Other Student Achievements

Dr Matthew Lennon

High achieving Dr Matthew Lennon took home the 2023 UNSW Psychiatry McConaghy Prize for best presentation.

His expert delivery covered his research with CHeBA's COSMIC consortium – an international collaboration which is determining what risk factors for Alzheimer's disease and dementia are common in all human populations across the globe.

Dr Mary Revelas

Dr Mary Revelas received the prestigious Dean's Award for outstanding PhD theses, which explored important genetic and epigenetic factors of exceptional longevity.

CHeBA Publication Awards

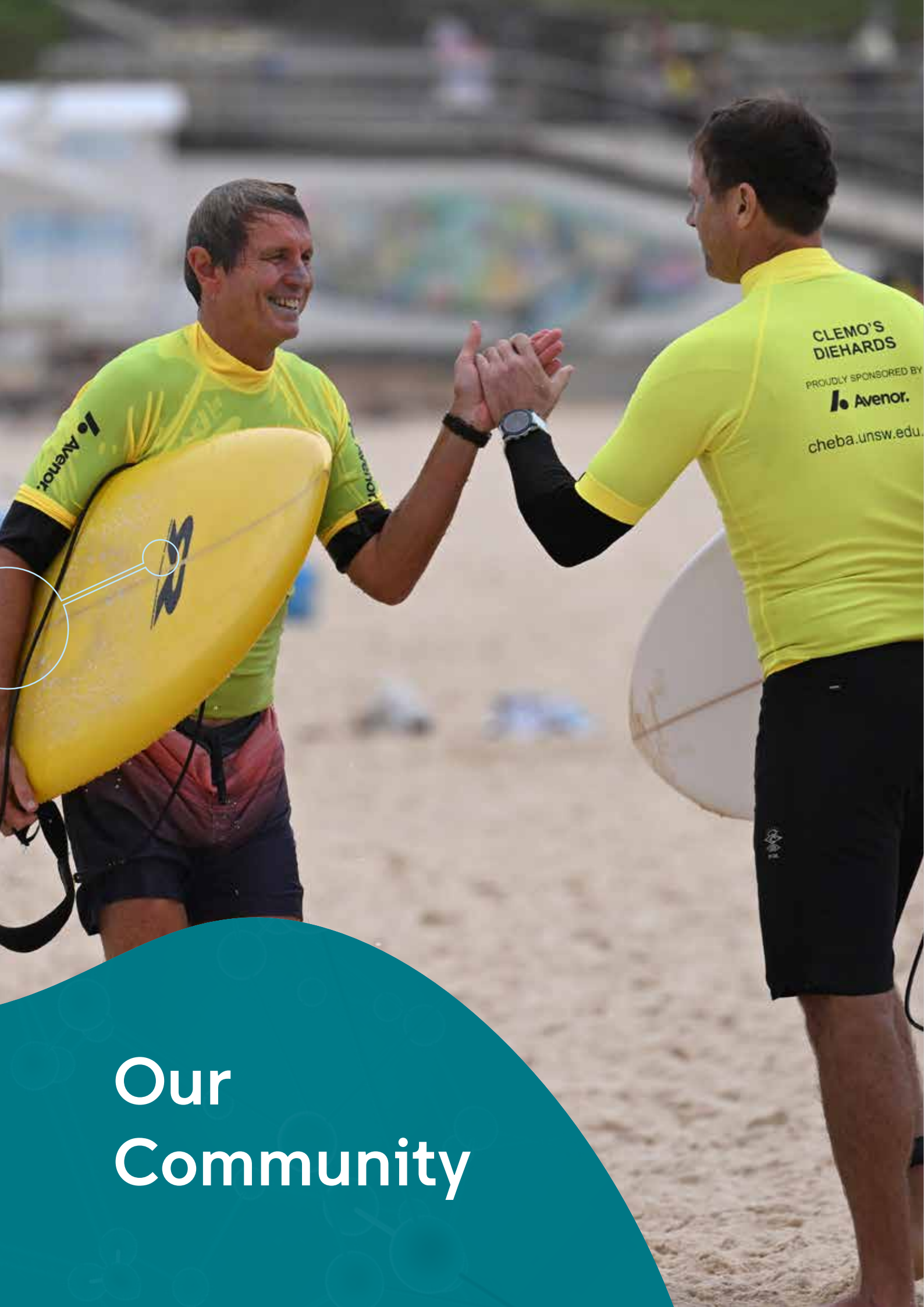
The CHeBA Publication Awards aim to recognise excellent performance, quality research and outstanding papers within our team.

Student: Dr Matthew Lennon

Lennon et al. Use of Antihypertensives, Blood Pressure and Estimated Risk of Dementia in Late-Life: An individual participant data meta-analysis. *JAMA Network Open* 2023, 6(9):e2333353. DOI:10.1001/jamanetworkopen.2023.33353 [epub 2023 Sep 21]

Early Career Research: Dr Claire Burley

Burley et al. Views of people living with dementia and their families/ care partners: helpful and unhelpful responses to behavioral changes. *International Psychogeriatrics* 2023, 35:2, 77-93. DOI:10.1017/S1041610222000849 [epub 2022 Nov 4]



Our Community

The incredible support from the CHeBA community provides an inspiration to our researchers to create a lasting impact in the fight against dementia.

Sydney Marathon

On 17 September 2023, 37 runners and walkers from five corporate teams, participated in the Sydney Marathon raising over $25,000 for CHeBA, while promoting the benefits of physical activity to reduce risk of dementia.

Battling a hot Sydney spring day, participants were involved in all distances including the 3km, 10km, half marathon and full marathon. CHeBA Ambassador PJ Lane ran his first ever marathon and led the charge as highest individual fundraiser with nearly $10,000 raised for research.

Senior executives from Henry William Lawyers, Luna Partners, Integrated Portfolio Solutions and Leftfield Group each committed teams, taking an extraordinary lead on corporate social responsibility to enact positive change in healthy ageing.

CHeBA Ambassador PJ Lane joins The Morning Show to talk about his mission to raise money and awareness of dementia by competing in the Sydney Marathon.

Henry William Laywers Director Nick Noonan featured in the Australian Financial Review covering the loss of his father, rugby great Bill Noonan, to Alzheimer's.

Wipeout Dementia

Wipeout Dementia was held on 24 March 2023, with 56 surfers from the property industry raising over $224,000 for The Dementia Momentum. The event was supported by sponsors Morgans Financial, Avenor, AWM, Buildcorp, Novm, SHAPE Australia, Sense Projects and Winten Property Group.

Senior executives and supporters from 37 companies across the property industry came together with event Ambassador 1978 World Surfing Champion Wayne "Rabbit" Bartholomew AM for the surf-off event on Sydney's Bondi Beach.

The event concluded with an awards ceremony to celebrate the achievements of Wipeout Dementia participants and supporters. The 'Gnarly Award', a Mark Richards retro pro surfboard was awarded to highest individual fundraiser Michael Gordon, General Manager of Buildcorp Interiors, who was also the recipient of this prestigious award in 2022. Gordon personally raised over $36,000.

Gordon's Buildcorp sponsored team, Gordo's Grovelers, were once again the highest fundraising team of the event – with the group raising over $63,000 for critical research led by CHeBA.

The other top individual fundraisers in this round, each raising over $10,000 and taking home a competition DHD surfboard were Mark Gross from Morgans, and Anthony Lombardo and Matthew Faddy, both from Avenor.

Avenor Director Peter Clemesha led his team, defending champions Clemo's Diehards, to retain the Surf Off Championship as well as the Battle Royale, an event which sees all competitors hit the surf at once, with each team aiming to surf the highest number of waves in 15 minutes of surfing rivalry.

WIPEOUT DEMENTIA
CENTRE FOR HEALTHY BRAIN AGEING

Congratulations to Mike Gordon for taking home the highest individual fundraising award and leading his team to fundraising victory for the second year.

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WIPEOUT
DEMENTIA


WIPEOUT
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Donor Highlights

In-Kind Partnership

Aria Event 2023

This year we were fortunate to have Aria Restaurant Sydney once again generously host an exclusive event to acknowledge the individuals who have made significant contributions to The Dementia Momentum initiative. Aria has partnered with CHeBA since 2014, and this year's event provided the official launch of a new national study investigating generational change in brain health, including incidence of dementia. Guest speaker was CEO of HammondCare and former Premier of NSW, Mike Baird, with Professor Henry Brodaty giving a keynote address and PJ Lane Master of Ceremonies.

Philanthropic Support

Over the last decade, the field of ageing and dementia research has become increasingly competitive, making philanthropic support a key factor in the enhancements to our research. In 2023, we were fortunate to receive the enduring support of the Sachdev Foundation, the Howarth Foundation and the Mostyn Family Foundation.

Professor Henry Brodaty, CEO of HammondCare Mike Baird and CHeBA Ambassador PJ Lane

The Sachdev Foundation

With the generous support of the Sachdev Foundation, and additional funding from the NHMRC Centre for Research Excellence for Vascular Cognitive disorders and a grant from the National Institute of Health, USA, we have been able to commence measuring specific blood proteins as biomarkers to support the diagnosis of Alzheimer's disease and Vascular dementia, both at the predementia stages.

Two major projects are being supported by the Sachdev Foundation, namely: '***Retinal biomarkers in Alzheimer's disease and Vascular Dementia***' and '***Blood Biomarkers for Alzheimer's disease and Blood Biomarkers for Vascular Cognitive Impairment***.'

We are extremely grateful to the Sachdev Foundation, who has supported CHeBA since 2014.

The Howarth Foundation

This year, a significant donation from the Howarth Foundation has wielded a profound impact on our Centre. Unrestricted philanthropic support allows for the expansion of our expert team and the seeding of new and innovative ideas that can be developed sufficiently to become competitive in major grants schemes. We extend our enormous thanks to the Howarth Foundation for their continued sharing of our vision - a future in which all Australians enjoy healthy ageing.

The Mostyn Family Foundation

The worldwide population of peopled aged 100 years and over has increased dramatically over the past few decades and is forecast to reach 2.2 million by mid-century. The study of centenarians is therefore of much interest for identifying the determinants of successful ageing. Support from the Mostyn Family Foundation is allowing us to look at the gut microbiome of centenarians from CHeBA's Sydney Centenarian Study, and how it is mediated by modifiable lifestyle factors including diet and exercise. The rationale for this project, *'The Diet Gut Microbiome and Exceptional Ageing'* stems from recent observations that the gut microbiome possibly plays a major role in ageing.

In 2023, the Mostyn Family Foundation also supported a second project examining the blood-brain barrier in older individuals who are either cognitively normal or have subtle impairments but do not have dementia. This project, *'Blood Brain Barrier and Integrity in the Ageing Brain'* is helping us determine whether breakdown in the BBB at the predementia stage may be a triggering factor in the development of Alzheimer's disease and/or Vascular Dementia.

The Brain Dialogues

CHeBA's blog continued to have a strong readership throughout 2023. The Brain Dialogues covers a range of topics surrounding brain health, research, sociocultural issues and donor impact. Here is an excerpt from two of 2023's most popular articles.

Mrs Patricia Segal

The Keys to Growing Old Well

Across the globe, people are fascinated and intrigued by centenarians – the group of incredible human beings that defy the odds and live to 100 and beyond. Over the last 20 years, the number of Australians who were living to over 85 years of age has risen by 110%; an extraordinary increase and begs the question as to whether this trajectory will continue.

Sydney near-centenarian Mrs Patricia Segal is the hallmark of positive ageing. She is a participant in CHeBA's Sydney Centenarian Study which explores the genetic and environmental determinants of extreme longevity.

Patricia is independent and lives in her own home. She considers herself a consistently happy person, enjoys seeing the lighter side of life and cooks her own meals.

Patricia is also a very talented artist; a hobby she only took up in her 90s and something she has become very passionate about.

Co-Director of CHeBA, Professor Perminder Sachdev, says that older Australians are the fastest growing proportion of our population. According to the Australian Bureau of Statistics, it is expected that there will be 50,000 centenarians by 2050 – a growth from just 4,279 in 2015.

Dr Rebecca Koncz

PhD Students Excel at CHeBA

The breadth of research groups and studies at CHeBA make it a leader in the global epidemiology of dementia, with the data available making the Centre a rich resource for not just researchers, but also students.

According to the Co-Directors of CHeBA, Professor Perminder Sachdev and Professor Henry Brodaty, the calibre of students the Centre has supported has been outstanding.

Recent PhD graduate, Dr Rebecca Koncz, is no exception. Dr Koncz led a world first study using data from CHeBA's long-standing Older Australian Twins Study, using a brain imaging technique called amyloid PET.

"Apart from guiding the content and direction of the thesis, the incisive feedback I received during my supervision sessions provided a guiding light throughout the PhD and beyond to shape my career"
Dr Rebecca Koncz

β-amyloid plaque build-up is a hallmark feature of Alzheimer's disease, which is the leading cause of dementia worldwide. Dr Koncz's thesis aimed to determine: 1) what proportion of amyloid burden is attributable to genes, and what proportion is determined by environmental, or modifiable, risk factors; 2) whether the presence of cerebral small vessel disease or vascular risk factors such as high blood pressure, high cholesterol or diabetes influence the build-up of β-amyloid; and 3) the role of genetics in the relationship between β-amyloid, cerebral small vessel disease and cognitive function.

Looking to the future, Dr Koncz hopes to be a positive example for the next generation of clinician scientists.

CHeBA Change Maker - Marina Oliveira

Marina Oliveira, Development Coordinator at UNSW Medicine & Health, joined the CHeBA Change Makers – Next Gen Philanthropy program in April. Change Makers are an exclusive group of next generation philanthropists who are supporting critical research into Alzheimer's disease and other dementias for a brighter future in ageing. Whilst Marina acknowledges she is not a doctor or researcher, she hopes her donations will contribute towards a potential breakthrough. For Marina, one of the most heart-wrenching aspects of dementia is that the individual you care for may be physically present but unable to recall the life they once shared with you. She is passionate about supporting research that will improve outcomes for dementia patients in the future.

CHeBA in the Media

In 2023 we continued to have CHeBA's research publicised Australia-wide across many reputable media outlets. A significant highlight included coverage of the launch of the Sydney Memory and Ageing Study 2 in print and on multiple television news broadcasts nationally.

Resident social health expert, Dr Suraj Samtani, received much media outreach for his research linking social interaction to lower dementia risk, and his perspective paper covering dementia not just being about memory loss was shared widely.

Dr Matt Lennon's research looking at lowering blood pressure to reduce risk of dementia was covered extensively, including on national news.

In addition to specific study outcomes, CHeBA's researchers continue to be sought regularly for expert comment on radio, in print and on television.

CHeBA Visiting Lecture Series

Professor Carol Brayne

Professor Jaime Miranda and Professor Perminder Sachdev

Professor Carol Brayne

On 15 February 2023, Professor Carol Brayne CBE, Professor of Public Health Medicine and Co-Director of Cambridge Public Health Interdisciplinary Centre at the University of Cambridge, presented *Reflections on long term population studies and their contribution to our understanding of brain health.*

Professor Jaime Miranda

On 9 November 2023, Professor Jaime Miranda, Head of the University of Sydney's School of Public Health, presented *Dealing with global inequity in dementia prevention research: lessons for low- and middle-income countries,* bringing his extraordinary international experience to the audience at CHeBA. This webinar is available for viewing on the CHeBA website.

Public Forums

Better Brains, Better Bodies, Better Ageing

More than 500 seniors filled the auditorium at The Juniors in Kingsford to discover the intrinsic links between their brains, bodies and better ageing. The annual event held on 25 October, was hosted by South Eastern Sydney Local Health District's Older Persons' Mental Health Service, in partnership with Randwick City Council and CHeBA.

With people over the age of 65 now outnumbering people under the age of 15, the theme of this year's public event was Better Brains, Better Bodies, Better Ageing, which boasted a series of expert speakers in the field of purposeful ageing, including Honorary Medical Officer of the Older Persons' Mental Health Service, Prince of Wales Hospital and Co-Director of CHeBA Professor Henry Brodaty, CHeBA Post-doctoral Research Fellow and advocate for anti-ageism Dr Katya Numbers, leader in the support of mental health from The Black Dog Institute Dr Sanderson Onie, and expert in the study of falls and Senior Principal Research Scientist at NeuRA, Professor Kim Delbaere.

Professor Brodaty, author of over 60 books or book chapters and over 800 refereed journal articles, and a leader in prevention of dementia, said at the forum "that over 40-50% of the risk for dementia can be attributed to risk factors that we can all do something about such as exercising, eat healthily, keeping mentally and socially active, managing high blood pressure, and, if hearing is declining, wearing hearing aids".

Tackling Ageism

On 18 May 2023, anti-ageism advocate Dr Katya Numbers joined a team of UNSW Sydney experts at the 'Ageism in Society' event, where they explored the impact of ageism and age discrimination in society and showcased a number of initiatives that are dedicated to tackling ageism head on.

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Ageing Futures Institute, UNSW Sydney

Australian Catholic University, Sydney

Australasian Research Institute, Sydney Adventist Hospital

Bankstown-Lidcombe Hospital

Bioanalytical Mass Spectrometry Facility, Mark Wainwright Analytical Centre, UNSW Sydney

Black Dog Institute

Centre of Excellence in Population Ageing Research (CEPAR), UNSW Sydney

Clinical Research Unit for Anxiety and Depression (CRUfAD), UNSW Sydney

Garvan Institute of Medical Research

Geriatric Medicine, Prince of Wales Hospital

Macquarie University

National Drug & Alcohol Research Centre (NDARC), UNSW Sydney

Neuropsychiatric Institute (NPI), Prince of Wales Hospital

Neuroscience Research Australia (NeuRA)

NSW Health (Older People's Mental Health OPMH)

School of Biotechnology and Biomolecular Sciences (BABS), UNSW Sydney

School of Biomedical Sciences, UNSW Sydney

School of Psychology, UNSW Sydney

St George Clinical School (The Microbiome Research Centre), UNSW Sydney

St Vincent's Centre for Applied Medical Research

St Vincent's Hospital

Sydney Academic Department for Old Age Psychiatry (ADFOAP), Prince of Wales Hospital

The George Institute, UNSW Sydney

University of Newcastle

University of Notre Dame Australia

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War Memorial Hospital

Western Sydney University (WSU)

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National Center for Geriatrics and Gerontology, Japan

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University of Bangor, India

University of Macau, Macau

Universiti Kebangsaan, Malaysia

Universiti Putra Malaysia, Malaysia

University of Auckland, New Zealand

University of Waikato, New Zealand

St. Luke's Medical Center, Philippines

Department of Neuropsychiatry, Gyeonggi Provincial Hospital for the Elderly, Republic of Korea

Hallym University, Republic of Korea

Korean National Institute of Dementia (KNID), Republic of Korea

Seoul National University, Republic of Korea

Changi General Hospital, Singapore

National Neuroscience Institute, Singapore

National University, Singapore

National University Health System, Singapore

Institut de Recherche pour le Développement (IRD), Tahiti, French Polynesia

Institut Louis Malardé, Tahiti, French Polynesia

Taipei Veterans General Hospital, Taiwan

Mahidol University, Thailand

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Heinrich Heine University (Neuroscience Network Dusseldorf), Germany

Helmholtz Association (German Center for Neurodegenerative Diseases - DZNE)

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University of Udine, Italy

University of Malta, Malta

Jagiellonian University, Poland

Medical University of Silesia, Poland

University of Porto, Portugal

Wroclaw Medical University, Poland

Biocruces Health Research Institute, Spain

Universidad Miguel Hernandez de Elche, Spain

University of Alicante, Spain

University of Valencia, Spain

University of Zaragoza, Spain

Karolinska Institutet, Sweden

Lund University, Sweden

University of Gothenburg, Sweden

University of Lausanne, Switzerland

Erasmus University Rotterdaam (Erasmus University Medical Center), The Netherlands

Leiden University, The Netherlands

Maastricht University, The Netherlands

Radboud University Nijmegan (Radboud University Medical Center), The Netherlands

University of Groningen, The Netherlands

University of Utrecht, The Netherlands

VU University, The Netherlands

Faroese Hospital System (Dept of Occupational Medicine & Public Health), Faroe Islands, Denmark

Southern Denmark University, Denmark

Jönköping University, Sweden

UK

Cambridge University, England

Dementias Platform UK, University of Oxford, England

King's College London, England

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CHeBA Consortia Collaborations

In addition to the CHeBA-led consortia (COSMIC, ICC-Dementia, STROKOG, COGNISANCE and SHARED), CHeBA is a member of the following:

- BRAIN-MEND (Biological Resource Analysis to Identify New Mechanisms and phenotypes in Neurodegenerative Diseases);
- BRIDGET (Brain Imaging, Cognition, Dementia and Next Generation Genomics: a Transdisciplinary Approach to Search for Risk and Protective Factors of Neuro-degenerative Disease);
- CHARGE (Cohorts for Heart and Aging Research in Genetic Epidemiology);
- DIAN (Dominantly Inherited Alzheimer Network);
- EADB (European Alzheimer's Disease DNA BioBank);
- ENIGMA (Enhancing Neuro Imaging Genetics through Meta-Analysis);
- FORCE (Fatty Acids and Outcomes Research Consortium);
- IALSA (Integrative Analysis of Longitudinal Studies on Aging and Dementia);
- IGEMS (Interplay of Genes and Environment across Multiple Studies);
- UNITED (Uncovering Neurodegenerative Insights Through Ethnic Diversity)

Projects

Current Projects

A 'culturally tailored iSupport model' for carers of people with dementia

CHeBA Staff: Henry Brodaty

Other Investigators: Non-CHeBA Staff (all from Flinders University except as indicated): Lily Xiao (lead), Julie Ratcliffe, Shahid Ullah, Bianca Brijnath (National Ageing Research Institute), Hui-Chen Chang (University of Wollongong)

Aims: To adapt for online delivery the WHO iSupport program for carers of people living with dementia for Chinese family carers in mainland China, Hong Kong, Macau, Taiwan and Australia, and to evaluate its efficacy. Filial piety, collectivism culture, spirituality and religiosity held by carers from culturally and linguistically diverse (CALD) groups motivate them to care for family members living with dementia. Carers from CALD communities receive little support in how to help their loved ones living with dementia.

This study includes four specific aims: 1) Co-design strategies and co-create resources to implement the iSupport model (aim 1); 2) determine the intervention effectiveness (aim 2) and implementation strategies (aim 3) and the intervention cost-effectiveness (aim 4). These aims align with this TCR grant objectives as it will develop an evidence-based model of dementia care to accommodate the preferences and needs of people with dementia and their carers.

Findings: The online version has been developed and field tested and delivered to target populations in hundreds of Chinese-speaking carers in countries/regions mentioned above and in Australia. By the end of 2023, over 600 carers had been recruited across all sites. Evaluation is in progress.

A simple risk model for the prediction of post-stroke dementia

CHeBA staff: Jessica Lo, Perminder Sachdev, John Crawford, Darren Lipnicki

Other investigators: STROKOG collaborators

Aims: To develop and validate a simple model to predict the risk of post-stroke dementia in the stroke population from multiple ethno-regional groups in a clinical setting. Such tools can help identify stroke survivors likely to develop dementia and can enable early interventions to retard disease progression and reduce hospitalisation.

Findings: The project proposal was approved in November 2023. Data request is continuing.

Funding: NHMRC

Anthocyanins to improve cognitive function

CHeBA staff: Henry Brodaty, Karina Chan

Other investigators: Karen Charlton (lead, University of Wollongong), Kaarin Anstey (UNSW), Steven Roodenrys (UoW), Katrina Weston-Green (UoW), Katherine Kent (UoW), Jan Potter (UoW), Jacqueline Street (UoW), Vinicius Do Rosario (UoW)

Aims: To conduct a multi-centre randomised, blinded, parallel arm clinical trial to identify:

1. the ability of dietary anthocyanins vs controls to prevent progressive loss of cognitive capacity and memory in older adults with amnestic mild cognitive impairment;
2. the mechanisms by which anthocyanins exert their beneficial effects;
3. whether lasting changes are evident 3 and 6 months post-intervention.

Findings: Recruitment for the trial is in progress; 6 months follow-up will conclude in July 2024. By the end of 2023, 105 participants (37 from UNSW, 68 from UoW) have been randomised to one of three groups: eating 'purple foods' rich in anthocyanins, taking an anthocyanin-rich supplement, or taking a purple coloured placebo supplement.

Apathy in older community-dwelling persons: improving assessment, investigating its association with immune markers, differentiating from depression and fatigue and modelling its longitudinal course

CHeBA staff: Fleur Harrison (PhD Candidate), Henry Brodaty, Julian Trollor

Other investigators: Moyra Mortby (NeurRA/UNSW), Adam Guastella (USyd), Andrew Lloyd (UNSW)

Aims:

- To psychometrically evaluate the validity and appropriateness of available assessment tools for apathy in community-dwelling older people, where they have not been sufficiently evaluated;
- To investigate the differential associations of a range of inflammatory biomarkers with apathy, fatigue and depression;
- To model longitudinal pathways of apathy, fatigue and depression, and determine the risk associated with these symptoms for dementia and mortality outcomes.

Findings: This work comprises a number of sub-projects, using data from the Sydney Memory and Ageing Study. In 2023, findings of the first sub-project, on health behaviours, were published (Harrison et al., Alzheimer's & Dementia: Diagnosis, Assessment and Disease Monitoring). Results suggested that apathy is a determinant of multiple health behaviours in older adults, distinct from depression and fatigue. Apathy may be a target for health promotion activities, including interventions for dementia risk reduction.

Work on other sub-projects also continued during 2023. In particular, the analyses and draft manuscript for the second sub-project, on risk for dementia and mortality, were prepared. Findings did not indicate apathy was a risk factor for dementia but provided evidence for a strong association between apathy and subsequent mortality, over more than 15 years of follow-up of the Sydney Memory and Ageing Study cohort.

Funding: Dementia Australia Research Foundation, Dementia Collaborative Research Centre Half-Funded PhD Scholarship, co-funded by CHeBA, Brain Sciences UNSW, Josh Woolfson Memorial Scholarship, Kwan Fung and Yuet Ying Fung Healthy Brain Ageing Research Award Fund

Associations of multimorbidity of cardiometabolic conditions with cognitive decline and dementia

CHeBA staff: Darren Lipnicki, Perminder Sachdev

Other investigators: Xin Xu, Xiaolin Xu, Xuhao Zhao, Yaguan Zhou (Zhejiang University), investigators from contributing COSMIC studies

Aims: To examine the impact of different cardiometabolic multimorbidity profiles on (1) specific longitudinal cognitive trajectory patterns identified by group-based trajectory modeling (GBTM); (2) longitudinal cognitive decline (both global and domain-specific); and (3) incident cognitive decline. Cardiometabolic profile groups will be based on number of CMCs, and determined via the associations of particular CMCs with the cognitive outcomes.

Findings: Manuscript submitted to The Lancet Psychiatry.

Funding: NIH

BRIDGET Consortium: Brain imaging, cognition, dementia and next generation genomics: a transdisciplinary approach to search for risk and protective factors of neuro-degenerative disease

CHeBA staff: Perminder Sachdev, Karen Mather, Wei Wen, Anbupalam Thalamuthu

Other investigators: Dr Nicola Armstrong (Curtin University) (CHeBA Hon. Research Fellow), BRIDGET Consortium members

Aims:

1. Identify rare and common genetic variants and DNA methylation loci influencing brain structure in older adults;
2. Explore the determinants of brain ageing from a life-course perspective, including genomic, epigenomic and environmental factors;
3. Examine whether identified genes predict decline in memory performance and an increased risk of Alzheimer's disease.

Findings: This work comprises a number of ongoing collaborative genetic and epigenetic projects, with a current focus on neuroimaging traits. Analyses have been undertaken to identify genetic variants associated with brain perivascular spaces that are a marker of cerebral small vessel disease. In a large collaborative genetics study, examining data from over 40,000 participants, 24 genetic risk loci were identified for perivascular spaces. These results suggested membrane transport and the extracellular matrix may play a role in the biology of perivascular spaces and cerebral small vessel disease (Duperron et al., 2023, Nature Medicine, DOI/10.1038/s41591-023-02269-9).

Funding: NHMRC National Institute for Dementia Research (NNIDR) (administered by CHeBA, UNSW), European Union Joint Programme for Neurodegenerative Disease (not administered by CHeBA)

CELPI: a randomised trial of a carer end of life planning intervention in people with dementia

CHeBA staff: Lynn Chenoweth

Other investigators: A/Prof Glenn Arendts (UWA), Prof Christopher Etherton-Beer (UWA), A/Prof Barbara Hayes (Monash University), A/Prof Katrina Spilsbury (UNDA), Prof Meera Agar (UTS), Prof Kirsten Howard (USyd)

Aim: Test a Carer End of Life Planning Intervention (CELPI) co-designed by clinicians, content specialists and consumers to improve access to end of life care for older people with severe dementia (FAST 6d-7e), using an ED visit as a catalyst for recognising unmet needs and specialist palliative care referral where indicated.

Methodology: A randomised controlled trial (RCT) of CELPI model of person-centred ED discharge support to family carers and people living with advanced dementia. Random allocation of family carers and people living with dementia 'dyads' (N=440) to CELPI model versus usual post-discharge care, at six EDs Perth (n=2), Melbourne (n=2) and Sydney (n=2).

Primary outcome: Proportion of participants dying in their carer-nominated preferred location for death within 12 months of enrolment.

Secondary outcomes: Changes in carer (proxy) reported and self-ratings of quality of life (QUALID); comorbidities (Charlson Comorbidity Index); symptoms (Karnofsky Performance Status, Symptom Assessment Scale); number of ED attendances post enrolment and hospital in the home admissions; days spent in nominated preferred location of care post enrolment; number and type of medical interventions in last seven days of life e.g. IV fluids or antibiotics; bereavement risk in the carer; and carer strain. Patient and family recruitment, education, and data collection are in progress.

Publications/presentations: Arendts G, Chenoweth L, Hayes B, Campbell E, Agar M, Braitberg G, Cubitt M, Magann L, Sudharshan T, Pearce J, Gilmore I, Cerra N, duPreez J, Jaworski R, Soh C, Spilsbury K, Howard K, Sheehan C, Celenza A. CELPI: A randomised controlled trial of a Carer End of Life Planning Intervention in people dying with dementia. Trial protocol. BMC Geriatrics, in press, Accepted 16.10.22

Funding: NHMRC targeted palliative care grant

Cerebrovascular burden in vascular cognitive impairment

CHeBA staff: Nikita Husein, Wei Wen, Jiyang Jiang, Darren Lipnicki, Perminder Sachdev

Other investigators: investigators from contributing COSMIC studies

Aims:

1. Pathophysiology: to investigate CSVD biomarkers as predictors of VCI, operationalized as either mild Vascular Cognitive Disorder (mVCD) or Vascular Dementia (VaD) by the Vascular Behavioral and Cognitive disorders (VASCOG) criteria. The populations to be investigated and compared will be among community dwelling individuals of East Asian descent (from China, Japan, Korea and Singapore) and Whites (from Australia, Europe, and the USA);
2. To identify and clarify differences in risk factors for CSVD and VCI among East Asians and Whites: Cardiovascular risk factors, including hypertension, smoking, diabetes, alcohol, exercise, and diet; Lifestyle, socio-economic background, and education; Dementia-related mental health risk factors, including anxiety and depression; Genetic risk factors: APOE*4.

Findings: Data being obtained.

Funding: NIH

Climate factors and dementia risk

CHeBA staff: Darren Lipnicki, Perminder Sachdev

Other investigators: Ding Ding, Zhenxu Xiao (Fudan University), investigators from contributing COSMIC studies

Aims:

1. To exam the relationships between average climate temperature, the lowest and highest temperatures, temperature variability, climate humidity and long-term cognitive decline, incident dementia, and dementia mortality;
2. To explore whether the time of ultraviolet exposure were associated with the long-term cognitive decline, incident dementia, and dementia mortality.

Findings: Data being obtained.

Funding: NIH

CogSCAN – Study of computer-administered neuropsychological tests in older adults

CHeBA staff: Nicole Kochan, Perminder Sachdev, Henry Brodaty, Karen Croot, Matilda Rossie, John Crawford, Ben Lam, Teresa Lee, Brian Draper, Adam Bentvelzen, Zara Page

Other investigators: Prof Julie Henry (University of Queensland), Prof Jacqueline Close (NeuRA), Prof David Bunce (Leeds University), A/Prof Peter Gonski (UNSW)

Aim: To systematically evaluate and compare four prominent computerised neuropsychological batteries in cognitively healthy older adults, and individuals living with Mild Cognitive Impairment and mild dementia. Secondary aims are to compare suitability and performance of traditional pencil-and-paper versus computerised assessments in older Australians from culturally and linguistically diverse (CALD) backgrounds, and to determine specific linguistic and cultural factors that influence test performances.

Findings: We have recruited 95 older adults from CALD backgrounds from over 35 different countries and will compare their performance to 212 of their English-speaking background counterparts. Another study validating the newly developed 'Characterising Language, Experience and Acculturation Questionnaire' will inform the major factors which will be examined in analyses of cognitive performance. The study will suggest the most appropriate cognitive measures to use when assessing individuals of CALD backgrounds and the most important factors to consider when interpreting test results.

Funding: NHMRC Boosting Dementia Research grant, UNSW Medicine Interlude Grant

Determining the genetic and epigenetic factors linked to odour identification

CHeBA Staff: Karen Mather, Anbupalam Thalamuthu

Other investigators: Dr Daniel Hwang (University Queensland), A/Prof Nicola Armstrong (Curtin University) (CHeBA Hon. Research Fellow), A/Prof John Kwok (University of Sydney; UNSW), Prof Peter Schofield Prof David Ames (National Ageing Research Institute, Royal Melbourne Hospital)

Aim: To identify and epigenetic genetic variants associated with olfactory identification.

Findings: Using data from the Sydney Memory and Ageing Study and the Older Australian Twins Study, suggestive evidence was found for genetic associations with 8 individual odours (Raj et al., 2021, Genes, 12: 669). This research is being extended by collaborating with other Australian and international studies to undertake a larger genetic study and identifying the epigenetic determinants of olfactory identification.

Funding: NHMRC

Development and validation of risk models for the prediction of dementia in Low- and Middle-Income Countries: A consortium of population-based cohort studies

CHeBA staff: Darren Lipnicki, Perminder Sachdev

Other investigators: Dr Eduwin Pakpahan (workgroup leader), Prof Dame Louise Robinson, Prof Blossom Stephan (Newcastle University Institute of Aging); Contributing COSMIC study leaders and associates: Representing cohorts from 6 countries. The project is also being undertaken within the NIHR funded Global Health Group on Dementia Prevention and Enhanced Care (DEPeC)

Aim: Within the field of dementia there is an urgent need for data pooling, particularly for undertaking risk stratification analysis, in order to have a sufficient number of outcome events and a sample large enough to undertake model development and validation. The aim of this project is to undertake a detailed program of research into dementia risk prediction modelling from harmonised data across low- and middle-income countries. We will start with the simple risk factors, such as demographic and socioeconomic status, then extend the analysis by including health and cognitive functions, includes lifestyle, medical history, genetics, etc. This project will address the research gap where usually health and its related predictors are limited.

Findings: Analyses underway and manuscript in preparation.

Funding: The Dementia Momentum Fund, NIH grant, NHMRC grant

Development, Validation and Implementation of a Computerised Tool to Assess Instrumental Activities of Daily Living (C-STAM)

CHeBA staff: Simone Reppermund, Henry Brodaty, Katya Numbers, Nicole Kochan, Julian Trollor, Brian Draper, Ben Lam, Perminder Sachdev, Kathy Nguyen, Ping-Hsiu Lin (PhD student), Minal Tanvir (PhD student)

Other investigators: Prof Lindy Clemson (USyd), Prof Kim Delbaere (NeuRA), Dr Jeewani Anupama Ginige (Western Sydney University), Dr Jacqueline Wesson (USyd), Dr Katharina Luttenberger (University of Erlangen), Mr Quoc Cuong Truong (University of Waikato), Dr Stephanie Ward (UNSW), Ms Claudia Woolf (St. Vincent's Hospital Sydney)

Aims: The aim of this project is to develop, validate, and implement a new, computerised diagnostic tool to assess functional ability in older people with and without dementia. The tool is a further evolution of our successful Sydney Test of Activities of Daily Living in Memory Disorders (STAM). The computerised STAM (C-STAM) will realistically simulate relevant IADL to assess functional performance in older people with cognitive impairment in clinical and research settings. The objectives of this study are to:

1. Develop new items and refine existing items of the STAM for a computerised version in collaboration with consumers, carers, clinicians, and other subject matter experts;
2. Pilot/usability testing for feasibility and refinement of the C-STAM in older people with normal cognition, MCI, and dementia;
3. Validate the final version of the C-STAM in older people with normal cognition, MCI, and dementia;
4. Implement the C-STAM into clinical use.

Findings: Delphi study has been finalised and a pilot version od the C-STAM has been developed and tested in participants with normal cognition and participants with MCI or dementia. The full validation study will commence in May 2024.

Diet and late-life depression

CHeBA Staff: Karen Mather, Simone Reppermund, Annabel Matison (PhD student), Vibeke Catts, Anbupalam Thalamuthu

Other investigators: Prof Victoria Flood (Sydney University)

Aim: To examine the associations between dietary measures and late-life depression. To determine the heritability of dietary measures.

Findings: Meta-analyses found higher intake of fruit and vegetables was associated with reduced risk of incident depression (Matison et al., 2021, Ageing Res Reviews, 70:101403). Further work has been undertaken to determine the heritability of fruit and vegetable consumption and to explore the shared genetic and environmental influences between fruit and vegetable intakes and depressive symptoms. Using OATS, vegetable intake was moderately heritable whilst there were no significant genetic or environmental correlations with fruit/vegetable intakes and depression, this work has now been published (BMC Geriatrics, 2023, 21:67). Other work assessing the relationships between baseline fruit and vegetable intake and incident depression has been undertaken using cohorts from international consortia, including the COSMIC and IGEMS Consortia, and is being written up for publication. This work was presented at the American Nutrition Society 2022 Conference and has been written up for publication and is currently under review.

Funding: NHMRC

Domain-specific cognitive impairments and depression as determinants of post-stroke functional disability

CHeBA staff: Perminder Sachdev, Jessica Lo, John Crawford

Other investigators: Dr Hanna Jokinen and Dr Hanna Laakso (Helsinki University Hospital, University of Helsinki)

Aim: Cognitive impairment and depression are frequent consequences of stroke, yet our understanding of their combined effects on functional outcome are unclear. This study investigated the associations of domain-specific cognitive impairments and depression with activities of daily living (ADL) and instrumental ADL (IADL) by using individual participant data (IPD) from the international cohorts of the Stroke and Cognition Consortium (STROKOG).

Findings: Domain-specific cognitive impairments and depression are related to post-stroke functional outcome. Subjects with executive dysfunction or global cognitive impairment together with depression are at higher risk of disability. Hanna is working on a revised draft manuscript soon to be circulated with co-authors.

Funding: Vincent Fairfax Family Foundation, NHMRC

EADB Consortium: A European DNA bank for deciphering the missing heritability of Alzheimer's disease

CHeBA staff: Perminder Sachdev, Karen Mather, Anbupalam Thalamuthu, Henry Brodaty

Other investigators: A/Prof Nicola Armstrong (Curtin University, CHeBA Hon. Research Fellow), EADB Consortium members

Aim: To identify common and rare novel genetic variants for Alzheimer's disease. The EADB Consortium has collected a very large data set of individuals from around the world who are cognitively normal, have mild cognitive impairment or Alzheimer's disease and have genetic data available.

Findings: This large international consortium is undertaking genetic studies examining Alzheimer's disease and related phenotypes. CHeBA has contributed genetic data to a series of planned genetic studies, including identifying genetic risk factors for Alzheimer's disease, mild cognitive impairment, vascular cognitive impairment, and amyloid imaging. This work is continuing.

Funding: NHMRC National Institute for Dementia Research (NNIDR) (administered by CHeBA), European Union Joint Programme for Neurodegenerative Disease (not administered by CHeBA)

Empowering Dementia Carers With an iSupport Virtual Assistant (e-DIVA)

CHeBA Staff: Henry Brodaty, Zara Page

Other Investigators: A/Prof Tuan Anh Nguyen (PI) (National Ageing Research Institute), Prof Sunil Bhar (Swinburne University of Technology), Prof Bianca Brijnath (National Ageing Institute), Prof Maria Crotty (Flinders University), Thu Ha Dan (Swinburne University of Technology), Prof Adrian Esterman (University of South Australia), Professor Susan Kurrle (University of Sydney), A/Prof Andre Queiroz De Andrade (University of South Australia), Prof Libby Roughead (University of South Australia), Prof Penelope Schofield (Swinburne University of Technology), Ron Sinclair (University of Adelaide), Prof Nilmini Wickramasinghe (Swinburne University of Technology), Prof Lily Dongxia Xiao (Flinders University)

Aims: The overarching aims of the e-DIVA project are:

1. to develop and evaluate an iSupport Virtual assistant (VA) to support dementia carers through a partnership among four Asia-Pacific Region countries (Australia, Indonesia, New Zealand, and Vietnam; and
2. to build capacity of researchers and non-government organisation (NGO) partners to support this development and evaluation.

The current study aims to evaluate the feasibility, acceptability, intention to use, and preliminary impact on carer perceived stress of the iSupport VA via a pilot randomised control trial of the e-DIVA Support VA website.

Findings: Development and co-design of the e-DIVA iSupport Materials and website is complete for the Australian, Indonesian and New Zealand sites, and in progress for the Vietnam Site. Recruitment and data collection for the randomised control trial is ongoing in Australia (for English, Bahasa, and Vietnamese speaking groups), Indonesia and New Zealand.

Funding: NHMRC e-Asia Joint Research Program

ENIGMA group harmonization of cognitive domain scores

CHeBA staff: Darren Lipnicki, Perminder Sachdev

Other investigators: Emily Dennis, Elisabeth Wilde, David Tate, Hannah Lindsey, Eamonn Kennedy, Shashank Vadlamani, Emma Read (University of Utah), Pui-wa Lei (Penn State), investigators from contributing COSMIC studies

Aims: The ENIGMA Consortium (Enhancing NeuroImaging Genetics through Meta-Analysis) is a worldwide framework for collaboration, joining researchers with similar data and questions and allowing them to work together to achieve greater sample sizes. Within the ENIGMA Consortium, the Clinical Endpoints group focuses on harmonizing non-imaging endpoint data, including cognitive and psychiatric data across individual scales with the goal of creating a set of procedures researchers can use to convert the scales we collected to harmonized domain scores. Using a variety of approaches, including item response theory and machine learning, we work to establish cross-walks between tests within a given domain. By collecting many datasets from different countries in different languages, we can develop approaches that will generalize. The conversion schemes will be made publicly available so that other researchers may benefit from the combined effort.

Findings: Data being obtained.

Funding: NIH

Evaluating cerebrovascular burden in ageing brains through normative modelling

CHeBA staff: Mai Ho (PhD candidate), Wei Wen, Jiyang Jiang, Perminder Sachdev

Other investigators: Yang Song (Computer Science and Engineering, UNSW Sydney)

Aims: The overarching objective of this PhD project is to investigate individual differences and levels of changes in the manifestation of neuroimaging markers of cerebrovascular burden in relation to ageing, clinical diagnosis of brain diseases, as well as the rates of progression. We will explore the etiology and clinical outcomes of heterogeneity in the neuroimaging findings by using normative modelling.

1. To explore existing mathematical/statistical and deep learning normative modelling techniques, selecting the most effective and suitable method for our large datasets;
2. To apply normative modelling as an emerging data-driven technique, to our large datasets to model neuroanatomical variation, capturing individualised neurobiological 'fingerprints';
3. To apply normative modelling to investigate the patterns of neuroanatomical variability in the individuals with various cerebrovascular risk factors. Such methods have the potential to detect clinically relevant subtypes and track the progression of both diseased and cognitively normal individual.

Funding: John Holden Family Foundation, PhD scholarship UIPA (University International Postgraduate Award)

Examining brain ageing from transcriptomic and epigenomic perspectives

CHeBA staff: Karen Mather, Anbupalam Thalamuthu, Perminder Sachdev, Adith Mohan (PhD student), Fatemeh Amjadimoheb (PhD Student)

Other investigators: A/Prof Nicola Armstrong (Curtin University, CHeBA Hon. Research Fellow), Associate Prof John Kwok (University of Sydney, UNSW), Prof Peter Schofield

Aims: Identify transcriptomic changes in the ageing brain.

Findings: For this ongoing project, over 60 samples from two brain regions have been collected from national and international brain banks, ranging in age from 35 to 105 years. RNA extraction and sequencing on these brain samples has been completed. Both coding and non-coding RNAs, including circular RNAs, and their relationship with age are being examined. Recently, small RNA sequencing and DNA methylation is also being undertaken on the same samples. Analyses are also being undertaken looking at age-related changes in brain expression using publicly available data.

Funding: NHMRC, Thomas Foundation, Rebecca Cooper Medical Research Foundation

Exceptional cognition in old age and interactions with other aspects of successful ageing

CHeBA staff: Alice Powell (PhD Candidate), Henry Brodaty, Perminder Sachdev

Other investigators: Prof Jacqueline Close (UNSW Sydney, NeuRA)

Aims: Explore how to best define exceptional cognition in older adults and its prevalence in an Australian sample, explore older people›s perceptions of super-ageing (qualitative study), examine the clinical characteristics and biomarkers associated with cognitive super-ageing, explore health care outcomes associated with cognitive super-ageing using health care linkage data.

Findings: Two publications, one manuscript under review, data analysis on two further studies ongoing.

Funding: NHMRC postgraduate scholarship

Genetics and epigenetics of longevity

CHeBA staff: Karen Mather, Perminder Sachdev, Anbupalam Thalamuthu, Dr Mary Revelas

Other investigators: A/Prof Nicola Armstrong (Curtin University, CHeBA Hon. Research Fellow), Prof John Attia (University of Newcastle), A/Prof John Kwok (University of Sydney; UNSW), Dr Chris Oldmeadow (University of Newcastle), Prof Peter Schofield; Prof David Ames (National Ageing Research Institute; Royal Melbourne Hospital), Prof Margaret J. Wright (University of Queensland)

Aim: Identify genetic and epigenetic variation associated with longevity and longevity-related phenotypes.

Findings: Prior work has identified a list of longevity-related genetic variants (Revelas et al., Mech Ageing Dev, 2018). In other work, genetic risk for cardiovascular factors and disease (e.g. low-density lipoproteins, stroke) were not significantly associated with longevity (Revelas et al., Genes, 2019). Prior work has identified a list of longevity-related genetic variants (Revelas et al., Mech Ageing Dev, 2018). In other work, genetic risk for cardiovascular factors and disease (e.g. low-density lipoproteins, stroke) were not significantly associated with longevity (Revelas et al., Genes, 2019). We found individuals with a high polygenic risk score for longevity had a healthy metabolic profile in studies from Australia, the UK and Sweden (Revelas et al., 2023, Geroscience, 45:399). PhD student, Mary Revelas, successfully completed her PhD in 2023 and received a UNSW Deans Award for an Outstanding PhD Thesis.

Funding: Sachdev Foundation, NHMRC, Thomas Foundation

Genetics of white matter hyperintensities

CHeBA staff: Karen Mather, Wei Wen, Anbupalam Thalamuthu, Perminder Sachdev

Other investigators: A/Prof Nicola Armstrong (Curtin University, CHeBA Hon. Research Fellow), Prof Paul Nqyuist (John Hopkins, USA), Prof David Ames (National Ageing Research Institute, Royal Melbourne Hospital), A/Prof John Kwok (University of Sydney; UNSW), Prof Peter Schofield and other external collaborators

Aim: Identify genetic variants associated with deep and periventricular white matter hyperintensities (WMHs).

Findings: WMH are regions of hyperintensity in the white matter, which are observed on neuroimaging scans. High burden of WMH is associated with negative health outcomes, including dementia and disability. WMH can be sub-classified into two categories based on their location in the brain, deep and periventricular WMHs. We undertook a genome-wide association study looking at these two sub-classifications using data from over 24,000 participants from around the world.

We identified common genetic variants significantly associated with both deep and periventricular WMHs and found unique variants for periventricular WMH alone. The results confirm that these two sub-classifications of WMH have distinct but also overlapping aetiology. This work has now been published in the highly respected journal, Stroke (Armstrong, Mather et al., 2020). Extension of this work is being undertaken, including looking at other types of genetic variation, such as short tandem repeats, that may influence deep and periventricular WMHs in cohorts from around the world.

Funding: NHMRC, Thomas Foundation

Genome-wide Association Studies (GWAS) and Epigenome-wide Association Studies (EWAS) of brain measures in collaboration with the ENIGMA consortium (Enhancing Neuroimaging Genetics through Meta-Analyses)

CHeBA staff: Karen Mather, Anbupalam Thalamuthu, Wei Wen, Perminder Sachdev

Other investigators: A/Prof Nicola Armstrong (Curtin University, CHeBA Hon. Research Fellow), Prof David Ames (National Ageing Research Institute, Royal Melbourne Hospital), A/Prof John Kwok (University of Sydney, UNSW), Prof Peter Schofield

Aim: Identify single nucleotide polymorphisms (SNPs) and differentially methylated regions for various brain measures, such as subcortical volume.

Findings: A number of genetic and epigenetic projects are underway, of which both the Sydney Memory and Ageing Study and the Older Australian Twins Study have contributed data. A recent epigenomics study using data from over 9000 adults, identified 12 DNA methylation sites and 46 differentially methylated regions associated with brain white matter hyperintensities, a marker of cerebral small vessel disease. This work suggested biological pathways related to the immune response and the blood-brain barrier may influence white matter hyperintensity burden (Yang et al., 2023, Brain, 146:492).

Funding: NHMRC, Thomas Foundation

Genome-wide Association Studies (GWAS) of various measures, including cognitive performance, in collaboration with the CHARGE consortium (Cohorts for Heart and Aging Research in Genomic Epidemiology)

CHeBA staff: Perminder Sachdev, Karen Mather, Anbupalam Thalamuthu, Wei Wen, Nicole Kochan, Teresa Lee

Other key investigators: A/Prof Nicola Armstrong (Curtin University) (CHeBA Hon. Research Fellow), Prof David Ames (National Ageing Research Institute, Royal Melbourne Hospital), A/Prof John Kwok (Sydney Univ UNSW), Prof Peter Schofield (NeuRA, UNSW), Prof Margaret J. Wright (Queensland Brain Institute, University of Queensland)

Aim: Identify genetic variants including single nucleotide polymorphisms (SNPs) and copy number variants and differentially methylated sites associated with cognitive performance and other measures, such as brain imaging traits.

Findings: CHeBA studies (Sydney Memory and Ageing Study, Older Australian Twins Study) have contributed to a number of projects on a variety of phenotypes using not only genetic data but also epigenetic data (DNA methylation). In a recent publication using over 53,000 adults without dementia or stroke, novel genetic loci were identified for verbal short-term memory and verbal learning performance as well as the expected APOE locus (Lahti et al, 2022, Molecular Psychiatry, 27:4419-4431). Interestingly, the top results exhibited a range of functions in brain tissue, such as acting as expression quantitative loci (eQTLs) or being associated with tau or amyloid accumulation in the brain.

Funding: NHMRC, Thomas Foundation

Guides to assisting with behaviours and psychological symptoms associated with dementia (BPSD): A Clinician's BPSD Guide; A Clinician's Field Guide to BPSD; and A Guide for Family Carers

CHeBA Staff: Kim Burns, Anne-Nicole Casey, Henry Brodaty

Aims: Following the Royal Commission into Age Care Quality and Safety, the Commonwealth Department of Health and Ageing commissioned CHeBA to update guidelines for the management of behaviours and psychological symptoms associated with dementia [BPSD]. Aim is to review the literature from 2012 (when the previous version was published) to 2021 and provide evidence-based guidance for clinicians and family carers in how to best assist people with dementia experiencing distressing behaviours.

Findings: Our systematic review summarised evidence for non-pharmacological and pharmacological interventions and produced three publications on three platforms:

1. Clinician's BPSD Guide 2023: Understanding and helping people experiencing changed behaviours and psychological symptoms associated with dementia is a comprehensive overview of evidence and practice-based principles for supporting people who present with behaviours and psychological symptoms associated with dementia (BPSD). This 2023 version is an update of the document Behaviour Management: A Guide to Good Practice, Managing Behavioural and Psychological Symptoms of Dementia (2012). This resource is designed for clinicians with a role in caring for people living with dementia in residential aged care services (RACS), community care and acute care settings. Additional considerations for Aboriginal and Torres Strait Island peoples and those from a culturally and linguistically diverse (CALD) background with dementia are included. This will be available in three ways in the first quarter of 2024 - on CHeBA Website (https://cheba.unsw.edu.au/ClinicalCare), as an App (search BPSD) and as printed copy.
2. Clinician's Field BPSD Guide 2023: a briefer more portable version of the Clinician's Guide available as same App as above and in 2024 as printed copy (on request).
3. A Guide for Carers 2023: provides information in lay terms. Available online (https://cheba.unsw.edu.au/guide-carers), as an App (refer to links below) and in 2024 as printed copy.

   CareForDementia on the App Store (apple.com)
   CareForDementia - App on Google Play

Identifying gene expression and apolipoprotein quantitative trait loci in older adults

CHeBA staff: Anbupalam Thalamuthu, Toyin Abdulsalam (Scientia PhD student), Karen Mather, Perminder Sachdev

Other investigators: Prof Bernhard Baune (University of Münster), Dr Liliana Ciobanu (University of Adelaide), A/Prof Nicola Armstrong (Curtin University, CHeBA Hon. Research Fellow), A/Prof John Kwok (Sydney University; UNSW), Prof Peter Schofield

Aim: Identify genetic variants associated with blood gene expression and protein levels.

Findings: SNPs controlling the expression level of genes (eQTLs) have been identified in the Sydney Memory and Ageing Study cohort. This analysis has been extended to the Older Australian Twins cohort, which is being used as a replication cohort for the Sydney Memory and Ageing Study results. In silico replication using data from the Consortium for Architecture of Gene Expression and other external data sets has been performed. This work has been submitted for publication. Work seeking to identify SNPs associated with protein levels (pQTLs) and DNA methylation (meQTLs) is currently being performed.

Funding: NHMRC

Illiteracy, gender, and dementia risk

CHeBA staff: Darren Lipnicki, Perminder Sachdev

Other investigators: Dae Jong Oh (Kangbuk Samsung Hospital), Ki Woong Kim (Seoul National University Bundang Hospital), investigators from contributing COSMIC studies

Aims: To test the following hypotheses:

1. Illiterate or not educated older adults have higher risks of prevalent and incident dementia and faster cognitive decline than literate/educated older adults;
2. The impact of illiteracy or lack of formal education on the risks of dementia and cognitive decline varies depending on the income of countries and/or educational level of study population;
3. The impact of illiteracy or lack of formal education on the risks of dementia and cognitive decline are more prominent in women than in men.

Findings: Data being obtained.

Funding: NIH

Impacts of modifiable risk factors on cerebrovascular burden and cognitive Impairment: a study on ethnicities and geographic locations

CHeBA staff: Nikita Keshena Husein (PhD candidate), Wei Wen, Jiyang Jiang, Darren Lipnicki, John Crawford, Perminder Sachdev

Other investigators: Investigators from around 6 contributing studies mainly from COSMIC

Aims: The overarching objective of this PhD project is to investigate the potential differential impact of modifiable risk factors such as hypertension, diabetes, smoking on the cerebrovascular burden by analyzing brain MRI scans from individuals of different ethnic backgrounds. Specific aims include:

1. To systematically review literature to understand the current research in the area, identify the methods and examine the current findings by conducting a meta-analysis;
2. To investigate effects of age, sex, and ethnicity on the MRI cerebrovascular markers including lacunes, white matter hyperintensity, perivascular spaces, and brain atrophy;
3. To investigate potential differential levels of cerebrovascular burden and the impact of cerebrovascular imaging markers on the cognition of the individuals of different ethnic backgrounds.

Findings: We have received data from COSMIC studies of Gothenburg H70, KLOSCAD (Korean Longitudinal Study on Cognitive Aging and Dementia), PATH (Personality and Total Health Through Life Study), SLAS (The Singapore Longitudinal Ageing Studies), and Sydney MAS (Memory and Ageing Study). We are currently collaborating with two other international partners to use their cohorts data of Asian origin for our research.

Funding: NIH, Vincent Fairfax Family Foundation, John Holden Family Foundation, PhD scholarship UIPA (University International Postgraduate Award)

Impact of mood and metabolic disorders on Alzheimer's disease: investigating sex specific interactions of chronic condition multimorbidity

CHeBA staff: Tessa Helman

Other investigators: Prof Nicolas Stapelberg (Bond University), Prof John Headrick (Griffith University)

Aims:

1. Reveal the sex-specific impacts of individual and commonly co-occurring disease states on cognition, anxiety and depressive behaviours;
2. Investigate the sex-specific influences of co-morbid conditions on the density and distribution of amyloid-β plaque formation in brain slices;
3. Identify sex-specific influences of co-morbid conditions on protein and lipid profiles within frontal cortex and hippocampal brain tissue;
4. Assess sex-specific influences of co-morbid conditions on nervous system expression of key genes linked to neurodegeneration, neuroinflammation and oxidative stress;
5. Evaluate the sex-specific influences of co-morbid conditions on circulating levels of inflammatory and metabolic markers.

Findings: Sexual dimorphic patterns of mood and metabolic disorders have been identified in both pre-clinical and clinical studies. In humans, women are more likely to be diagnosed with mood disorders such as anxiety and depression, while men are more likely to suffer from substance abuse disorders. Clearly dimorphic patterns are also apparent in animal models of disease. Previous pre-clinical research from our group has shown that chronic social stress induces distinct sex-specific behaviours, with male mice presenting with depressive-like behaviour and females with anxiety-like behaviour. In addition, prominent sex differences were observed for circulating and nervous system biomarkers linked to mood and metabolism. Importantly, sexual dimorphic patterns are also apparent in AD. Women are more likely to develop AD and experience more rapid cognitive decline. Similarly, female mice exhibit higher Aβ plaque burden and greater levels of phosphorylated tau and proinflammatory cytokines.

Pilot data has been completed for this project and a manuscript is currently being prepared for submission in 2024. Main findings include:

- Chronic psychological stress alters the frontal cortex proteome in a similar way to that observed in Alzheimer's Disease, however, the contributory pathways that produce Alzheimer's Disease-related changes within the frontal cortex are distinct in female and male mice;
- Sex-specific behavioural changes may be linked to differences within the memory deficits pathways.

Funding: NHMRC, Rhyolite Innovations, UNSW Medicine Neuroscience, Mental Health and Addiction Theme and SPHERE CAG

Improved accessibility and long-term storage of biospecimens from the Centre for Healthy Brain Ageing's (CHeBA) longitudinal studies

CHeBA staff: Karen Mather, Anne Poljak (Adjunct), Tharusha Jayasena, Sohail Siddiqui, Henry Brodaty, Perminder Sachdev

Aims:

1. Inventory and aliquot samples for ready distribution to researchers;
2. Improve the safety of sample storage by aliquoting and transferring samples into -80oC and vapour phase storage.

Findings: Aliquoting of MAS samples (all waves which have plasma) has largely been completed, although ongoing plasma collections will require processing. Aliquoting of all waves of OATS has been completed, except the OATS2 (PET study), aliquoting of SCS samples is ongoing. Biobanking is an ongoing project for remaining stored CHeBA blood samples, as well as new samples coming for additional waves of existing projects or any new projects.

Funding: CHeBA Philanthropic Funds

Improving health outcomes, well-being and care of people living with dementia in the hospital setting

CHeBA Staff: Lynn Chenoweth, Henry Brodaty, Claire Burley, Fleur Harrison, Mayouri Sukhapure

Other investigators: A/Prof Anna Williams (UNDA), Dr Zhixin Liu (Stats Central, UNSW), Dr Patricia Reyes (SESLHD, UNSW), Ms Jane McGuire (SESLHD), Ms Genevieve Maiden (SESLHD), Ms Jacquelene Cook (PhD applicant UNSW)

Aims: To identify

1. the impact that the person-centred approach has for persons living with dementia during a sub-acute hospital stay (neuropsychiatric symptoms, delirium and other iatrogenic harms, psychotropic prescription, length of stay, discharge destination, hospital readmission within 30 days, satisfaction with service);
2. identify how the person-centred approach impacts on services operations and quality;
3. determine the cost and cost-benefit of implementation;
4. understand the organisational requirements to implement and maintain the person-centred care approach in routine services.

Methodology: This evidence-translation project employs a pre/post/follow-up evaluation of the person-centred approach to sub-acute hospital services on outcomes for prospective patients with a diagnosis of dementia (n=80), compared with a comparison group (n=80) (6-months de-identified, aggregated retrospective in-patient data). Evaluation of staff's person-centred care knowledge, skills, participation and satisfaction is obtained via direct observation, chart audit, survey and interviews with family/carers (n=80), patients (n=80) and clinical staff (medical, nursing, allied health) (n=60).

PhD Study: Ms Jacquelene Cook is undertaking an embedded PhD study, which focuses on developing, implementing, and evaluating the staff's on-line person-centred service education program.

Findings: The main project has received all ethics approvals and is in progress. Retrospective patient data is being entered in REDCap, staff recruitment and pre-intervention survey has occurred, staff training in person-centred approach commences end of February, patient and family/carer recruitment will commence April/May. The PhD study has received all ethics approvals and is in progress. The staff Champion training program has been developed and is manualised, the 12-module staff on-line education program is almost complete and learning modules are being loaded to the study's on-line learning platform hosted by Uniting War Memorial Hospital. Hospital staff have been recruited, consented and pre-intervention surveys have been completed.

Funding: NHMRC, Dementia Collaborative Research Centre (DCRC)

Maintaining Social Engagement study

CHeBA staff: Suraj Samtani, Henry Brodaty, Eman Shatnawi, Tiffany Chau

Other investigators: Julie Henry (UQ), Tanya Davison and Marissa Dickins (Silverchain)

Aims: To conduct a randomised controlled trial to evaluate a novel, co-designed social cognitive skills intervention for people with cognitive impairment and

its impact on social cognition, cognitive function, and mental and social health.

Findings: Recruitment has commenced. Trial in progress.

Funding: Dementia Australia Research Foundation

Neuropsychiatric symptoms and dementia risk

CHeBA staff: Darren Lipnicki, Perminder Sachdev, Henry Brodaty

Other investigators: Dae Jong Oh (Kangbuk Samsung Hospital), Ki Woong Kim (Seoul National University Bundang Hospital), investigators from contributing COSMIC studies

Aims:

1. To identify a variety of neuropsychiatric symptoms (NPS) at baseline which have significant associations with cognitive decline, identified as deterioration in cognitive test scores, or as transitions from normal to MCI or dementia, and from MCI to dementia;
2. To investigate associations between patterns of change in NPS during follow-up and cognitive decline.

Findings: Data being obtained.

Funding: NIH

Nightmares, cognitive decline and dementia

CHeBA staff: Darren Lipnicki, Perminder Sachdev

Other investigators: Investigators from contributing COSMIC studies

Aims: The primary aim of this project is to investigate if and how nightmares are associated with cognitive decline and dementia in the general older population, more comprehensively than done previously, using neuropsychological test data and consensus diagnoses of dementia. If sufficient data are available similar analyses will be performed for REM Sleep Behaviour Disorder and Restless Leg Syndrome.

Findings: Data being obtained and preliminary analyses undertaken.

Funding: NIH

Nutrition and cognitive health in the older population: emphasis on food groups consumption and dietary patterns

CHeBA staff: Darren Lipnicki, Perminder Sachdev, Henry Brodaty

Other investigators: A/Prof Costas Anastasiou (workgroup leader), Prof Nikolaos Scarmeas, Prof Mary Yannakoulia: Greece; Contributing COSMIC study leaders and associates: Representing cohorts from around 10 countries

Aim: To examine the association between consumption of food groups, in isolation or in their combination into specific dietary patterns, and cognitive function in the older population (>60 years).

Findings: Data being harmonised and analysed.

Funding: The Dementia Momentum Fund, NIH grant, NHMRC grant

Physical activity, traumatic brain injury, and cognitive outcomes

CHeBA staff: Darren Lipnicki, Perminder Sachdev, Matthew Lennon

Other investigators: Benjamin Tari, Tony Thayanandan, John Gallacher, Sarah Bauermeister, Vanessa Raymont (University of Oxford), Matthew Heath (Western University), investigators from contributing COSMIC studies

Aims:

1. Understand the epidemiology of traumatic brain injury (TBI) in an international consortium;
2. Understand the late life effects of mid-to-late-life TBI;
3. Evaluate the differential effects of TBI on cognitive domains;
4. Evaluate the moderating effect of physical activity;
5. Examine differential subgroup effects within TBI.

Findings: Data being obtained.

Funding: NIH

Polygenic risk scores and dementia

CHeBA staff: Karen Mather, Anbu Thalamuthu, Darren Lipnicki, Perminder Sachdev

Other investigators: investigators from contributing COSMIC studies

Aims: To examine the utility and performance of polygenic risk scores derived from non-European and European genome-wide association studies on dementia, and its risk/protective factors and endophenotypes.

Findings: Data being obtained.

Funding: NIH

Poststroke anxiety: a domain-specific cognitive impairments characterization from the STROKOG Consortium

CHeBA staff: Perminder Sachdev, Jessica Lo

Other investigators: A/Prof Thibaut Dondaine, Dr Regis Bordet, Ms Florine Ruthmann (University of Lille)

Aims: This study aims to assess the prevalence of post-stroke anxiety (PSA) within 3–6 months following an ischemic stroke and its correlation with various demographic factors, clinical factors, and cognitive impairments in three cohorts from the STROKOG consortium.

Findings: Anxiety is a frequently observed issue following a stroke. This study highlights that PSA is more common in females and is associated with depression and cognitive impairment. The assessment of anxiety should be integrated into post-stroke care to enhance patient outcomes. Future investigations should delve into the mechanisms underpinning the associations between PSA and cognition, as well as their long-term trajectories. A manuscript has been submitted for peer-review.

Funding: Vincent Fairfax Family Foundation, NHMRC

Post-stroke neuropsychiatric symptoms: apathy and psychosis

CHeBA staff: Michael Connors, Perminder Sachdev, Jessica Lo, Henry Brodaty, John Crawford, Nicole Kochan

Other investigators: Prof Armando Teixeira-Pinto (University of Sydney)

Aim: We aim to examine post-stroke apathy and psychosis using the STROKOG data. In particular, we seek to address questions of prevalence; incidence; time to onset of symptoms; clinical correlates and predictors (including demographics; cognition; medical history; other neuropsychiatric symptoms, such as depression and anxiety); neuroanatomical correlates; and ethnic and geographical variation. Based on previous research, it is expected that patients with these symptoms will show worse clinical outcomes.

Findings: Eight studies have provided data. Data harmonisation is completed and analysis is continuing.

Predicting dementia risk in low- and middle-income countries with machine learning

CHeBA staff: Jiyang Jiang, Darren Lipnicki, Perminder Sachdev, Yang Song, Ashleigh Vella

Other investigators: investigators from contributing COSMIC studies

Aims:

1. To establish prediction models for short- (3-5 years) and long-term (10-15 years) dementia risks in all low- and middle-income countries (LMICs), using features that are accessible to LMICs,
2. To establish sex-specific short- and long-term dementia prediction models in all LMICs, using the same features as Aim 1;
3. To examine the heterogeneity of models developed in Aim 1 and 2 in individual LMICs, and establish models for individual LMICs according to sample characteristics;
4. To examine the moderating and additive effects of blood chemistry, imaging, and genetic data, to the models for a sub-sample with available data;

5. To compare the performance of the overall LMIC models (Aim 1) with published dementia prediction models in high-income countries, in LMIC data.

Findings: Data being obtained.

Funding: Alzheimer's Disease Data Initiative, NIH

Relationship between body mass index and cognitive decline

CHeBA staff: Darren Lipnicki, John Crawford, Ben Lam, Nicole Kochan, Henry Brodaty, Perminder Sachdev

Other investigators: Contributing COSMIC study leaders and associates: Representing cohorts from at least 15 countries

Aim: To examine associations between body mass index (BMI), cognition and dementia in diverse ethno-regional groups.

Findings: The project is being re-designed in consideration of recent literature and may include additional COSMIC studies that have joined recently.

Funding: The Dementia Momentum Fund, NIH grant, NHMRC grant

Rethink my drink trial: reducing alcohol consumption and preventing cognitive decline in older Australians

CHeBA staff: Louise Mewton, Virginia Winter, Sarah Davies, Nicolas Hoy, Rachel Visontay, Nicole Kochan, Perminder Sachdev

Other Investigators: Prof Maree Teesson, Prof Andrew Baillie, Prof Nicola Newton, Prof Cath Chapman, A/Prof Matthew Sunderland (The Matilda Centre for Mental Health and Substance Use, Sydney University)

Aims:

1. To determine whether an online alcohol intervention (Rethink My Drink) is effective in reducing alcohol use in older Australians (aged 60-75 years; n=850);
2. To determine whether an online alcohol intervention is effective in reducing cognitive decline in older Australians;
3. To determine whether an online alcohol intervention is effective in reducing alcohol-related harms and improving quality of life in older Australians.

Findings: Recruitment and 12-month follow-up of 888 older adults (aged 60+ years) has been completed. Data is currently being processed and analysed.

Funding: Dementia Centre for Research Collaboration (DCRC) World Class Research Grant

Revealing the genomic, epigenomic and transcriptomic landscape of metabolic syndrome

CHeBA Staff: Anbupalam Thalamuthu, Karen Mather

Other investigators: A/Prof Nicola Armstrong (Curtin University) (CHeBA Hon. Research Fellow), A/Prof John Kwok (University of Sydney; UNSW), Prof Peter Schofield, Prof David Ames (National Ageing Research Institute, Royal Melbourne Hospital), Prof Bernhard Baune (University of Münster), Dr Liliana Ciobanu (University of Adelaide), Ms Emilie Kjeldsen (University of Copenhagen)

Aim: To identify genomic, epigenomic and transcriptomic factors associated with metabolic syndrome.

Findings: Analyses are underway using different datasets from the UK Biobank, the Sydney Memory and Ageing Study, the Older Australian Twins Study and the Sydney Centenarian Study. Multi-omic analyses will also be undertaken.

Funding: NHMRC

Risk factors for post-stroke depression

CHeBA staff: Ben Lam, Jessica Lo, Perminder Sachdev, Louise Mewton, Simone Reppermund, John Crawford, Henry Brodaty

Other investigators: Dr Lena Oestreich, Dr Michael O'Sullivan, STROKOG collaborators

Aims: To investigate and identify the risk factors that predict the first onset and development of post-stroke depression using STROKOG data.

Findings: Approximately 40% of stroke participants developed mild or greater depressive symptoms at any assessment, and 14% developed moderate-to-severe depressive symptoms, over a median follow-up of 2.16 years. Female sex, fewer years of education, a past history of depression, stroke location, more severe stroke, and functional and cognitive impairment were associated with the development of mild or greater

depression. Similar factors, with the addition of a past history of stroke and removal of education, stroke location, and stroke severity, were associated with the development of moderate-to-severe depression. A manuscript has been submitted for review.

Funding: Vincent Fairfax Family Foundation, NHMRC

Sex-specific risk and associated factors for transitions to mild cognitive impairment and dementia in diverse international cohorts of older adults from the COSMIC consortium

CHeBA staff: Darren Lipnicki, Perminder Sachdev

Other investigators: Cuiling Wang, Mindy J. Katz, Richard B. Lipton, Carol Derby (Albert Einstein College of Medicine), investigators from contributing COSMIC studies

Aims: Our overall aim is to examine the effects of sex on the transitions from cognitive normality to MCI and dementia, and whether these effects are impacted by age, education, race/ethnicity, ApoE genotype, SES and vascular factors. We propose to address the following specific aims:

1. Examine the effects of sex on the risks of transitions to MCI and dementia, control for demographics and ApoE genotype. Differences of sex effects within different stages of progression will also be tested;
2. Examine whether age, education and ApoE genotype modifies the effect of sex on the risks of transitions to MCI and dementia;
3. Examine whether the effects of sex on the risks of transitions to MCI and dementia are further impacted by SES and vascular factors.

Findings: Data being obtained.

Funding: NIH

Sleep, Mild Cognitive Impairment, and Dementia in Elderly Cohorts with Ethnoracial Diversity

CHeBA staff: Darren Lipnicki, Perminder Sachdev

Other investigators: Dr Seung Wan Suh (workgroup leader), Prof Ki Woong Kim: South Korea; Contributing COSMIC study leaders and associates: Representing cohorts from around 8 countries

Aims:

1. To identify subjective sleep parameters at baseline which have significant associations with cognitive decline at follow-up;
2. To investigate the association between a specific pattern of changes of sleep parameters over follow-up period and cognitive decline.

Findings: Results are being finalised.

Funding: The Dementia Momentum Fund, NIH grant, NHMRC grant

Social health and cognitive health trajectories among healthy older adults

CHeBA staff: Darren Lipnicki, Perminder Sachdev, Henry Brodaty

Other investigators: Lisan Braas, Rene Melis (Radboud University Medical Center), investigators from contributing COSMIC studies

Aims:

1. Describe the heterogeneity and concordance of social and cognitive health trajectories among older adults initially without dementia;
2. Describe these trajectories by geographic, sociodemographic and physical factors, such as gender and ethnicity.

Findings: Manuscript in preparation.

Funding: NIH, European Union Joint Programme-Neurodegenerative Disease Research

Social Health and Reserve in the Dementia patient journey (SHARED)

CHeBA staff: Suraj Samtani (Study Co-ordinator), Henry Brodaty (Work Package leader), Gowsaly Mahalingam, Ben Lam, Darren Lipnicki, Perminder Sachdev

Other investigators: Contributing COSMIC study leaders and associates, and SHARED consortium associates

Aims:

1. Examine the variance in cognitive function explained by social health (marital status; social network size; frequency of interactions; social support received and provided; independence in daily functioning; loneliness; quality of relationships), beyond that explained by APOE*4, demographic variables, baseline cognitive function, and physical health;
2. Study the trajectory of social health as individuals progress from MCI to dementia (latent growth class analysis);
3. Investigate the pathways that mediate the relationship between social and cognitive health (brain reserve as indicated through MRI, health behaviours, physiological factors, psychological factors) using structural equation modelling;
4. Examine the variance in social health explained by cognitive function, physical health, and APOE*4.

Findings: We published our first meta-analysis paper exploring the associations between social connections and rates of cognitive decline in The Lancet Healthy Longevity (https://doi.org/10.1016/S2666-7568(22)00199-4). We harmonised data from 13 longitudinal ageing studies (12 from COSMIC) with social connection data (N= 40 006). After controlling for known risk factors for cognitive decline, we found that living with others, being married/in a relationship, at least monthly interactions with family/friends, at least yearly community engagement, and never feeling lonely were associated with slower rates of cognitive decline. Our results provide specific recommendations for policy makers, health professionals and the community regarding the type and number of social connections needed for healthy cognitive ageing. Our next paper was published in Alzheimer's & Dementia: The Journal of the Alzheimer's Association (https://alz-journals.onlinelibrary.wiley.com/doi/full/10.1002/alz.13072) and explored the associations between social connections and risk of dementia and mortality. We found that at least monthly friend or family interactions and having a confidante were associated with lower risk of incident dementia. Furthermore, we found that living with others, at least monthly community engagement, and having a confidante were associated with a lower risk of early mortality.

In 2024, we are working on a paper highlighting the findings from the SHARED project overall, across the international teams involved in this project. We hope to highlight what the SHARED project has added to our understanding of the link between social connections and healthy brain ageing and some of the future directors to be explored.

Funding: The Dementia Momentum Fund, NIH grant, NHMRC grants, European Union Joint Programme - Neurodegenerative Disease Research grant

The global burden of dementia

CHeBA staff: Louise Mewton, Asheigh Vella, Darren Lipnicki, Perminder Sachdev, Henry Brodaty, Nicole Kochan

Other investigators: Ms Emma Nichols, Dr Jaimie Adelson (Institute for Health Metrics and Evaluation), investigators from around 34 contributing COSMIC studies

Aims:

1. Describe prevalence and incidence of dementia by age and sex for each contributing study. For those studies that have included the Clinical Dementia Rating Scale (CDR) or other markers of severity, describe the severity of dementia by age and sex for each contributing study and investigate whether this varies across countries;
2. Using mortality records (date of death), investigate excess mortality attributable to dementia and how this may vary across countries. For the subset of studies that have included the CDR, investigate what proportion of mortality among people with dementia occurs in those with severe disease and can therefore be assumed to be due to dementia as an underlying cause of death;
3. Calculate relative risks and population attributable fractions for risk factors previously included in the GBD analyses (BMI, fasting plasma glucose, and smoking), as well as several additional dementia risk factors that have not previously been estimated within the GBD study, including education, alcohol consumption, physical inactivity and blood pressure.

Findings: Data from COSMIC studies obtained and analyses are currently underway.

Funding: NIH

The Memory and Ageing Study 2 (MAS2)

CHeBA staff: Henry Brodaty, Perminder Sachdev, Nicole Kochan, Katya Numbers, Tiffany Chau, Amanda Selwood, Deena Sharabas, Matthew Barwell, Georgina Brown, Abbie Lucien, Vibeke Catts, Wei Wen, Karen Mather

Other investigators: Prof Collin Masters (University of Melbourne), Prof Maria Fiatarone Singh (University of Sydney), Prof Steven Lord (NeuRA), Prof Annette Dobson (University of Queensland), Prof Alleta Schutte (UNSW), Prof Henry Cutler (Macquarie University), Prof Carol Brayne (Cambridge University), Prof Lisa Keay (UNSW), Prof Katherine Samaras (The Garvin Institute), Prof Jason Kovacic (Victor Change Institute), Prof Kim Delbaere (NeuRA)

Aims:

1. To chart the generational change in the physical, psychological, social, cognitive/ brain health in Australians aged 70-90 years old;
2. To determine changes in risk factors for cardio- and cerebrovascular disease and cognitive decline and their relative contributions to cognitive decline;
3. To determine changes in use of health services and pathways to care and factors associated with health care.

Findings: We are still actively recruiting and testing participants and informants for our first wave of data collection. To date we have received 513 expressions of interest of whom we have screened 455 participants with 294 meeting eligibility requirements. To date, we have tested 226 participants with an additional 57 booked in. Two hundred and ninety-seven participants have agreed to have bloods taken and an additional 57 have agreed to do an MRI. We have partnered with three optional Add-On studies with collaborators from UNSW (the Vision and Hearing Study), the Garvin and Victor Change Institutes (the Cardiometabolic Study), and NeuRA (the Falls and Balance Study).

The NAD+ metabolome as a thereapeutic target for ageing and dementia

CHeBA staff: Tessa Helman

Aims:

1. Uncover metabolomic signatures and define correlations of the NAD+ metabolome with healthy ageing and disease progression, sex and an unbalanced immune response and its onset retrospectively in mild cognitive impairment (MCI), AD and vascular dementia (VaD) (compared to cognitively normal control subjects), using cross-sectional and longitudinal data from multiple cohorts;
2. To compare NMN and NR dietary interventions to determine if maintaining NAD+ levels reinstate cerebrovascular function and ameliorates AD pathology, and consequently cognitive and neuronal function in animal models;
3. To carry out a human pilot study to determine whether NMN and NR can raise NAD+ levels and reduce pathological trajectories and cognitive decline in MCI patients.

Findings: This project considers a NADomics approach to biomarker and drug target discovery using liquid chromatography mass spectrometry (LC-MS). Our preliminary NADomics screening of cognitively normal healthy adults has yielded markers of interest (e.g., NAD+, NADP+, NADH, nicotinic acid adenine dinucleotide (NAAD), N-methyl-nicotinamide (MeNAM) etc). NAD+ had the steepest age decrease average 4% standard deviation units decline per year. To confirm previous in vivo findings that these NAD+ precursors do not present toxic effects, we plan to begin a small-scale dose escalation study using wild-type C57bl6 mice. Provided the dose escalation study confirms lack of toxic or harmful effects, we will first define the NAD+ metabolome in plasma and brain homogenates in an animal model for AD (APP/Ps-1 mice), and correlate them with behaviour, immune status, and neuropathology at 4, 8, 12, and 18 months. Our earlier work indicated Alzheimer's like changes in this model, indicating its suitability. There are two publications reporting on these findings and two more are under preparation for submission.

Funding: NHMRC, Rhyolite Innovations

The relationship between alcohol use trajectories and health, mortality, and cognition in older adults

CHeBA staff: Louise Mewton, Darren Lipnicki, Perminder Sachdev, Nicholas Hoy, Rachel Visontay

Other investigators: Contributing COSMIC study leaders and associates: Representing cohorts from around 12 countries

Aim: To examine inter-individual variation in the relationship between drinking trajectories and a range of variables related to health, mortality, and cognition in adults aged 60+ years.

Findings: Paper on dementia published, with a second paper looking at cognition being worked on.

Funding: The Dementia Momentum Fund, NIH grant, DCRC grant

The relationship between blood pressure and risk of cognitive decline

CHeBA staff: Matthew Lennon, Darren Lipnicki, Perminder Sachdev, Henry Brodaty

Other investigators: Dr Ruth Peters (NeuRA), Prof Alta Schutte; Contributing COSMIC study leaders and associates: Representing cohorts from 17 countries

Aims: To examine the effect of BP and antihypertensives on cognitive function in late life. Specifically:

1. The relationship of hypertension (including systolic and diastolic) with cognitive decline and all cause dementia;
2. The relationship of hypotension with cognitive decline and all cause dementia and Alzheimer's disease;
3. Differences in late life BP trajectories among those who maintain normal cognition or develop MCI/ dementia;
4. If antihypertensive treatment and type are related to risk of cognitive decline, including within BP groups;
5. Ethno-regional differences in hypertension as a risk for cognitive decline and dementia;
6. If the genetic determinants of hypertension are correlated with the genetic determinants of cognitive decline (if possible);
7. Investigate associations between BP and small vessel disease using MRI data (if possible).

Findings: The analysis included 17 studies with 34 519 community dwelling older adults (20 160 [58.4%] female) with a mean (SD) age of 72.5 (7.5) years and a mean (SD) follow-up of 4.3 (4.3) years. In the main, partially adjusted analysis including 14 studies, individuals with untreated hypertension had a 42% increased risk of dementia compared with healthy controls (hazard ratio [HR], 1.42; 95% CI 1.15-1.76; P = .001) and 26% increased risk compared with individuals with treated hypertension (HR, 1.26; 95% CI, 1.03-1.53; P = .02). Individuals with treated hypertension had no significant increased dementia risk compared with healthy controls (HR, 1.13; 95% CI, 0.99-1.28; P = .07). The association of antihypertensive use or hypertension status with dementia did not vary with baseline BP. There was no significant association of baseline SBP or DBP with dementia risk in any of the analyses. There were no significant interactions with age, sex, or racial group for any of the analyses.

The findings indicate that antihypertensive use was associated with decreased dementia risk compared with individuals with untreated hypertension through all ages in late life. Individuals with treated hypertension had no increased risk of dementia compared with healthy controls. These findings have been published in JAMA Network Open in Sept 2023.

Funding: The Dementia Momentum Fund, NIH grant, NHMRC grant

The Sydney Centenarian Study (SCS)

CHeBA staff: Perminder Sachdev, Henry Brodaty, John Crawford, Wei Wen, Nicole Kochan, Karen Mather, Fleur Harrison, Anbupalam Thalamuthu, Jiyang Jiang

Other Investigators: Catherine Browning

Aims:

- Determine the prevalence of major medical and neuropsychiatric disorders in individuals aged ≥95 years;
- Establish tools for the valid assessment of cognitive function in centenarians;
- Examine brain structure and function in centenarians and relate it to neuropathology;
- Determine the major genetic and environmental factors that influence longevity and normal cognitive function;
- Explore the determinants of 'successful ageing'.

Findings: CHeBA's Genetics and Epigenomic Group whole genome sequenced 101 SCS participants who had reached 100 years of age, which provides us with detailed information about the genetic makeup of these long-lived SCS participants. 74% of the sample sequenced were women, which reflects the gender difference in reaching 100 years or over. This newly acquired data allows us to look at different types of genetic variants, including genomic repeats - sections of DNA that can vary in their copy number and even to estimate telomere length. Telomeres are the DNA caps found at the ends of our chromosomes that have a protective function, which shorten as we age. Our preliminary results, yet to be published, suggest that centenarians do have shorter telomeres compared to younger individuals aged in their 70s.

Funding: NHMRC

Towards achieving culture-fair neuropsychological assessment for Mild Cognitive Impairment and dementia in culturally and linguistic diverse (CALD) older Australians

CHeBA staff: Zara Page (PhD Candidate), Henry Brodaty, Nicole Kochan, Karen Croot

Other Investigators: N/A

Aims: The overarching objective of this PhD project is to identify culturally-appropriate cognitive assessments for older Australians from culturally and linguistically diverse (CALD) backgrounds and create knowledge to guide the selection of the most suitable assessments for these individuals. Specific aims include:

1. To systematically review literature to identify methods that aim to reduce construct and/or item bias associated with culturally, ethnically, or linguistically diverse status in pencil-and-paper neuropsychological assessment (PnPA) or computerised neuropsychological assessment (CNA) of older adults;
2. To involve and engage older CALD community members in the design and implementation of an online survey validation of the CogSCAN Languages and Acculturation Questionnaire (CLAQ) through the introduction of a Community Working Group;
3. To establish the factor structure of the CLAQ, as a tool to capture linguistic and acculturation variables to robustly characterise CALD status;
4. To examine the relative importance of a range of linguistic and acculturation variables in explaining CALD performance on both PnPA and two CNAs;
5. To compare the level and patterns of performance between English-speaking background (ESB) and CALD participants on PnPA and CNA measures.

Funding: DCRC PhD Scholarship, The Josh Woolfson Memorial Scholarship

Towards understanding the role of gene expression in ageing and ageing-related traits

CHeBA staff: Anbupalam Thalamuthu, Karen Mather, Perminder Sachdev, Sri Chandana Kanchibhotla

Other investigators: Prof Bernhard Baune (University of Münster), Dr Liliana Ciobanu (University of Adelaide), A/Prof Nicola Armstrong (Curtin University) (CHeBA Hon. Research Fellow), A/Prof John Kwok (University of Sydney; UNSW), Prof Peter Schofield

Aim: Identify differentially expressed genes associated with ageing and ageing-related phenotypes.

Findings: This work is ongoing with analyses using data from both the Sydney Memory and Ageing Study and the Older Australian Twins Study, examining a variety of phenotypes. Heritability of gene expression in older adults using participants from the Older Australian Twins Study has been undertaken and compared with two prior studies. Genes related to the immune response were amongst the top heritable genes. This work is being written up for publication.

Funding: Yulgilbar Foundation Alzheimer's Research Program Grant, NHMRC, Thomas Foundation

Trajectories of cognitive decline before and after stroke: an individual participant data meta-analysis from the COSMIC collaboration

CHeBA staff: Jessica Lo, Perminder Sachdev, John Crawford, Darren Lipnicki

Aims: To map the trajectory of cognitive function before and after stroke in global cognition and in four cognitive domains. Secondary objective was to compare the cognitive trajectory before stroke with that of individuals without incident stroke over follow-up.

Findings: Fourteen COSMIC studies from 10 countries contributed longitudinal data of 20,945 participants to this project. Five percent of participants suffered a stroke over follow up, which ranged from 3 to 15 years. Incident stroke was associated with acute decline in global cognition, the MMSE, and all cognitive domains, as well as accelerated post-stroke decline in global cognition, and all domains except memory. There was no significant difference in the rate of decline before stroke in stroke survivors compared with the rate of decline in individuals without incident stroke in all cognitive measures. A manuscript has been submitted to a journal for review.

Funding: NIH, NHMRC

Trajectory of post-stroke depression

CHeBA staff: Jessica Lo, Perminder Sachdev

Other investigators: Dr Lena Oestreich, Dr Michael O'Sullivan, Matthew Thurston, STROKOG collaborators

Aims: To map the trajectory of post-stroke depression in STROKOG studies.

Findings: Nine STROKOG studies contributed data to this project. Analyses is continuing.

Funding: NHMRC

Untangling the mechanistic links between heart and brain health in older populations: An AI assisted toolkit for assessing dementia risk

CHeBA staff: Darren Lipnicki, Perminder Sachdev

Other investigators: Prof Blossom Stephan, A/Prof Grazziela Figueredo, Jacob Brian (University of Nottingham), Stephen Kaptoge (Cambridge University), investigators from contributing COSMIC studies

Aims: To develop novel models for predicting risk of incident dementia in the context of cardiovascular disease using artificial Intelligence (AI) methods synthesising clinical/biological, lifestyle, health, and socio-demographic data.

Findings: Data being obtained and preliminary analyses underway.

Funding: NIH, UKRI

White matter lesions and their neuropsychological correspondence using data from COSMIC

CHeBA staff: Jiyang Jiang, Wei Wen, John Crawford, Darren Lipnicki, Perminder Sachdev, Henry Brodaty, Nicole Kochan

Other investigators: Investigators from around 5 contributing studies

Aims:

1. To examine effects of age, sex, and ethnicity on WML measures;
2. To study how WML measures and changes in WML measures over time are associated with cognitive domain scores;
3. To study how WML measures and their changes over time are associated with MCI and dementia;
4. To examine how WML measures are associated with neuropsychological disorders (e.g. depression, anxiety) and motion disorders.

Findings: We have received data from Gothenburg H70, KLOSCAD (Korean Longitudinal Study on Cognitive Aging and Dementia), PATH (Personality and Total Health Through Life Study), SLAS (The Singapore Longitudinal Ageing Studies), and Sydney MAS (Memory and Ageing Study). A preliminary analysis in Gothenburg H70, KLOSCAD and Sydney MAS showed that hypertension, diabetes, history of cardiovascular diseases, stroke, inadequate physical exercises, and higher BMI were associated with greater white matter lesion burdens. These associations didn't differ between Caucasians and Asians. Analysis of all datasets is complete and results were published in the Alzheimer's Association Journal in March 2023 (https://doi.org/10.1002/dad2.12567).

Funding: NIH, Vincent Fairfax Family Foundation, John Holden Family Foundation

Completed Projects

Differential effect of family history on the risk for dementia by sex

CHeBA staff: Darren Lipnicki, Perminder Sachdev, Henry Brodaty, Nicole Kochan

Other investigators: Dr Jong Bin Bae, Prof Ki Woong Kim (Seoul University Bundang Hospital), and investigators from around 7 contributing COSMIC studies

Aims: To investigate if the association between familial history of dementia and dementia risk differs by sex; also to investigate whether the association between a familial history of dementia and dementia risk is different for a history of dementia in the father or brothers compared to a history of dementia in the mother or sisters.

Findings: Published.

Funding: NIH

Failure to identify particular odours predicts future dementia and mortality

CHeBA staff: Darren Lipnicki, Nicole Kochan, Katya Numbers, John Crawford, Julian Trollor, Henry Brodaty, Perminder Sachdev

Aim: To investigate whether the inability to identify particular odours predicted mortality, and whether similar odours also predicted future dementia.

Findings: Lower total BSIT scores significantly predicted both dementia (OR=1.24, 95%CI=1.09-1.41) and mortality (OR=1.16, 95%CI=1.03-1.30), even when accounting for dementia before death and attrition. Dementia was significantly predicted by incorrect responses to smoke, gasoline, and paint thinner, and mortality significantly predicted by incorrect responses to smoke, gasoline, and onion. These items retained their significant associations in sensitivity analyses. A manuscript being revised for submission to a new journal.

Funding: The Dementia Momentum Fund, NHMRC grant

Longitudinal investigation of the inter-relationships between depression, vascular disease, and cognition in older adults

CHeBA Staff: Simone Reppermund, Ben Lam, Louise Mewton, Wei Wen, Perminder Sachdev

Other investigators: Prof Kaarin Anstey (UNSW Sydney)

Aims: This project aims to further examine the longitudinal associations among late-life depression, vascular factors and disease (e.g., history and onset of stroke/TIA, hypertension, diabetes, hypercholesterolemia, smoking, BMI, white matter hyperintensities), and cognition using data from three longitudinal studies, Memory and Ageing Study (MAS) (> 8 years follow up), Older Australian Twin Study (OATS) (> 10 years) and Personality & Total Health (PATH) Through Life (> 16 years). We will extend the outcomes by including more neuropsychological domains (i.e., executive function, memory, attention, language and visuo-spatial) in addition to global cognition.

Findings: Findings from this research will provide evidence on the vascular mechanisms linking depression and cognition, and inform recommendations on managing depression, vascular disease, and neurocognitive disorder in late-life.

Funding: NHMRC, UNSW Scientia Fellowship

Maximising dementia risk reduction: the impact of demographic/diversity factors on a modifiable dementia risk score

CHeBA staff: Darren Lipnicki, Perminder Sachdev, Henry Brodaty, Nicole Kochan

Other investigators: A/Prof Kay Deckers, A/Prof Sebastian Köhler, A/Prof Martin van Boxtel, Stephanie van Asbroeck (Maastricht University), and investigators from around 15 contributing COSMIC studies

Aims: To investigate whether there are differences in dementia risk factor profiles (LIBRA scores) based on important demographic/diversity factors such as sex, educational level, ethnicity/race and socioeconomic status.

Findings: Accepted for publication.

Funding: NIH

Network analysis of neuropsychiatric, cognitive, and functional complications of stroke

CHeBA staff: Jessica Lo, Perminder Sachdev

Other investigators: Dr Lena Oestreich, Dr Michael O'Sullivan, STROKOG collaborators

Aims: To examine relationships among post-stroke complications and identify key features of their interrelatedness using network theory across diverse stroke cohorts.

Findings: Nine STROKOG studies contributed data to this project. Across cohorts and depression scales, a single network of interrelated post-stroke complications emerged. Networks exhibited dissociable depression, apathy, fatigue, cognitive impairment, and functional disability modules. Worry was the most central symptom in networks across all cohorts, irrespective of the scale used to measure depression. Items relating to activities of daily living were also highly central nodes. Follow-up analysis in two studies revealed that individuals who worried had more densely connected networks than stroke patients free of worry. This work was published in the journal Psychiatry Clin Neuroscience: Oestreich LK et al. Network analysis of neuropsychiatric, cognitive, and functional complications of stroke: implications for novel treatment targets. Psychiatry Clin Neurosci. 2023 Dec 19. DOI: 10.1111/pcn.13633

Funding: Vincent Fairfax Family Foundation, NHMRC

The Older Australian Twins Study (OATS)

CHeBA staff: Perminder Sachdev, Henry Brodaty, John Crawford, Teresa Lee, Karen Mather, Anne Poljak (Adjunct), Amanda Selwood, Anbu Thalamuthu, Julian Trollor, Wei Wen, Vibeke Catts

Aims:

- Find out what influences memory and thinking as we age;
- Investigate environmental influences such as lifetime physical and mental activity, socioeconomic environment, and nutrition;
- Investigate how biological factors such as hypertension and antioxidant levels interact with genes to influence brain ageing;
- Determine which influences on the ageing process are genetic, which are environmental, and how the two interact.

Findings: OATS data contributed to a significant number of publications in 2022, including:

1. Beam, C.R., et al., Estimating Likelihood of Dementia in the Absence of Diagnostic Data: A Latent Dementia Index in 10 Genetically Informed Studies. Journal of Alzheimer's Disease, 2022. 90: p. 1187-1201.
2. Brouwer, R.M., et al., Genetic variants associated with longitudinal changes in brain structure across the lifespan. Nat Neurosci, 2022. 25(4): p. 421-432.
3. Dong, C., et al., Parental Life Span and Polygenic Risk Score of Longevity Are Associated With White Matter Hyperintensities. J Gerontol A Biol Sci Med Sci, 2022. 77(4): p. 689-696.
4. Finkel, D., et al., Financial strain moderates genetic influences on self-rated health: support for diathesis–stress model of gene–environment interplay. Biodemography and Social Biology, 2022. 67(1): p. 58-70.
5. Hop, P.J., et al., Genome-wide study of DNA methylation shows alterations in metabolic, inflammatory, and cholesterol pathways in ALS. 2022. 14(633): p. eabj0264.
6. Jefferis, J., et al., The Heritability of Kidney Function Using an Older Australian Twin Population. Kidney International Reports, 2022. 7(8): p1819-1830.
7. Koncz, R., et al., The heritability of amyloid burden in older adults: the Older Australian Twins Study. J Neurol Neurosurg Psychiatry, 2022. 93(3): p. 303-308.
8. Lahti, J., et al., Genome-wide meta-analyses reveal novel loci for verbal short-term memory and learning. Molecular Psychiatry, 2022. 27: p4419-4431.
9. Li, S., et al., Early life affects late-life health through determining DNA methylation across the lifespan: A twin study. EBioMedicine, 2022. 77: p. 103927.
10. Li, X., et al., White matter hyperintensities segmentation using an ensemble of neural networks. 2022. 43(3): p. 929-939.
11. Matison, A., et al., Nature Versus Nurture – Studying the Relationships Between Diet and Depression in

Older Adults. Current Developments in Nutrition, 2022. 6(Supplement_1): p. 1118-1118.

12. Restuadi, R., et al., Polygenic risk score analysis for amyotrophic lateral sclerosis leveraging cognitive performance, educational attainment and schizophrenia. Eur J Hum Genet, 2022. 30(5): p. 532-539.
13. Revelas, M., et al., High polygenic risk score for exceptional longevity is associated with a healthy metabolic profile. GeroScience, 2022. 45(1): p399-413
14. Sonderby, I.E., et al., Effects of copy number variations on brain structure and risk for psychiatric illness: Large-scale studies from the ENIGMA working groups on CNVs. Hum Brain Mapp, 2022. 43(1): p. 300-328.

Funding: NHMRC

Polygenic risk scores for dementia and their associations with cognitive performance and brain structure

CHeBA staff: Karen Mather, Anbupalam Thalamuthu, Arjun Appavoo S/O Sambanthamoorthy (Medicine Independent Learning Project student)

Aim: To determine if dementia subtype polygenic risk scores (PRS) are associated with cognition and neuroimaging measures.

Findings: Polygenic risk scores summarise the known genetic risk for a particular trait or disease, such as Alzheimer's disease. This work tested the hypothesis that polygenic risk scores for different types of dementia are associated with cognitive performance and brain imaging measures in community-dwelling older adults. Data from both the Sydney Memory and Ageing Study and the Older Australian Twins Study was used in this study. For cognition, both cross-sectional and longitudinal analysis yielded significant and consistent results for the AD PRS with global cognition and the following subdomains: memory, verbal memory, language, and visuospatial ability. The FTD PRSs were inversely associated with the language subdomain for Sydney MAS only. There were no significant neuroimaging results. This work was written up as a Medicine ILP thesis.

Funding: NHMRC

Sex differences in white matter hyperintensities (WMH) in non-demented individuals

CHeBA staff: Abdullah Alqarni, Wei Wen, Jiyang Jiang, Perminder Sachdev

Aim: To examine the risk factors for WMHs in non-demented individuals, the possible differential trajectories for WMH progressions for men and women in mid-life and ageing process. WMHs are generally considered to be associated with cerebral small vessels disease. They are commonly found in the brains of older individuals. Significant sex differences have been reported in the severity of WMH, but there are many unknown factors for such differences, e.g., it is not yet known if the risk factors for WMH differ in men and women; are the trajectories of WMH progression for men and women different; are the major risk factors that are associated with men and women different; and how these risk factors have differential impact on men and women?

Findings: Our first study in this research theme appeared in *Neurobiology of Aging* (2021: DOI/10.1016/j.neurobiolaging.2020.11.0). Results showed that the burden of WMH was significantly higher in women compared to men, especially in the deep WMH (DWMH). In the generalized linear model that included the interaction between sex and body mass index (BMI), there was a differential association of BMI with DWMH in men and women in the exploratory sample, that is, the Sydney Memory and Aging Study, ***n*** = 432, aged between 70 and 90. The finding of a higher BMI associated with a higher DWMH in men compared to women was replicated in the Older Australian Twins Study sample, ***n*** = 179, aged between 65 and 90. The risk factors of WMH pathology are suggested to have a different impact on the aging brains of men and women.

Our second study examined the moderation effects of hormonal factors on the relationship between vascular risk factors and WMH volumes. Results showed that in men with testosterone levels one standard deviation (SD) higher than the mean value, increased body

mass index and pulse wave velocity, and smoking were associated with higher WMH volumes. The association between body mass index and WMH was more significant in the periventricular white matter regions, whilst the relationship between pulse wave velocity and WMH was restricted to deep white matter regions. Men with low testosterone levels (one SD below the mean level) showed a significant association between hypercholesterolemia and higher deep WMH volumes. Hypertensive women showed higher WMH volumes than women without hypertension regardless of whether hormone replacement therapy was used. However, higher WMH volumes, especially in the deep white matter regions, were found in women who did not use hormone replacement therapy or use it for a shorter duration. These findings highlighted the importance of considering hormonal risk factors in the prevention and management of WMH. The manuscript has been accepted for publication in Brain Imaging and Behavior (Manuscript number: BIOR-D-22-00189).

The third study aims to examine the longitudinal changes of WMH using Sydney Memory and Ageing Study data. The manuscript is being revised internally.

Funding: NHMRC, John Holden Family Foundation and a PhD scholarship provided by Saudi government

The prevalence of poor mobility in older adults

CHeBA staff: Darren Lipnicki, Perminder Sachdev, Henry Brodaty, Nicole Kochan

Other investigators: Dr Caterina Rosana, Dr Briana Sprague (University of Pittsburgh), Prof Joe Verghese (Albert Einstein College of Medicine), Dr Kim Delbaere (NeuRA), investigators from around 14 contributing COSMIC studies

Aims:

1. Is the prevalence of poor mobility (via objective measure of gait speed and self-reported measures of physical disability such as ADL/IADLs) similar across countries, and
2. What are the most common predictors of poor mobility across countries?

Findings: Published.

Funding: NIH

Stroke recovery associated with cognitive impairment: A population-based study

CHeBA staff: Perminder Sachdev, Jessica Lo, John Crawford

Other investigators: Dr Clare Flach and A/Prof Majed Obaid (King's College London) and other STROKOG collaborators

Aims: To determine how cognitive impairment in the first three months after stroke is associated with physical, mental, social and care needs up to five years post-stroke.

Findings: Individuals who were cognitively impaired three months after stroke were at significantly increased risk of depression and disability in long-term follow-up. A number of drafts have been circulated with co-authors. Majed has submitted the results as a part of his PhD thesis.

Funding: Vincent Fairfax Family Foundation, NHMRC

Appendices

Appendix A: Staff List

Leadership

Henry Brodaty
Scientia Professor, Co-Director CHeBA, Co-Leader Epidemiology Group

Perminder Sachdev
Scientia Professor, Co-Director CHeBA, Co-Leader Epidemiology Group, Leader Neuropsychiatry Group

Sophia Dean
Centre Manager (from 5 June 2023)

Angela (Angie) Russell
Centre Manager (until 4 July 2023)

Vibeke Catts
Research Manager

Heidi Douglass
Team Lead – Innovations & Communications

Academic Staff

Adam Bentvelzen
Research Fellow, Senior Neuropsychologist, ADNet Project (ADNet-MC Initiative – until 30 June 2023), Senior Research Associate, Centres of Research Excellence for Vascular Cognitive Disorders (CRE-VCD)

Claire Burley
Postdoctoral Fellow, PCC in Sub-acute Care Study

Kim Burns
Research Associate, Update to dementia behaviour management app - 4-G3D95QC Project (until 31 Oct 2023)

Lynn Chenoweth
Professor of Nursing, Leader of the NHMRC-DCRC World Class Project – Improving health outcomes, well-being and care of people living with dementia in the hospital setting (PCC in Sub-acute Care Study – until 30 Nov 2023)

Meredith Gresham
Research Fellow, COGNISANCE Project Co-ordinator (until 31 October 2023)

Tessa Helman
Postdoctoral Fellow, Brain Ageing Research Laboratory

Tharusha Jayasena
Postdoctoral Fellow, Molecular Biomarkers Group

Jiyang Jiang
Postdoctoral Fellow, Neuroimaging Laboratory

Nicole (Nicky) Kochan
Research Fellow, Leader of the CogSCAN Study, Co-Leader of the Neuropsychology Group

Amit Kumar
Postdoctoral Fellow, Data Scientist

Chun Pan (Ben) Lam
Postdoctoral Fellow, STROKOG Project Co-ordinator (until 10 Feb 2023)

Darren Lipnicki
Postdoctoral Fellow, COSMIC Consortium Co-ordinator

Xiaoping Lin
Senior Research Associate, Australian Consortium for Aged Care Quality Metric Evaluation Toolbox Project

Jessica (Jess) Lo
Research Associate, STROKOG Consortium Co-ordinator

Karen Mather
Senior Research Fellow, Leader of the Genomics & Epigenomics Group

Louise Mewton
Senior Research Fellow, UNSW Scientia Program of Research (until 29 Feb 2023)

Adith Mohan
Senior Lecturer, PhD Candidate

Katya Numbers
Postdoctoral Fellow, Project Co-ordinator of the Memory and Ageing Study (MAS2)

Matt Paradise
Senior Research Fellow, Medical Fellow in the ADNeT Project (ADNet-MC Initiative) (until 30 June 2023)

Danit Saks
Postdoctoral Fellow, Vascular Contributions to Dementia - Centre of Research Excellence (VCD-CRE)

Suraj Samtani
Postdoctoral Fellow, SHARED Project Co-ordinator (until 31 December 2022) / Dementia Australia Research Foundation Fellow

Anbupalam (Anbu) Thalamuthu
Senior Research Fellow

Ashleigh Vella
Postdoctoral Fellow, COSMIC and IGEMS

Stephanie Ward
Senior Research Fellow, Clinical Leader of the ADNet Project (ADNet-CQR Initiative)

Wei Wen
Associate Professor, Leader of the Neuroimaging Group, Director Neuroimaging Laboratory

Professional & Technical Staff – Research

Valerie Arsenova
Research Officer, ADNet Project (ADNet-MC & ADNet-CQR Initiatives) (until 28 April 2023)

Matthew Barwell
Research Assistant, Memory and Ageing Study 2 (MAS2)

Josephine (Josie) Bigland
Research Assistant (casual), CHeBA Longitudinal Studies (until 7 July 2023)

Anne-Nicole Casey
Research Officer (casual), Update of Behavioural & Psychological Symptoms of Dementia (BPSD) Handbook Project

Karina Chan
Research Officer, Purple Foods Project

Tiffany Chau
Research Officer, Memory and Ageing Study 2 (MAS2)

Rory (Xinyue) Chen
Senior Project Officer, Dementia Platforms Australia (DPAU) Project

John Crawford
Senior Statistician, CHeBA Longitudinal Studies

Sarah Davies
Research Assistant, Rethink My Drink Project (until 10 February 2023)

Naja Fragnate
Data Officer

Sumangali (Sumi) Gobhidharan
Research Officer, Genomics & Epigenomics Group

Gurpreet Hansra
Research Assistant (casual), VCD-CRE

Fleur Harrison
Research Assistant, OAM Study and Patient Centre Care (PCC) in Sub-acute Care Study (until 30 Nov 2023), Research Assistant (casual), CHeBA Longitudinal Studies / OATS

Shizuka Hayashi
Research Assistant (casual), CHeBA Longitudinal Studies

Mai Phuong Ho
Research Assistant (casual), CHeBA Longitudinal Studies

Nicholas Hoy
Research Assistant, COSMIC Alcohol Study (until 7 April 2023)

Sri Chandana Kanchibotla
Research Assistant, Genomics & Epigenomics Group

Inga Mehrani
Project Manager, The Australian Dementia Network (ADNet) Project

Zara Page
Student Assistant, CHeBA Longitudinal Studies
Research Assistant (casual); BPSD, eDiVA and ACAC-QMET Projects

Juan Carlo San Jose
Research Officer (casual), Older Australian Twins Study (OATS) Online

Amanda Selwood
Research Assistant, Memory and Ageing Study 2 (MAS2)

Deena Sharabas
Research Assistant, Memory and Ageing Study 2 (MAS2)

Khawar Sohail Siddiqui
Research Assistant (casual), CHeBA Biobank VCD-CRE

Mayouri Sukhapure
Research Assistant, Patient Centre Care (PCC) in Sub-acute Care Study (until 31 October 2023)

Emily Swift
Research Officer, Functional Neurological Disorders (FND) Project

Marina Ulanova
Research Assistant, Brain Ageing Research Laboratory (until 3 Sep 2023)

Rachel Visontay
Research Assistant, COSMIC Alcohol Study (until 17 March 2023)

Virginia Winter
Research Officer, Rethink My Drink Project (until 7 April 2023)

Professional & Technical Staff – Support

Belinda Cooper
Digital Communications Officer

Sophia Dean
Administrative Officer (until 4 June 2023)

Janelle Burns
Engagement & Projects Officer

Helena Hudson
Project Administrator

Rachel Tarlinton
Project Administrator

UNSW Adjunct & Conjoint Staff

Catherine Browning
Adjunct Associate Lecturer

Premilla Chinnappa-Quinn
Adjunct Lecturer

Michael Connors
Conjoint Senior Lecturer

Karen Croot
Adjunct Senior Lecturer

Brian Draper
Conjoint Professor

Heidi Foo
Adjunct Associate Lecturer

Megan Heffernan
Conjoint Lecturer

Tiffany Jessop
Adjunct Lecturer

Rebecca Koncz
Adjunct Senior Lecturer

Elizabeth (Li-Jung) Ku
Adjunct Fellow (from Aug 2023)

Teresa Lee
Conjoint Senior Lecturer (until 2 Sep 2023)

Matthew Paradise
Adjunct Senior Lecturer (from July 2023)

Anne Poljak
Adjunct Senior Lecturer, Protein Chemist, Study Coordinator, Molecular Biomarkers Group

Matilda Rossie
Adjunct Associate Lecturer (from Sep 2023)

Kuldip Sidhu
Adjunct Associate Professor

Anne Wand
Adjunct Associate Professor

UNSW Honorary Academics

Lynn Chenoweth
Honorary Professor (from Dec 2023)

UNSW Visiting Fellows

Jessica Baker
Visiting Fellow

Kim Burns
Visiting Fellow (from Nov 2023)

Jing Du
Visiting Fellow

Meredith Gresham
Visiting Fellow (from Nov 2023)

Satoshi Hosoki
Visiting Fellow

Ben (Chun Pan) Lam
Visiting Fellow

Louise Mewton
Senior Visiting Fellow (from Feb 2023)

Janet Mitchell
Visiting Fellow

Michael Valenzuela
Senior Visiting Fellow

Appendix B: External Appointments

Dr Adam Bentvelzen

- Alzheimer's Association International Society to Advance Alzheimer's Research and Treatment (ISTAART) Professional Membership

Professor Henry Brodaty

- Scientia Professor, Ageing and Mental Health, (previously Professor of Psychogeriatrics, 1990-2010), Discipline of Psychiatry & Mental Health, UNSW Sydney (2011-present)
- Montefiore Chair of Healthy Brain Ageing (2012-2022)
- Head (and Founder), Memory Disorders Clinic, Prince of Wales Hospital (1985-2018)
- Senior Psychogeriatrician, Old People's Mental Health Service, Prince of Wales Hospital (1990-present) Member, International Advisory Committee of the National Institute of Dementia, South Korea (2013-present)
- Honorary Professorial Fellow, Black Dog Institute (1990-2000)
- Professorial Fellow, Black Dog Institute (2000-present)
- Honorary Professor, Kiang Wu Nursing College, Macau (2014-present)
- Chair, Australian Institute for Health and Welfare, Dementia Advisory Committee (2021-2024)
- Honorary Lifetime Vice-President, Alzheimer's Disease International (ADI) (2005-present)
- Honorary Medical Advisor, Dementia Australia NSW (1992-present)
- Ambassador for Dementia Australia (2015-present)
- Member, Australian Advisory Board for Nutricia, (2012-present)
- Ambassador, Montefiore Homes (2006-present)
- Chair, Clinical Advisory Committee, Montefiore Homes (2012-present)
- Expert Advisory Panel, NHMRC National Institute for Dementia Research (2016-present)
- Dementia Expert Advisory Panel, Commonwealth Department of Health (2022-present)
- Member, International Research Network for Dementia Prevention Advisory Group (2017-present)
- Member, Psychotropics Clinical Care Standard Topic Working Group, Australian Commission for Quality and Safety in Health Care (2022-2023)
- WHO Blueprint for dementia research working group and WHO mhGAP Guidelines Development Group – guidelines for mental health management especially for LMIC (2022-present)
- Editorial board member for the following journals: *Aging and Mental Health* (1996-present), *Alzheimer Disease and Associated Disorders: an International Journal* (1995-present), *Alzheimers and Dementia: Journal of the Alzheimers Association* (2005-present), *Australian and New Zealand Journal of Psychiatry* (1981-present), *CNS Drugs* (1999-present), *Dementia and Geriatric Cognitive Disorders* (2010-present), *Neurodegenerative Disease Management* (2010-present), *The Australian Journal of Dementia Care* (2012-present)
- Deputy Editor, *International Psychogeriatrics* (2017-present)

Dr Anne-Nicole Casey

- Resource reviewer, World Health Organization (WHO) Global Dementia Observatory (GDO) Knowledge Exchange Platform (2019-present)
- Expert advisor, Interdisciplinary and mixed-methods Delphi process led by the Canadian Alliance for Social Connection and Health to develop the world's first public health guidelines for social connection (2023-present)

Dr Vibeke Catts

- Member, Behavior Genetics Association (2019-present) and Australian Society for Medical Research (2006-present)

Professor Lynn Chenoweth

- Adjunct Professor in Medicine & Nursing; The University of Notre Dame Australia (2021-present)
- Adjunct Professor in Nursing, Midwifery and Health; Western Sydney University
- Board Member, Australian Multicultural Aged Nursing Pty Ltd (AMAN)
- Member of the following research committees: Research Advisory and Review Committee, Dementia Australia; Human Research Ethics Committee B, UNSW; War Memorial Hospital Research Committee
- Research Grant Review panel member: NHMRC Health Services Research, Health Promotion & Ageing discipline Project Grants
- Editorial Board member in *Journal of Older People Nursing, Older People Nursing Journal, Austin*

Journal of Nursing and Health Care, Open Nursing Research Journal, Worldviews on Evidence-based Nursing, Annals of Alzheimer's and Parkinson's Disease, Future Medicine – Neurodegenerative Disease Management, Healthcare Journal, Geriatrics Journal

Fleur Harrison

- Student Member, Australian Psychological Society (2016-present)
- Member, Alzheimer's Association International Society to Advance Alzheimer's Research and Treatment (ISTAART) (2011-present)
- Member, Australian Association of Gerontology (2016-present)

Dr Nicole Kochan

- Member ADNeT-Memory Clinics Steering Committee (2020-present)
- Honorary Associate, Department of Psychology, Macquarie University (2007-present)
- Member Steering Committee, UNSW Psychiatry Forums for General Practitioners and for Psychiatrists (2018-2019)
- Renji UNSW CHeBA Neurocognitive Centre (RUCNC) – Clinical Reviews Panel – collaboration with Renji Hospital, Jiao Tong University, Shanghai China (2018-present)

Dr Rebecca Koncz

- Senior Lecturer, Specialty of Psychiatry, Faculty of Medicine and Health, Concord Clinical School, The University of Sydney (2018-present)
- Clinical academic neuropsychiatrist, Sydney Local Health District (2017-present)
- Adjunct Senior Lecturer, Discipline of Psychiatry and Mental Health, UNSW Sydney (August 2020-present)
- Advisory board member, Australian and New Zealand Journal of Psychiatry (2022-present)
- Member, Australian Association of Developmental Disability Medicine (2022-present)
- Member, "Motivation" taskforce, The Human Affectome Project (2017-present)
- Fellow, Royal Australian and New Zealand College of Psychiatrists (RANZCP) (2017-present)
- Member, Section of Neuropsychiatry, RANZCP (2017-present)
- Member, Section of Psychiatry of Intellectual and Developmental Disabilities, RANZCP (2017-present)
- Member, "intellectual disability" advisory group for the Australian Dementia Network (ADNet) revised Memory and Cognition Clinic Guidelines

Dr Matthew Lennon

- Member, Australian and New Zealand Association of Neurologists
- Member, Australian Medical Association
- Conjoint Associate Lecturer, University of New South Wales
- Editorial Board, *Journal of Alzheimer's Disease*

Dr Darren Lipnicki

- Associate Editor in *Frontiers in Dementia* (Section: Aging and Risk Factors for Dementia)
- Review Editor in *Frontiers in Epidemiology* (Section: Neurological and Mental Health Epidemiology)
- Adjunct and Graduate Faculty (Co-supervisory role and supervisory committee member role) in the Department of Psychology, Faculty of Arts, University of Prince Edward Island, Canada; 15 Sept 2023 - 14 Sept 2026

Dr Karen Mather

- Associate Editor, Genetics and Biomarkers of Dementia, Frontiers in Dementia (2023-present)
- Member, Australasian Neuroscience Society (2023-present)
- Member, Australian Association Gerontology (2020-present)
- Member, ISTAART (2015-present)
- Member, Australasian Epigenetics Alliance (2023-present)

Dr Adith Mohan

- Senior Staff Specialist, Neuropsychiatry, SESLHD
- Site Chair for ECT, Prince of Wales Hospital, Eastern Suburbs Mental Health Service, SESLHD
- Chair, Mental Health Medical Staff Council, SESLHD
- NSW Jurisdictional Representative, Section of Neuropsychiatry, RANZCP

Dr Katya Numbers

- Associate Investigator of the Ageing Future Institutes, UNSW (2020-present)
- Member of the Australian Human Rights Institute, UNSW (2022-present)
- Member of the Alzheimer's Association International Society to Advance Alzheimer's Research and Treatment (ISTAART), Alzheimer's Association (2019-present)
- Member of the ISTAART Subjective Cognitive Decline PIA, Alzheimer's Association (2019-present)
- Member of the ISTAART Dyadic Patterns of Subjective Cognitive Complaints PIA, Alzheimer's Association (2019-present)
- Editor of journals *PLOS ONE* (2020 – Present), *Frontiers in Ageing Neuroscience* (2020-present), *Frontiers Ageing Psychiatry* (2020 – Present), *BMC Psychology* (2023-present)

Zara Page

- Alzheimer's Association International Society to Advance Alzheimer's Research and Treatment (ISTAART) Ambassador (March 2022 - March 2023)
- Alzheimer's Association International Society to Advance Alzheimer's Research and Treatment (ISTAART) Lead Ambassador (March 2023 - March 2024)
- ISTAART AWARE PIA Steering Committee Member (August 2023-present)
- HDR Representative, Discipline of Psychiatry HDR Research Committee (2022-present)

Dr Matthew Paradise

- Clinical appointments as a VMO Psychogeriatrician (Campbelltown 1day/week; Tamworth 2days/month; Coffs Harbour 2days/month).

Dr Anne Poljak

- Senior Research Scientist, Bioanalytical Mass Spectrometry Facility, Mark Wainwright Analytical Centre, UNSW Sydney
- Conjoint Lecturer, School of Medical Sciences, UNSW Sydney
- Member, Scientific Review Committee, NSW Brain Bank Network (NSWBBN)
- Member, Scientific Advisory Committee, Rebecca L. Cooper Medical Research Foundation
- Member, Cochrane Community
- Reviewer, Alzheimer's Association International Conference (biomarkers, non-neuroimaging)

Associate Professor Simone Reppermund

- Associate Editor Scientific Reports (2023-present)
- Associate Editor Neurodegenerative Diseases (2021-2023)
- NHMRC grant review panel member
- Postgraduate Coordinator, Discipline of Psychiatry and Mental Health, UNSW (2022-present)
- School of Clinical Medicine Research Committee representative (2023-present)
- Member of the Academic Promotion Committee at the Faculty of Engineering (2023-2024)

Professor Perminder Sachdev

- Scientia Professor, Neuropsychiatry (previously Professor of Neuropsychiatry, 1999-2009), School of Psychiatry, UNSW (2009-present)
- Clinical Director, Neuropsychiatric Institute, Prince of Wales Hospital, Sydney (1987-present)
- Visiting Fellow, Australian National University (2009-present)
- Visiting Professor, Jiao Tong University, Shanghai (2018-present)
- Committee Member of the WHO's Expert Advisory Committee for the Global Dementia Observatory (GDO)
- Executive Member of the International Society of Vascular Behavioural and Cognitive Disorders (VASCOG) (2012-present)
- Member, Neurocognitive Disorders Work Group for DSM-5 (2007-present)
- Member of the International Advisory Group for the Revision of ICD-10 Mental and Behavioural Disorders and the International Advisory Group for the Revision of ICD-10 Diseases of the Nervous System, WHO ICD-11 Expert Working Group on Neurocognitive Disorders (2011-present)
- President-Elect of the International College of Geriatric Psychoneuropharmacology (2012-present)
- Executive Member of the International Society of Vascular Behavioural and Cognitive Disorders (VASCOG) (2012-present)
- Member, Expert Advisory Panel, NHMRC National Institute for Dementia Research

- Founding Executive Committee Member of the Tourette Syndrome Association of Australia (1989-present)
- Scientific Advisory Committee Member of the Alzheimer's Association of Australia (1995-present)
- Committee Member on Psychotropic Drugs and Other Physical Treatments, Royal Australian and New Zealand College of Psychiatrists (1996-present)
- Chair of the Medical Advisory Committee of the Tourette Syndrome Association of Australia (1996-present)
- Chair of the Section of Neuropsychiatry, RANZCP (2005-present)
- Fellow of the Australian Academy of Health & Medical Sciences (2015-present)
- Fellow of the NHMRC Academy (2011-present)
- Member of the NHMRC Assigner's Academy (2012-present)
- Australian Advisory Board of Biogen (2018-present)
- Alzheimer's Disease Advisory Board – Biogen Australia and New Zealand (2021-present)
- Advisory Board of Roche Australia (2021-present)
- Invited Member, Task Force of the International League Against Epilepsy (2011-present) Neuropsychobiology Commission (2011-present)
- Deputy Director, Alzheimer's Disease Network (ADNeT)
- Committee Member, Ageing Futures Institute, UNSW Sydney
- Member of the Dean's Advisory Committee, UNSW (1995-present)
- Member of the Scientific Steering Committee, Neuroscience Institute of Schizophrenia and Allied Disorders (NISAD), Garvan Institute, Sydney (1996-present)
- Chair of the Scientific Review Committee of the Division of Psychiatry, ESAHS Eastern Section (1996-present)
- Member of the Ministerial Advisory Committee for Psychosurgery in NSW (1996-present)
- Member of the Faculty of Medicine Research Committee, UNSW (2005-present)
- Member of the Brain Sciences UNSW Executive Committee (2008-present)
- Member of the Awards Committee at the School of Psychiatry, UNSW (2010)
- Overseas Ambassadors Advisory Group (2014-present)
- Member of the UNSW Microbiome Research Centre's Advisory Committee (2021-present)
- Editorial board member for the following journals: *Current Opinion in Psychiatry* (Neurocognitive Disorders section), *Middle Eastern Journal of Ageing, Middle Eastern Journal of Psychiatry & Alzheimer's, Brain and Mind Matters, The Open Neuroimaging Journal, International Psychogeriatrics, Alzheimer's & Cognitive Disorders*

Dr Suraj Samtani

- Member of Australian Psychological Society, Australian Clinical Psychology Association
- Sessional Lecturer (Child and Adolescent Brain Development), NYU Sydney (Feb-July 2023)
- Clinical Psychologist, Sunrise Psychology Group Pty Ltd. (March 2023-present)

Appendix C: Students

Current

Toyin Abdulsalam Ademola

Scientia PhD student

Bioinformatics using multi-omics data integration strategies to predict age-related phenotypes and longevity

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Prof Perminder Sachdev, Dr Karen Mather, Dr Anbu Thalamuthu, Dr Anne Poljak, Prof Marc Wilkins (School of Biotechnology and Biomolecular Sciences)

Mohammed Ali Saeed Alghamdi

PhD student

An investigation of the altered functional connectivity in relation to cerebrovascular burden

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: A/Prof Wei Wen, Dr Jiyang Jiang

Fatemeh Amjadimoheb

PhD student

Circular RNAs as modulators of longevity and healthy ageing

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Dr Karen Mather, Dr Anbu Thalamuthu

Chao Dong

Scientia PhD student

Genetic and environmental influences on human brain changes in ageing

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: A/Prof Wei Wen, Dr Jiyang Jiang, Dr Karen Mather, Dr Anbu Thalamuthu, Prof Perminder Sachdev

Gurpreet Kaur Hanstra

PhD student

Blood biomarkers for the diagnosis and prognosis of vascular dementia

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Prof Perminder Sachdev, Dr Anne Poljak, Dr Tharusha Jayasena

Shizuka Hayashi

PhD student

Enlarged perivascular spaces in the ageing brain, automated detection using deep learning, and analysis of their association with vascular risk factors

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: A/Prof Wei Wen, Dr Jiyang Jiang, Prof Perminder Sachdev, Prof Dadong Wang, A/Prof Yang Song

Fleur Harrison

PhD student

Apathy in older community-dwelling persons: improving assessment, investigating its association with immune markers, differentiating from depression and fatigue and modelling its longitudinal course

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Prof Henry Brodaty, Dr Liesbeth Aerts, Dr Katrin Seeher, Prof Adam Guastella, Prof Julian Trollor, Prof Andrew Lloyd

Mai Phuong Ho

PhD student

Evaluating cerebrovascular burden in ageing brains through normative modelling

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: A/Prof Wei Wen, Dr Jiyang Jiang, A/Prof Yang Song (School of Computer Sciences and Eng), Prof Perminder Sachdev

Nikita Hussein

PhD student

Impacts of cerebrovascular burden in vascular cognitive impairment across ethnicities: East Asians and whites

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: A/Prof Wei Wen, Dr Jiyang Jiang, Prof Perminder Sachdev

Chulkyu Kim

PhD student

Exploring multi-omics profiling and novel neurotherapeutic strategies to promote healthy brain ageing with clinical relevance to Alzheimer's disease

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisor: Prof Perminder Sachdev

Matthew Lennon

PhD student

Blood pressure, antihypertensive use and dementia risk – an international harmonisation of longitudinal studies

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health, and St Vincent's Clinical School, UNSW

Supervisors: Prof Perminder Sachdev, Dr Anbu Thalamuthu, Dr John Crawford, Dr Ben Lam

Keshuo Lin

PhD student

Poststroke white matter hyperintensity, its progression, relationships with cognitive change

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health, and St Vincent's Clinical School, UNSW

Supervisors: Dr Jiyang Jiang, A/Prof Wei Wen

Ping-Hsui Lin

PhD student

Development, validation and implementation of a computerised tool to assess instrumental activities of daily living

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: A/Prof Simone Reppermund, Dr Katya Numbers

Jessica Lo

PhD student

Vascular risk factors for cognitive impairment and dementia

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Prof Perminder Sachdev, Dr John Crawford, Dr Heidi Welberry

Annabel Matison

PhD student

Examining the relationship between diet, depression and nutrigenomics

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health, and St Vincent's Clinical School, UNSW

Supervisors: Dr Karen Mather, A/Prof Simone Reppermund

Adith Mohan

PhD student

Human brain transcriptome changes during ageing - a post-mortem brain tissue study – a large multi-site RNA sequencing study investigating age-related change in the human brain transcriptome

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Prof Perminder Sachdev, Dr Karen Mather, Dr Anbu Thalamuthu

Zara Page

PhD student

Towards achieving culture-fair neuropsychological assessment for mild cognitive impairment and dementia in culturally and linguistic diverse (CALD) older Australians

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Prof Henry Brodaty, Dr Nicky Kochan, Dr Karen Croot

Alice Powell

PhD student

Exceptional cognition in old age and interactions with other aspects of successful ageing

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Prof Henry Brodaty, Prof Perminder Sachdev, Dr Nicky Kochan

Devashree Vakil

PhD student

Mesenchymal stem cell exosomes as a therapeutic strategy in Alzheimer's disease

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: A/Prof Kuldip Sidhu, Prof Perminder Sachdev

Mark Yates

PhD student

The impact of the Dementia Care in Hospitals Program in improving the quality of life and adverse events in acute hospital patients with cognitive impairment: a stepped wedge cluster randomized trial

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Prof Henry Brodaty, Prof Brian Draper

Completed

Dr Andrew Affleck, PhD

Effects of anti-hypertensive medications on Alzheimer's and cerebrovascular disease brain pathology

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Prof Perminder Sachdev, Prof Glenda Halliday (USyd)

PhD conferred: May 2023

Dr Abdullah Alqarni, PhD

Sex differences in risk factors for white matter hyperintensities in non-demented older individuals

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: A/Prof Wei Wen, Dr Jiyang Jiang, Prof Perminder Sachdev

PhD conferred: Nov 2023

Dr Jing Du, PhD

Investigation of cerebrovascular burden using neuroimaging techniques in ageing brains

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: A/Prof Wei Wen, Dr Jiyang Jiang

PhD conferred: Aug 2023

Kathleen Irena, Masters in Health Data Science

Examining the relationship between fruit and vegetable intake and DNA methylation in older adults

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Dr Karen Mather, Dr Anbu Thalamuthu

Masters conferred: Dec 2023

Dr Rebecca Koncz, PhD

The heritability of cerebral amyloid in older people and its relationship to vascular risk factors, cerebral small vessel disease and cognition

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Prof Perminder Sachdev, Prof Christopher Rowe (Austin Health, Melbourne), A/Prof Wei Wen, Dr Anbu Thalamuthu

PhD conferred: Mar 2023

Dr Mary Revelas, PhD

The genetics of exceptional longevity and successful ageing

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Dr Karen Mather, Dr Anbu Thalamuthu, Prof Perminder Sachdev

PhD conferred: Dec 2023

Dr Annette Spooner, PhD

Predicting dementia using machine learning

School of Computer Science and Engineering (CSE), Faculty of Engineering, UNSW

Supervisors: Prof Arcot Sowmya (CSE), A/Prof Gelareh Mohammadi (CSE), Prof Perminder Sachdev

PhD conferred: May 2023

Honours and ILP Students

Jason Chen

Honours student

How well do changed behaviours predict cognitive decline in community samples

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Prof Henry Brodaty, Dr Katya Numbers

Arjun Appavoo Sambanthamoorthy

ILP student

Polygenic risk scores for different dementia subtypes and their associations with cognitive performance and brain structure in older adults

Discipline of Psychiatry and Mental Health, School of Clinical Medicine, UNSW Medicine and Health

Supervisors: Dr Karen Mather, Dr Anbu Thalamuthu

Appendix D: Awards and Promotions

Dr Claire Burley

2023 Winner of the CHeBA Publication Awards (early-career researcher category)

Views of people living with dementia and their families/ care partners: helpful and unhelpful responses to behavioral changes. *Int Psychogeriatr.* 2023 Feb; 35(2):77-93. DOI: 10.1017/S1041610222000849. PMID: 36330686 [ePub 2022 Nov 4]

Gurpreet Hansra

Kwan Fung and Yuet Ying Fung Healthy Brain Ageing Research Award Fund (top-up scholarship)

Dr Jiyang Jiang

William H. Gates Sr. Fellowship from the Alzheimer's Disease Data Initiative (ADDI)

Dr Matt Lennon

2023 Winner of the CHeBA Publication Awards (student category)

Use of Antihypertensives, Blood Pressure, and Estimated risk of Dementia in late-life: An individual participant data meta-analysis. *JAMA Network Open.* 2023 Sep; 6(9):e2333353. DOI: 10.1001/ jamanetworkopen.2023.33353. PMID: 37698858 / PMCID: PMC10498335 [ePub 2023 Sep 21]

Dr Katya Numbers

Dementia Australia Research Foundation Project Grant for the project *Functional cognition screening to detect pre-clinical functional decline in everyday activities in older adults: which tool is fit for purpose?* Investigators: Wesson J (USyd), Reppermund S, Numbers K, Brodaty H

UNSW Faculty of Medicine Collaborative Scheme for the project *Listen to your heart and mind*. Investigators: Tan I (MQ), Schutte A (George Institute & UNSW), Sharma M (MQ), Brodaty H, Numbers K, Catherine Morgan (previously NAL)

Annabel Matison

Nutrition Society of Australia Student Travel Grant 2023

Zara Page

ISTAART Ambassador AAIC Travel Grant

UNSW Discipline of Psychiatry & Mental Health HDR funds

Josh Woolfson Memorial Scholarship

Associate Professor Simone Reppermund

Professor Vera Morgan Medal 2023 for an outstanding contribution to mental health epidemiology

Dementia Australia Research Foundation Project Grant for the project *Functional cognition screening to detect pre-clinical functional decline in everyday activities in older adults: which tool is fit for purpose?* Investigators: Wesson J (USyd), Reppermund S, Numbers K, Brodaty H

Dr Mary Revelas

2023 Deans Award for Outstanding PhD Thesis *The genetics of exceptional longevity and successful ageing*

Appendix E: Research Grants & Funding

Grants

Mapping the neurobiological risks and consequences of alcohol use in adolescence and across the lifespan

Funding Source:	University of Sydney / National Institutes of Health Subaward
Project ID:	RG240324
Investigator/s:	A/Prof Louise Mewton, A/Prof Wei Wen*
Duration:	5 years; Sep 2023 – Apr 2028
Total Funds:	USD1,275,511 (*USD184,304 / $279,502.58 only)

The Australian Dementia Network (ADNeT): Bringing together Australia's dementia stakeholders – interim payment

Funding Source:	University of Melbourne / NHMRC Boosting Dementia Research Grant Shared Grant – Department of Health and Aged Care Contribution
Project ID:	RG234243
Investigator/s:	Prof Christopher Rowe, Prof Perminder Sachdev*, Prof Sharon Naismith, Prof Michael Breakspear, Prof Henry Brodaty, Prof Kaarin Anstey, Prof Ralph Martins, Dr Stephanie Ward, Prof James Vickers, Prof Colin Masters
Duration:	1 year; 2024
Total Funds:	*$298,936

The Mindgardens Functional Neurological Disorders (FND) Clinic – evaluation of feasibility and effectiveness of an interdisciplinary tertiary FND clinic with a nested brief psycho-behavioural intervention study

Funding Source:	Mindgardens Neuroscience Network / Translational Research Grants
Project ID:	RG233718
Investigator/s:	Dr Adith Mohan
Duration:	2 years; Oct 2023 – Jan 2025
Total Funds:	$150,000

Predicting all-cause dementia risks in low- and middle-income countries

Funding Source:	Alzheimer's Disease Data Initiative / William H. Gates, Sr. Fellowship
Project ID:	RG232396
Investigator/s:	Dr Jiyang Jiang
Duration:	2 years; Aug 2023 – Aug 2025
Total Funds:	USD100,000 ($154,202)

Emerging researchers in ageing - for student Zara Page

Funding Source:	Emerging Researchers in Ageing (ERA) / CEPAR – Travel Exchange Program
Project ID:	RG230250
Investigator/s:	Prof Henry Brodaty, Ms Zara Page
Duration:	1 year; 2023
Total Funds:	$8,000

The Australian Consortium for Aged Care - Quality Measurement Toolbox (ACAC-QMET): Improving quality of care through better measurement and evaluation

Funding Source:	South Australian Health and Medical Research Institute Limited (SAHMRI) / MRFF Dementia Ageing and Aged Care Mission Shared Grant
Project ID:	RG223129
Investigator/s:	Dr Stephanie Ward, Maria Inacio, Johanna Westbrook, Len Gray et al.
Duration:	4 years; Jun 2022 – May 2025
Total Funds:	$152,886

A randomised controlled trial for a co-designed social cognitive skills intervention for older adults with memory concerns

Funding Source:	Dementia Australia Research Foundation / DGP Post-doctoral Fellowships
Project ID:	RG222862 / RG222862-A
Investigator/s:	Dr Suraj Samtani
Duration:	4 years; June 2023 – Jun 2026
Total Funds:	$405,000

Living with uncertainty: What information do people with mild cognitive impairment and families need and want after diagnosis?

Funding Source:	Australian Association of Gerontology / The Hal Kendig Research Development Program
Project ID:	RG222382
Investigator/s:	Dr Meredith Gresham
Duration:	3 years; Nov 2022 – Apr 2024
Total Funds:	$17,979

A global epidemiology of cognitive impairment and dementia due to Alzheimer's disease and related disorders: the COSMIC collaboration

Funding Source:	National Institutes of Health (NIH) / Research on Current Topics in Alzheimer's Disease and Its Related Dementias
Project ID:	RG220087
Investigator/s:	Prof Perminder Sachdev, Dr Vibeke Catts, Ms Rory Chen, Dr John Crawford, Dr Jiyang Jiang, Prof Louise Jorm, Dr Nicole Kochan, Dr Ben Chun Pan Lam, Dr Darren Lipnicki, Dr Karen Mather, A/Prof Louise Mewton, Dr Anbu Thalamuthu, A/Prof Wei Wen
Duration:	5 years; Sep 2023 – Jun 2028
Total Funds:	USD7,270,286 ($11,185,055.40)

A randomised trial of a carer end of life planning intervention (CELPI) in people dying with dementia

Funding Source:	University of Western Australia / NHMRC Targeted Research Grant Shared Grant
Project ID:	RG214288
Investigator/s:	A/Prof Glen Arendts, Prof Lynn Chenoweth*, A/Prof Barbara Hayes, A/Prof Katrina Spilsbury, Prof Kirsten Howard, Prof Meera Agar
Duration:	4 years; Oct 2021 – Sep 2025
Total Funds:	$1,486,231 (*$98,802 only)

Understanding intergenerational change in the health and well-being of older adults and its effects: The Sydney Memory and Ageing Study 2 (MAS2)

Funding Source:	NHMRC / Clinical Trials and Cohort Studies Grants
Project ID:	RG212928
Investigator/s:	Prof Henry Brodaty, Prof Perminder Sachdev, Prof Colin Masters, Prof Maria Fiatarone Singh, Prof Annette Dobson, Prof Aletta Schutte, Prof Henry Cutler, Prof Carol Brayne, Dr Nicole Kochan, Dr Katya Numbers
Duration:	5 years; Oct 2022 – Sep 2027
Total Funds:	$3,304,760.16

Exceptional cognition in old age and interactions with other aspects of successful ageing. Postgraduate Scholarship for Dr Alice Powell

Funding Source: Scholarships	NHMRC / Postgraduate
Project ID:	RG212082
Investigator/s:	Prof Henry Brodaty, Dr Alice Powell
Duration:	5 years; Jan 2022 – Sep 2024
Total Funds:	$124,846.60

Update to dementia behaviour management app - 4-G3D95QC

Funding Source:	Department of Health and Aged Care / Dementia and Aged Care Services Fund (DACS)
Project ID:	RG211792
Investigator/s:	Prof Henry Brodaty, Dr Kim Burns
Duration:	3 years; May 2021 – Oct 2023
Total Funds:	$366,000

Nicotinamide adenine dinucleotide as a novel target for ageing and dementia

Funding Source:	NHMRC / Investigator Grant
Project ID:	RG210997 / RG210997-A
Duration:	5 years; 2022 – Dec 2026
Total Funds:	$1,570,120

Vascular contributions to Dementia (VCD-CRE): a transformative approach to reducing the burden of cognitive disorders

Funding Source:	NHMRC / Centres of Research Excellence
Project ID:	RG203943
Investigator/s:	Prof Perminder Sachdev, Prof Amy Brodtmann, Prof Christopher Levi, Prof Michael O'Sullivan, A/Prof Andrew Bivard, Dr Vivek Gupta
Duration:	5 years; Nov 2021 – Oct 2026
Total Funds:	$3,000,000

Scalable governance, control & management of FAIR sensitive research data

Funding Source:	Monash University / Australian Research Data Commons - Platforms Programs Shared Grant
Project ID:	RG203447
Investigator/s:	Prof Perminder Sachdev
Duration:	3 years; Mar 2021 – Dec 2023
Total Funds:	$40,000

Food for thought: preventing decline and improving cognition through diet and dietary advice in older people at risk (PURPLE project)

Funding Source:	University of Wollongong / DCRC World Class Projects
Project ID:	RG203154
Investigator/s:	Prof Karen Charlton, Prof Henry Brodaty*, Prof Kaarin Anstey, A/Prof Steven Roodenrys, Dr Katherine Kent
Duration:	3 years; July 2021 – Jul 2024**
Total Funds:	$599,552 (*$118,440 only)

**Extended to 31 Dec 2024

e-DIVA (empowering dementia carers with an iSupport visual assistant)

Funding Source:	National Ageing Research Institute (NARI) / NHMRC e-ASIA Joint Research Program
Project ID:	RG203150
Investigator/s:	A/Prof Tuan Nguyen, Prof Lily Dongxia Xiao, Prof Henry Brodaty*, A/Prof Bianca Brijnath, Dr Andre Andrade, Prof Adrian Esterman, Prof Susan Kurrle, Prof Maria Crotty, Prof Penelope Schofield, Prof Sunil Bhar
Duration:	4 years; Jul 2021 – Jun 2024
Total Funds:	$1,883,366 (*$58,265 only)

The impact of the environment and pollution on cognitive health (epoch): building the knowledge base through international collaboration

Funding Source:	Australian Catholic University / UKRI-NHMRC Built Environment Prevention Research Scheme Shared Grant
Project ID:	RG201875 / RG201875-A
Investigator/s:	Prof Ester Cerin, Prof Fiona Matthews, Prof Kaarin Anstey, Prof Perminder Sachdev*, Dr Suzanne Mavoa, A/Prof Luke Knibbs, Prof Bin Jalaludin, Dr Yu-Tzu Wu, Dr Matthew Prina, Dr Benjamin Barratt
Duration:	3 years; Oct 2020 – Dec 2023
Total Funds	$681,240 (*$116,925 only)

Ageing – development and validation of emerging magnetic resonance imaging (MRI) methods for measuring cerebrovascular disease (CVD) burden in the ageing brain

Funding Source:	UNSW Sydney/UNSW-Tsinghua University Collaborative Research Fund – Seed Grants
Project ID:	RG193804
Investigator/s:	A/Prof Wei Wen, A/Prof Hua Guo, Prof Perminder Sachdev, Dr Jiyang Jiang, Dr Xihai Zhao, Dr Huijun Chen
Duration:	1 year; 2019*
Total Funds:	$15,000

*Extended to 30 Nov 2023

Developing robust biomarkers for vascular cognitive impairment and dementia: adding V to the ATN research framework

Funding Source:	NHMRC / Investigator Grant
Project ID:	RG193540 / RG193540-A
Investigator/s:	Prof Perminder Sachdev
Duration:	5 years; Jan 2021 - Dec 2025
Total Funds:	$3,289,215

Unravelling human brain ageing – a multi-omics approach

Funding Source:	Rebecca L Cooper Medical Research Foundation / Project Grants
Project ID:	RG192990
Investigator/s:	Dr Karen Mather
Duration:	2 years: Jan 2020 – Dec 2021*
Total Funds:	$100,000

*Extended to 30 June 2023

The APPLE Tree programme: active prevention in people at risk of dementia through lifestyle behaviour change and technology to build resilience

Funding Source:	Economic & Social Research Council (ESRC)-NIHR Dementia Research Initiative Shared Grant (University College London/CHeBA)
Project ID:	RG191662
Investigator/s:	Prof Claudia Cooper, Prof Helen Kales, Prof Henry Brodaty*, Dr Penny Rapaport, Dr Miguel Rio, Prof Anne Matie Minihane, Prof Irene Petersen, Dr Julie Barber, Dr Iain Lang, Ms Rachael Hunter, Dr Zuzana Walker, Dr Nicholas Bass, Dr Natalie Marchant, Dr Jonathan Huntley, Dr Jennifer Wenborn, Dr Joanne Rodda, Prof Paul Higgs, Dr Kate Walers, Dr Sarah Morgan-Trimmer, Dr Elisa Aguirre, Prof Karen Ritchie, Ms Alexandra Burton
Duration:	5 years; Jan 2019 – Dec 2023**
Total Funds:	£3,884,409 (*$13,863.19 only)

**Extended to 31 Dec 2024

Improving health outcomes, well-being and care of people living with dementia in the hospital setting

Funding Source:	NHMRC / Dementia Collaborative Research Centre (DCRC)
Project ID:	RG180842-E
Investigator/s:	Prof Lynn Chenoweth, Prof Henry Brodaty
Duration:	2 years; Jan 2021 – Dec 2023*
Total Funds:	$536,000

*Extended to 30 June 2024

Healthier drinking choices and cognitive decline in older risky drinkers

Funding Source:	NHMRC / DCRC
Project ID:	RG180842-D
Investigator/s:	Dr Louise Mewton, Prof Perminder Sachdev, Dr Nicole Kochan, Maree Teeson, Nicola Newton, Matthew Sunderland, Cath Chapman, Andrew Baille

Duration: 4 years; Jan 2020 – Dec 2023*

Total Funds: $598,209

*Extended to 30 June 2024

Towards achieving culture-fair neuropsychological assessment for mild cognitive impairment and dementia in culturally and linguistic diverse (CALD) older Australians – PhD scholarship for Zara Page

Funding Source: NHMRC / DCRC

Project ID: RG180842-C

Investigator/s: Dr Nicole Kochan, Ms Zara Page

Duration: 4 years; Jan 2020 – Dec 2023

Total Funds: $90,000

SJTU-UNSW collaboration on research in cognitive ageing and dementia

Funding Source: UNSW / SJTU-UNSW Collaborative Research Fund – Seed Grant

Project ID: RG173379

Investigator/s: Prof Perminder Sachdev, A/Prof Wei Wen, Dr Jiyang Jiang, Dr Rebecca Koncz

Duration: 1 year: 2019*

Total Funds: $10,000

*Extended to 31 Dec 2023

Towards a better understanding of the mechanisms of ageing and longevity in Celegans and humans

Funding Source: UNSW/Chinese Academy of Sciences (CAS) Collaborative Research Seed Program – Mobility Grant

Project ID: RG192635

Investigator/s: Dr Karen Mather, Dr Shi-Qing Cai

Duration: 1 year: 2019*

Total Funds: $5,000

*Extended to 30 Oct 2023

The Australian Dementia Network (ADNet): Bringing together Australia's dementia stakeholders

Funding Source: NHMRC

Project ID: RG181548 / RG191015

Investigator/s: Prof Christopher Rowe, Prof Perminder Sachdev*, Prof Sharon Naismith, Prof Michael Breakspear, Prof Henry Brodaty, Prof Kaarin Anstey, Prof Ralph Martins, Dr Stephanie Ward, Prof James Vickers, Prof Colin Masters

Duration: 5 years; Jul 2018 – Jun 2023*

Total Funds: $18,000,000 (*$1,456,591.33)

*Extended to 30 June 2024

Clarify risk and protective factors for dementia with the interplay of genes and environment in multiple studies (IGEMS) consortium

Funding Source: National Institutes of Health (NIH)

Project ID: RG182556

Investigator/s: Prof Nancy Pedersen, Dr Margaret Gatz, Dr Vibeke Catts, Prof Perminder Sachdev

Duration: 6 years: Jul 2018 – Mar 2024

Total Funds: $189,891.95

Apathy in older community-dwelling persons: assessment, investigation, differentiation (DCRC Half-Funded PhD Scholarship for Fleur Harrison)

Funding Source: Alzheimer's Australia Dementia Research Fund (AADRF) / DCRC Early Diagnosis and Prevention Shared Grant – PhD Scholarship for Ms Fleur Harrison

Project ID: RG161424

Investigator/s: Prof Henry Brodaty (Supervisor), Ms Fleur Harrison

Duration: 4 years; Jul 2016 – July 2019*

Total Funds: $74,453

*Extended to 31 Aug 2023

Philanthropic

Social determinants of dementia

Funding Source: Kennards Hire Foundation Pty Ltd
Project ID: PS70838_PS708851
Awardee/s: Prof Perminder Sachdev, Prof Henry Brodaty
Total Funds: Undisclosed (2023-2027)

Fluid biomarkers for dementia

Funding Source: Sachdev Foundation
Project ID: PS66582_PS66719
Awardee/s: Prof Perminder Sachdev
Total Funds: $98,959 (2022-2023)

Blood biomarkers for dementia

Funding Source: Sachdev Foundation
Project ID: PS63671_PS65013
Awardee/s: Prof Perminder Sachdev
Total Funds: $39,000 (2022-2023)

The application of nanotechnology to the diagnosis of Alzheimer's disease and vascular dementia

Funding Source: Anonymous
Project ID: PS63654_PS63673
Total Funds: $250,000 (2021-2025)

Retinal biomarkers in Alzheimer's disease and vascular dementia

Funding Source: Sachdev foundation
Project ID: PS61547_PS61604
Awardee/s: Prof Perminder Sachdev
Total Funds: $39,000 (2022-2023)

Magnetic particle imaging

Funding Source: John Holden Family Foundation
Project ID: PS59199_PS59205
Awardee/s: Prof Perminder Sachdev
Total Funds: $300,000 (2021-2023)

Blood brain barrier and integrity in the ageing brain

Funding Source: Mostyn Family Foundation
Project ID: PS38235_PS38252
Awardee: Prof Perminder Sachdev
Total Funds: $30,000

Other

The Healthy Brain Ageing Fund

Funding Source:	Miscellaneous Donor Contributions
Project ID:	PS22384_PS41631
Awardees:	Prof Henry Brodaty, Prof Perminder Sachdev
Duration:	Ongoing
Total Funds:	$374,494*

*As of 31 Dec 2023

The Dementia Momentum

Funding Source:	Miscellaneous Donor Contributions
Project ID:	PS38235_PS38252
Awardees:	Prof Henry Brodaty, Prof Perminder Sachdev
Duration:	Ongoing
Total Funds:	$1,125,540 (inc. $30,000 from Mostyn Family Foundation)

*As of 31 Dec 2023

Centre for Healthy Brain Ageing Event Spending Fund

Funding Source: Contributions	Miscellaneous Sponsorship
Project ID:	PS33379_PS33397
Awardees:	Prof Henry Brodaty, Prof Perminder Sachdev
Duration:	Ongoing
Total Funds:	$21,127

*As of 31 Dec 2023

The Kwan & Yuet Ying Fung Health Brain Ageing Research Award

Funding Source:	Late Kwan Fung & Yuet Ying Fung Estate
Project ID:	PS36983_PS37138
Awardees:	Prof Perminder Sachdev, Prof Henry Brodaty
Duration:	Ongoing
Total Funds:	$105,137*

*As of Dec 2023

The Josh Woolfson Memorial Scholarship Fund

Funding Source:	Woolfson Family
Project ID:	PS42948_PS42948/PS42978
Awardees:	Prof Perminder Sachdev, Prof Henry Brodaty
Duration:	Ongoing
Total Funds:	$244,402*

*As of 31 Dec 2023

Appendix F: Financial Statement

Statement of Financial Performance for the Year Ended 31 December 2023

		Notes	2023	2022
Revenue				
	Research Revenue		3,564,062	4,814,994
	Donations		1,767,242	1,016,538
	Faculty Funds	3	198	-
	UNSW Contribution - Competitive	1	158,468	332,623
	UNSW Contribution - Strategic	2	125,296	-
	Sundry Other Revenue			160,285
Total Revenue			5,615,267	6,324,440
Costs				
	People Costs		4,872,141	5,552,016
	Scholarship Stipends		132,228	160,830
	Contract & Consulting Services		302,742	11,271
	Repairs and Maintenance		293	3,710
	Consumables		136,194	39,415
	Travel		113,345	27,322
	Equipment		35,351	25,901
	Other Expenses		101,327	217,989
	Internal Expenses		100,639	139,204
Total Costs			5,794,260	6,177,658
Operating result			(178,994)	146,782
Opening Balance			1,652,665	1,505,883
Prior Year Adjustments		4	992,509	-
Closing Balance			**2,466,181**	**1,652,665**

Notes to the Statement of Financial Performance

1. UNSW Contribution - Competitive relates to funding awarded to CHEBA from UNSW through various competitive schemes supporting research activities and infrastructure.
2. UNSW Contribution - Strategic relates to funding provided to CHEBA from UNSW as a strategic investment in the centre's research activities.
3. Faculty Funds - Operating funds provided by the faculty are budget allocations, with no revenue transferred to CHEBA.
4. Prior year adjustments are largely from unaccounted Strategic contributions from UNSW to CHeBA.

Appendix G: Publications

Books

1. Burns K*, Casey AN*, Brodaty H. A Clinician's BPSD Guide 2023: Understanding and helping people experiencing changed behaviours and psychological symptoms associated with dementia. 2nd edition. Sydney, Australia: Centre for Healthy Brain Ageing (CHeBA), UNSW; 2023. ISBN 978-0-6459932-0-2. *Burns K and A-N Casey contributed equally to this work and are designated as co-first authors.

Book Chapters

1. Bentvelzen A, Chander RJ, Foo H, Lee T, Lipnicki DM, Sachdev P. Neuropsychological Assessment of Cognitive Aging (Chapter 6). In Boyle GJ, Stern Y, Stein DJ, Sahakian B, Golden CJ, Lee TM-C, Chen S-HA (Eds.). The SAGE Handbook of Clinical Neuropsychology, Volume 2: Clinical Neuropsychological Assessment and Diagnosis. London, UK: Sage Publications. 2023; 77-93. DOI: 10.4135/9781529789539. ISBN: 9781529717754.
2. Ramalingam J, Sachdev P, Mohan A. Neurocognitive disorders (Chapter 13). In: IsHak WW (ed) Atlas of Psychiatry. Cham: Springer International Publishing; 2023. p. 407-35. DOI: 10.1007/978-3-031-15401-0_13. ISBN: 9783031154010.

Journal Articles

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Published Abstracts

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Appendix H: Presentations

Conferences

1. Anstey KJ, Brodaty H, Chau T, Ginige JA, Heffernan M, Jorm L, Jose JCS, Kochan N, McLinNeuro, Maeder A, McNeil J, Millard M, Sachdev PS, Singh MF, Valenzuela M, Welberry H. FC4: Maintain Your Brain: a scalable 3-year online intervention which reduced cognitive decline in 55-77 year olds. Presented at the 20th IPA International Congress. Lisbon, Portugal; 29 June - 3 July 2023.
2. Bentvelzen A, Sachdev P. Reaching international consensus – Delphi and other approaches. Sweden. Short presentation at lunchtime mixer at VASCOG Conference. Gotherburg, Sweden; 14 Sep 2023.
3. Brodaty H. Invited Speaker. Maintain Your Brain, a personalised online multidomain lifestyle intervention, improves 3-year cognition in at-risk older adults. RANZCP Faculty of Psychiatry of Old Age Conference "Ageing in the Contemporary Era". Melbourne, VIC; 9 Nov 2023.
4. Brodaty H. Invited Speaker. Social connections and risk of incident mild cognitive impairment, dementia and mortality. RANZCP Faculty of Psychiatry of Old Age Conference "Ageing in the Contemporary Era". Melbourne, VIC; 10 Nov 2023.
5. Brodaty H, Chattat R, Hubers C, Ikram MA, Jeon Y-H, Lenart-Bugla M, ..., Sachdev PS, Samtani S, et al. Conceptual framework for social health: identification of modifiable and protective and risk factors. Presented at the 20th IPA International Congress. Lisbon, Portugal; 29 June - 3 July 2023.
6. Brodaty H and Cognisance team. Co-designing dementia diagnosis and post-diagnostic care, the cognisance project: Forward with Dementia (FWD). International Psychogeriatric Association (IPA) International Congress. Lisbon, Portugal; 29 June - 2 July 2023.
7. Brodaty H and Maintain Your Brain team. Maintain Your Brain: a scalable 3-year online intervention which reduced cognitive decline in 55-77 year olds. International Psychogeriatric Association (IPA) International Congress. Lisbon, Portugal; 29 June - 2 July 2023.
8. Burley CV, Casey A-N, Parmenter B. Meta-analyses demonstrate mind-body interventions reduce pain levels and symptoms of depression in people with osteoarthritis. Online poster presentation at the American College of Sports Medicine Annual Meeting and World Congresses. Denver, Colorado USA and online; June 2023.
9. Burley CV, Casey A-N, Parmenter B. Targeting chronic conditions that increase dementia risk: nonpharmacological approaches for pain and symptoms of depression in people with osteoarthritis. Online poster presentation at the Australia Dementia Research Forum. Gold Coast, QLD and online; 29-31 May 2023.
10. Casey AN, Chau T, ..., Brodaty H. The Maintain Your Brain online multidomain intervention for dementia risk reduction: qualitative exploration of lifestyle changes made, continued or declined, and why. International Psychogeriatric Association (IPA) International Congress. Lisbon, Portugal; 29 June - 2 July 2023.
11. Casey AN, Chau T, Heffernan M, Brodaty H. The Maintain Your Brain online multidomain intervention for dementia risk reduction: end-user evaluations of what did and did not work and why. Online poster presentation at the Alzheimer's Association International Conference. Amsterdam, The Netherlands and online; July 2023.
12. Cherbuin N, Walsh EI, Leach L, Bruestle A, Burns R, Anstey KJ, Sachdev PS, Baune BT. Elevated oxidative stress and inflammatory levels are associated with plasma AD biomarkers in middle-age. Poster presentation at the Alzheimer's Association International Conference. Amsterdam, The Netherlands and online; July 2023.
13. Karamacoska D, Heins P, Branco RM, Wallcook S, Truong A, Leung IH, Sawan MJ, Page ZA, Borelli WV, Arroyo-Miranda M, Demnitz N, Folarin R, Guo T, Shaaban CE, Smith A, Bartels S. How are early career dementia researchers considered and supported by national dementia plans and dementia-specific charities and associations? An overview of global policy approaches. Poster presentation at the Alzheimer's Association International Conference. Amsterdam, The Netherlands and online; 16-20 July 2023.
14. Kim CK, Thalamuthu A, Zhong L, Pickford R, Sachdev PS, et al. Effects of nutrigenomic activators against neurotoxicity induced by amyloid beta in human glioma cells. Poster presentation at the Australian Dementia Research Forum. Gold Coast, Australia; 29-31 May 2023.
15. Kim CK, Helman T, Sachdev PS, et al. Multi-omics profiling reveals distinct molecular changes in the brains of APP/PS1 Alzheimer's mouse model. Poster presentation at the 26th Annual Meeting of the Korean Society for Brain and Neural Sciences. Busan, South Korea; 6-8 Sep 2023.

16. Lam B. Invited Speaker. Neuropsychiatric profiles in stroke patients: A STROKOG collaboration study. VASCOG Conference. Gothenburg, Sweden; 15 Sep 2023.
17. Lo JW, Crawford JD, Lipnicki DM, et al. Trajectories of cognitive decline after incident stroke – a COSMIC collaboration study. Poster presentation at VASCOG Conference. Gothenburg, Sweden; 15 Sep 2023.
18. Lo JW. STROKOG current status. Short oral presentation at the Lunchtime Mixer of International Consortia, VASCOG Conference. Gothenburg, Sweden; 14 Sep 2023.
19. Matison A, Flood V, Lam B, Lipnicki D, Tucker K, Preux P, Guerchet M, d'Ors E, Skoog I, Scarmeas N, Gureje O, Shahar S, Anstey K, Ho R, Brodaty H, Sachdev PS, Reppermund S, Mather K, for Cohort Studies of Memory in an International Consortium (COSMIC). Is higher fruit and vegetable intake associated with a reduced risk of depression in middle-aged and older adults? Data from 10 diverse international cohorts. Oral presentation at the Nutrition Society of Australia and New Zealand Scientific Meeting. Auckland, New Zealand; Nov 2023.
20. Mather KA. Differential DNA Methylation in exceptionally long-lived individuals. GeneMappers Annual Conference. Hobart, Australia; 8-10 Mar 2023.
21. Numbers K, Samtani S, Lam BCP, Crawford JD, Brodaty H. Increased Concern associated with self-reported, but not informant-reported, subjective cognitive decline predicts increased risk of incident dementia. Oral presentation as part of a Featured Research Session (FRS), Alzheimer's Association International Conference. Amsterdam, The Netherlands and online; 28 July - 1 Aug 2023.
22. Page ZA, Croot K, Brodaty H, Sachdev P, Lam BCP, Kochan NA. (2023, July 16-20). Suitability of Computerised and Pencil-and-Paper Neuropsychological Assessments in Healthy Older Culturally and Linguistically Diverse Australians: The CogSCAN Study. Poster presentation at the Association International Conference. Amsterdam, The Netherlands and online; 16-20 July 2023.
23. Powell A, Page ZA, Close JCT, Sachdev PS, Brodaty H. What does 'super-ageing' mean to high-functioning Australian older adults? Poster presentation at the Association International Conference. Amsterdam, The Netherlands and online; 16-20 July 2023.
24. Reppermund S, Walker A, Cvejic R, Srasuebkul P, Wand A, Draper B, Trollor J. Self-harm in people with dementia – assessing risk factors, health profiles and healthcare pathways using big data. Oral presentation at the Society for Mental Health Research Annual Conference. Perth, Australia; 29 Nov - 1 Dec 2023.
25. Reppermund S, Numbers K, Lin PH, Delbaere K, Wesson J, Clemson L, Ginige JA, Trollor J, Draper B, Brodaty H. Developing an innovative computerised assessment of instrumental activities of daily living. Poster presented at the Society for Mental Health Research Annual Conference. Perth, Australia; 29 Nov - 1 Dec 2023.
26. Reppermund S, Numbers K, Lin PH, Delbaere K, Wesson J, Clemson L, Ginige JA, Trollor J, Draper B, Brodaty H (2023). Developing an innovative computerized assessment of instrumental activities of daily living. Oral presentation at the 56th Australian Association of Gerontology Conference. Gold Coast, Australia; 14 Nov 2023.
27. Reppermund S, Walker A, Cvejic R, Srasuebkul P, Wand A, Draper B, Trollor J. Self-harm in people with dementia – assessing risk factors, health profiles and healthcare pathways using big data. Poster presentation at the Alzheimer's Association International Conference. Amsterdam, The Netherlands and online; 28 July - 1 Aug 2023.
28. Reppermund S, Numbers K, Lin PH, Delbaere K, Wesson J, Clemson L, Ginige JA, Trollor J, Draper B, Brodaty H. Development of an innovative computerized assessment of instrumental activities of daily living. Poster presentation at the Alzheimer's Association International Conference. Amsterdam, The Netherlands and online; 28 July - 1 Aug 2023.
29. Sachdev P. Invited Speaker. "Mental Health in New Era". WPA Thematic Congress. Karachi, Pakistan; 3-5 Mar 2023.
30. Sachdev P. Invited Speaker. "Vascular Contributions to Dementia (VCD-CRE) - a transformative approach to reducing the burden of cognitive disorders". Australian Dementia Research Forum. Gold Coast QLD, Australia; 29 May 2023.
31. Sachdev P. Keynote Speaker. "Can we aspire to live to 150?". Ageing Symposium. Wellington, New Zealand; June 2023.
32. Sachdev P. Invited Speaker. "Neurobehavioural consequences of stroke". Neurotorium Expert Meeting. Munich, Germany; 11-13 Sep 2023.
33. Sachdev P. Diagnostic criteria for vascular cognitive disorders. Poster presentation at VASCOG Conference. Gothenburg, Sweden; 15 Sep 2023.
34. Sachdev P. Invited Speaker. Cognitive diagnostic criteria. VASCOG Conference. Gothenburg, Sweden; 16 Sep 2023.

35. Sachdev P. Invited Speaker. A research agenda to meet the global challenge of dementia: The WHO Blueprint for Dementia Research. WPA 2023. Vienna, Austria; 28 Sep - 1 Oct 2023.
36. Sachdev P, Bentvelzen A. Reaching international consensus – Delphi and other approaches. Lunchtime Mixer of International Consortia. Oral presentation at VASCOG Conference. Gothenburg, Sweden; 14 Sep 2023.
37. Saks D. Current and Emerging CADASIL Consortia. Oral presentation at VASCOG Conference. Gothenburg, Sweden; 14 Sep 2023.
38. Samtani S, Mahalingam G, ..., Brodaty H. Individual participant data meta-analysis of social connections and annual rates of decline in global cognition and cognitive domains. International Psychogeriatric Association (IPA) International Congress. Lisbon, Portugal; 29 June - 2 July 2023.
39. Samtani S, Mahalingam G, Lam BCP, Lipnicki DM, Lima-Costa MF, Castro-Costa E, Shifu X, Guerchet M, Preux P-M, Skoog I, Scarmeas N, Kim K-W, Riedel-Heller S, Shahar S, Numbers K, Ganguli M, Crowe M, Pin Ng TP, Yun-Hee Jeon Y-H, Sachdev PS, Brodaty H, on behalf of the SHARED consortium for the Cohort Studies of Memory in an International Consortium (COSMIC). Social connectedness and prevention of cognitive decline: Evidence from 13 cohort studies. Oral presentation at the Australia Dementia Research Forum 2023. Gold Coast, Australia; 29-31 May 2023.
40. Samtani S, Mahalingam G, Lam BCP, Lipnicki DM, Numbers K, Lima-Costa MF, Castro-Costa E, Xiao S, Riedel-Heller S, Röhr S, Pabst A, Scarmeas N, Krishna M, Shahar S, Ng TP, Kim K-W, Skoog I, Najar J, Rydberg Sterner T, Ganguli M, Sachdev PS, Brodaty H for the Cohort Studies of Memory in an International Consortium (COSMIC). Instrumental and Emotional Support: Associations with depressive symptoms in longitudinal ageing cohort studies. In symposium 'Advances in understanding and treating depression, anxiety and post-traumatic stress disorder in later life.' Chaired by Jessamine Chen. Oral presentation at the Australian Association of Cognitive Behaviour Therapy Conference 2023. Sydney, Australia; 19 Oct 2023.
41. Samtani S, Mahalingam G, Lam BCP, Lipnicki DM, Castro-Costa E, Lima-Costa MF, Shifu X, Skoog I, Scarmeas N, Kim K-W, Riedel-Heller S, Shahar S, Numbers K, Ganguli M, Krishna M, T Ng TP, Sachdev PS, Brodaty H, on behalf of the COSMIC consortium and SHARED consortium. Types of social support and depressive symptoms in older adults: An IPD meta-analysis of longitudinal ageing studies. Virtual poster presented at the Alzheimer's Association International Conference. Amsterdam, The Netherlands and online; 4 July 2023.
42. Selwood A, Catts VS, Numbers KT, Lee T, Thalamuthu A, Wright MJ, Sachdev PS. The heritability of subjective cognitive complaints in older Australian twins. Poster presentation at Alzheimer's Association International Conference. Amsterdam, The Netherlands and online; 16-20 July 2023.
43. Welberry HJ, Chau T, Heffernan M, San Jose JC, Jorm LR, Fiatarone Singh M, Sachdev PS, Anstey KJ, Lautenschlager NT, Valenzuela M, McNeil JJ, Brodaty H. Factors Associated with Participation in a Multidomain Web-Based Dementia Prevention Trial: Evidence from Maintain Your Brain (MYB). Oral presentation at the Australian Dementia Research Forum. Gold coast, Australia; 29-31 May 2023.

Seminars, Lectures & Workshops

1. Bentvelzen A, Sachdev P. Expert panel discussion: updating VASCOG diagnostic criteria for vascular cognitive disorders. ***Workshop at the VASCOG Conference.*** Gothenburg, Sweden; 14 Sep 2023.
2. Brodaty H. Invited Speaker. "Dementia in Primary Care – Detection, Management and Latest Advances". Online webinar hosted by the Sydney North Health Network; 9 Aug 2023.
3. Brodaty H. Invited Speaker. Managing Dementia, Depression and Anxiety. ***Spotlight Series: Let's talk about Ageing***. Online webinar hosted by Montefiore; 2 Mar 2023.
4. Chander R. Algorithms and heuristics in creating a short-form version of the Reading the Mind in the Eyes Test (RMET). ***CHeBa Seminar***. Online; 14 June 2023.
5. Koncz R. Neuroimaging for Psychiatrists. Lecture for Master of Medicine (Psychiatry). Brain & Mind Centre, University of Sydney; May 2023.
6. Koncz R. Cerebral PET: From research to the clinic. Lecture for Master of Brain and Mind Sciences. Brain & Mind Centre, University of Sydney; April 2023
7. Matison A, Dai-Keller Z. Eating well for ageing well – What are the challenges, priority research areas, and methodology on sustainable diet in healthy ageing? Oral presentation at the ***Nutrition Society of Australia and New Zealand Scientific Meeting Workshop***. Auckland, New Zealand; Nov 2023.

8. Matison A. Invited talk. Nutrition for Heathy Ageing. Oral presentation at the ***War Memorial Hospital***; Dec 2023.
9. Mather KA. Invited speaker. Identification of differentially methylated sites and regions in exceptionally long-lived individuals. Oral Presentation at the Garvan Institute, Sydney.
10. Mather KA. Invited Speaker. Healthy Ageing: Studying centenarians to reveal the secrets of healthy ageing. ***War Memorial Hospital Health Promotion Group, Sydney***.
11. Numbers K. Designing technology for people living with dementia and care partners: Towards meaningful codesign. Presentation at ***UNSW Dementia Research Day***. UNSW Sydney; 12 Sep 2023 Sep.
12. Numbers K. Thriving in Later Life: Cultivating Purpose, Connection, and Activity to Beat Depression and Anxiety. Invited talk presented at ***Better Brains, Better Bodies, Better Ageing Symposium***. Older People's Mental Health (OPMH) of Southeast Sydney Local Health District, Sydney; Oct 2023.
13. Numbers K. Rethinking Healthy Ageing – Why our Attitudes About Growing Older Matter. Invited talk. Killara City Council, Sydney; Sep 2023.
14. Numbers K. "Redefining Dementia" Challenging stigmas and stereotypes in medicine. Invited presentation at the ***Ageing Futures Institute (AFI) SEASONS Launch Event***. UNSW Sydney; May 2023.
15. Numbers K. Preventing Dementia and Enhancing Brain Health. Invited presentation at the Gordon City Council, Sydney; Feb 2023.
16. Page Z, Kochan N. Community Talk at the Woollahra Probus Club; Sept 2023.
17. Sachdev P. Invited Speaker. The neuropsychiatric approach. Tasmanian Travelling Scholar for 2023. ***Tasmanian Psychiatry Training Program hosted by RANZCP***. Hobart, TAS; 21 June 2023.
18. Sachdev P. Invited Speaker. The current status of tardive dyskinesia. Tasmanian Travelling Scholar for 2023. ***Tasmanian Psychiatry Training Program hosted by RANZCP***. Hobart, TAS; 22 June 2023.
19. Sachdev P. Invited Speaker. A biomarker approach to diagnosing dementia. Tasmanian Travelling Scholar for 2023. ***Tasmanian Psychiatry Training Program hosted by RANZCP***. Hobart, TAS; 23 June 2023.
20. Sachdev P. Invited Speaker. Is dementia preventable? Examining the evidence. Tasmanian Travelling Scholar for 2023. ***Tasmanian Psychiatry Training Program hosted by RANZCP***. Hobart, TAS; 21 June 2023.
21. Sachdev P. Invited Speaker. Addressing the mental health needs of older adults. ***Workshop on Aging*** sponsored by National Academies of Science, Engineering, and Medicine. Washington, DC, USA; 15-16 May 2023.
22. Sachdev P. Invited Speaker. Treatment of Dementia-State of the Art, Circa 2023". ***8th edition of Frontiers in Psychiatry Meeting***. Online, India; 20 May 2023.
23. Sachdev P. Invited Speaker. Can we live to 150?. ***Ageing Forum, Vivid Ideas Program***. Sydney, Australia; 15 June 2023.
24. Samtani S. Invited speaker. Social interactions and reducing risk of dementia. ***Science Comedy Talk***. Sydney; 17 Aug 2023.
25. Samtani S. Invited speaker. Social interactions and reducing risk of dementia. ***Science Comedy Talk.*** Sydney; 14 Sept 2023.
26. Samtani S. Invited speaker. Social connections: The key to healthy ageing? Presentation at the ***Ku-ring-gai Council Chambers***. Sydney; 14 Sept 2023.
27. Samtani S. Panel member for ***UNSW Alumni Online Event***. 30 Nov 2023.

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