The Canadian Longitudinal Study on Aging
A Platform Study to Support Policy Decisions and Initiatives

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Workshop Objectives

1. To provide an overview of the CLSA methodology, the kinds of measures that are being collected, and how data can be accessed

2. To present select findings and discuss how the CLSA can support responding to policy-relevant questions
The CLSA

• Strategic initiative of CIHR Institute of Aging; on the Canadian research agenda since 2001

• 3 co-principal investigators supported by more than 160 co-investigators from 26 institutions

• Multidisciplinary - biology, genetics, medicine, psychology, sociology, demography, nursing, economics, epidemiology, nutrition, health services

• Largest study of its kind to date in Canada for breadth and depth: following 50,000 participants for ≥20 years
CLSA Leads

Lead Principal Investigator
Parminder Raina (McMaster)

Co-principal Investigator
Christina Wolfson (McGill)

Co-principal Investigator
Susan Kirkland (Dalhousie)
Aim and Vision

• **AIM**: To examine life/health transitions and capture trajectories to enable the identification of modifiable factors with the potential to inform interventions (prevention/treatment/impact) to improve the health of populations as they age.

• **VISION**: To create a research platform infrastructure to enable state-of-the-art, interdisciplinary population-based research and evidenced-based decision-making that will lead to better health and quality of life for Canadians as they age.
Participants aged 45 to 85 at baseline (51,338)

Target: 20,000
Randomly selected within provinces

Target: 30,000
Randomly selected within 25-50 km of 11 sites

Questionnaire
• By telephone (CATI)

Questionnaire
• In person, in home (CAPI)

Clinical/physical tests
Blood, urine
• @ Data Collection Site

2010 - 2015
2015
2018

20 Years

Active follow-up every 3 years

Data Linkage
National in Scope

Home Interviews & Data Collection Site Visits
Recruitment & follow-up

Telephone Interviews
Recruitment & follow-up

Victoria
Vancouver
Surrey
Calgary
Winnipeg
Montreal
Sherbrooke
Halifax
St. John’s
Hamilton
Ottawa
Terminology

• Tracking Cohort
  - Target - 20,000 participants from all 10 provinces, followed through Computer Assisted Telephone Interviews (60 minutes at baseline)
  - 21,241 recruited*

• Comprehensive Cohort
  - Target - 30,000 participants living within 25 km (or 50 km) of a CLSA Data Collection Site (DCS)
  - Followed through in-home interviews (60 minute) and physical assessments (2-3 hours) at a DCS
  - 30,097 recruited*
Study Content and Data Collection
CLSA Questionnaire modules
All 51,338 participants

Demographic/Lifestyle
- Age
- Gender
- Education
- Marital status
- Sexual orientation
- Language
- Ethnicity
- Wealth/income
- Veteran Identifier
- Smoking, alcohol
- Nutritional risk
- Physical activity
- Health care utilization
- Medication use
- Supplement use

Health
- General health
- Women’s health
- Chronic conditions
- Disease symptoms
- Sleep
- Oral health
- Injuries, falls
- Mobility
- Pain, discomfort
- Functional status
- ADL, IADL
- Cognition
- Depression
- PTSD
- Life Satisfaction

Social
- Social networks
- support
- participation
- inequality
- Online communication
- Care receiving
- Care giving
- Retirement status
- Labour force participation
- Retirement planning
- Transportation
- Mobility, Migration
- Built environments
- Home ownership
CLSA Data Collection

Data Collection Site

Physical Assessments:
- Height, Weight, BMI
- Bone Density, Body Composition, Aortic Calcification
- Blood Pressure, ECG, c-IMT
- Pulmonary Function
- Vision & Hearing
- Performance testing

Cognitive Assessments:
- Neuropsychological Battery
  - Memory
  - Executive function
  - Reaction time

Biospecimen Collection:
- Blood
- Urine
## Core Biomarkers: Baseline

<table>
<thead>
<tr>
<th>Category</th>
<th>N</th>
<th>Biomarkers</th>
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| **HEMATOLOGY**            | 25,425 | • Erythrocytes  
• Granulocytes  
• Hematocrit  
• Hemoglobin |
| **CHEMISTRY**             | 27,122 | • Albumin  
• Alanine aminotransferase (ALT)  
• C-reactive protein (CRP)  
• Creatinine  
• Cholesterol  
• Ferritin  
• Free T4  
• Hemoglobin A1c (n = 26961)  
• HDL  
• LDL  
• Non-HDL  
• Thyroid stimulating hormone (TSH)  
• Triglycerides  
• 25-Hydroxyvitamin D |
| **GENETICS**              | 10,000 | • Genome-wide genotyping  
• DNA extracted from buffy coat on samples (n = 26,884)  
• 820K UK Biobank Axiom Array (Affymetrix) |
| **EPIGENETICS**           | 1,500 | • DNA methylation  
• DNA extracted from PBMCs  
• 850K Infinium MethylationEPIC BeadChip (Illumina) |
| **METABOLOMICS**          | 1,000 | • Mass spectrometry |
| Available mid-2018        |     |                                                                           |

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Updated July 14, 2017
Passive Data Collection

Work in progress

• Linkage is an important CLSA strategy
  • Great potential for collecting information that is difficult to get from participants due to time, accuracy limitations; and/or may even be unknown to participants
  • Potential to obtain historical data prior to CLSA entry

• Types of databases
  • Individual level administrative provincial health databases
  • Vital statistics/disease registries
  • Population level databases of community characteristics, climate, pollution
Linkage with CANUE Data Platform

NEIGHBOURHOOD FACTORS  GREEN/BLUE SPACES  CLIMATE

AIR QUALITY  NOISE  TRANSPORTATION
First Follow-Up: New Content Added

- *Child maltreatment
- **Elder abuse
- Epilepsy screening
- Decedent interview
- Unmet health-care needs
- Preventive health behaviours (screening, vaccination, etc)
- Enhanced hearing, oral health and transportation modules
- Gender identity questions
- Subjective cognitive decline
- Loneliness

*Childhood Experiences of Violence Questionnaire. Walsh et al 2012
**National Initiative for the Care of the Elderly (NICE)

Follow-up 1 data available in early 2019!
Current CLSA Platform-Use Models and Categories

1. Use CLSA data/biospecimens for research projects
   - 123 projects approved to date

2. Use of the CLSA platform to collect additional data or biospecimens or analyses to enrich CLSA Platform
   - E.g. Public Health Agency of Canada, Health Canada, Veterans Affairs Canada, Ontario Ministry of Transportation, Neurological Health Charities Canada, Calgary Laboratory Services

3. Projects by the CLSA on behalf of a third party
   - E.g. CLSA Report (Public Health Agency of Canada, Employment and Social Development Canada)

4. Use of the CLSA infrastructure
   - Use of DCS lab for the Ontario Health Study
   - Use of DXA for research project at Simon Fraser University
   - Use of biorepository for sample storage
Data Access Timeline

Submission

- Administrative & Statistical Review
  - 6-9 weeks

DSA Committee Review

- Up to 12 weeks

Access Agreement Signed; Ethics Approval
- Variable Time Frame

Dataset Preparation & Release
- 1 year

Monitoring (CLSA) - Annual Report

Final Report

- 5-7 days

• Plan on receiving data 6 months after submission deadline
How much does it cost?

• **Partial Cost Recovery Model**
  • **Alphanumeric data**
    • $3,000 for a straightforward alphanumeric dataset
    • **Graduate students** using data solely for thesis research & **Postdoctoral fellows** using data solely for the postdoctoral project are eligible for a **fee-waiver**.
  • **Images**
    • Additional fees are associated with the request for images. Fees determined by type of images requested.
  • **Genomics**
    • Additional fees are associated with the delivery of genomics data as it must be shipped on an encrypted drive.
Keywords from Approved Projects

Dementia, Multimorbidity, Prevalence, Nutrition, Social Support, Cognition, Disability, Depression, Healthy Aging, Frailty, Age, Chronic Disease, Social Isolation, Risk Factors, Physical Health, Older Adults, Sarcopenia, Norms, Older Adults, Osteoporosis, Respiratory, Health Inequities, Protective Factors, Mobility, Activities of Daily Living, Cardiovascular, Resilience, Immigrants, Vision Loss, Hearing Loss, Alcohol Use, Inequality, Social Norms, Older Adults, Women, Veterans, Stroke, Veterans Research, Geriatric Assessment, Companion Animals, Caregiving, Cultural Background, Eye Disease, Hearing Loss, Osteoporosis, Neuromuscular Disease, Chronic Disease, Physical Function, Mobility, Health Status, Population Health, Mental Health, Healthy Aging, Quality of Life, Exercise, Social Participation, Retirement Planning, Retirement Planning, Air Pollution, Cognitive Impairment, Sleep Patterns, Muscle Wasting, Friendly Cities, Successful Aging, Senior Citizen Health, Population Health, Health Status, Loneliness, Physical Activity, Spirometry.
Information for Researchers

Researchers

The CLSA provides documents online to facilitate understanding of the study and how we are gathering and managing the data.

Protocols

CLSA Protocol – Executive Summary
CLSA Protocol – Full Study Design and Baseline (2008)
CLSA Protocol – First Follow-up (2015)

The protocols listed are based on the applications CLSA submits to CIHR for each funding cycle. As the CLSA data collection progresses, occasionally, some measurements are changed. Updated versions of the protocols will be posted as necessary. Please refer to the Data Collection Tools section to review the specific questions and measurements gathered at each phase of the study.

Data Collection Tools

Over the course of 20 years, the CLSA will be conducting full data collection every three years. At each major data collection event, the questionnaires and physical assessments remain largely the same for consistency, but there will be some additions to the data collection to further enhance the CLSA platform.

Physical Assessments

To ensure that physical assessment data are collected, processed, and stored in a consistent, professional, and structured manner at all CLSA sites across the country, Standard Operating Procedures (SOPs) help maintain the integrity of the data collection and data management.
CLSA Report on Health & Aging in Canada

- Partnership between PHAC, ESDC, CIHR and the CLSA
- CLSA Day on the Hill
Select Findings
Demographics

84% of participants report being born in Canada

3.7% of participants self-identify as indigenous

74% of participants report having a post-secondary degree of diploma

5.7% of participants report an annual household income of less than $20,000
More women than men of all ages in the CLSA reported being lonely at least some of the time.
Loneliness

% who are lonely at least some of the time

Women

Married

Widowed

Men

Married

Widowed

45-64 65-74 75+

45-64 65-74 75+

45-64 65-74 75+
Almost 90% of Canadians aged 45-85 rate their general health as excellent, very good or good.

95% of Canadians aged 45-85 rate their own mental health as excellent, very good or good.
Basic and Instrumental Activities of Daily Living Limitations

% with at least one BADL or IADL limitation

Women

Men

45-54 55-64 65-74 75+

45-54 55-64 65-74 75+
% of participants report only providing care to others.

% of participants report that they only receive care.

% report both giving and receiving care.

% of caregivers report only getting out at least once a year or never getting out.
Only 25% of Canadians aged 45-85 reported reaching the recommended amounts of aerobic and resistance-based physical activity.
The most frequently cited nutritional risk factors are: skipping meals, eating alone, and weight loss.