Canadian Longitudinal Study on Aging: Advancing the Science of Aging through Interdisciplinary Research

Parminder Raina, PhD
Professor & Labarge Chair in Optimal Aging
CIHR Investigator
Department of Clinical Epidemiology and Biostatistics,
Faculty of Health Sciences, McMaster University, Hamilton

Hamilton, March 5th, 2009

CLSA
ELCV

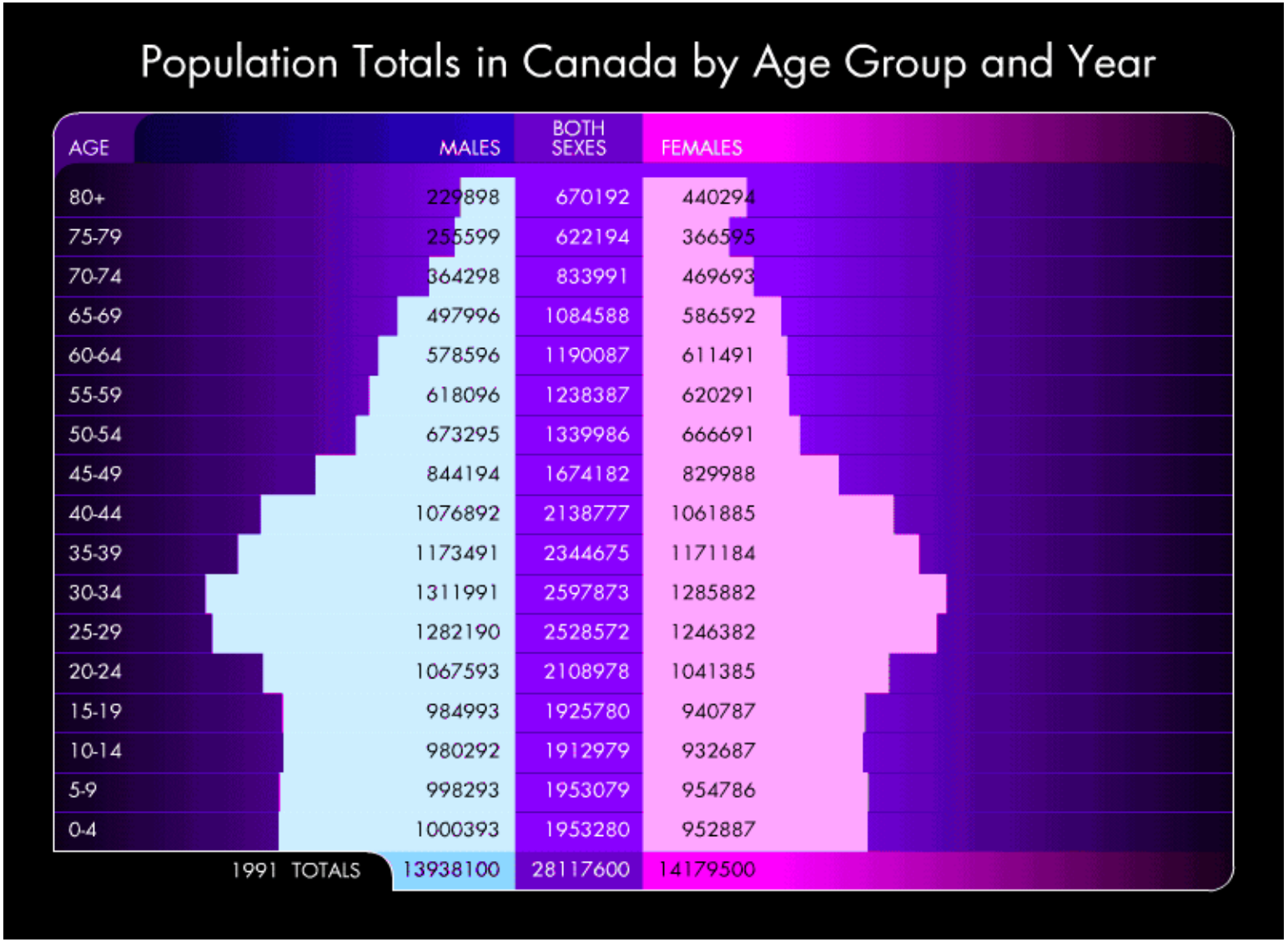
A New Milestone

- For the first time in the history, the number of people on the planet aged 60 and over has surpassed those under 5

- Canada is also seeing the graying of the population

CLSA
ELCV

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

CLSA ELCV

The Aging Revolution

- The rapid and continuing increase in human survival.
- New scientific understanding of the ageing process.
- The changing nature of old age and its determinants.
- Expectations, adjustments and policy.

CLSA ELCV

Demographic Futures

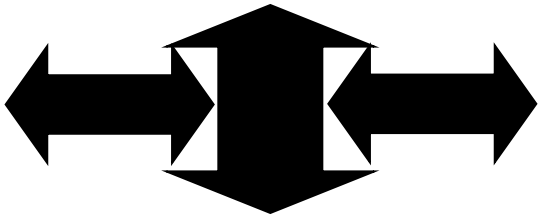
- Upward trend in life expectancy continue, cease, or reverse?
  - + Effective interventions against age-related diseases
  - + Improved environment for ageing
  - + Life-cycle deceleration (delayed reproduction)

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

CLSA ELCV

Why ageing occurs

Intrinsic



Extrinsic

How ageing is caused

CLSA ELCV

What Accounts for the Individuality of Human Ageing?

CLSA
ELCV

Genetic Heritability of Human Lifespan

Cournil & Kirkwood *Trends in Genetics* 2001

Twin Studies

▪ McGue et al (1993)	0.22
▪ Herskind et al (1996)	0.25
▪ Ljungquist et al (1998)	<0.33

Traditional Family Studies

▪ Philippe (1978)	0-0.24
▪ Bocquet-Appel & Jakobi (1990)	0.10-0.30
▪ Mayer (1990)	0.10-0.33
▪ Gavrilova et al (1998)	0.18-0.58
▪ Cournil et al (2000)	0.27

Genes account for 25% of what determines longevity

CLSA ELCV

Extrinsic Factors Beyond Biology

- Nutrition
- Lifestyle
- Social
- Psychological
- Physical Environment
- Chance

CLSA ELCV

Future of Research on Aging in Post-Genomic Era

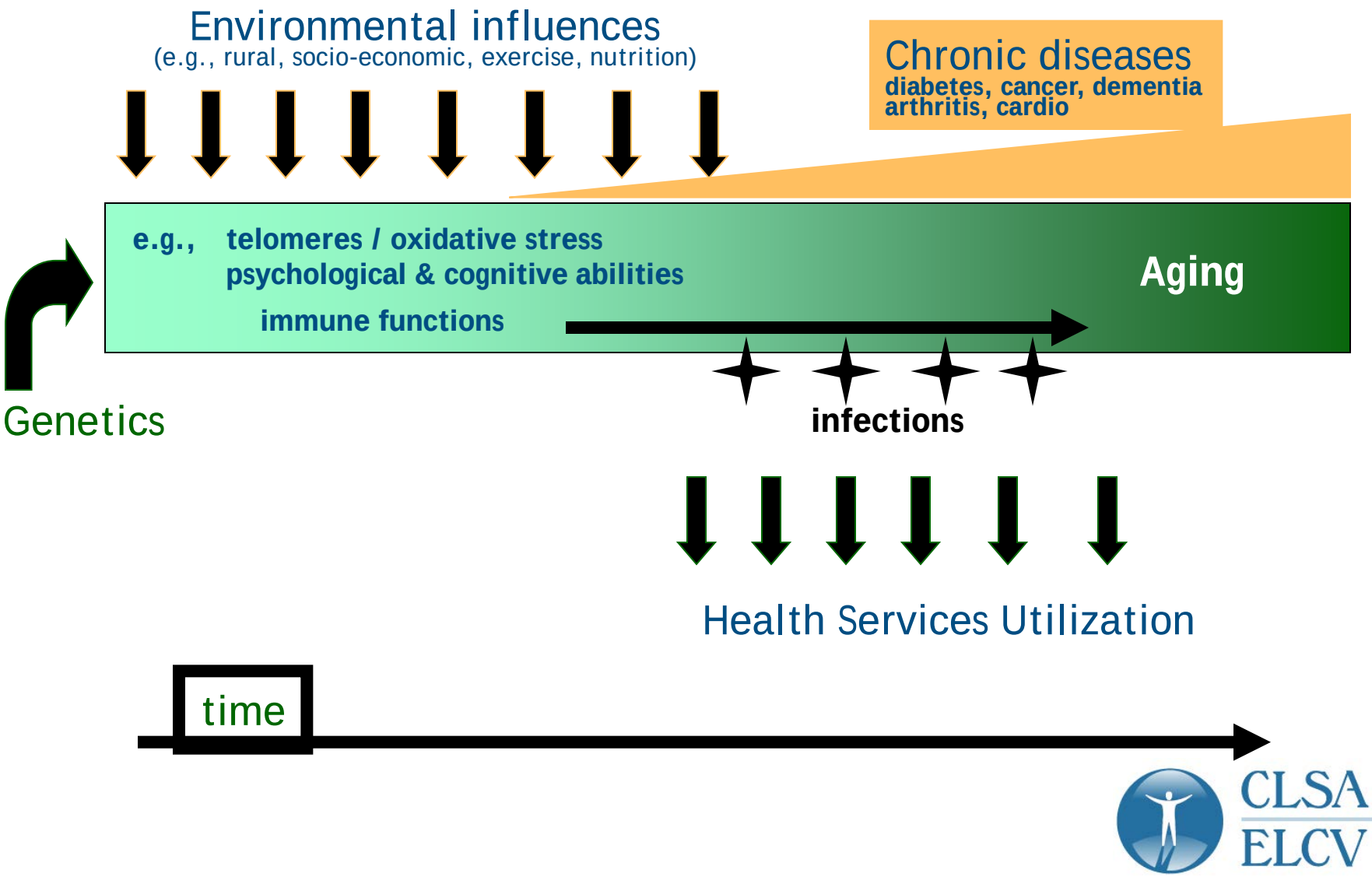
- Age-related changes---”complexity”
  - INDIVIDUAL LEVEL
  - SOCIETAL AND CONTEXTUAL LEVEL

- 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

CLSA
ELCV

Need for Integration to Understand Aging and Health



CLSA ELCV

Policy Needs

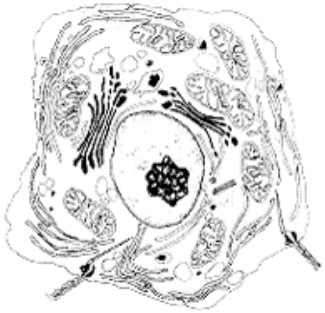
- Changing demographics #1 priority of Canadian Federal and Provincial Governments
- Healthy aging is important to the Canadian public and policy makers
- Canada differs from other countries in its:
  - health and social policy
  - health care delivery systems
  - climate, environment, geography, and
  - 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

CLSA
ELCV

The Canadian Longitudinal Study on Aging (CLSA)

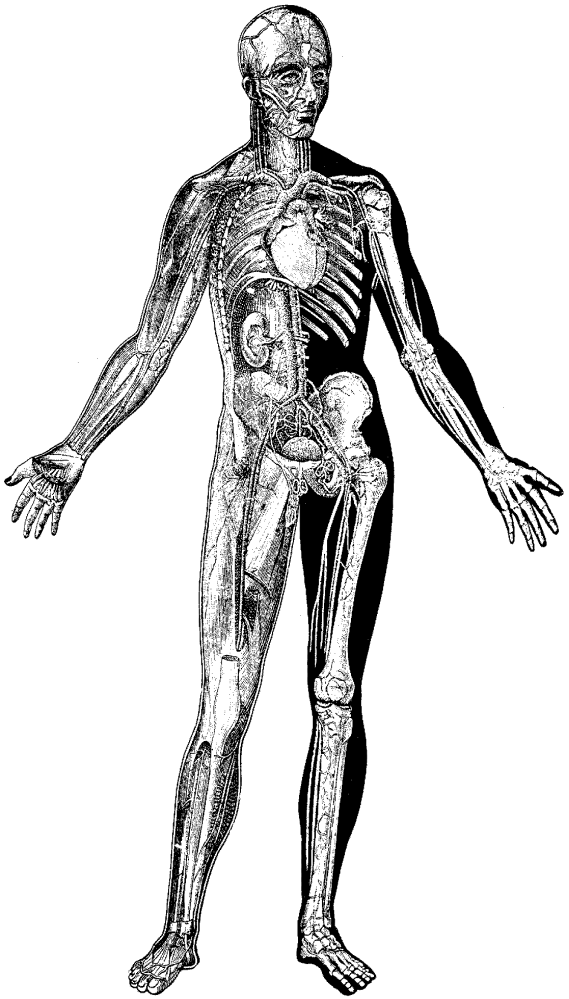
- A key strategic initiative of CIHR
  - The Canadian Longitudinal Study on Aging
- More than 160 researchers - 26 institutions
- Multidisciplinary - biology, genetics, medicine, psychology, sociology, demography, economics, epidemiology, nursing, nutrition, health services, biostatistics, population health

CLSA
ELCV



Innovation - Cell to Society

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



CLSA ELCV

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: successful aging.
- To provide infrastructure and build capacity for sustained high quality research on aging in Canada.

CLSA
ELCV

CLSA Program of Research

- Biological Function
  - Genetics/epigenetics
- Physical Function
  - Mobility/Chronic diseases/Injury
- Psychological Function
  - Cognition/Mental Health/Coping
- Social Function
  - Work and retirement/Social Participation/Housing/Economics

CLSA ELCV

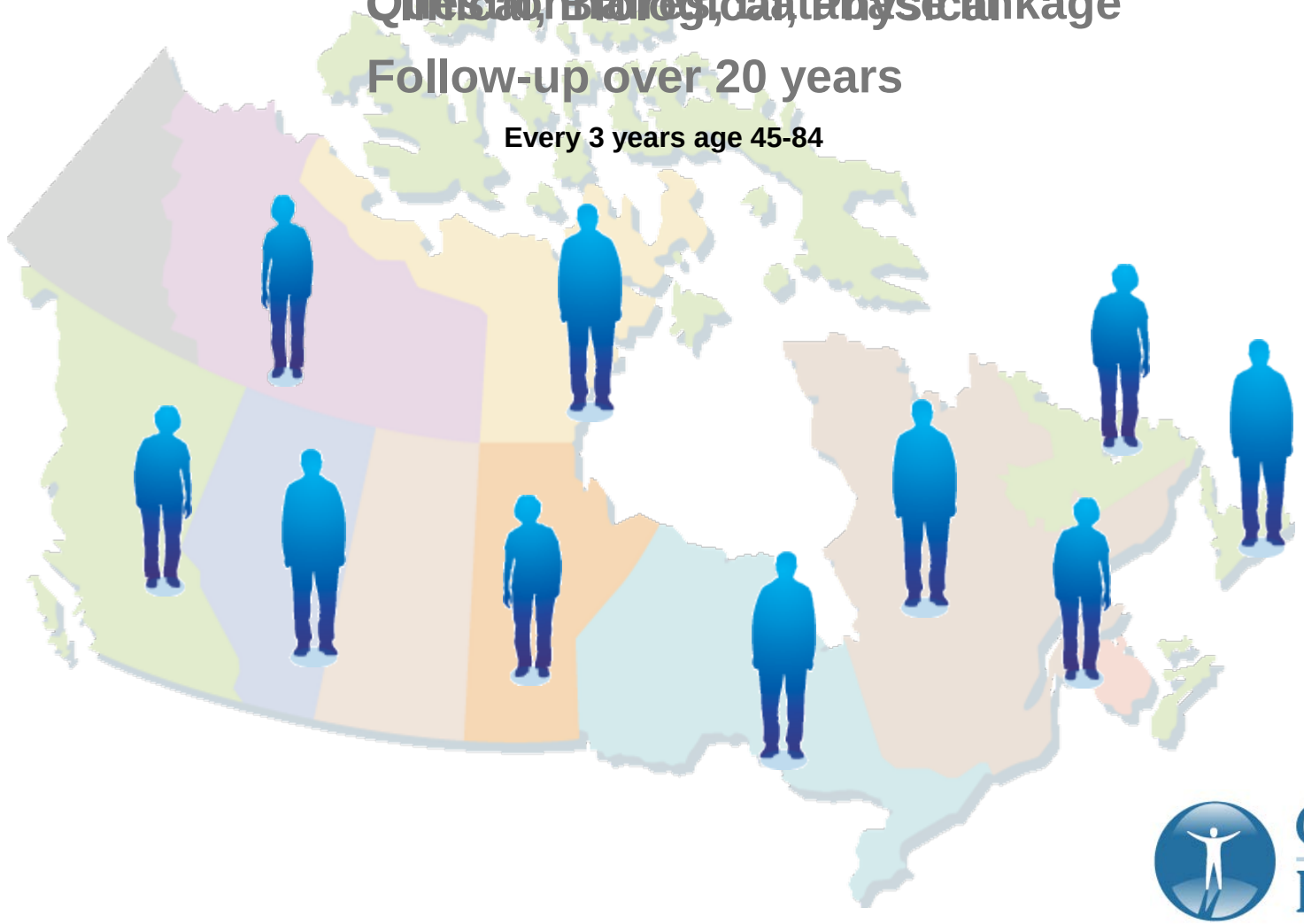
Data Linkage

- Data linkage to existing databases:
  - Healthcare utilization data bases
  - Drug databases
  - By geographical region (postal code)
    - Pollution: air, water
    - Climate: temperature, precipitation
    - Motor vehicle density

CLSA ELCV

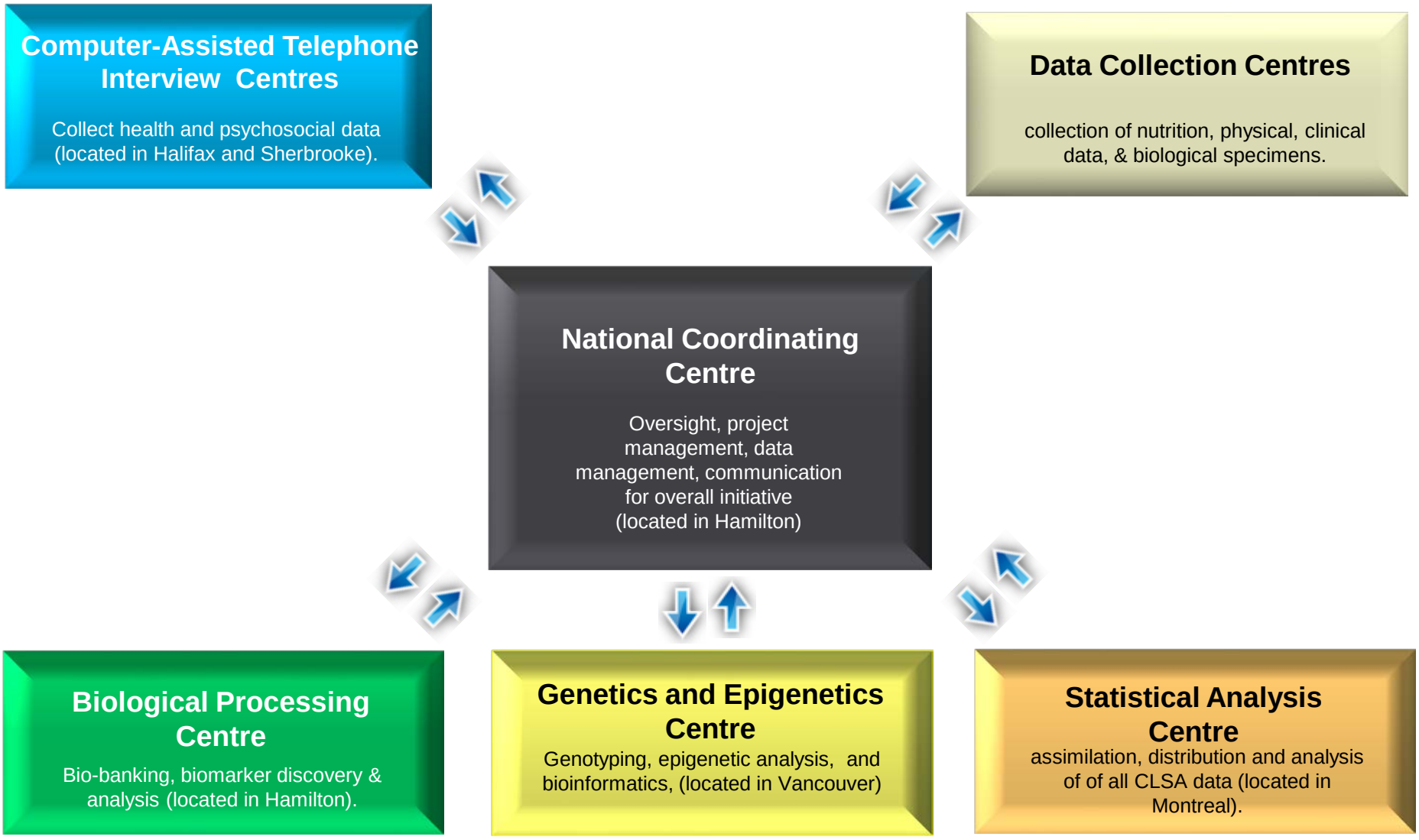
CLSA Architecture

- Participant recruited, 50,000 30,000 (at 10 sites)
- Interview, Biological, Physical
- Questionnaire, Data, Physician linkage
- Follow-up over 20 years
  - Every 3 years age 45-84



CLSA ELCV

Equipment and Infrastructure Supporting Research on Aging



CLSA ELCV

Highly Qualified Personnel

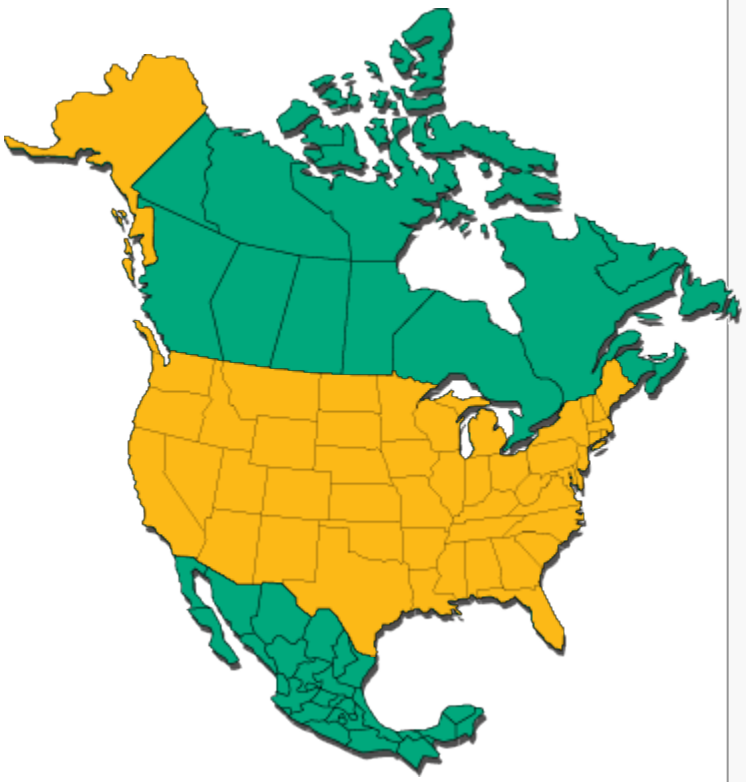
- Formation of a premier national training facility for the Study of Aging with 500+ HQP trained w/in 5 years

	PI's/Faculty	Postdoctoral Fellows	Graduate Students	Research Staff
Total HQP	18 – 21	160 – 165	135 - 150	180 – 300

- Interdisciplinary Scholar Program in Aging (ISPA)
  - Open to graduate students and fellows enrolled in Canadian Universities
  - Rich research-focused interdisciplinary learning environment
  - Opportunities to develop collaborative research
  - Incorporation of KT and KE
  - Partner with existing CIHR Strategic Training Programs

CLSA ELCV

International Links



Womens Health and Aging Study - USA

Aging & Sexuality - USA

HRS - USA

British Birth Cohort - UK

UK Biobank - UK

ELSA - UK

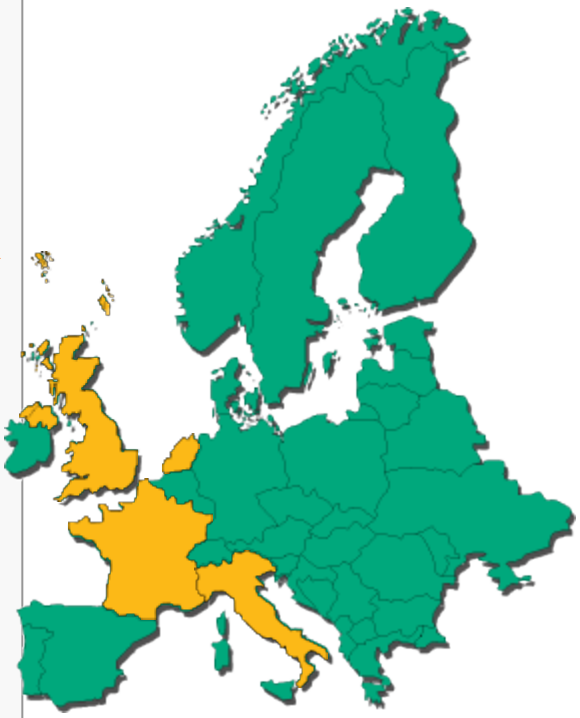
ALSPAC - UK

Cohorte Constances - FRANCE

LASA - Amsterdam

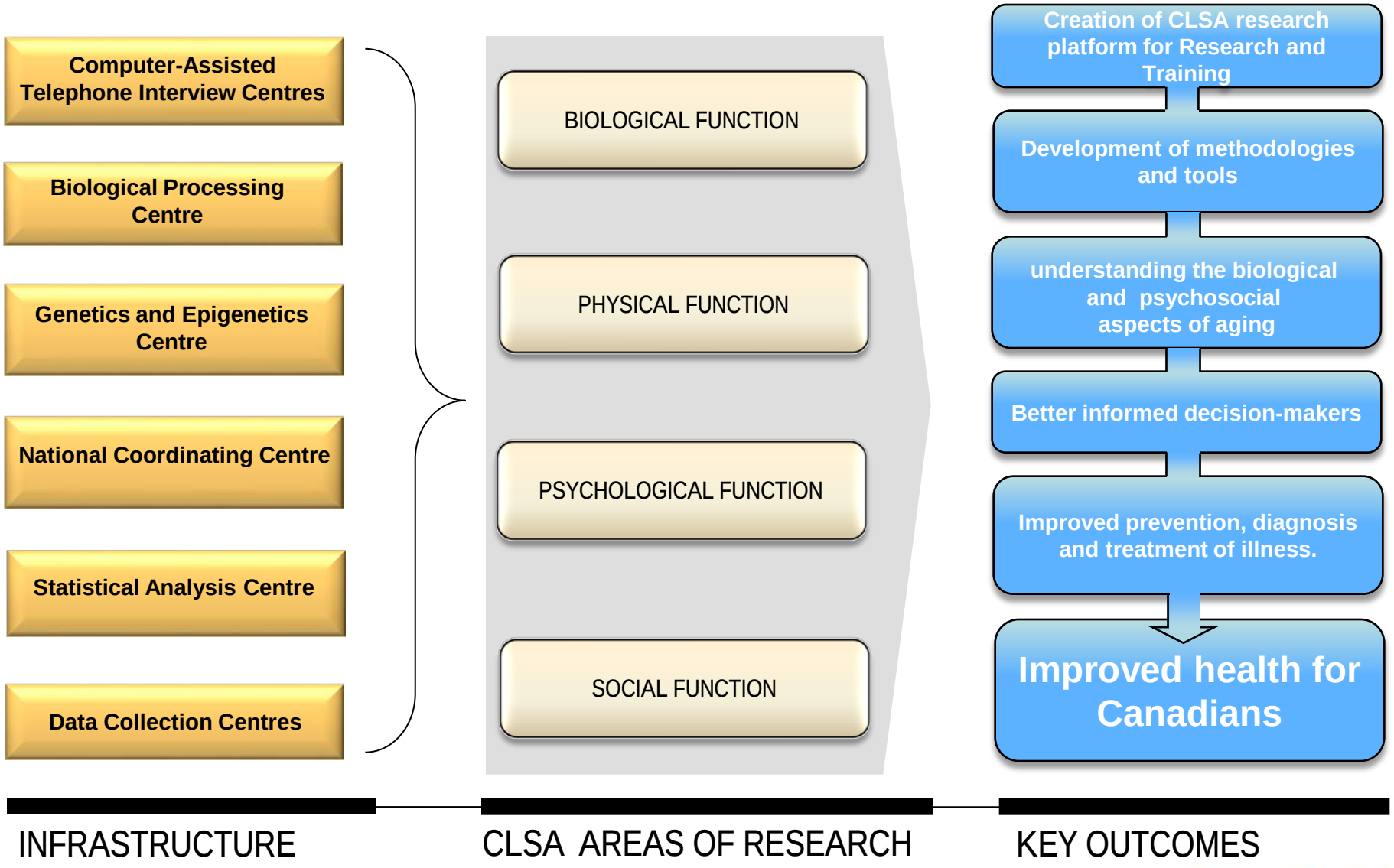
ILSA - Italy

InChianti - Italy



CLSA ELCV

Impact of infrastructure and research on key outcomes



CLSA ELCV

Sources of Funding

- Major funding from:
  - CIHR, CIHR-IA
    - Other Funding Partners
      - FRSQ- Réseau Québecois de Recherche sur le Vieillissment
      - Michael Smith Foundation-BCNAR
      - OMHLTC-ORC
    - In kind Support
      - Statistics Canada, McMaster, McGill and Dalhousie

CLSA ELCV

CLSA
ELCV

Website: www.CLSA-ELCV.ca

praina@mcmaster.ca

CLSA
ELCV

Focus of Measurement

Biomedical

- Activities of daily living/disability/injuries
- Frailty/co-morbidities
- Chronic diseases
- Cognitive function
- Mental Health
- Oral health
- Vision, hearing
- Medications
- Health Care Use
- Institutional care
- Genetics/Biology
  - Disease susceptibility/longevity genes
  - DNA repair
  - Antioxidant defence
  - Apoptosis, programmed cell death
  - Immunosenescence
  - Telomere loss
- Nutrition

Psychosocial

- Lifestyle/behaviours
- Social networks and social support
- Care giving/Care receiving
- Social care
- Everyday competence, adaptive functioning, coping
- Personality, emotion, psychopathology
- Work to retirement transitions
- Structural inequalities
- Built environments/physical environment/Housing
- Economics/Wealth
- Demograhics
- Healthy aging and well being
- Linkage to secondary data bases
  - Health care use
  - Disease registries e.g. Cancer
  - Drugs
  - Environmental

CLSA ELCV