



# **Aging of the Population: Why This Matters?**

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**4<sup>th</sup> Annual care of the Elderly, Hamilton Convention Centre, Hamilton ON, June 5th, 2013**

Historians may well  
conclude that the most  
significant event of the  
20<sup>th</sup> century was ...?

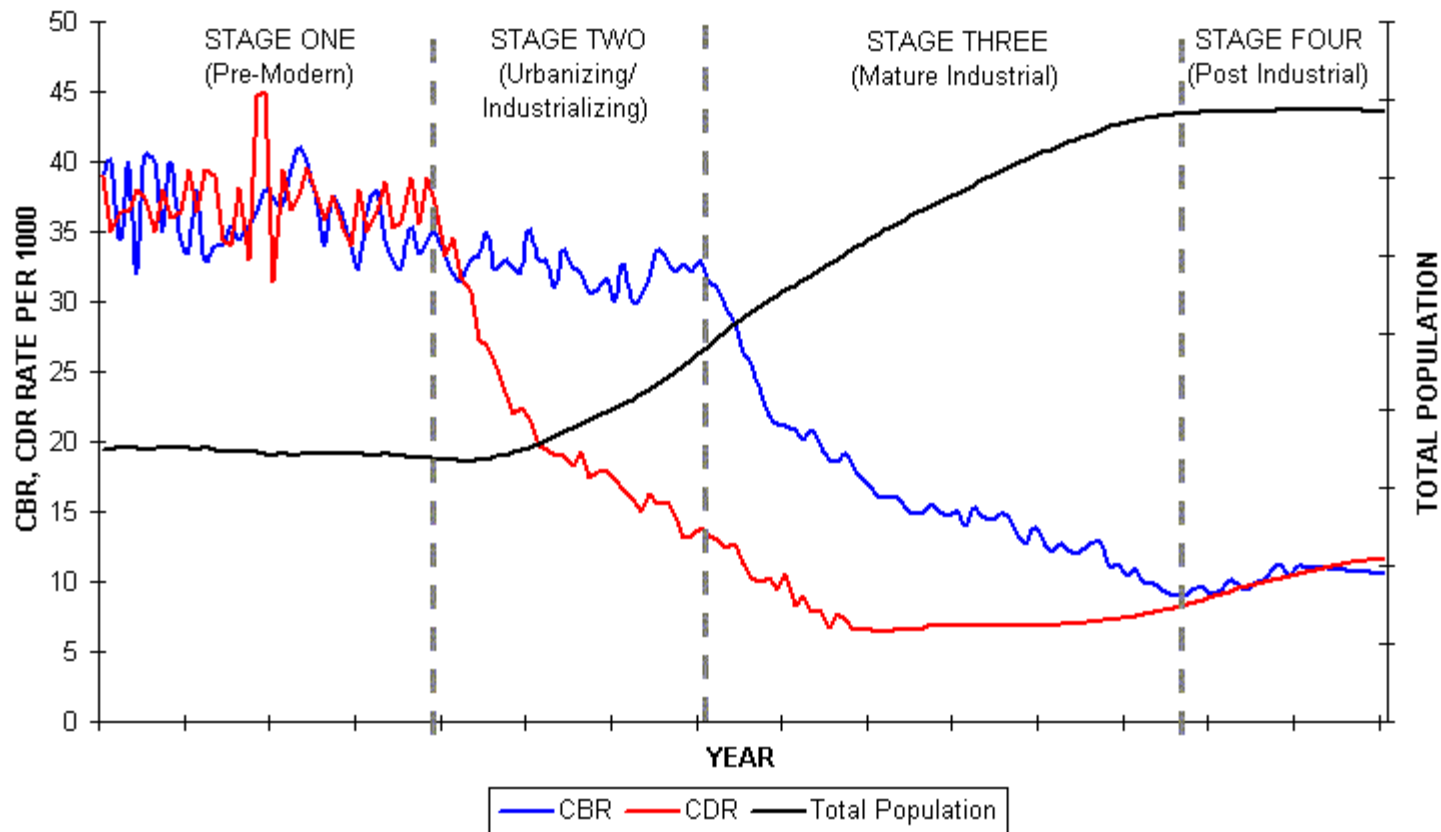
the growth of world population.

And in the 21<sup>st</sup> century,  
the most significant event  
may likely be ...?

the aging of humanity.

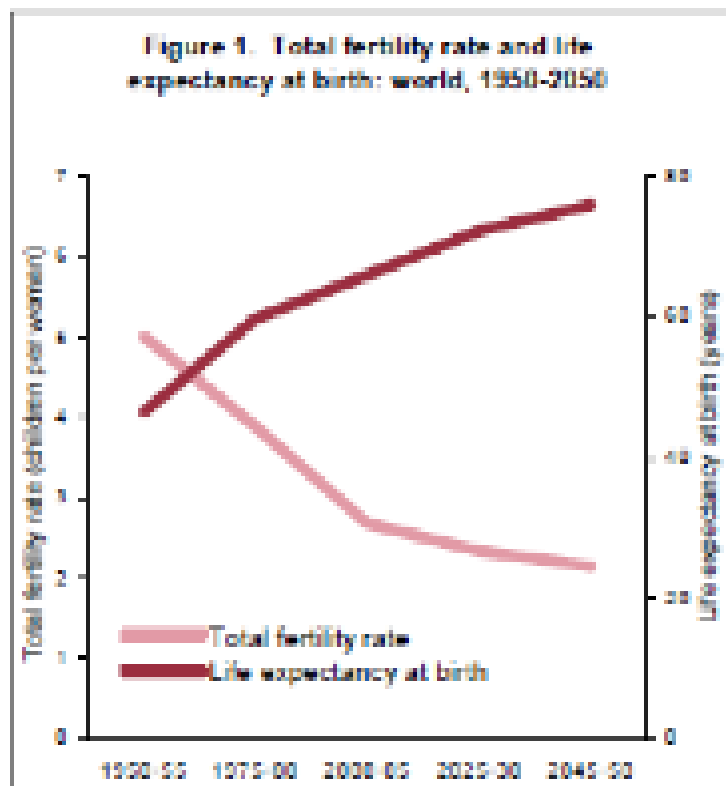
# THE DEMOGRAPHIC TRANSITION

THE DEMOGRAPHIC TRANSITION MODEL



# WORLD POPULATION AGING

During the last decades there has been a global decline of mortality and fertility from higher to lower levels.



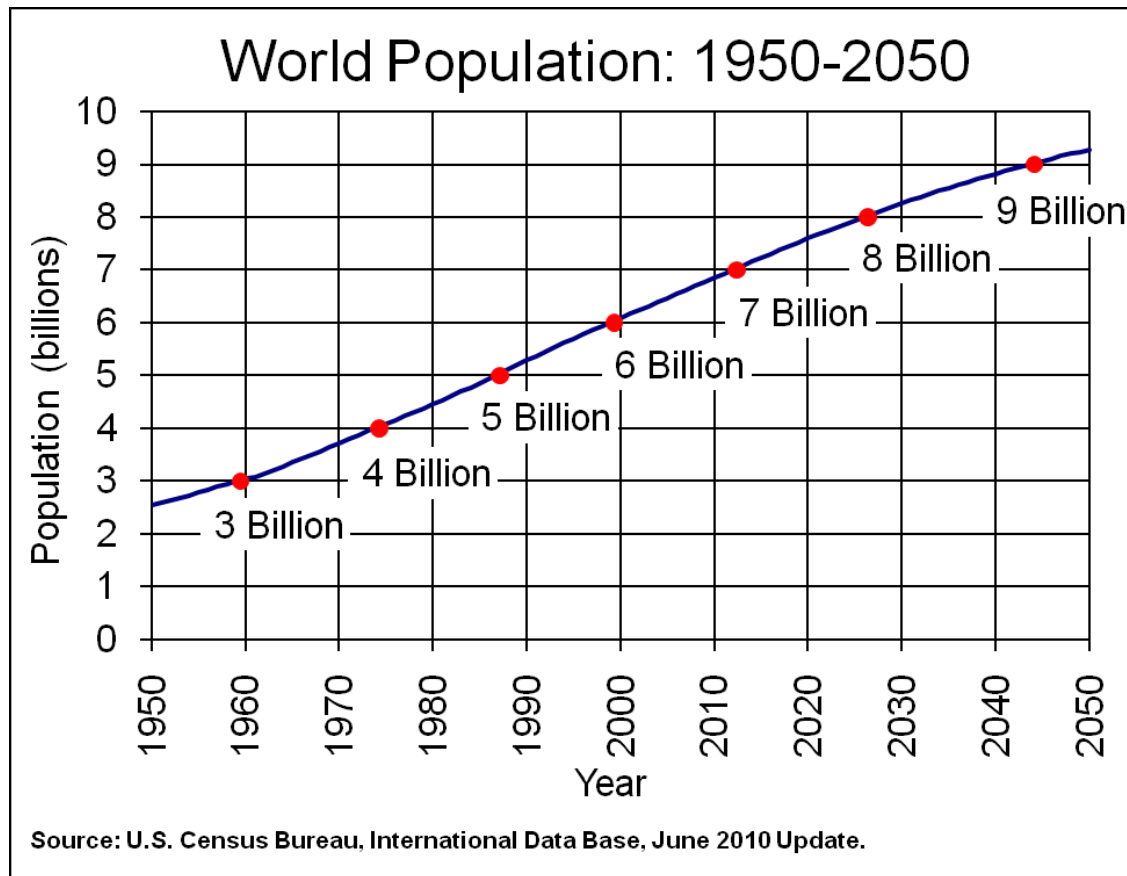
World Population Ageing 1950-2050 Population Division, DESA, United Nations



Canadian Longitudinal Study on Aging  
Étude longitudinale canadienne sur le vieillissement

# WORLD POPULATION

The world population is rapidly growing:



# WORLD POPULATION AGING

- World population is especially **growing older**:
  - the share of the population aged 65+ is expected to double between 2010 and 2040, from 7.8% to 14.7%
  - the number of older people will increase from 530 million in 2010, to 1.3 billion by 2040.

([U.S. Census Bureau, International Data Base](#))

# WORLD POPULATION AGING

- Another aspect of world population aging is **the aging of the older population**; the share of the older at ages 80+ (the “oldest-old”) is growing more rapidly than the older population itself.
- This growth will translate into a large increase of oldest-old within the world’s older population, from 16% in 2000 to 24% in 2040.  
([U.S. Census Bureau, International Data Base](#))

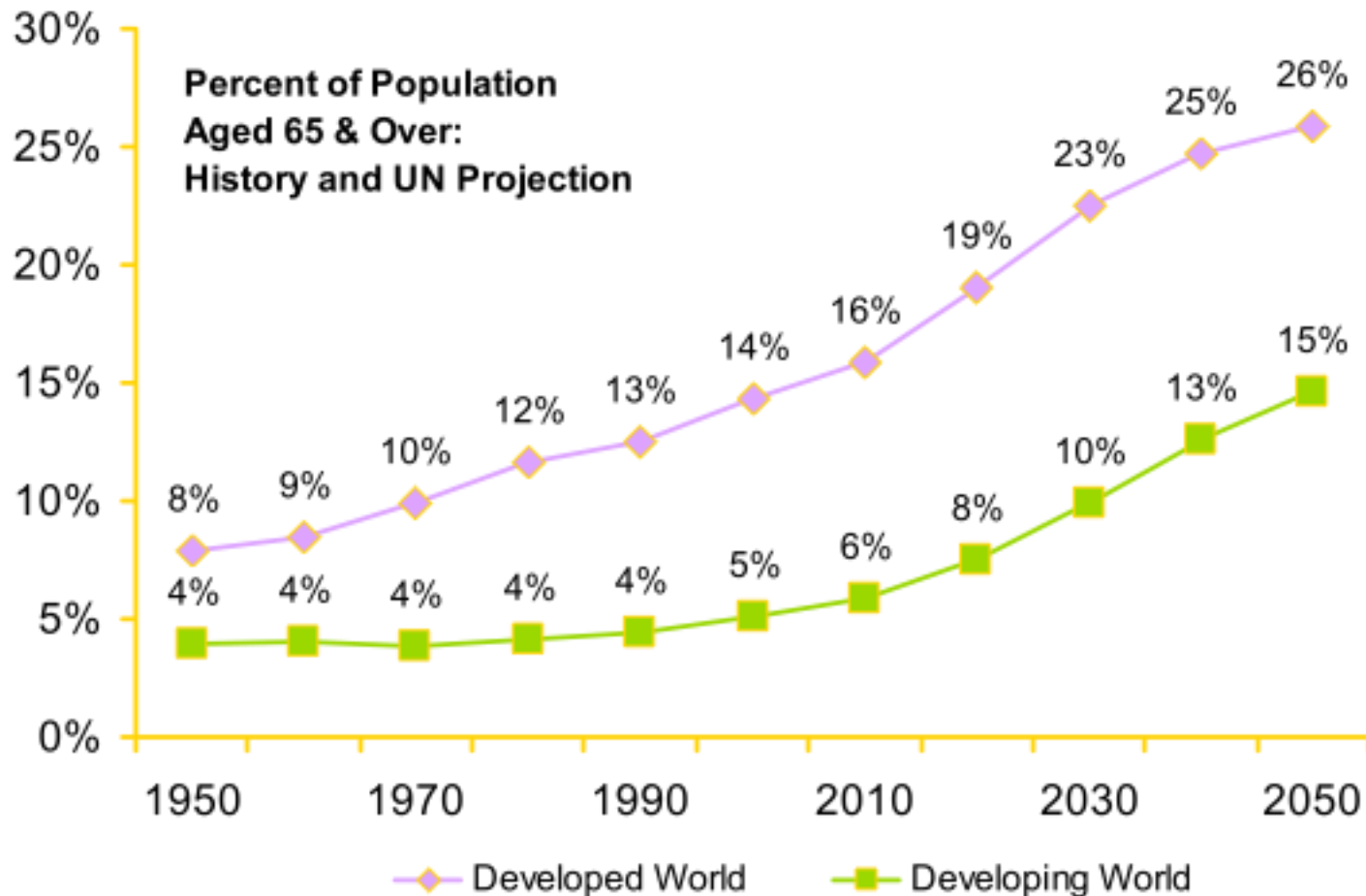


# Gender and Aging

- NUMBERS
- MORBIDITY
- POVERTY



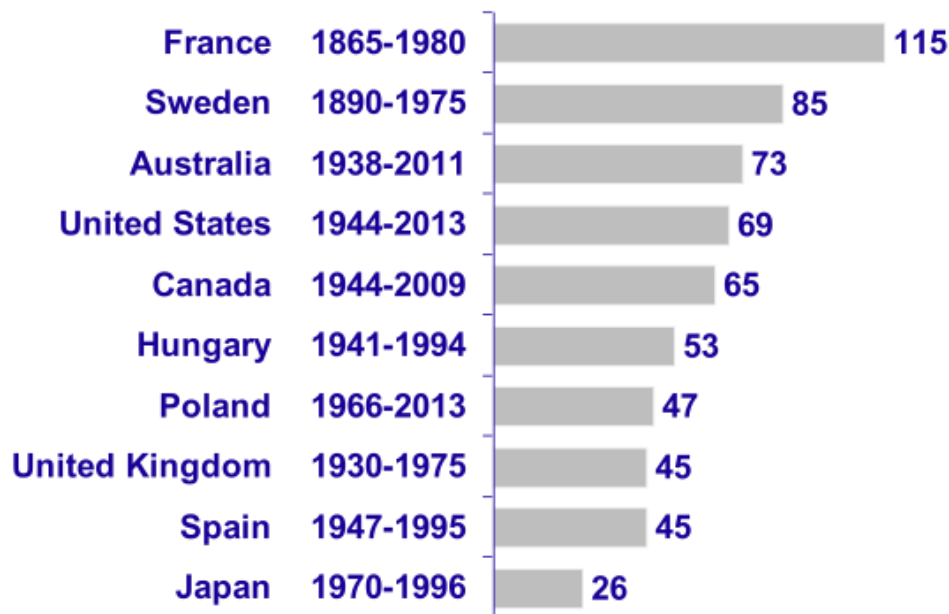
# Trends in Global Aging



Source: UN (2005)

# Number of Years for Percent of Population Age 65 or Older to Rise from 7% to 14%

## More developed countries



## Less developed countries



\* Dates show the span of years when percent of population age 65 or older rose (or is projected to rise) from 7 percent to 14 percent.

Source: K. Kinsella and Y.J. Gist, *Older Workers, Retirement, and Pensions: A Comparative International Chartbook* (1995) and K. Kinsella and D. Phillips, "The Challenge of Global Aging," *Population Bulletin* 60, no. 1 (2005).

# 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

# EPIDEMIOLOGY OF AGING: DISEASES

- The leading cause of death among elderly:
  - heart disease
  - cancer
  - stroke
  - chronic lower respiratory tract disease
  - Alzheimer's disease

*(Minino et al. National Vital Statistics Reports 2007; 55(9):1-120)*

# EPIDEMIOLOGY OF AGING: DISEASES

The leading Causes of Morbidity:

- Hypertension
- Osteoporosis
- Osteoarthritis
- Vision/Hearing Problems
- Falls and Fractures
  - Disease in older population is the norm
    - And many have multiple morbidities: Need more research in this area
  - Use of multiple medications

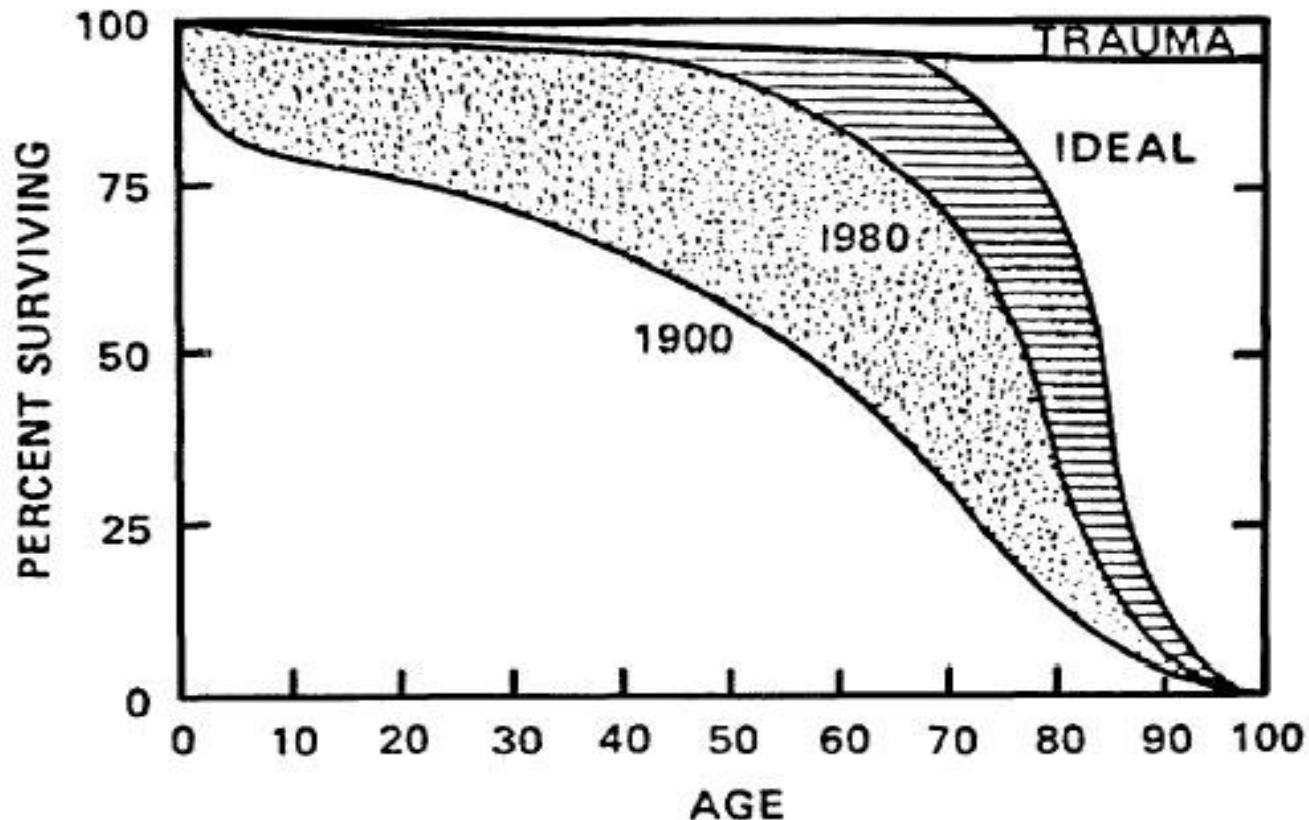




# Rectangularization of the survival curve

## FURTHER INCREASE IN LIFE EXPECTANCY

Squaring the survival curve



JAMES F. FRIES, M.D., THE NEW ENGLAND JOURNAL OF MEDICINE, JULY 17, 1980,

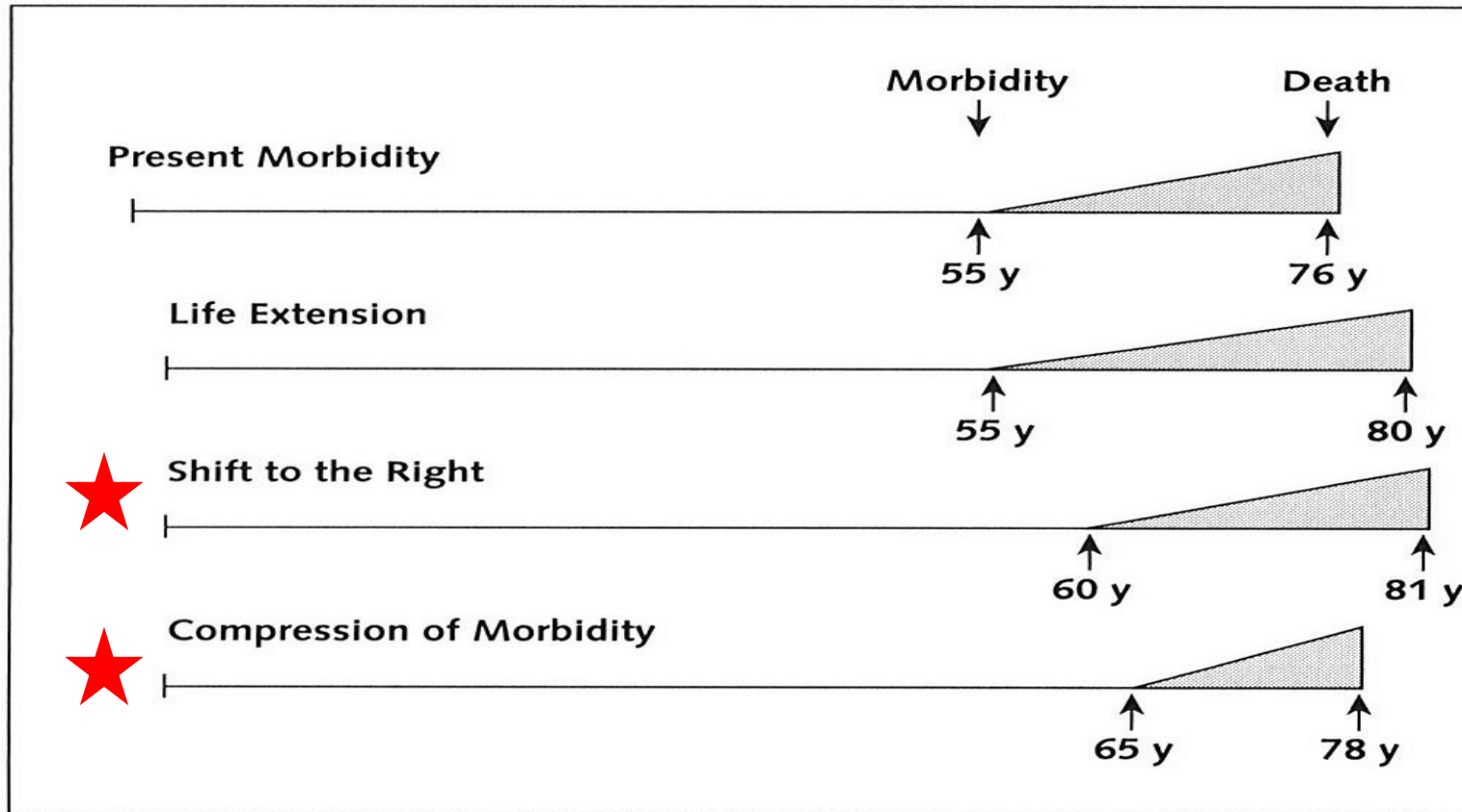
# Compression of morbidity

Fries' paradigm based on the premise that:

- The length of human life is fixed  
AND
- Chronic disease can be postponed
- Predicted that the increase in life expectancy would plateau in the coming decades, particularly life expectancy from age 65 which excludes early life mortality



# Fries potential scenarios



# Evidence suggests otherwise

- Is average life expectancy approaching an upper limit to life expectancy?
  - the evidence that the average life span is 85 years is unconvincing
  - there is no evidence for further rectangularization of survival curves
- Will age at first infirmity increase?
  - there is no evidence for over-all declines in incidence of morbidity: on the contrary
  - evidence for actual “(de)compression” of morbidity is ambiguous

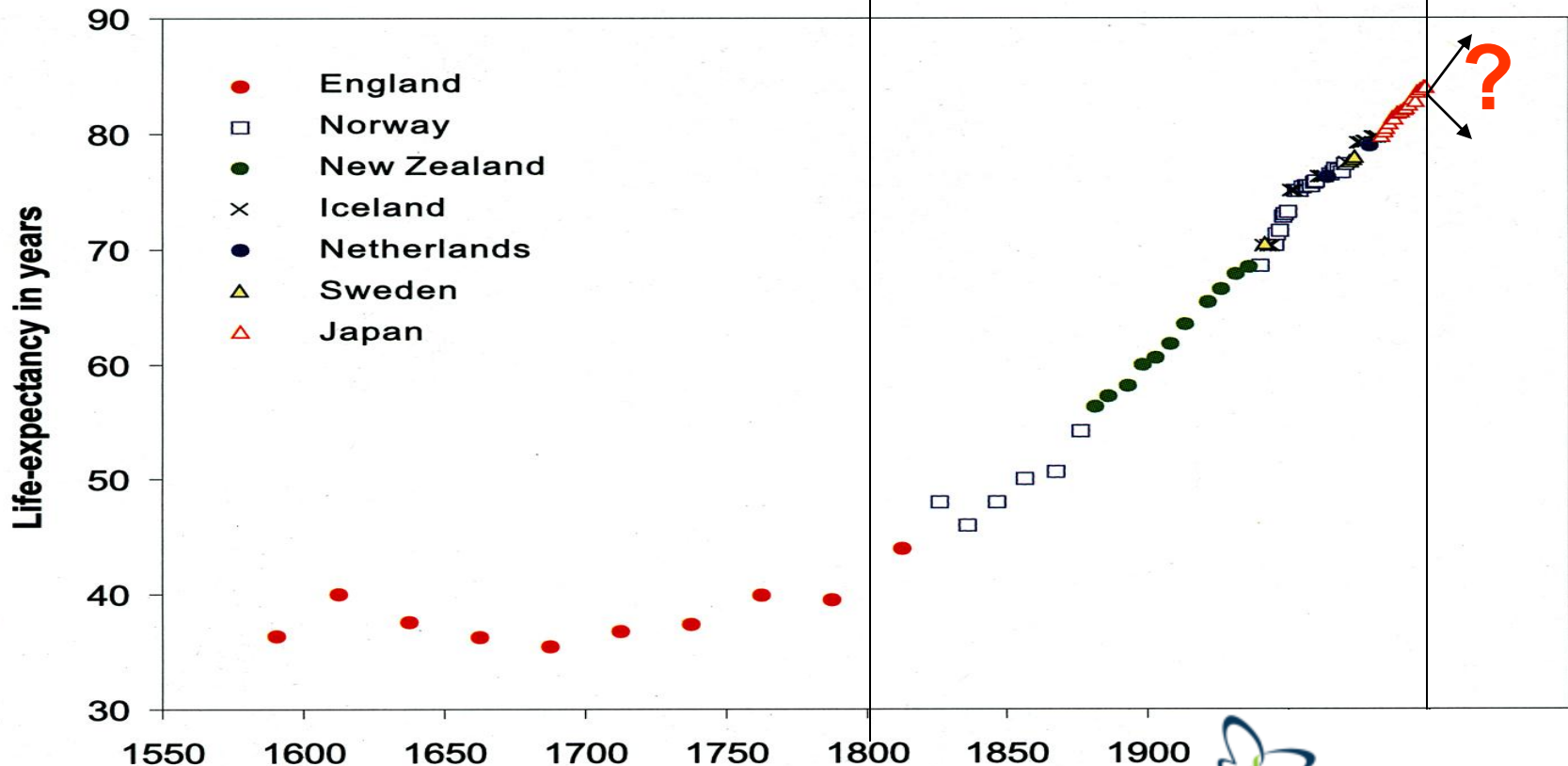
# Historical increases of life expectancy

Oepen and Vaupel, Science 2002; C Finch adaptation

**Phase 1**  
early urban

**Phase 2**  
sanitation-nutrition

**Phase 3?**  
regeneration  
modern medicine  
Social Policy Innovation



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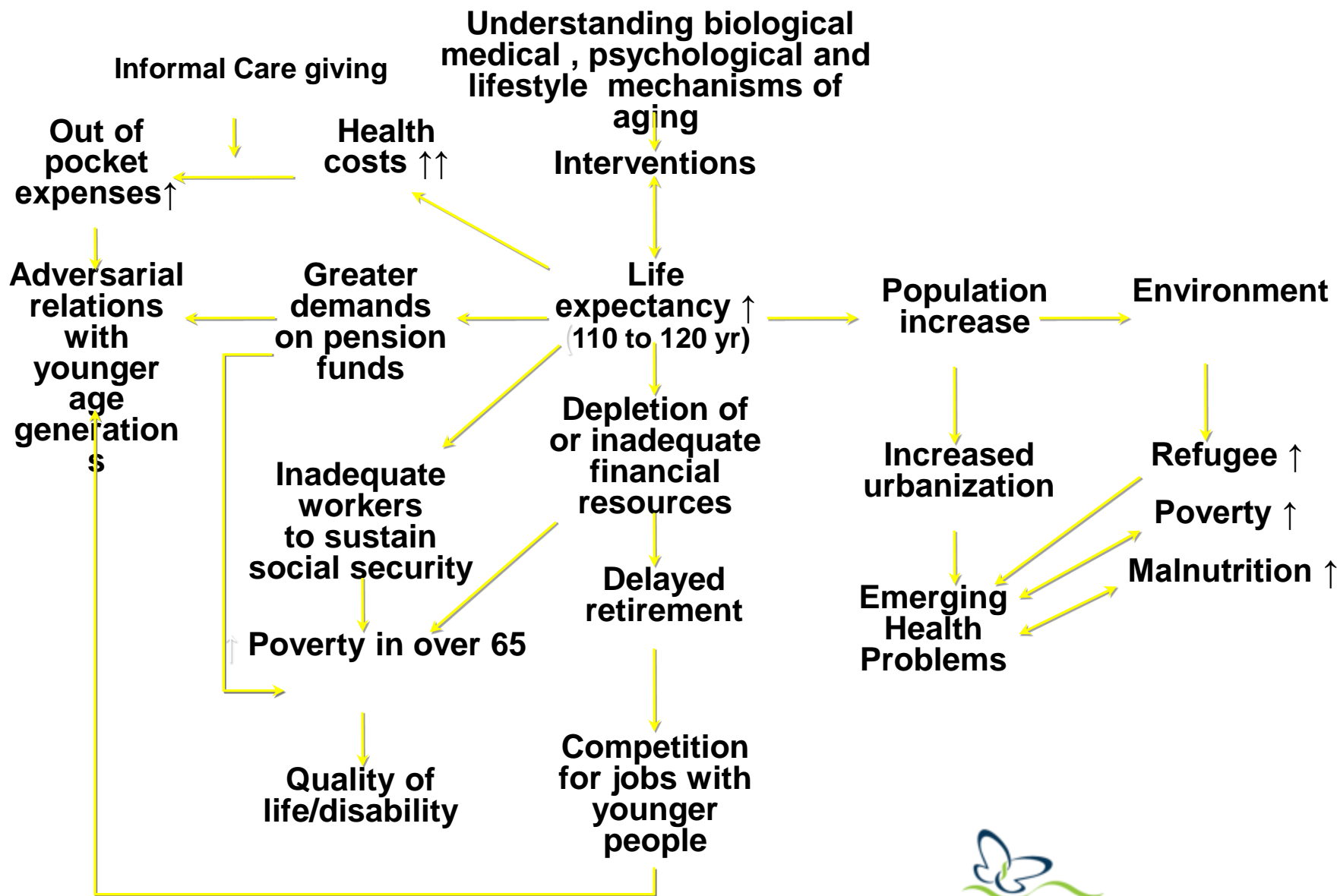
What happens when the  
epidemiologic and  
demographic transitions collide?



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# Framework for Research on Aging: Addressing the Demographic and Health Paradox



# Health Care and Aging: Why Should this Matter?



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# Why should this Matter?

- According to ICES (2012) in Ontario amongst the 65+
  - The most complex 10% of older adults account for 60% of our collective health care funding
  - The least complex 50% of older adults account for 6% of our collective health care spending

# Aging and Hospitalization in the 70+

- No Hospital Episodes~42.6%
  - Consistently Low Users~24.6%
  - Inconsistently High Users~6.8%
  - Consistently High Users~4.8%
- 
- Only a small proportion of older adults are consistently extensive users of hospital services



# What Defines our Highest Users?

- Multimorbidity
- Functional Dependence
- Social Frailty
- Psychological Frailty

# What are our options?

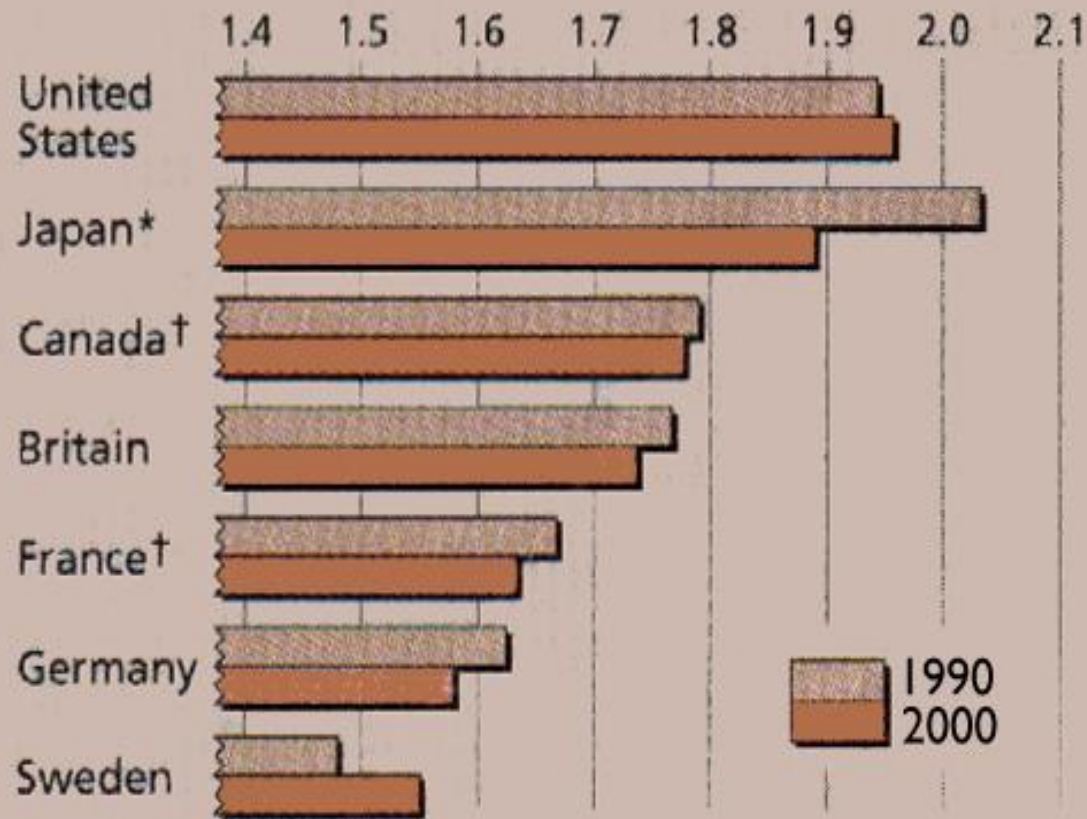
- One day in Hospital costs~\$1000
- One day in Long term care~\$130
- One day in Supportive Housing or Home and community care costs~\$55
- Senior's Strategy For Ontario, 2013

# Few Key Strategic Areas Identified in Senior's Strategy for Ontario

- Development of elder friendly communities
- Promoting health and wellness
- Strengthening Primary care for older adults
- Improving Community care
- Improving Acute care
- Enhancing LTC environments
- Caring for caregivers

# Harder-working Americans

Annual number of hours worked  
per person in employment, '000



Source: OECD

\*1995 †1997

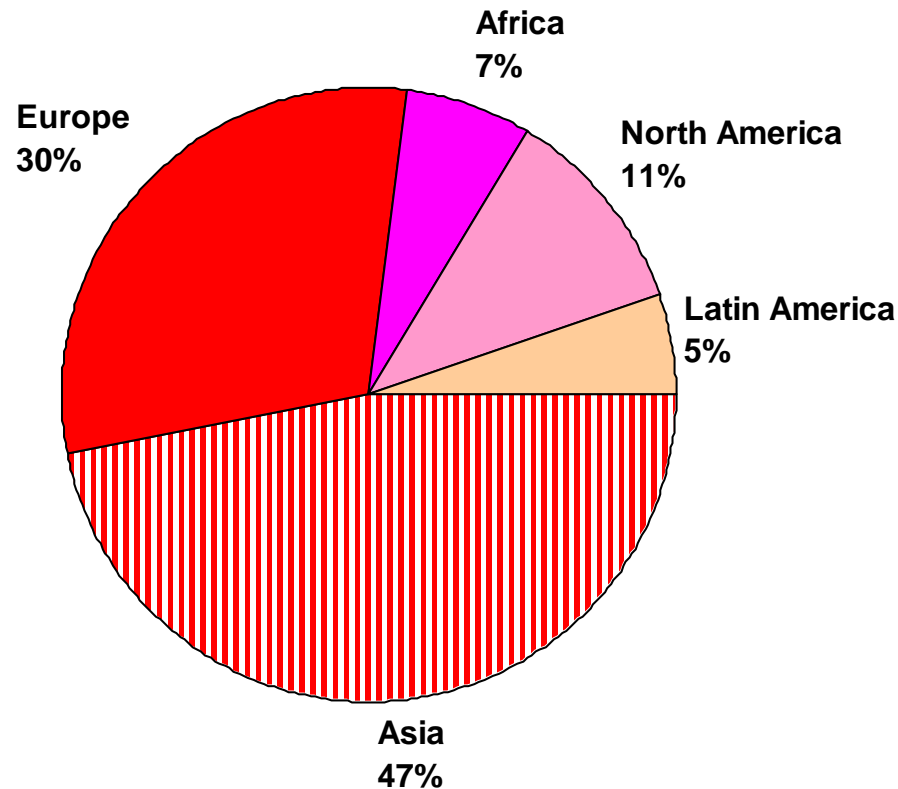


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# Workers have heavy caregiving loads

- 25% of employees have cared for an elderly relative in the last year
- More dual-earning couples
- 20% of working parents are also providing elder care
- ~50% of workers are caring for someone

# Global Distribution of Incident Dementia (7.7 million new cases per year)



One new case  
every 4 seconds!

WHO Report 2012 – Dementia a Public Health Priority



**Family & Friends** are the cornerstone of care, but their need for support is often overlooked

- What are the consequences of caregiving?
- Negative versus positive consequences





hours spent on  
informal care is  
expected to more  
than **triple**

Now  
Within a Generation

231 million hours

756 million hours

The time Canadians will be providing in informal care



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Annual Economic Burden

Within one generation **\$15 billion to \$153 billion**



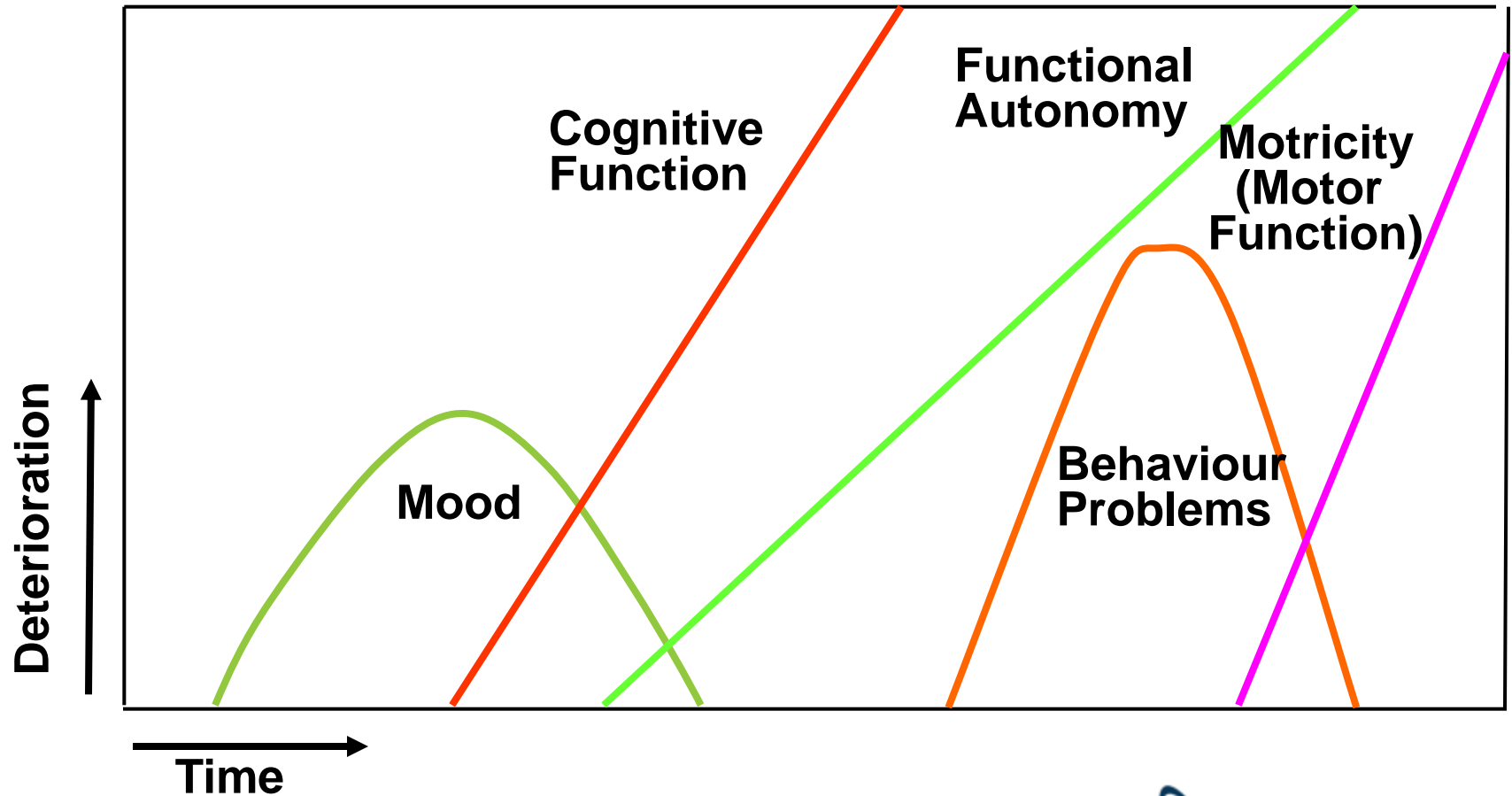
Monetary economic burden to reach approximately **\$97 billion**

Opportunity costs of informal caregivers add a further **\$56 billion**



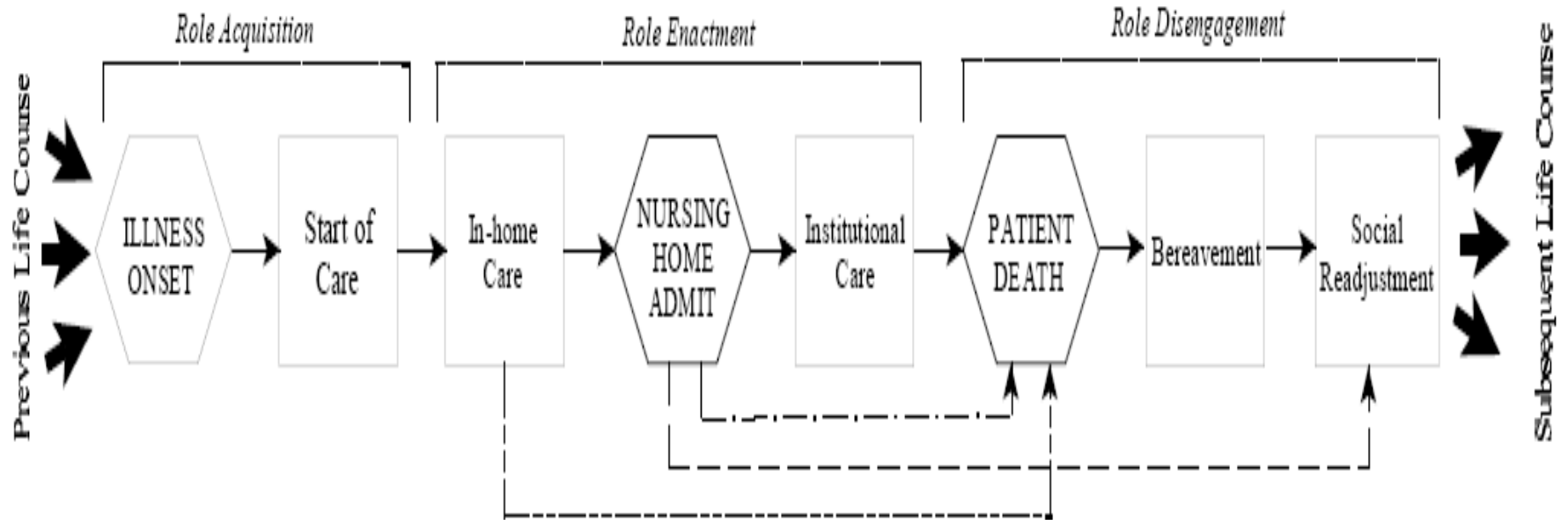
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# Symptomatic Domains of AD Over Time



Adapted from Gauthier et al. *Clinical Diagnosis and Management of Alzheimer's Disease*, 1999.

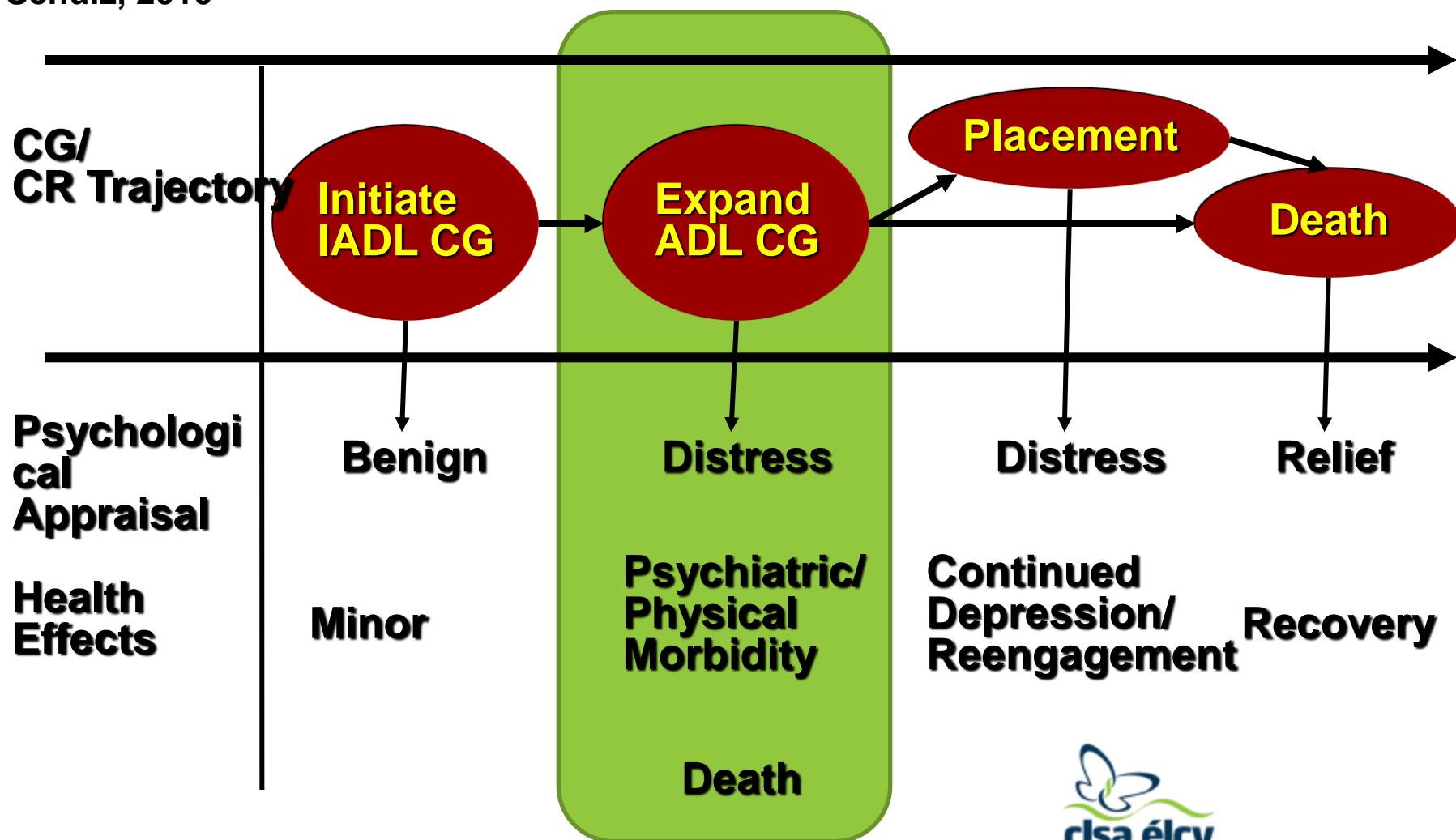
# The Caregiving Career



Aneshensel et al., 1995

# Chronic Stress Trajectory in Caregiving

Schulz, 2010



# Who are the caregivers of people with dementia?

# Profile of Canadian Caregivers

## (Baseline Data from CSHA-1)

- 75% of caregivers were women; 70% were married
- 29% were also employed
- 23% of caregivers were the person's wife
- 12% were the husband
- 37% were children: 28% daughters, 9% sons
- 23% were other friends or relatives
- 5% were paid caregivers.

Source: *Can J Aging* 1994;13:470-487



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# Community Support Services

- 40% of caregivers used a homemaker service
- 20% used a home nurse
- 9% meals on wheels
- 8% day centre
- However, people with dementia received fewer services than non-demented people with the same level of disability

Source: *Can J Aging* 1994;13:470-487

# We recorded comments made by the participants and the interviewers...

*“This subject has Alzheimer’s.*

*For the last four years has not been able to speak or recognize anyone. Can’t do any ADLs; is just in bed.”*

*“She is very happy that her father is alive and that she can share and enjoy things with him. He is very independent and very loving--often an emotional support for her and the grandchildren”*

*“Mom had Alzheimer’s. Dad couldn’t cope, so he gave up...  
He was incontinent and depressed.*

*I had 2 “babies” to look after... I just couldn’t cope.”*



# Help given by caregivers

- In the Community

## **People with dementia:**

- The primary caregiver helps with an average of 4.2 activities of daily living
- Other informal caregivers on average help with 1.9 activities
- Paid caregivers help with 2.3 activities of daily living

## **People without dementia:**

- The primary caregiver helps with 1 activity of daily living
- Other informal caregivers help with 0.3
- Formal caregivers help with 0.6 activity

- In Institutions

- Demented: 45% of primary caregivers help with daily activities
- Nondemented: 25% of primary caregivers help with daily activities

# **Understanding the Influence of the Complex Relationships among Informal and Formal Supports on the Well-Being of Caregivers of Persons with Dementia\***

Parminder Raina,<sup>1,2</sup> Chris McIntyre,<sup>6</sup> Bin Zhu,<sup>1</sup> Ian McDowell,<sup>3</sup> Lina Santaguida,<sup>1</sup> Betsy Kristjansson,<sup>5</sup> Alexandra Hendricks,<sup>4</sup> Helen Massfeller,<sup>1</sup> and Larry W. Chambers<sup>3,4</sup>

Canadian Journal on Aging / La Revue canadienne du vieillissement,  
Volume 23 Supplement/Supplément 2004, pp. S43-S53 (Article)

Published by Cambridge University Press  
DOI: 10.1353/cja.2005.0041



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# Consequences of Caregiving

- Caregiver stress rises with behavioral and other acute problems of the care recipient (aimlessness, aggression, etc.)
- Caregiver burden increases with more disturbing behavior, combined with lower social support or family functioning
- Caregiver and patient characteristics predict conflicts among family members
- The hopelessness theory of depression applied to caregivers

# Implications for Caring for Caregivers

- Interventions need to consider the complex influences on the health of the caregivers
- Different stages of the CG career require different support systems
- Caring for elderly also requires caring for family caregivers

# Research on Aging and Hamilton: What are we doing to support your work?



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# RESEARCH ON AGING

- The **demographic causes of aging** of the population, in terms of fertility rates and mortality rates, are generally predictable. A variety of population projections are available, prepared by UN, EU and National Statistic Institutes.
- What is **less predictable** is the interaction of these forces with social context, health status, economic changes, cultural influences and hence international migrations.

# Risk factors for Disease, Disability and longevity

- Risk factors
  - Many factors contribute
  - Gender difference remains unexplained
  - Loss of prediction
  - Paradoxes in prediction
- New opportunities
  - Larger number of very old people
  - Longer term follow-up
  - Longitudinal data – identify optimal trajectory
  - Common risk factors

# Exceptional survival – Understanding physiologic reserve

- Do systems decline together?
- Is there a common underlying “rate” of aging across organ systems?



# RESEARCH ON AGING

- For this reason further **research** on biodemography, dynamic of health, epidemiology, economics, psychology, social sciences and aging are needed.
- **Longitudinal data** are essential in order to sort causal relationships among demographic, biological, psychosocial and economic factors, and health.
- **Cross-national comparison** are important, considering variability across societies, in terms of status and well-being of older persons, experiences of health and mortality, family and social support.



# The Canadian Longitudinal Study on Aging (CLSA)

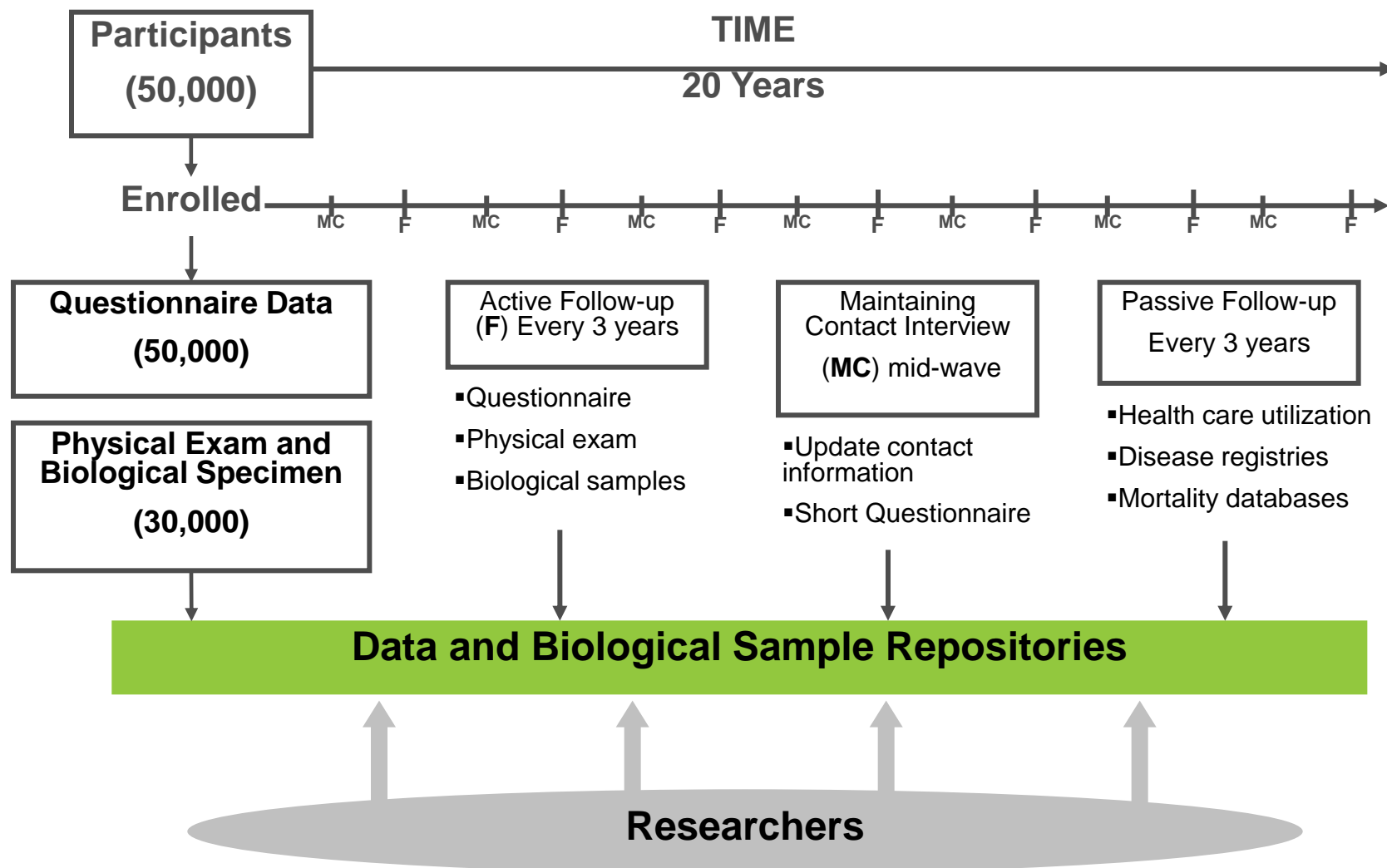
- ▶ A key strategic initiative of CIHR
  - ▶ The Canadian Longitudinal Study on Aging
- ▶ More than 160 researchers - 26 institutions
- ▶ Multidisciplinary - biology, genetics, medicine, psychology, sociology, demography, economics, epidemiology, nursing, nutrition, health services, biostatistics, population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

# Canadian Longitudinal Study on Aging (CLSA)

A research platform – infrastructure to enable state-of-the-art, interdisciplinary population-based *research* and *evidenced-based* decision-making that will lead to better health and quality of life for Canadians.



Canadian Longitudinal Study on Aging  
Étude longitudinale canadienne sur le vieillissement





Watch our videos

## Canadian Longitudinal Study on Aging

23146 Participants so far

50,000 goal

## Our Mission

Transforming everyday life into extraordinary ideas

The Canadian Longitudinal Study on Aging (CLSA) is a large, national, long-term study that will follow approximately 50,000 men and women between the ages of 45 and 85 for at least 20 years. The study will collect information on the changing biological, medical, psychological, social, lifestyle and economic aspects of people's lives. These factors will be studied in order to understand how, individually and in combination, they have an impact in both maintaining health and in the development of disease and disability as people age. The CLSA will be one of the most comprehensive studies of its kind undertaken to date, not only in Canada but around the world.

[Dr. Parminder Raina](#) (McMaster University, Hamilton) is the lead principal investigator of the CLSA. [Dr. Christina Wolfson](#) (McGill University, Montreal) and [Dr. Susan Kirkland](#) (Dalhousie University, Halifax) are co-principal investigators of the CLSA. Drs. Raina, Wolfson and Kirkland, along with a team of more than 160 investigators and collaborators from several Canadian universities, have participated in the development of this innovative, interdisciplinary study.

For more information, please contact us at [info@clsa-elcv.ca](mailto:info@clsa-elcv.ca).

## News

Mar 13<sup>th</sup>

### The new science of everyday living for aging well

The Canadian Longitudinal Study on Aging (CLSA) will be the focus of an upcoming [Café Scientifique](#) hosted by the [University of Victoria Centre on Aging](#).

Mar 12<sup>th</sup>

### CLSA hosts MP Joy Smith

The Canadian Longitudinal Study on Aging (CLSA) welcomed Joy Smith, Member of Parliament for Kildonan – St. Paul, for a tour of the Winnipeg Data Collection Site in March.

Mar 12<sup>th</sup>

### I'm not afraid of aging: But let's talk

The Montreal site of the Canadian Longitudinal Study on Aging (CLSA) hosted a [Café Scientifique](#) at Le Café des Beaux-Arts on March 12, 2013.



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## Provincial & Institutional Partners



## Funders

Supported by the Government of Canada through the Canadian Institutes of Health Research and the Canada Foundation for Innovation.



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# Teams Advancing Patient Experience: Strengthening Quality (TAPESTRY)

- to help older adults stay healthy at home using an inter-professional primary health care team delivery approach that integrates community trained primary healthcare volunteer volunteers, system navigation, community engagement, and use of technology; and
- to adopt this team approach as a scalable and sustainable model for care across jurisdictions and illnesses.



## McMaster Optimal Aging Portal

The **McMaster Optimal Aging Portal** is a website that will provide a unique, trusted information source with a variety of tools and information to address questions about healthy aging from citizens, health care providers, researchers and policy makers. The site will become Canada's authoritative voice on optimal aging, and will offer free, up-to-date, evidence-based and bilingual information.

The portal will consist of a "knowledge refinery," which will search for and review the best available research evidence related to health aging; the "information rater" will then assess the information by subject experts and evaluate it for value; finally, a system navigator will link the user to related resources. The portal project will also include strategies to engage the key audiences through public talks, forums and the use of media outreach.

Please check back here soon for a link to our new portal.



The McMaster Optimal Aging Portal team includes (from left): **Anthony Levinson**, **Brian Haynes**, **Maureen Dobbins**, **Parminder Raina** and **John Lavis**

## Knowledge Translation Enterprise

### The KT Enterprise will consist of the following:

- **Citizen panels** — to give elderly citizens, caregivers and those interested in optimal aging a voice in how optimal aging is supported in Canada.
- **Public talks** with include high-profile speakers to discuss and debate on important issues related to optimal aging.
- **Debates** with high-profile national and global researchers to discuss these important issues with scientists and to learn how we can address the needs of the aging population.
- **Student-led conversations** to discuss current issues in optimal aging, to expose students to relevant information and to learn from the students about how they think optimal aging is or should be supported in Canada.

# Strategic Initiative on Aging at McMaster



## **SUPPORTING INFRASTRUCTURE**

Technology Development and Testing Laboratory  
Data Collection & Processing Laboratory  
Social Sciences Quantitative & Qualitative Laboratory  
Data Repository Laboratory  
Sensory and Neurocognitive Laboratory  
Biospecimen & Biomarker Laboratory  
Aging Animal Model Laboratory  
Optimal Aging Portal for Knowledge Transfer





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**CLSA funded by the Government of Canada through  
CIHR and CFI, and provincial governments and  
universities**

**[www.clsa-elcv.ca](http://www.clsa-elcv.ca)**

