Sydney Centenarian Study (SCS)

Centre for Healthy Brain Ageing (CHeBA)

University of New South Wales (UNSW)

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.
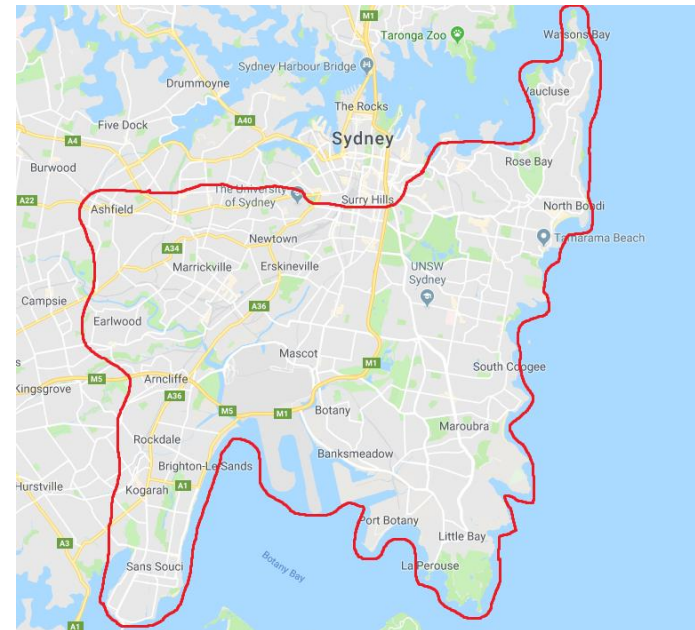
Sydney Centenarian Study: Assessment Protocol

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

Informant interview:

- 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

- 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)
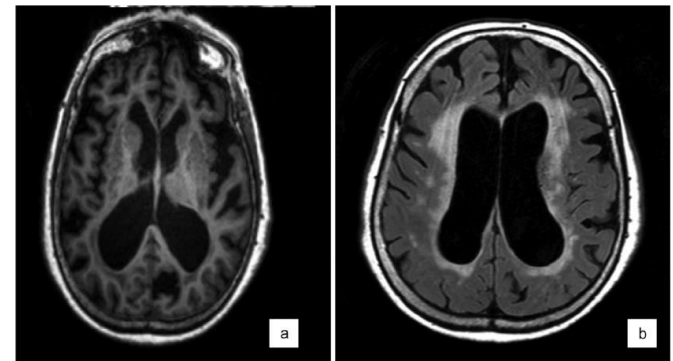
Sydney Centenarian Study: Assessment Protocol

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
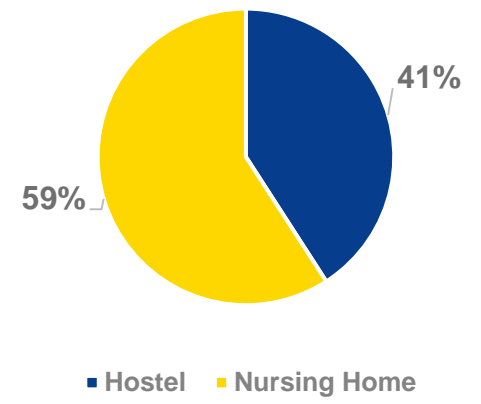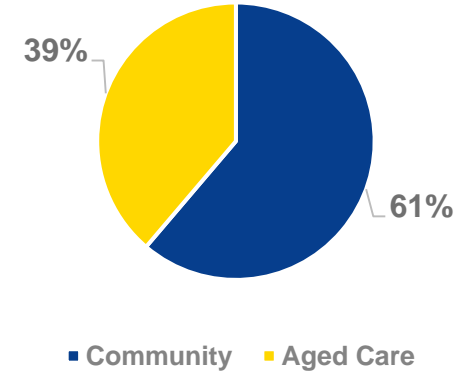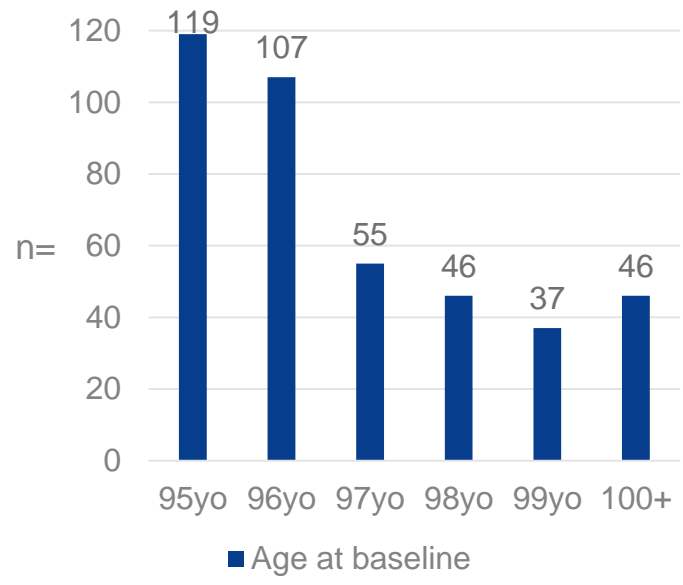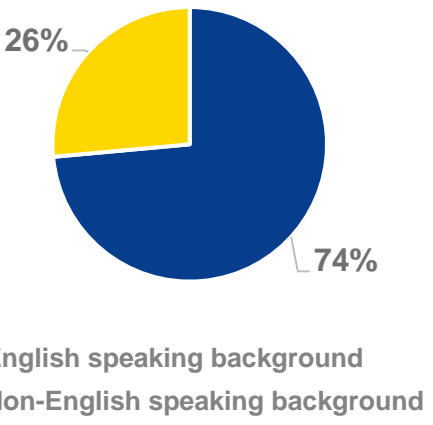   - Folate
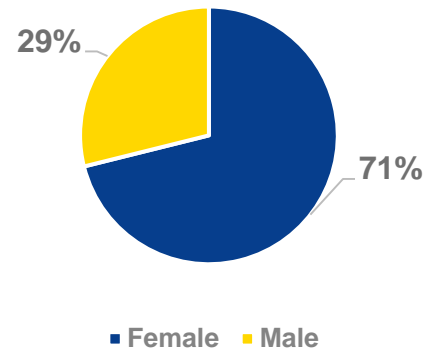
Brain donation (n=10)

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]

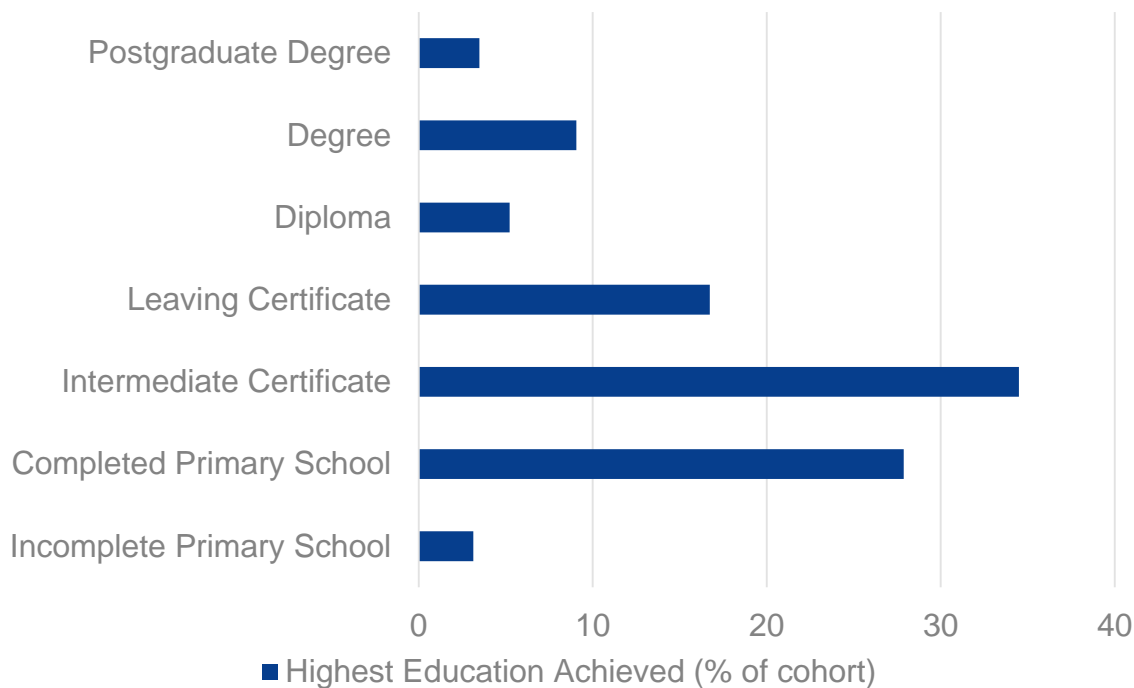# Sydney Centenarian Study: Baseline Demographics

N=410
Mean Age: 97.40y *(SD 2.07)*
Age Range: 95.02y – 106.3y
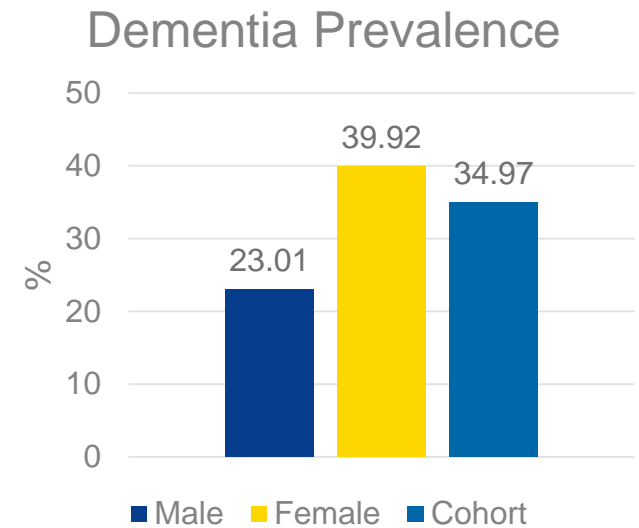
Sydney Centenarian Study: Years of Education

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

- **34.5% completed high school**
- **12.5% completed university studies**

Chart: Highest Education Achieved (% of cohort)

Category	% of cohort (approx.)
Postgraduate Degree	~3.5
Degree	~9
Diploma	~5
Leaving Certificate	~16.5
Intermediate Certificate	~34.5
Completed Primary School	~28
Incomplete Primary School	~3

■ Highest Education Achieved (% of cohort)

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)

Dementia Prevalence
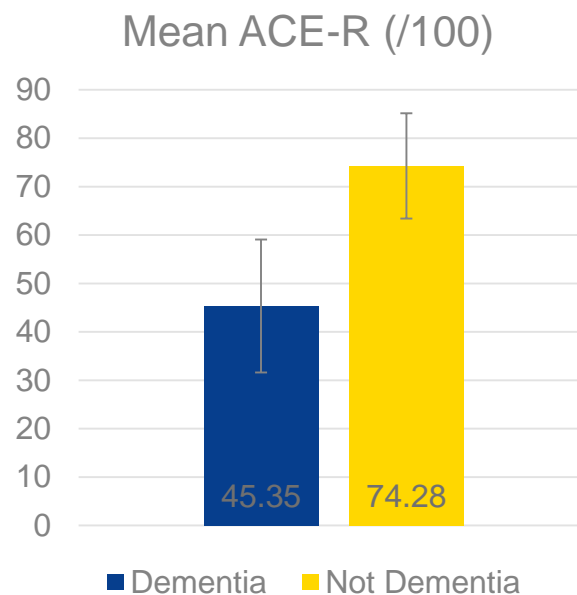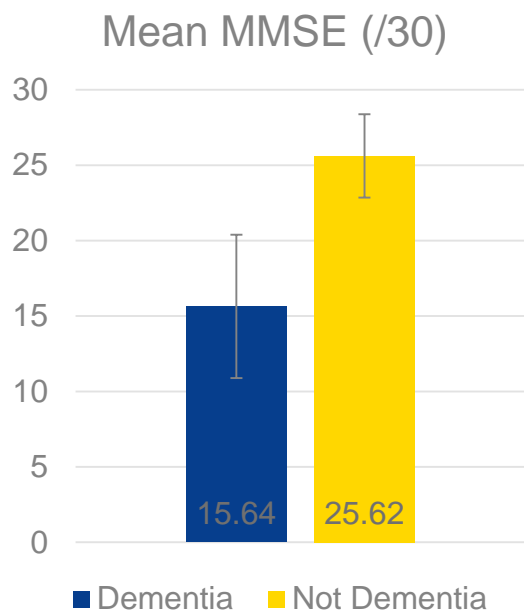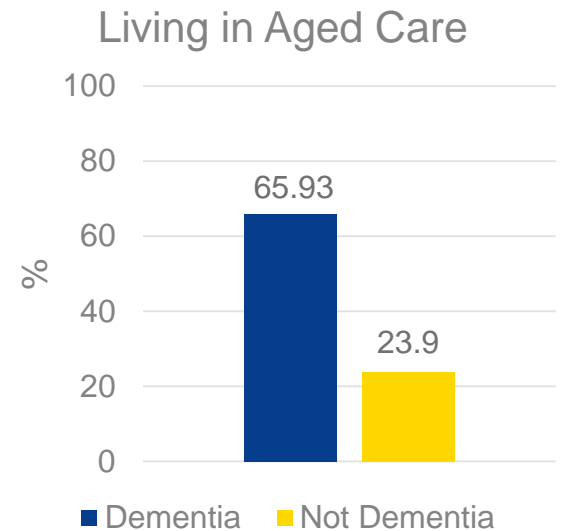

Bar chart showing dementia prevalence (%): Male 23.01, Female 39.92, Cohort 34.97

Sydney Centenarian Study: Dementia vs Non-Dementia

Mean MMSE (/30)

Dementia: 15.64
Not Dementia: 25.62

Mean ACE-R (/100)

Dementia: 45.35
Not Dementia: 74.28

Sydney Centenarian Study: Dementia vs Non-Dementia

Sydney Centenarian Study: ADLs
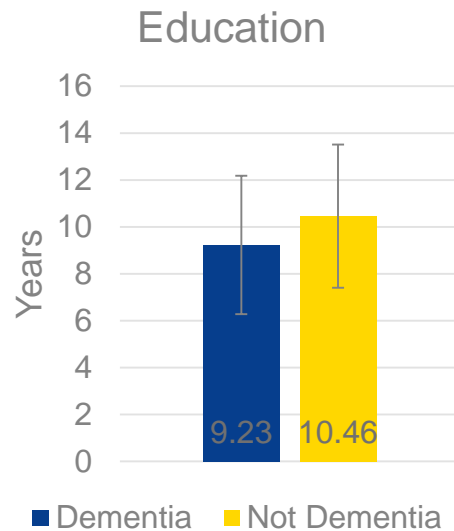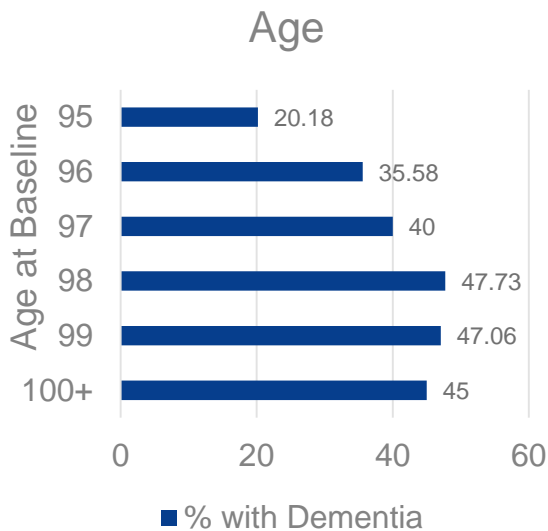
How independent are the oldest old with activities of daily living (ADL's)?

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

5%
4%
14%
77%
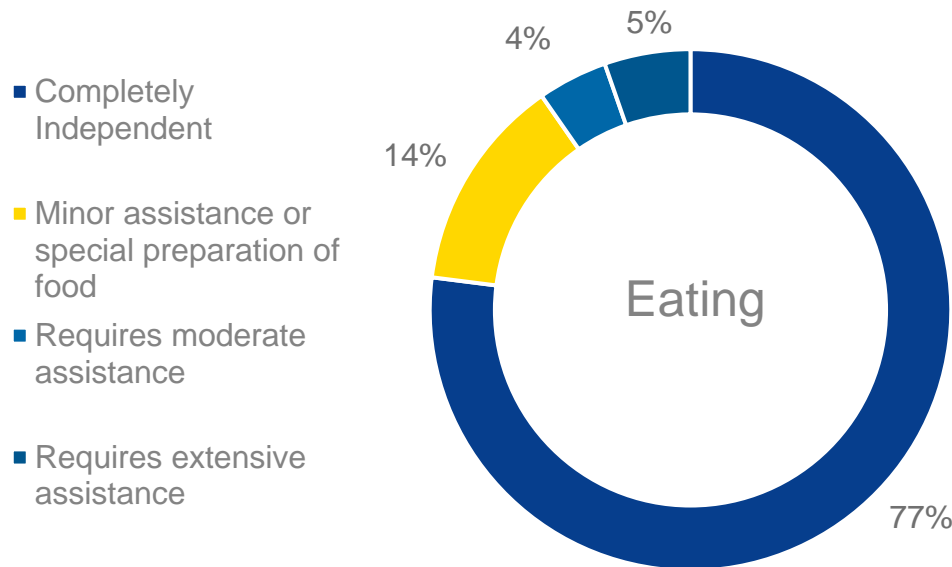
Eating

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.
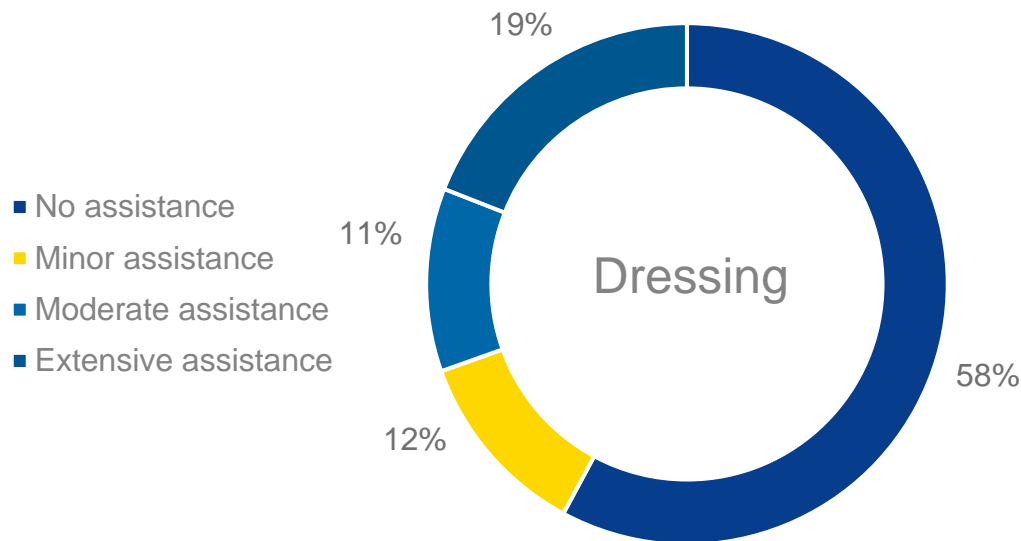
Sydney Centenarian Study: ADLs

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

Legend:
- No assistance
- Minor assistance
- Moderate assistance
- Extensive assistance
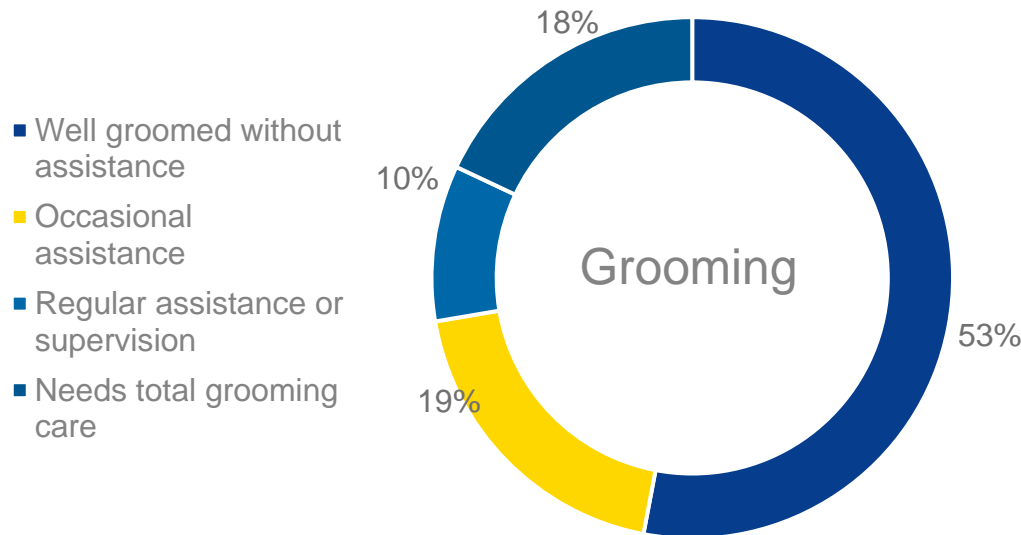
Chart (Dressing):
- 58%
- 12%
- 11%
- 19%

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
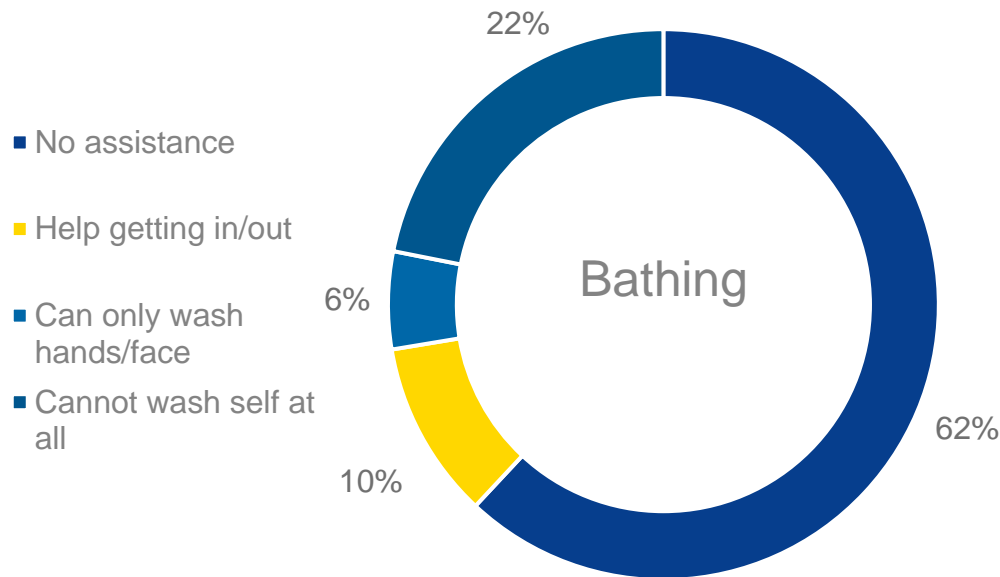- ■ Needs total grooming care

Grooming

18%
10%
53%
19%

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)?

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

Donut chart labeled "Bathing": 22%, 62%, 10%, 6%

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.

Sydney Centenarian Study: Mobility

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
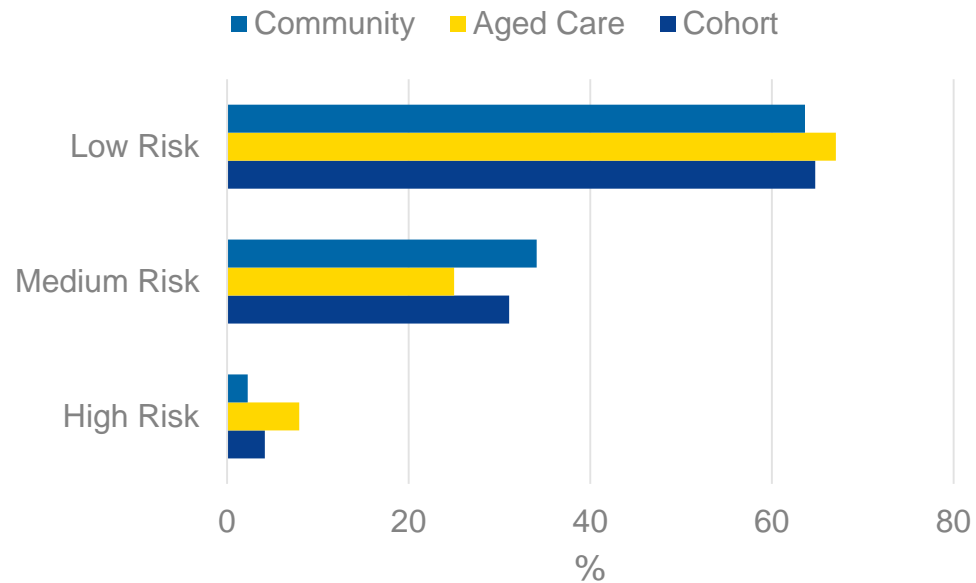
Sydney Centenarian Study: Mental Health

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]

Legend: ■ Community ■ Aged Care ■ Cohort

Categories: Low Risk, Medium Risk, High Risk

X-axis: % (0, 20, 40, 60, 80)

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

1. Sachdev, P.S., Levitan, C., Crawford, J., Sidhu, M., Slavin, M., Richmond, R., et al. (2013). The Sydney Centenarian Study: methodology and profile of centenarians and near-centenarians. International Psychogeriatrics, 25, 993-1005.

2. Andrews, G. & Slade, T. (2001). Interpreting scores on the Kessler Psychological Distress Scale (K10). Australian and New Zealand Journal of Public Health, Vol 25(6), 494-497.

3. Sachdev, P.S., Brodaty, H., Reppermund, S., Kochan, N.A., Trollor, J.N., Draper, B., et al. (2010). The Sydney Memory and Ageing Study (MAS): Methodology and baseline medical and neuropsychiatric characteristics of an elderly epidemiological non-demented cohort of Australians aged 70–90 years. International Psychogeriatrics, 22, 1248–1264.