Towards the implementation of CIHR Institute of Aging's Action Plan 2014-15

Mining a unique Canadian resource: The Canadian Longitudinal Study on Aging

CAG
Niagara Falls, ON
October 17, 2014
Overview

• Landscapes of Aging: Snapshots from the CLSA
  Susan Kirkland, PhD, Dalhousie University

• Developing a Social Isolation Program of Research Using the CLSA
  Andrew Wister, PhD, Simon Fraser University

• Exploring health and function using the CLSA
  Verena Menec, PhD, University of Manitoba

• Work, Aging, Retirement and Health in the CLSA
  Lauren Griffith, PhD, McMaster University
Landscapes of Aging: Snapshots from the Canadian Longitudinal Study on Aging

Susan Kirkland, PhD, Dalhousie University
Parminder Raina, PhD, McMaster University
Christina Wolfson, PhD, McGill University

CAG
Niagara Falls, ON
October 17, 2014
The Canadian Longitudinal Study on Aging (CLSA)

- Strategic initiative of CIHR; on Canadian research agenda since 2001

- Team of 3 principal investigators, 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 Canadians for 20 years
CLSA Timeline and Milestones

Team Design Objectives Content
Acceptability Bio-specimens Recruitment Data Linkage
Pilot recruitment Validate measures SOPs, TMs Pilot protocol
Recruitment Baseline Data Collection
First Follow Up Data Collection

2001 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 2017

RFA Protocol Development Phase I Feasibility Studies Phase II Validation, Pilot CFI Recruitment Baseline Data Collection First Follow Up Data Collection

*
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 state-of-the-art, interdisciplinary, population based research and evidenced-based decision making
Design Overview

50,000 women and men aged 45 - 85 at baseline

Tracking (20,000)
Randomly selected 10 provinces

Comprehensive (30,000)
Randomly selected 25-50 km of 11 sites in 7 provinces

Questionnaire
• By telephone (CATI)

Questionnaire
• In person, in home (CAPI)

Physical Assessments
Blood, Urine
• At Data Collection Site

20 year study: Full follow up every 3 years, maintaining contact in between

Data Linkage
National Scope

- Comprehensive
- Tracking

Locations:
- Vancouver
- Victoria
- Burnaby
- Calgary
- Winnipeg
- Hamilton
- Ottawa
- Montreal
- Sherbrooke
- Halifax
- St Johns

Map of Canada showing locations with comprehensive and tracking data.
Representative Sample Frame for Recruitment

- Partnered with Statistics Canada
  - CCHS 4.2 Healthy Aging Survey
  - 2006 Census as an area frame to select households
  - Agreed to share contact information
- Partnered with provincial Ministries of Health
  - Health Card Registration databases
  - Mailouts, return Consent to Contact form
- Supplemented with Random Digit Dialing
  - Pre-recruitment
Standardized, Centralized Process

Potential Participants Sent Study Information

Participants Consent to Participate in CLSA

Participants Provide Questionnaire Data (n=50,000)

DATA COLLECTION SITE VISIT
Physical/Neuropsychological Data

Biological Data
- Blood
- Urine

Biorepository and Bioanalysis Centre (BBC)

n=30,000
Telephone Interview

n=20,000
Home Interview

Physical/Neuropsychological Data

n=20,000

Home Interview

n=30,000
Telephone Interview

Stored at (NCC/SAC)

SAC Data dissemination

Stored at Biorepository and Bioanalysis Centre (BBC)
Depth and Breadth of CLSA Questionnaire modules

- **DEMOGRAPHIC**
  - Education
  - Marital status
  - Ethnicity
- **HEALTH BEHAVIOURS**
  - Smoking, alcohol
  - Nutritional risk
  - Food frequency
  - Physical activity
  - Health care utilization
  - Medication use
  - Supplement use
- **HEALTH STATUS**
  - General health
  - Women’s health
  - Chronic conditions, symptoms
- **PHYSICAL**
  - Oral health
  - Injuries, falls
  - Mobility
  - Pain, discomfort
  - Functional status
  - ADL, IADL
- **PSYCHOLOGICAL**
  - Cognition—Executive function, memory, psychomotor speed
  - Depression
  - Mood
  - Psychological distress
  - Veteran identifier
- **SOCIAL**
  - Social networks
  - Social support
  - Social participation
  - Online communication
  - Social inequality
  - Care receiving
  - Care giving
  - Retirement status
  - Labour force participation
  - Retirement planning
  - Transportation
  - Mobility, Migration
  - Built environments
  - Home ownership

**CLSA ÉLCV**

Canadian Longitudinal Study on Aging
Étude longitudinale canadienne sur le vieillissement
Depth and Breadth of CLSA Physical Assessment Modules

- Height, weight, BMI
- Blood pressure
- Spirometry - FEV
- Carotid ultrasound – CIMT, plaque sweep
- ECG
- DEXA – BMD, body composition, aortic calcification
- Hearing
- Visual acuity
- Grip strength

- Fundus photograph – blood flow
- Tonometer – pressure
- Neuropsych battery – memory, executive function, reaction time
- Timed up and go
- Balance
- 4 metre walk
- Chair rise
- Blood
- Urine
Bio specimen processing
42 aliquots per participant

- Basic hematological tests completed on site
- Remainder processed, frozen within 2 hrs

Legend:
- Citrate
- Serum
- Heparin
- EDTA
- ACD
- CPT
- Urine
Biorepository and Bioanalysis Centre (BBC)

- 31 nitrogen freezers (-180°C)
  - Space for 5 million aliquots
- Personal Archive
  - Dry storage, humidity controlled, room temperature
- Laboratory Information System (LabWare)
  - Sample tracking system, QC
- High-throughput robotic platform for biomarker analysis
Disease outcomes via algorithms

Chronic Airflow Obstruction (CAO) Algorithm

Self-reported Diagnosis (yes/no)

Spirometry

Normal
- No reported wheezing, coughing, shortness of breath
  - Medication No Yes
    - Normal (no CAO)

- Wheezing, coughing, shortness of breath: any ‘yes’
  - Medication No Yes
    - Possible CAO

Abnormal
- No reported wheezing, coughing, shortness of breath
  - Medication No Yes
    - Definite CAO

- Wheeze with exertion or cough up phlegm: any ‘yes’
  - Medication No Yes
    - Possible CAO
      - Outcome when self-reported diagnosis = no.

- Wheezing, coughing, shortness of breath: any ‘yes’
  - Medication No Yes
    - Definite CAO

- Wheeze with exertion or cough up phlegm: any ‘yes’
  - Medication No Yes
    - Definite CAO

\( e \)Figure 1c: Chronic Airflow Obstruction Algorithm. CAO = chronic airflow obstruction. *If participant coughs without phlegm, then outcome will be possible CAO. *Outcome when self-reported diagnosis = no. *Outcome when self-reported diagnosis = yes.
Linking CLSA Data with Administrative Databases

• Linkage is key to CLSA research strategy
  • Enormous potential for collection of information that is difficult to get from participants due to time, accuracy limitations; unknown to participants

• Types of databases
  • Individual level administrative provincial health databases (priority)
  • Disease registries
  • Population level databases of community characteristics, climate, pollution
  • Individual level economic characteristics
Recruitment and Baseline Data Collection Progress and Milestones

• On schedule to meet recruitment and baseline data collection goals by Spring 2015
  ➢ Tracking: Completed! N=21,241
  ➢ Comprehensive: Over 20,000 completed – underway

• Inter-wave contact (MCQ) with >96% retention so far
  • 10,000 completed to date

• 90% signed consent for linkage to health records so far
• 94% signed consent to provide blood and urine so far
Tracking cohort participants
Data weighted to represent the Canadian (and provincial) population between 45-85 years old

A survey weight corresponds to the number of persons in the entire population that an individual respondent represents

Weighting is necessary because the probability of selecting individuals from certain sub-groups of the population varied
# CLSA Tracking Telephone Interviews

**N=21,208**

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
<th>Percent</th>
<th>Weighted Percent</th>
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<td><strong>Age</strong></td>
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<td>45-54</td>
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<td>55-64</td>
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<td>65-74</td>
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<td>75-85</td>
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<tr>
<td><strong>Sex</strong></td>
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<tr>
<td>Male</td>
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<td>Female</td>
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<tr>
<td><strong>Language</strong></td>
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<tr>
<td>English</td>
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<td>French</td>
<td>3751</td>
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<td>Born in Canada</td>
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# CLSA Tracking Telephone Interviews

**N=21,208**

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<th>Province</th>
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<tr>
<td>Alberta</td>
<td>2110</td>
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<td>Saskatchewan</td>
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<td>Manitoba</td>
<td>1472</td>
<td>6.9</td>
<td>3.3</td>
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<tr>
<td>Ontario</td>
<td>4722</td>
<td>22.3</td>
<td>38.3</td>
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<td>Quebec</td>
<td>3603</td>
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<td>New Brunswick</td>
<td>1350</td>
<td>6.4</td>
<td>2.4</td>
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<td>Nova Scotia</td>
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<td>7.4</td>
<td>3.1</td>
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<td>Prince Edward Island</td>
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<td>0.5</td>
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<td>Newfoundland, Lab</td>
<td>1248</td>
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## CLSA Tracking Telephone Interviews

**N=21,208**

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<th>Chronic Condition</th>
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<td>35.1</td>
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<tr>
<td>Asthma</td>
<td>2344</td>
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<td>11.7</td>
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<td>COPD</td>
<td>1433</td>
<td>6.8</td>
<td>5.8</td>
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<tr>
<td>Hypertension</td>
<td>8090</td>
<td>38.2</td>
<td>33.4</td>
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<tr>
<td>Diabetes</td>
<td>3542</td>
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<td>15.1</td>
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<td>Heart disease</td>
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<tr>
<td>Angina</td>
<td>1149</td>
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<td>4.3</td>
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<tr>
<td>Heart attack</td>
<td>1299</td>
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<tr>
<td>Stroke</td>
<td>388</td>
<td>1.8</td>
<td>1.5</td>
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<tr>
<td>Dementia/AD</td>
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<td>0.2</td>
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<tr>
<td>Parkinson’s, Parkinsonism</td>
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<td>0.4</td>
<td>0.3</td>
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<tr>
<td>Cancer</td>
<td>3262</td>
<td>15.4</td>
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<tr>
<td>Osteoporosis</td>
<td>2008</td>
<td>9.5</td>
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## CLSA Tracking Telephone Interviews

**N=21,208**

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<th>Marital status</th>
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<th>Weighted Percent</th>
<th>CCHS Weighted Percent</th>
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<td>Single/Never married</td>
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<td>8.4</td>
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<td>Married/Common Law</td>
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<td>73.8</td>
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<td>Widowed</td>
<td>2355</td>
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<td>8.4</td>
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<tr>
<td>Divorced</td>
<td>1988</td>
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<td>8.5</td>
<td>2.7</td>
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<tr>
<td>Separated</td>
<td>579</td>
<td>2.7</td>
<td>2.7</td>
<td>8.2</td>
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<table>
<thead>
<tr>
<th>Education</th>
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<tr>
<td>Less than Secondary</td>
<td>1978</td>
<td>9.3</td>
<td>7.0</td>
<td>20.4</td>
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<td>Secondary School</td>
<td>2875</td>
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<td>12.8</td>
<td>19.1</td>
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<tr>
<td>Some Post-Secondary</td>
<td>1622</td>
<td>7.7</td>
<td>7.6</td>
<td>5.2</td>
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<tr>
<td>Post Secondary Degree/ Dipl</td>
<td>14650</td>
<td>69.1</td>
<td>72.2</td>
<td>55.3</td>
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<table>
<thead>
<tr>
<th>Annual Household Income</th>
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<tr>
<td>Less than $20,000</td>
<td>1341</td>
<td>6.8</td>
<td>5.5</td>
<td>9.0</td>
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<tr>
<td>$20,000 - $50,000</td>
<td>5841</td>
<td>29.4</td>
<td>23.9</td>
<td>29.1</td>
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<tr>
<td>$50,000 - $100,000</td>
<td>7212</td>
<td>36.3</td>
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<td>36.2</td>
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<td>$100,000 - $150,000</td>
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<td>19.4</td>
<td>16.2</td>
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<tr>
<td>Greater than $150,000</td>
<td>2237</td>
<td>11.3</td>
<td>15.3</td>
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### CLSA Tracking Telephone Interviews

N=21,208

<table>
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<tr>
<th></th>
<th>Count</th>
<th>Percent</th>
<th>Weighted Percent</th>
<th>CCHS Weighted Percent</th>
</tr>
</thead>
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<tr>
<td><strong>Self Rated General Health</strong></td>
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<tr>
<td>Excellent</td>
<td>3972</td>
<td>18.8</td>
<td>20.8</td>
<td>20.5</td>
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<tr>
<td>Very Good</td>
<td>8115</td>
<td>38.3</td>
<td>38.3</td>
<td>33.8</td>
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<tr>
<td>Good</td>
<td>6249</td>
<td>29.5</td>
<td>28.7</td>
<td>30.4</td>
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<tr>
<td>Fair</td>
<td>227</td>
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<td>9.6</td>
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<tr>
<td>Poor</td>
<td>624</td>
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<tr>
<td><strong>Self reported Weight Status</strong></td>
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<tr>
<td>Overweight</td>
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<tr>
<td>Underweight</td>
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<td>1.3</td>
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<tr>
<td>Just about right</td>
<td>9492</td>
<td>45.0</td>
<td>46.0</td>
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<tr>
<td><strong>Satisfaction with Life</strong></td>
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<td></td>
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<tr>
<td>Dissatisfied</td>
<td>2068</td>
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<td>9.6</td>
<td>9.3</td>
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<tr>
<td>Neutral</td>
<td>850</td>
<td>4.0</td>
<td>4.5</td>
<td>2.7</td>
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<tr>
<td>Satisfied</td>
<td>18264</td>
<td>86.2</td>
<td>88.0</td>
<td>88.0</td>
</tr>
</tbody>
</table>
First Follow Up (2015-2018)

- **1st follow up Tracking** (June 2015 to May 2018)
  - Re-contacting 21,242 participants for their follow up telephone interviews

- **1st follow up Comprehensive** (June 2015-May 2018)
  - Re-contacting 30,000 participants for their follow up inhome interviews and DCS visits

- **2nd MCQ** (December 2016-November 2019)
  - Re-contacting ~50,000 participants for maintaining contact telephone interviews
First Follow Up (2015-2018)
Additions to study content

- Child maltreatment
- Elder Abuse
- Epilepsy
- Hearing
- Arterial stiffness
- Decedent information
- Workability
- Subjective cognitive decline
- Transportation
- Health care use
- Preventive health behaviours
Biomarker and epigenetic analyses

- Complete Blood Count (available)

- Proposed panel of biomarkers: albumin, ALT, creatinine, CRP, ferritin, hemoglobin A1C, lipids (cholesterol, HDL, Triglycerides, LDL), thyroid stimulating hormone, free T4, 25-hydroxyvitamin D
  - N~30,000 (Calgary Laboratory Services)

- Proposed genotyping: Affymetrix UKBiorepository array assay
  - 820,967 SNPs
  - n=10,000 (McGill Genome Centre)

- Proposed epigenetic analysis: targeted age-associated CpG methylation using pyrosequencing and Sequenom EpiTyper
  - n=5,000 (UBC Genetics and Epigenetics Centre)
Data and Sample Access

- Data and samples available to the research community
- Guiding principles
  - Rights and privacy of participants must be protected
  - Confidentiality and security of data must be safeguarded
  - Data and samples made available in timely manner
  - Data and samples can only be used for research purposes
  - Return of derived variables
  - No exclusive access
  - Cost neutral
Data Currently Available

21,242 Telephone Interviews (Tracking):

- 1st release available now
- 2nd release planned for late 2014/early 2015 to include cognitive scores, occupational classes

30,000 Data Collection Site Visits (Comprehensive)

- 1st release planned 10 months after completion of recruitment and baseline assessments
- ~Mid 2016
How to apply for data

• Via CLSA website: www.clsa-elcv-ca

• CLSA Data and/or Biospecimen Request Application

• Reviewed by CLSA Data and Sample Access Committee

• 6-8 week turnaround

• Institutional data/biospecimen transfer agreements
DataPreview Portal

• DataPreview Portal launched May 2014
• Gateway to access for alphanumeric data and biospecimens
  ➢ Meta data: data dictionaries, data collection tools
  ➢ Documentation and application form
  ➢ Variable search mechanism providing simple descriptive statistics for selected variables
DataPreview Portal
www.clsa-elcv.ca

CLA DataPreview Portal

Welcome to the DataPreview Portal for the Canadian Longitudinal Study on Aging (CLSA)! The CLSA data and biological samples are available to approved Canadian and international public sector researchers, with no preferential or exclusive access for any individual. As you navigate the site you will find information about the application process and requirements for data and sample access. If you are new to using the portal we recommend you begin by reading the Frequently Asked Questions.
DataPreview Portal

Datasets

A Canadian Longitudinal Study on Aging (CLSA) dataset holds and describes variables collected from participants at each wave of data collection. The variable search tool enables researchers to locate items of interest within all available data collected from CLSA participants.

Currently, data emanating from the over 20,000 Tracking participants who completed the baseline 60-minute telephone interviews are available. Cognitive scoring is ongoing and these data will be available as part of the second CLSA data release in December 2014.

Datasets from future data collection events will be added when they are available.

Variables (June 2014)
- Variables currently available in the first wave of the data release, with filtering and search options.

Variables (December 2014)
- Variables that will be available in the second CLSA data release in December 2014.

Sampling weights
- Description of sampling weights used in the CLSA.

Questionnaire
- Baseline 60-minute Telephone Interview questionnaire (Tracking).

Study design
- Study design of the Canadian Longitudinal Study on Aging (Tracking participants).
# DataPreview Portal

## Variables

Help: To obtain all the variables contained in a CLSA questionnaire module, type the two- or three-letter module prefix (e.g. SDC for socio-demographic variables) into the full-text search box.

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<thead>
<tr>
<th>Name</th>
<th>Label</th>
<th>Dataset</th>
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</thead>
<tbody>
<tr>
<td>startdate</td>
<td>Date and time at start of interview</td>
<td>Tracking - Baseline Interview</td>
</tr>
<tr>
<td>startlanguage</td>
<td>Language at start of interview</td>
<td>Tracking - Baseline Interview</td>
</tr>
<tr>
<td>AGE_NMBR_TRM</td>
<td>Age (years)</td>
<td>Tracking - Baseline Interview</td>
</tr>
<tr>
<td>SEX_ASK_TRM</td>
<td>Sex</td>
<td>Tracking - Baseline Interview</td>
</tr>
<tr>
<td>SDC_COB_TRM</td>
<td>Country of birth</td>
<td>Tracking - Baseline Interview</td>
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<tr>
<td>SDC_COB_OTSP_TRM</td>
<td>Country of birth other, Specify</td>
<td>Tracking - Baseline Interview</td>
</tr>
<tr>
<td>SDC_YACA_YR_TRM</td>
<td>Year arrival in Canada</td>
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<td>SDC_ETHN_CA_TRM</td>
<td>Parental ethnic background Canadian</td>
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<td>SDC_ETHN_FR_TRM</td>
<td>Parental ethnic background French</td>
<td>Tracking - Baseline Interview</td>
</tr>
</tbody>
</table>
Enabling Unit Leads

- Debra Sheets, Lynn Young, DCS Victoria
- Andrew Wister, Scott Lear, DCS Surrey
- Max Cynader, Teresa Liu-Ambrose, DCS Vancouver
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