

Living Well to 100

Henry Brodaty

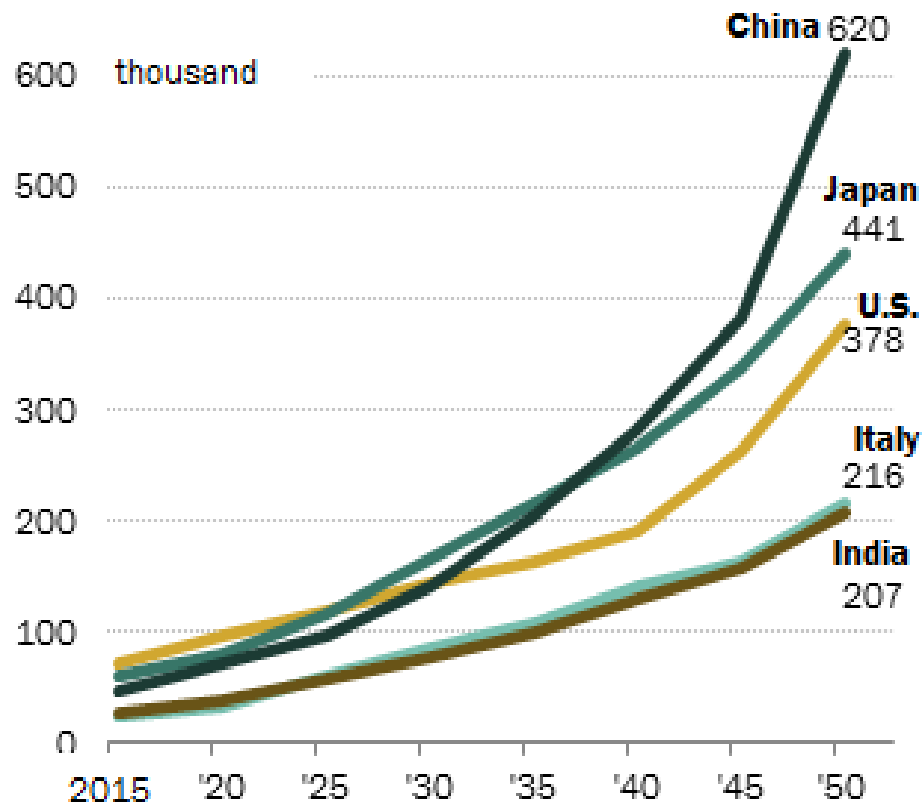
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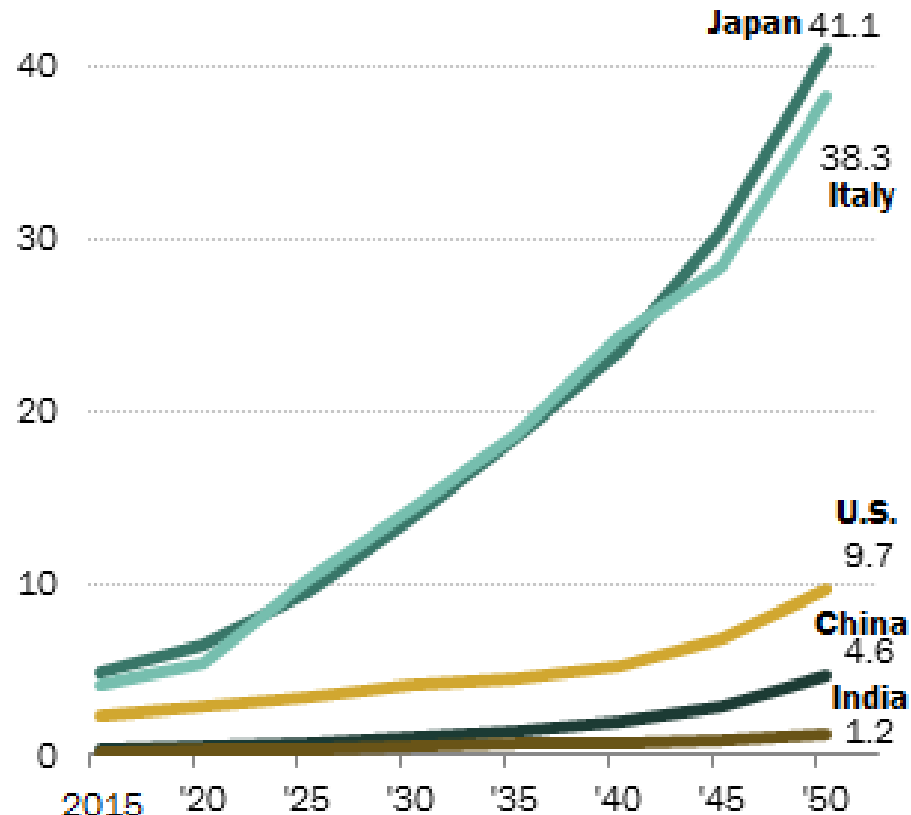
Centenarians around the world

Number of centenarians in China and Japan expected to surpass number in U.S.

Number of persons ages 100 and older



Number of persons ages 100 and older per 10,000



Source: United Nations, Department of Economic and Social Affairs, "World Population Prospects: 2015 Revision"

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...ring in Melbourne, 2013 on Australia Day

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broken in November, attended a lunch in Brisbane by Queensland Premier Ann Palaszczuk. Before, an unofficial yet when 57 centenarians celebrated the sixth Century celebration at Government House in Melbourne. Victorian MP Donna Monaghan presided the inaugural gathering after reading six or seven centenarians locally. "Being 100 is such an incredible achievement, so worth celebrating. I know that I am out of the way and I don't know - it might be the next morning I'm not here. But still I am interested in it." People always tell him he is ex-



SMH 3/1/17

"I have a heart condition which restricts me to a very slow type of life," he said. "I used to go to libraries, museums, exhibitions in the city. Reading is my main occupation, besides cooking and cleaning. I am still interested in what's happening around the world. I

120

People celebrated their 100th birthday in 1975

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People always tell him he is ex-

exceptional longevity of the residents - have been identified in Costa Rica, Sardinia, the Greek island of Ikaria and Okinawa in Japan. Those communities prioritise family and are socially engaged. They tend not to smoke, have diets high in vegetables and legumes and en-

600

People turned 100 in 2016

4870

Centenarians in 2016

41,100

Centenarians by 2050

joy constant moderate physical activity.

Researchers at UNSW's Centre

examined the determinants of suc-

still living independently in the community, CHeBA co-director Perminder Sachdev said.

"One important finding was that these individuals have often been very healthy until a very late age," he said. "If they have diseases such as hypertension, coronary artery

disease, diabetes, often these are late in developing, so somehow they've been able to push back [these diseases] - and some have been able to avoid it altogether."

ing] healthy old age is actually a lifelong enterprise. You're really looking at your risk factors, your diet, your weight, your exercise, cognitive activity."

Along with research by former La Trobe University lecturer John McCormack, who interviewed 130 centenarians, the study helps dispel assumptions that anyone living to such an old age will inevitably be dependent on aged care and public health services. "It's a negative stereotype that anyone at that age is decrepit, almost in a vegetative state, in a nursing home," Dr McCormack said.

He found a history of physical work and not being overweight were the most common characteristics among centenarians and

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Don't worry, be happy: how to live to 100

Liam Mannix

Science reporter

A few months ago, Tom Sample finally admitted defeat. His dicky knee was starting to give him real trouble as he walked across the greens at his golf club.

So, aged 97, Mr Sample gave in to the passing of time. He started using a golf cart.

"To be honest, I don't like riding in the cart – it breaks up the rhythm," he says. "It's a pain in the neck. But I guess it's one of those things I'll have to accept."

Mr Sample has grown old the way many would hope to. He lives independently, in Sydney's eastern suburbs, and has lots of friends. He does his own shopping, mows his own lawn, plays golf twice a week and spoils his great-grandchildren rotten.

And he's still sharp as a tack.

"I think in some ways it's quite disappointing, getting to be this old," he said, lamenting his home repair abilities are now limited. "You cannot do the things you used to do. I've got a bit of trouble in my plumbing. I could have fixed that in five minutes when I was younger – but it took me about half an hour!"

It is probably no coincidence that Mr Sample nails every recommendation from experts who study how to live to 100.

He does the basics: he is socially and physically active, has an active mind, and eats well.

That's a good start. But experts say Mr Sample has another little-known attribute many centenarians share: the right personality.

"Their psychological characteristics are remarkable,"



Hit a century: Tom Sample, 97, enjoys putting in his living room. Photo: Jessica Hromas

Healthy Brain Ageing (Mr Sample is a participant), sees the same thing in his studies.

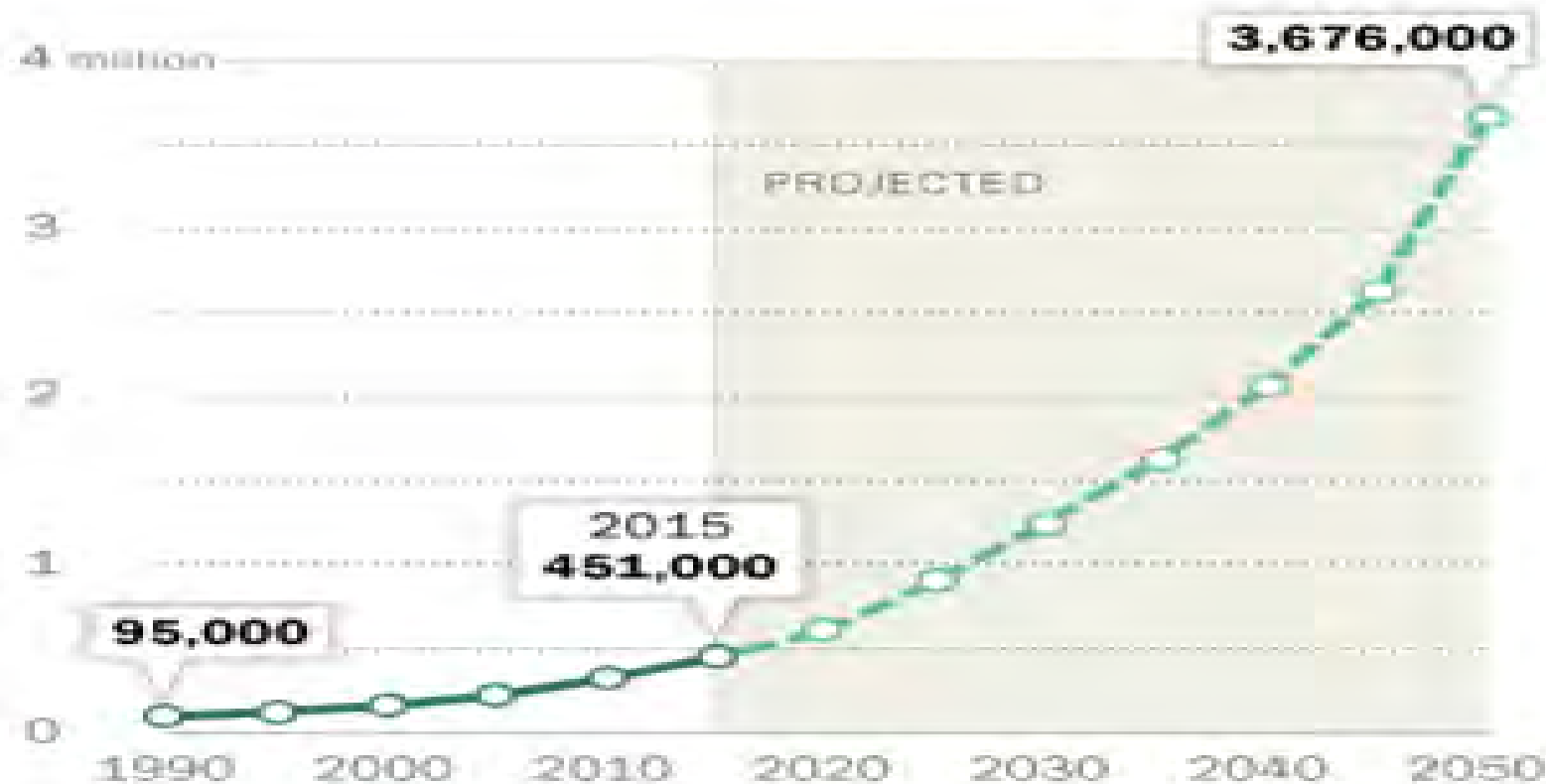
"They are a resilient lot – life does throw curve balls but they appear to come back with vigour."

"They are a resilient lot – life does throw curve balls but they appear to come back with vigour. This seems to come up in all studies of centenarians."

key if you want to stay alive. Staying fit and trim to avoid diabetes and high blood pressure is important. Seventy per cent of those who live past 110 manage to get lucky and avoid catching any nasty diseases, like cancer.

The world's centenarian population projected to grow rapidly

Number of persons ages 100 and older

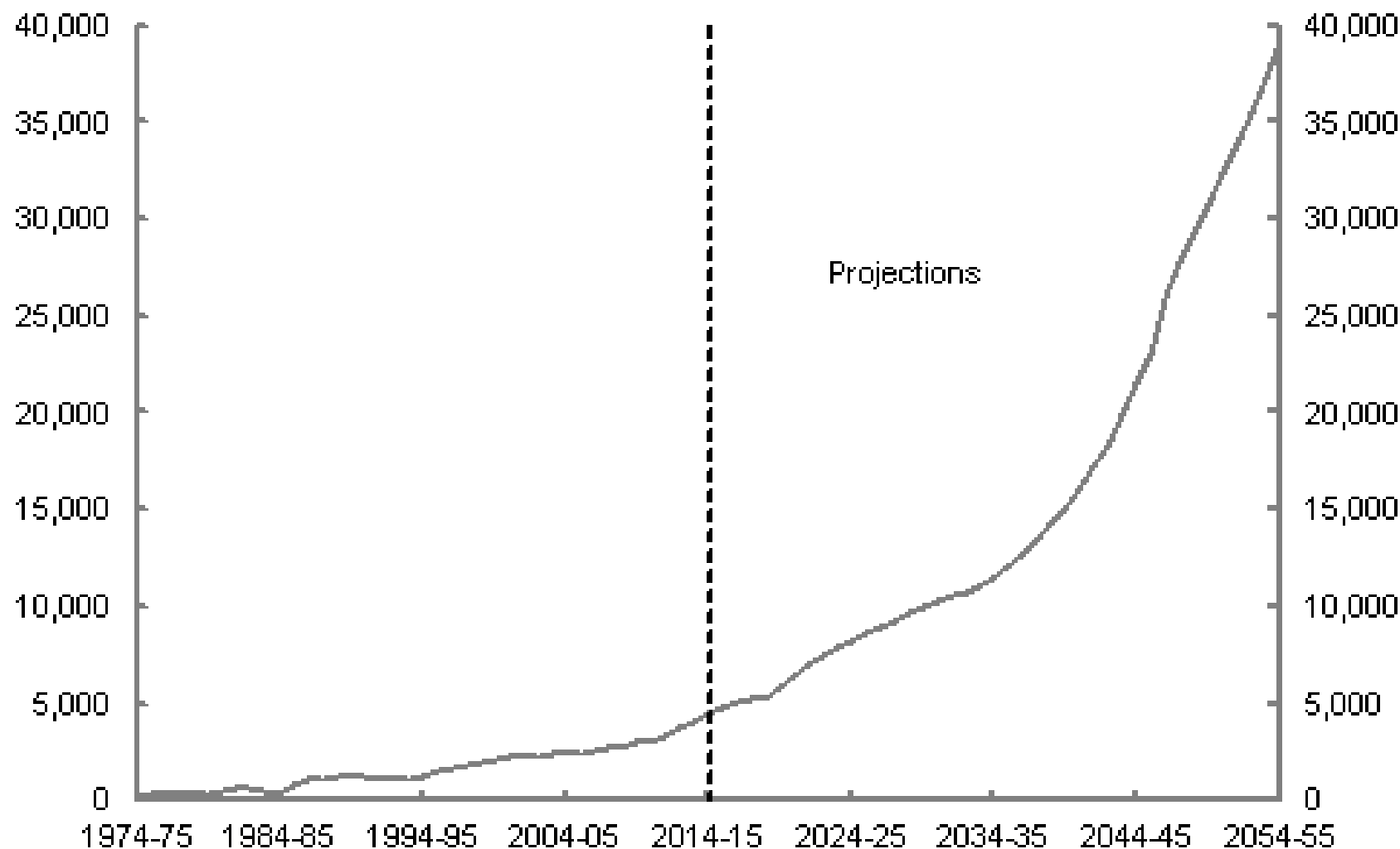


Source: United Nations, Department of Economic and Social Affairs, "World Population Prospects: 2015 Revision"

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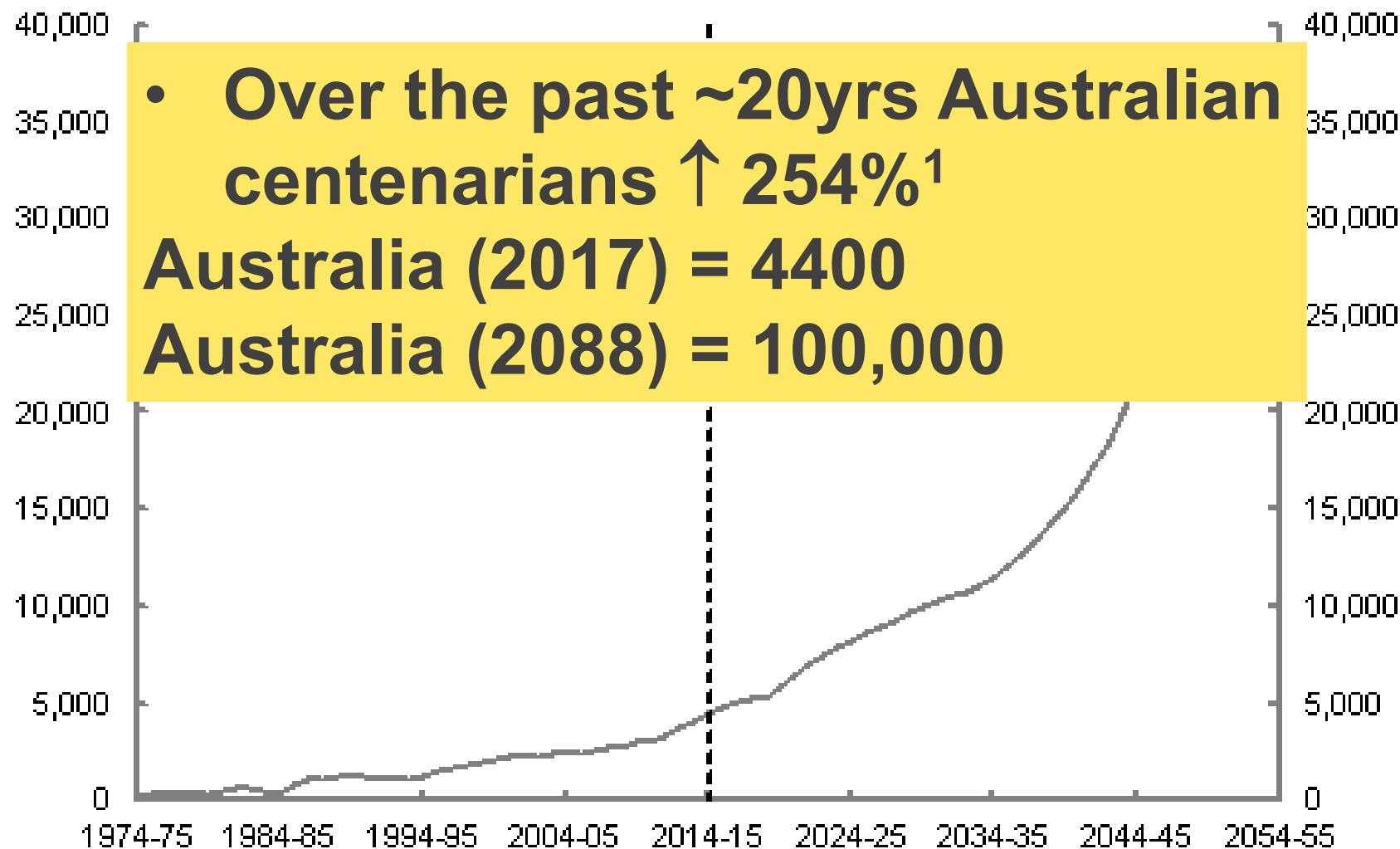
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Australian Centenarian Projections



Source: ABS cat. no. 3105.0.65.001, 3101.0 and Treasury projections

Australian Centenarian Projections



Source: ABS cat. no. 3105.0.65.001, 3101.0 and Treasury projections

But not just living longer....

Living well

- **General: Autonomy, Independence**
- **Mental: Happy, not depressed or anxious**
- **Social: Not lonely, feeling loved and loving**
- **Physical: Self-rated health, pain-free, mobile**

Rating living well?

- **Successful aging (Rowe and Kahn):**
 - **low probability of disease and disease-related disability**
 - **high cognitive and physical functional capacity**
 - **active engagement with life**
- **Satisfaction with life (SWL)**
- **Quality of Life (QoL)**
- **Self-rated health (SRH)**

Paradox: SRH v Satisfaction with Life

- Low correlation between self-reported health and SWL
- Oldest old more accepting? More resilient?
- Personality?
- Gero-transcendance Gondo Y

What determines living well to 100?

- **Delaying disease: most centenarians markedly delay high mortality risk-associated diseases**
- **Coping with disease: many endure more chronic age-related diseases for many years, women more so than men**
- **Most centenarians seem to deal with these chronic diseases more effectively, not experiencing disability until well into their nineties**

What determines living well to 100?

- **Genes – account for about 30% (NECS, Perls & Sebastiani)**
- **< 20% of centenarians escape major age-related diseases by 100**
- **$\approx 45\% \geq 1$ of these diseases before 65 (Evert et al., [2003](#))**
- **despite diseases, $\approx 90\%$ of centenarians delayed disability until mean 93 years (Perls & Sebastiani, 2013)**
 - **Do they have more functional reserve that enables longer independence?**

Power 9 Principles of the Blue Zones

1. Moderate, regular physical activity
2. Life purpose
3. Stress reduction
4. Moderate calories intake
5. Plant-based diet
6. Moderate alcohol, esp wine
7. Engage in family life
8. Engage spiritually/ religion
9. Engage in social life

1. Move Naturally

Right Outlook

2. Know your purpose
3. Down shift

Eat Wisely

4. 80% rule
5. Plant slant
6. Wine@5

Belong

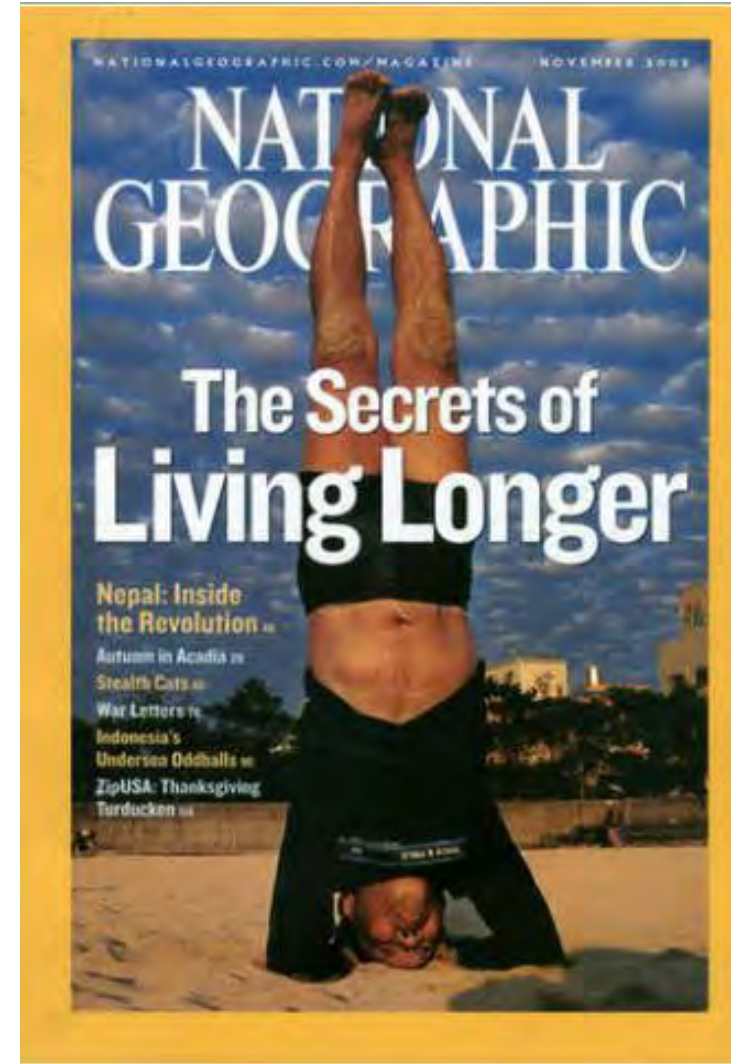
7. Family first
8. Belong
9. Right tribe

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Lifestyle

Seven protective factors

- Not being a smoker or stopping young
- Adaptive coping style
- Absence of alcohol abuse
- Healthy weight
- Stable marriage
- Some exercise
- Years of education



Vaillant GE, Mukamal K. *Am J Psychiatry* 2001;158: 839-847

Would you want to live to 100?

What does your answer depend on?

- Cognition?
- Physical health?
- Mental health?
- Personality?
- Family?
- Friends?
- Quality of life?
- Finances?

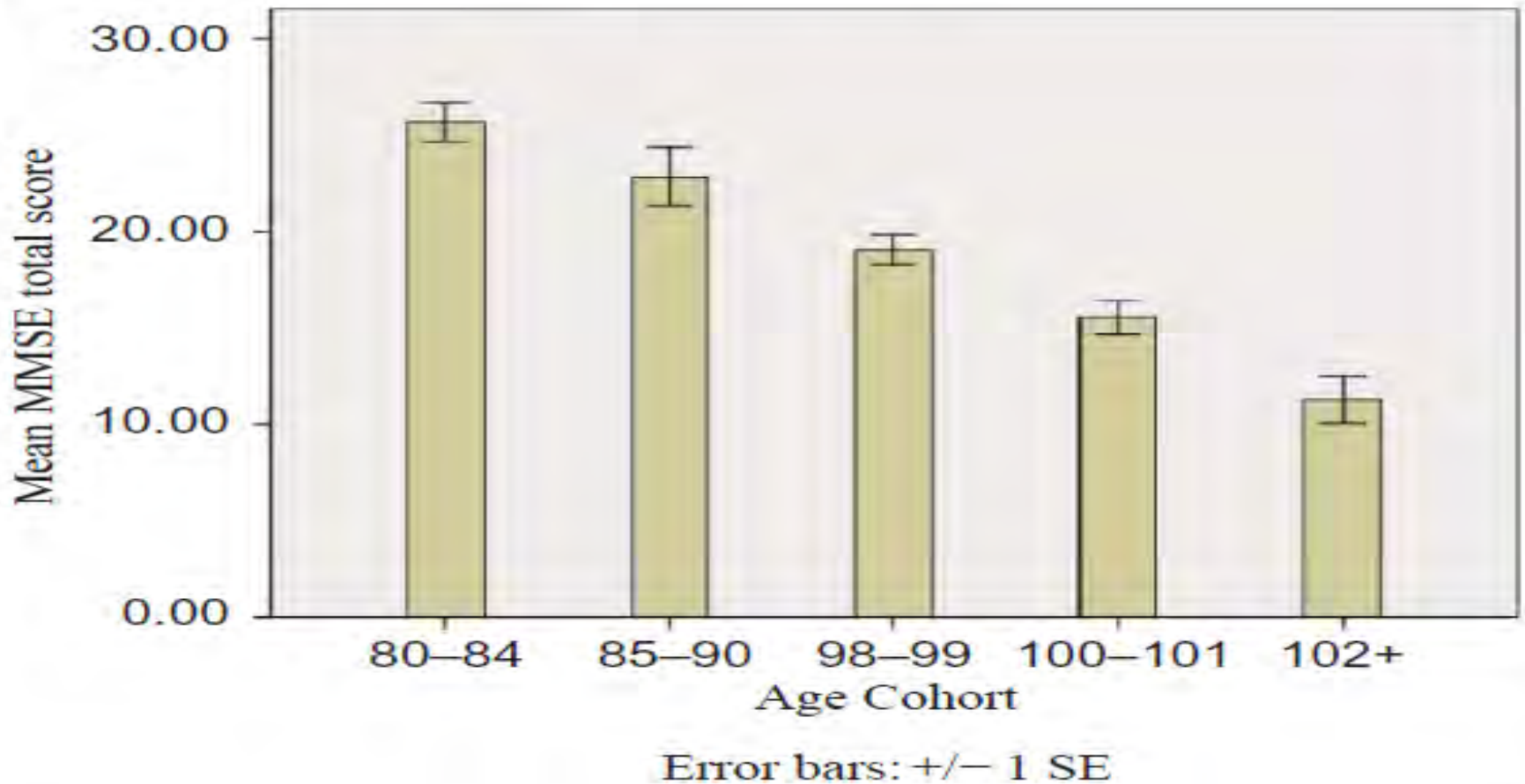


Cognition



Centenarians: MMSE

FIGURE 1. MMSE scores by age cohorts.



Sydney Centenarian Study, 95-106yo^s

- 343 persons, mean age 97.4 (SD 2.1); F = 71.7%
- Age 95-99, n = 302; 100-106, n = 41
- Private dwelling 54%; care home 46%
- 22.4% married, 71.1% widowed; 4.2% single
- Dementia about half (depends on definition)

Int. Centenarian Consortium - Dementia

- 17 studies
- 4121 participants aged 95 or above

Cognitive Impairment & dementia across older ages

- **Prevalence of cognitive impairment ↑ with age**
 - **39.7% (95-99 age group)**
 - **69.5% (100-104 age group)**
 - **80% (105+ group)**
- **Prevalence of dementia increases with age**
 - **37.9% (95-99 age group)**
 - **59.9% (100-104 age group)**
 - **73.5% (105+ group)**

Dementia in Centenarians



- ~ half of centenarians are dementia free^{1,2,3}
- Prevalence of dementia:
~ 40-60%^{1,2,3,4}
- Incidence of dementia:
~ 41% per yr ⁴
- Incidence similar for men and women⁴

¹Richmond et al. (2011); ²Andersen-Ranberg et al. (2001);

³Sachdev et al. (2013);

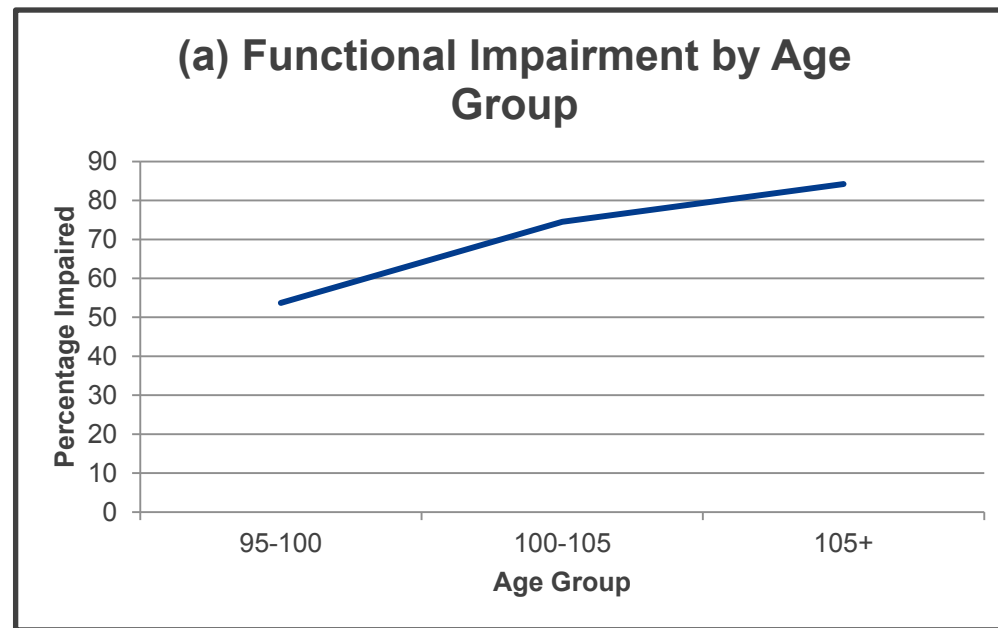
⁴Corrada et al. (2010); ⁴CHeBA data

Functional independence



SCS: Function

- **Basic ADLs** 95-99y = 4.5 (3.1); 100+ = 5.3 (3.2)
- **Adjusted bADLs** 3.4 (2.8); 3.0 (2.0)



Centenarians: General Functioning

- ~46% men & 25% women don't take any prescription medications¹
- +ve health self-rating ~ 54%²
- No major disease/disability ~29%²
- Active social companionship ~73%²
- Active community engagement ~ 20%²
- ADLs and IADLs often impaired ³

Sensory Functioning in Centenarians

- Significant visual impairment ~31%¹
- Significant hearing impairment ~14%¹
- No problems with vision ~ 37%²
- No problems with hearing ~ 27%²



Mental Health



Depression¹

- 25/37 studies → prevalence rates 12-29%
- Compared to younger cohorts (70s, 80s, 90s) rates are lower, similar or higher!
- More depression associated with poor health, pain, frailty, loneliness, vision impairment, being in care and traumatic events *but not sex*
- Less depression associated with
 - positive attitude towards life
 - better perception of economic resources
 - high morale and better functional health

¹Cheng A 2018 in preparation

Depression & Life Satisfaction: Centenarians and Near Centenarians

Jopp D et al (2016)

- 119 individuals aged 95-107 in NY
- Average of 4.85 ± 2.32 illnesses...however 67% reported good to excellent health
- 17 % reported no difficulty with daily activities
- ~ 80% = no depression (GDS<8)
- ~ 66% = mod - high Satisfaction with Life (SWL)

Mental Health of Australian Centenarians

- **Convenience sample of 118 centenarians (RACFs and community)**
- **Centenarians had regular contact with friends (59%), neighbours (62%), family (72%)**
- **54% were religious**
- **Mean MMSE = 21.5**
- **Anxiety = 10% (HADS)**
- **Depression = 14% (HADS)**

Sydney Centenarian Study

- K10 measures risk of psychological morbidity
- **In SCS**, K10 (n = 214) Mean 15.4 (6.1)
 - M $\approx$ F; 95-99yo $\approx$ 100+
- High risk (K10 $\geq$ 20) 18.7%
 - M 15% < F 25%; 95-99yo=18%; 100+ = 25%
- **In MAS** 70-90 yo^s (n = 1015)
 - K10 mean 13.4; High risk 6.6%
- More depression in SCS vs MAS (p <0.001)

Centenarians & Anxiety¹

- 3/5 studies → prevalence rates
- Clinically significant anxiety in Cs
 - Ribeiro (2015) ~ 45% had high anxiety Sx
 - Richmond R (2011) ~ 10%
 - Sachdev P (2013) K10 mean 15 (<30 indicates lack of psychological distress)
- Clinical anxiety associated with ...
 - ↓health perception; ↑medical conditions
 - ↑financial concerns; ↑loneliness Ribeiro 2015

Cheng A 2018 In Preparation

Satisfaction with Life (SWL) in Cs

- **Fordham Study: 66% of Cs rated SWL mod to very high despite poor physical health**
- **Most studies report lower SWL v younger groups**
 - **Georgia CS: 65% of 100+ vs 83% of 80-89yo^s**
 - **Only 1.3% rated SWL as poor (Martin et al)**

Sydney Centenarian Study SWL

- In SCS, SWL (n = 233) Mean 6.0 (1.4)
 - M = F; 95-99yo = 5.9 (1.5); 100+ = 6.3 (0.7)
- In MAS 70-90 yo^s (n = 994)
 - SWL mean 5.6 (1.3); M = F

**SWL significantly higher in SCS than MAS
($p < 0.001$)**

Greater SWL associated with...

- **Social resources**
- **Cognition, functional ability, social network, health, extraversion**
 - **Possibly mediated by attitudes to life and self-efficacy**

Happiness

- **Not linked to longevity in the sick but may be protective in well population** Veenhoven R, 2008
- **Prospective UK Million Women Study happiness & wellbeing do not affect mortality (corrected for fact that poor health can cause unhappiness)** Liu B, 2016

English Longitudinal Study of Ageing Zaninotto P 2016

- **More enjoyment of life, less mortality (adjusted for demographics, depression, health, mobility)**

Predictors of Mental Health: Centenarians and Near Centenarians

- Better subjective health & ADLs, more living children = $\uparrow$ SWL¹
- Better subjective health, IADLs & support from relatives = less depression¹
- Living in NH, more depression²



CReBA
Healthy Brains ■ Positive Ageing

¹Jopp et al. (2016); ²Margrett et al. (2010)

Predictors of SWL in SCS

- Do mental or physical activity or social integration at younger ages predict SWL in later life?
- We asked participants to rate themselves at three epochs: 40-50, 65-75 and 95+
- Compare Hi and Lo SWL: similar ratings of their mental, physical or social activities when aged 40-50 and 65-75
- At 95+ very large differences between High and Low SWL re current mental activity ($p = .007$) and social integration ($p < .001$)

Social integration

- 1. Do you have someone in whom you can confide?**
- 2. How many friends or relatives (not in your household) are you in regular contact with?**
- 3. How many of these friends or relatives do you feel at ease with, can talk to about private matters, and can call on for help?**
- 4. Overall, how many face to face contacts do you have with friends or relatives in average month?**
- 5. Do your spouse, children, close friends and/or relatives make you feel loved and cared for?**

Personality



Role of personality

- What is personality? How to measure?
- When to measure?
- Who rates – person/others?
- What if centenarian is cognitively impaired?
- Personality may change with age & with health (Martin P et al 2002)
 - X-sectional: 100 yo^s > suspicious, <intelligent, < stress than 80 & 90 yo^s
 - Longitudinal: 100yo^s over 18m lower Sensitivity, higher Radicalism

Measuring personality

Baltimore Longitudinal Study of Aging (Terracciano 2005)

- neuroticism ↓ ~ age 80; then began to increase
- most facets of extraversion, openness to experience, conscientiousness ↓ in later life
- agreeableness generally increased in later life

How could personality traits affect longevity?

- Lifestyle eg lack of impulsive/ risky behaviours
- Health behaviour eg conscientiousness more health checks, compliance with medications
- Extraversion associated with more socialisation
- Genes for personality could be connected to genes for longevity
 - Offspring of Centenarians: hi extraversion, low neuroticism & in ♀ high agreeableness Givens, 2009

Role of personality

- **Personality traits associated with longevity**
 - **Higher conscientiousness**
 - **Greater extraversion**
 - **Less neuroticism**

Conscientiousness

- **Defⁿ: impulse control, goal-directed, planful, delay gratification, follow norms and rules**
- **linked to health and disease processes:**
 - **longevity, diseases, morbidity-related risk factors, health-related behaviours, and social environmental factors**
- **Associated with better lipid profile & lower inflammatory markers**
- **Associated with less AD & cognitive deficits**
- **Could cognitive function mediate link between conscientiousness and longevity?**

Personality & lifestyle

- **Georgia Centenarian Study (285 Cs) $\geq$ 98yo**
 - **Cs more engaged (eg volunteer, travel, public speaking) scored better cognitively**
 - **Cs with high level of consciousness & high level of engagement scored higher**
 - **Cs with low levels of emotional stability, extraversion, openness, agreeableness and consciousness and low levels of engagement scored lower**

(Martin P et al, 2009)

Life skills

- **Five life skills: conscientiousness, emotional stability, determination, control & optimism**
- **Over 4 yrs: better life skills associated with sustained psychological wellbeing, less loneliness, fewer new chronic diseases and physical impairments (correct for usual variates)**

(Steptoe & Wardle 2017)

Life skills

- In women ≥ 52 yrs, (mean 66.7), the number of skills were associated with:
 - wealth, income
 - subjective wellbeing, less depression
 - low social isolation & loneliness
 - more close relationships
 - better self-rated health, fewer chronic diseases
 - fewer impaired activities of daily living
 - faster walking
 - better objective biomarkers (lipids, inflammationⁿ)

Personality Traits of Centenarians

- Study of 165 centenarians in Italy
- Personality traits assessed
- Extroverted = 65.4%
- Open-minded = 50%
- Emotional stability = 34.5%
- Centenarians with ↑extroversion described themselves as “very energetic, dynamic, active and loquacious”

Conclusions

- Number of centenarians ↑
- Variable decline cognitⁿ & function
- Rates of dementia ? $\approx$ 50% ($\propto$ defⁿ)
- Moderate anxiety; low depression
- Disjunction between Self-rated health and Satisfaction with Life
- High SWL

Conclusions

- **Determinants of living well to very late life are partly genetic**
- **Even with disease & disability many Cs show resilience**
- **Diet, physical activity, illness, social support all play roles**
- **Personality and lifestyle important**

Thank you

www.cheba.unsw.edu.au

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