

Occupational health and safety issues in the aging workforce

Harry Shannon



2012



European Year for **Active Ageing**
and **Solidarity between Generations 2012**



International Day of Older Persons

1 October

- "By 2050, the number of older persons will be twice the number of children in developed countries, and the number of older persons in developing countries is expected to double. This trend will have profound effects on countries and individuals."

Ban Ki-moon, 2013

Outline of talk

- Aging of the population
- Implications for work and workforce
- Relationship between age and health
- Implications for work health and safety
- Relationship between age and job performance
- Managing the aging workforce
- Research questions and methodological issues

Aging of the population

in Western societies

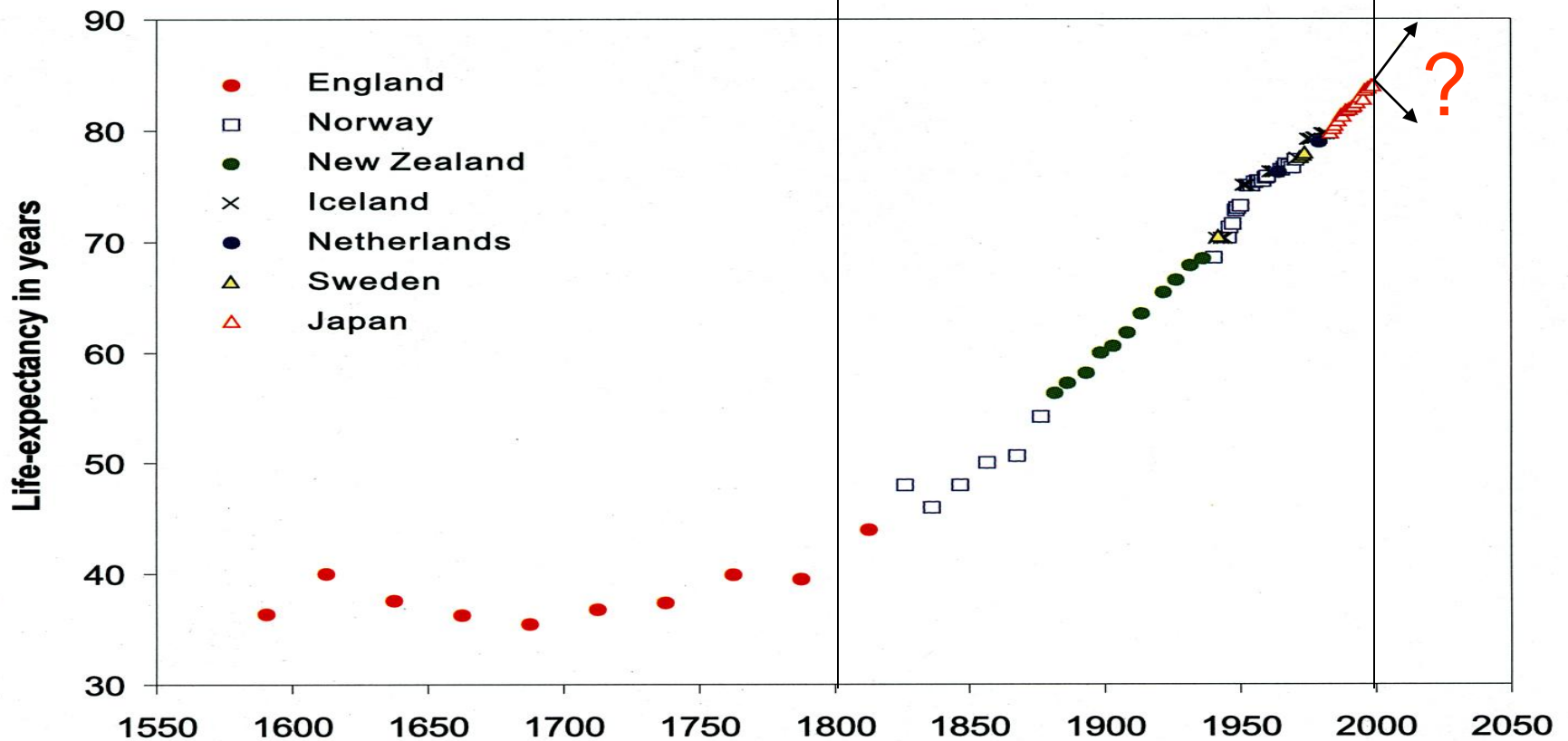
Increase in life expectancy, 1600 - 2000

Oepen and Vaupel, Science 2002; C Finch adaptation

Phase 1
early urban

Phase 2
sanitation-nutrition

Phase 3?
regeneration
modern medicine
Social Policy Innovation



Life expectancy world-wide

Sex	1970	1980	1990	2000	2010
Men	56.4	59.8	62.8	64.2	67.5
Women	61.2	64.9	68.1	69.8	73.3

Increases due to ...

Source: Wang et al., Lancet, 15 Dec 2012

Reduction in mortality rates

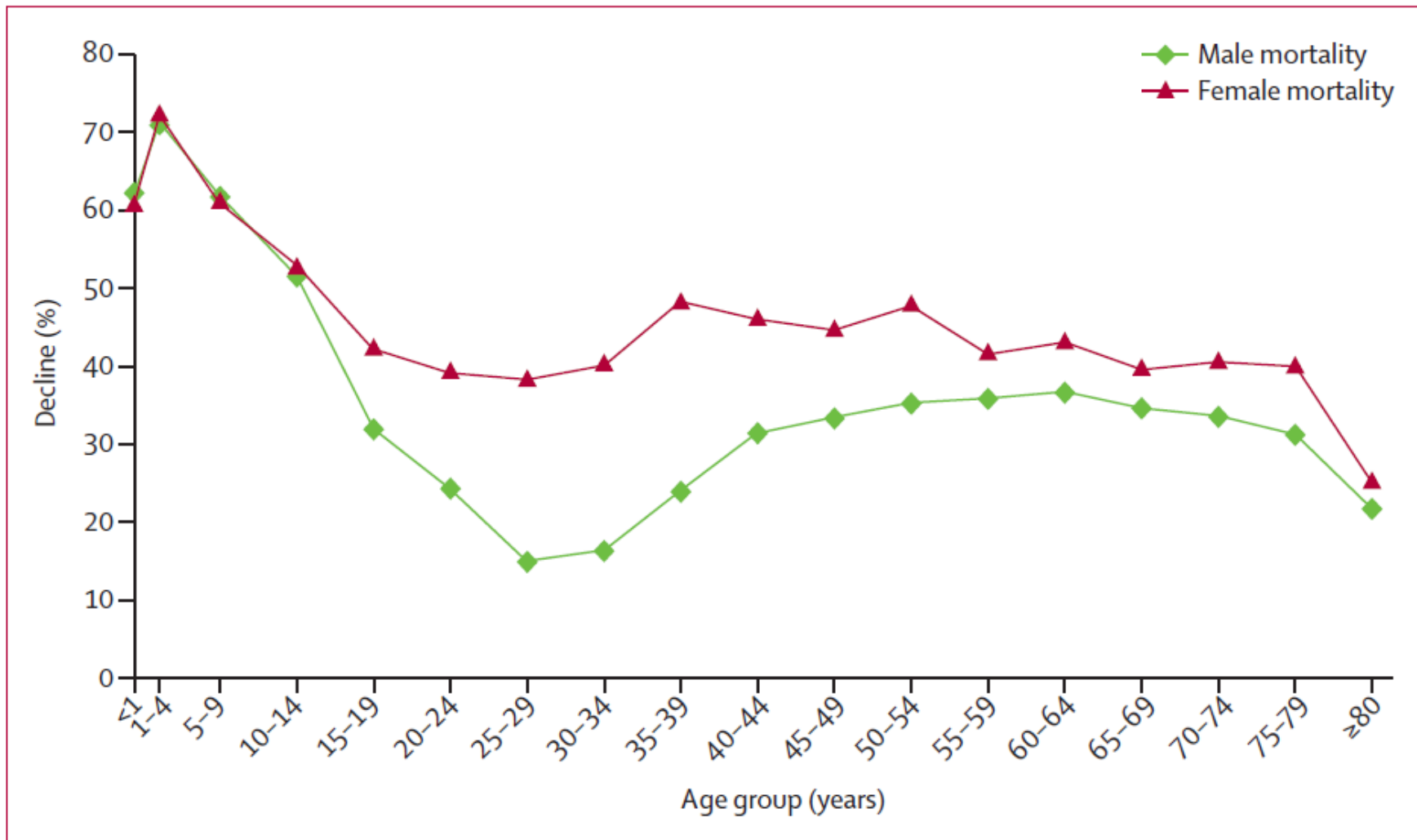


Figure 2: Decline in global age-specific mortality rate, 1970–2010

From: Wang et al., Lancet, 15 Dec 2012

UK projection

‘Around one-third of babies born in 2012 in the United Kingdom are expected to survive to celebrate their 100th birthday’

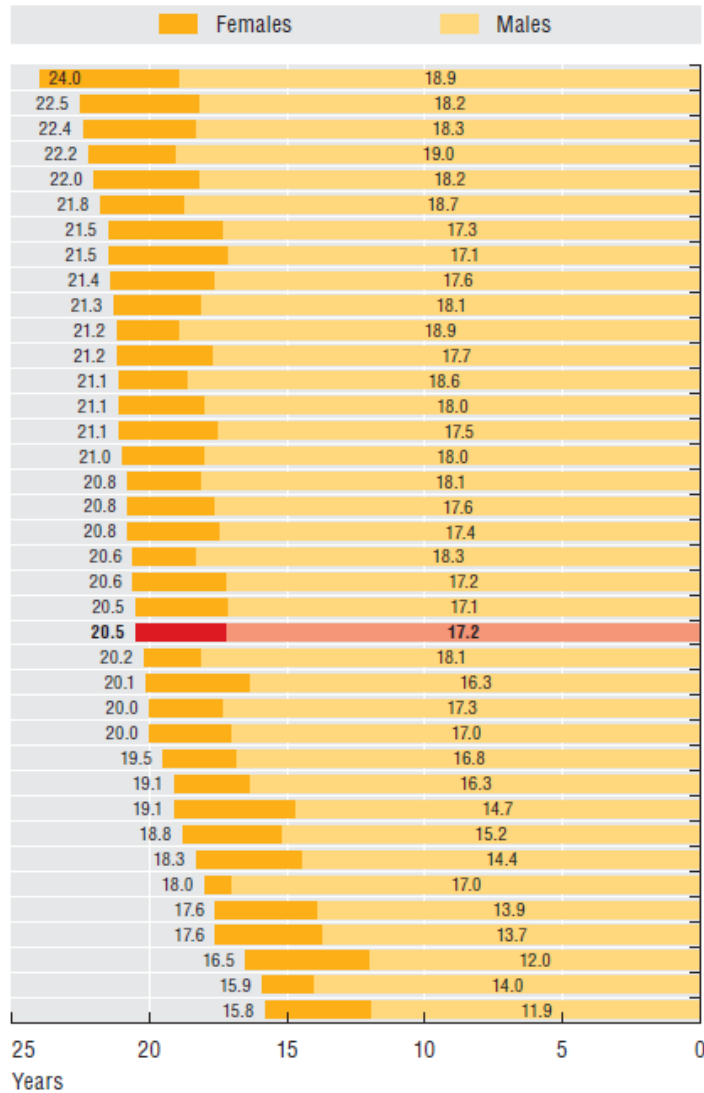
(UK) Office of National Statistics, March 2012



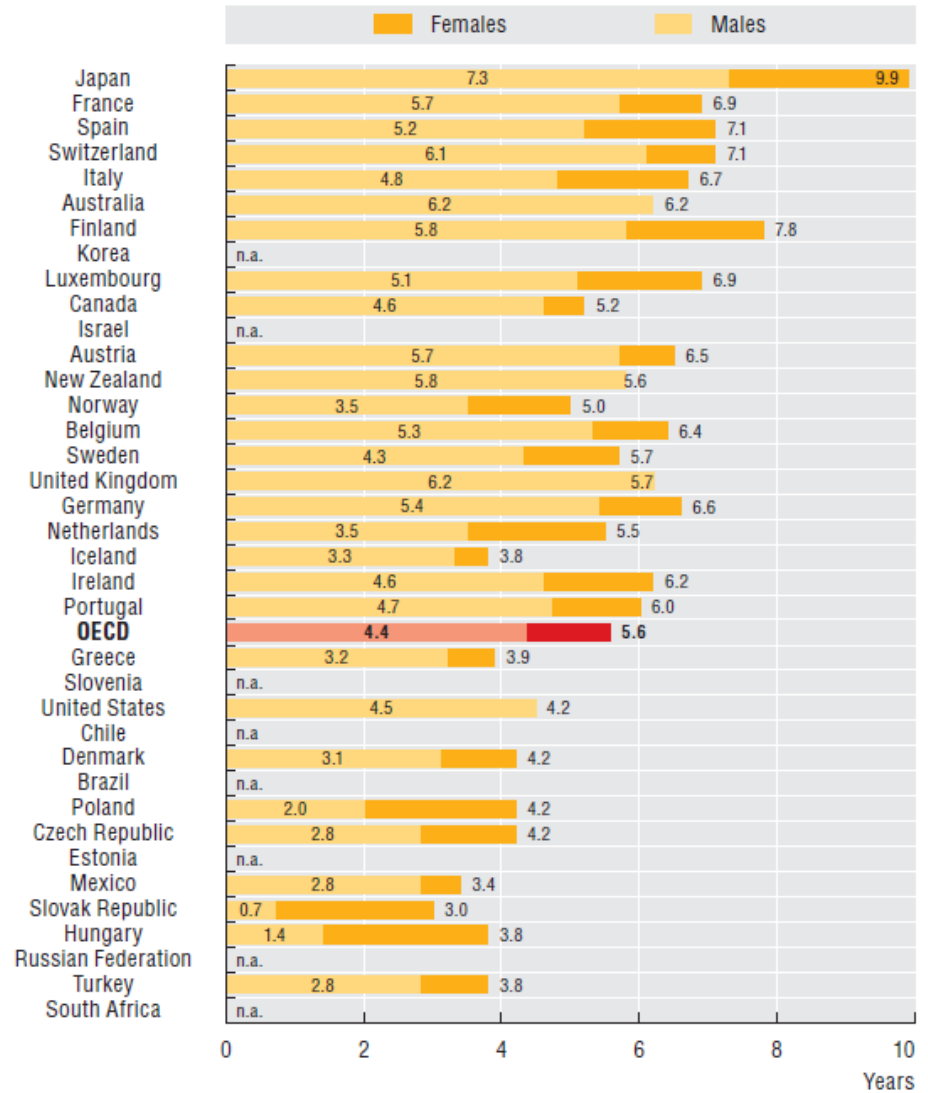
Life expectancy after age 65

8.1.1 Life expectancy at age 65, 2009 and years gained since 1960 (or nearest year)

Life expectancy at 65, 2009



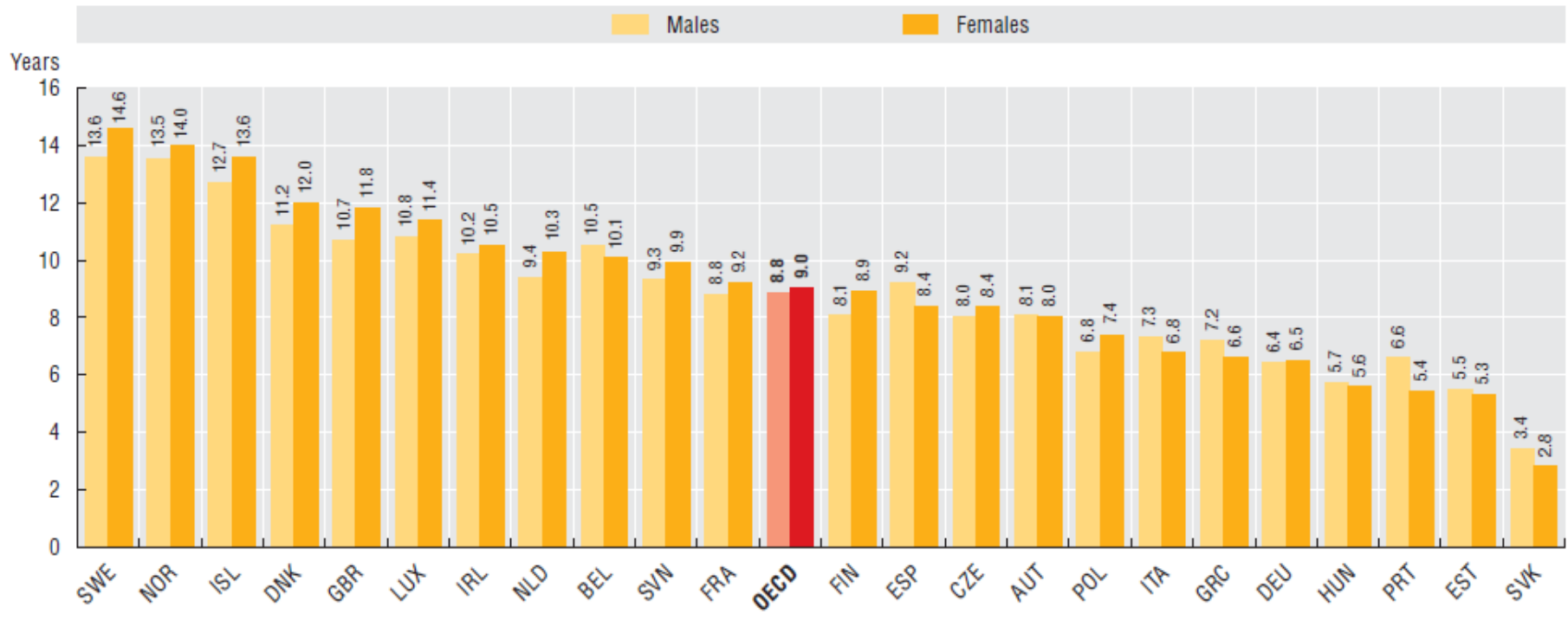
Years gained, 1960-2009



Source: OECD, 2011

Disability-free life expectancy after 65

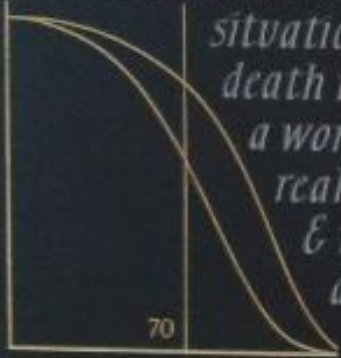
8.1.2 Healthy life years at age 65, European countries, 2009



Source: OECD, 2011

DEATH IN OLD AGE IS INEVITABLE BUT DEATH BEFORE OLD AGE IS NOT

In previous centuries seventy years used to be regarded as humanity's allotted span of life and only about one in five lived to such an age. Nowadays, however, for non-smokers in Western countries, the situation is reversed; only about one in five will die before seventy and the non-smoker death rates are still decreasing, offering the promise, at least in developed countries, of a world where death before seventy is uncommon. But, for this promise to be properly realised, ways must be found to limit the vast damage now being done by tobacco & to bring home, to not only the many millions of people in developed countries but also the far larger populations elsewhere, the extent to which those who continue to smoke are shortening their expectation of life by so doing. **RICHARD DOLL**



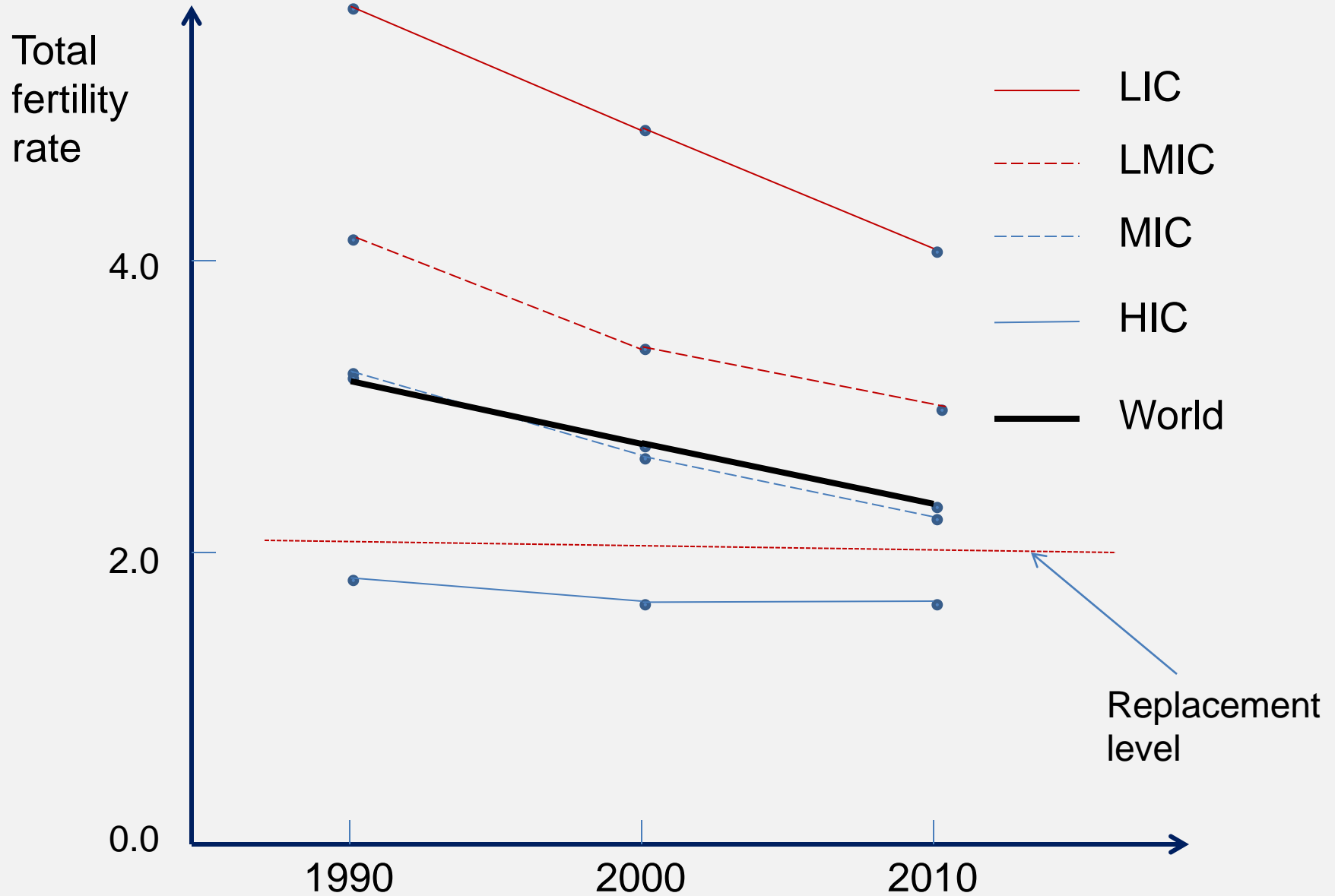
Changes in population *structure* result from

- Reduced mortality
- Reduced fertility rates



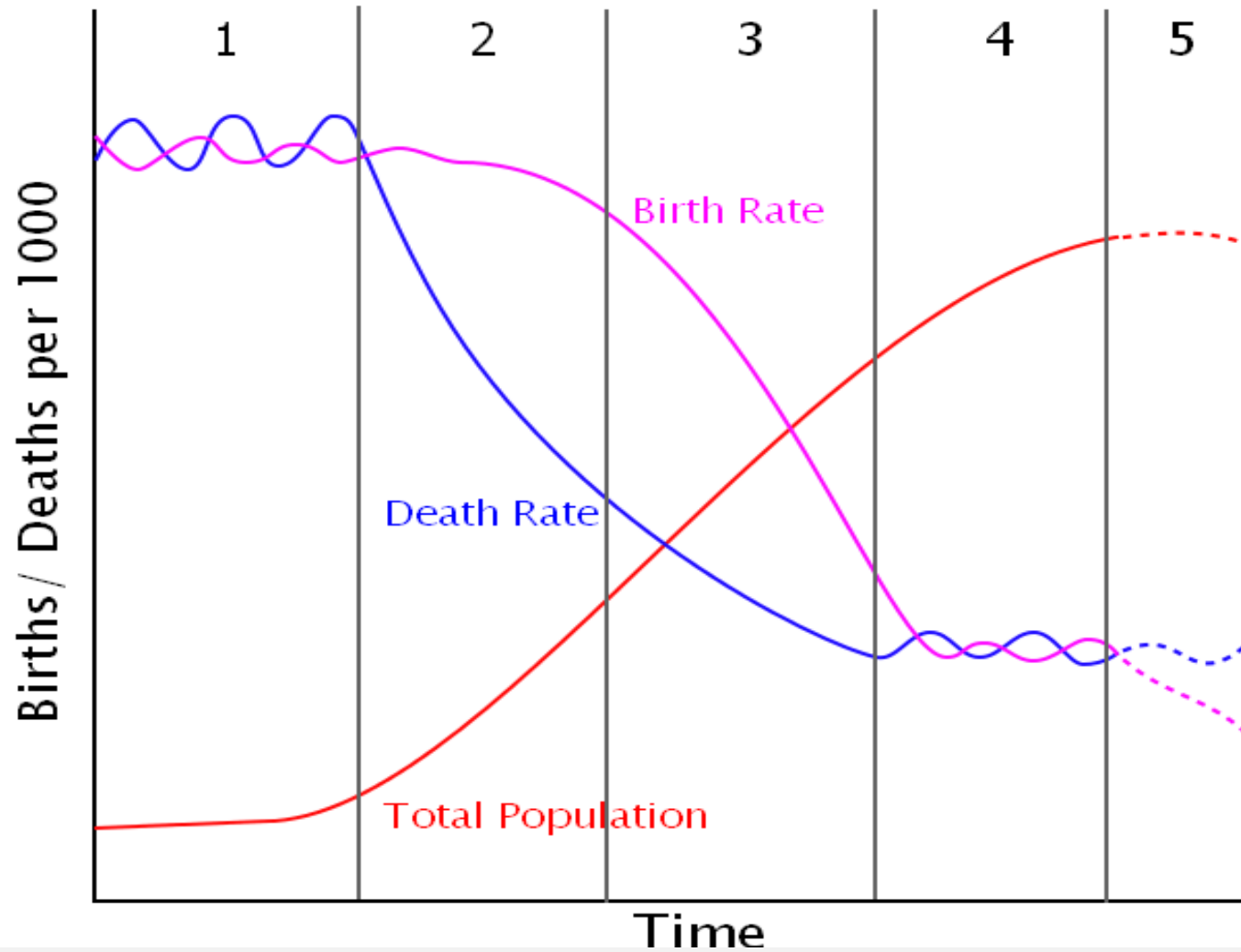
Demographic transition

Fertility by region



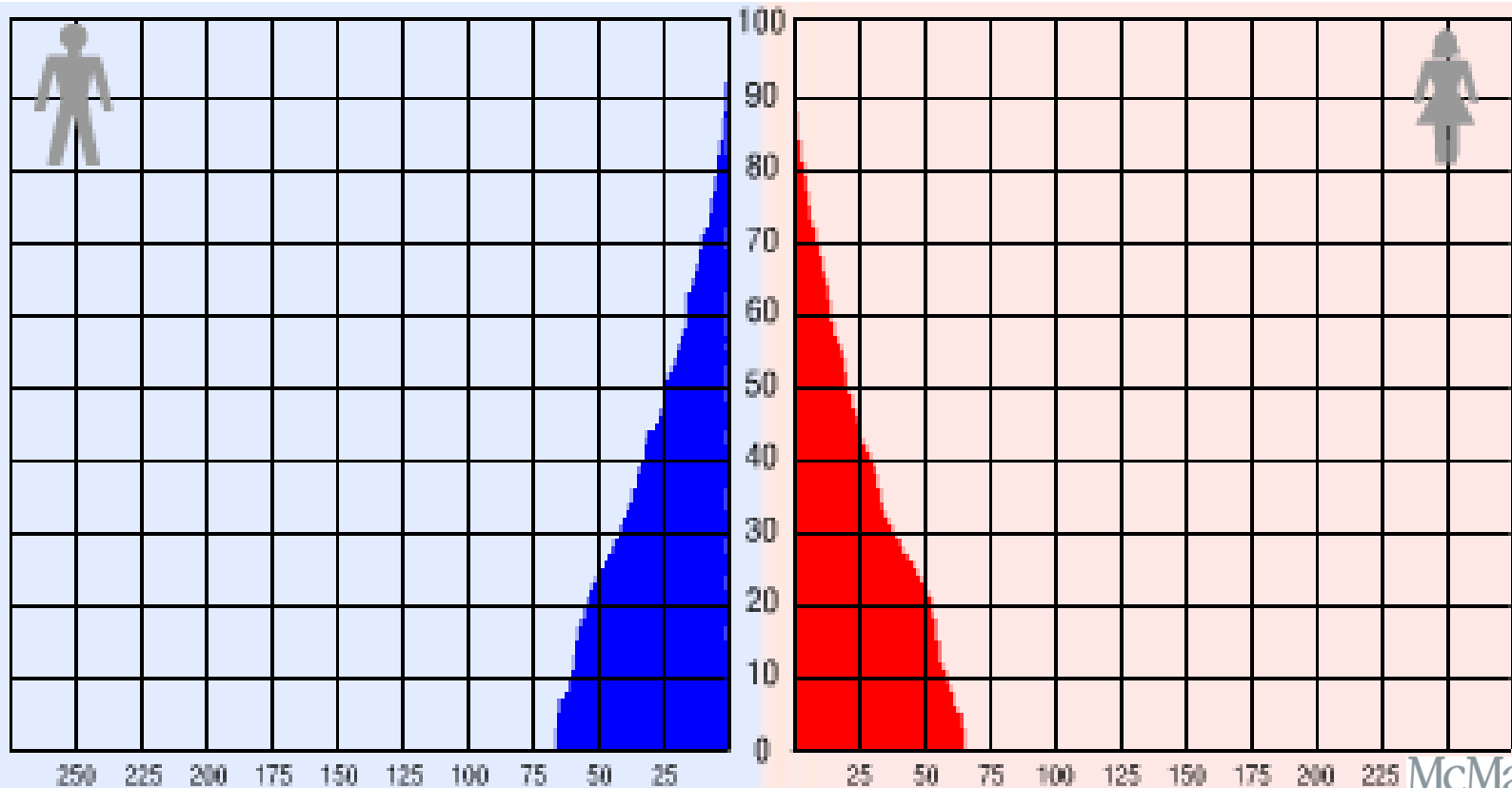
Source: World Bank

Demographic transition

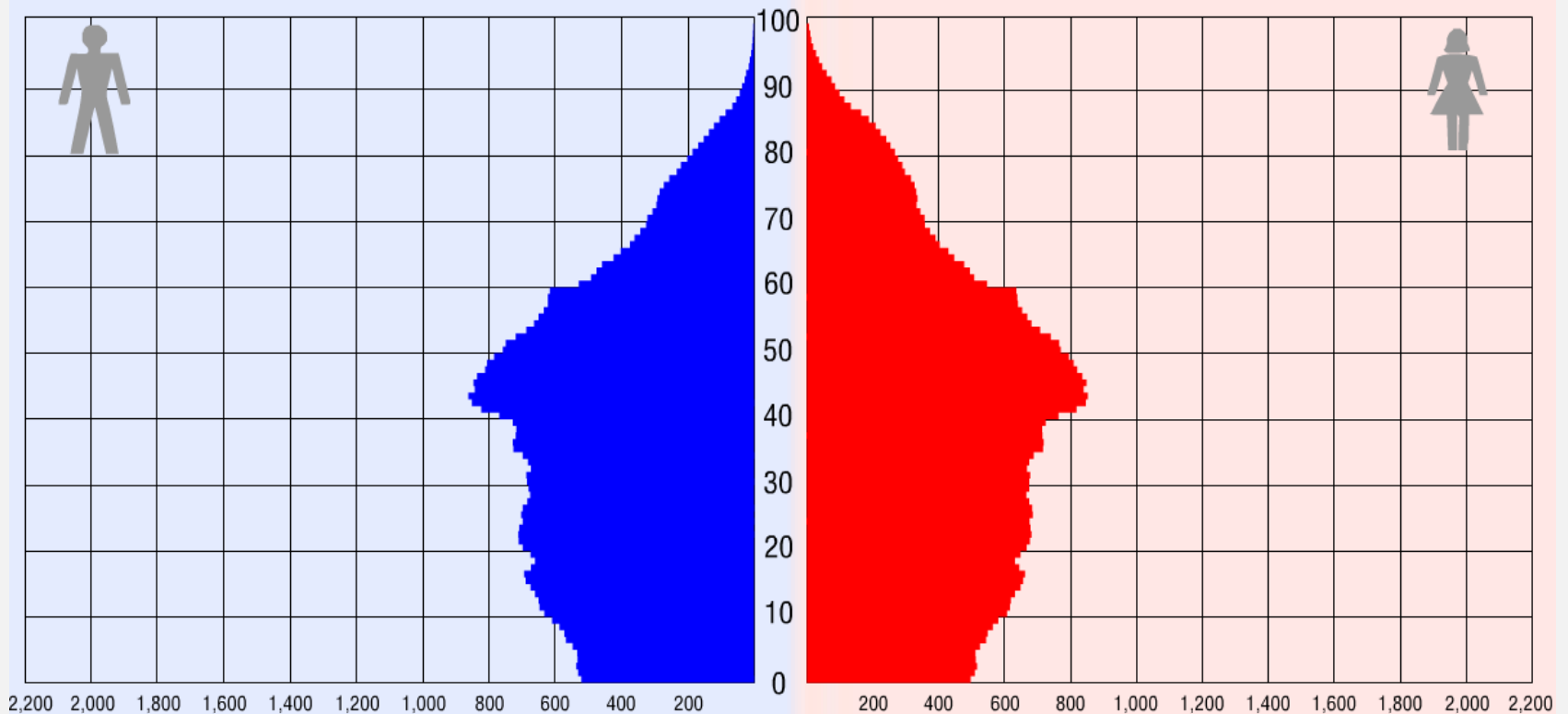


From: Wikipedia

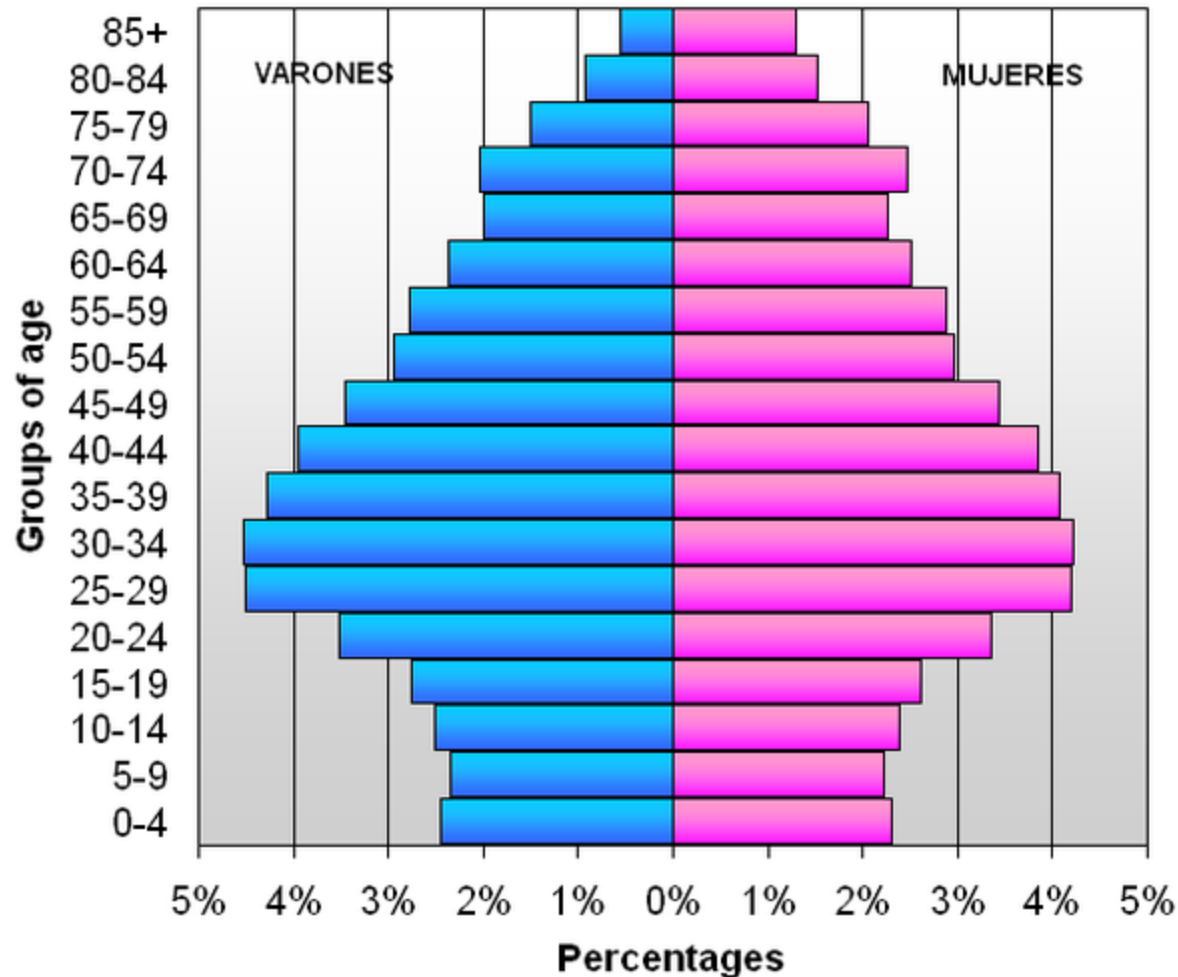
Age pyramid of population of Canada, 1901 (5.3 m people)



Age 'pyramid' of population of Canada, 2006 (32.5 m people)



Population 'pyramid' Spain 2005



Source: 'Instituto Nacional de Estadística' of Spain. 1st January 2005 census

Scenarios for the projection of the labour force in Canada

Scenarios	Assumptions about population growth	Assumptions about participation rates
A. Low growth	Low growth	Continuing trends (1999-2008)
B. Constant participation rate (2008)	Medium growth	Constant (2008 levels)
C. Recent trends in participation rate (1999-2008)	Medium growth	Continuing trends (1999-2008)
D. High growth	High growth	Continuing trends (1999-2008)
E. Long-term trends in participation rates (1990-2008)	Medium growth	

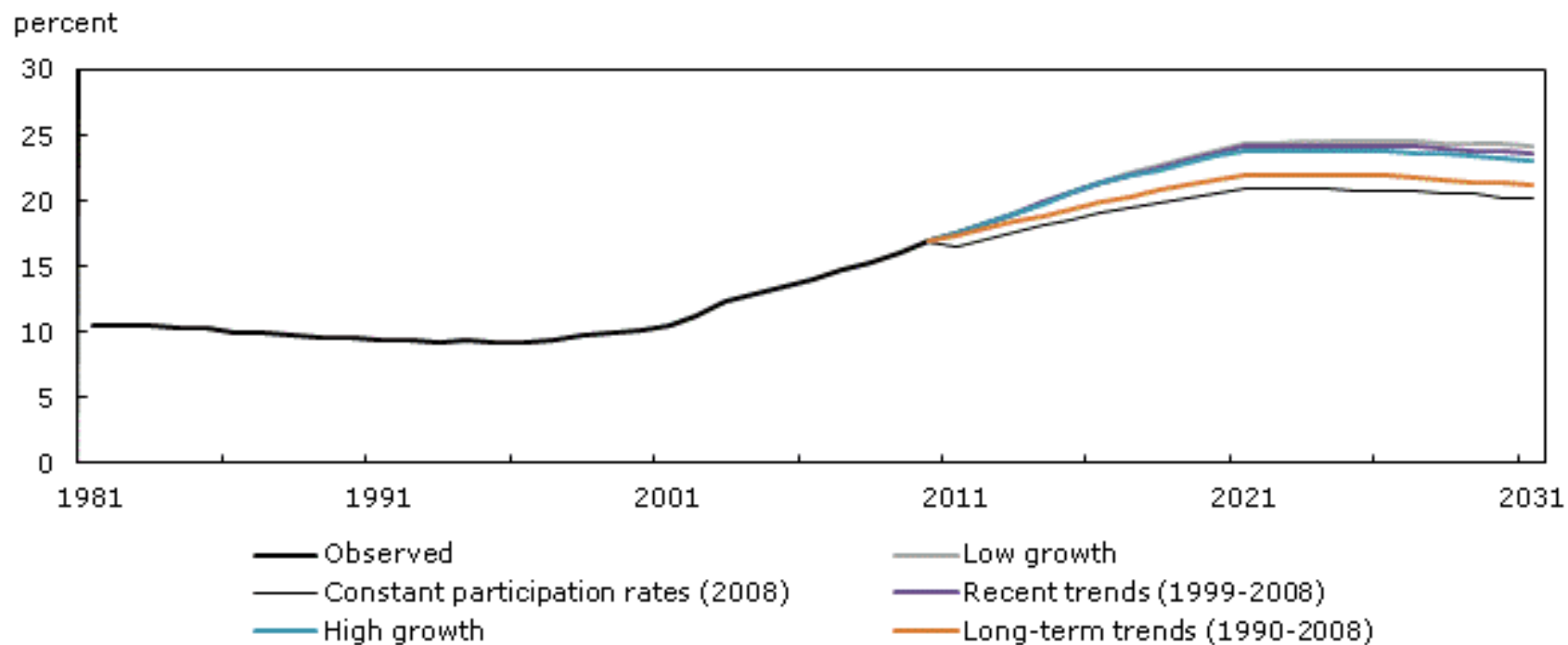
Statscan Projections

- Allowed for:
 - Population aging
 - Rising education levels
 - Evolution of participation rates over time
 - Gaps in labour market activity between immigrants and visible minorities vs rest of population
- Did not allow for:
 - Labour demand
 - Economic cycles
 - Public policies

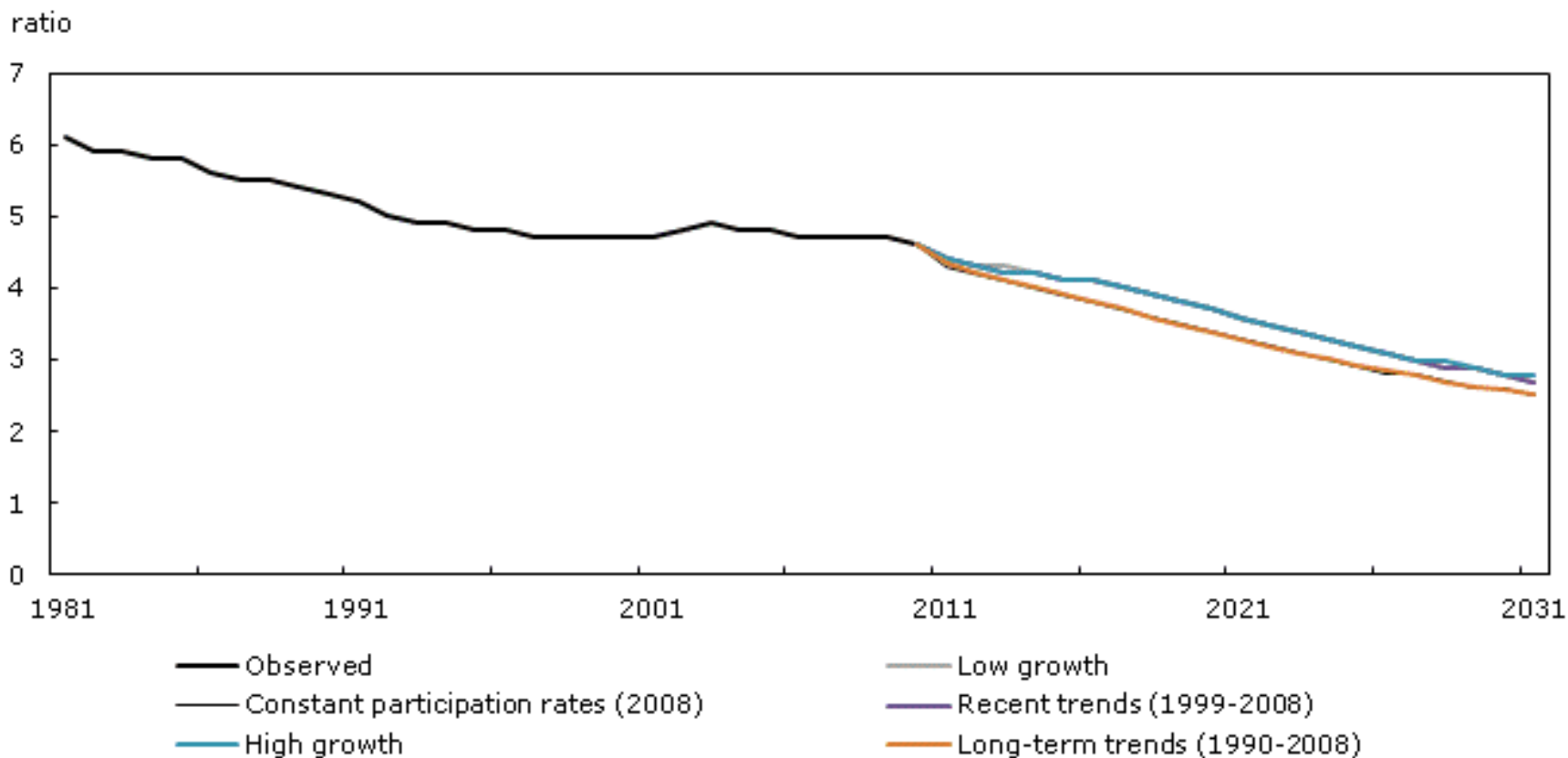
Overall participation rates observed (2010) and projected (2031) by province according to five scenarios

		Canada	Ontario
2010		67.0	67.1
2031	A. Low growth	62.6	63.7
	B. Constant participation rates	61.1	62.3
	C. Recent trends '99-'08	62.6	63.7
	D. High growth	62.5	63.7
	E. Long-term trends '90-'08	59.7	60.8

Observed (1981 to 2010) and projected (2011 to 2031) percentage of labour force aged 55 years and over according to five scenarios



Observed and projected ratio of the labour force to persons aged 65 years and over and not in the labour force according to five scenarios



Implications for work and workforce - 1

- Proportion of older workers is increasing
- Employment rate in older age groups is increasing
- Retirement may be delayed
- Individuals' reasons for delaying retirement
 - Financial resources
 - Need to feel 'worthwhile'
 - Enjoy working
 - etc

Implications for work and workforce - 2

- Societal needs – more dependents per worker, especially non-working older people
- Need to keep older workers in the workforce to prevent economies from becoming smaller

Implications for work and workforce - 3

- Various policy options - e.g., raise the standard pension age
- Actual policies vary greatly by country
- Society and organizations need to maintain capability of older workers to be productive

Two questions

- What will persuade older workers to stay in employment?
- How to ensure they remain healthy and productive?

Griffiths, 2009

Work and careers

- Working later in life – EU target
- Africa – many already work when over 65
- Predominance of agriculture in poorer countries
- Discrimination against older workers
- Flexible employment, retraining
- China – Universities of the 3rd Age
- Which jobs will be where in the future?
- Role of automation

German project

News Research Technical information Databases hazardous substances Practical solutions Testing/Certification Publications

Research > Project registry

▼ Project registry

Project

Financed by:

• Deutsche Gesetzliche

iga: My next occupation - personnel
development for occupations of limited
duration

- Identify jobs people leave early – physical and mental stressors
- What career advice will prevent early retirement, unemployment at older ages
- What general lessons can be learned

Pensions: options

- Lowering the standard of living for pensioners
- Older retirement ages
- Increasing contributions while working
- Increasing total transfers from workers to pensioners

Source: UK Pension Commission, 2004

Daily Express, 23 October 2012



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UK NEWS

MILLIONS MUST WORK FOREVER



Nearly 1.5 million people who are over 65 still work /
Posed by model

Tuesday October 23, 2012

By Sarah O'Grady

Have your say(24)

THE pensions crisis means millions of Britons will never be able to retire, an alarming report has found.

Nearly 1.5 million people who are over 65 still work. And more than half of them say they have no option but to carry on as they do not have sufficient [savings](#)

What is an 'older worker'?

- Different definitions of age:
 - Chronological
 - Subjective
 - Social age
 - Relative age
 - Legal
 - Biological
- US Age Discrimination in Employment Act
 - Prohibits discrimination against over-40s
- May be chronologically 45+ or 50+ or 55+

Historical views of 'older workers': first part of the 20th Century

- “women begin to break down in their thirties”
- “men [over 40] lack the essential flexibility of body and mind and suffer with impaired health”

Common attitudes of businesses described by Alsaker (1939);
cited by Veit (2012)

Relationship between age and 'job performance'

Stereotype of older worker

- Less physically able
- More problems with co-workers
- Want more time with families
- Less technologically savvy
- Less willing to adapt to volatile environments

- Hence, lower job performance

Ng & Feldman, 2008

- Challenged this view in systematic review of literature
- Argued that there are more dimensions of 'job performance' than simply 'core task performance'

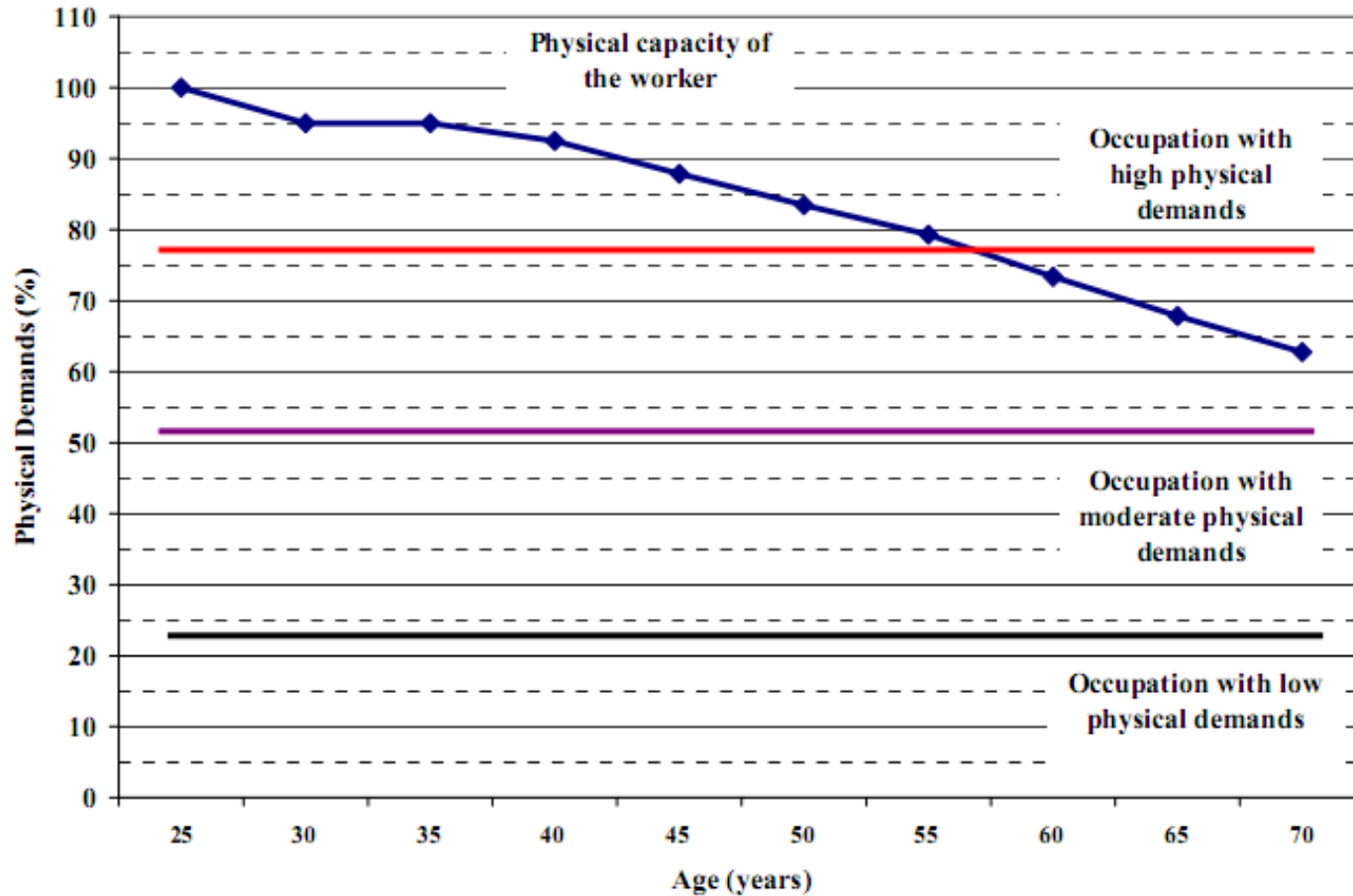
Extra dimensions of job performance

- Citizenship behaviour
 - Creativity
 - Performance in training programs
 - Organizational citizenship behaviour
 - Safety performance
- Minimum performance
 - General counter-productive behaviours
 - Workplace aggression
 - On-the-job substance abuse
 - Tardiness
 - Absenteeism

Relationship of dimensions with age

Dimension	Benefit to workplace
Core task performance	0
Creativity	0
Training Program Performance	X
General citizenship behavior	✓
Injury rate	✓
General counter-productivity	✓
Aggression	✓
Substance abuse	✓
Tardiness	✓
Absenteeism	✓ / X

Hypothetical relationship between age, worker capacity and job demands



Smith P with permission. Adapted from Ilmarinen 2002.

Relationship between age and health

Musculoskeletal system

- Gradual ↓ in strength
 - In early 50s, 80% that of early 30's
 - Mean decline 3% per year after 70
- Flexibility/mobility of joints ↓
- Bones lose calcium
 - Can be moderated by regular weight-bearing exercise

Cardio-respiratory system

- Functional breathing capacity
 - Reduced by 40% from 30 to 65
- O₂ exchange rate ↓
- Blood vessels lose flexibility
- Arteries thicken / harden

Hearing

- Hearing ↓, especially ability to hear high-pitched sounds
- Ability to locate source of sound ↓
- Noise-induced hearing loss irreversible
- Ability to hear conversation in noisy environment ↓

Vision

- Flexibility of lens ↓
 - Can be corrected with glasses
- Amount of light reaching back of eye ↓
 - Up to 75% between 20 and 50
- Dark adaptation ↓
- Colour sensitivity ↓
- More affected by glare

Skin

- Stretches less easily
- Permeability ↑

Mental processes - 1

- Peak in 30s and 40s; only small decline in 50s and 60s
- Motivation ↑
- Verbal command ↑
- With normal aging:
 - Happiness ↑
 - Negative affect ↓
 - Anxiety, depression ↓
 - Occupational stress ↓

Mental processes - 2

- Small, generally positive relationship with age with respect to personality and adjustment
- Distinguish crystallized cognition ('pragmatics') and fluid cognition ('mechanics')
- Working memory ↓
- Difficulty in dividing attention (multi-tasking)
- Potential dementia, Alzheimer's

Other effects of aging

- More sleep problems
- Prevalence of chronic diseases ↑
- Possible prescription or over-the-counter drug interaction with workplace exposures
- Recovery from injuries / illnesses longer

Caution

- Much of what's 'known' is based on cross-sectional studies
- Also, there is greater variation in health at older ages than at younger ones (hence hypothesis that effects of aging can be prevented)

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 c. 25% of what determines longevity
(and disease?)

Implications for work health and safety

Some effects of aging on work - 1

- Ability to do extended physical work ↓
- Strength sufficient for most work
- Likelihood of fractures from falls ↑
- Injuries may result from short-term overexertion
- Potential for musculoskeletal disorders, 'repetitive strain injuries' ↑

Some effects of aging on work - 2

- Reduced thermo-regulation
- Potential for dermal exposure ↑
- Ability to hear alarms, verbal instructions ↓
- Reaction / response time ↑
(though this will not affect most work)
- Ability to read material, dials, screens, detailed work, adapt to changing light conditions may decline
- Potential for less alertness in critical jobs

Some solutions to health and safety risks of older workers

Note that many apply to work in general!

Levels of dealing with aging and work

- Societal
 - E.g., anti-discrimination laws, labour force policies
- Organizational
 - What the workplace can do
- Individual
 - Take care of health, follow procedures

Some solutions for organizations - 1

- Provide lifting devices
- Minimize lifting by, e.g., packing in smaller quantities/containers
- Use lighter materials
- Provide adjustable seating and work-stations
- Reduce climbing needed
- Minimize extreme movements
- Remove excessive force, awkward postures
- Reduce repetitive tasks

Some solutions for organizations - 2

- Assign / schedule work to avoid fatigue
 - more time to complete tasks
 - more breaks
- Reduce general workplace noise
- Provide PPE, and maintain it
- Consider exposures with respect to chronic diseases
- Reduce long-term and repeated exposure to noise
- Avoid or adjust work in extreme heat or cold

Some solutions for organizations - 3

- Reduce glare; provide indirect lighting
- Avoid sharp contrasts in light levels, or low levels of light
- Reduce multi-tasking
- Reinforce tasks and skills
- Use larger type in written materials, signs

Some solutions for organizations - 4

- Adapt training to learning styles of older workers (principles of adult education)
- Improve psycho-social conditions of work
- Promote positive attitudes to older workers
- Provide health promotion programs
 - Maintain work ability
 - Physical training
- Ensure comprehensive approach to RTW

NIOSH package

- “Age Awareness Training for Miners”, 2008
- Provided modules on effects of aging
- Trained workers with modules
- Encouraged ideas to come from workforce – local solutions

Potential future problem

- Rael (1993) study of Ontario construction workers
- Found most of gap in injury rates between older and younger workers was because older workers did different work (e.g., supervision)
- With fewer younger workers and those employed working longer, older workers may do the hard physical work – and incur the risks they have been avoiding

Other issues

- (Ethical issue) Human enhancement
- Different cohorts – different expectations, etc?
- Career stages
- Increase in part-time work?
- Longer careers = more exposure
- Work in stressful jobs

Some research questions

- Effect of toxic exposures in older workers
- Interactions of exposures with medications for chronic diseases
- Work Ability Index – value at individual level
- Optimal time to retire – to prevent harm to workers, to prevent harm to others
- Time to start re-training

Some research questions

- Distribution of work over one's lifetime
- Role of Workers' Compensation in Return to Work
- Problems of low-skilled migrants
- Evaluation of interventions
- Increasing obesity

Methodological Issues

- Need for longitudinal studies, continuing into retirement
- Possible use of historical cohorts
- Measurement – e.g., Work Ability, including cognitive ability
- ‘Harmonising’ data across studies
- Analyses using life course perspective

Summary

- Populations are aging
- Likely that workforces will get older
- (Some) Physical and mental declines occur with age
- Effects of declines can be reduced with workplace changes
- Need to be aware of effects of aging to manage change in workforce
- Various research questions remain

Contact

Harry Shannon
McMaster University



harry.shannon@mcmaster.ca

Canadian Longitudinal Study on Aging:
www.clsa-elcv.ca