

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

- 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

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)

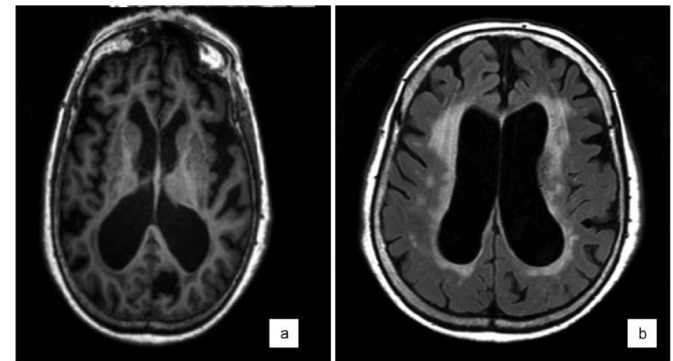
Sydney Centenarian Study: Assessment Protocol

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

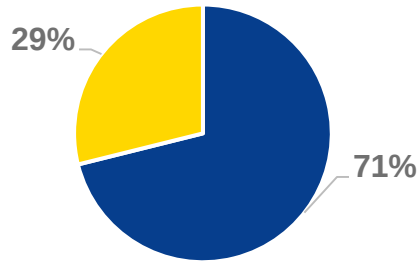
Brain donation (n=10)

Brain imaging – MRI (n=43)

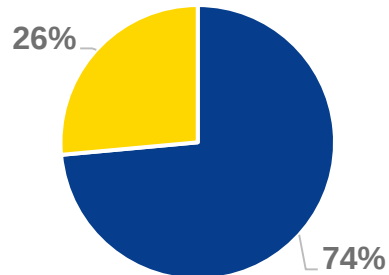


MRI brain scan of a 101yo female participant with dementia showing (a) moderate generalised brain atrophy and (b) extensive white matter hyperintensities [1]

Sydney Centenarian Study: Baseline Demographics



■ Female ■ Male

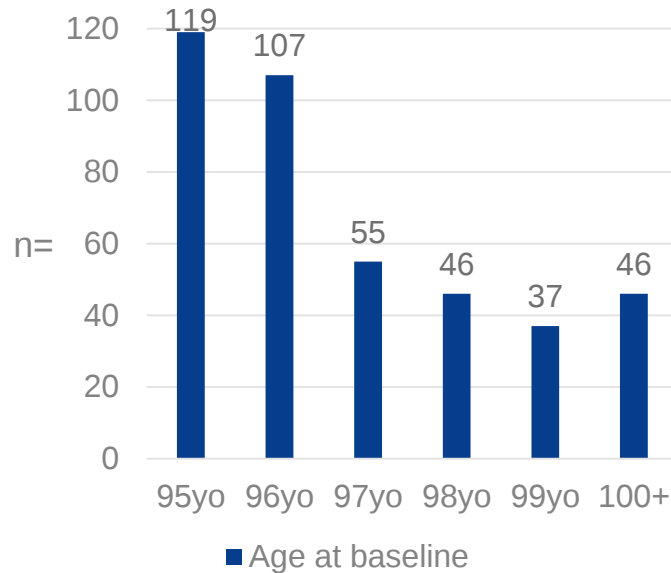


■ English speaking background
■ Non-English speaking background

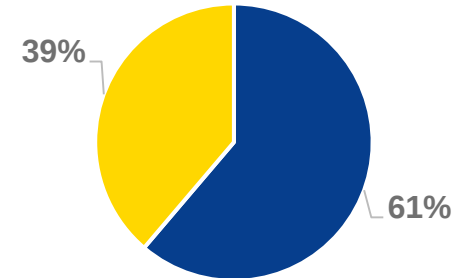
N=410

Mean Age: 97.40y (SD 2.07)

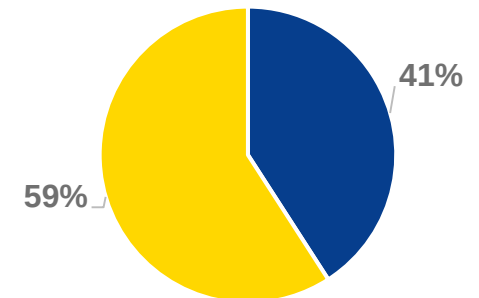
Age Range: 95.02y – 106.3y



■ Age at baseline



■ Community ■ Aged Care



■ Hostel ■ Nursing Home

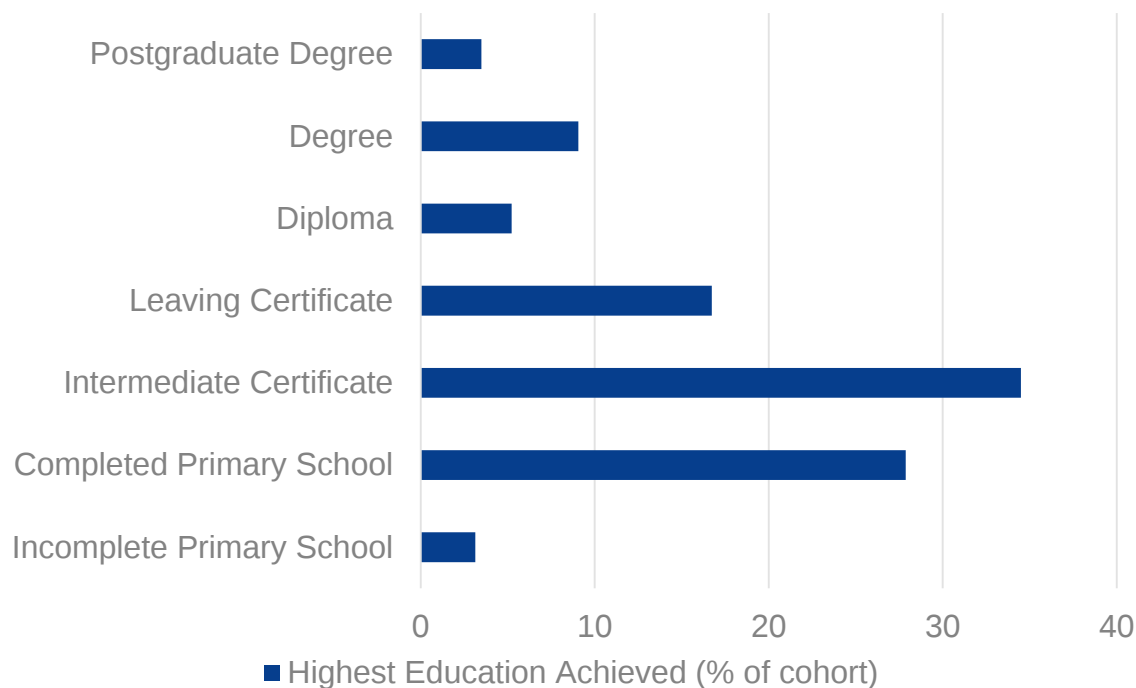
Sydney Centenarian Study: Years of Education

Years of Education

Mean: 10.02y (*SD 3.12*)

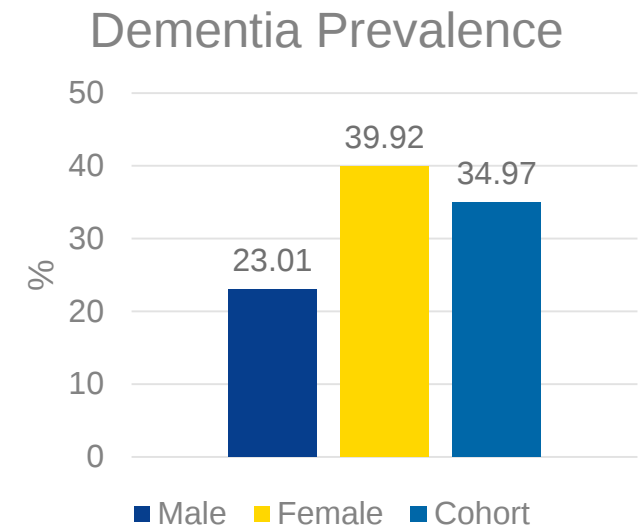
Range: 0-23y

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

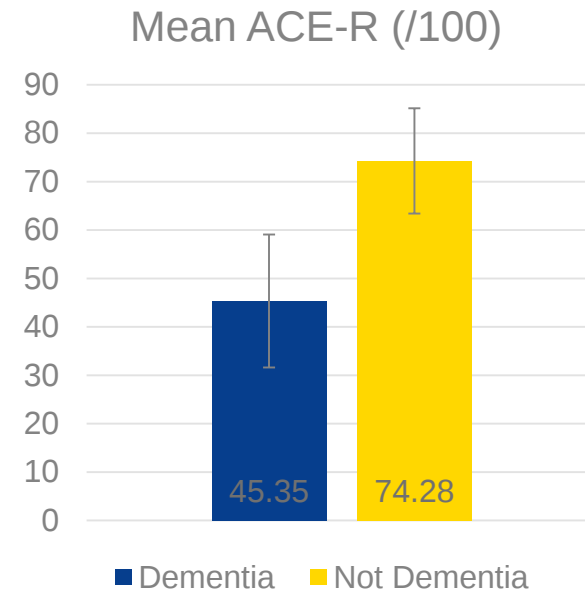
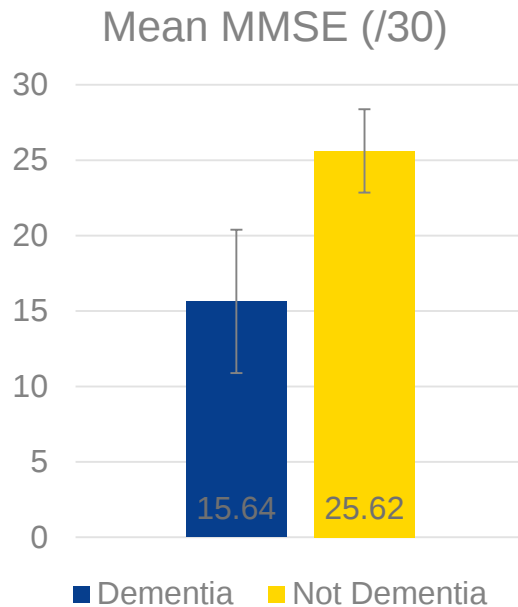


Sydney Centenarian Study: Dementia

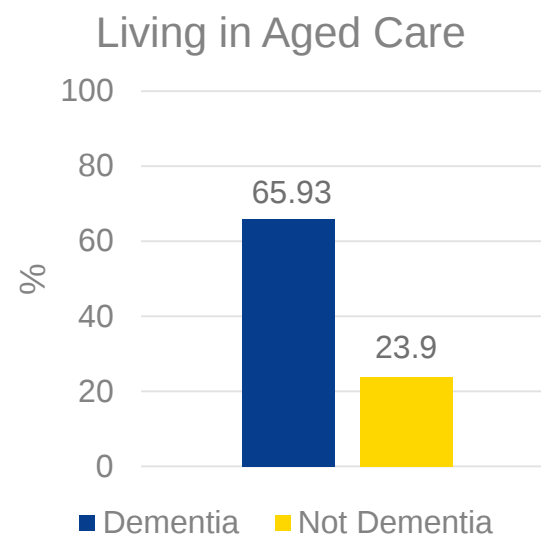
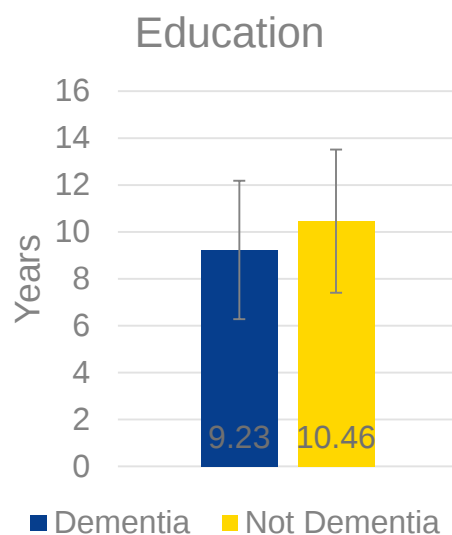
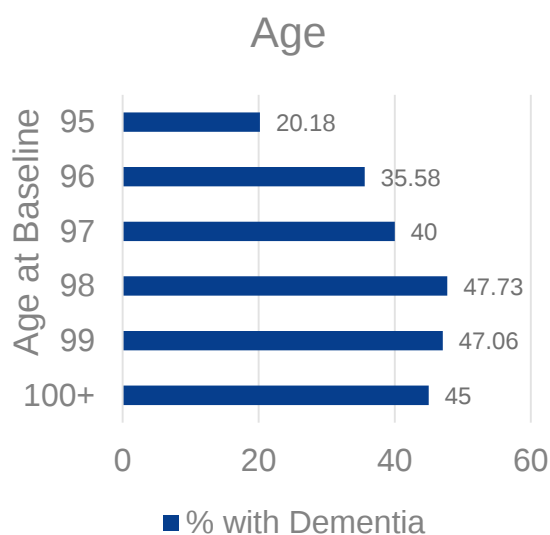
- Each participant is reviewed by a 'consensus' panel to determine whether they meet criteria for dementia
- Panel includes:
 - Neuropsychiatrist
 - Old-age Psychiatrist
 - Neuropsychologist
 - With input from other study staff
- Consensus review takes into consideration:
 - Performance on cognitive 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

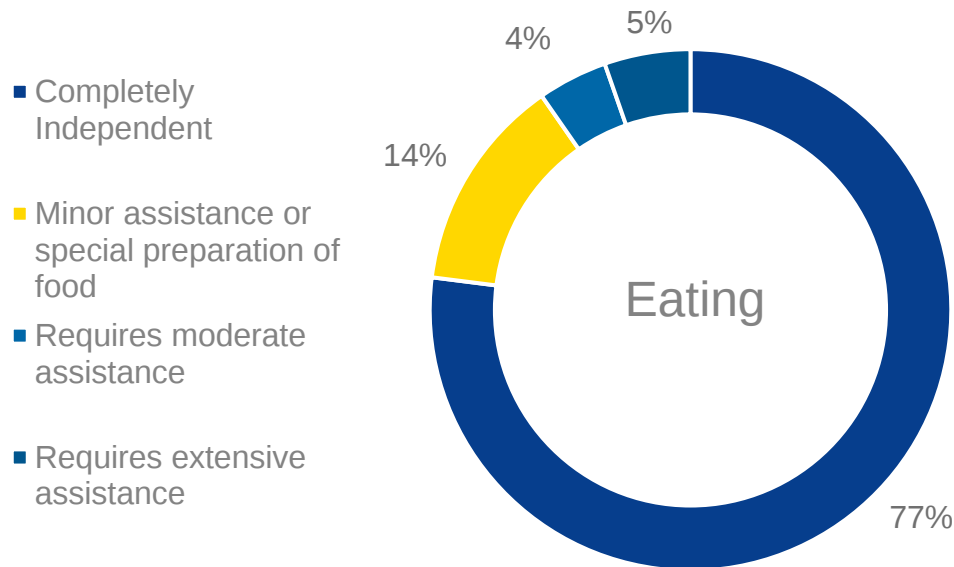


Sydney Centenarian Study: Dementia vs Non-Dementia



Sydney Centenarian Study: ADLs

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

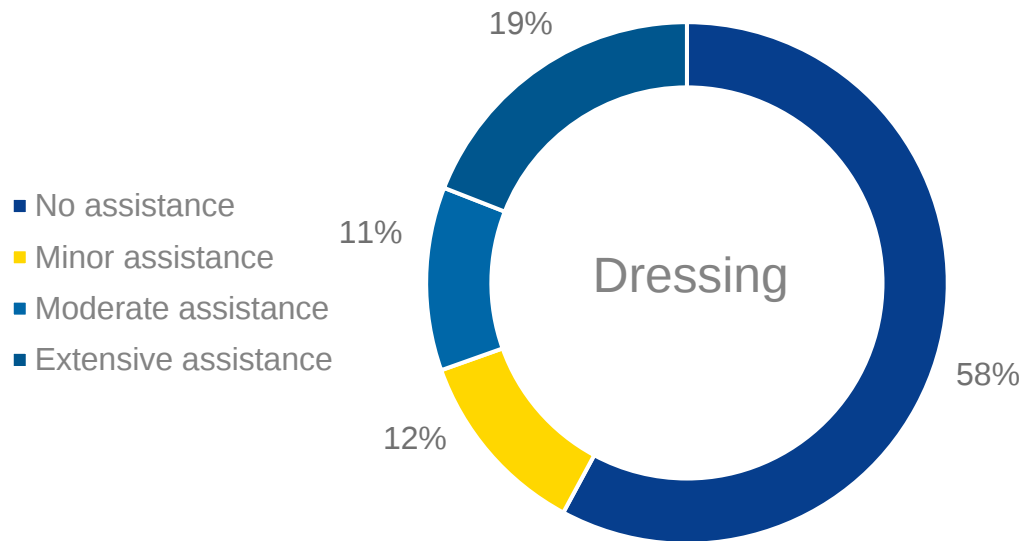


Of those living in the **community**, only **13.4%** of participants required assistance with eating and/or special preparation of meals.

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)?

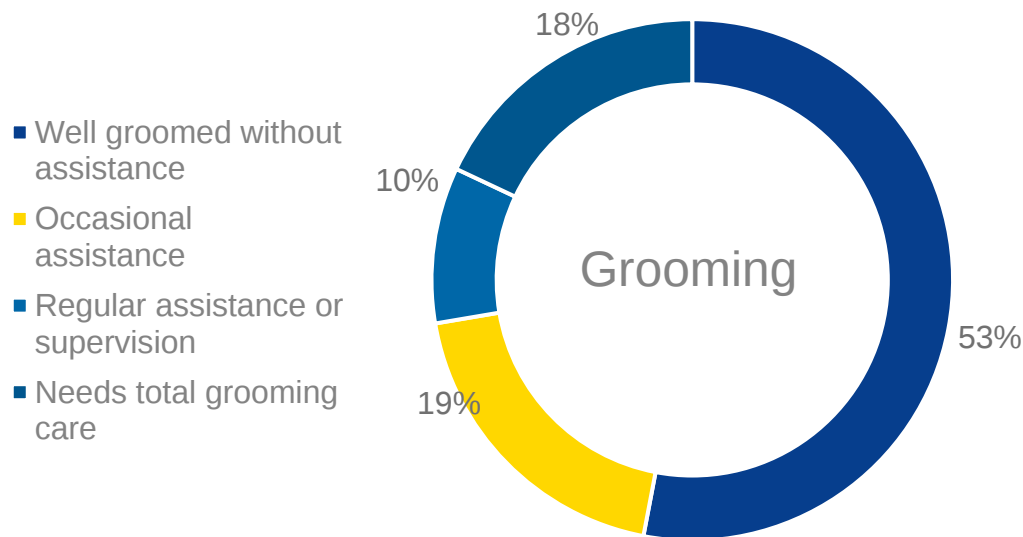


Of those living in the **community**, **29.6%** of participants required at least minor assistance with dressing and/or clothes selection

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)?

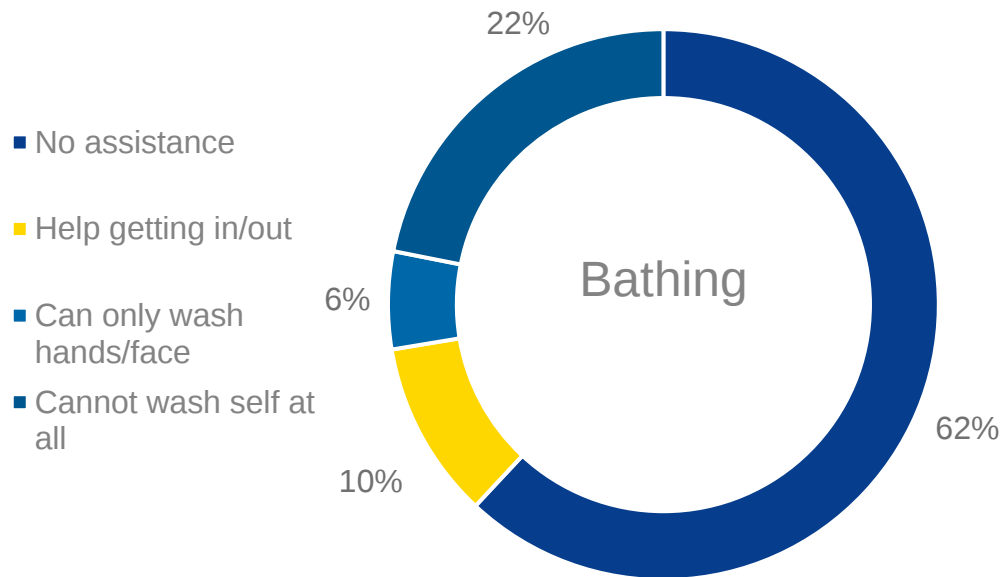


Of those living in the **community**, **35.5%** needed some level of assistance with grooming

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)?



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

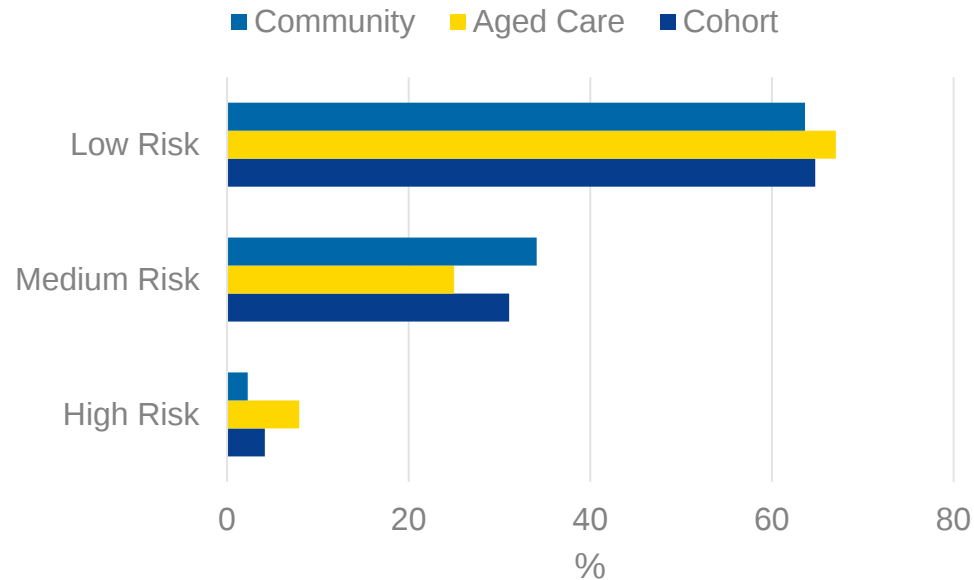


Sydney Centenarian Study: Mental Health

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]



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.