



 **Transforming Everyday Life
into Extraordinary Ideas**





The Canadian Longitudinal Study on Aging: A Platform for Research on Aging

SYMPOSIUM

IAGG

San Francisco, CA

July 26, 2017

Symposium Overview

- CLSA study design and methods (Susan Kirkland, Dalhousie University, NS)
- Multiple chronic conditions related to disability and social participation (Lauren Griffith, McMaster University, ON)
- Associations between sensory loss and social networks, participation, support, and loneliness (Paul Mick, University of British Columbia, BC)
- Understanding inequalities and inequities in health and wellness among older Canadians (Yukiko Asada, Dalhousie University, NS)
- Characteristics of Caregiver Burden (Yoko Ishigami-Doyle, Dalhousie University, NS)
- Discussant (Andrew Wister, Simon Fraser University, BC)
- Questions (Istvan Molnar-Szakacs, McGill University, QC)



The Canadian Longitudinal Study on Aging: Study Design and Methods

Susan Kirkland, PhD

Dalhousie University

Christina Wolfson, Parminder Raina, Lauren Griffith, Mark Oremus, and the CLSA Research Team

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

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

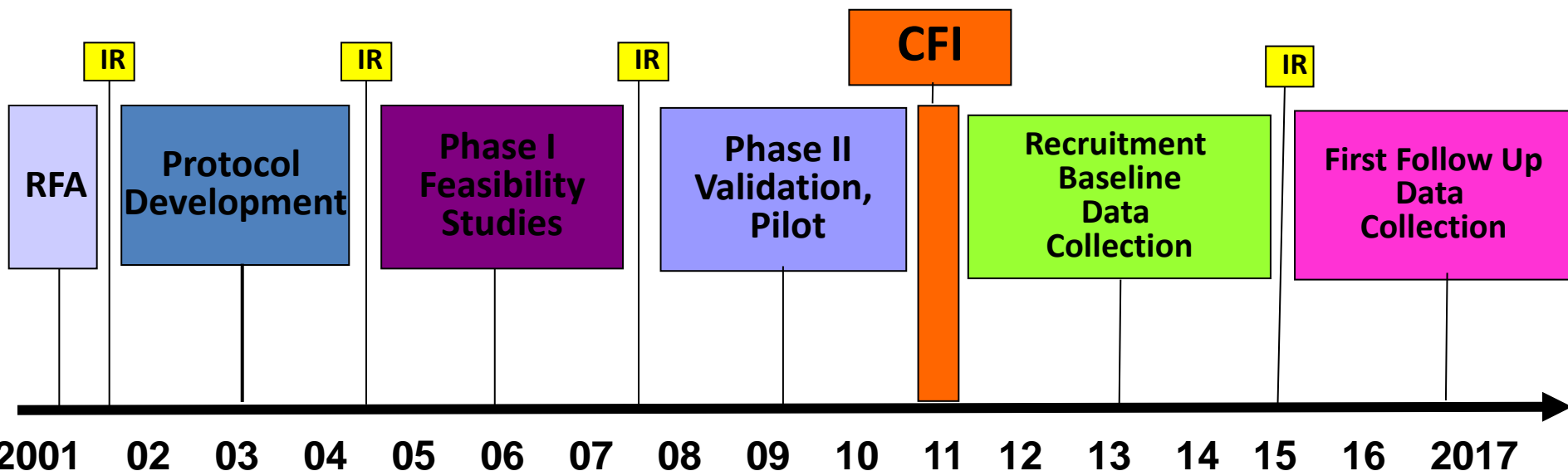
CLSA Timeline and Milestones

Team
Design
Objectives
Content

Acceptability
Bio-specimens
Recruitment
Data Linkage

Pilot recruitment
Validate measures
SOPs, TMs
Pilot protocol

Data Collection
Data Cleaning
Data Release



Design Overview

50,000 women and men aged 45 – 85 community dwelling 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



Canadian Longitudinal Study on Aging
Étude longitudinale canadienne sur le vieillissement

2010 - 2015

2015

2018

CLSA Overview

TIME

20 Years

Participants
aged 45 to 85
at baseline
(51,338)

Enrolled

Baseline

FU-1

FU-2

FU-3

FU-4

FU-5

FU-6

Questionnaire data (telephone
and in-person interviews)
(>50,000)

Physical assessments
and biological
specimens
(>30,000)

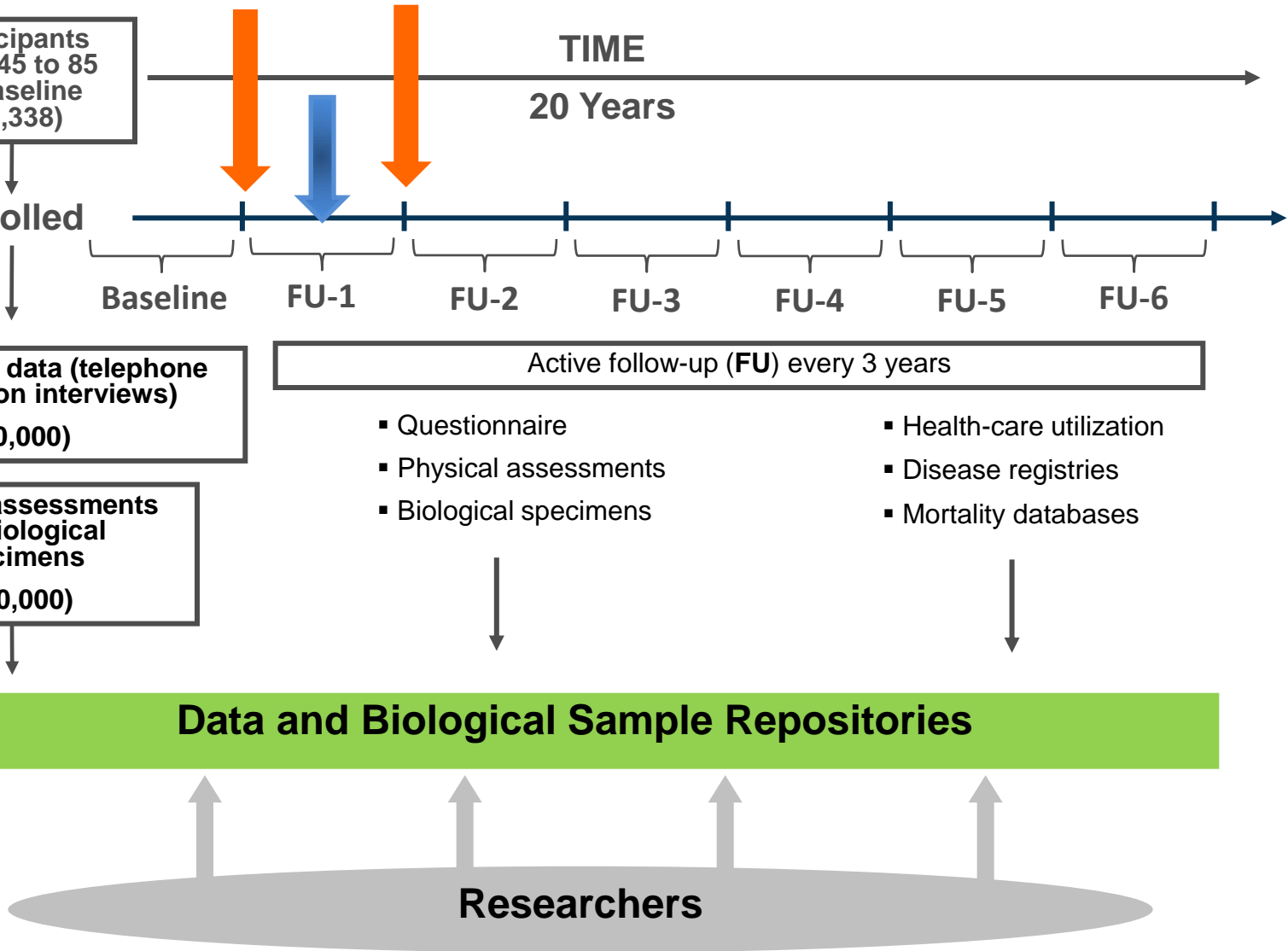
Active follow-up (FU) every 3 years

- Questionnaire
- Physical assessments
- Biological specimens

- Health-care utilization
- Disease registries
- Mortality databases

Data and Biological Sample Repositories

Researchers



Recruitment Sampling Frame

- 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, agree to recontact

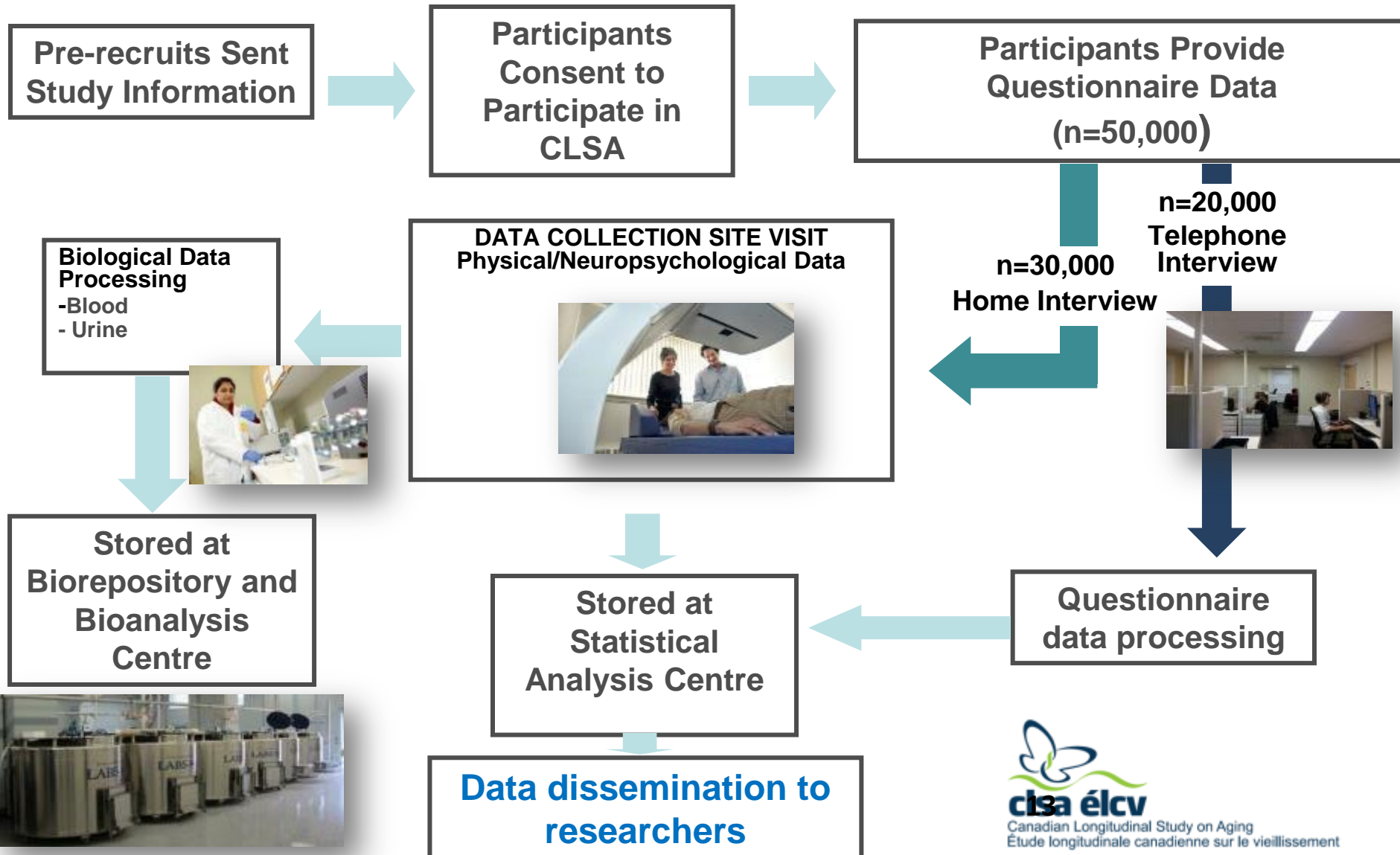
Exclusion Criteria at Baseline

- Resident of the 3 territories (Northwest Territories, Nunavut, Yukon)
- Living in an institution
- Living on a First Nations Reserve
- Full time member of the armed forces
- Temporary visa holder
- Cognitive impairment
- Unable to communicate in French or English

National Scope Representative Sampling Frame



Innovative Electronic Data Capture



Depth and Breadth of CLSA Baseline Questionnaire modules



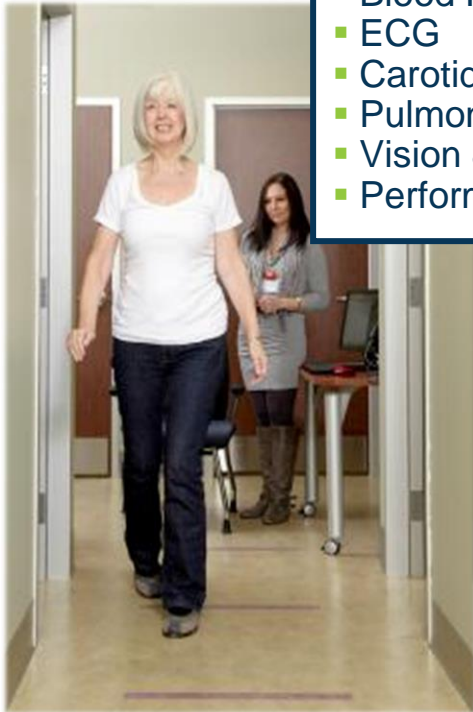
- **DEMOGRAPHIC**
 - Education
 - Marital status
 - Ethnicity
- **HEALTH BEHAVIOURS**
 - Smoking, alcohol
 - Nutritional risk
 - Food frequency
 - Physical activity
 - Health care utilization
 - Medication use
 - Supplement use
- **HEALTH STATUS**
 - General health
 - Women's health
 - Chronic conditions, symptoms
- Oral health
- **PHYSICAL**
 - Injuries, falls
 - Mobility
 - Pain, discomfort
 - Functional status
 - ADL, IADL
- **PSYCHOLOGICAL**
 - Cognition—Executive function, memory, psychomotor speed
 - Depression
 - Mood
 - Psychological distress
 - Veteran identifier
 - Satisfaction with life
 - PTSD
- **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 Data Collection

Data Collection Site

Physical Assessments:

- Height, Weight, BMI
- Bone Density, Body Composition, Aortic Calcification
- Blood Pressure
- ECG
- Carotid Intimal-Medial Thickness
- Pulmonary Function
- Vision & Hearing
- Performance testing



Biospecimen Collection:

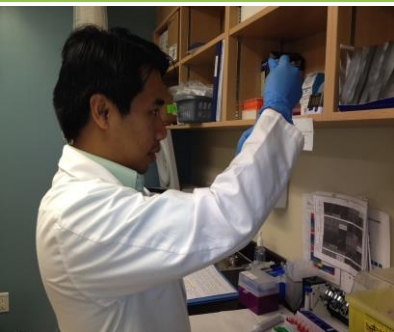
- Blood
- Urine

Cognitive Assessments:

- Neuropsychological Battery
 - Memory
 - Executive function
 - Reaction time



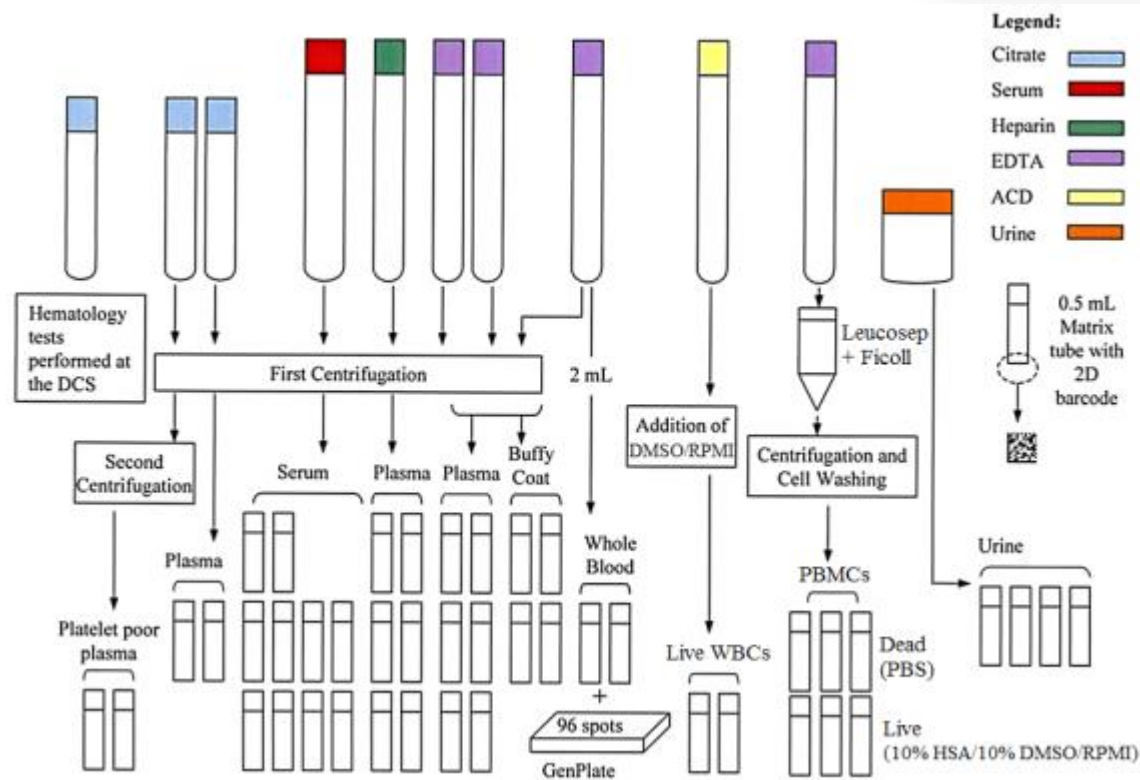
Canadian Longitudinal Study on Aging
Étude longitudinale canadienne sur le vieillissement



Bio specimen processing 42 aliquots per participant



- Basic hematologic tests done on site
- Remainder processed, frozen within 2 hours
- Shipped weekly
- Stored in Nitrogen tanks at BBC McMaster



Canadian Longitudinal Study on Aging
Étude longitudinale canadienne sur le vieillissement

FU1: New Study Content

- Child maltreatment
- Elder abuse
- Epilepsy
- Arterial stiffness
- Unmet health-care needs
- Workability
- Preventive health behaviours
- Enhanced hearing, oral health and transportation
- Sexual orientation and gender identity
- Subjective cognitive decline
- Loneliness
- Decedent information



FU1:

Accommodation Strategies

- **Changing circumstances**

- Migration out of area
- Cognitive impairment
- Physical impairment
- Sensory impairment
- Institutionalization



- Accommodation strategies to maintain long-term participation
- Allows for flexible participation
- Baseline exclusion criteria no longer apply

FU2: Modifications to the Protocol

- Content revision, additions
- Proxy Questionnaire
 - Basic (30 min) and Extended (40 min)
- Decedent Questionnaire
 - Death, living arrangements, function at one month prior, care receiving, care preferences and decisions
- Linkage with provincial administrative health data bases
 - Mortality via provinces
 - Exploring national linkage via CIHI
- Planning for FU2 now underway

Data and Biospecimen Access

- **Fundamental tenets:**
 - The rights, privacy and consent of *participants* must be protected and respected at all times
 - The confidentiality and security of *data and biospecimens* must be safeguarded at all times
 - CLSA data and biospecimens are resources that will be used optimally to support research to benefit all Canadians
 - No preferential or exclusive access
 - Available to researchers at public institutions



Demographic Characteristics of CLSA Participants at Baseline

	Tracking N=21,241	Comprehensive N=30,097	Total N=51,338
Age			
45-54	5832 (27.5)	7595 (25.2)	13427 (26.2)
55-64	6564 (30.9)	9856 (32.7)	16420 (32.0)
65-74	4634 (21.8)	7362 (24.5)	11996 (23.4)
75-85	4211 (19.8)	5284 (17.6)	9495 (18.5)
Sex			
Female	10835 (51.0)	15320 (50.9)	26155 (50.9)
Male	10406 (49.0)	14777 (49.1)	25183 (49.1)
Language			
English	17483 (82.3)	24291 (80.7)	41774 (81.4)
French	3758 (17.7)	5806 (19.3)	9564 (18.6)
Born in Canada	18513 (87.2)	24644 (81.9)	43157 (84.1)

Summary of Data Available

Dataset	N	Details
Tracking – Baseline 60-minute telephone interview (Version 3.2)	21,241	<ul style="list-style-type: none"> Alphanumeric questionnaire data <ul style="list-style-type: none"> Cognition data Open text variables
Tracking Maintaining Contact Questionnaire - Baseline 30-minute telephone interview (Version 2.0)	19,052	<ul style="list-style-type: none"> Alphanumeric questionnaire data
Comprehensive Baseline in-home interview and Data Collection Site visit (Version 3.1)	30,097	<ul style="list-style-type: none"> Alphanumeric questionnaire data <ul style="list-style-type: none"> Cognition data Physical assessments (incl. DXA) <ul style="list-style-type: none"> Hematological biomarkers
Comprehensive Maintaining Contact Questionnaire - Baseline 30-minute telephone interview (Version 2.0)	28,789	<ul style="list-style-type: none"> Alphanumeric questionnaire data

Core Biomarkers: Baseline

	Category	N	Biomarkers
Available	HEMATOLOGY Data Collection Sites (DCS)	25,425	<ul style="list-style-type: none"> Erythrocytes Granulocytes Hematocrit Hemoglobin Lymphocytes Platelets MCV MCV MCHC MPV RDW
Available mid-2018	CHEMISTRY Calgary Laboratory Services (CLS)	27,170	<ul style="list-style-type: none"> Albumin Alanine aminotransferase (ALT) C-reactive protein (CRP) Creatinine Cholesterol Ferritin Free T4 Non-HDL Thyroid stimulating hormone (TSH) Triglycerides 25-Hydroxyvitamin D Hemoglobin A1c (n = 26961) HDL LDL
	GENETICS Genetic and Epigenetic Centre (GEC)	10,000	<ul style="list-style-type: none"> Genome-wide genotyping DNA extracted from buffy coat on samples (n = 26,884) 820K UK Biobank Axiom Array (Affymetrix)
	EPIGENETICS Genetic and Epigenetic Centre (GEC)	1,500	<ul style="list-style-type: none"> DNA methylation DNA extracted from PBMCs 850K Infinium MethylationEPIC BeadChip (Illumina)
	METABOLOMICS Kyoto, Japan	1,000	<ul style="list-style-type: none"> Mass spectrometry

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Participants

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Researchers

- [Spring 2016 data release](#)
- [DataPreview Portal](#)
- [Approved Projects](#)



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CLSA Research Team

Principal Investigators, Site Investigators,
Working Group Leads, Key Co-investigators

UVic: Debra Sheets, Lynne Young, Holly Tuokko

UBC: Teresa Liu-Ambrose, Michael Kobor

SFU: Andrew Wister, Scott Lear

UCalgary: David Hogan, Marc Poulin, Eric Smith, Alex Chin, Hossein Sadrzadeh

UManitoba: Verena Menec, Phil St. John

McMaster: Parminder Raina, Cynthia Balion, Lauren Griffith, Andrew Costa, Harry Shannon, Christopher Patterson, Michael Veall, Guillaume Paré, Brenda Vrkljan

UOttawa: Vanessa Taler, Larry Chambers

McGill: Christina Wolfson, Ron Postuma, Brent Richards, Mark Lathrop

USherbrooke: Hélène Payette, Benoît Cossette

Dalhousie: Susan Kirkland

Memorial: Gerry Mugford

UToronto: Andrew Paterson

UWaterloo: Mark Oremus, Mary Thompson, Changbao Wu

Eindhoven University of Technology: Edwin van den Heuvel

+ Scientific working group members and co-investigators

CLSA Funders and Partners



Veterans Affairs
Canada



Anciens Combattants
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Health PEI



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Susan.Kirkland@dal.ca
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