Transforming Everyday Life into Extraordinary Ideas
Canadian Longitudinal Study on Aging: Advancing the Science of Population Health and Aging through Interdisciplinary Research

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Canadian Longitudinal Study on Aging (CLSA)

- 20 years, 50,000 Canadians
- More than 160 researchers – 26 institutions
- Multidisciplinary – biology, genetics, medicine, psychology, sociology, demography, economics, epidemiology, nursing, nutrition, health services, biostatistics, population health
Strategic Partners

- Strategic initiative of the Canadian Institutes of Health Research (CIHR)
- Funded by CIHR and the Canada Foundation for Innovation (CFI)
- Provinces and universities across Canada
Our Vision

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.
Our Aim

To study aging as a dynamic process and the inter-relationship among intrinsic and extrinsic factors from mid-life to older age.
Overall Goals of the CLSA

- The progression of health from middle-age to early old age to older old age
- The determinants of well-being and quality of life
- Risk factors (including genetics) of chronic diseases:
  - Cardiovascular, Cerebrovascular, Neurological, Respiratory, Vision and Hearing, Diabetes, Renal, Metabolic, Cancer, Osteoarthritis, Osteoporosis, Depression, Musculoskeletal
- Cognitive functioning and mental health
- Disability and the compression of morbidity
- The examination of socioeconomic and health inequalities in an aging population
- Social participation, social relationships and caregiving in an aging population
- Retirement and post-retirement labour market activity
CLSA Data Collection

Participants Consent to Participate in CLSA

Potential Participants Sent Study Information

Participants Provide Questionnaire Data (n=50,000)

Biological Data
- Blood
- Urine

Home Interview followed by Site visit for Physical/Psychological Data
- Neuropsychological Battery
- Performance Testing
- Anthropometric Measures
- Bone Density, Body Composition
- Aortic Calcification
- ECG
- Carotid Intimal-Medial Thickness
- Pulmonary Function
- Vision and Hearing

n=30,000 “COMPREHENSIVE”

Stored at Biorepository and Bioanalysis Centre (BBC)

n=20,000 “TRACKING”

Stored at National Coordinating Centre (NCC) and Statistical Analysis Centre (SAC)

Questionnaire Data Processed

Telephone interview

Stored at National Coordinating Centre (NCC) and Statistical Analysis Centre (SAC)
Depth and Breadth of CLSA

**PHYSICAL & COGNITIVE MEASUREMENTS**
- Height & weight
- Waist and hip measurements
- Bioimpedence
- Arterial pressure
- Mean heart rate
- Grip strength, timed up-and-go, chair raise, 4-m walk
- Standing balance
- Vision
- Hearing
- Spirometry
- Bone density
- Aortic calcification
- ECG
- Carotid intima-media thickness
- Cognitive assessment

**HEALTH INFORMATION**
- Chronic disease symptoms (11 chronic conditions)
- Medication intake & compliance
- Women’s health
- Self-reported health service use
- Oral health
- Preventative health
- Administrative data linkage health services & drugs
- Other administrative databases

**PSYCHOSOCIAL**
- Social participation
- Social networks and support
- Caregiving and care receiving
- Mood, psychological distress
- Coping, adaptation
- Work-to-retirement transitions
- Job-demand/effort reward
- Retirement planning
- Social inequalities
- Mobility-lifespace
- Built environments
- Wealth

**LIFESTYLE & SOCIODEMOGRAPHIC**
- Smoking
- Alcohol consumption
- Physical activity
- Nutrition
- Birth location
- Ethnicity/race/gender
- Marital status
- Education
- Income
Biological Samples

BIOCHEMICAL & HEMATOLOGICAL ANALYSIS (50 ml Blood; Urine)

General Hematology
- Basophils
- Eosinophils
- Neutrophils
- Lymphocytes
- Monocytes
- White blood count
- Red blood cells
- Hemoglobin
- Platelets

Lipid Profile
- HDL-cholesterol
- LDL-cholesterol
- Tryglycerides
- Glucose
- Fasting blood sugar

Genetic and Epigenetic Markers
Participant Recruitment

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

**Tracking Cohort Recruitment:**

- Canadian Community Health Survey (CCHS)
- Ministry of Health Registries and/or Random Digit Dialing

**Comprehensive Cohort Recruitment:**

- Ministry of Health Registries and/or Random Digit Dialing
Time lines

- 50,000 participants
- 20 years to complete the study
- Baseline Wave 1, to be completed 2013 – 2015
- Six additional Waves every three years
Baseline - Tracking Cohort Timeline (2009-2015)

- **2009**: Initial contact names to NCC
  - CCHS Healthy Aging

- **2010**: Wave 1 - Recruitment & Baseline data collection 5,000

- **2011**: Wave 1 - Recruit remaining sample. Baseline interview all 20,000

- **2013**: MC* Interviews

- **2014**: REB Renewal

- **2015**: *MC= Maintaining Contact
Baseline - Comprehensive Cohort Timeline (2009-2015)

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*MC = Maintaining Contacts*
CLSA Governance Structure

- CIHR Advisory Committee on Ethical, Legal, and Social Issues (ELSI)
- CIHR International Oversight Committee
- Scientific Advisory Board
- CLSA Advisory Council
- CLSA Scientific Management Team
- Data and Sample Access Committee
- Community Liaison Committee
- Intellectual Property and Commercialization Committee
- Operations Committee (DCS Site and Enabling Centre Directors)
- Training and Research Capacity Committee
- Knowledge Translation and Communications Committee

Reporting → Communications
Canadian Investment

$50M Canadian investment in national platform

- $23.5M CIHR for 5 Years
- $10M CFI for 5 Years (infrastructure)
- $10M Provinces for 5 Years (infrastructure)
- $6.5 M Universities and other partners
CLSA Partners

- Public Health Agency of Canada
- Veterans Affairs
- Statistics Canada
- Ontario Ministry of Health and Long-Term Care
- Provinces
- Universities
- CLSA Infrastructure vendors and suppliers
- Private companies
CLSA by the numbers

- 50,000 participants
- 20 years to complete the study
- 57,487 Lines of code making up Sabretooth, Beartooth and Mastodon (software)
- Up to 140,000 Telephone interviews
- Up to 210,000 Home interviews
- Up to 210,000 Visits to data collection sites
  - Up to 8,820,000 biospecimen aliquots
- Up to 300,000 Follow-up calls
- Up to 129 million Questions asked during telephone interviews
- Up to 219 million Data points collected during CLSA home interviews and visits to data collection sites
- Up to 348 million Anticipated number of data points that will form the CLSA research platform
COLLABORATE AND INNOVATE

INFRASTRUCTURE

• State-of-the-art facilities: bio-repository and bio-analysis laboratories, fully equipped data collection facilities and call centres across Canada, statistical analysis centre, genetics and epigenetics centre
• Novel open-source software for conducting multicentre research
• Novel hardware design and architecture
• Secure data management systems to preserve participant confidentiality
• Collaboration and harmonization with other national and international cohorts

RESEARCH

• Progression and management of disease and disability
• Risk factor identification
• Co-morbidity
• Psychosocial aspects of health
• Genetic and epigenetic aspects of disease and disability
• Biospecimen and preservation research
• Biomarker discovery for early detection and management of disease
• Research platform for auxiliary studies
• Trajectories of healthy aging
• Quality of life

OUTPUTS

• Healthcare utilization patterns
• Evidence to inform health and public policy
• Personalized medicine to improve outcomes
• Development of interventions and programs
• Development of services and products
• Research capacity
• Advanced science of aging
• Improved health of Canadians
# CLSA CORE TEAM

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<th>Role</th>
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<tr>
<td>Lead PI</td>
<td>Parminder Raina <em>(McMaster)</em></td>
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<td>CO-PI</td>
<td>Christina Wolfson <em>(McGill)</em> and Susan Kirkland <em>(Dalhousie)</em></td>
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<td>Key Senior Co-Investigators</td>
<td>Gerry Mugford <em>(Memorial)</em>, Helene Payette <em>(Sherbrooke)</em>, Ron Postuma <em>(McGill)</em>, Larry Chambers and Vanessa Taler <em>(Ottawa)</em>, Harry Shannon, Cynthia Balion, Christopher Patterson, Lauren Griffith and Mark Oremus <em>(McMaster)</em>, Mary Thompson and Chang Bo <em>(Waterloo)</em>, Margaret Penning, Holly Tuokko, <em>(Victoria)</em>, Verena Menec <em>(Manitoba)</em>, David Hogan <em>(Calgary)</em>, Max Cynader, Michael Hayden and Michael Kobor <em>(UBC)</em> and Andrew Wister <em>(SFU)</em></td>
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| Scientific Working Group | See our website – www.clsa-elcv.ca |
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CLSA funded by the Government of Canada through CIHR and CFI, and provincial governments and universities

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