

Centre for Healthy Brain Ageing (CHeBA) Sydney Centenarian Study

NEWSLETTER | December 2018

Happy holidays from the team at the Sydney Centenarian Study (SCS). We hope this newsletter finds you in good health.

2018 has been a busy year for the SCS and for the Centre for Healthy Brain Ageing (CHeBA). Our study has continued to recruit new participants with a focus this year on the Bayside, Kogarah and Rockdale areas. We have also been conducting follow-up interviews every six months with our existing participants and are delighted that so many of you enthusiastically welcome us back into your homes. Maintaining contact with our participants is crucial to the success of the study as it allows us to track the stability of health and cognition as people approach 100. Many of our participants continue to defy their age and enjoy a high level of independence, good health and intact cognition, demonstrating that dementia is certainly not inevitable at this age.

The study has now included well over 400 Sydney residents, all of whom have been aged 95 or above. Many have already reached the century mark with many more well on the way. Our cohort has an average baseline age of 97.40 with our oldest participant to date being 106. Almost three-quarters of our participants are female, a quarter of our cohort hail from a non-English speaking background, and 60% are still living in the community.

Life expectancy when our participants were born was just over 60 in Australia. They have lived a further 35-40 years beyond this, often surviving hardship, significant medical issues and trauma. They are excellent exemplars of healthy ageing. The data we continue to collect is helping us better understand what factors contribute to healthy ageing, both environmental and genetic. We are currently investigating lifestyle factors like diet, physical exercise, social integration and mental stimulation. We are exploring genetic factors by examining the DNA and RNA profile of our participants and contrasting this with younger age groups. And we are examining the care needs and quality of life of our participants to allow us to better plan for Australia's rapidly ageing population.

Beyond the SCS, CHeBA leads a large number of other projects as we continue to study the detection, prevention and treatment of age-related disorders, in particular dementia, which is now the second leading cause of death in Australia. Just this year CHeBA launched the world's largest internet-based intervention study which targets modifiable risk factors for Alzheimers and other dementias. We also continue to form productive, collaborative partnerships with international research groups who share our determination to promote healthy ageing.

Thank you to all our participants and informants for their ongoing support. We greatly appreciate the time you have given to our research and we look forward to visiting you again in 2019. From all the staff at the Sydney Centenarian Study we hope you have a wonderful holiday period and wish you and your family a very happy and healthy year ahead.



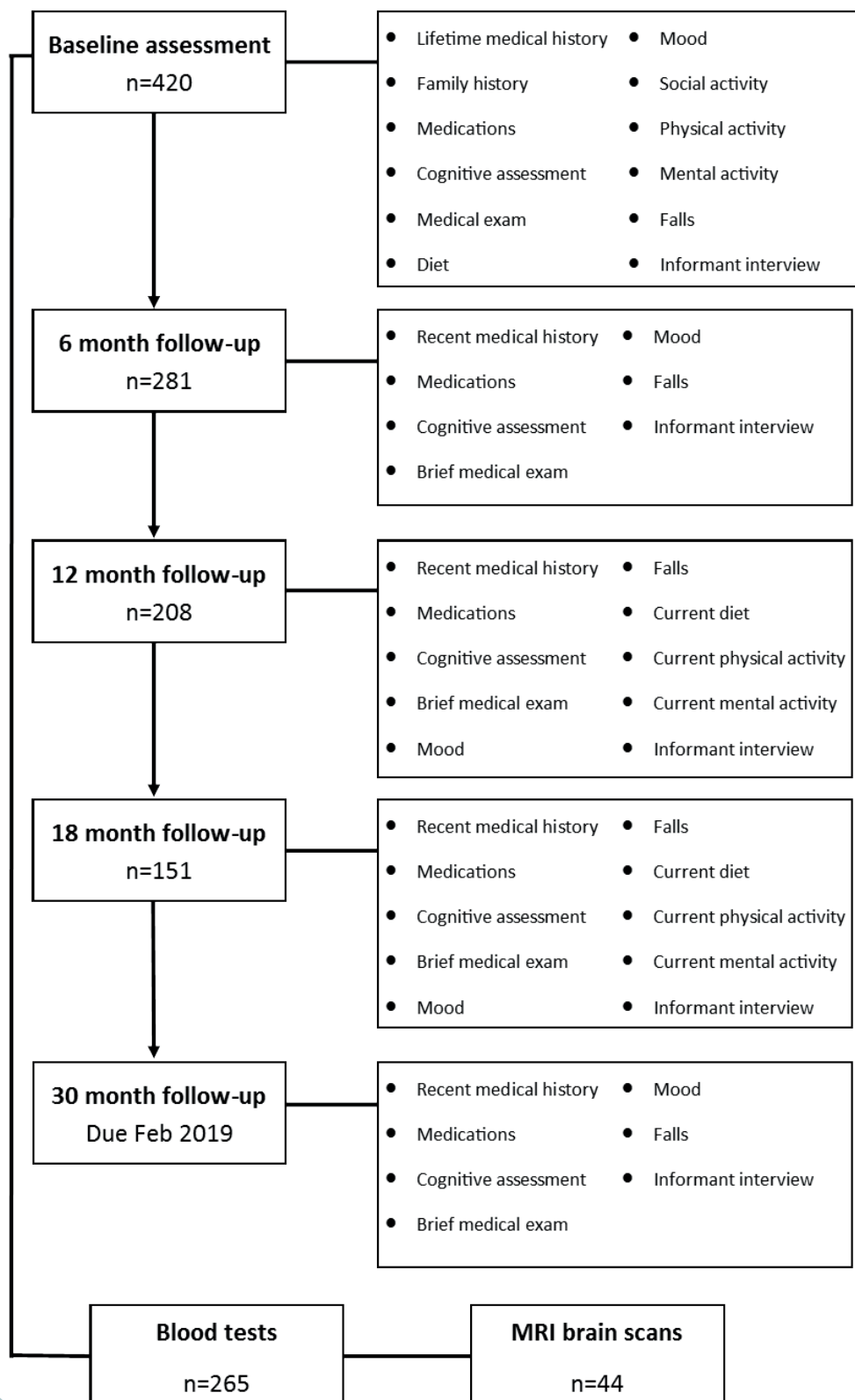
*Professor Henry Brodaty & Professor
Perminder Sachdev, CHeBA Co-Directors*



**Scientia Professor
Henry Brodaty AO**



**Scientia Professor
Perminder Sachdev AM**



Sydney Centenarian Study progress

Living to 100 Conference 2018

In September, CHeBA hosted the second international Living to 100 Conference at the International Convention Centre in Darling Harbour. Held over two days the event brought together experts from around the world who presented their cutting-edge research on longevity.

Our study coordinator, Adam Theobald, joined representatives from four other centenarian studies to open proceedings with an update on the latest international research findings. The conference also heard from CHeBA co-directors Prof Perinder Sachdev who discussed theories of ageing, and Prof Henry Brodaty who discussed the role of lifestyle factors, diet, personality and attitude in reaching 100.

Hotly anticipated talks included Professor Toby Walsh who mused on how robotics and artificial intelligence can help us live longer. Professor David Irving who spoke of experimental work with blood transfusions to aid healthy ageing. And Professor Nobuyoshi Hirose who spoke of his experiences working with Japan's 'super-centenarians' who have reached 110 years of age.

The conference also heard from some of Australia's rising young research stars, including A/Professor Jessica Mar who leads ground-breaking research at the University of Queensland into single-cell biology. UNSW's own Dr Fatima El-Assad also



Centenarians share their thoughts on healthy ageing.



Centenarian researchers discuss their latest findings.

took the stage to discuss her latest work into the microbiome (the invisible microbial communities that live within us). Centenarians are known to harbour a distinct microbiome compared to younger groups.

The highlight of the conference was a humorous and poignant panel discussion led by Sophie Scott, the ABC's National Medical Reporter, who interviewed four of our study participants. They shared their attitudes towards ageing, reflected on lessons from their life, gave dietary advice, and impressed the audience with their grace, humour and wisdom.

The conference concluded with a fiery and passionate debate that asked 'can we live to 150 years of age?'. Four world-renowned academics went head-to-head and left the audience split as to which side were the more convincing.

The Psychological Health of Near-Centenarians and Centenarians



CHeBA student, Adrian Cheng

Fourth year medical student, Adrian Cheng, has spent the past year examining the psychological health of centenarians and near-centenarians. Working closely with Prof Henry Brodaty, Adrian compared levels of psychological distress and degree of life satisfaction in Sydney Centenarian Study participants to a younger CHeBA cohort. He also explored protective factors for maintaining good psychological health as people reach very advanced ages.

Despite showing higher levels of psychological distress than younger age groups, near-centenarians and centenarians were more satisfied with their overall lives.

The study also found that among Sydney Centenarian participants, more psychotropic medications and having fewer relatives and friends were associated with higher psychological distress. Residence in an assisted living facility and having fewer relatives and friends were associated with lower life satisfaction.

Adrian's work provides evidence that social support is a significant predictor of psychological health. Friends and family help provide the very old with meaningful experiences and are an integral component of happiness in old age. These findings suggest potential social targets for future interventional studies to improve the psychological health of near-centenarians and centenarians.

Genetic Variants Associated with Exceptional Longevity



CHeBA PhD candidate, Mary Revelas

The SCS is interested in exploring the role that genetic factors play in successful ageing. The blood and saliva samples that our SCS participants provide allow us to examine DNA and RNA (a form of genetic material that allows researchers to determine which genes are switched on or off). This information can be used to determine which genetic markers are associated with exceptional ageing.

PhD candidate, Mary Revelas, has conducted a review of the existing scientific literature regarding genetic variants that have been associated with exceptional longevity, including data from the Sydney Centenarian Study. Previous studies have shown that genetics indeed play a role in longevity, with heritability estimates of 20-30%.

This review, using a statistical technique known as meta-analysis, identified five genetic variants that were significantly associated with exceptional longevity. These variants were located in the *ACE*, *APOE*, *FOXO3A*, *KLOTHO* and *IL6* genes. However, these genetic variants appear to each have only a small influence on longevity, suggesting that many genes play a role in successful ageing, not just a key few.

The review also identified a number of gaps in the literature regarding exceptional longevity genetic studies, including the lack of non-Caucasian population studies, and studies that examine gender differences.

Ageing with Purpose

The Juniors at Kingsford was packed to the rafters for the annual forum held by the Aged Care Psychiatry Service with support from CHeBA. The theme for 2018 was 'ageing with purpose'. Guest speakers included CHeBA co-director Prof Henry Brodaty, CHeBA researcher Dr Karen Croot, former Australian of the Year Ita Buttrose AO OBE, and beloved TV personality Diana "Bubbles" Fisher.

The audience was encouraged to remain active and keep challenging themselves as they age. "I don't do old age" said Diana Fisher who noted that she has the same approach to life as she did at 40 or 50. "Sit up, get up, go out and have some fun!".

The educational elements of the event focused on understanding and managing mood in late life (A/Prof Wijeratne), assertive communication (Dr Karen Croot), and remaining visible in later life (Prof Henry Brodaty). Prof Brodaty reminded attendees that it is never too late to create meaning in one's life through family, volunteering, socialising, spirituality and personal development.



Ageing with Purpose forum at the Juniors, Kingsford

Novel Approach for Early Detection of Alzheimer's Disease

Co-leader of CHeBA's 'Omics and Neurobiology of Ageing Group', Dr Nady Braidy, has recently been awarded significant funding to continue his ground-breaking research in the field of stem cell transplantation. Dr Braidy is investigating a novel cellular approach for the early detection of Alzheimer's disease, modelling and developing diagnostics.

Dr Braidy explains that the study of Alzheimer's disease is currently limited by a lack of model systems that can reproduce the precise sequence and timing of cellular and molecular events. "The recent advances in biomedicine have led to a growing interest in using stem cells as cellular carriers for disease modelling, drug discovery, drug toxicity, and regenerative medicine".

CHeBA co-director Prof Sachdev said the fact that preclinical trials have shown promise in animal studies, but mostly failed in human trials, suggested an impending requirement to study Alzheimer's disease in human model systems. Dr Braidy's team will use Alzheimer's disease-specific stem cell clones for disease modelling drug discovery, including drug toxicity.

The research will likely be extended to other common neurodegenerative disorders, such as Parkinson's disease, with far reaching implications for public health worldwide.



CHeBA Researcher, Dr Nady Braidy

Brain Imaging Study Reveals Turning Point in Age-Related Brain Changes



Leader of CHeBA's Neuroimaging Group, Associate Professor Wei Wen

CHeBA researchers - in collaboration with Beihang University (Beijing), Capital Medical University (Beijing), and the University of Sydney – have identified significant, age-related decline over time in the brain structure of cognitively normal adults. The largest study of its kind, the team examined longitudinal changes in the width and depth of sulci (grooves) in the folded surface of the brain.

Leader of CHeBA's neuroimaging group, Associate Prof Wei Wen, said that the findings indicate an accelerated atrophy of the brain cortex starting in the late 70's. "We found significant decline in sulcal depth over time. Importantly, we also detected some turning points, which occurred between ages 75-80 with marked acceleration in the widening of the sulci."

Previous research had identified that sulcal changes occur alongside brain atrophy, however the pattern of this change remained unclear. The present study identified both widening and shallowing of sulci over time, including differences

in rates of decline between the right and left hemisphere, as well as between different areas of the brain. The superior frontal sulcus showed the most rapid increase in fold opening and decrease in sulcal depth.

The study has improved our understanding of structural changes that occur as part of normal ageing and has laid a solid foundation for future cortical folding studies of neurocognitive disorders in the elderly.

ICC-Dementia: A Global Effort to Unlock the Secrets of Healthy Ageing

The Sydney Centenarian Study is a founding member of the International Centenarian Consortium of Dementia (ICC-Dementia), a group of 17 centenarian studies from around the world who pool their data, knowledge and resources to better understand the health, cognition and unique care needs of our oldest citizens. Researchers from the US, Japan, Sweden, the UK, France, Poland, Portugal, Germany, Italy, China and the Netherlands have contributed their data and expertise towards our common goal – discovering the determinants of longevity, promoting positive ageing, and meeting the very real challenges posed by a rapidly ageing society.

The group meets annually to discuss their latest findings and plan future collaborations. This year the Sydney Centenarian Study had the pleasure of hosting the group over two days in the beautiful Blue Mountains. The jam-packed schedule included a fascinating talk from Prof Michel Poulain, a pioneer of research on 'Blue Zones' (areas of the world where people live longer and healthier lives than anywhere else). Examples include the island of Okinawa in Japan and Sardinia in Italy. Prof Poulain discussed plans for a 'man-made' Blue Zone in the Netherlands, a planned community where optimal health and well-being are promoted.



International experts in centenarian research convene in the Blue Mountains.

Other highlights included an update from Prof Takashi Sasaki who is completing whole genome sequencing on almost 500 Japanese centenarians, including a significant number of super-centenarians (those aged 110 and above). CHeBA's Dr Karen Mather discussed our own genetics work that has so far identified several genes associated with exceptional longevity.

CHeBA co-director Prof Perminder Sachdev spoke of the importance of these collaborative meetings; "Longevity beyond 100 is no longer rare but it remains an exception. It is an exciting time to engage with other international experts to discover the determinants of such longevity with the expectation that it will help support positive ageing internationally".

The 2019 meeting of the ICC-Dementia will be held in Switzerland.

Wipeout Dementia

CHeBA's biannual corporate surfing event, Wipeout Dementia, entered its fourth year in 2018. In May, a group of Sydney's senior executives, including Liberal MP Tony Abbott, braved the chilly water at Queenscliff. In November, leaders from the property industry enjoyed warmer weather and a gentle swell at Bondi. The events raised a combined \$236 000 to support research at CHeBA.

Participating surfers completed a gruelling four week 'strength-for-surfing' training regime which culminated in a professionally judged team competition at Queenscliff and Bondi. Once again the surfers were joined in the water by former world surfing champion (1978) and Wipeout Dementia ambassador Wayne 'Rabbit' Bartholomew AM.

As well as raising much-needed research funds, the event aims to highlight the global social and economic impact of dementia. "Dementia is now estimated to cost Australia more than \$15 billion annually," says Wipeout Dementia Ambassador and Spokesman for The Dementia Momentum, Richard Grellman AM.

"By 2056 the total cost of dementia is predicted to increase to more than \$36.8 billion in today's dollars," he said. "Clearly we need a colossal increase in funding to support key research to alter the course of dementia forecasts."

Many of the competitors have a personal link to dementia, including team captain Steve Watson whose father has recently been confined to a nursing home with dementia. "The decision to move him to full time care was inevitable but still feels terrible. Raising money for dementia research is something tangible that I can do to help others facing this in the future".



'Clemo's Diehards', one of the competing teams at Bondi.



November 2018 Wipeout Dementia surfer Mark Gross

The money raised will help fund key dementia research at CHeBA. Prof Henry Brodaty, who attended both events to cheer on the competitors, said during the presentation ceremony that "the team at CHeBA are dogged in our determination to discover risk factors for and protective factors against cognitive decline with ageing, ways to prevent or stave off the onset of dementia, more accurate ways to diagnose Alzheimer's disease and other dementias, as well as better care models for people with dementia.

To find out more about Wipeout Dementia please contact Heidi Douglass at h.douglass@unsw.edu.au.

Brain Donation

In our quest to understand and promote healthy brain ageing, discovering what differentiates a healthy brain from one with a disease like dementia is essential and requires examination of brain tissue. Like organ donation, donating brain tissue after your death can leave a legacy for future generations by providing the resource that researchers need to understand how the brain works and to fight dementia.

The Centre for Healthy Brain Ageing collaborates with the Sydney Brain Bank and participants in the Sydney Centenarian Study are able to donate their brain to this program. By comparing brain tissue to the huge volume of information we have collected over the course of our study we hope to gain new insights into the neurobiological basis of ageing and dementia.

If you would like more information about brain donation or would like to register as a donor, please contact study staff on (02) 9385 0433.



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