Longitudinal studies, population health, and aging

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Longitudinal Studies
Why?

- Healthy aging is an achievable goal for many (JA Barondess JAGS 2008)
- The baby boomers are entering their 60s
- Life trajectories into older age need to be studied
- Teasing out the gene (20-30%) from the environment (70-80%)
Longitudinal Studies
When?

- Chronic diseases are common
- By the time they are identified, they have been present for a long time
- Start before old age – mid life!
- Interventions are better started earlier than later
Longitudinal Studies

What?

- Longitudinal studies are often disease oriented but could (and should) have a broader frame of reference
  - *health and aging* rather than *disease and aging*

- Narrow and thick cohorts vs broad and thin cohorts
  - Try for the middle ground
Longitudinal Studies
The Pros

- A study design that allows us to establish temporality
- A study design that permits us to examine aging as a dynamic process
  - Using powerful methods to examine change
- A study design with sufficient follow-up to examine multiple outcomes in relation to single risk factors
Longitudinal Studies
The Cons

- Expensive
- Delay in outcomes of interest – delayed publications!
- Challenging to recruit and retain subjects for the long haul
- Challenging to recruit and retain investigators for the long haul
- Designing a study with no specific hypotheses
Longitudinal Studies
On the horizon

- The Canadian Longitudinal Study on Aging
- A strategic initiative of the Canadian Institutes of Health Research (Institute of Aging)
Scientific Evidence

In working towards developing the CLSA we identified more than 70 longitudinal studies of aging worldwide

- Majority of these studies were studying people over the age of 65 – one might consider these to be studies of the aged
- These studies generally fell into one of two main types
  - collected a great deal of information on social factors or retirement but lack detailed information on health, especially clinical and biological measures
  - collected a great deal of information on disease (often a specific disease) but lacked detailed information on social factors or retirement
Scientific Evidence

- Very few studies have looked at the aging process from a mid-life through to old age in the same individual.

- Very few were/are population-based studies capturing the changing individual within a changing context and incorporating multiple levels of inquiry, the cell, the individual and society.

- Very few have focused on how individuals cope or adapt to changing circumstances and how these changing circumstances (good and bad) have an impact on their well-being.

- We need to move from describing old age to the determination of mechanisms that underlie changes with age.
The Canadian Longitudinal Study on Aging (CLSA)

A key component of the Canadian Lifelong Health Initiative, a strategic initiative of CIHR

- The Canadian National Birth Cohort
- The Canadian Longitudinal Study on Aging

More than 160 researchers - 26 institutions

Multidisciplinary - biology, genetics, medicine, psychology, sociology, demography, economics, epidemiology, nursing, nutrition, health services, biostatistics, population health
The Canadian Longitudinal Study on Aging (CLSA)

Parminder Raina (Lead PI) McMaster University
Christina Wolfson (co-PI) McGill University
Susan Kirkland (co-PI) Dalhousie University
Overall Aims of the CLSA

- To examine aging as a dynamic process.

- To investigate the inter-relationship among intrinsic and extrinsic factors from mid life to older age.

- To capture the transitions, trajectories and profiles of aging

- To provide infrastructure and build capacity for sustained high quality research on aging in Canada.
Addressing Policy Needs

Changing demographics #1 priority of Canadian Federal and Provincial Governments

Healthy aging is important to the Canadian public and policy makers

Canada differs from other countries in its:

- health and social policy
- health care delivery systems
- climate, environment, geography, and
- retirement policy and pension programs

Seniors of tomorrow have different needs and expectations than the seniors of today

major implications & challenges for the health care system and for social programs
Innovation - Cell to Society

- Mid life to old age
- Quantitative traits
  - Physical
  - Social
  - Psychological
- Gene-environment interactions
- Disease, disability, psychosocial consequences
- Adaptation

CLSA ELCV
Priority Areas for CLSA

- Neurological
  - Cognitive impairment
  - Dementias/AD
  - Parkinson’s disease
  - Stroke
- Musculoskeletal
- Respiratory
- Metabolic
- Cardiovascular

- Psychosocial and behavioral environment
- Health and social care environment
- Economic environment
CLSA
Study Design
Architectural Details
Baseline

- 50,000 individuals
- Community dwelling at baseline
- Women and men between the ages of 45 and 85 at baseline
  - Pre Boomers
    - Born between 1923 and 1945
  - Boomers
    - Born between 1946 (62 y in 2008) and 1964 (44 y in 2008)
Architectural Details
Follow-up

- 20+ year follow-up beginning in 2009
- Repeated assessment every 3 years
- Yearly “maintaining contact”
- Linkage to databases
CLSA Architecture

Data collection on all 50,000 Questionnaires, Database linkage 20+ years

In-depth data collection on 30,000 (at 10 sites)
Clinical, Biological, Physical
The Data

- Questionnaires administered over the phone to all 50,000 participants
- Subgroup of 30,000 individuals selected to undergo in-depth “comprehensive” assessment over the course of the study
  - within 25 km of study sites that can support the data collection
- The *goal* is to “reassemble” the 50,000 to provide valid and reliable information on the full sample
  - at least with respect to common questionnaire data collected
Data collection: Basic baseline and longitudinal

- Questionnaire data (50,000)
  - Computer assisted telephone interviews
  - Common core set of questions
    - demographics, social, economic, nutrition, lifestyle, basic health

- Linkage to existing data bases (50,000)
  - Administrative: physician services, hospitalizations, medications
  - Homecare, community services, mental health services
  - Mortality
  - Environmental, neighbourhood indicators

- Infrastructure needs
  - Computer assisted telephone interview centre
  - Web based interviews
Data collection: Comprehensive baseline and longitudinal

- Comprehensive (in-depth) assessment (30,000)
  - Additional questionnaire based information face-to-face
    - Social, behavioural, economic, nutrition, lifestyle
  - Clinical/physical assessment
    - Medical, neuropsychological, physical measures
  - Blood/urine samples
    - Blood chemistry panel, biomarkers

- Infrastructure needs
  - 10 sites across the country with the capability of high volume throughput
Treading a fine line

- Taking advantage of the potential of the longitudinal study while attempting to minimize the challenges
  - Thin vs thick data collection
  - Long term outcomes vs quick results
  - Cost effectiveness
  - Assembling a natural resource
Building an Infrastructure to build capacity for sustained high quality research on aging in Canada

Canada Foundation for Innovation
Application for Infrastructure
CFI – Call 6
The Vision

A national network of infrastructure to enable state-of-the-art longitudinal interdisciplinary population based research across Canada

Once in place this network will support the largest interdisciplinary research project in aging conducted to date: the Canadian Longitudinal Study on Aging
Core National Network of Facilities

- National Coordinating Centre
- Manage and Coordinate; Timelines; Develop Protocols, Procedures; Training & Documentation
- Operations Data / Measures / Analyses
- Operations
- Interim Follow Up
- Biological Processing Centre
- Data Collection Sites (10)
- CATI Data Collection Centre
- Data Management / Statistics Centre
Where is the CLSA now?

- **Phase 1**
  - A series of pilot and developmental studies have been conducted

- **Phase 2**
  - The measures are being finalized; the blue print is being drawn

- **Launch**
  - June 2009
Recruitment
Collaboration with Statistics Canada

- Canadian Community Health Survey 4.2 in 2008
  - Healthy Aging
  - CLSA team- CCHS content development
  - Inception Cohort for CLSA
Recruitment - Pilot
Collaboration with Statistics Canada

- Canadian Community Health Survey 4.2 in 2008
  - CCHS Pilot Study completed November-December 2007
  - Pilot testing of sharing questions
  1. Do you agree to share your coordinates with researchers from the CLSA?
  2. Do you agree to share the content of the CCHS survey that you have just completed with researchers from the CLSA?
Recruitment - Pilot
Collaboration with Statistics Canada

- Canadian Community Health Survey 4.2 Pilot
  - Pilot study of 1,000 individuals in
    - Montreal; Halifax; Toronto; Winnipeg
  - Memorandum of understanding with Statistics Canada to allow the Universities to receive the coordinates (under a disclosure clause signed by the chief statistician of Canada)
  - We will pilot the recruitment into the CLSA as well as the conduct of a telephone interview
Launching the CLSA

- The CLSA pilot will take place this spring
- The CCHS 4.2 will take place in June 2008
  - CLSA will use the CCHS “sharers” as the inception cohort
- If all goes well (i.e. sharing; funding) then the CLSA will be launched in early 2009
“One should neither seek nor avoid complexity”

John Strutt

1904 Nobel Prize Winner - Physics