Sydney Centenarian Study: Aims

- Establish a cohort of centenarians and near-centenarians to explore the genetic and environmental factors that underpin successful ageing.

- Specific aims:
  - Determine the prevalence of major medical and neuropsychiatric disorders in the oldest old, including prevalence of dementia.
  - Validate and/or establish tools for the valid assessment of cognitive function in the oldest old.
  - Examine the genetics, brain structure and neuropathology of the oldest old.
  - Explore the care needs, quality of life, physical and mental health, and degree of functional independence of the oldest old.
Sydney Centenarian Study: Recruitment

Multiple and exhaustive recruitment strategies in an effort to identify all >95yo Australians within our catchment area to establish as representative a cohort as possible.

- Targeted mailouts utilising Department of Human Services (i.e. Medicare) roll.
- Aged-care facilities.
- Public health forums and seniors events.
- Media.
- Word-of-mouth.
## Sydney Centenarian Study: Assessment Protocol

### Baseline Assessment (n=410)

- Demographics
- Lifetime medical history
- Current medications
- Family medical history
- Cognitive assessment (MMSE + ACE)
- Premorbid intellectual functioning (NART)
- Mood (K-10, GDS)
- Subjective memory complaints
- Falls (last 12 months)
- Diet
- Physical activity
- Mental activity
- Social network

### Physical exam
- Vitals
- Vision
- Walking speed
- Balance
- Grip strength
- Spirometry

### Informant interview:

- Demographics
- Corroborate participant medical history
- Corroborate family medical history
- Activities of daily living (self care)
- Instrumental activities of daily living (Bayer iADLs)
- Cognitive decline (IQ-CODE)
- Health service utilisation (RUD-Lite)
- Apathy (AES)
- Interpersonal reactivity (IRI)
- Neuropsychiatric symptoms (NPI)
Sydney Centenarian Study: Assessment Protocol

6 monthly follow-up assessments:

- Interval medical history medical history
- Current medications
- Cognitive assessment (MMSE+ACE)
- Mood (K-10, GDS)
- Subjective memory complaints
- Falls (last 6 months)
- Current diet
- Current physical activity
- Current mental activity
- Current social network

• Physical exam
  ▪ Vitals
  ▪ Vision
  ▪ Walking speed
  ▪ Grip strength
  ▪ Spirometry

6mo: n=270
12mo: n=203
18mo: n=141

Informant interview:

- Corroborate interval medical history
- Activities of daily living (self care)
- Instrumental activities of daily living (Bayer iADLs)
- Cognitive decline since last assessment (IQ-CODE)
- Health service utilisation (RUD-Lite)
Sydney Centenarian Study: Assessment Protocol

Neuropsychological assessment

- Verbal fluency (FAS)
- Hopkins Verbal Learning
- Tactile Naming (ADAS-Cog)
- Boston Naming (BNT)
- Oral trail-making (Trails A and B)
- Similarities (WAIS-III)
- National Adult Reading Task (NART)
Sydney Centenarian Study: Assessment Protocol

Bloods (n=262)
- DNA/RNA
  - Genotyping
  - Whole genome sequencing
  - Gene expression
  - Epigenetic assays
  - Storage of serum and plasma for future proteomics and lipidomics work

- Clinical chemistry
  - Glucose and lipids
  - Kidney function
  - Haemoglobin and WBC
  - Urate
  - Electrolytes
  - B12
  - Folate

Brain donation (n=10)

Brain imaging – MRI (n=43)

MRI brain scan of a 101yo female participant with dementia showing (a) moderate generalised brain atrophy and (b) extensive white matter hyperintensities [1]
Sydney Centenarian Study: Baseline Demographics

- **Gender Distribution**:
  - Female: 71%
  - Male: 29%
  - Total: 410
  - Mean Age: 97.40y (SD 2.07)
  - Age Range: 95.02y – 106.3y

- **Language Background**:
  - English Speaking: 74%
  - Non-English Speaking: 26%

- **Residential Setting**:
  - Community: 39%
  - Aged Care: 61%

- **Age Distribution at Baseline**:
  - 95yo: 119
  - 96yo: 107
  - 97yo: 55
  - 98yo: 46
  - 99yo: 37
  - 100+: 46

- **Residential Location**:
  - Hostel: 41%
  - Nursing Home: 59%
Sydney Centenarian Study: Years of Education

Years of Education
Mean: 10.02y (SD 3.12)
Range: 0-23y

- 34.5% completed high school
- 12.5% completed university studies
Sydney Centenarian Study: Dementia

- Each participant is reviewed by a 'consensus' panel to determine whether they meet criteria for dementia

- Panel includes:
  - Neuropsychiatrist
  - Old-age Psychiatrist
  - Neuropsychologist
  - With input from other study staff

- Consensus review takes into consideration:
  - Performance on cognitive tasks
  - Informant report of cognition and functional independence
  - Medical history
  - Mood
  - Physical frailty
  - Subjective memory complaints
  - Detailed notes from Research Assistant
  - MRI report (if available)
Sydney Centenarian Study: Dementia vs Non-Dementia

Mean MMSE (/30)

Mean ACE-R (/100)

Dementia vs Not Dementia
Sydney Centenarian Study: Dementia vs Non-Dementia

**Age at Baseline**
- 95: 20.18%
- 96: 35.58%
- 97: 40%
- 98: 47.37%
- 99: 47.06%
- 100+: 45%

**Education**
- Years: 0-16
- Dementia: 9.23%
- Not Dementia: 10.46%

**Living in Aged Care**
- %: 0-100
- Dementia: 65.93%
- Not Dementia: 23.9%
Sydney Centenarian Study: ADLs

How independent are the oldest old with activities of daily living (ADL’s)?

- Completely Independent
- Minor assistance or special preparation of food
- Requires moderate assistance
- Requires extensive assistance

Of those living in the community, only 13.4% of participants required assistance with eating and/or special preparation of meals.

Of those living in aged care, 38.6% required special preparation of meals and/or some level of assistance with eating.
Sydney Centenarian Study: ADLs

How independent are the oldest old with activities of daily living (ADL’s)?

- No assistance: 19%
- Minor assistance: 11%
- Moderate assistance: 12%
- Extensive assistance: 58%

Of those living in the community, 29.6% of participants required at least minor assistance with dressing and/or clothes selection.

Of those living in aged care, 62.8% required at least some level of assistance.
Sydney Centenarian Study: ADLs

How independent are the oldest old with activities of daily living (ADL’s)?

- Well groomed without assistance
- Occasional assistance
- Regular assistance or supervision
- Needs total grooming care

Of those living in the **community**, 35.5% needed some level of assistance with grooming

Of those living in **aged care**, 65.8% required some level of assistance or supervision with grooming
Sydney Centenarian Study: ADLs

How independent are the oldest old with activities of daily living (ADL’s)?

- No assistance
- Help getting in/out
- Can only wash hands/face
- Cannot wash self at all

Of those living in the community, 22.5% needed at least some assistance with bathing/showering.

Of those living in aged care, 64.9% required assistance with bathing/showering.
How mobile are the oldest old?

- 63.5% of our participants can ambulate without assistance from others (although most rely on a walking stick or walking frame), with almost half of these able to walk more than a blocks distance.

- 22.5% of our participants can walk at least a short distance with the assistance of others.

- 14% of our participants are restricted to a wheelchair or are bed bound.

Of those that can ambulate more than a block (29.4% of the sample)

- 30% reported they walk more than 4x each week for exercise

- 34% reported they go for a walk 1-3x weekly for exercise

- Our participants reported that they walk for an average of 30 minutes each time they exercised
Sydney Centenarian Study: Mental Health

Kessler Psychological Distress Scale (K-10)

- 10-15 = Low risk
- 16-29 = Medium risk
- 30-50 = High risk

... of having an anxiety or depressive disorder [2]
Sydney Centenarian Study: Challenges

- Age verification.
- Increasing focus on privacy with growing difficulty obtaining information or assistance with recruitment from aged care facilities.
- Sensory impairments (affects assessment but also recruitment e.g. booking interview times).
- Consent.
- Attaining a representative sample.
Sydney Centenarian Study: Current and Future Focus

- Combine data with international centenarian studies.
- SCS cohort Vs younger CHeBA study cohort, the Memory and Ageing Study, n=1037, age 70-90 at baseline. [3]
- Develop Australian norms for 95-100y and 100y+ on a range of neuropsychological tests.
- Identify environmental predictors of successful ageing – diet, physical activity, cognitive stimulation, social networks etc.
- Genetics: Examine polygenic risk scores, gene expression including non-coding RNA, DNA methylation, whole genome sequencing.
References

