Active and healthy ageing through the life course

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Montpellier 20–21 October 2014
Population ageing: a success story, a grand challenge or a social problem?

- \(\uparrow\) in life expectancy is a success of human endeavour in improving environment

- How to pay for the health and social care of the baby boom generation seen as a grand challenge

- Scientific & political priority to find ways to \(\uparrow\) proportion of healthy and active older people
  - relieve costs of ageing population
  - enhance individual wellbeing

- ‘Healthy ageing’ is a growing area of research
  - What do we mean by healthy ageing?
  - Is the chance of healthy ageing affected by factors operating across life?
  - When to intervene; what to change?
Conceptual and methodological challenges in healthy ageing research

- No agreed conceptual framework; no standard definitions of healthy ageing
  - Review showed 28 studies, 1978-2005, with 29 different operational definitions (Depp & Jeste 2006)

- Indicators of healthy ageing commonly:
  - Rely on self-reported measures that often do not capture full spectrum
  - Use negative rather than positive criteria
  - Cross sectional- no account of individual’s trajectory
  - Most epidemiological studies of ageing do not start before 65y, sometimes 40y, few have data from earlier life
  - Few studies look at lifetime risk or protective factors, almost no systematic reviews
  - Take little account of the variation in environmental challenges or variation in response to challenges

➤ What does a life course approach to ageing offer?
What do we mean by healthy & active ageing?

A. Healthy biological ageing
   - Chance of survival to old age
   - Delay onset of chronic diseases
   - Delay in the progressive generalised impairment of function: highest level of functioning for the maximal period of time

B. Wellbeing, active ageing, quality of life
   - Psychological wellbeing (happiness & other pleasant emotions, leading meaningful life, life satisfaction)
   - Social wellbeing/integration (participation in valued social roles, engaging with others, maintaining autonomy & independence)
What do we mean by healthy biological ageing?

- Chance of survival to old age
  - 88% in high income countries survive to age 65

- Delay onset of chronic diseases
  - Evidence of a rise in chronic diseases among older people
  - ↑ duration of time with disease: earlier diagnosis, decreased case fatality, diagnostic creep
  - Inconsistent evidence for the compression of morbidity or disability

- Delay in the progressive generalised impairment of function: highest level of functioning for the maximal period of time
  - Functioning at the individual or multi-system level (physical and cognitive capability)

- Functioning at the physiological/body systems level
  - Physiological reserve when challenged

- Functioning at the cellular levels
  - Ability to repair damage
Physical capability: the capacity to undertake the physical tasks of daily living

- Muscle function (strength, power) (e.g. grip strength)
- Locomotion, balance, dexterity at the individual or multi-system level (e.g. performance tests of walking speed, chair rises, standing balance)
  Include endurance?
- Self reports of everyday function from tasks at the top of the hierarchy (e.g. gripping) to the bottom of the hierarchy (IADLs, then ADLs) based on timing of loss.
Benefits of objective assessment of physical capability

- Variation across full spectrum of ability
- Identification of people performing most well
- Facilitates study of processes from early life prior to manifestation of disability
- Performance changes with age, is associated with current & subsequent health outcomes, and is sensitive to lifetime influences
- Practical & effective for large samples

**Challenges:**
- Requires a tester (few opportunities for remote testing)
- Little formal assessment of added value of each test
- Consistent protocol for those who cannot do the tests (increasing proportion as people age)
Jean has set a hard challenge!

- Measure physical capability component of healthy ageing using only short self-administered questionnaires, preferably with analogue scales.

- Questionnaires should be valid for a large age range & cross nationally.

- Questionnaires should show population and individual differences with age, reflecting underlying ageing processes.

- What resources are there for assessing function?

- Can we overcome limitations of the self-reported measures?
Relevant resources on functioning: what can be assessed remotely?

- WHO instruments: WHODAS; new ICF measures – suitability?

- National Health and Ageing Trends Study (NHATs) - a resource for the scientific study of functioning in later life (survey & tests)

- NIH toolbox – a multidimensional set of royalty-free measures to assess cognitive, sensory, motor and emotional function in people age 3-85 years. All sub-domains assessed by tests rather than surveys except for emotional function.

- MRC Healthy Ageing Indicators review – led by John Mathers
  - Reviewed objective tests of physical capability, physiological function, cognitive function, endocrine & immune function

- Others?
Self reported physical capability: challenges

- Inadequate to define healthy ageing on the basis of absence of problems or difficulties.

- Self-reports affected by cognitive function, culture, language & education

- Don’t get full spectrum, a high proportion of the population is not differentiated (especially at younger ages)
  - Limited potential for assessing change over time
  - This may improve if enough tasks of varying complexity are assessed.

- Capture tasks from the top to the bottom of the hierarchy that reflect underlying ageing processes
  - Tasks needing complex manual dexterity and balance
  - Tasks requiring balance and the capacity to walk long distances
  - Tasks requiring balance & good upper limb control
  - Good upper limb control in a seated position
Self reported physical capability: possible solutions?

• Ask about higher physical functioning:
  • Running 20-30m; standing for 2 hours (30min, 15min); squatting, kneeling, walking a kilometre or more.

• Ask ‘Can you’ of a higher order task. Then follow up with questions about the level of difficulty and/or modifications made:
  • Does it take more effort, time (than used to, compared with others of similar age?)
  • Do you get discomfort and pain?
  • Have you had to change the way you do the task?
    • Eg. Steps (hold on? Stop to take a breath? Walk sideways or one step at a time?)

• One suggestion: compare short standardised questionnaire, modified questionnaire & set of objective tests
Life course epidemiology & healthy ageing: future directions

- Characterise better in populations the change in function at the individual, body systems & molecular/cellular levels
  - How different aspects of function co-vary across life
  - Relationships with disease, disability, frailty & wellbeing

- Investigate the environmental, behavioural, psychological and biomedical factors across life that influence functional level & change,
  - Characterise better the changing physical and social environment
  - Causal? Reversible?
  - Capacity for resilience
    - maintain or restore physiological function in response to environmental challenges
    - maintain wellbeing & participation in presence of accelerated functional decline

- Further cross cohort initiatives for power, replication, & causal inference

- When to intervene and what needs to be changed to maintain highest level of functioning for as long as possible?
Thank you for listening