International mortality trends

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This presentation covers published and unpublished material from a variety of sources and countries. The findings do not necessarily reflect the position of the authors' employers.

With thanks to:

Framework for presentation

- Introduction
- Longevity and death rates, country by country
  We know the UK and US are seeing a slowdown: Where else -- and why?
- Analysis: groupings, causes and drivers
  What do we know about the causes and drivers of change?
  Are these indications a blip or a trend?
  Are there similarities internationally?
- What are actuaries, demographers and others doing?
Methodology for comparisons

- The problem: how to show and compare progress in different countries when we have figures from some to 2016, others to 2015 (the “bad” year) and some only to 2014
- Wishing to compare annual improvement rates against a common base we choose to use the period [2011 most recent year] against a base of [2001-2011].
- In the selection of high-income countries in Europe we considered population size and availability of recent data.
  - Comparing rate of increase in longevity:
    - Green = increase  Red = decrease
Selected high-income countries

Where are there signs of a fallback – and why?

- UK
- Other European countries
- US
- Canada
- Australia
- Japan

Life expectancy at birth: Months gained per year elapsed

Average trend annual increase in period life expectancy at birth - Months

|-----------|------|------|------|------|------|------|------|------|
| Life expectancy at age 65: Months gained per year elapsed

Average trend annual increase in period life expectancy at birth - Months

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Data source: HMD+NSO

Green = better
Red = worse

15 June 2018
US: Period life expectancy 2001 to 2015

US increase in partial life expectancy by 5-year age bands, for 5-year periods ending 1986 to 2011 and 4 years to 2015

US: Standardised deaths by age group indexed to 100,000 in 2001
France: Period life expectancy at birth 2001 to 2015

Germany: Period life expectancy at birth 2001 to 2015

Sweden: Period life expectancy at birth 2001 to 2016
The Netherlands: Period life expectancy 2001 to 2016

Spain: Period life expectancy at birth 2001 to 2016

Austria: Period life expectancy at birth 2001 to 2016
Australia: Period life expectancy at birth 2001 to 2016

Canada period life expectancy at birth and age 65, males and females combined, 2001/2 to 2015/16

Canada Old Age Security (OAS) Program Mortality Experience
Average Annual Increase in Life Expectancy of OAS Beneficiaries (in months)
Selected high-income countries

Where are there signs of a fallback – and why?

- US
- UK
- Other European countries
- Canada
- Australia
- Japan – the exception

Now, what about causes and drivers? – evidence of a “blip” or a trend?
Groupings, Causes and drivers

Looking at a few of the causes and drivers

Seasonal factors (e.g., winter mortality)

Causes of death

15–64 cardiovascular/circulatory/stroke
dementia

Drivers: Smoking – obesity – diabetes – behaviours

Socio-economic groups and deprivation

Austerity

Seasonal mortality - Europe excess winter mortality

Causes of death

- 15–64
- Cardiovascular/circulatory/stroke
- Dementia

E&W: Age standardised mortality rates for top five leading causes of death M, F (per 100,000)

Australia

Cardiovascular

Cerebrovascular
Drivers

• Smoking: Effect of past generations quitting smoking – is it now fading out?
• Obesity and diabetes – effect increasing?
• Behaviours: eg US deaths from drug and alcohol poisoning, suicide, and chronic liver disease and cirrhosis
• Socio-economic factors

England: Socio-economic gap. Progression of death rates for those aged 60-89 of each socioeconomic circumstances quintile – mortality given as a percentage of that in 2001

It's mainly about money
“Of the many factors including income, education, crime, health, housing, environment and unemployment, income deprivation is the strongest independent predictor of mortality rates”

US: Compares age-standardized deaths for counties with average household income in top 30% against all counties
Austerity — mixed messages

- Europe: The slowing down of life expectancy, correlated to the level of austerity, raises uncomfortable questions as to whether we are beginning to transition from the era of consistently improving population health to a new age characterised by an instability in population health largely dictated by the social and political determinants of health."

- "While income inequality has increased in both the United States and France, inequality in mortality in France remained remarkably low and stable".


Framework for presentation

- Introduction
- Longevity and death rates, country by country
- Analysis: groupings, causes and drivers
- What are actuaries, demographers and others doing?

The CMI Model — Life expectancy age 65

CMI life expectancy projections have been reduced in successive iterations of the model.

Source: CMI WP 17

15/06/2018
US

Updated views on future mortality improvement  Fenton et al, WillisTowersWatson June 2016

Projected mortality improvement

- projected future mortality improvement rates using our COD model to reflect recent historical experience

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Germany

- The Life Insurance Committee of die Deutsche Aktuarvereinigung e.V. (DAV) reviewed reserving guidelines for pensions insurance in Jan 2018. Reserves based on DAV2016UR are slightly lower than those based on DAV2004R but within the range of expected fluctuations. Projections work on base mortality plus trend, and the reviewers found no need to change the guidelines.

US OASDI:
Successive projected period life expectancies in 2025

![Graph showing life expectancies](image)

Ultimate annual percent reductions in age-sex adjusted death rates, USA, OASDI Trustee reports

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Canada Pension Plan:
Successive projected period life expectancies in 2025

![Graph showing life expectancies](image)

Ultimate annual percent reductions in age-sex adjusted death rates, Canada, CPP Trustee reports

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Source: [Direct link to OASDI](http://www.osfi-bsif.gc.ca/Eng/oca-bac/ar-ra/oasdi-rpo/Pages/default.aspx)
Conclusions

Longevity improvements have slowed down in most countries

Underlying causes unlikely to disappear

- Excess winter mortality
- "External causes"
- Opioids
- Cardiovascular/circulatory/stroke gains slackening
- Dementia and Alzheimer's mixed
- Poverty and the widening socio-economic gap
- Austerity

Impact on insured and pensioner populations differ:

different subsets of the population exposure by "amounts" higher for higher socio-economic groups