Canadian Longitudinal Study on Aging as a Platform for Studying Disease and Disability in Aging Population

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The Canadian Longitudinal Study on Aging (CLSA)

- A key strategic initiative of CIHR
  - 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

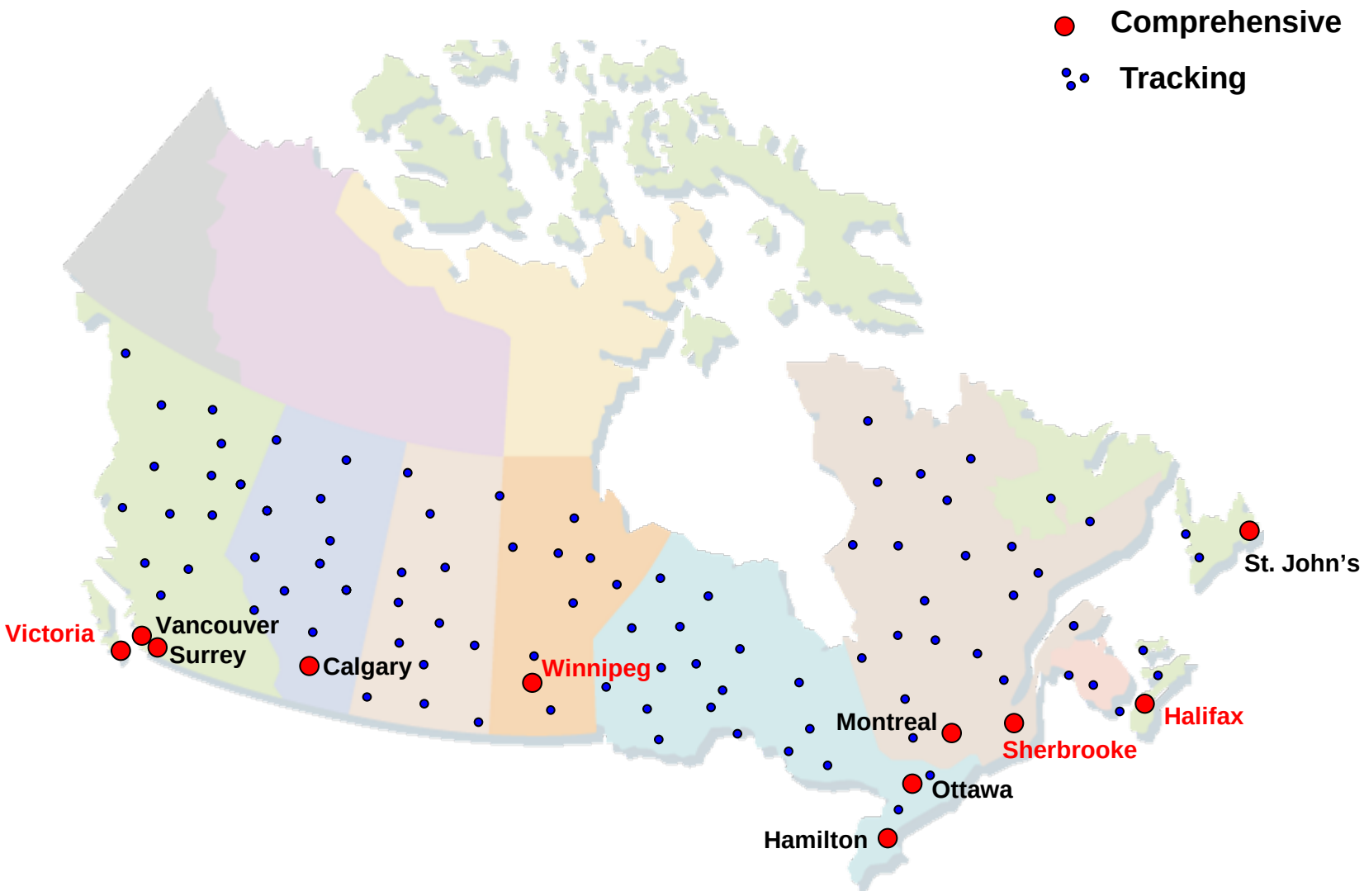
Our Aim

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

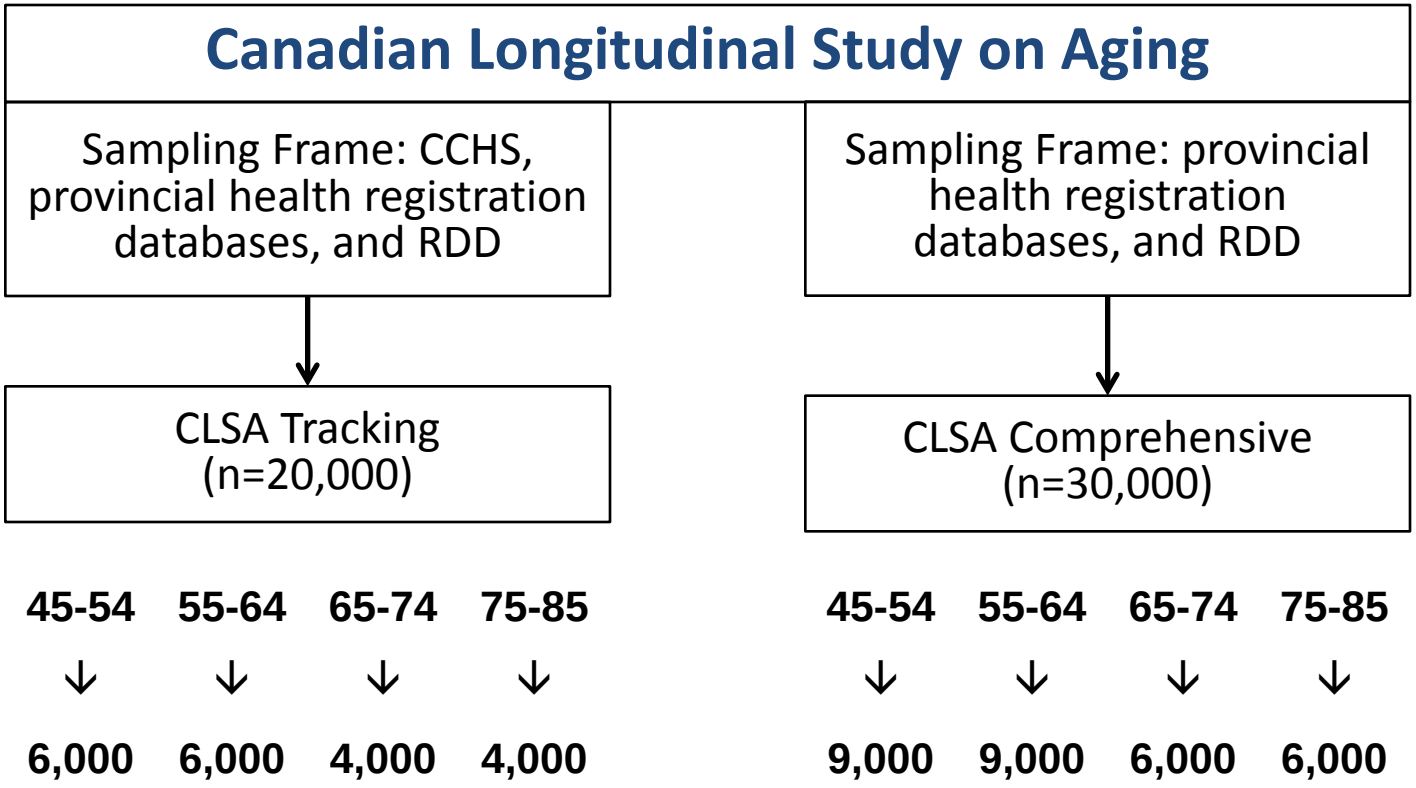
Overall Aims of the CLSA

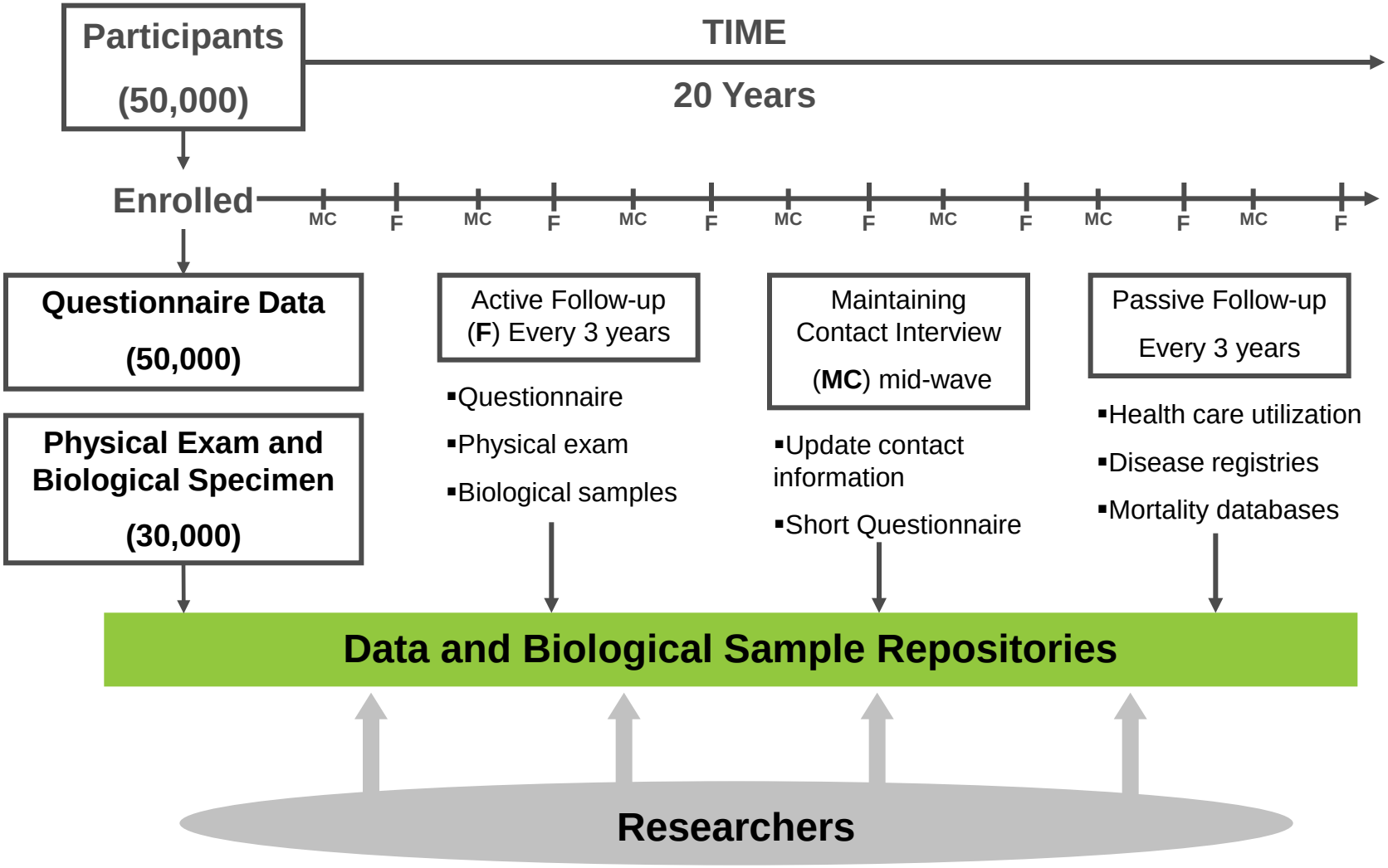
- The progression of **health** from middle-age to early old age to older old age
- The determinants of **well-being and quality of life**
- Risk Factors (including genetics) of **Chronic diseases**
- **Cognitive functioning** and **mental health**
- **Disability** and the compression of morbidity
- The examination of socioeconomic and health **inequalities** in an aging population
- **Social participation, social relationships and care giving** in an aging population
- **Retirement** and **post retirement** labor market activity

Participant Recruitment



CLSA Sampling




Participants
(50,000)
TIME
20 Years
Enrolled
MC
F
MC
F
MC
F
MC
F
MC
F
MC
F
MC
F
Questionnaire Data
(50,000)
Physical Exam and Biological Specimen
(30,000)
Active Follow-up
(F) Every 3 years
▪Questionnaire
▪Physical exam
▪Biological samples
Maintaining Contact Interview
(MC) mid-wave
▪Update contact information
▪Short Questionnaire
Passive Follow-up
Every 3 years
▪Health care utilization
▪Disease registries
▪Mortality databases
Data and Biological Sample Repositories
Researchers

Depth and Breadth of CLSA

PHYSICAL & COGNITIVE MEASUREMENTS

- Height & weight
- Waist and hip measurements
- Blood Pressure
- Grip strength, timed up-and-go, chair raise, 4-m walk
  Standing balance
- Vision (retinal imaging, Tonometer & visual acuity)
- Hearing (audiometer)
- Spirometry
- Body composition (DEXA)
- Bone density (DEXA)
- Aortic calcification (DEXA)
- ECG
- Carotid Plaque sweep (ultrasound)
- Carotid intima-media thickness (ultrasound)
- Depression
- Cognitive assessment (30 min. battery)

HEALTH INFORMATION

- Chronic disease symptoms **(disease algorithm)**
- Medication and supplements intake
- Women's health
- Self-reported health service use
- Oral health
- Preventative health
- **Administrative data linkage health services & drugs & other administrative databases**

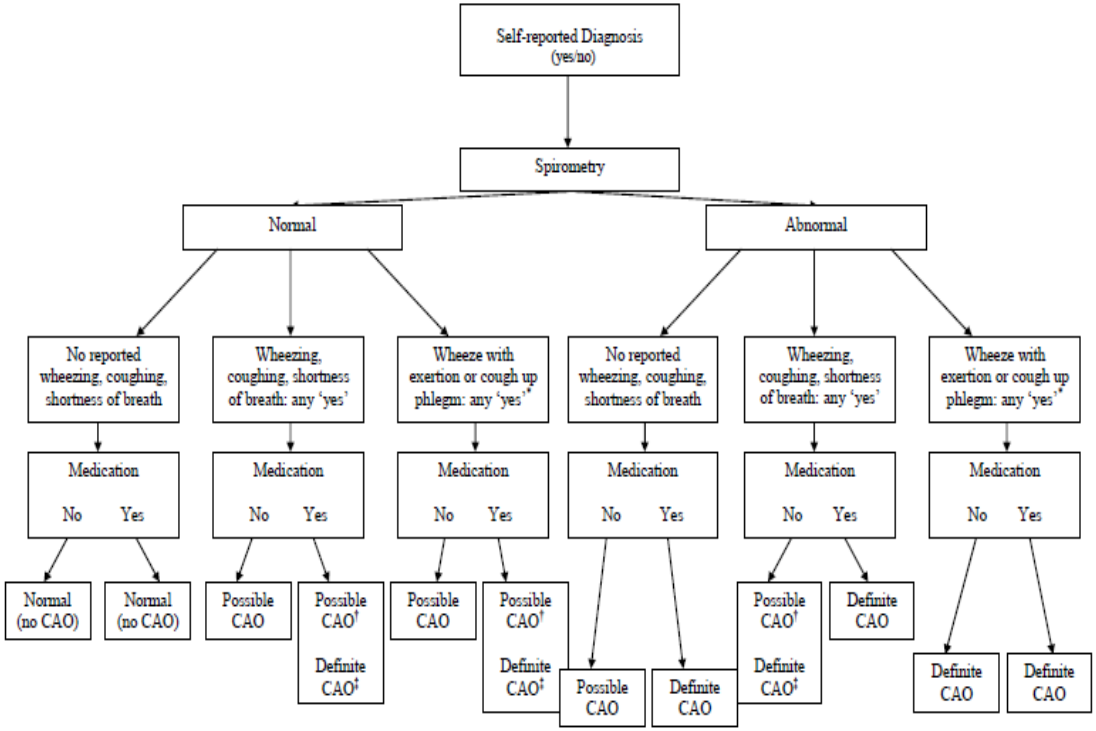
PSYCHOSOCIAL

- Social participation
- Social networks and support
- Caregiving and care receiving
- Mood, psychological distress
- PTSD
- Coping, adaptation
- Injuries and consumer products
- Work-to-retirement transitions
- Retirement planning
- Social inequalities
- Mobility-lifespace
- Built environments & Contextual Factors
- Income, Wealth and Assets

LIFESTYLE & SOCIODEMOGRAPHIC

- Smoking
- Alcohol consumption
- Physical activity (PASE)
- Nutrition (nutritional risk and food frequency)
- Birth location
- Ethnicity/race/gender
- Marital status
- Education

Chronic Airflow Obstruction (CAO) Algorithm



eFigure 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.

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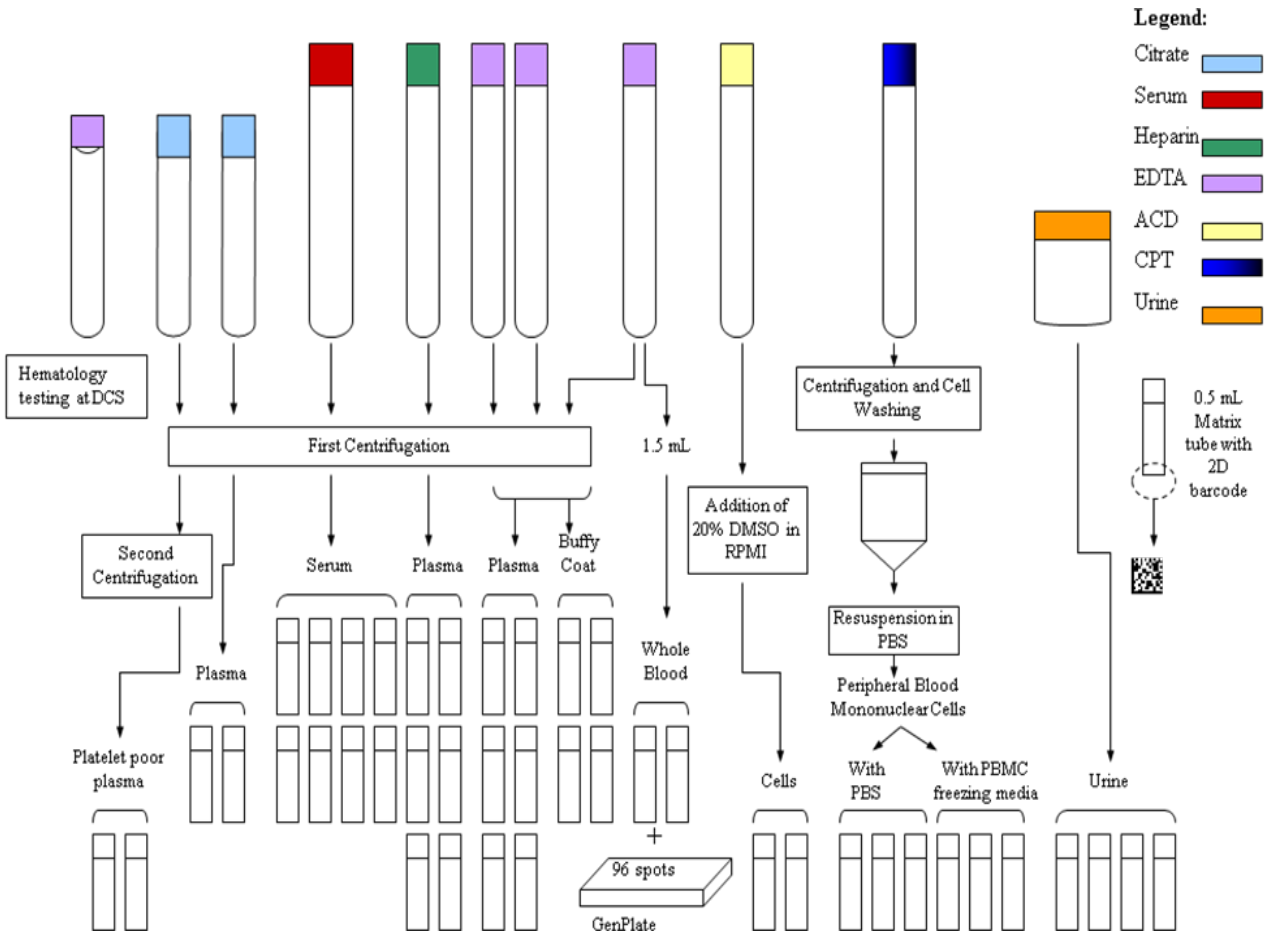
Bio specimens
42 aliquots per participant



Proposed Analysis of baseline biomarkers

- 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)

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H V Z D S
N C V K D
C Z S H N

Baseline Recruitment and Data Collection

- First selection of 20,000 started in late 2011
  - Completed 60 minute questionnaire by telephone on about 21,000 individuals (***Includes Health care number on over 90% of the respondents)***
- In August 2013 our maintaining contact interviews (30 minute telephone interview)
  - Minimize loss to follow-up
  - Collect additional data

Implementation Plan for the Comprehensive Cohort (n=30,000)

- Cohort of 30,000 persons to be recruited within 25 to 50 km radius of 11 data collection sites (DCS)
  - Victoria (3000), Vancouver (1500), Burnaby (1500),Calgary (3000), Winnipeg (3000), Hamilton (3000), Ottawa (3000), Montreal (3000), Sherbrooke (3000), Halifax (3000), St. John's (3000)

Comprehensive Cohort Rolling Recruitment

- First batch of 10,000 people to be recruited across all sites (Fall-2012 to mid-2013)
  - Maintaining contact by phone (end of 2013- end 2014)
- Second batch of 10,000 (mid-2013 to mid-2014)
  - Maintaining contact: (end of 2014-end of 2015)
- Third batch of 10,000 (mid-2014 to mid 2015)
  - Maintaining contact: (end of 2015-end of 2016)

- **Completed almost 24,000 In home (IH) Interviews**
- **IH + Physical assessment + Health care number (over 95%) + biosamples (96%) over 21,000**

CORE ADDITIONAL STUDIES WITHIN CLSA

- Brain CLSA
  - Proposal to CIHR to develop a core brain imaging study (n=800)

- Division of Environment Health: Health Canada (Funded)
  - Air Pollution Data Base (n=50,000)

Data and Sample Access

- Data and Sample Access is Open
  - All researchers have access to data
    - No special access to the “creators” of the platform
    - Individual level data versus aggregate data
    - Genetic versus Health (Depression) versus Social data

- Ethical and Legal Considerations
  - How the data are used and what purpose?
  - Public sector versus Private sector access to data

Baseline Data Release

- 21,242 Telephone Interviews: Release Spring 2014
- 2nd release late 2014/early 2015 to include cognitive scores (scoring ongoing), occupational classes (planned)
- 30,000 Data Collection Site Visits: anticipate 1st release of data within 10 months of completed recruitment and baseline assessments ~Spring 2016
- Application-to-access process via CLSA DataPreview
- Formal Review through the CLSA Data and Sample Access Committee
- Following approval, release requires data/biospecimen transfer agreements

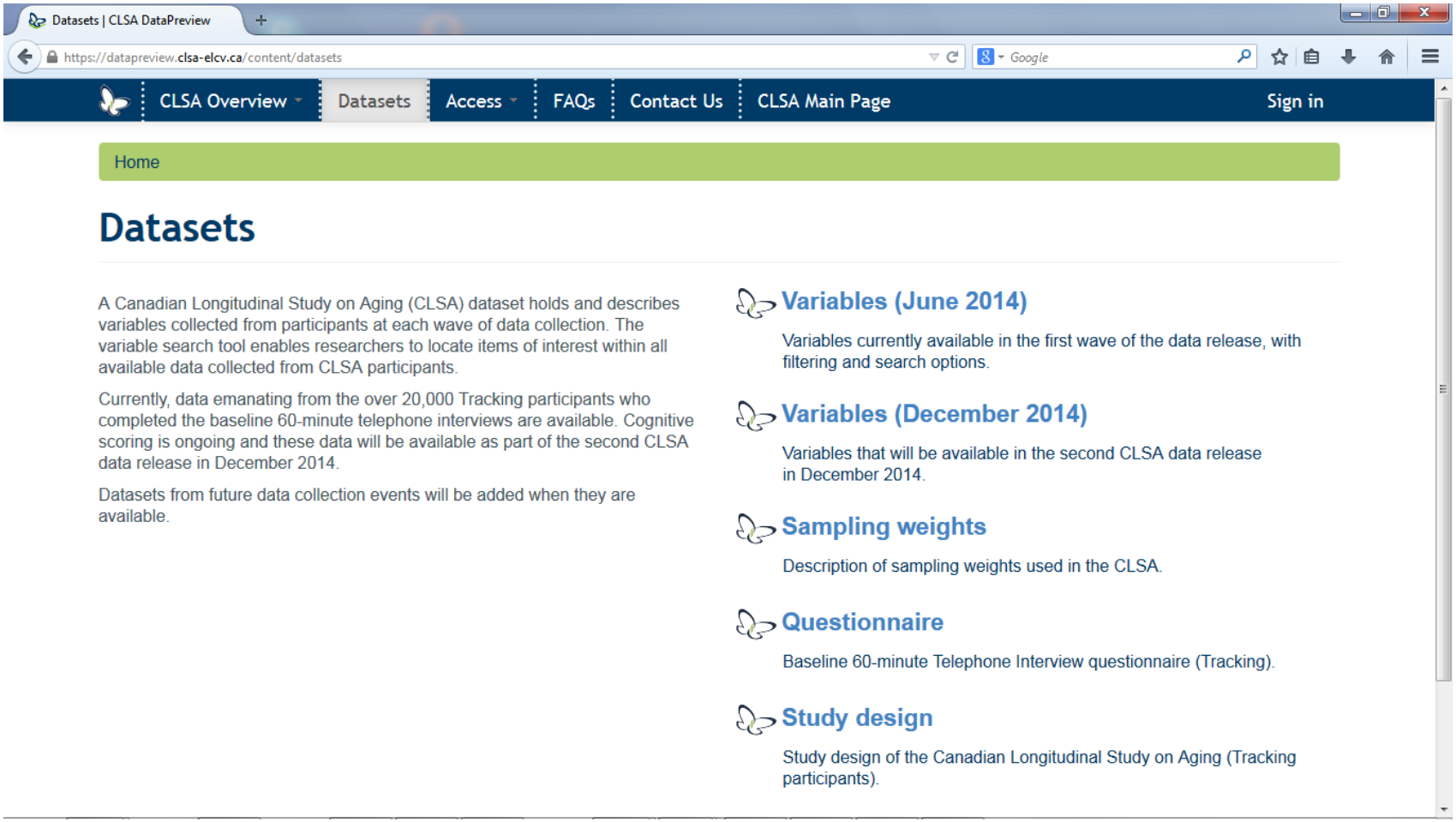
Aim 1: Recruitment and Baseline Data Collection
Data Release

- DataPreview Portal soft launch May 15, 2014
- Gateway to access for data* and biospecimens
  - Meta data: data dictionaries, data collection tools
  - Documentation and application form
  - Variable search mechanism providing simple descriptive statistics for selected variables

  - *Currently available for alphanumeric data

DataPreview Portal

DataPreview Portal



CLSA Research Team

Scientific Management Team

Lead Principal Investigator
Parminder Raina (McMaster)

Co-principal Investigator
Christina Wolfson (McGill)

Co-principal Investigator
Susan Kirkland (Dalhousie)

CLSA Research Team

Operations Committee and Scientific Leads

CIHR IRSC
Canadian Institutes of Health Research
Instituts de recherche en santé du Canada

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