International Actuarial Association
Association Actuarielle Internationale

Recent developments in longevity, internationally

Actuarial Research Conference Aug 2018

Brian Ridsdale, BSc, FFA, CEng, MBCS
Chair, IAA Mortality Working Group

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This presentation covers published and unpublished material from a variety of sources and countries.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 or of the IAA.

With thanks to:

Steven Baxter, Sophie Sanders, Marine Habart, Jon Palin, Richard Willets, Magali Barbieri, Assia Billig, Al Klein, Sam Gutterman, Dale Hall, Madhavi Bajecal, Michael Sherris, Rikard Bergstrom, David Raymont, Lars Pralle, Jari Niittuinperä, Luis Alfonso Jiménez Muñoz, Hans de Mik and many others

Agenda

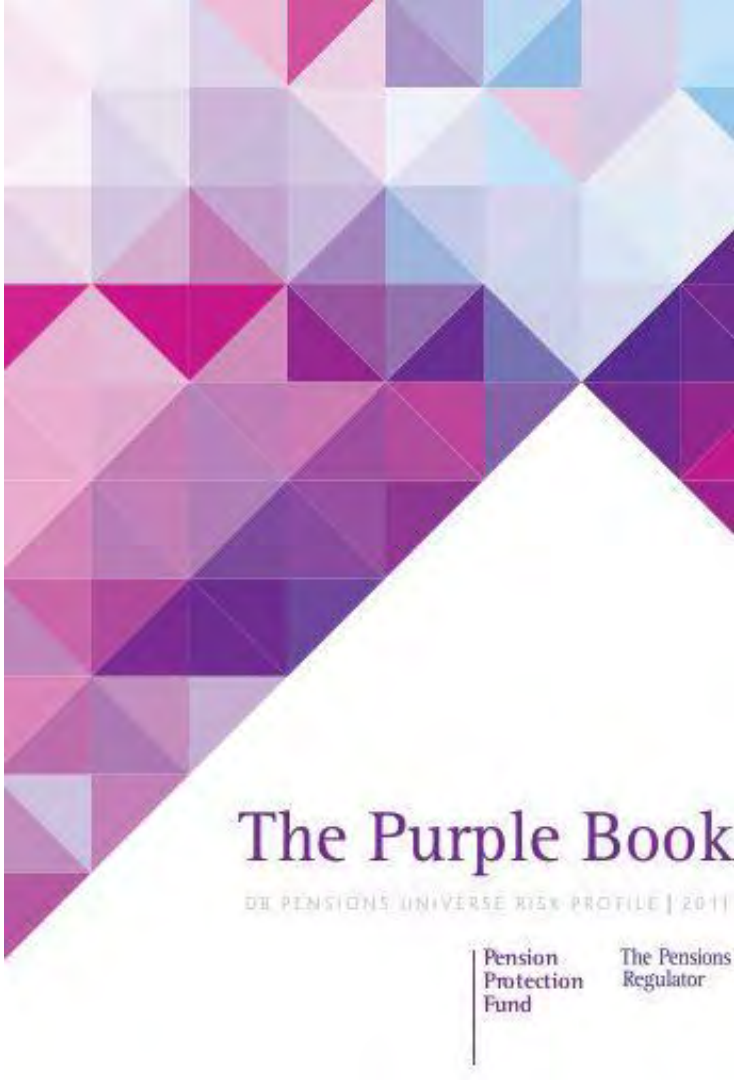
- US and UK are seeing improvements slowing down. Where else?
- Possible causes and drivers
- Is this a trend or a blip? Similarities internationally?
- What are actuaries doing about it?
- Questions

US and UK are seeing improvements slowing down

- ”So what”?

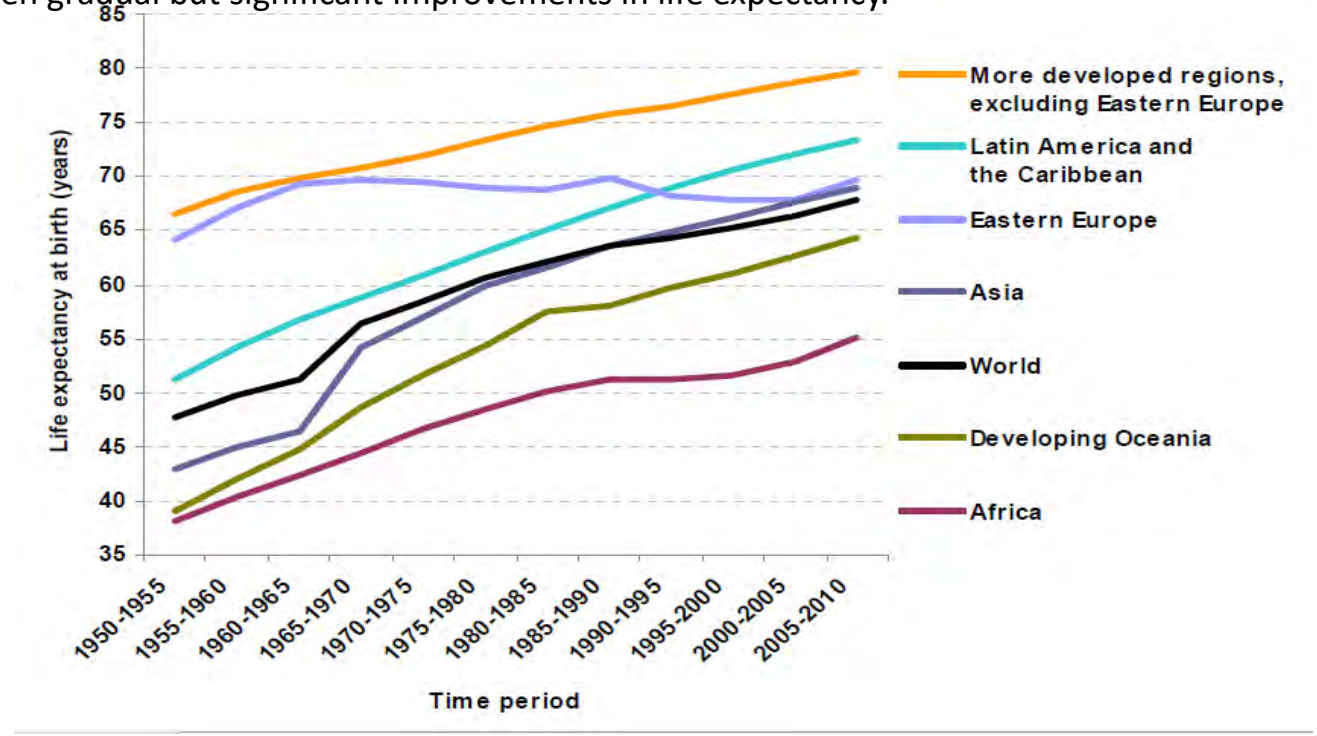
- estimated Aggregate Deficit in UK Pension Funds: £780 billion on a full buyout basis

- small changes to longevity assumptions can make big differences to reserves



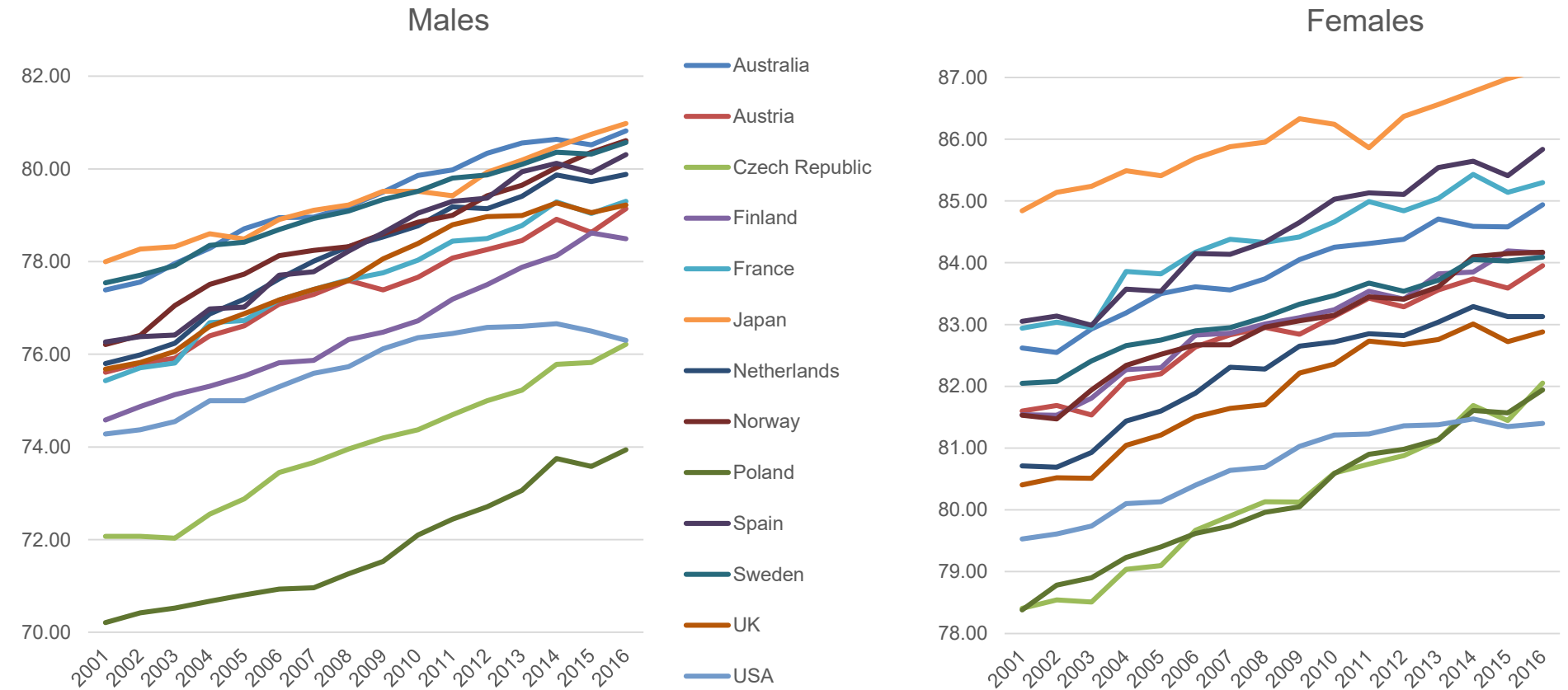
Past 70 years – the world

In most parts of the world with the notable exception of Eastern Europe, the last 70 years have seen gradual but significant improvements in life expectancy.



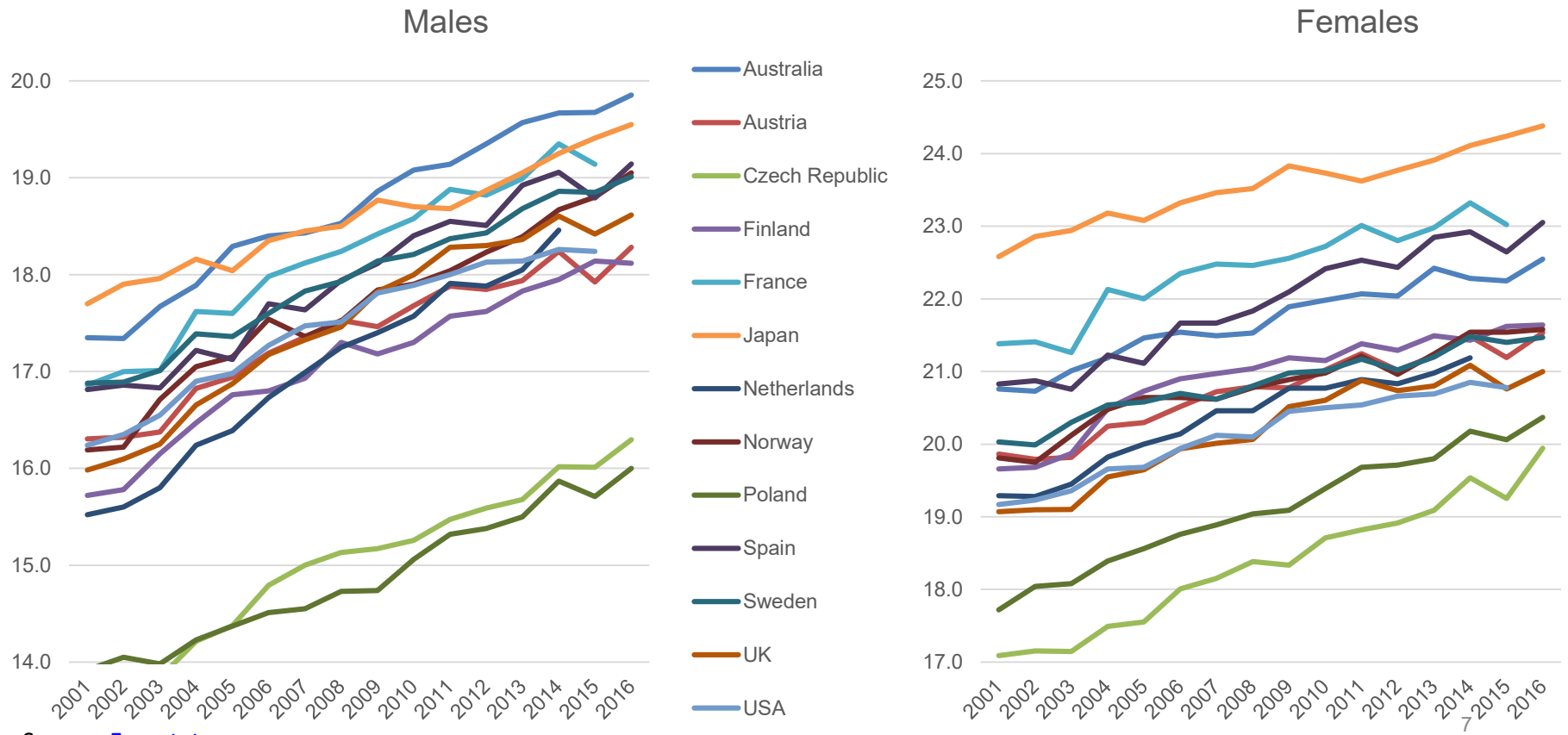
Source World Health Statistics. Accessed on 8 March 2018 https://healthyplanetpro.wordpress.com/world-health-stats/

Period life expectancy at birth 2001 to 2016



Source: [Eurostat]

Period life expectancy at age 65 2001 to 2016

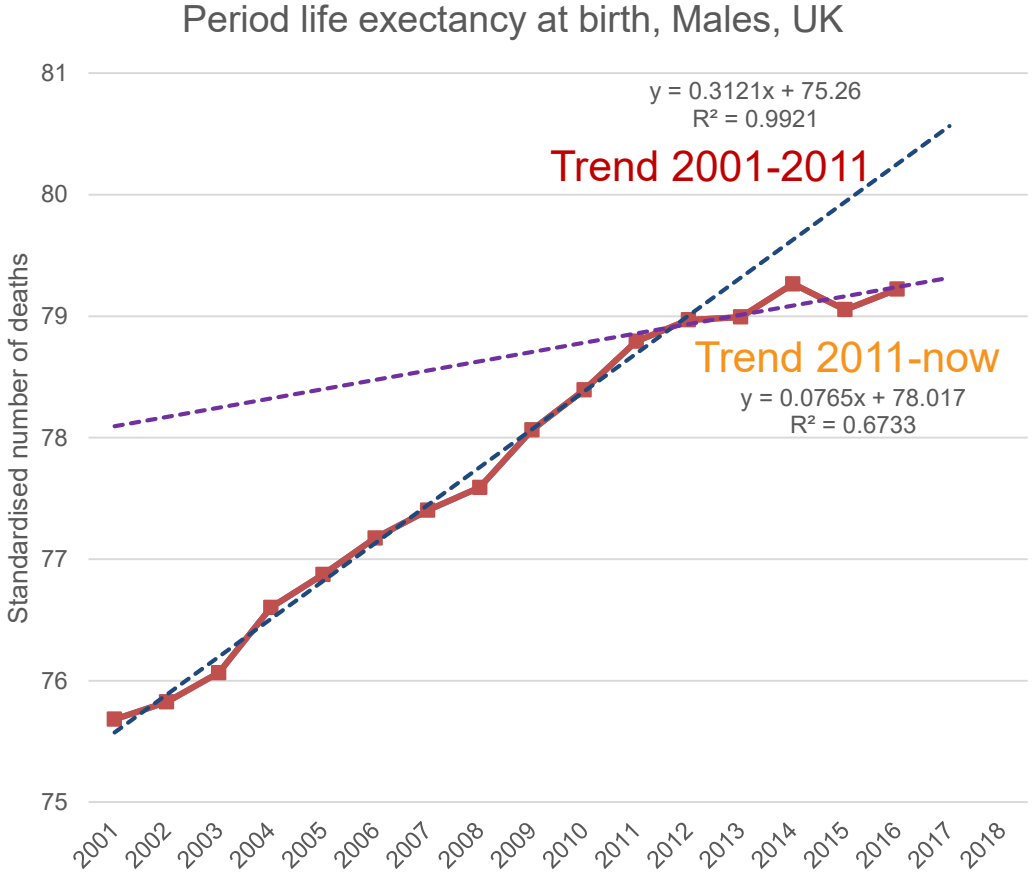


Source: Eurostat

A word about our methodology

We wanted to compare the trend of recent improvements (2011 until “now”) against the trend from 2001-2011

UK Period life expectancy Trends



Methodology:

Compare
Trend [2011-most recent year]
against
Trend 2001-2011

Next: the details

Methodology for comparisons – data sources

- Compare progress in different countries when we have different data sources, different final years for data
- Main data source is the Human Mortality Database (HMD)
- However, data available for some countries to 2016, others to 2015 (the “bad” year) and some only to 2014
- For the latter cases data from national statistical offices (NSO) was used, if available
- In some cases HMD data was extended with data from NSOs, where not too different from HMD results

Methodology for comparisons

- Wishing to compare annual improvement rates against a common base we chose to use the period [2011-most recent year] against a base of [2001-2011].
- Method fits trend lines to 2001-11 and 2011 onwards using linear regression.
- 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

US and UK are seeing longevity improvements slowing down. Where else?

Period life expectancy at birth: Months gained per year elapsed

Average trend annual increase in period life expectancy at birth

Country	Last	Male		Female		Difference	
	Year	2011+	2001-11	2011+	2001-11	M	F
Australia	2016	1.7	3.1	1.2	2.2	-1.5	-0.9
Austria	2016	2.4	3.0	1.3	2.3	-0.6	-1.0
Belgium	2015	3.0	3.4	1.5	2.1	-0.3	-0.6
Canada	*2013/15*	*1.6*	*2.9*	*1.2*	*2.1*	*-1.4*	*-0.9*
Czech Republic	2016	3.6	3.5	3.0	3.0	0.1	0.0
Denmark	2015	3.0	3.5	2.8	2.9	-0.4	-0.1
Finland	2016	3.5	2.9	1.9	2.5	0.5	-0.6
France	2015	2.4	3.6	1.1	2.5	-1.2	-1.4
Germany	2015	1.4	3.1	0.8	2.0	-1.7	-1.1
Italy	*2014*	*3.4*	*3.6*	*2.6*	*2.2*	*-0.1*	*0.4*
Japan	2016	3.6	1.9	2.9	1.5	1.7	1.3
Netherlands	2014	2.0	4.2	0.9	2.9	-2.2	-2.0
Norway	2016	3.9	3.3	2.2	2.3	0.5	-0.1
Poland	2016	3.7	2.4	2.5	2.7	1.3	-0.2
Portugal	2015	2.8	4.3	2.2	3.4	-1.5	-1.2
Spain	2016	2.4	3.9	1.6	2.7	-1.5	-1.2
Sweden	2016	1.9	2.7	1.3	1.9	-0.8	-0.6
UK	2016	0.9	3.7	0.4	2.8	-2.8	-2.4
USA	2015	0.2	2.8	0.4	2.2	-2.6	-1.8

Data source

HMD

NSO

HMD+NSO

Green = better

Red = worse

Period life expectancy at age 65: Months gained per year elapsed

Average trend annual increase in period life expectancy at age 65

Country	Last	Male		Female		Difference	
	Year	2011+	2001-11	2011+	2001-11	M	F
Australia	2016	1.6	2.3	1.0	1.6	-0.7	-0.6
Austria	2016	0.9	2.0	0.8	1.8	-1.1	-1.0
Belgium	2015	1.5	2.3	0.8	1.7	-0.8	-0.9
Canada	*2013/15*	1.6	2.2	0.8	1.8	-0.6	-1.0
Czech Republic	2016	2.0	2.1	2.4	2.3	-0.2	0.2
Denmark	2015	2.3	2.3	2.1	2.0	0.0	0.1
Finland	2016	1.5	2.2	0.8	2.2	-0.7	-1.4
France	2015	1.3	2.4	0.6	2.0	-1.2	-1.4
Germany	2015	0.7	2.0	0.4	1.5	-1.3	-1.1
Italy	*2014*	2.4	2.1	2.0	1.6	0.2	0.4
Japan	2016	2.1	1.3	1.9	1.4	0.8	0.5
Netherlands	2014	2.2	3.0	1.3	2.1	-0.8	-0.9
Norway	2016	2.4	2.2	1.3	1.6	0.2	-0.3
Poland	2016	1.6	1.6	1.7	2.2	0.1	-0.5
Portugal	2015	1.4	2.4	1.2	2.4	-1.0	-1.1
Spain	2016	1.1	2.3	1.4	2.2	-1.1	-0.9
Sweden	2016	1.6	1.9	1.0	1.4	-0.3	-0.3
UK	2016	0.8	2.8	0.3	2.3	-2.0	-1.9
USA	2015	0.7	2.2	0.8	1.8	-1.5	-1.0

Data source

HMD

NSO

HMD+NSO

Green = better

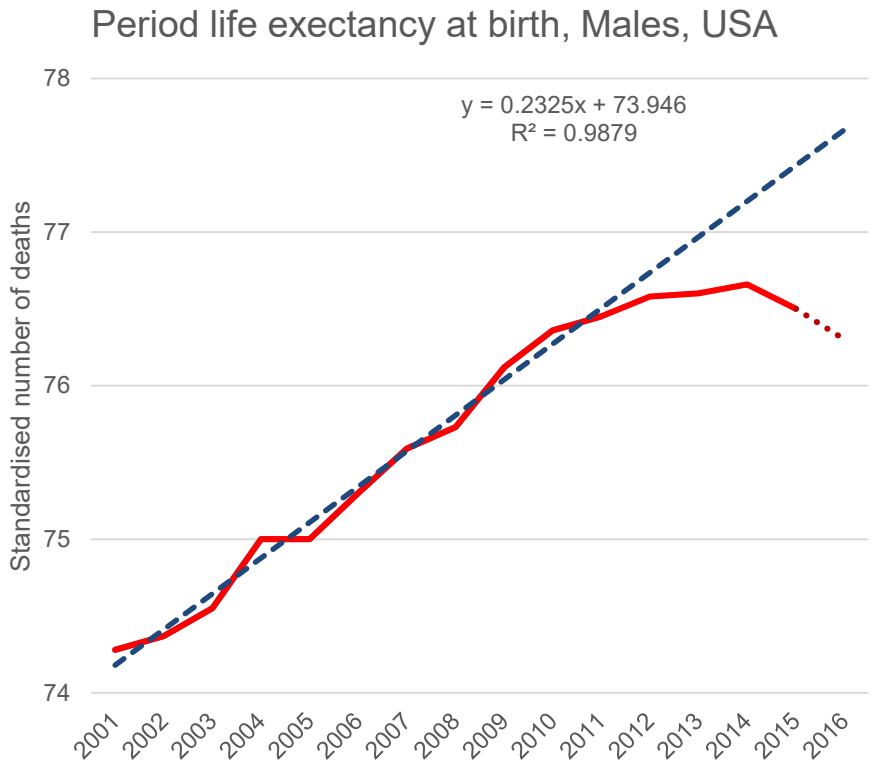
Red = worse

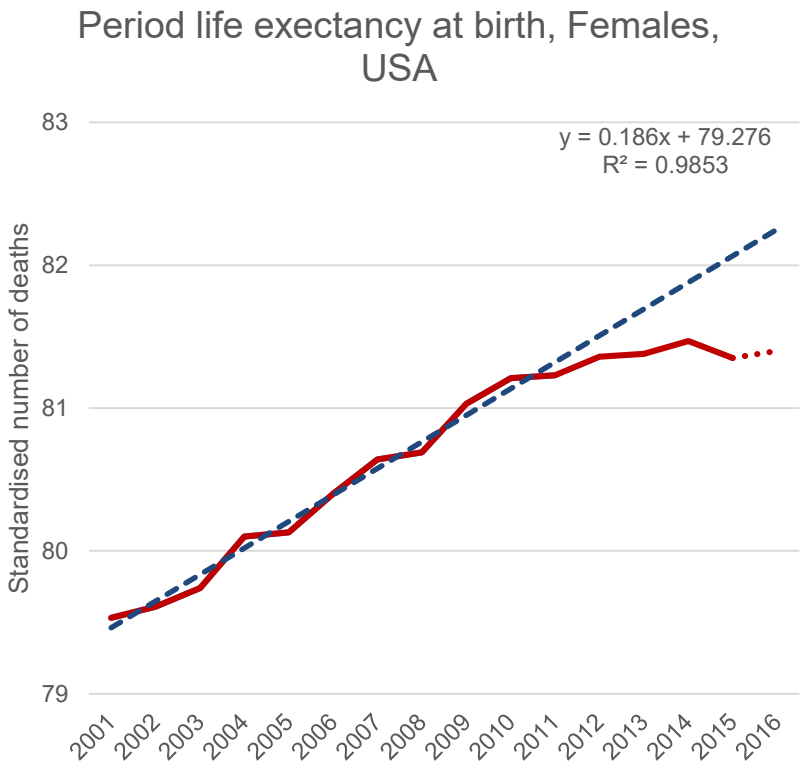
Selected high-income countries

Where are there signs of a fallback – and why?

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

US Period life expectancy at birth

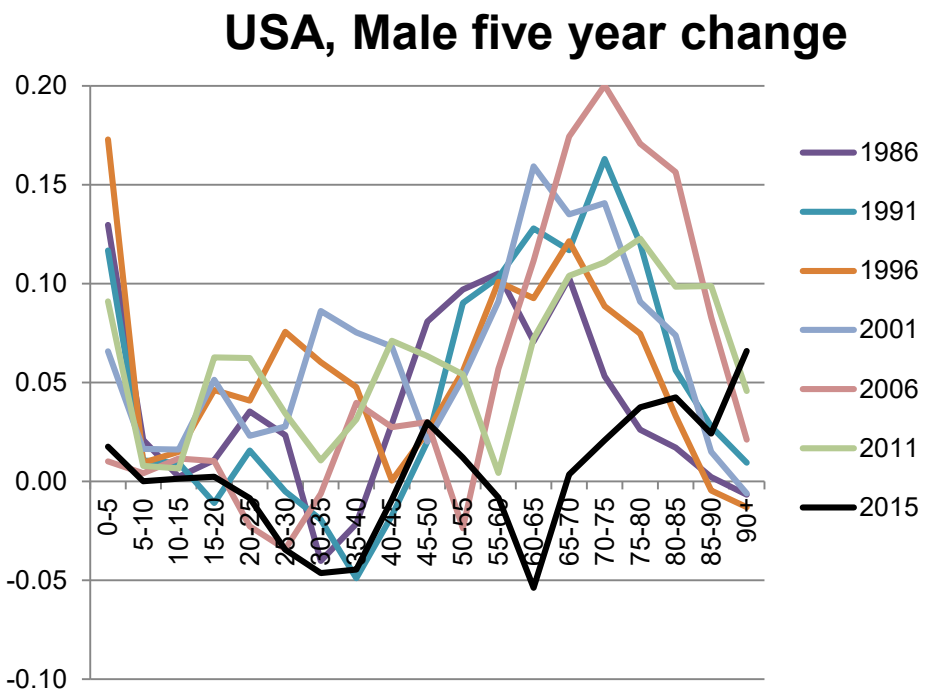


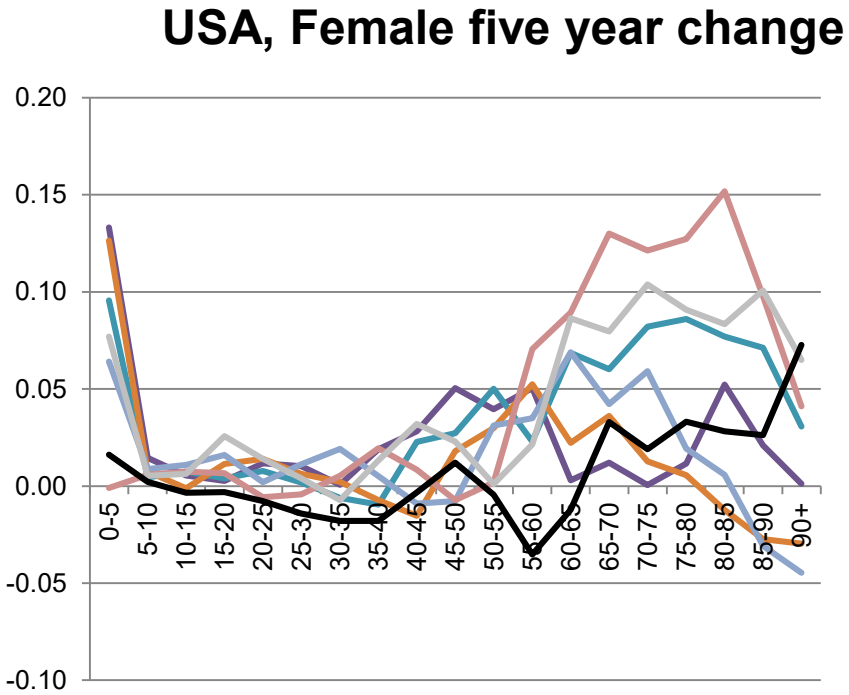


2016: Mortality in the United States, 2016, National Center for Health Statistics https://www.cdc.gov/nchs/products/databriefs/db293.htm
Extension to 2016 done by applying difference between 2015 and 2016 figures from NHSC to HMD data used for analysis

Next: What age groups caused the slow-down?

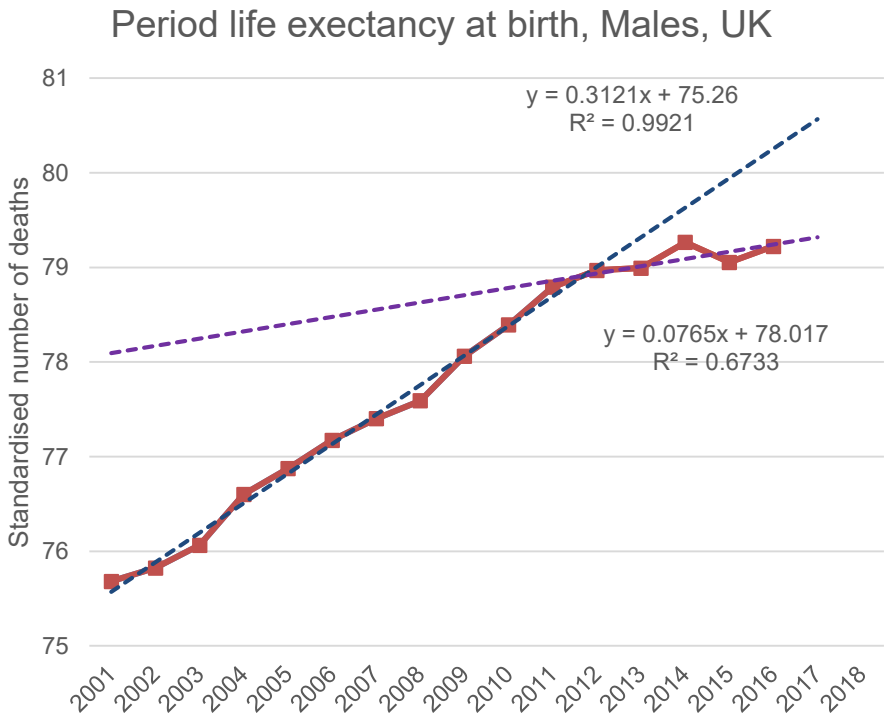
US increase in partial life expectancy by 5-year age bands, for 5-year periods ending 1986 to 2011 and 4-year to 2015

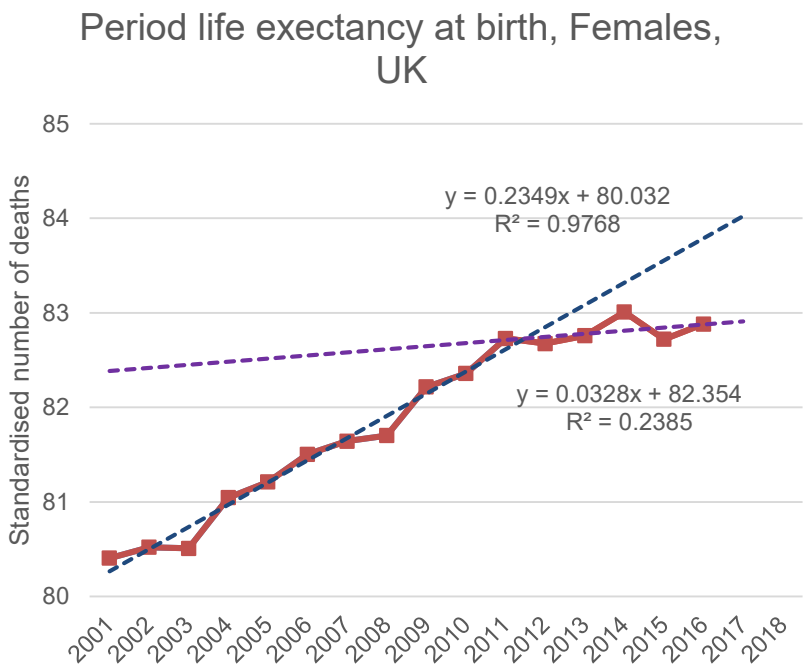




Next: UK

UK: Period life expectancy at birth 2001 to 2016





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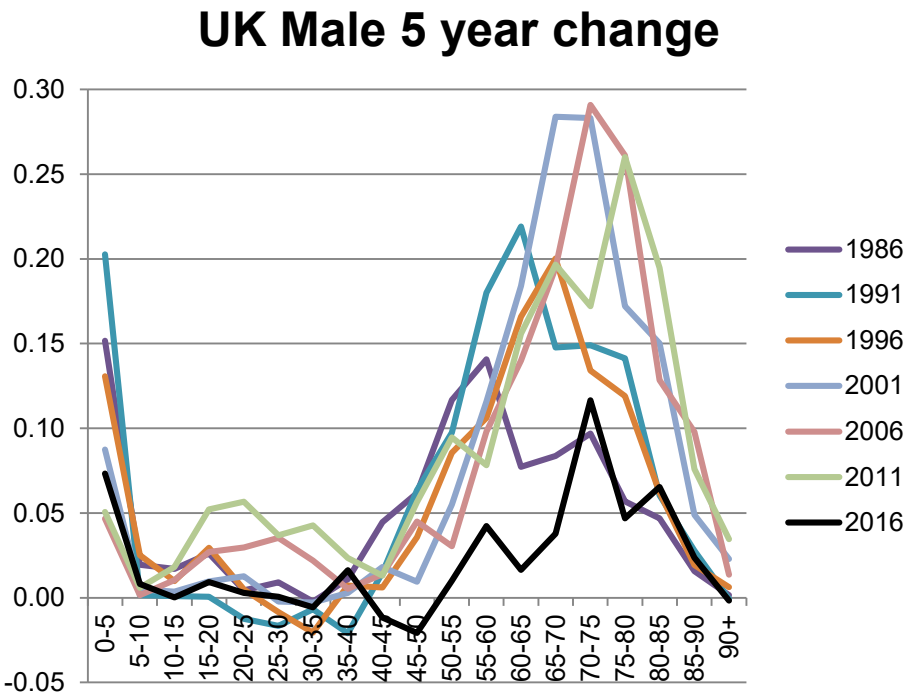
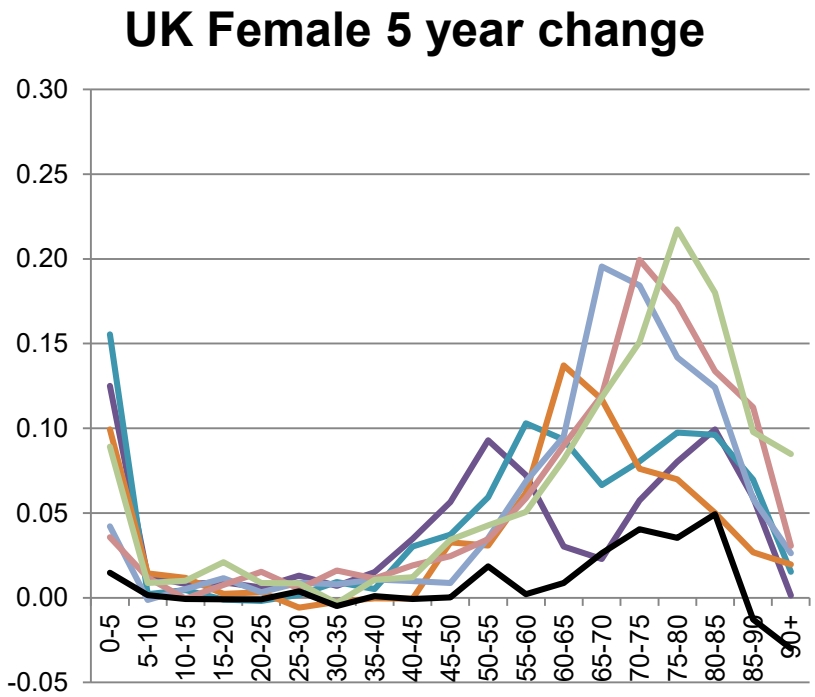
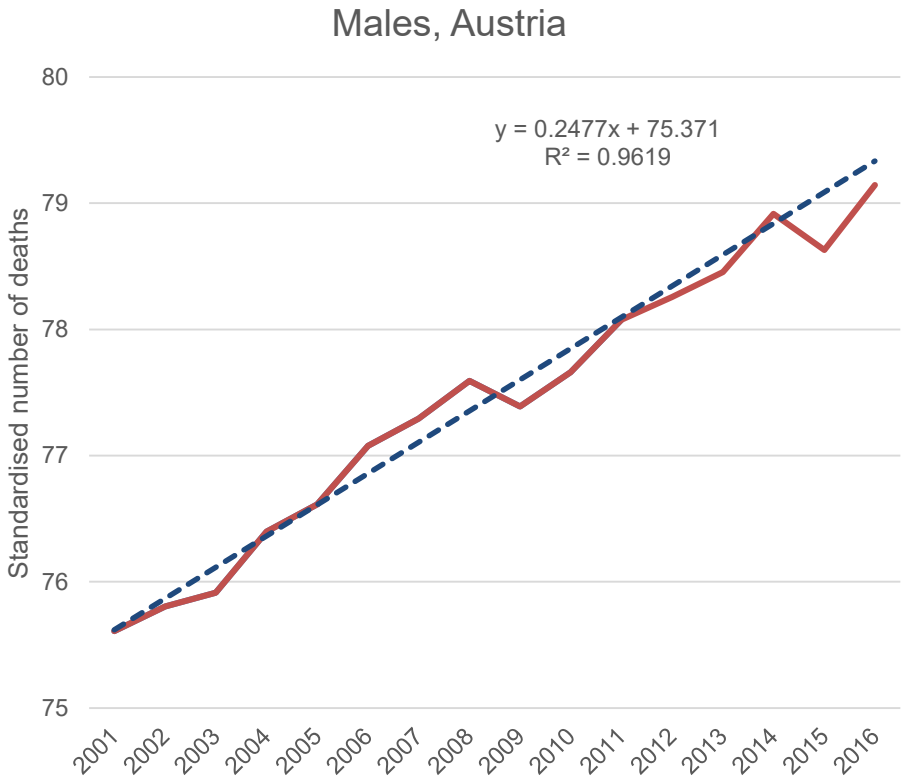
UK increase in partial life expectancy by 5-year age bands, for 5-year periods ending 1986 to 2016

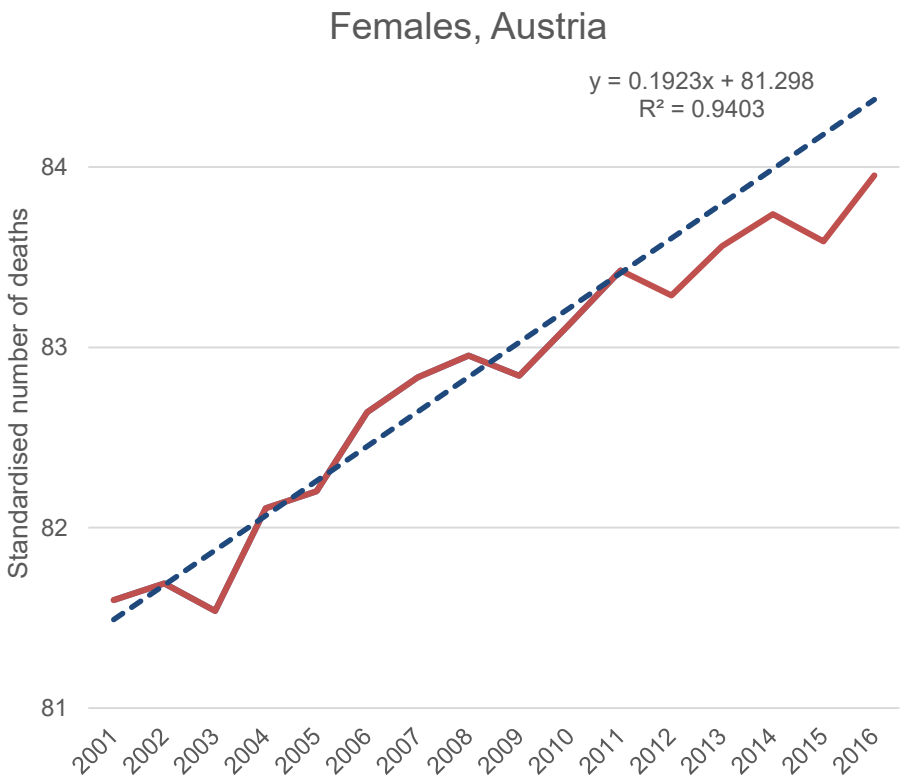




Next: other European countries -Austria

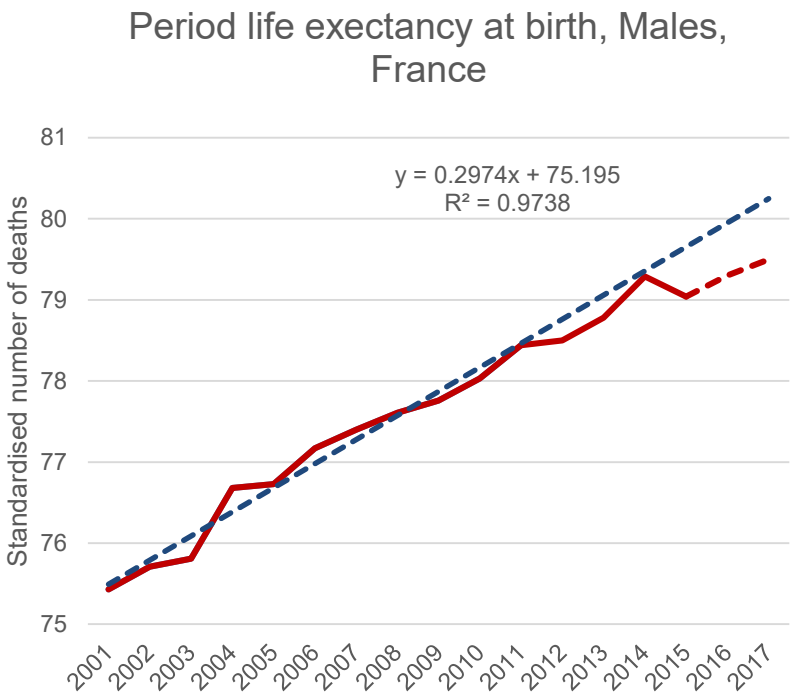
Austria Period life expectancy growth fell in 2012 for females, in 2015 and is recovering better for males than for females

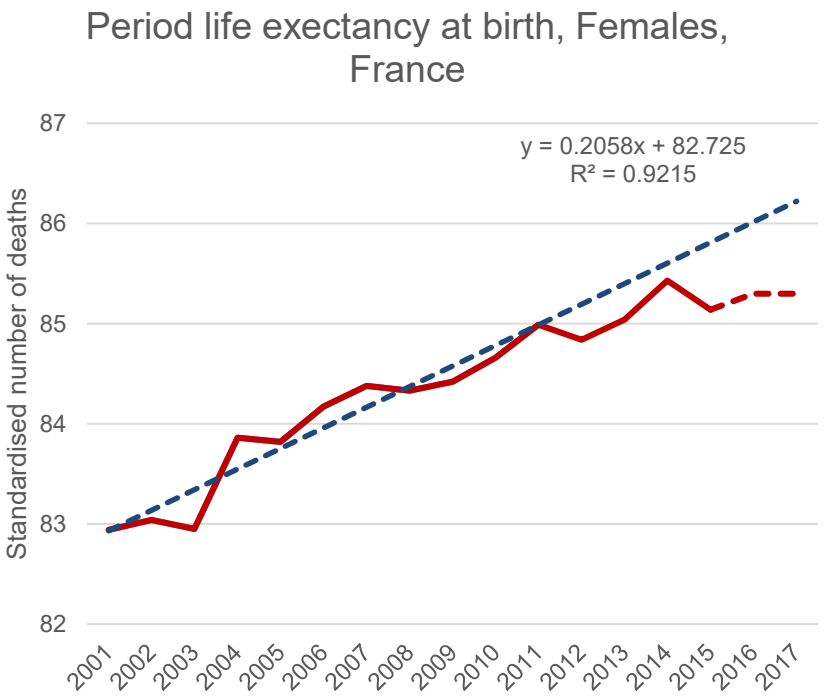




Next: France

France: Period life expectancy at birth from 2001

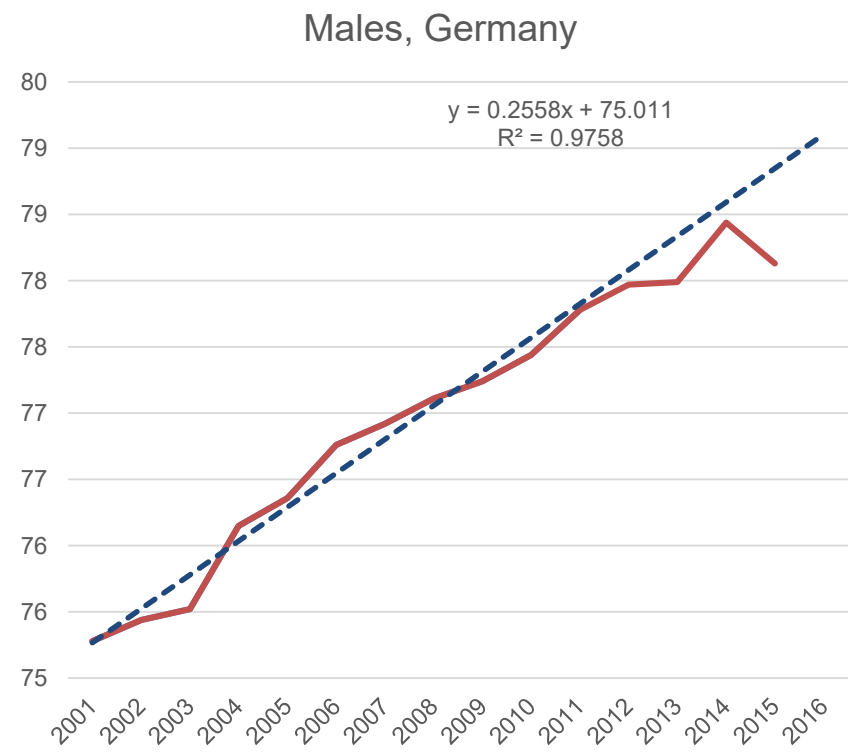


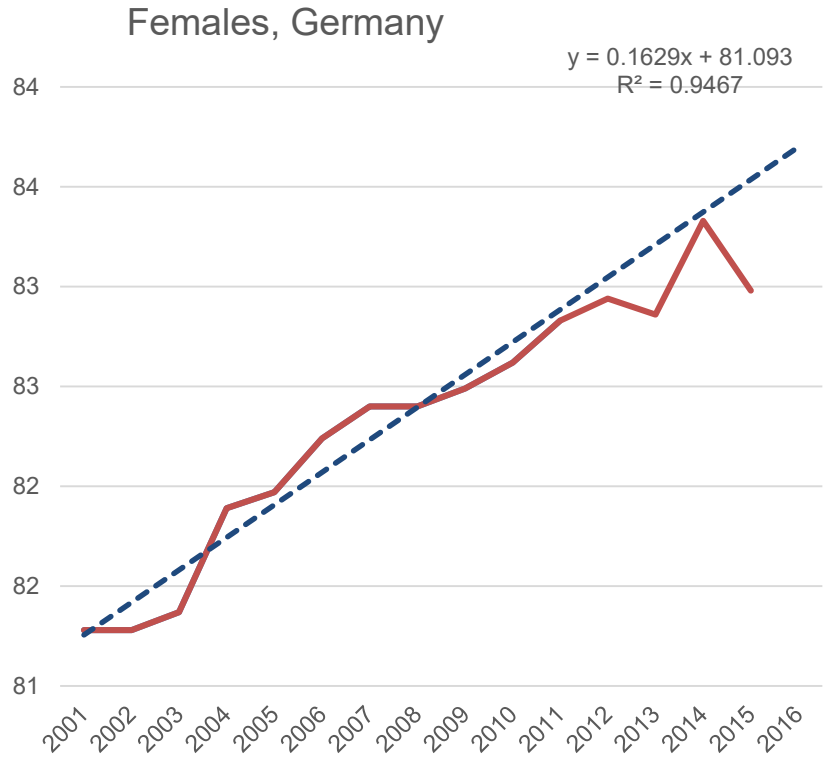


See also Espérance de vie à divers âges en 2017 Données annuelles de 1994 à 2017, Insee
https://www.insee.fr/fr/statistiques/2416631#Tableau-Donnes Courtesy Marine Habart

Next: Germany

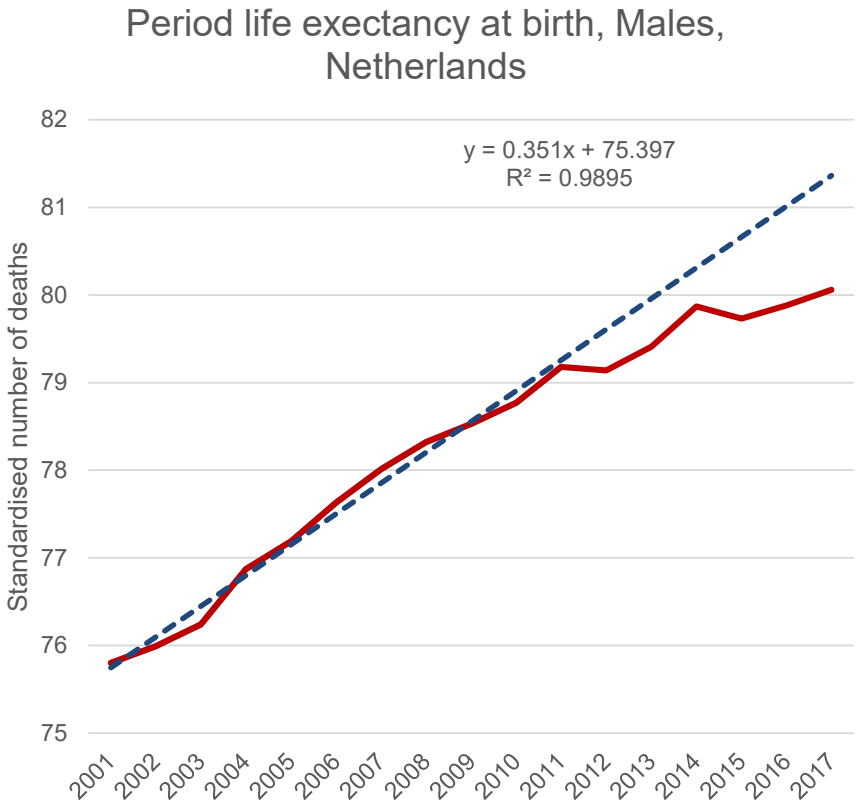
Germany Period life expectancy at birth

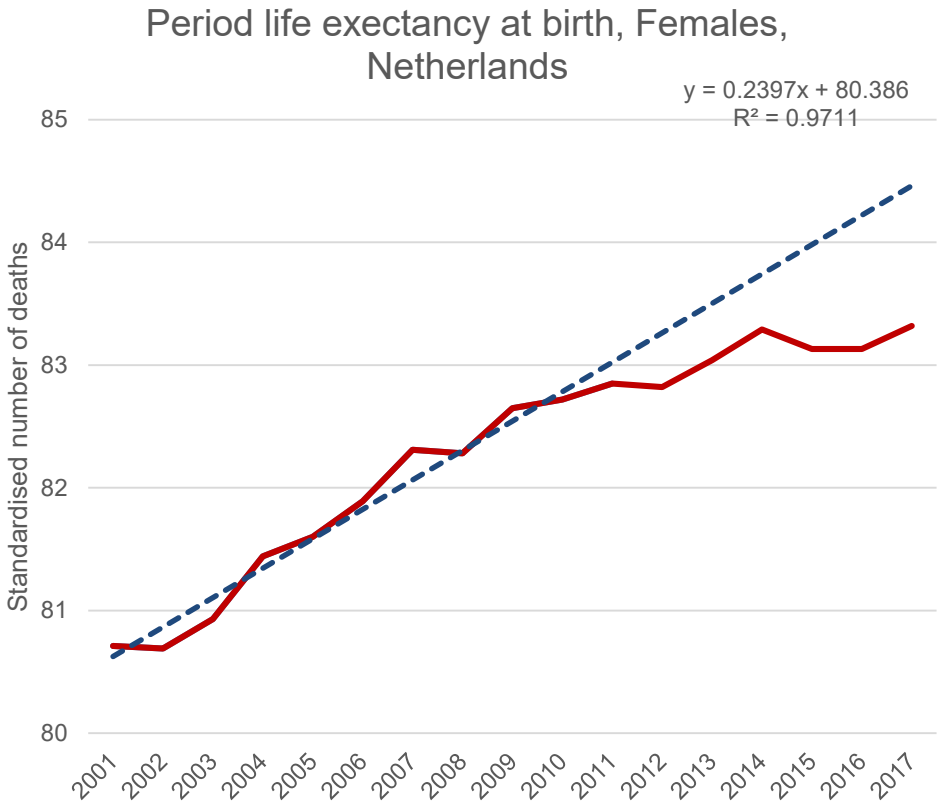




Next: Netherlands

The Netherlands: Period life expectancy at birth

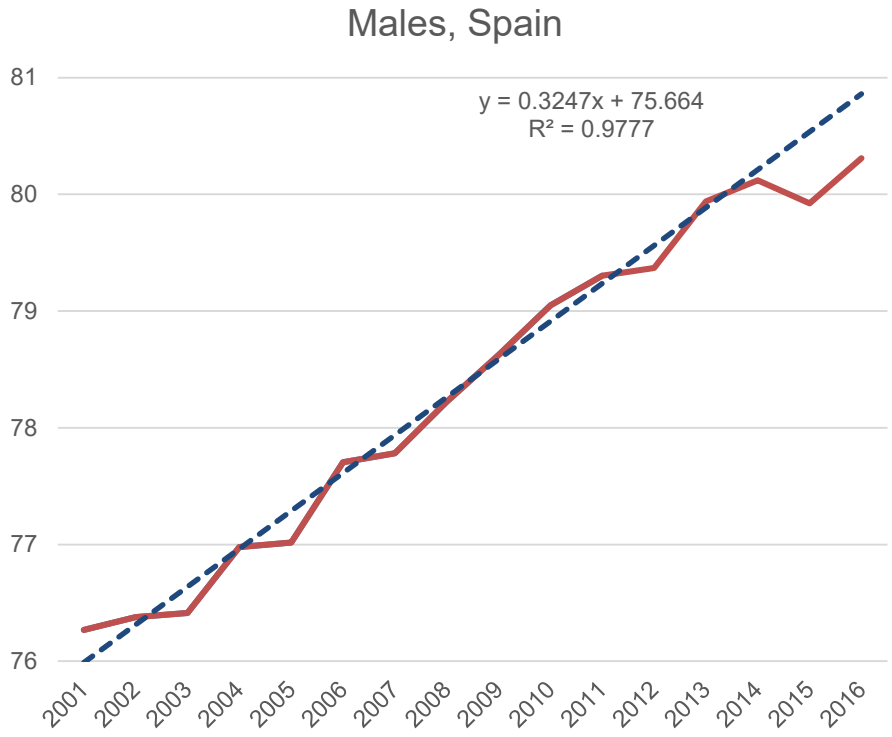


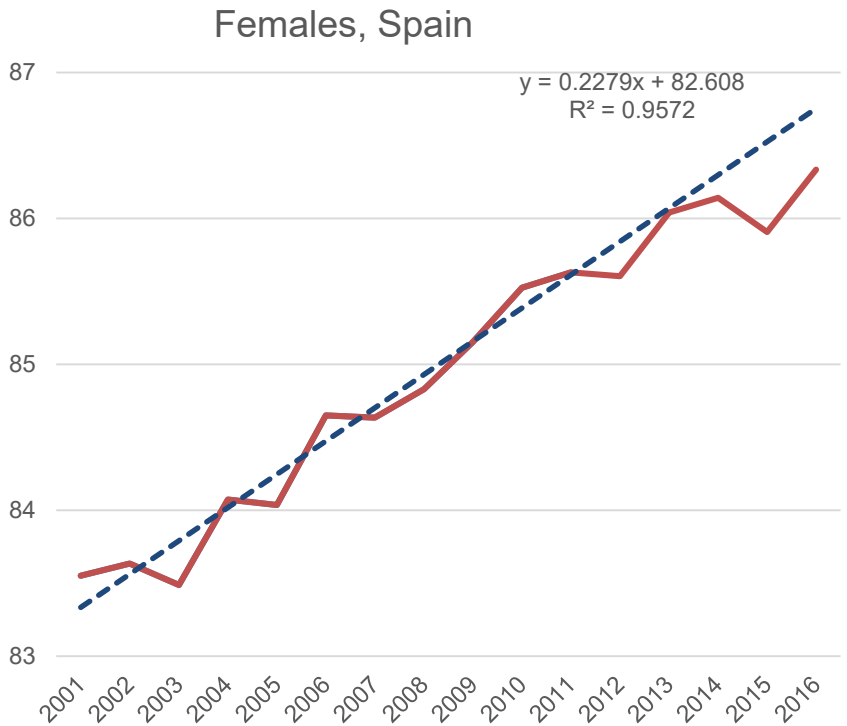


Source: Centraal Bureau voor de Statistiek, http://statline.cbs.nl/Statweb/publication/?VW=T&DM=SLNL&PA=37360ned&D1=3&D2=1-2&D3=0&D4=77,79-83,85-89,91-95,97-98&HD=180525-1109&HDR=G1,T&STB=G2,G3 Courtesy Hans de Mik

Next: Spain

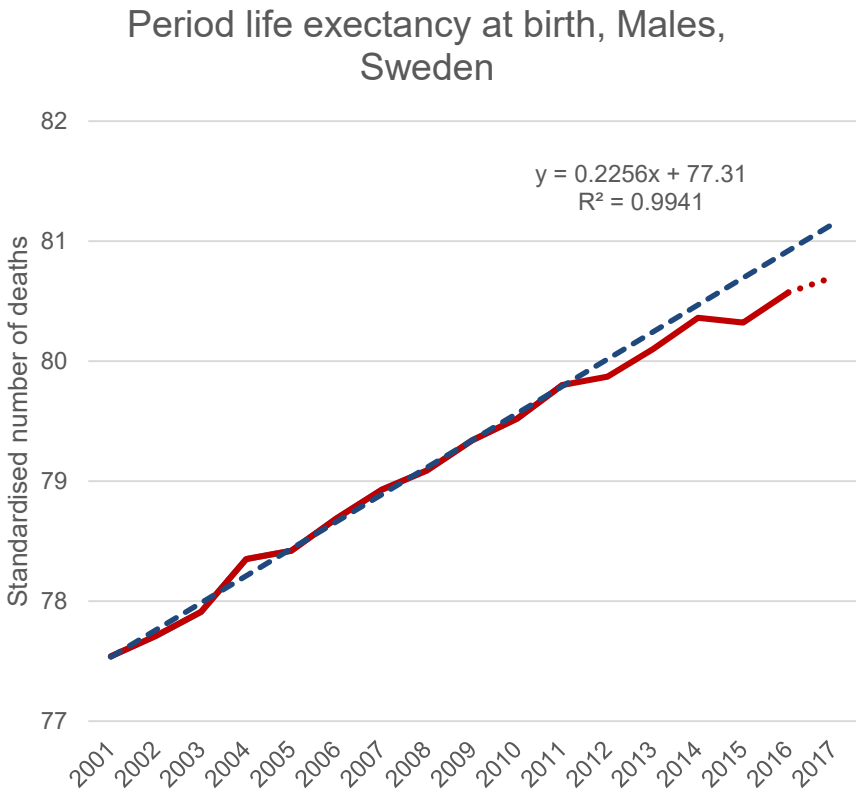
Spain Period life expectancy at birth

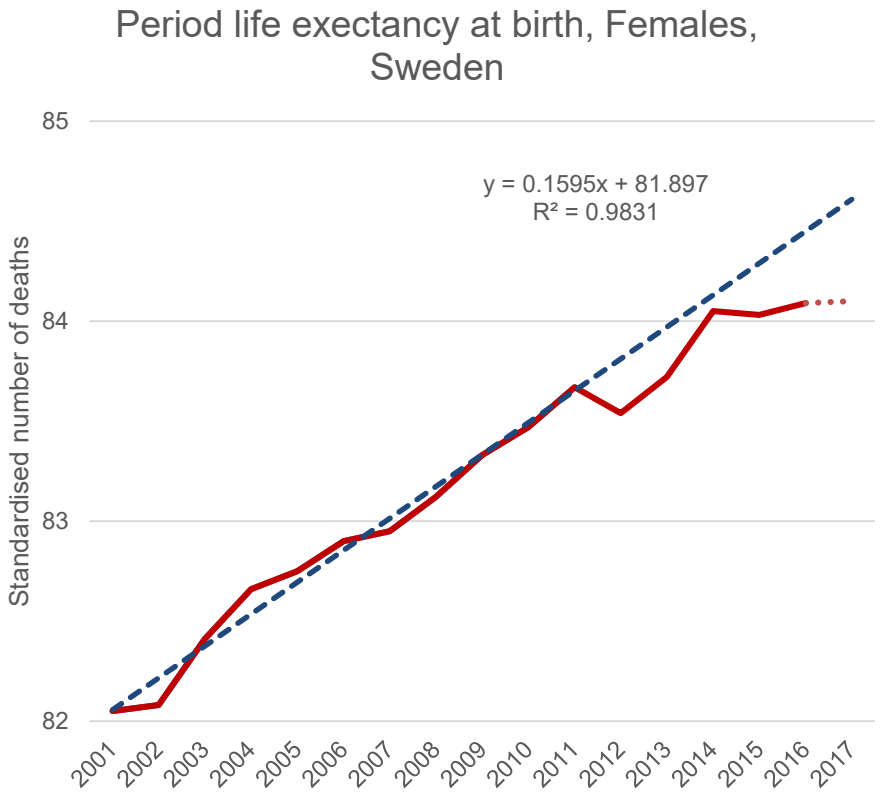




Next: Sweden

Sweden: Period life expectancy at birth

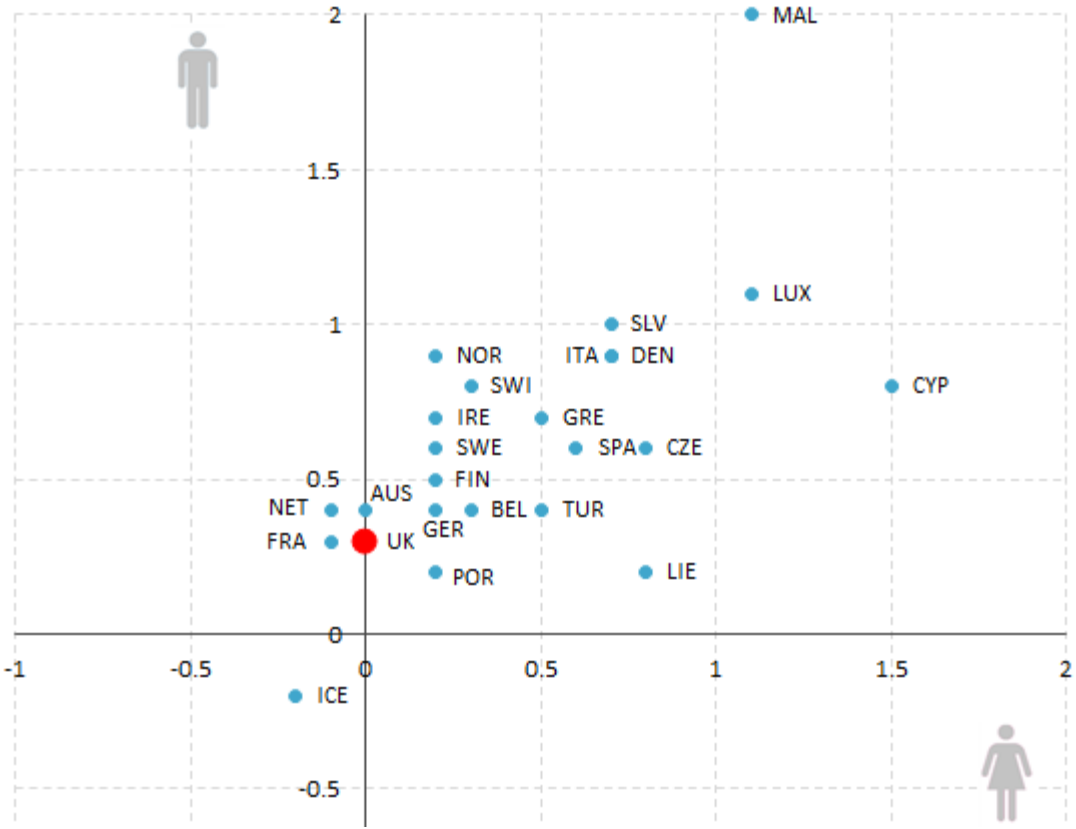




Source for 2017: http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__BE__BE0101__BE0101I/LivslangdEttariga/?rxid=984223ab-5d2a-4259-a8eb-6bb54a495f6e Courtesy Rikard Bergstrom

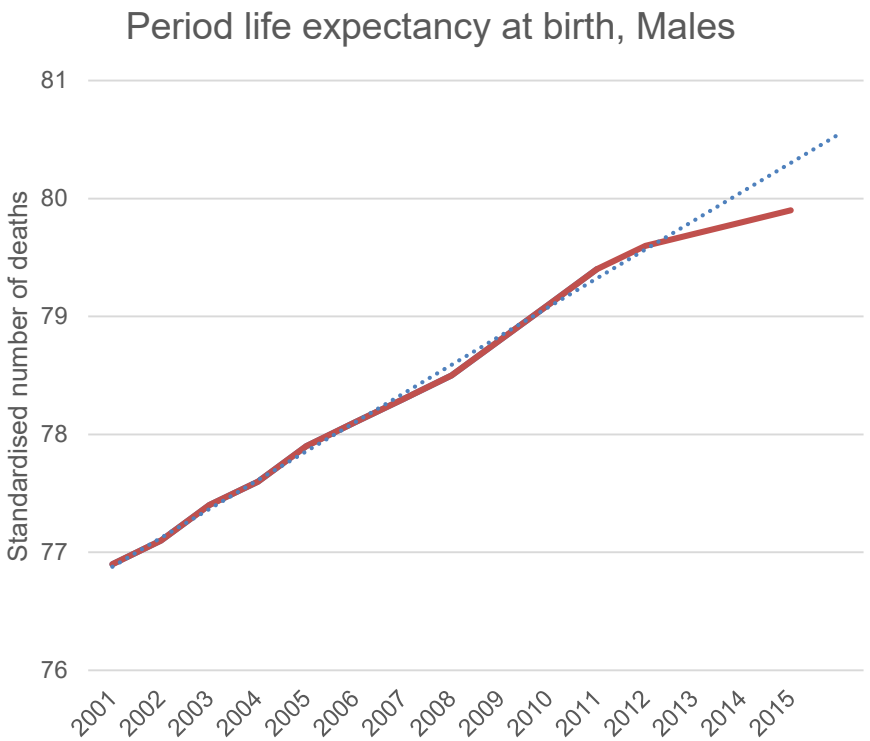
Next: European countries combined

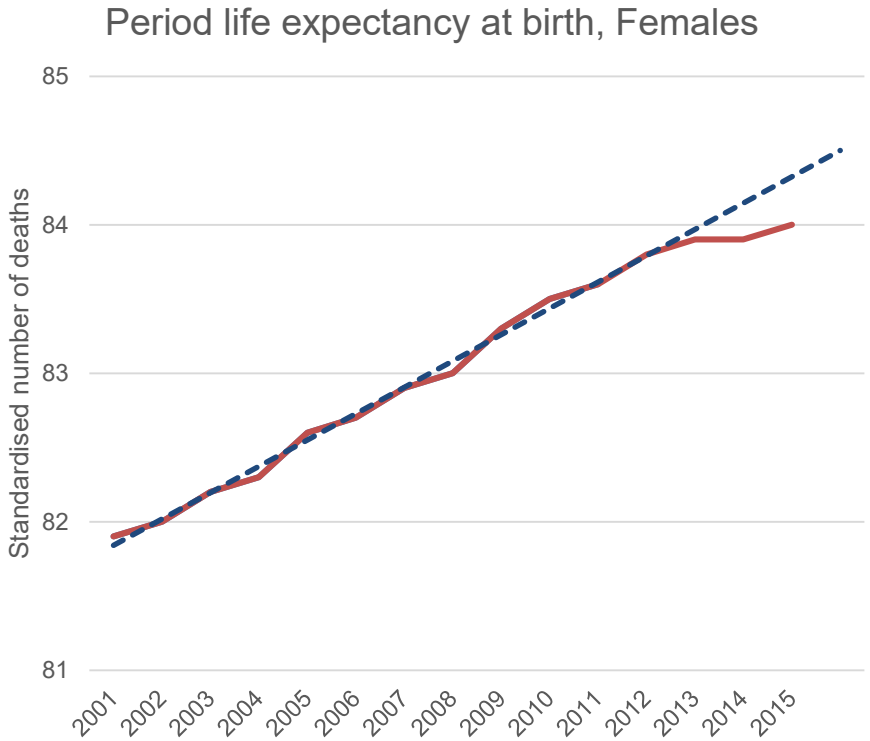
European countries Period life expectancy growth 2011-2016



Source Eurostat Courtesy Steven Baxter, Club Vita

Canada Period life expectancy at birth



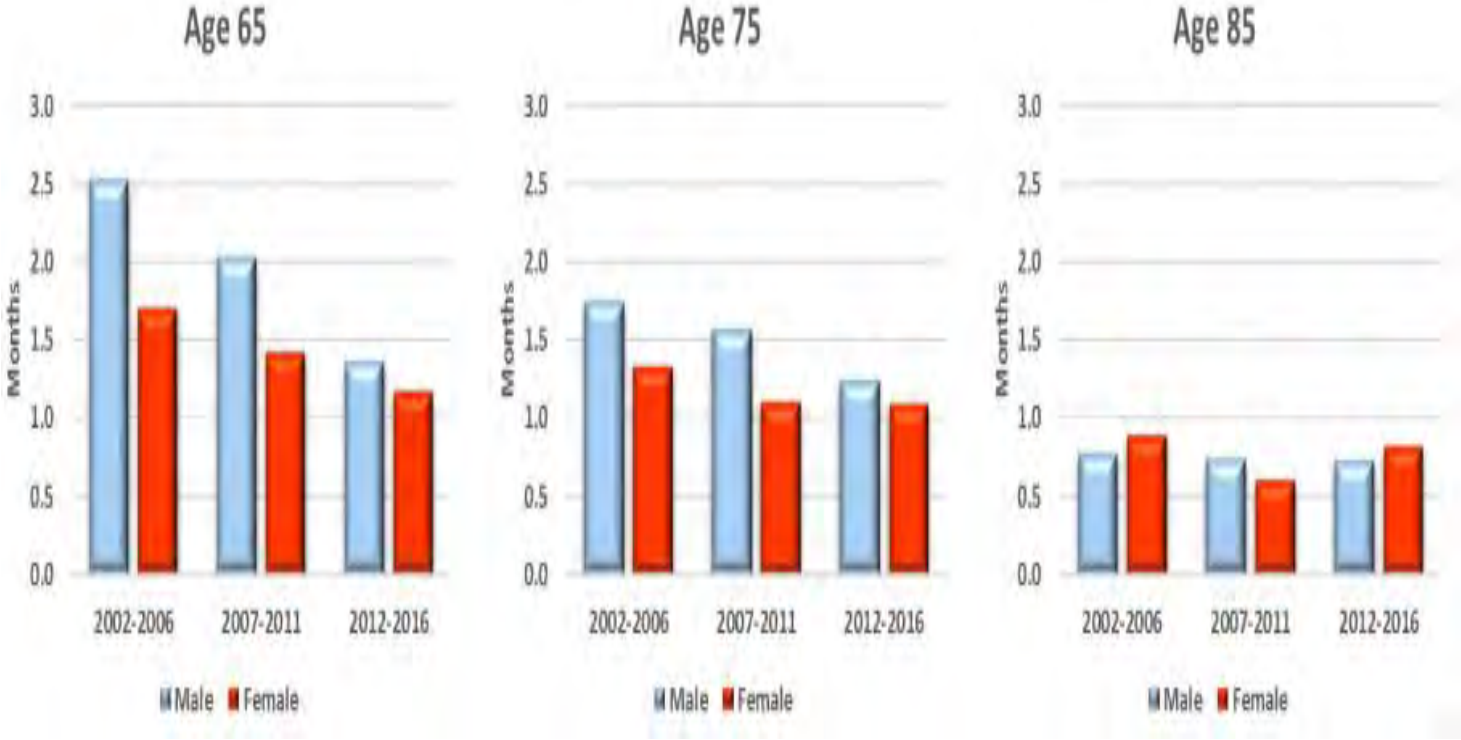


Source: [Report on the Demographic Situation in Canada Mortality: Overview, 2014 to 2016 by Rufteen Shumanty]

Next: Canada Old Age Security experience

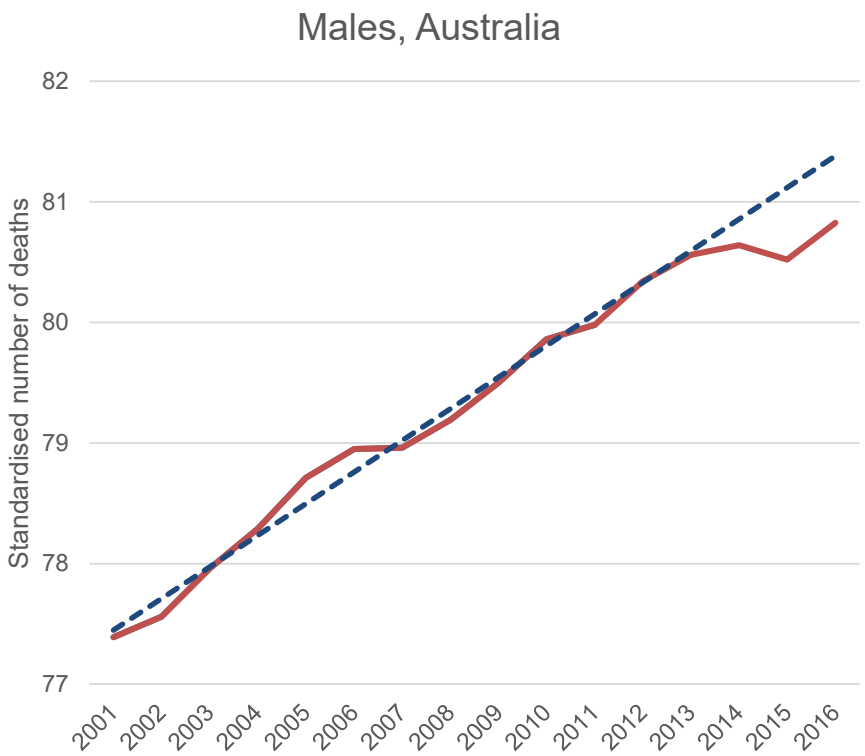
Canada Old Age Security (OAS) Program

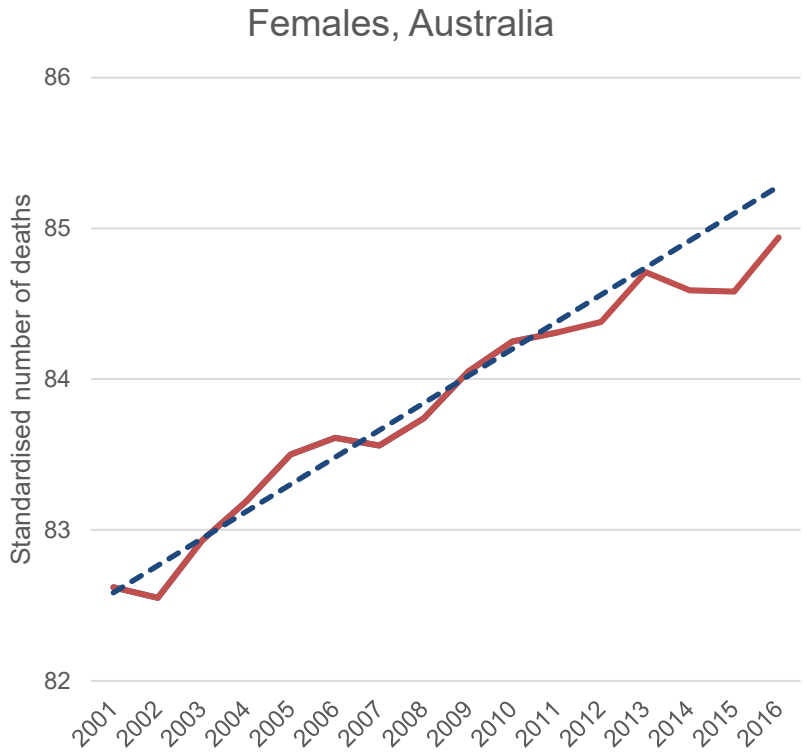
Average Annual Increase in Life Expectancy of OAS Beneficiaries (in months)



Canada, Old Age Security (OAS) Program Mortality Experience Fact Sheet, Office of the Superintendent of Financial Institutions http://www.osfi-bsif.gc.ca/eng/oca-bac/fs-fr/Pages/oas_pme.aspx Courtesy Assia Billig

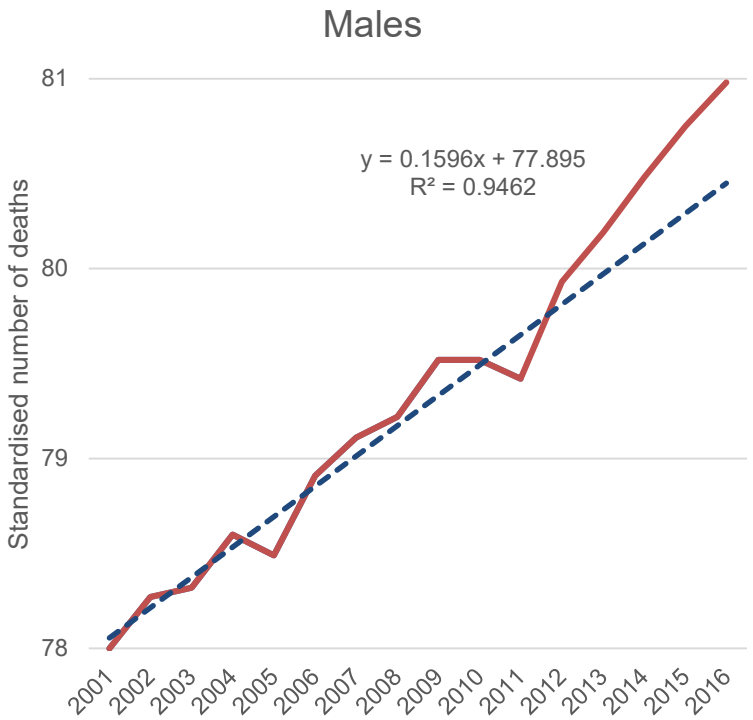
Australia Period life expectancy

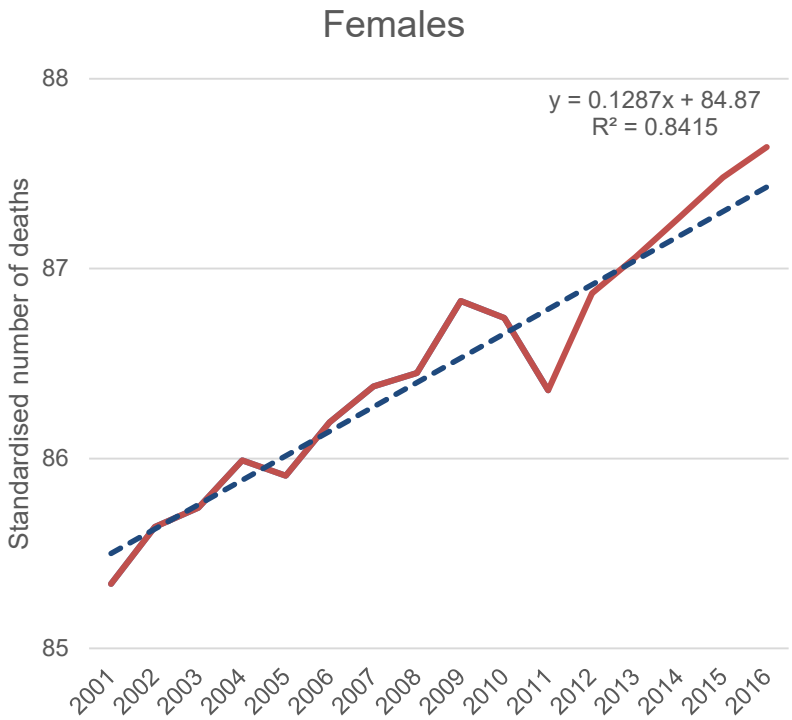




Next: Japan

Japan period life expectancy

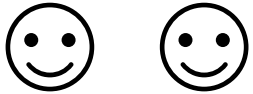




Next: summary

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? –

Possible causes and drivers

Looking for **major** causes and drivers that might have contributed to the recent changes

How about ***your*** country/experience? Are there the same influences?

Groupings, Causes and drivers

Seasonal factors (eg winter mortality)

Causes of death

- “working age” causes (15-64)
- cardiovascular/circulatory/stroke
- dementia

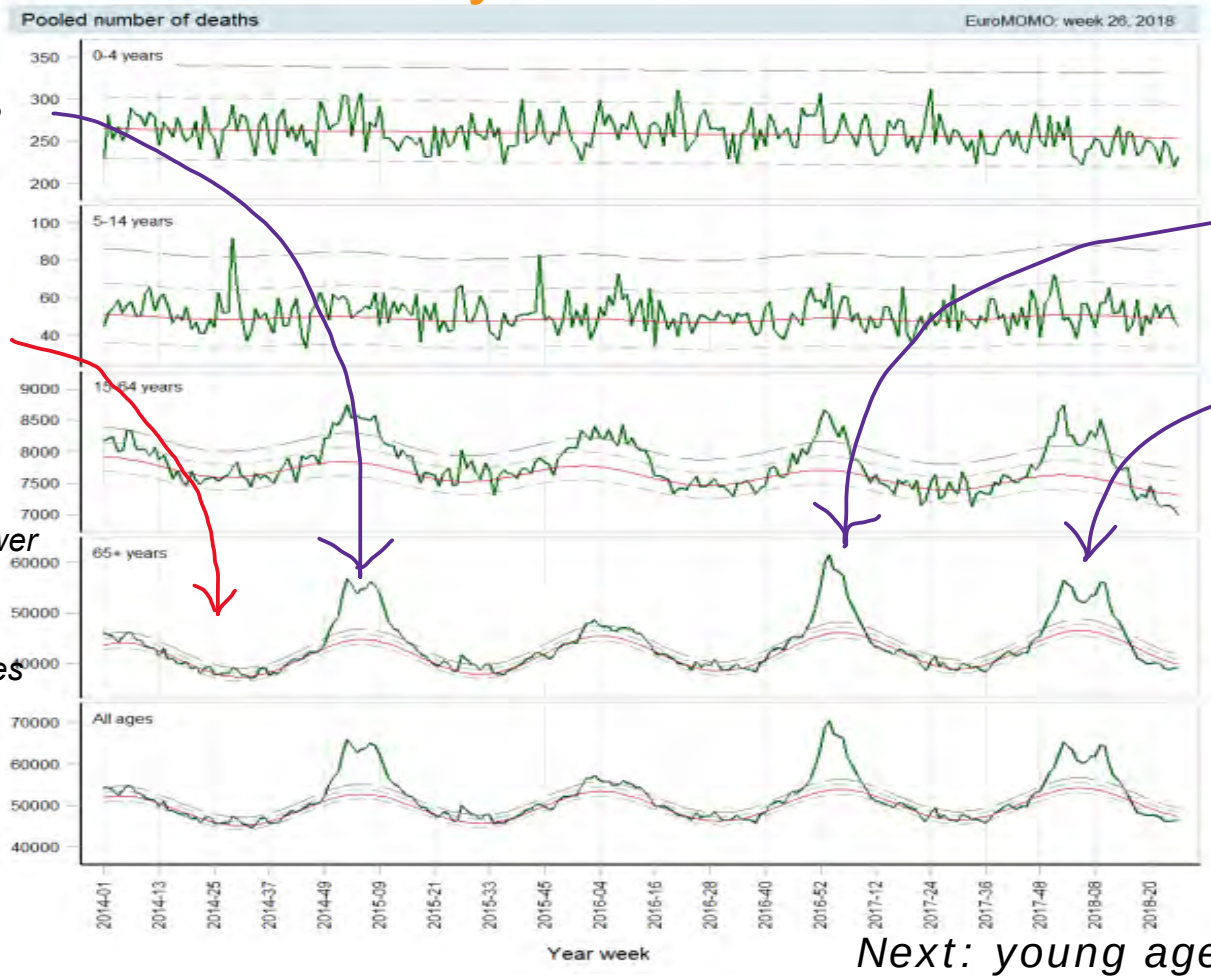
Drivers: behaviours - smoking – obesity

Socio-economic groups and deprivation

Austerity

Next: seasonal mortality

Seasonal mortality – Europe excess winter mortality



Winter 2014/15

Normal excess Winter mortality 2013/14

Scandinavian countries normally experience lower excess winter mortality

… and southern countries (Spain, Portugal) often higher!

Age band

0 – 4

Winter 2016/17

5 – 14

Winter 2017/18

15 – 64

Influenza A(H3N2) inter alia

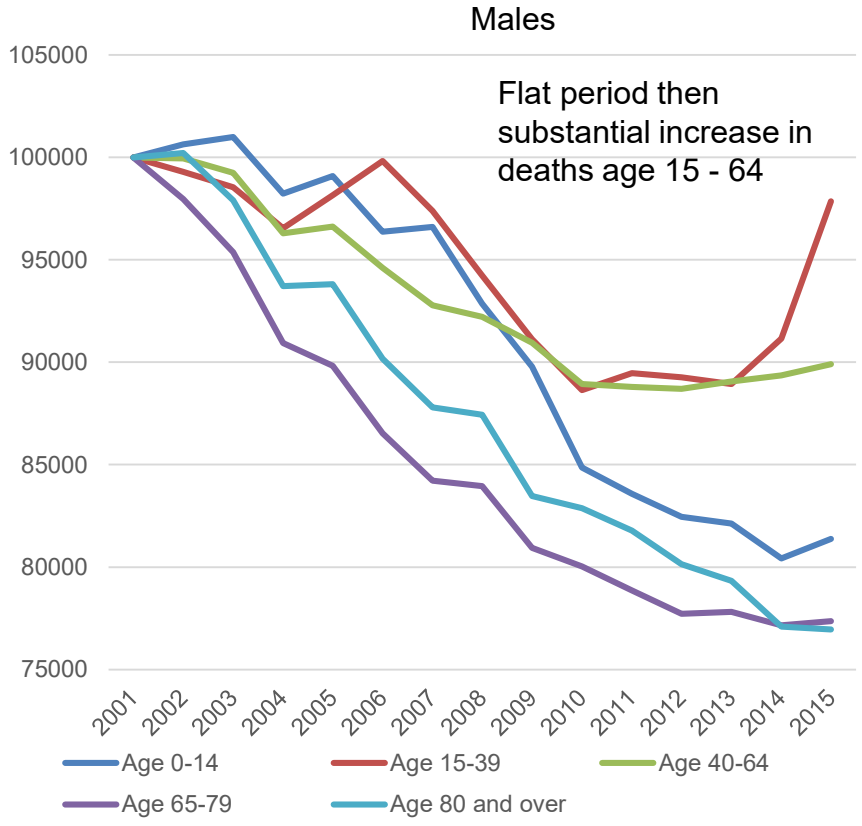
65 +

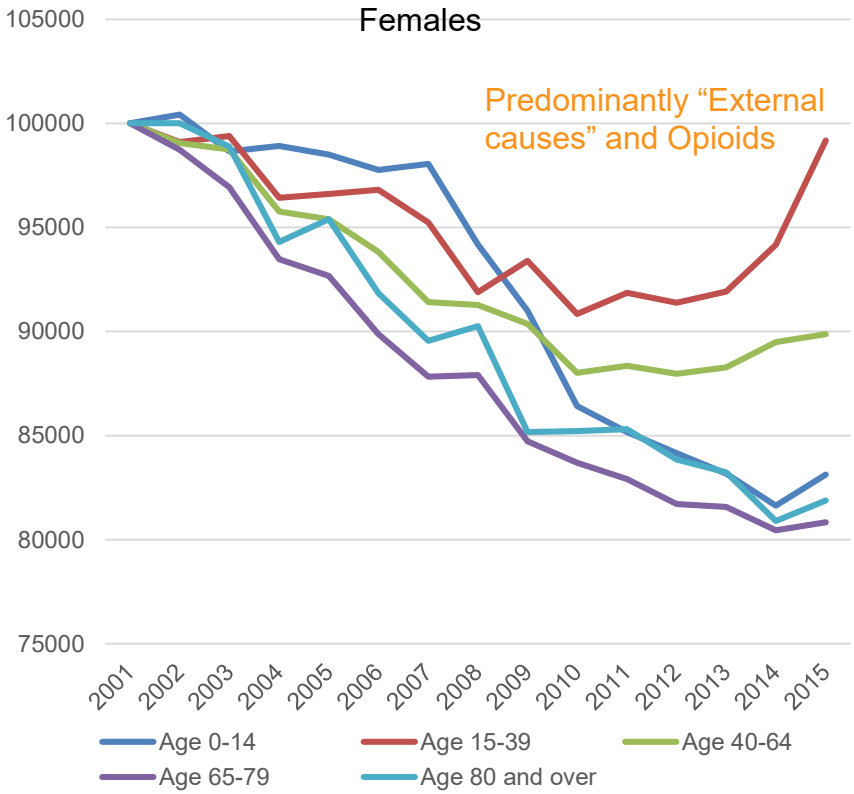
all ages

Source: EuroMOMO

Next: young age mortality US

US Standardised deaths indexed to 100k in 2001





Next: opioids

US Opioids: Age adjusted mortality 1999-2016 Deaths per 100.000

All Ages	Annual Improvement 1999-2016	2011-2016	2015-2016
Both	-9.7%	-12.5%	-27.4%
Female	-11.2%	-10.1%	-19.9%
Male	-9.0%	-13.9%	-31.1%
Age Group*			
< 1	**	**	**
1 - 4	**	**	**
5 - 14	**	**	**
15 - 24	-10.9%	-9.8%	-31.7%
25 - 34	-11.4%	-15.4%	-33.2%
35 - 44	-7.4%	-14.1%	-30.6%
45 - 54	-8.3%	-8.7%	-20.6%
55 - 64	-14.7%	-14.5%	-22.5%
65 - 74	-13.1%	-15.6%	-20.8%
75 - 84	-6.1%	-9.7%	-3.2%
85+	-5.8%	0.6%	6.5%

*includes both genders

**Less than 10 deaths. See section 3.

overall mortality rate (both genders) due to opioid drug overdose increased 27.4% in 2016

U.S. Population Mortality Observations Updated with 2016 Experience, Holman et al. SOA 2018 https://www.soa.org/Files/resources/research-report/2018/us-population-mortality.pdf

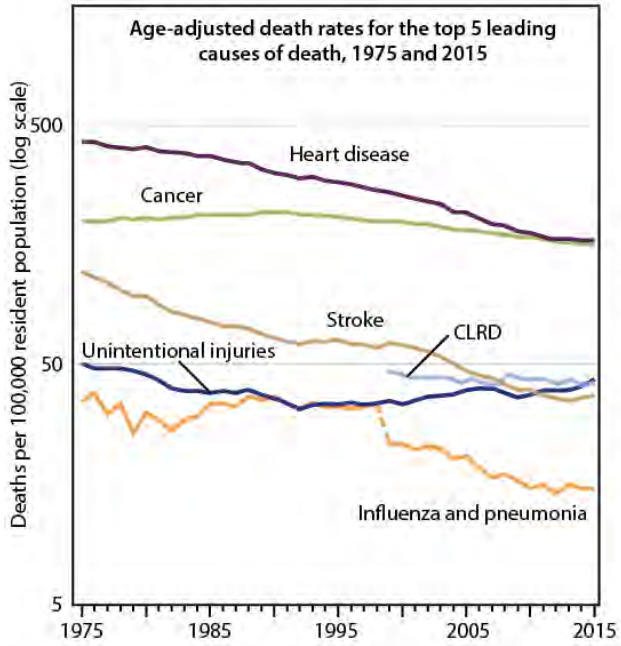
Next: US Cause of Death

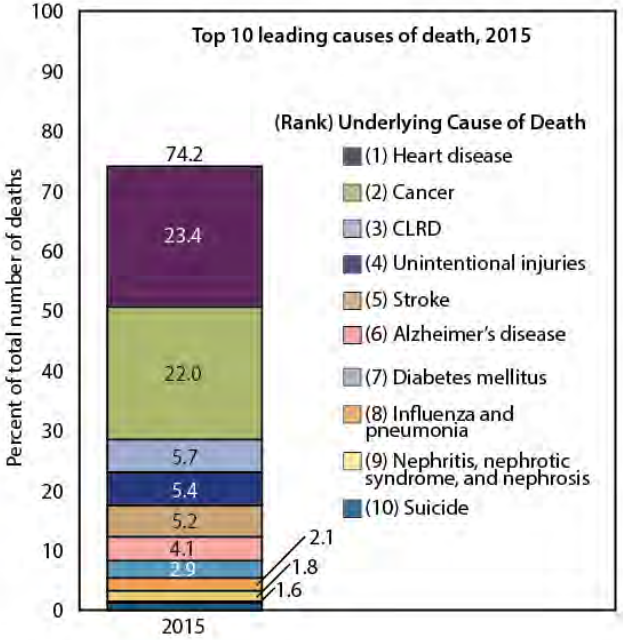
US top 5 causes of death (all ages)

NB – logarithmic scale

Cardiovascular/
circulatory/
Stroke

Substantial improvements (reduced by 1/3) now slowing





Source: NHCS

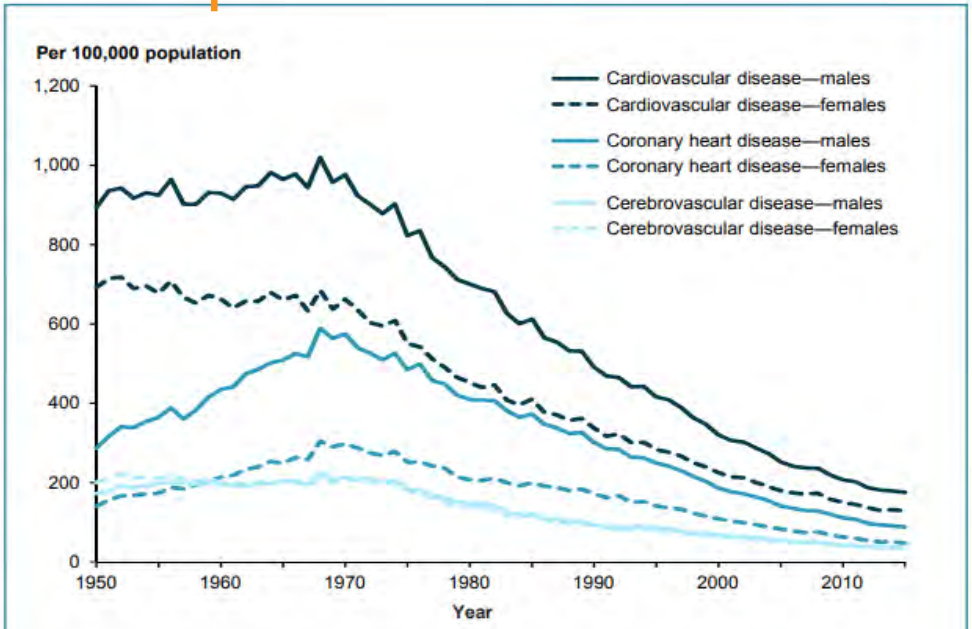
Next: Australia

Australia top causes of death

Cardiovascular

CHD

Cerebrovascular



Note: Rates have been standardised to the Australian population as at 30 June 2001.

Source: AIHW National Mortality Database.

Figure 1: Death rates for cardiovascular disease, coronary heart disease, and cerebrovascular disease, 1950–2015

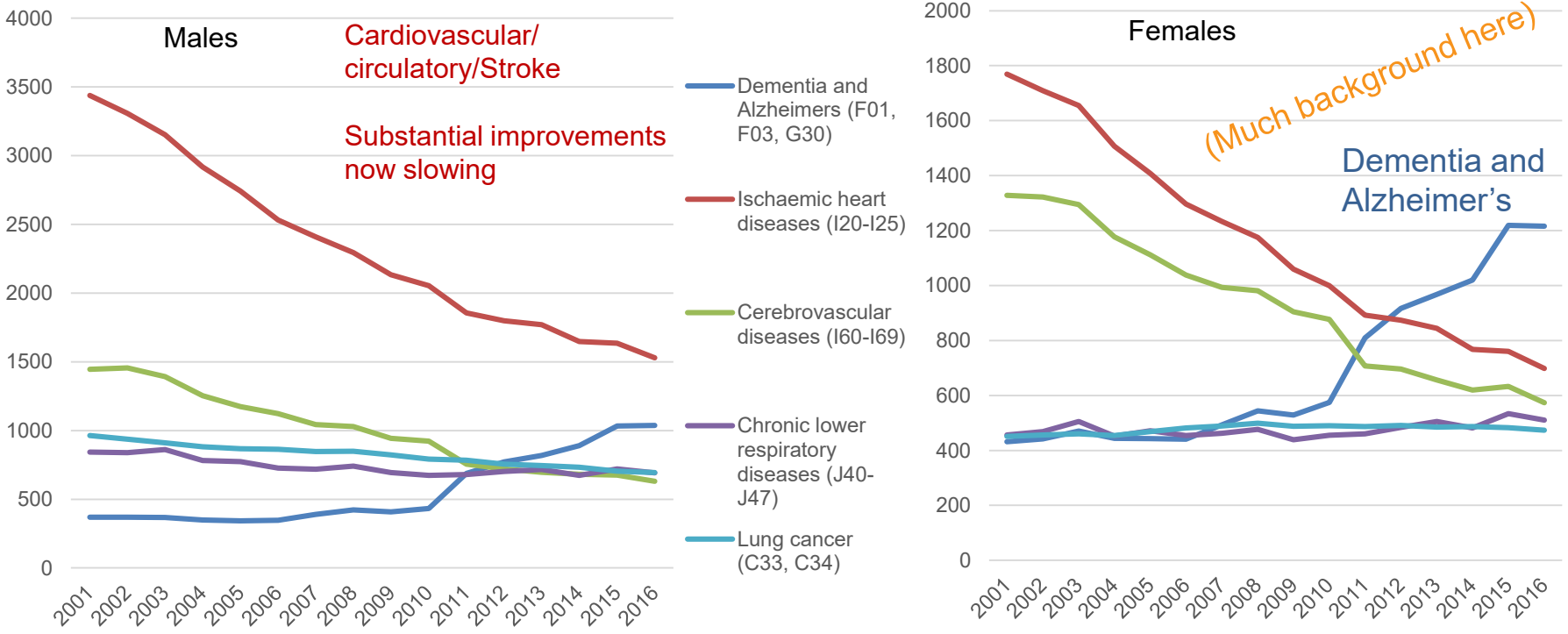
"As the death rate from cardiovascular disease fell, rates from other diseases, such as dementia rose. Dementia might soon overtake coronary heart disease as the single leading cause of death in Australia (ABS 2016).

There are close associations between dementia and cardiovascular disease—cardiovascular disease itself is a major cause of dementia, and it is often listed as an associated cause when dementia is the underlying cause of death."

Source: Trends in cardiovascular deaths, Australian Institute of Health and Welfare Bulletin 141 • September 2017 https://www.aihw.gov.au/getmedia/2ba74f7f-d812-4539-a006-ca39b34d8120/aihw-21213.pdf

Next: E&W cause of death

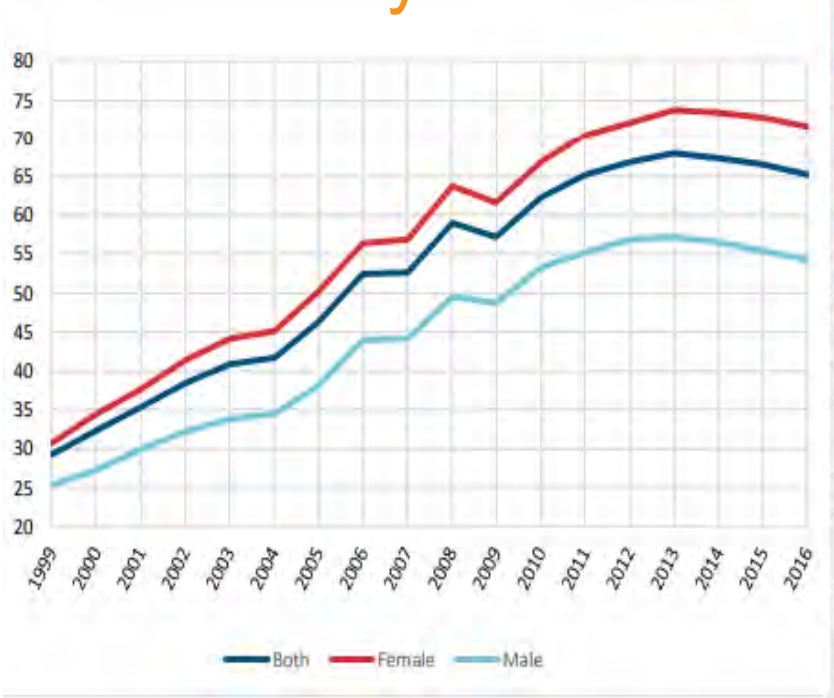
E&W Age standardised mortality rates for top five leading causes of death M, F (per million population)



Next: US Dementia and Alzheimer's

Source: Deaths registered in England and Wales (series DR): 2016
https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsregisteredinenglandandwalesseriesdr/2016#dementia-and-alzheimer-disease-remained-the-leading-cause-of-death-in-2016

US Alzheimer's/Dementia, age adjusted mortality 1999-2016



All Ages	Annual Improvement 1999-2016	2011-2016	2015-2016
Both	-4.8%	0.0%	1.8%
Female	-5.1%	-0.3%	1.5%
Male	-4.6%	0.4%	2.0%
Age Group*			
< 1	**	**	**
1 - 4	**	**	**
5 - 14	**	**	**
15 - 24	**	**	**
25 - 34	**	**	**
35 - 44	-1.4%	6.1%	30.2%
45 - 54	-3.8%	3.2%	-8.0%
55 - 64	-4.2%	0.1%	-4.3%
65 - 74	-3.6%	0.0%	-1.5%
75 - 84	-4.4%	0.9%	2.6%
85+	-5.1%	-0.4%	1.7%

*includes both genders

**Less than 10 deaths. See section 3.

U.S. Population Mortality Observations Updated with 2016 Experience, Holman et al. SOA 2018 https://www.soa.org/Files/resources/research-report/2018/us-population-mortality.pdf

Next: trend or blip?

Summarising Causes.

Is this a trend or a blip? Similarities internationally?

How about ***your*** country/experience? Are there the same influences?

Groupings, Causes and drivers *summary so far*

Seasonal factors (eg winter mortality) Blip? - 3 years in past 4 (Europe)

Causes of death

“working age” causes (15-64) US	Blip? Opioids Hard to reverse
cardiovascular/circulatory/stroke	Blip? Only if the decline in improvements reversed
Dementia	Mixed

NB Considerable variations between countries

Drivers: behaviours - smoking – obesity

Socio-economic groups and deprivation

Austerity

Next: Drivers

Drivers

- Behaviours
- Smoking
- Obesity
- Socio-economic factors
- Austerity

WHAT'S HAPPENING TO U.S. MORTALITY RATES? Chen et al, Center for retirement research, Boston College.
http://crr.bc.edu/wp-content/uploads/2017/09/IB_17-17.pdf

Next: Socio-economic groups and deprivation: US

Drivers: behaviours - smoking – obesity

Look at the big ones for clues on trends or blip

- Behaviours account for up to 50% of all deaths.
  What effects recently? US deaths from drug and alcohol poisoning, suicide, and chronic liver disease and cirrhosis

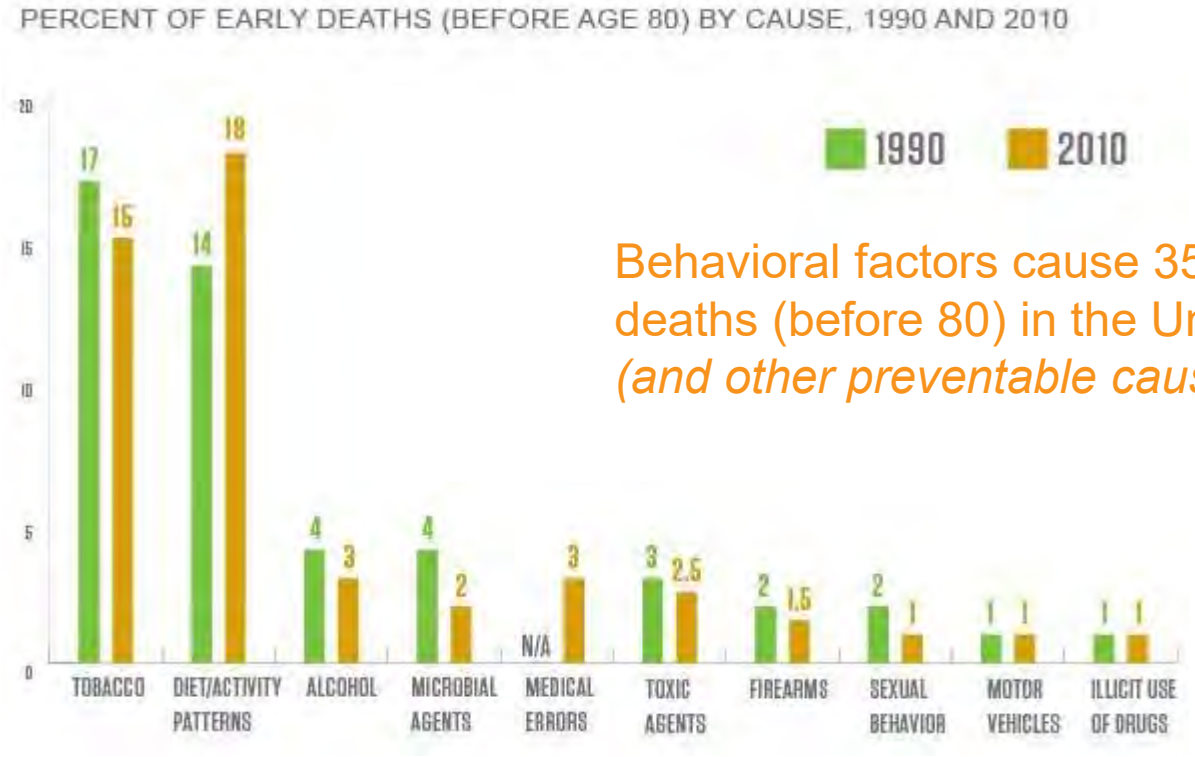
- Smoking: Is the effect of past generations quitting smoking now fading out?

- Obesity is the effect increasing?

WHAT'S HAPPENING TO U.S. MORTALITY RATES? Chen et al, Center for retirement research, Boston College.
http://crr.bc.edu/wp-content/uploads/2017/09/IB_17-17.pdf

Next: Socio-economic groups and deprivation: US

US Behaviors: Smoking and dietary deaths 2010

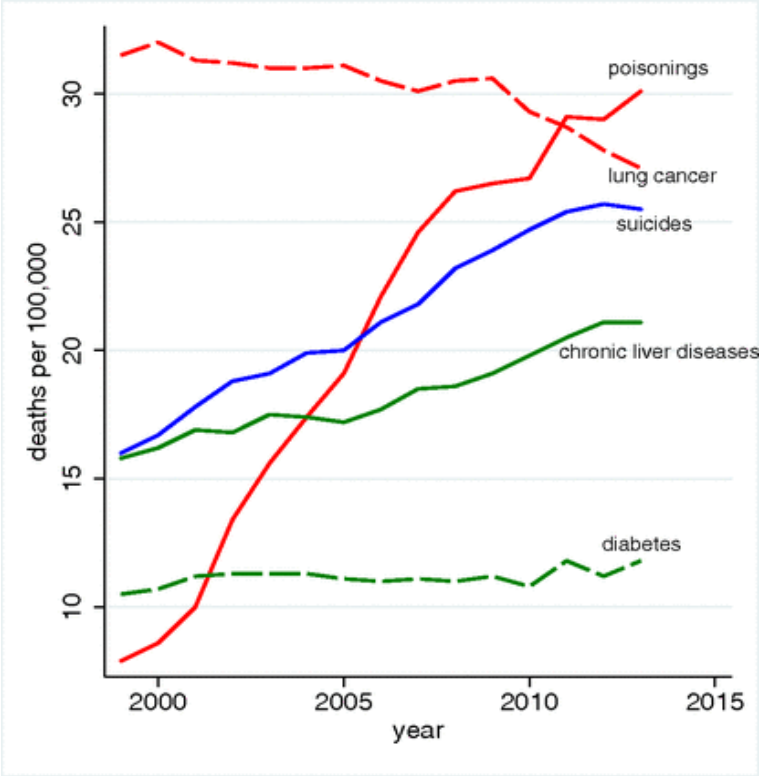


Behavioral factors cause 35 percent of all premature deaths (before 80) in the United States
(and other preventable causes another 13%)

Source: Up to Half of U.S. Premature Deaths Are Preventable; Behavioral Factors Key: Mather and Scommegna 2015
https://www.prb.org/us-premature-deaths/

Next: white non-Hispanics US

US Behaviors: white non-Hispanics 45-54 deaths

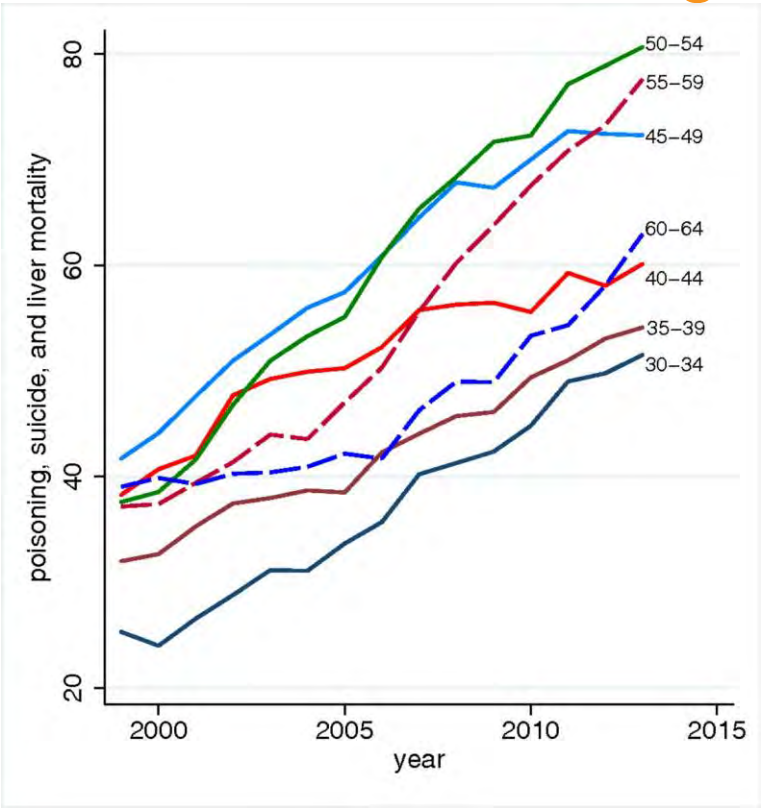


The change in all-cause mortality for white non-Hispanics 45–54 is largely accounted for by an increasing death rate from external causes.

Source: Case, A.; Deaton, A. (2015). Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century. Proceedings of the National Academy of Sciences (2015) 112

Next: it's all age groups

US Behaviors: it's all age groups from 30-64

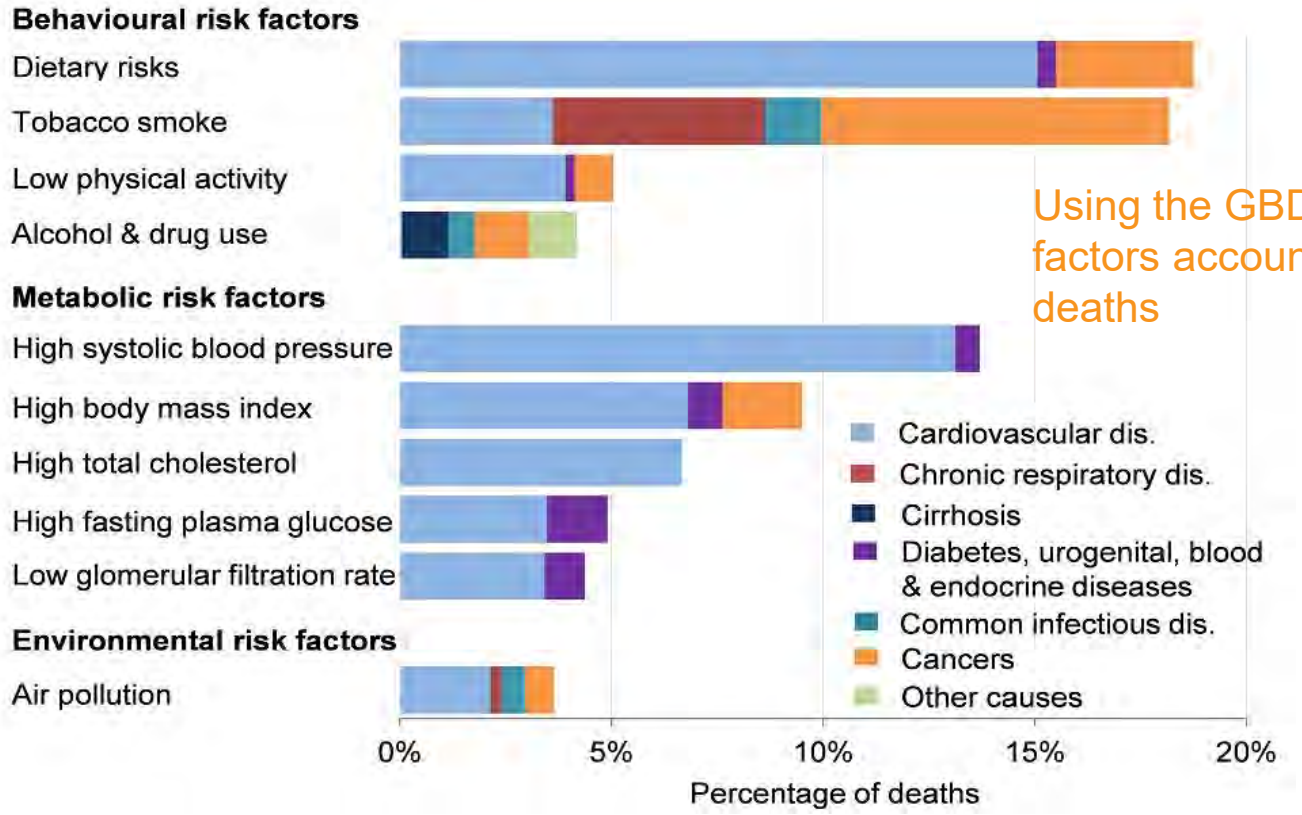


All 5-y age groups between 30–34 and 60–64 have witnessed marked and similar increases in mortality from the sum of drug and alcohol poisoning, suicide, and chronic liver disease and cirrhosis over the period 1999–2013
Case and Deaton

Case, A.; Deaton, A. (2015). Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century. Proceedings of the National Academy of Sciences (2015) 112

Next: England

Behaviours: Smoking and dietary risk factors England

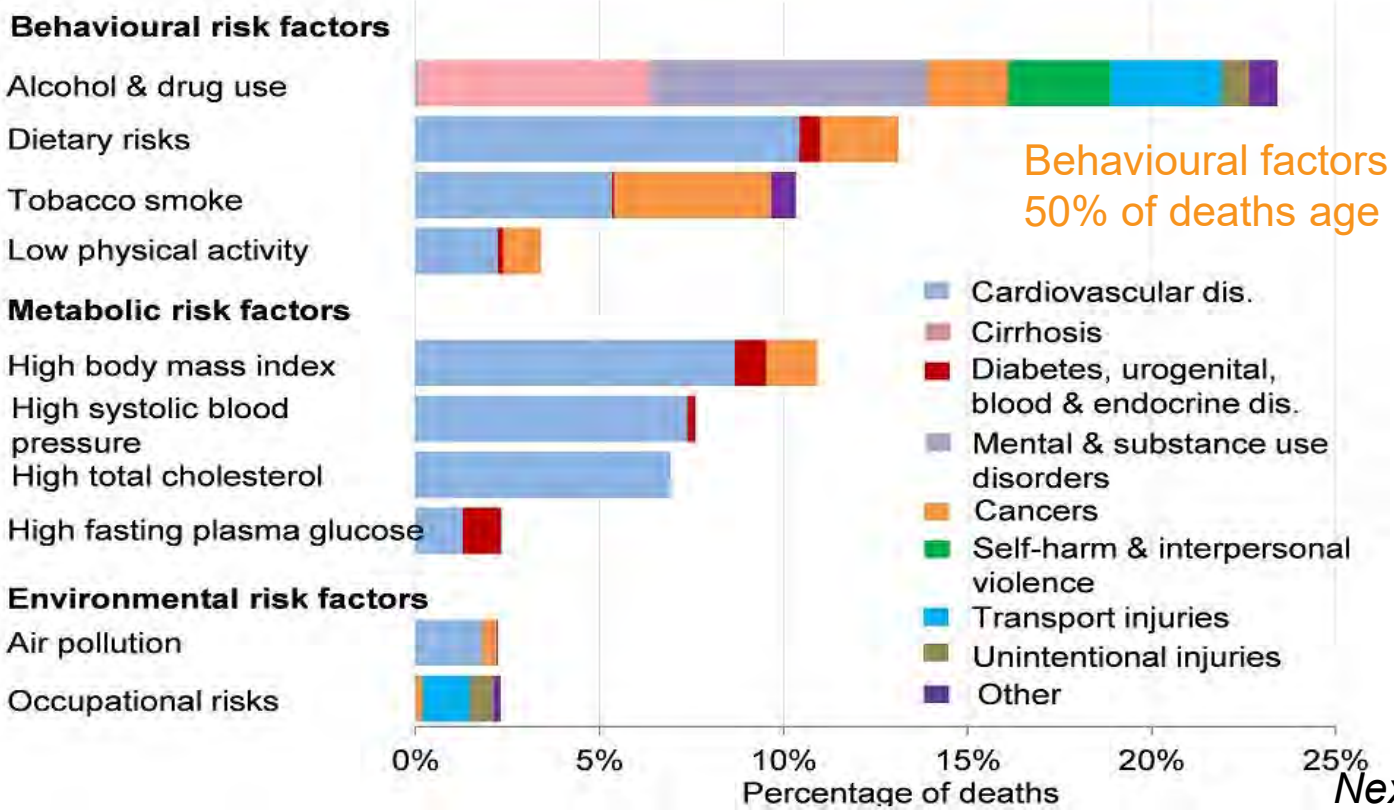


Using the GBD model, Behavioural factors account for around 45% of all deaths

Next: age group 15-49

Source: Health profile for England, Chapter 2: major causes of death and how they have changed July 2017
https://www.gov.uk/government/publications/health-profile-for-england/chapter-2-major-causes-of-death-and-how-they-have-changed

Behaviours: risk factors age 15-49 England



Behavioural factors account for around 50% of deaths age 15-49

Next: Socio-economic groups and deprivation: US

Source: Health profile for England, Chapter 2: major causes of death and how they have changed July 2017
https://www.gov.uk/government/publications/health-profile-for-england/chapter-2-major-causes-of-death-and-how-they-have-changed

Drivers: socio-economic factors - austerity

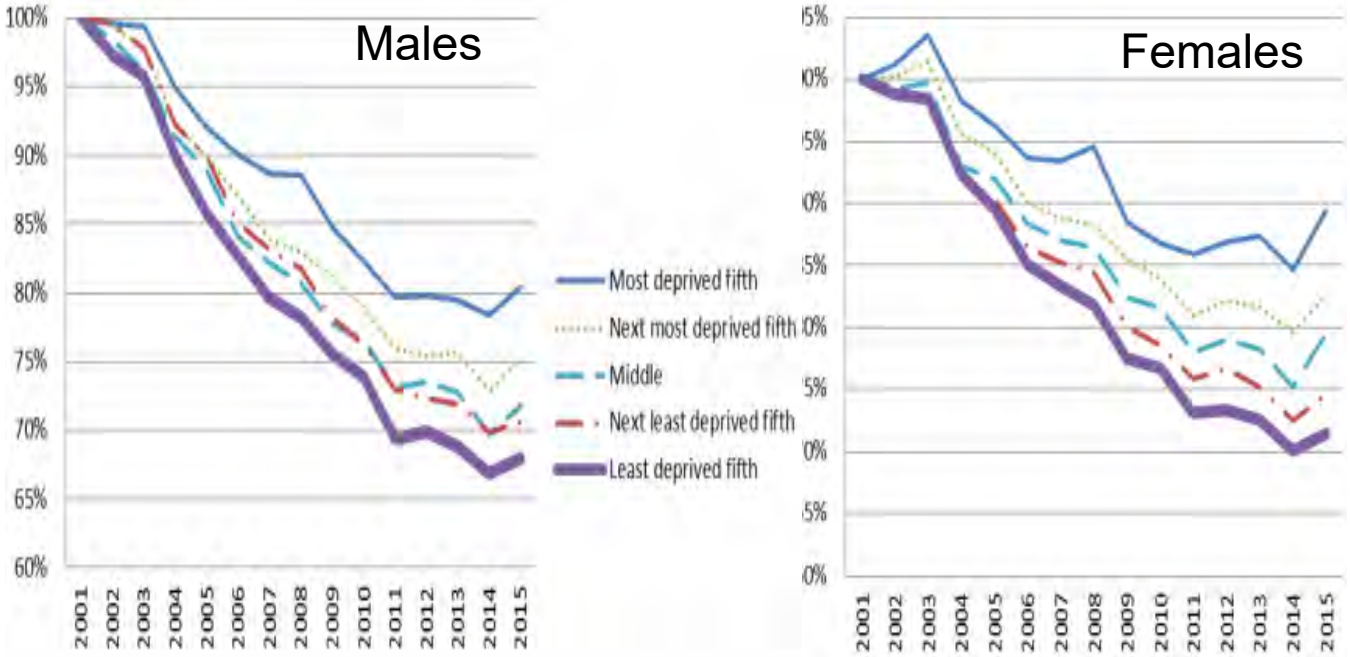
- Socio-economic factors: US, UK, France – Socio-economic gap increasing
- Austerity: Europe, US

WHAT'S HAPPENING TO U.S. MORTALITY RATES? Chen et al, Center for retirement research, Boston College.
http://crr.bc.edu/wp-content/uploads/2017/09/IB_17-17.pdf

Next: Socio-economic groups and deprivation: US

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"

Life expectancy: is the socioeconomic gap narrowing? Longevity Science Panel Feb 2018
http://www.longevitypanel.co.uk/_files/LSP_Report.pdf

Next: Austerity

Austerity – mixed messages

EUROPE: “The slowing down of improvements in 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**.”

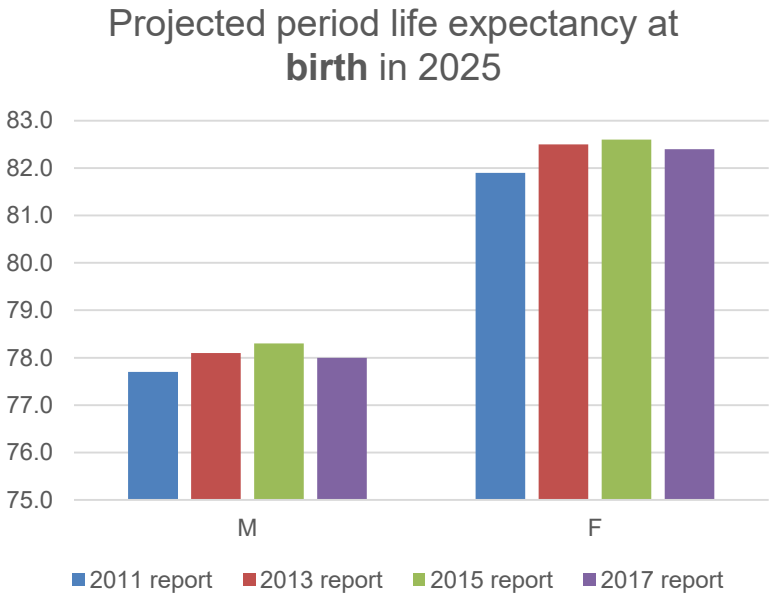
“While **income inequality** has increased in both the United States and France, **inequality in mortality** in France remained remarkably low and stable”

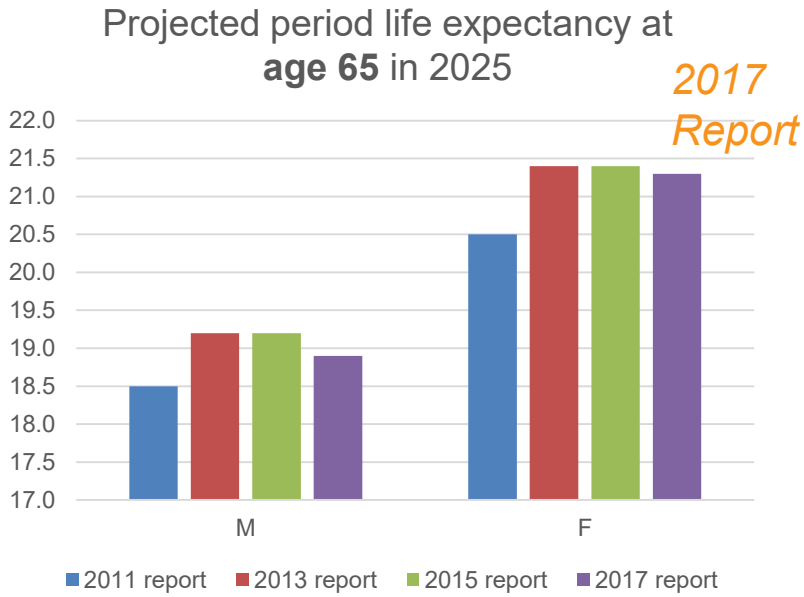
Source: Austerity and the new age of population health? Mark A Green, Scandinavian Journal of Public Health
Source: Mortality (in)equality in France and the United States, J Currie et al National Bureau of Economic Research, Cambridge, MA

What are actuaries doing about it?

Projections

US OASDI: Successive projected period life expectancies in 2025

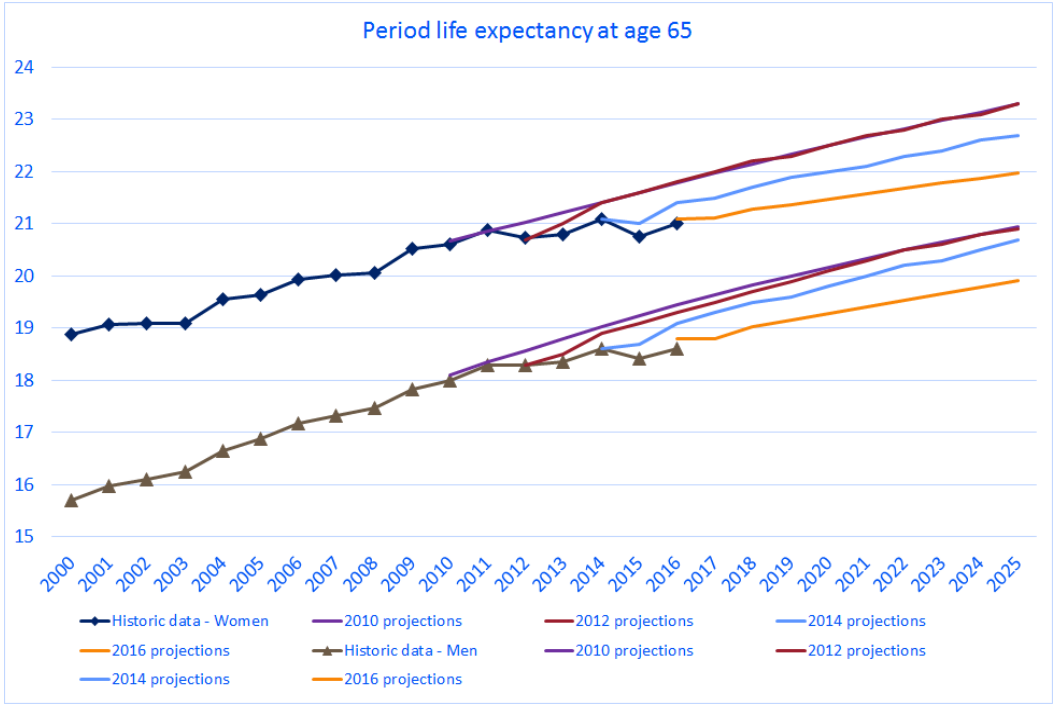




Source: [USA Federal Old-age and Survivors insurance and federal Disability insurance trust funds (OASDI)]

Next: UK ONS

UK Office for National Statistics: period life expectancy projections age 65 from 2010 to 2016



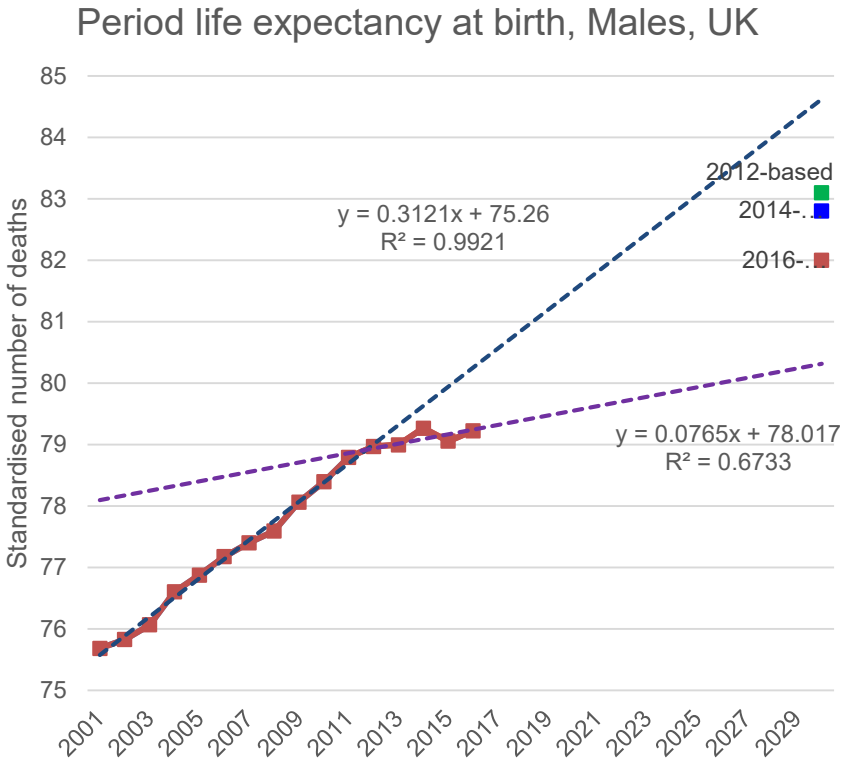
Female:
2010 2012
2014
2016

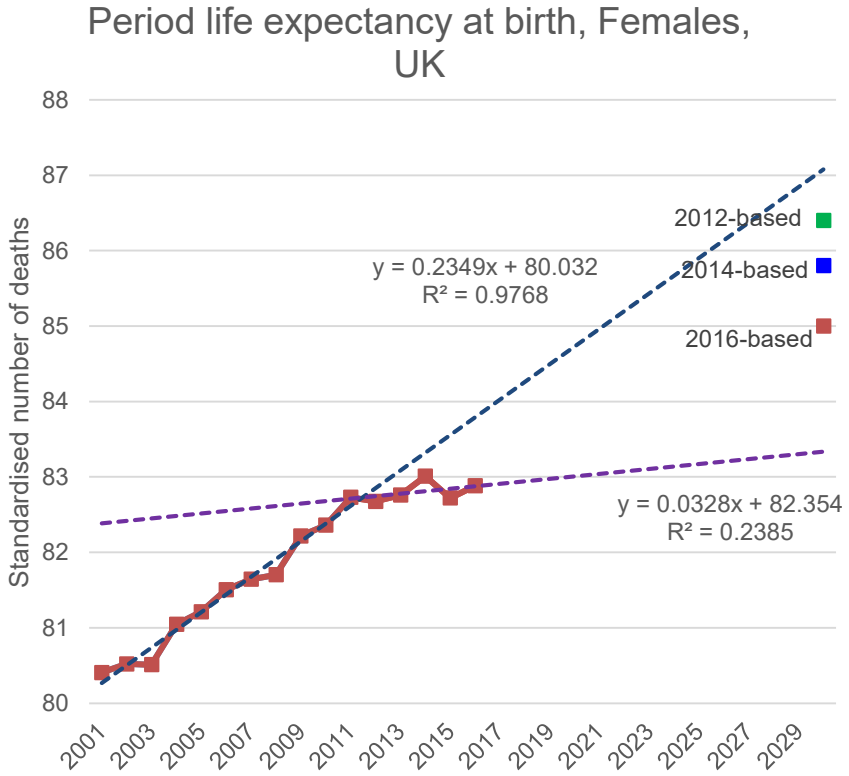
Male

Source: Office for National Statistics

Next: How does it compare with trend observed?

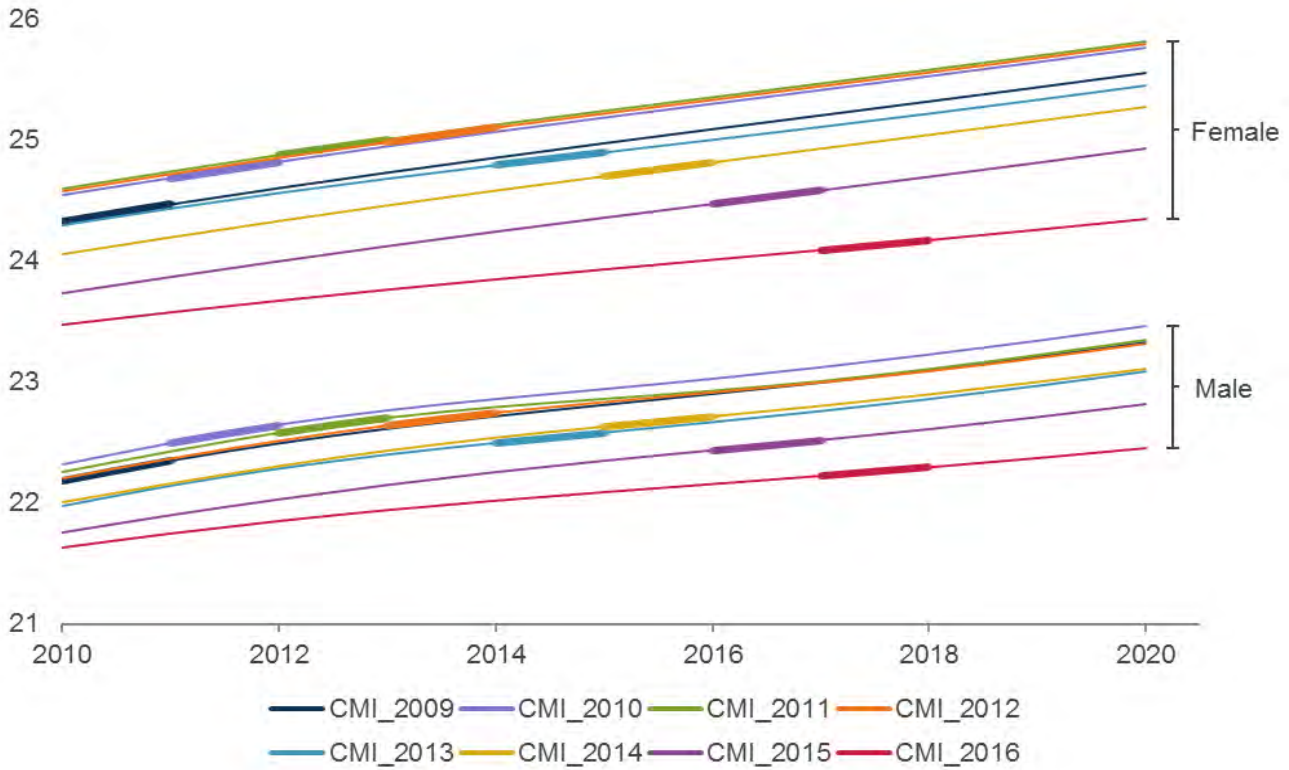
UK: Historical and projected period life expectancy at birth





The CMI Model – Life expectancy age 65

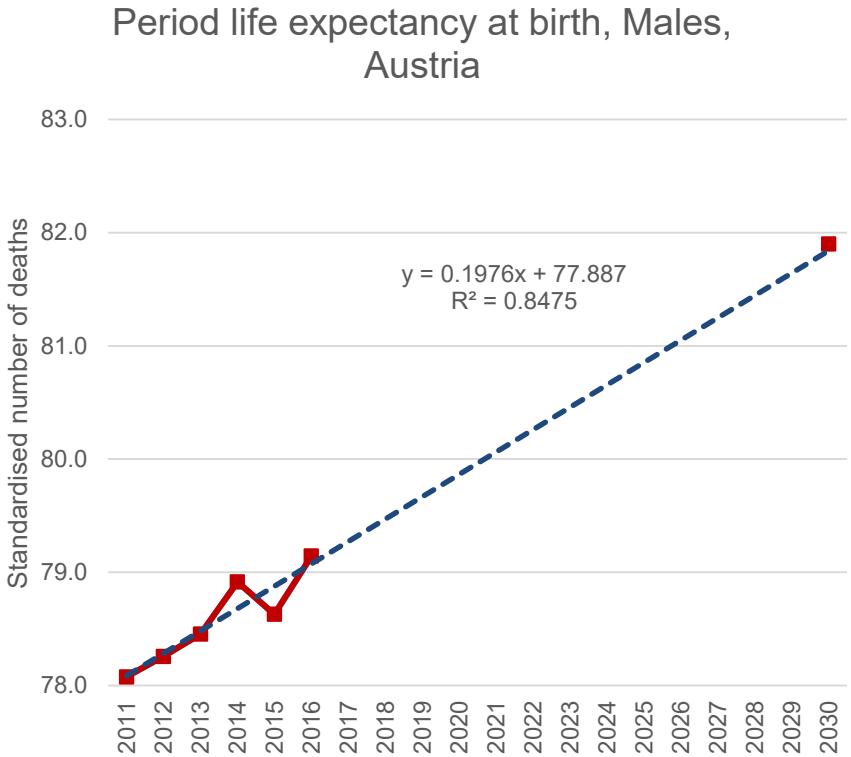
CMI life expectancy projections have been reduced in successive iterations of the model – age 65 shown

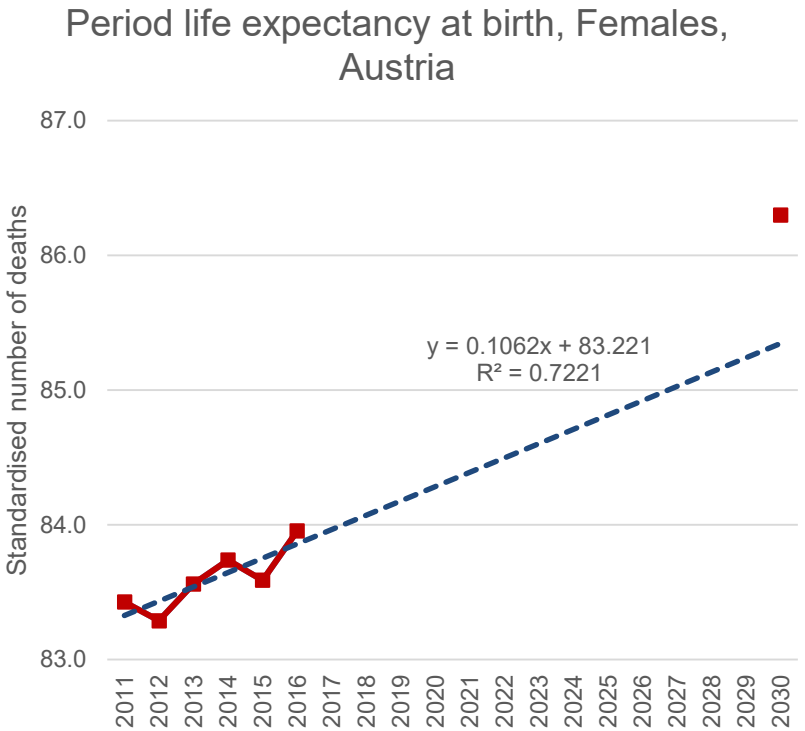


Source: CMI WP 97

Next: Canada Pension Plan

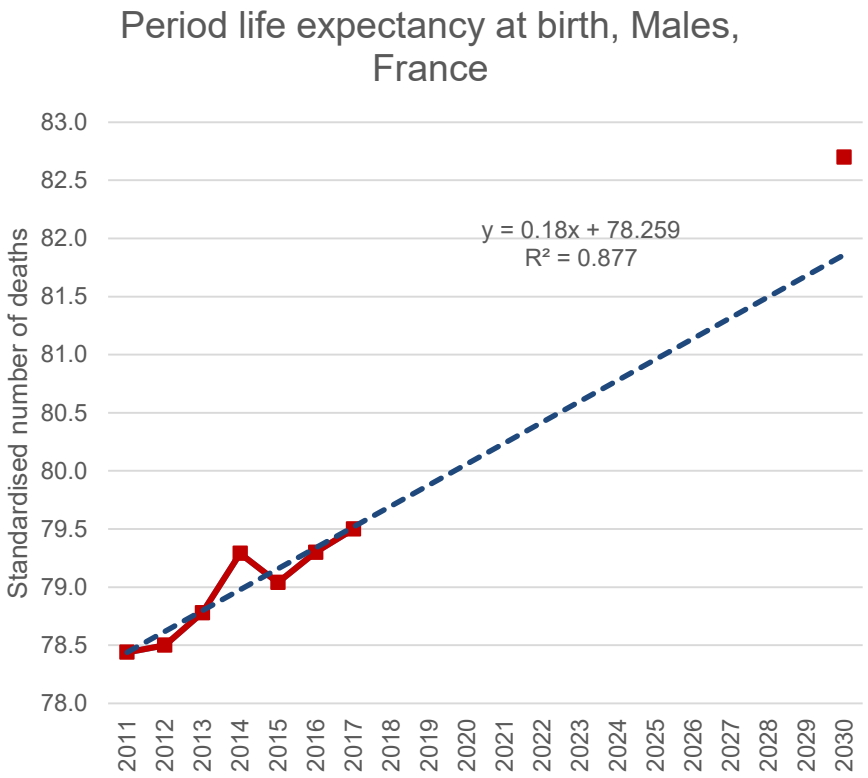
Austria: projected life expectancy at birth for 2030

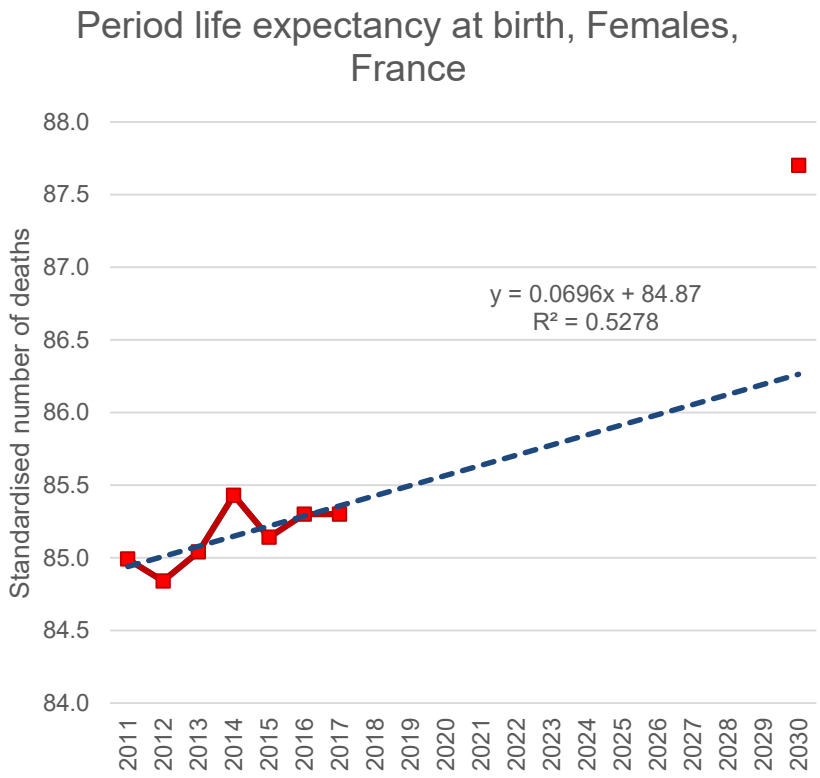




2015-2100 projections

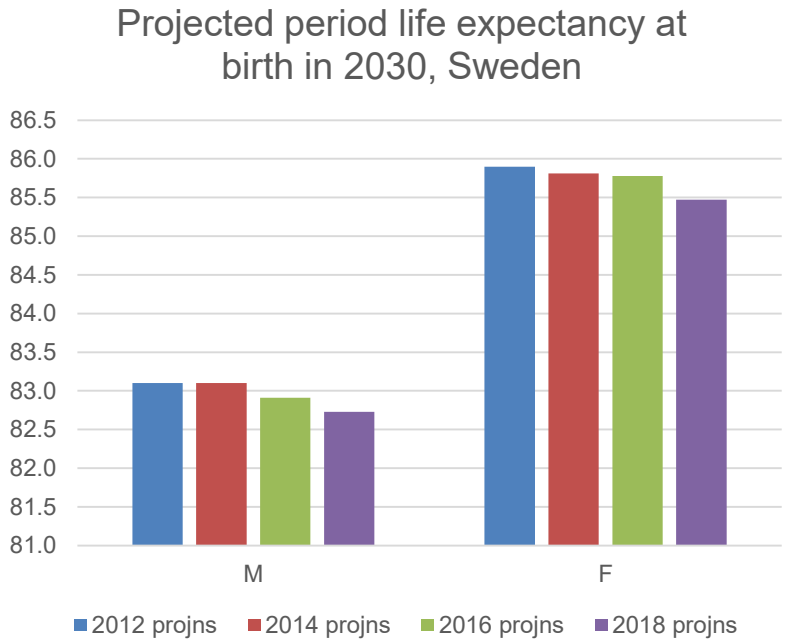
France: projected life expectancy at birth for 2030

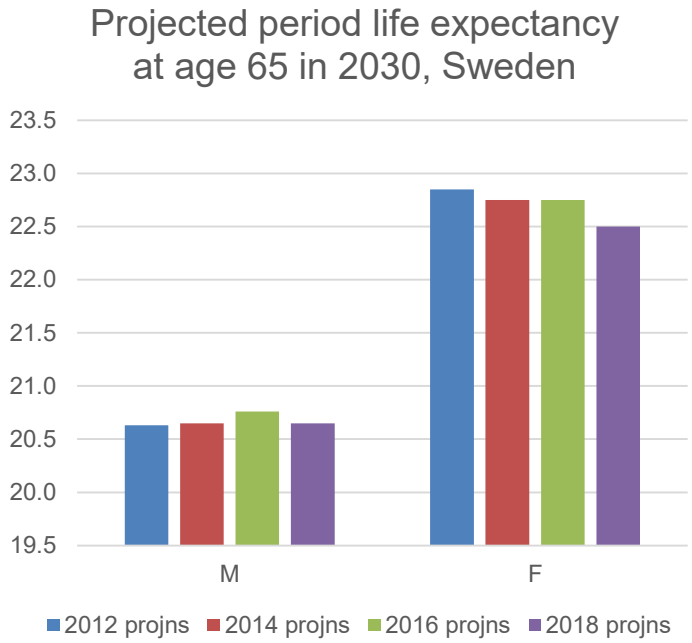




Ttrend line extrapolated to 2030 and the projected period life expectancy for males and females in 2030 from the latest population projections for France (2031-2070) is also shown. Source: INSEE

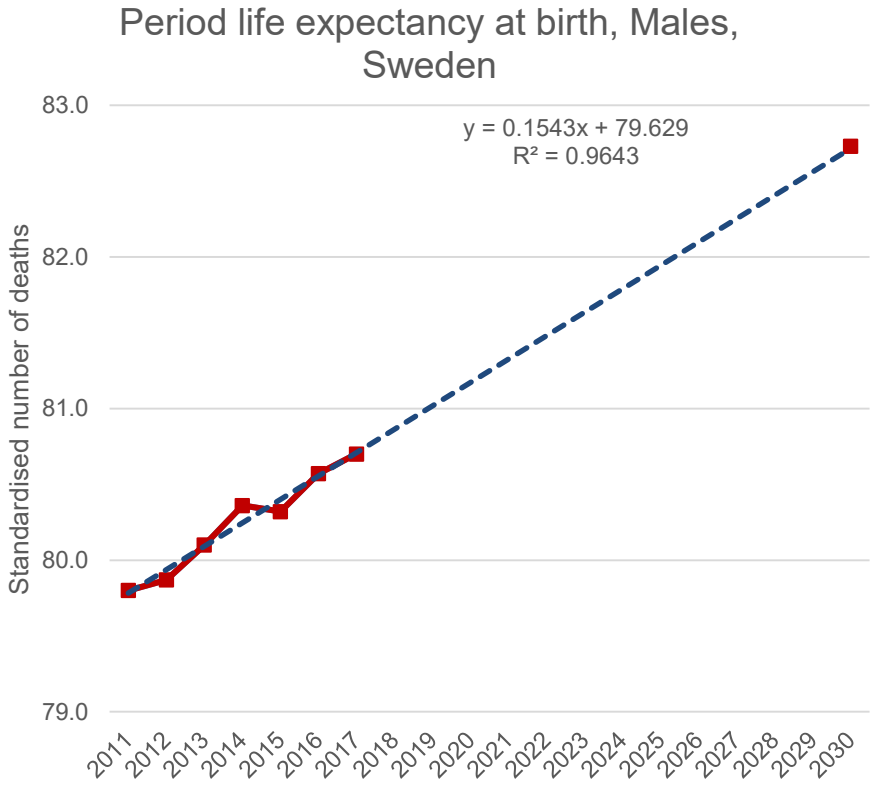
Sweden population: Projected period life expectancies in 2025

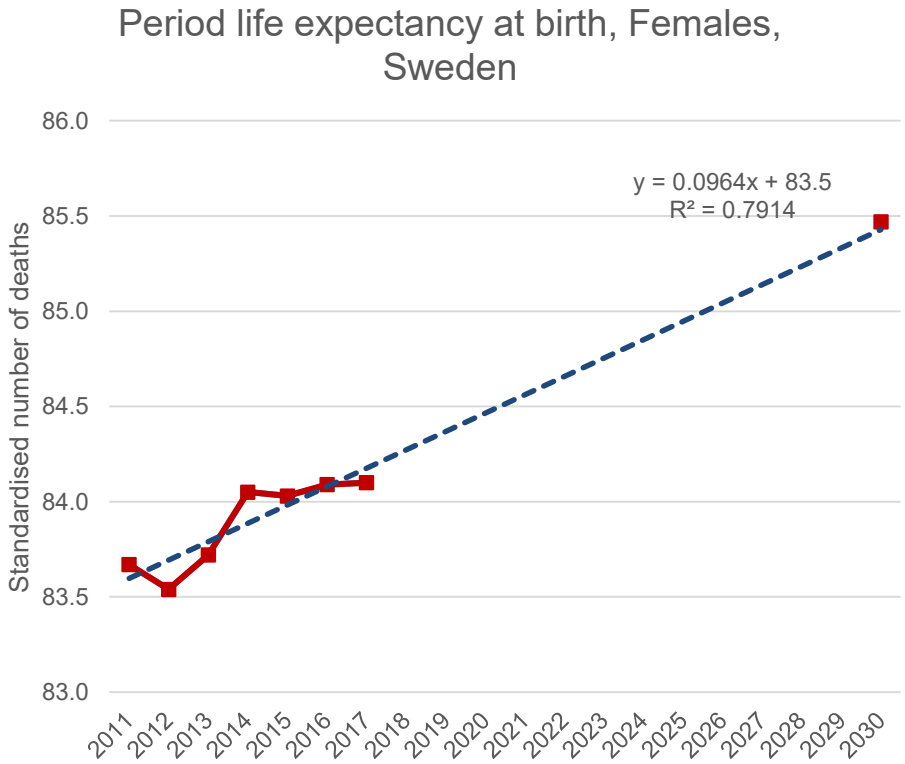




Next: vs trend line

Sweden: projected life expectancy at birth for 2030

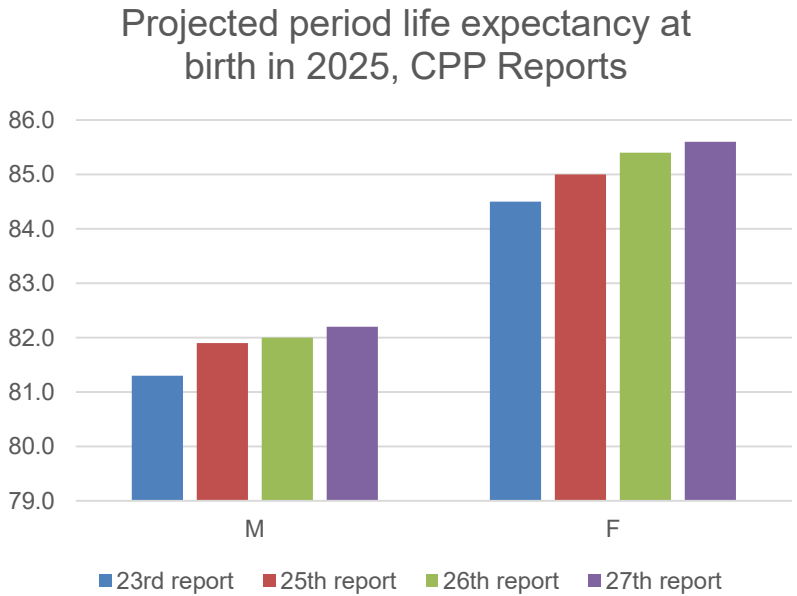


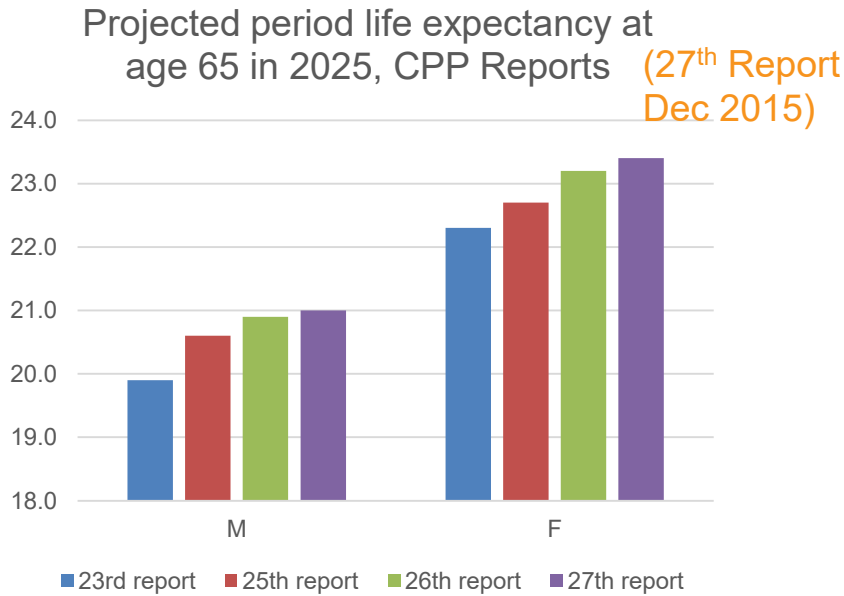


2018-2060 projections

Next: Canada Projections

Canada Pension Plan: Successive projected period life expectancies in 2025

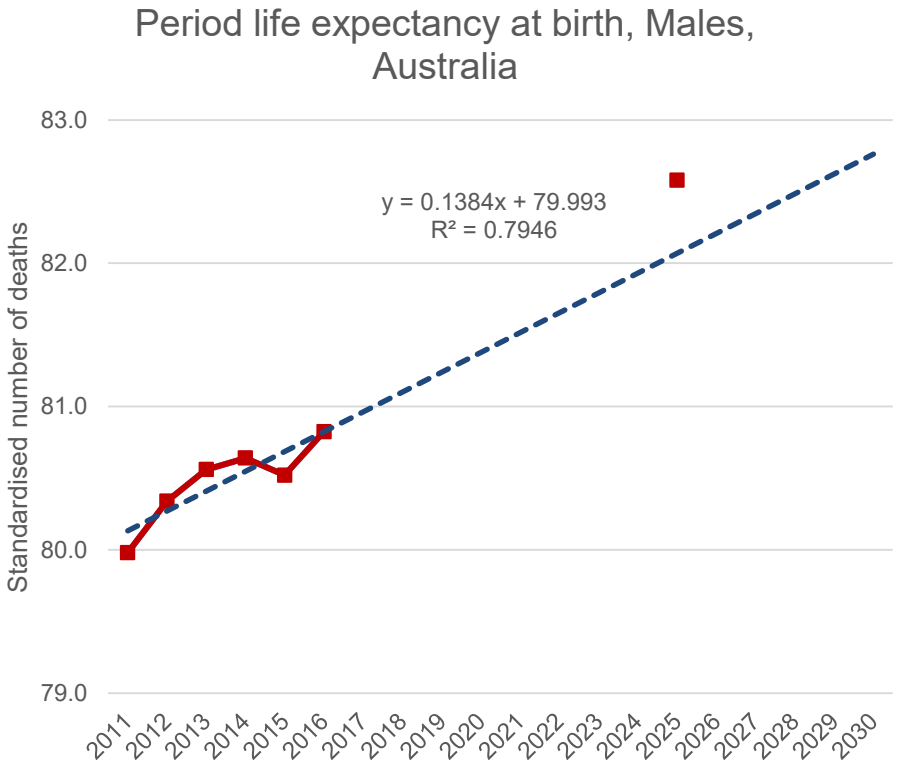


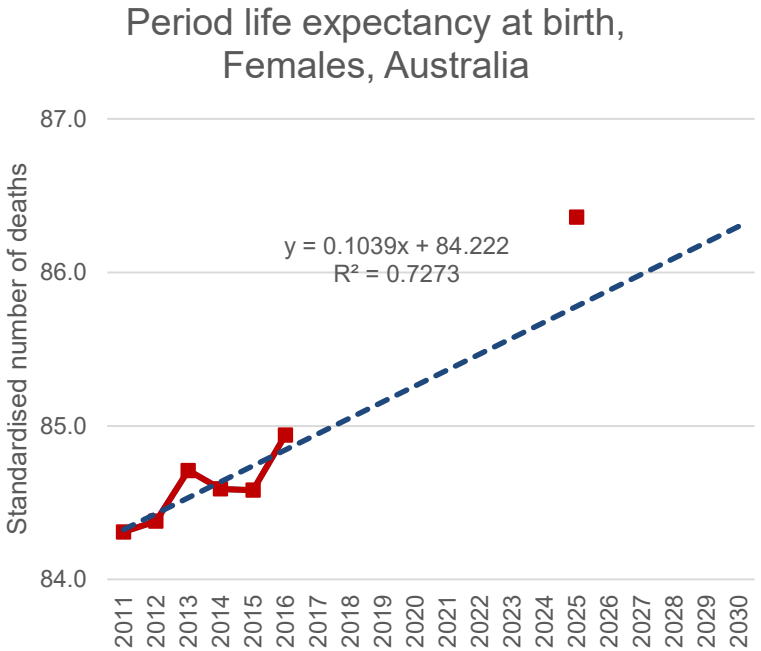


Source: http://www.osfi-bsif.gc.ca/Eng/oca-bac/ar-ra/cpp-rpc/Pages/default.aspx

Next: Australia Projections

Australia: with projected life expectancy at birth for 2025/6

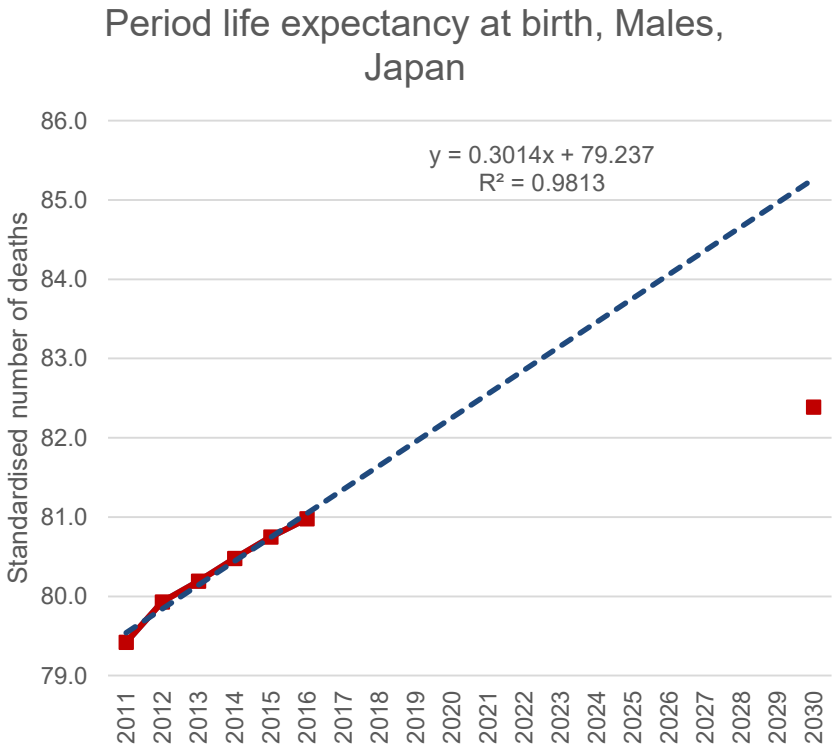


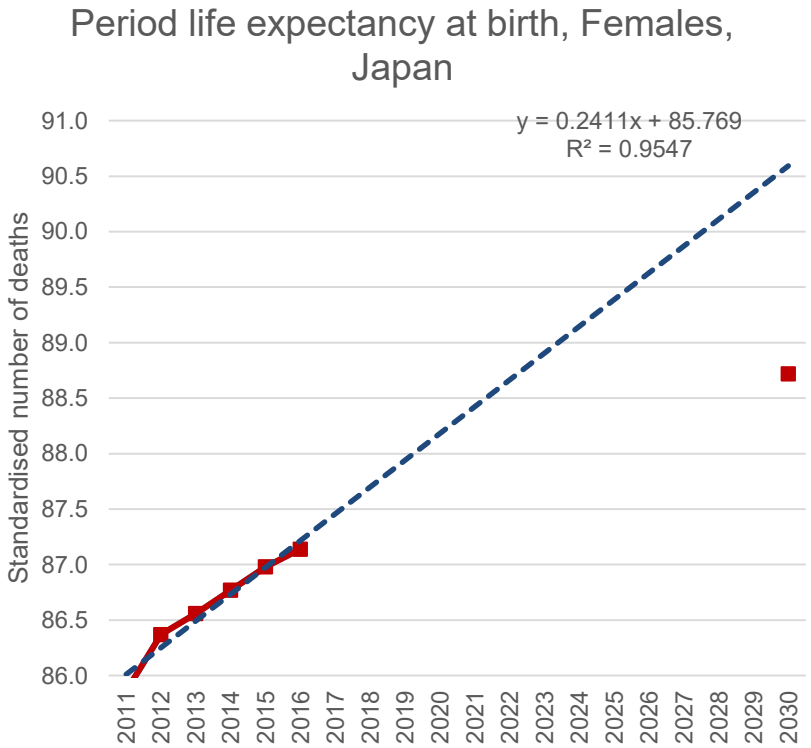


Projected year here is 2025/6; data not readily available for 2030. These are from the 2011-2060 projections so reasonably old – can't find more recent projections

Next: Japan

Japan: with projected life expectancy at birth for 2030





2017 – 2115 projections.

Next: Conclusions

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

Next: MWG

Conclusions

Longevity improvements have slowed down in most countries

Underlying causes unlikely to disappear

- Excess winter mortality
- “External causes”
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- Cardiovascular/circulatory/stroke gains slackening
- Dementia and Alzheimer’s - mixed
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My views only
Please bring your views to the Discussion
Session at the end (after Assia’s paper)

Impact on insured and pensioner populations differ:

different subsets of the population

exposure by “amounts” higher for higher socio-economic groups

Next: MWG

International Actuarial Association
Association Actuarielle Internationale

www.actuaries.org/mortality

Our website

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Mortality Working Group

References to hundreds of relevant papers

Scientific Committee

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Half-yearly Updates with all papers presented at our meetings

Mortality Working Group

Insights about the level of mortality rates around the world, and the trends of future mortality rates, have never been more important. While mortality rates are declining in most countries, in other countries they are stable and in some instances are even increasing. Mortality rates affect many aspects of society, including:

- The costs of old age income support in Social Security systems;
- The proportion of resources absorbed by government sponsored and private health arrangements;
- The financial position of defined benefit pension funds;
- The probability that assets will be sufficient for retirement needs for members of defined contribution funds;
- The solvency requirements of life insurers;
- Pricing of long term mortality related financial products;
- Work place practices relating to the employment of older workers;
- The growth of certain industries (such as aged care services) and the need for infrastructure (such as accessibility to transport).

Country reports

International Actuarial Association
Association Actuarielle Internationale

www.actuaries.org/mortality

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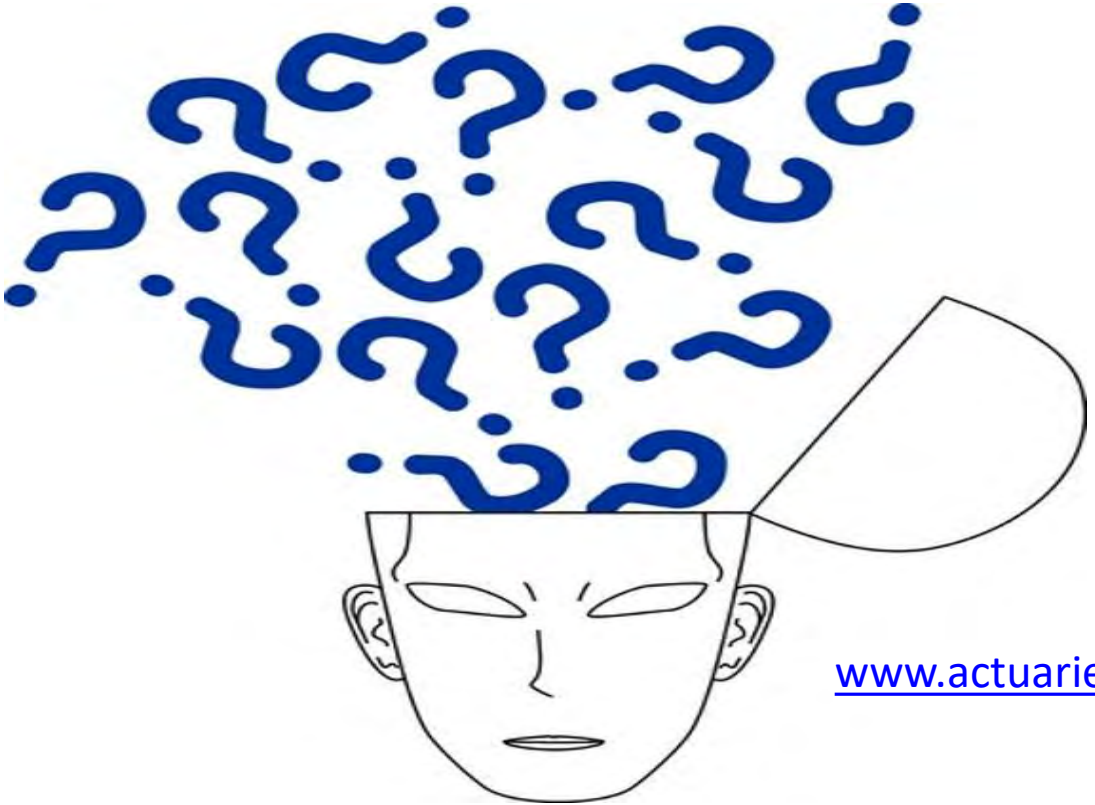
Mortality Working Group

If you are interested in Longevity and Mortality do join us as an Interested Person

You'll get Half-yearly Updates and Event Information Free of charge

Just email: iaamwg@actuaries.org

Comments and questions?



www.actuaries.org/mortality

Thank you

Brian Ridsdale
br@ridsdales.com
https://www.actuaries.org/mortality

Terminology etc

ONS Office for National Statistics (UK)

ASMR Age-Standardised Mortality Rate

E & W England and Wales

NHS UK National Health Service, providing medical care to 100% of the population

> *"Medical treatment covering all requirements will be provided for all citizens by a national health service". Sir William Beveridge (1942)*

NHCS US National Center for Health Statistics

EOL "Life expectancy" = Period life expectancy
(unless specifically mentioned)

> *We have chosen here to focus on life expectancy at birth, as "recent" EOLs at other ages are often not available*

European Standard Population: Used to prepare age-standardised deaths on the same basis

Sources are hyperlinked from the relevant slide

About the speaker

- **Brian Ridsdale** BSc, FFA, CEng, MBCS
- Chair, IAA Mortality Working Group
- Member IFoA Mortality Research Steering Cttee

- Director, Solent Credit Union
- Past Chair, CMI
- Past Trustee, Christian Aid
- Past Vice President, Faculty of Actuaries UK
- Past General Manager, Zurich Life UK