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Canadian Longitudinal Study on Aging
Étude longitudinale canadienne sur le vieillissement

Advancing the Science of Population Health and Aging through Interdisciplinary Research

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Ontario LTC Meeting, Markham, Canada, October 28, 2010

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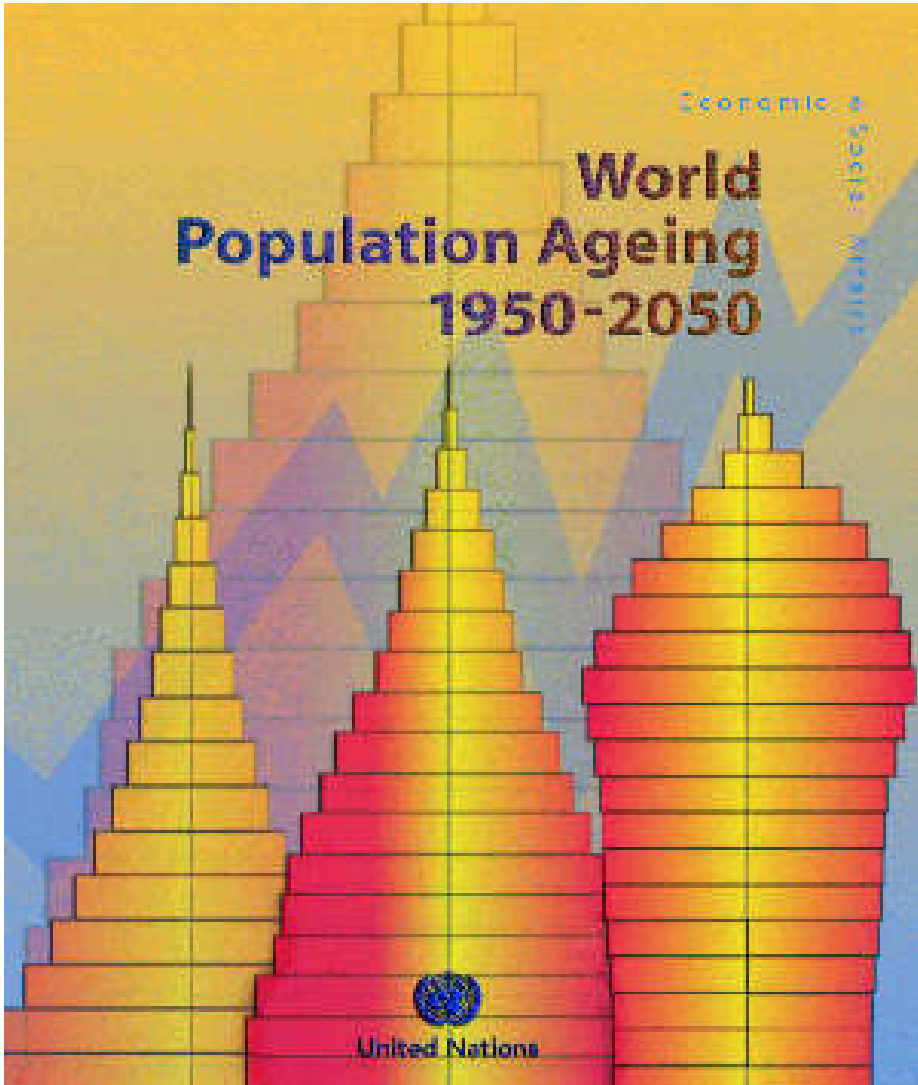
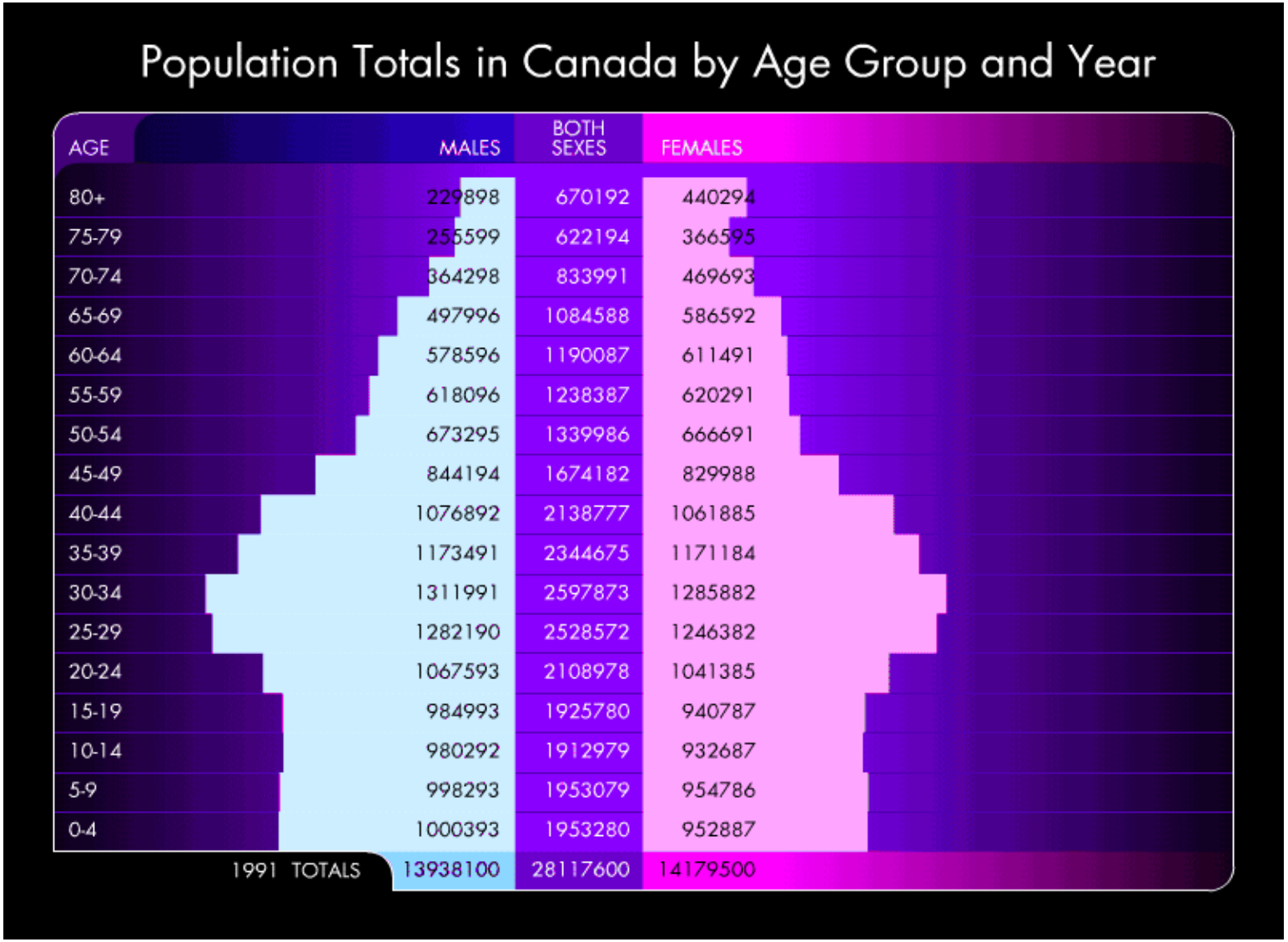
Population aging

- Due to declining fertility and increasing longevity (demographic transition)
- Unprecedented, accelerating, shifts will be permanent
- Profound implications for human life, including health



Population Totals in Canada by Age Group and Year



AGE	MALES	BOTH SEXES	FEMALES
80+	229898	670192	440294
75-79	255599	622194	366595
70-74	364298	833991	469693
65-69	497996	1084588	586592
60-64	578596	1190087	611491
55-59	618096	1238387	620291
50-54	673295	1339986	666691
45-49	844194	1674182	829988
40-44	1076892	2138777	1061885
35-39	1173491	2344675	1171184
30-34	1311991	2597873	1285882
25-29	1282190	2528572	1246382
20-24	1067593	2108978	1041385
15-19	984993	1925780	940787
10-14	980292	1912979	932687
5-9	998293	1953079	954786
0-4	1000393	1953280	952887
1991 TOTALS	13938100	28117600	14179500

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Demographic Futures

- Upward trend in life expectancy continue, cease, or reverse?
  - \+ Effective interventions against age-related diseases
  - \+ Improved environment for ageing
  - \+ Life-cycle deceleration (delayed reproduction)

  - \- Adverse effects of excess nutrition
  - \- Adverse effects of alcohol and drug abuse
  - \- Adverse effects of increasingly sedentary lifestyles
  - \- Life-cycle acceleration (early maturation)

Projections

- In 1996/97 the number of beds required in LTC
  - 184,300
- In 2031 it is projected that it might be:
  - Lower end projections: 565,000 by 2031
  - Higher end projections: 746,000 by 2031
- What impact baby boomers will have on the system? Unknown..

Policy Needs

- Changing demographics #1 priority of Canadian Federal and Provincial Governments
- Healthy aging is important to the Canadian public and policy makers
- Canada differs from other countries in its:
  - health and social policy
  - health care delivery systems
  - climate, environment, geography, and
  - retirement policy and pension programs
- Seniors of tomorrow have different needs and expectations
  - major implications & challenges for the health care system and for social programs

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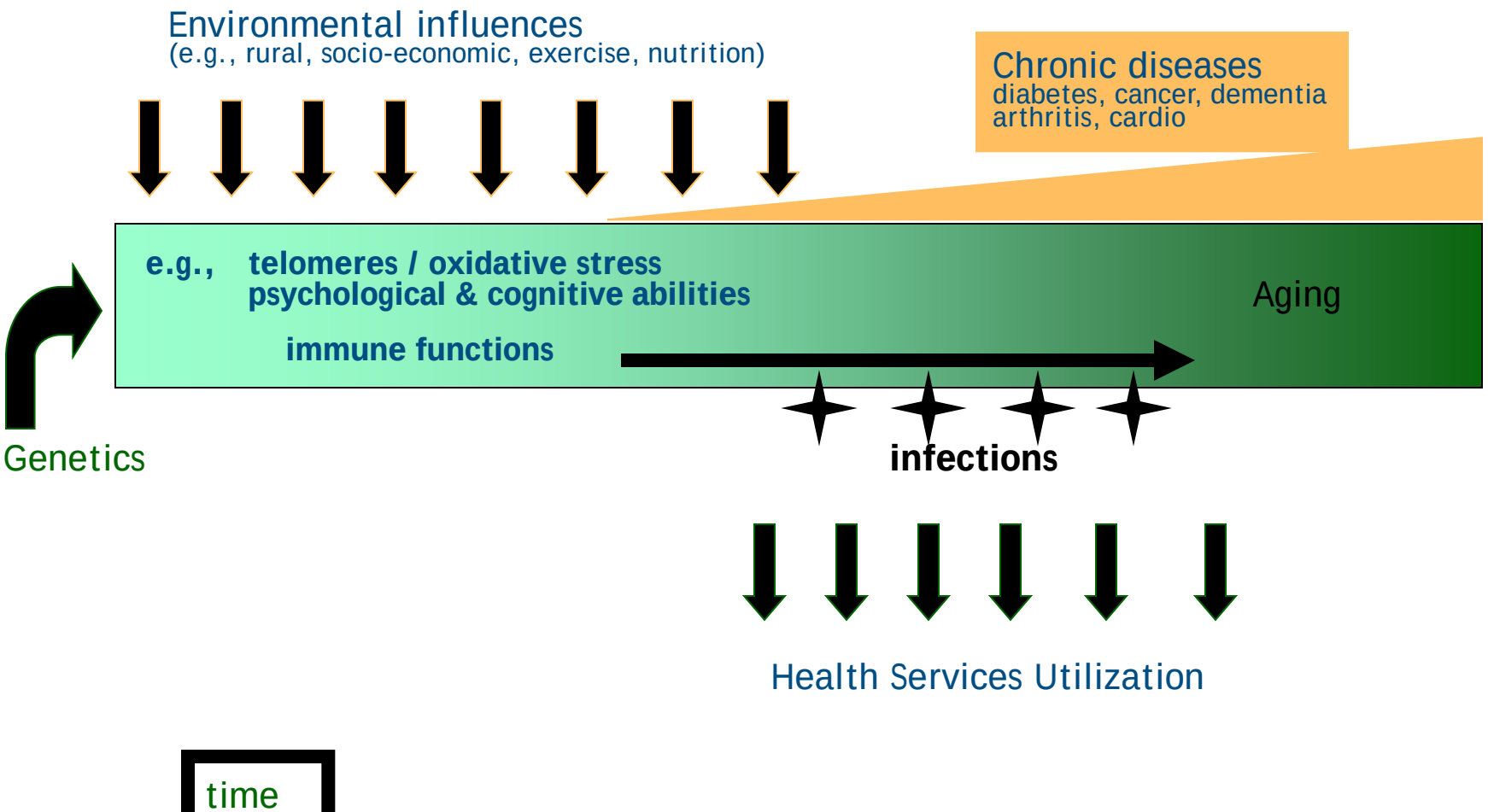
Future of Research in Aging in Post-Genomic Era



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Future of Research in Post-Genomic Era

- Age-related changes---”complexity”
  - INDIVIDUAL LEVEL
  - SOCIETAL AND CONTEXTUAL LEVEL

- Innovative study design that advance science of aging and health as well as inform health and social policy

- Need for interdisciplinary long-term longitudinal studies

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

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CLSA- The Concept

The Vision

A research platform - - infrastructure to enable state-of-the-art interdisciplinary population based *research* and *evidenced-based* decision making.

The Aim

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

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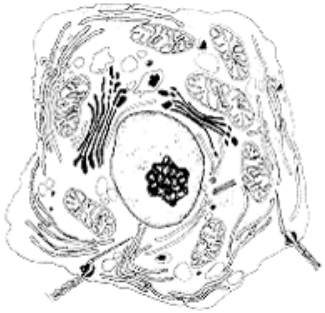
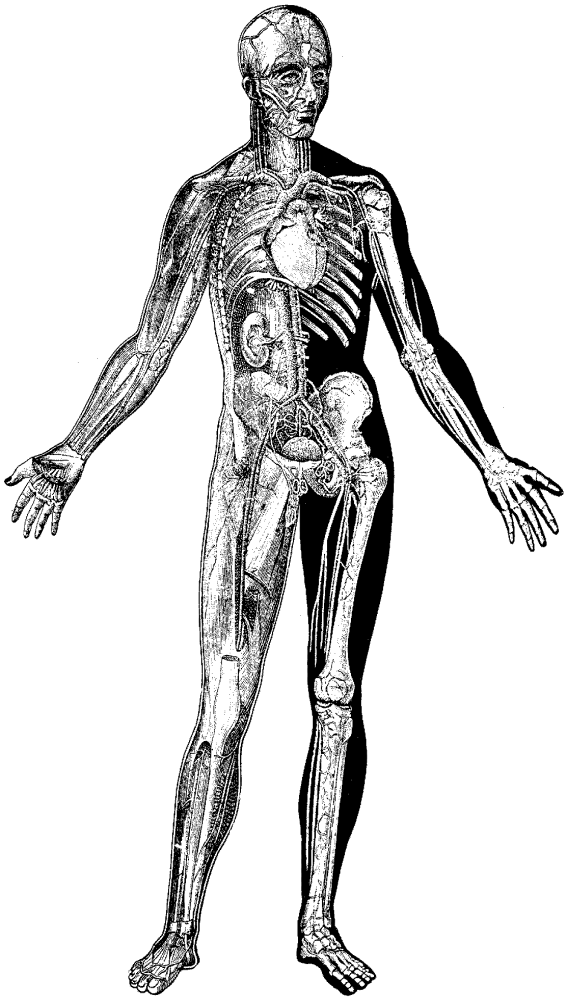


Innovation - Cell to Society

- Mid life to old age
- Quantitative traits
  - Physical
  - Social
  - Psychological
- Gene-environment interactions
- Disease, disability, psychosocial consequences
- Adaptation



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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

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CLSA Architecture

Inception Cohort: 50,000

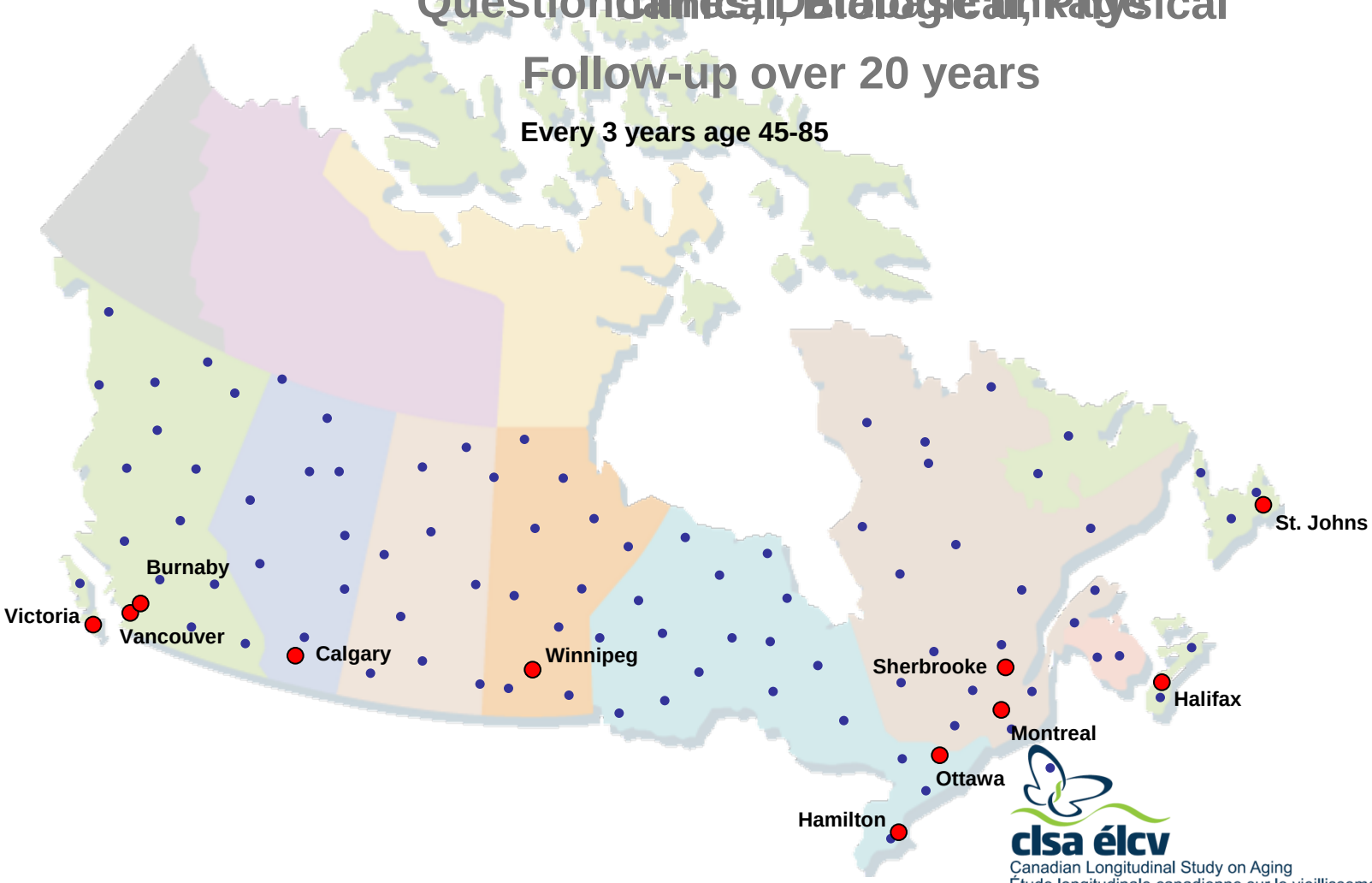
Questionnaires, Database Linkage

Follow-up over 20 years

Every 3 years age 45-85

In-Depth Collection on 30,000 (at 11 sites)

Clinical, Biological, Physical



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 Data bases

PSYCHOSOCIAL

- Social participation
- Social networks and support
- Care giving 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

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Biological Samples

BIOCHEMICAL & HEMATOLOGICAL ANALYSIS (50 ml Blood; Urine)

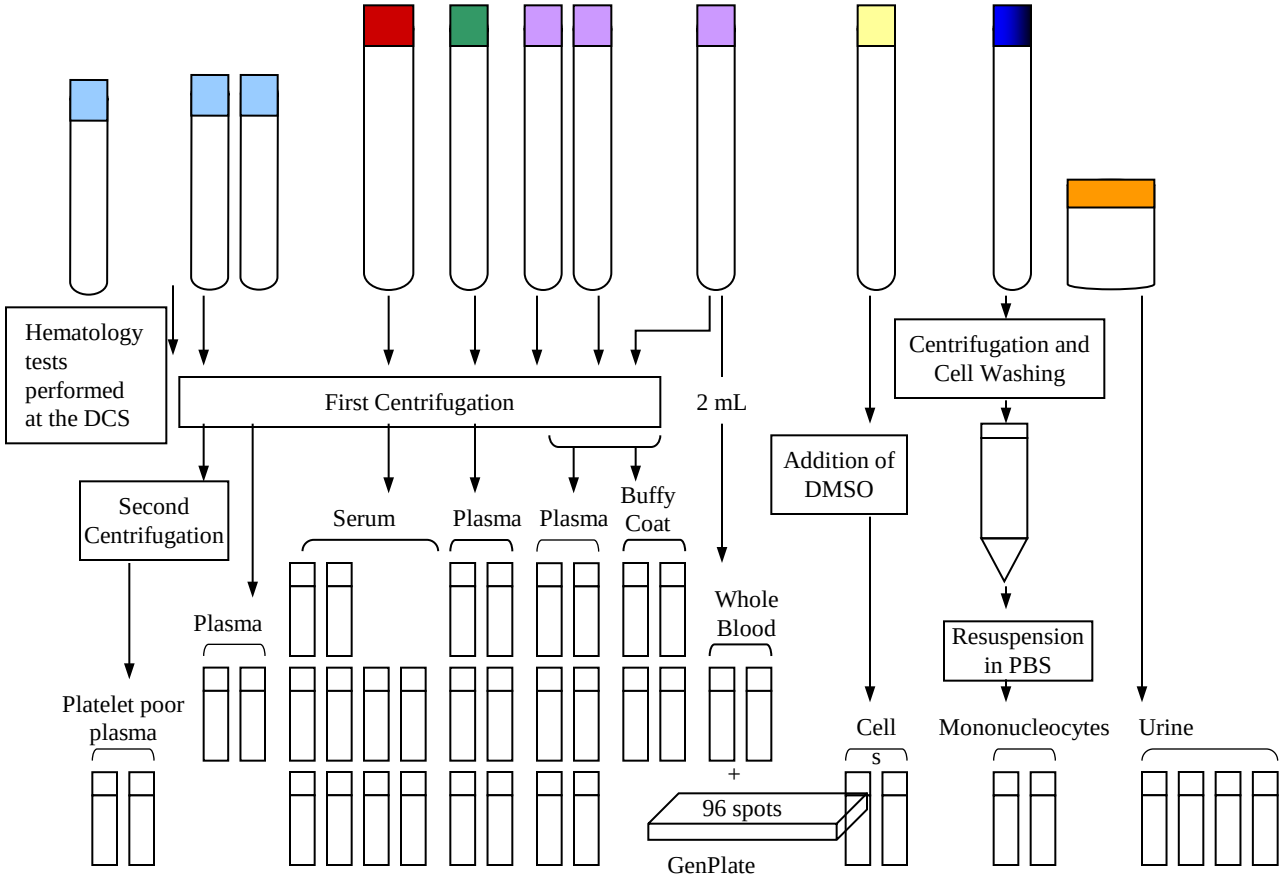
General Hematology

- 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



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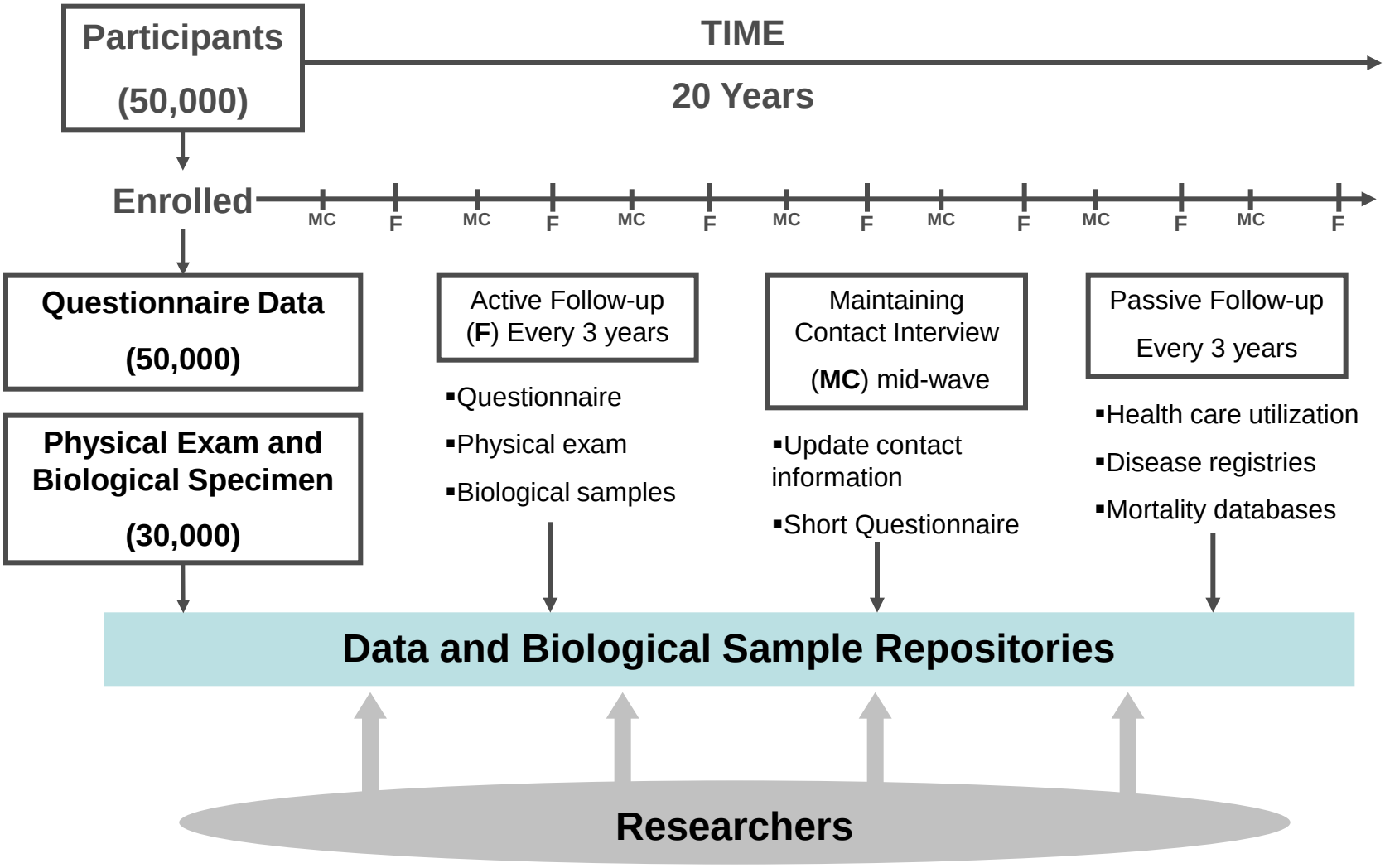

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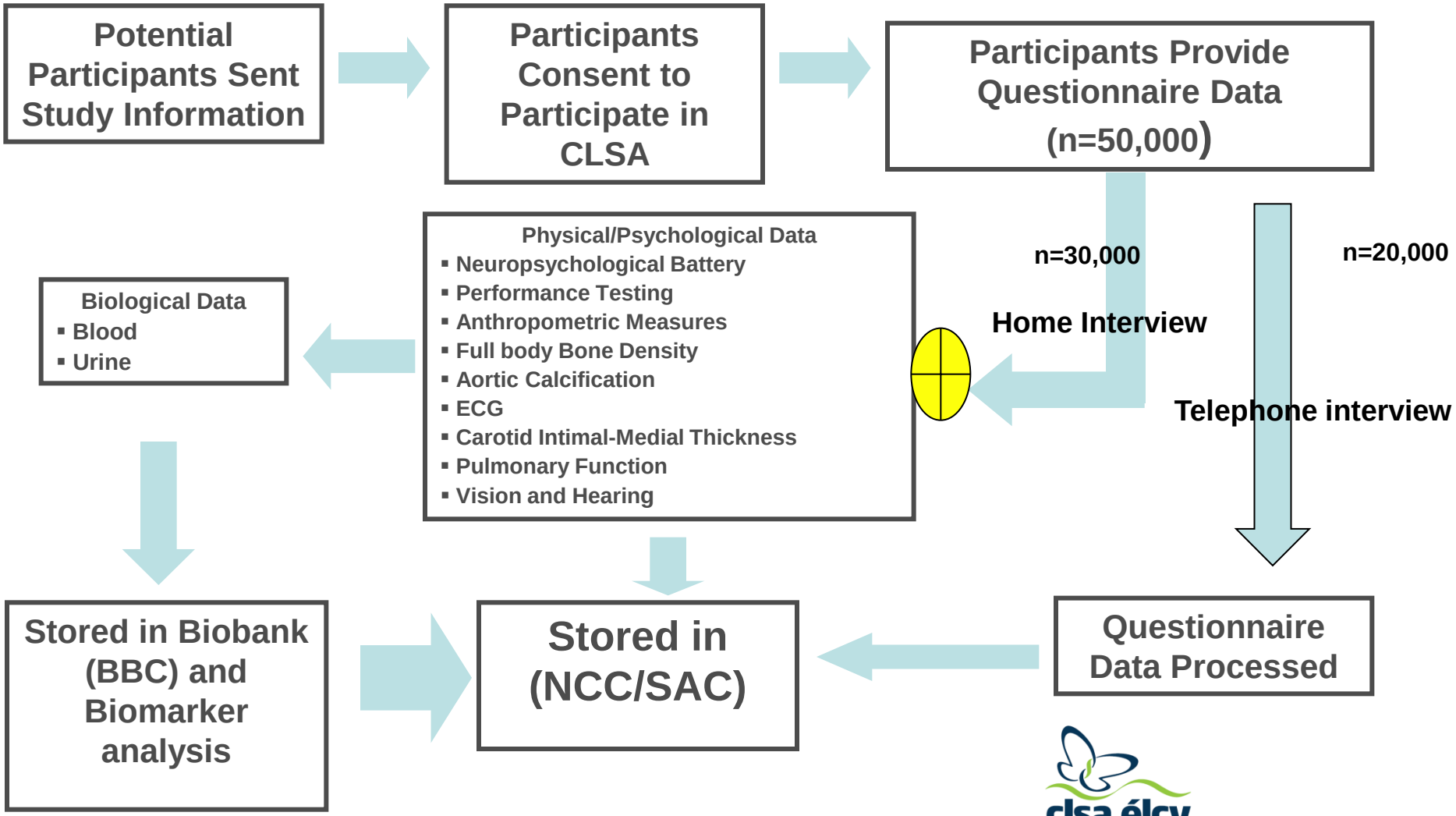
Data Collection Overview



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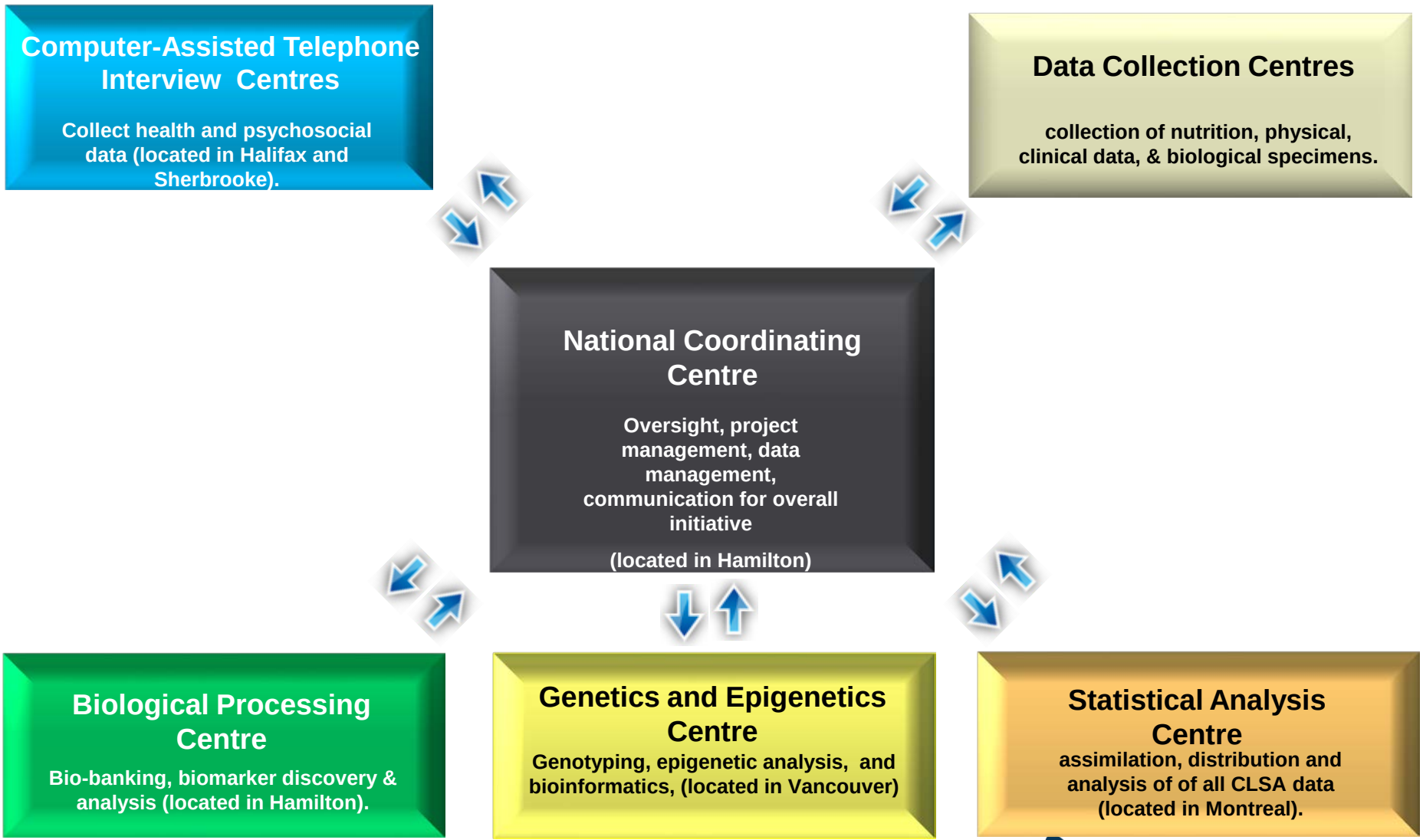
Equipment and Infrastructure Supporting Research on Aging



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Implementation Plans for Tracking Cohort of the CLSA (n=20,000)

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Launch of the CLSA

- First selection of 20,000 started in late 2008 in collaboration with Statistics Canada CCHS Healthy Aging module (Tracking Cohort)
    - Approximately 12 500 have agreed to release their names to CLSA (currently being recruited)
- Remaining 8,000 for Tracking Cohort will be recruited in late 2010
- Remaining 30,000 will be recruited in late 2010 (Comprehensive Cohort)
    - Provincial Client Registries

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Implementation Plans for Comprehensive Cohort of the CLSA (n=30,000)

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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 1000 people to be recruited/site (mid-2011 to mid-2012)
  - Maintaining contact by phone (end of 2012- end 2013)
- Second batch of 1000 people to be recruited/site (mid-2012 to mid-2013)
  - Maintaining contact: (end of 2013-end of 2014)
- Third batch of 1000 people to be recruited/site (mid-2013 to mid 2014)
  - Maintaining contact: (end of 2014-end of 2015)

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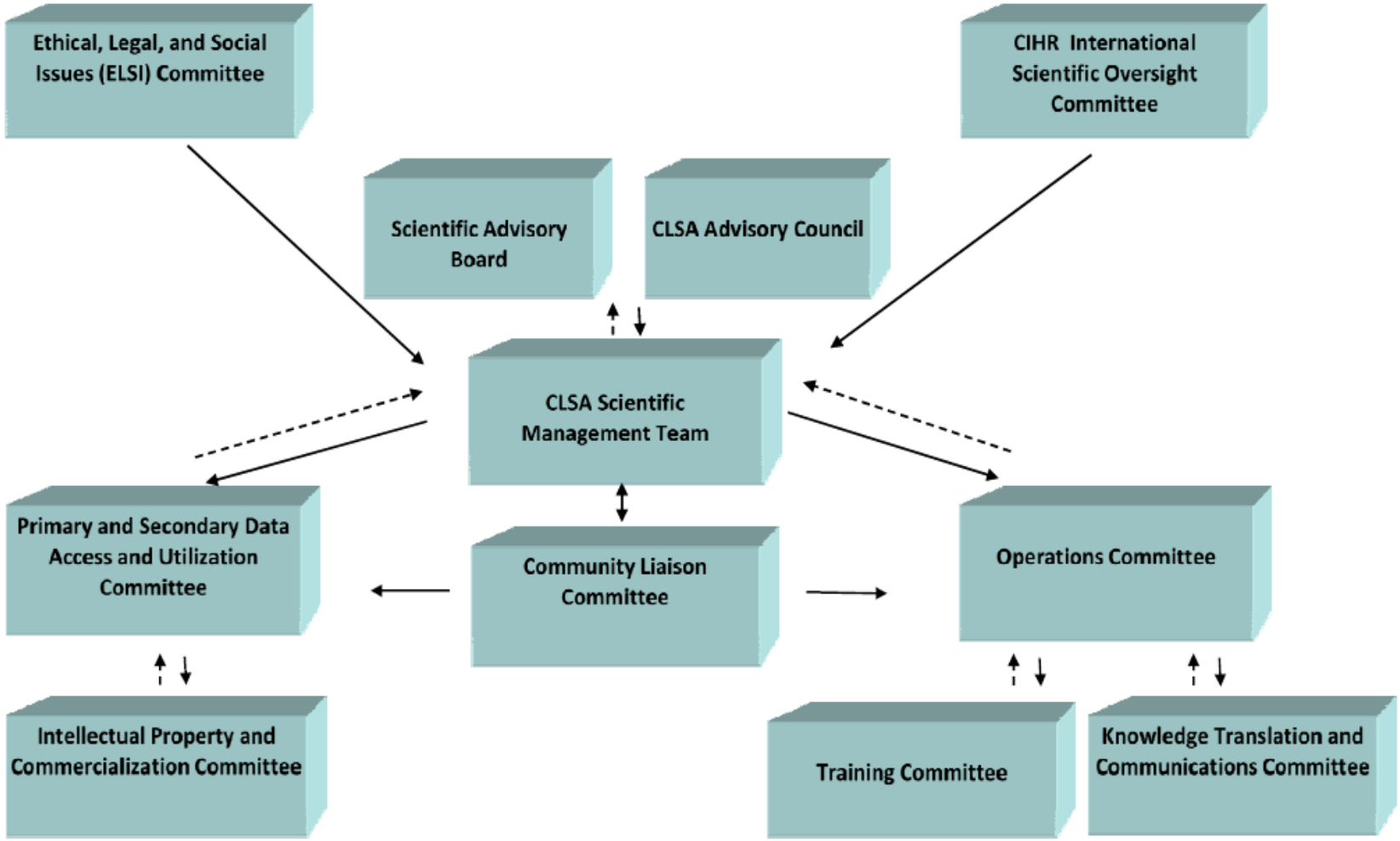
Governance



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Future and Current Legacy of the CLSA Research Platform

Effective Design

- Multidisiciplinary Team
- Key initiative of CIHR
- Governance Structure
- Longitudinal Design
- Random selection
- Extensive data
- Extensive feasibility work
- Transparent data access policies
- Simple IP policy
- Harmonization with international cohorts
- State of the art facilities
  - Bio-repository
  - High Throughput biomarker labs
  - Statistical Analysis centre
  - Bioinformatics
  - Fully equipped data collection facilities

Strong Scientific Program

- Healthy Aging
- Association studies based on candidate genes & diseases-related QTs
- Unique Approach:
  - Chronic conditions as Precursor, mediator Outcome
  - Binary outcomes and quantitative traits
- Quality of life
- Chronic disease management
- Risk factor identification
- Psychosocial aspects of Health
- Environment & Health
- Methodological development
  - Statistical modelling
  - Biological sample collection and storage

Resource for the future

- CFI-funded research facilities
- Supporting biomarker discovery research
- Supporting and developing complex diseases screening methodologies
- Personalized medicine
- Informing health & Social care policy
- Commercialization
- Building research capacity
- Platform for sub-studies
- Advancing Science of Aging
- Improving the health of Canadians

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Canadian Investment

$50M Canadian investment in national platform

- $23.5M CIHR for 5 Years
- $10M CFI for 5 Years
- $10M Provinces for 5 Years
- $6.5 M Universities and other partners**
- Invaluable in-kind contribution from Statistics Canada on design and recruitment

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Discussion Points

Value of the CLSA platform

Data access and IP policies

Opportunities for collaboration for the core data collection CLSA

Opportunities for analyses of the data and biological samples

Opportunities for using CLSA facilities for non CLSA research

Opportunities for sub-studies

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