



SCOR Annual Conference
28 & 29 September 2017, Paris

Longevity: recent trends and the role for (re)insurers to meet the challenges

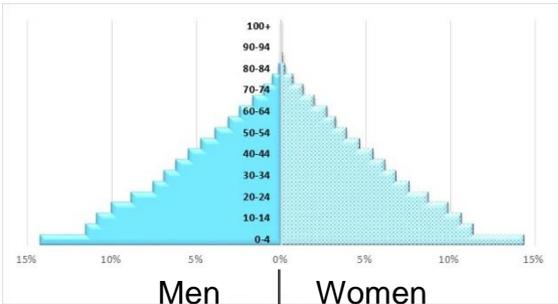
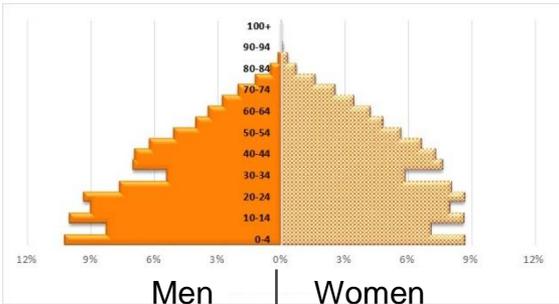
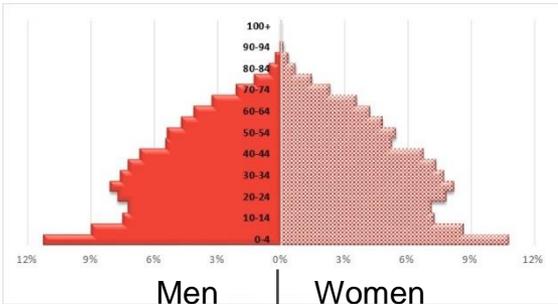
Daria Ossipova, Head of Health and Longevity R&D
SCOR Global Life



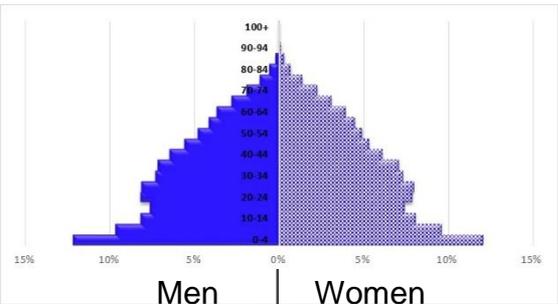
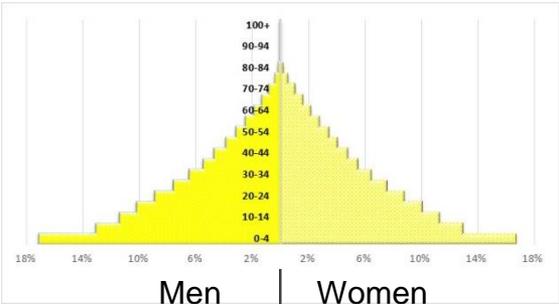
1 Increasing life expectancy

- 2 Divergences within populations
- 3 Challenges for the (re)insurance industry

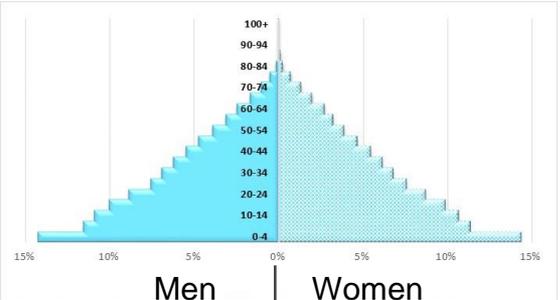
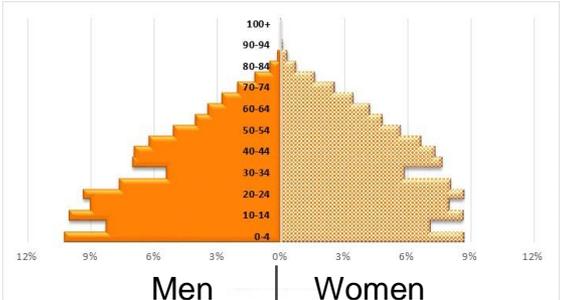
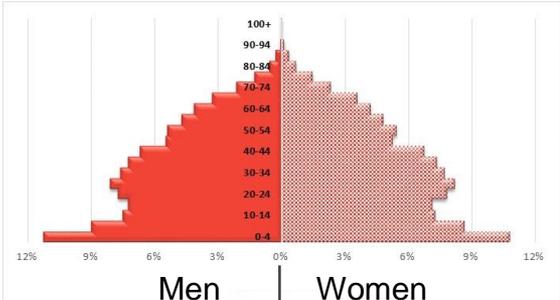
The world population is ageing, and average life expectancies keep increasing



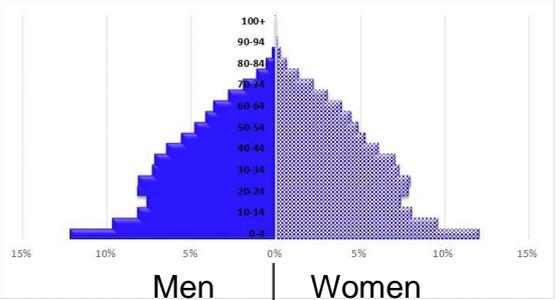
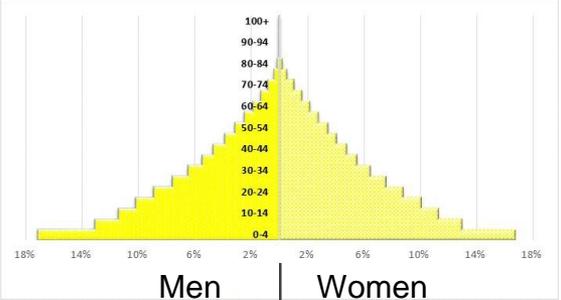
1950



The world population is ageing, and average life expectancies keep increasing

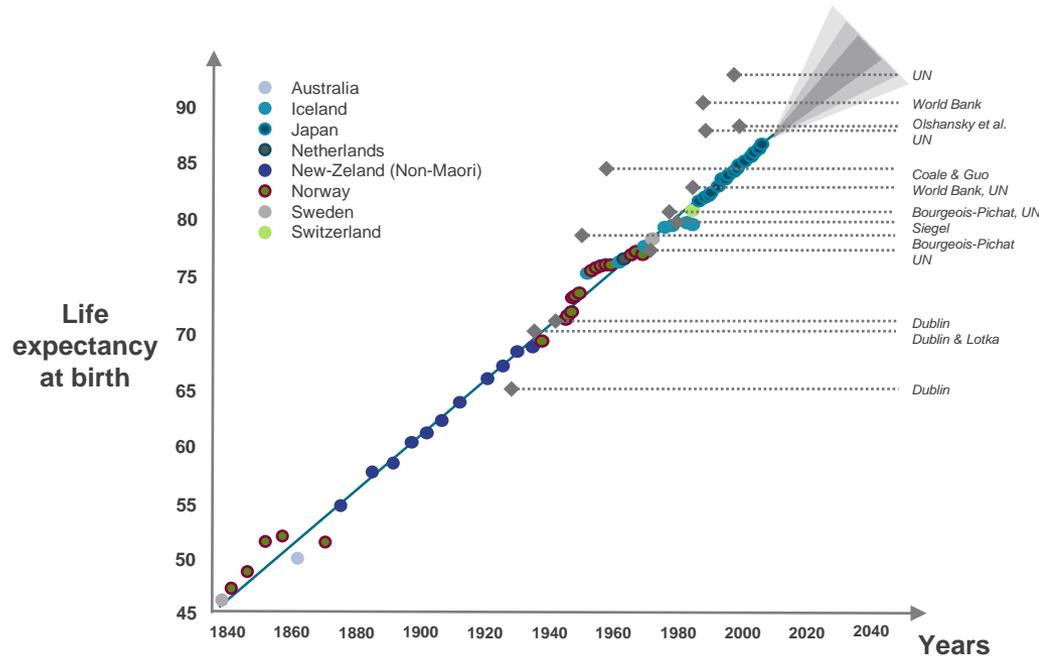


1950



Historically, scientists have not foretold the continuous increase in average life expectancy

Life expectancy at birth keeps growing

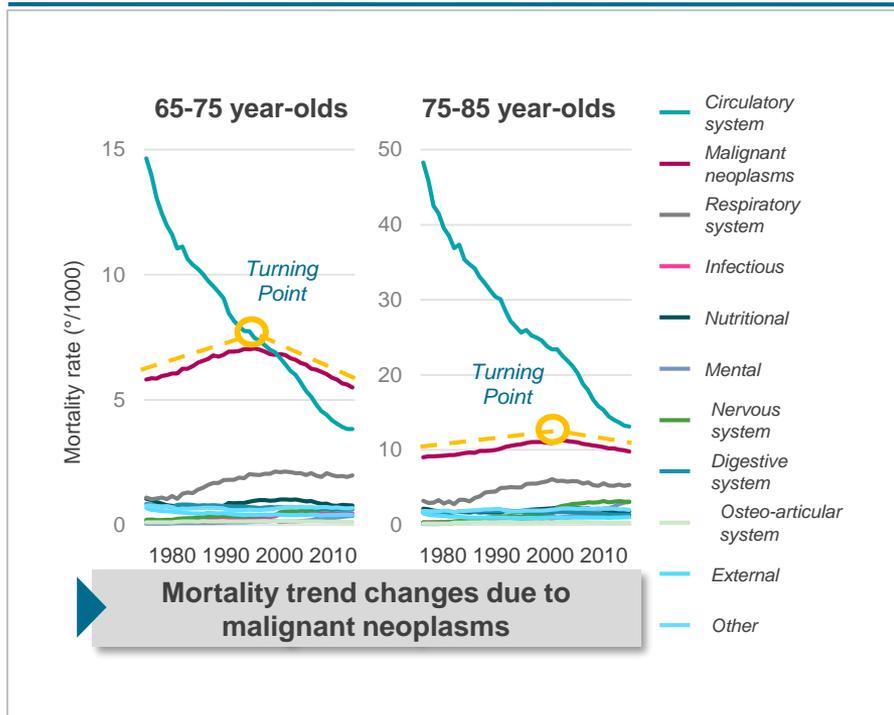


- Colored dots on the graph represent the yearly world record for life expectancy at birth (one color per country)
- Historically, numerous experts assumed there was a limit to the average human life expectancy (represented by horizontal lines); findings proved them wrong
- Over the past 150 years life expectancy has increased by one trimester every year on average
- There is a real uncertainty concerning future trends

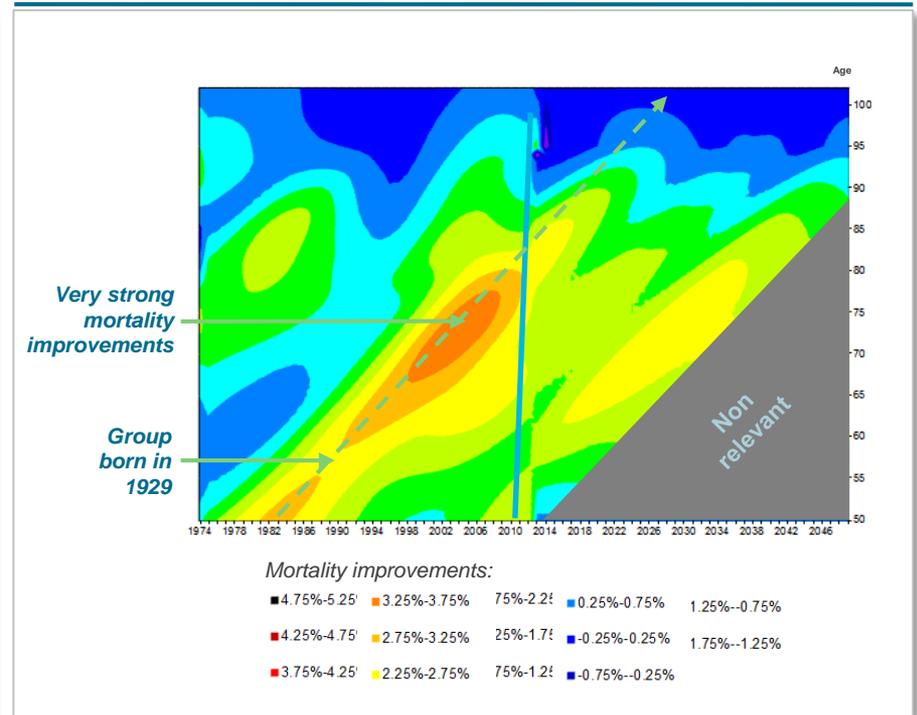
Experts have often underestimated progress in longevity

A combination of advanced quantitative and qualitative analysis methods is needed to evaluate longevity risk.

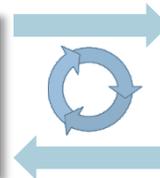
Trends by cause of death



Mortality improvements based on age/birthyear

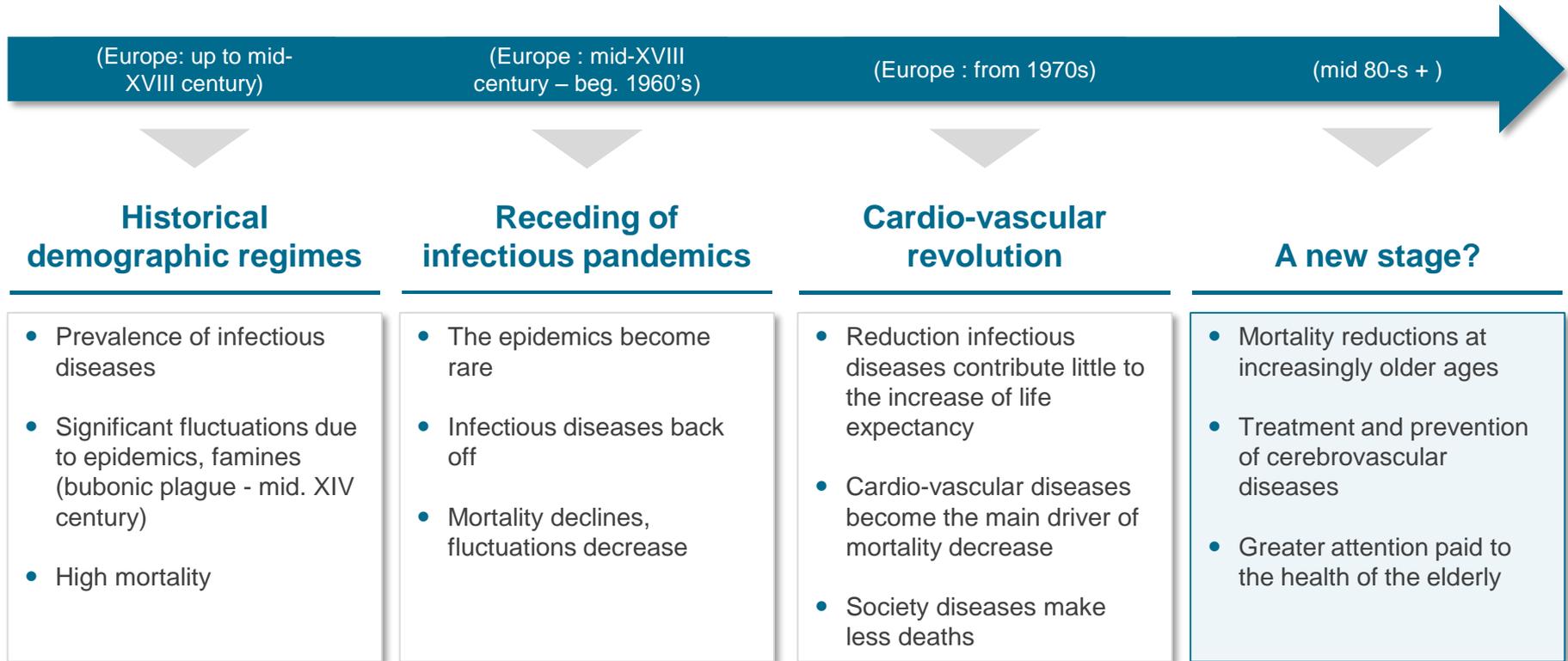


Qualitative analysis:
understanding the numbers



Numerical analysis:
determining the factors of change

Drivers of mortality are evolving

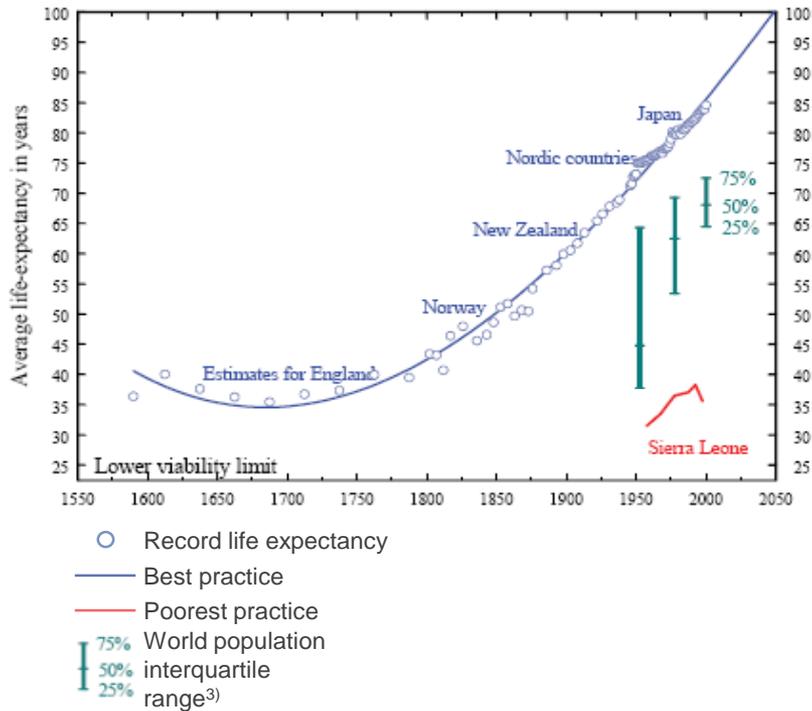


Not all countries undergo the stages at the same time, speed, or even order

The general progress of life expectancy is far from being a homogenous process, impacted by the existing development gaps between countries

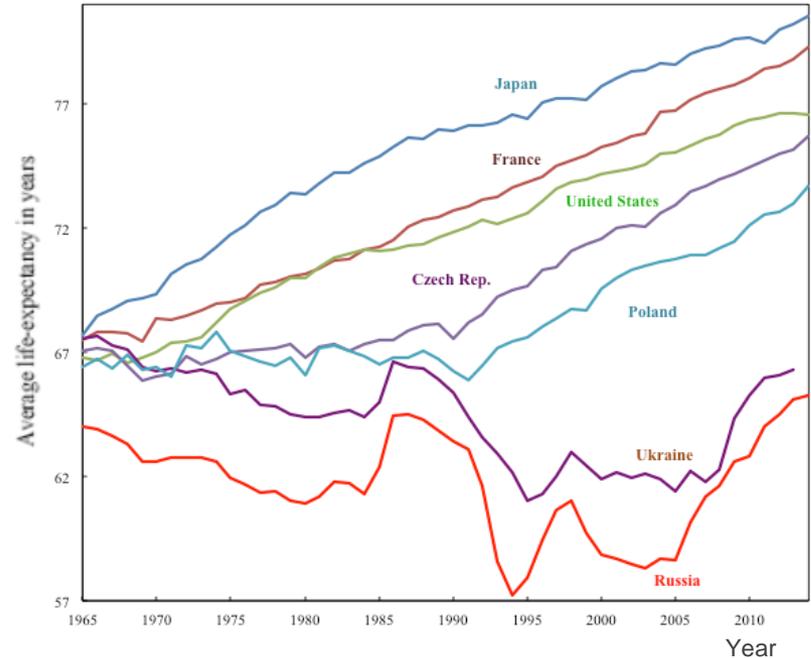
Despite a convergence towards the best practice levels, significant variations appear at the top end

Record female life expectancy at birth¹⁾



Socio-economic conditions create divergence in trends

National average male life expectancy at birth for selected industrialized countries²⁾



1) Source: Jim Oeppen (2006)

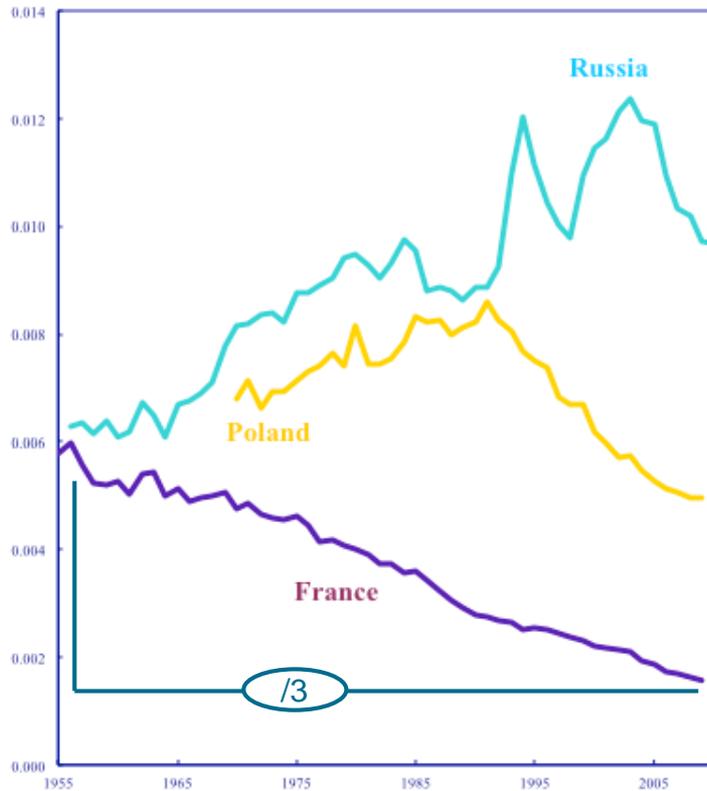
2) Source: F. Mesle, INED

3) 50% of the world population having a life expectancy between the 25% and 75% bars

A succession of divergence/ convergence processes helps decipher the trends

Mortality rates due to cardiovascular diseases diverged significantly in the USSR from France

Standardized death rate, males (# per 1,000)¹⁾



Health transition theory²⁾

- Any major factor of improvement in life expectancy results in a phase of divergence
- After some time, laggards catch up with the pioneers in a convergence phase
- A new process can start even if the previous one has not ended
- Sub-national trends may follow the same rule



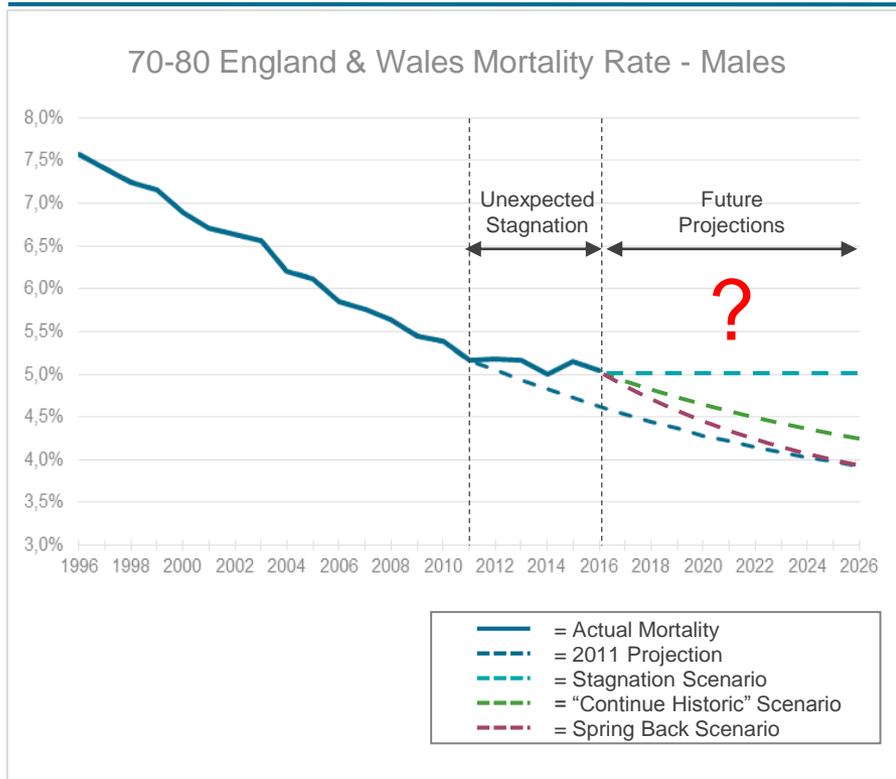
1 Increasing life expectancy

2 Divergences within populations

3 Challenges for the (re)insurance industry

Recent UK mortality improvements for the elderly were lower than expected...

Males mortality rates observed¹⁾ and projected



Key questions raised by the recent observations

- Is this phenomenon a coincidence or a structural change?
- What are the main reasons for this slowdown in Mortality Improvements ?
- Does it impact all layers of population in the same manner?
- How should we reflect the recent observations in our mortality forecast?

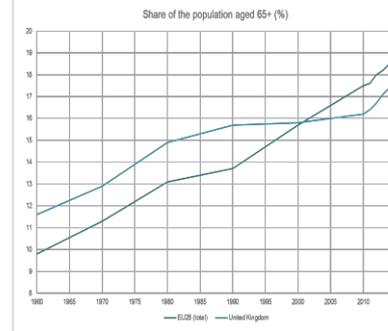
...Thorough R&D analysis is needed to investigate the reasons of lower than expected national mortality improvements

Seasonal cause of death analysis, lifestyle and healthcare access investigations

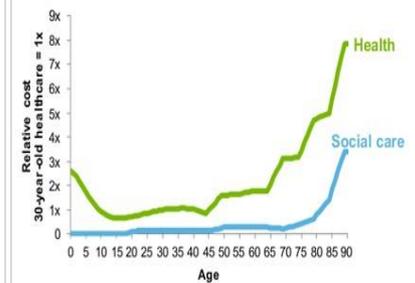
- **Cause of death analysis** showed expected slowdown of circulatory improvements due to already low proportion of circulatory deaths, and increase in Dementia and Alzheimer deaths partially due to the classification changes.
- However the peaks in **winter mortality** were much higher than usual and driven by the higher age group (+85) revealing the bigger structural factor linked to NHS struggles such as the lack of funding and the clogged A&E during winter epidemics.
- The slowdown seems to be a **consequence of general population aging and the inability of the health systems.**

pointed towards social and healthcare system troubles

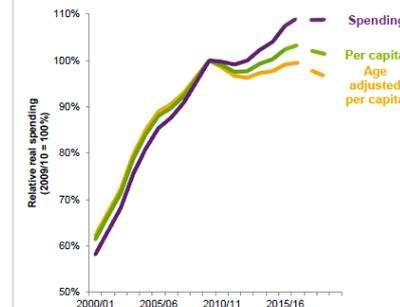
Ageing population...



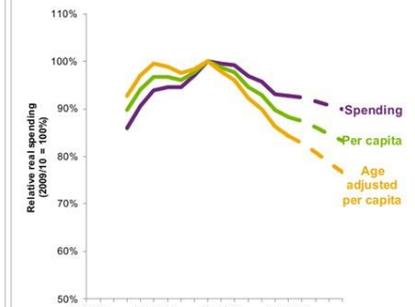
... with healthcare costs rising with age



Stagnating healthcare budget...



... and decreasing social care spending

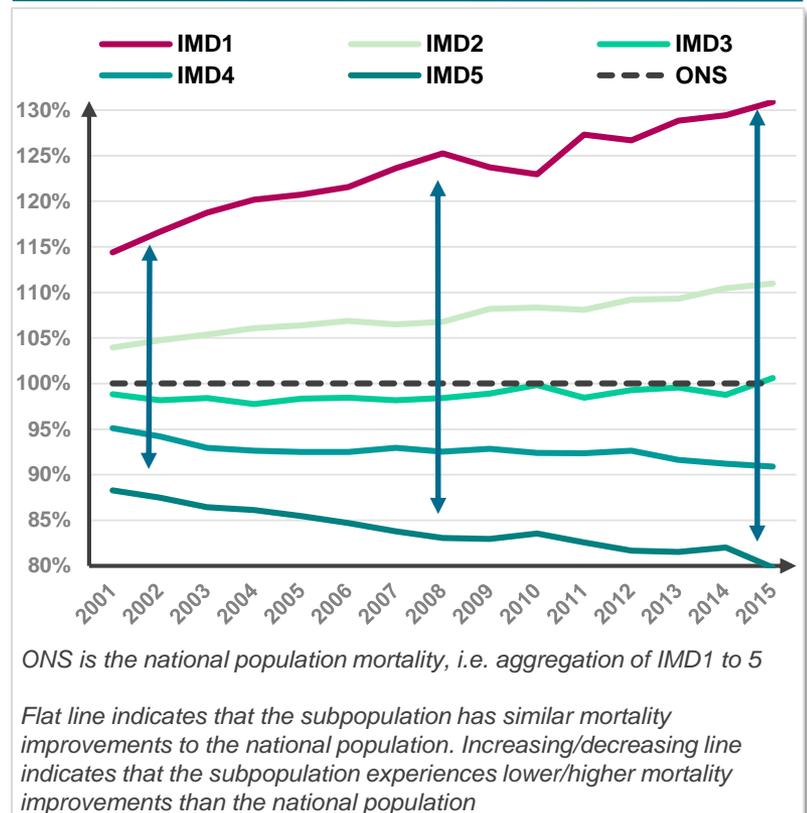


Analysis indicates that the UK currently are in a period of increasing social class differences in mortality

The main driver of mortality in the next 5-10 years is expected to be the state of the UK care system

- ONS population data, grouped by indices of deprivation (IMD), shows an increasing gap between England & Wales subpopulations. More deprived areas have lower improvements than the national population. At the same time, less deprived areas have higher improvements than national population
- The proportion of 65+ in the population will continue to rise putting increasing pressure on the already struggling UK health and social care system
- The future health and social care system reforms would shape the future evolution of social class differences

Widening gap between mortalities of England & Wales female subpopulations



General (re)insurance liability is skewed towards least deprived groups due to higher pension amounts



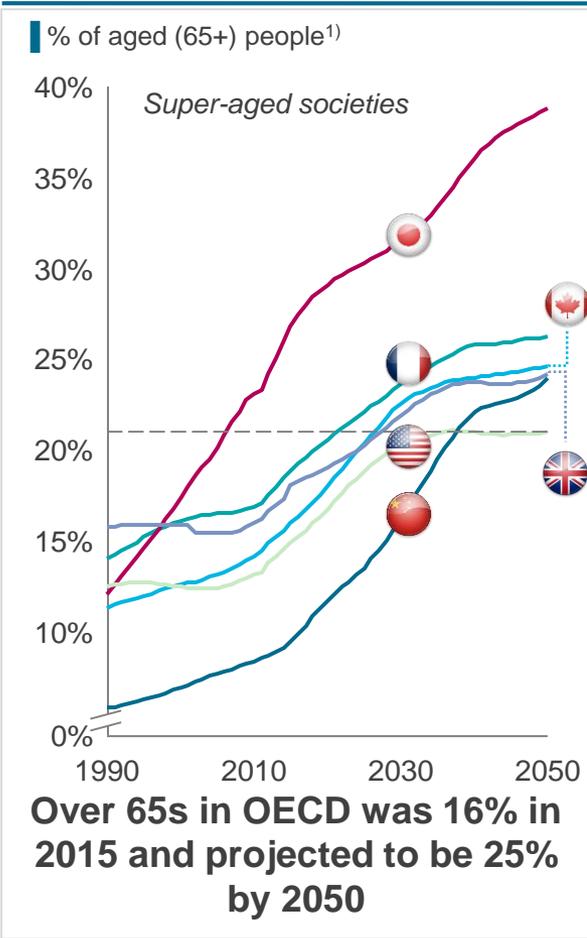
1 Increasing life expectancy

2 Divergences within populations

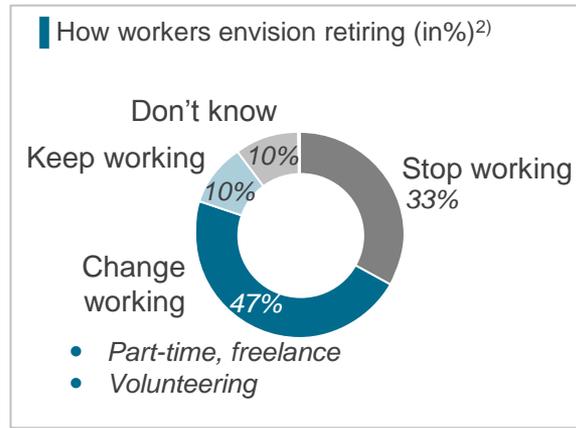
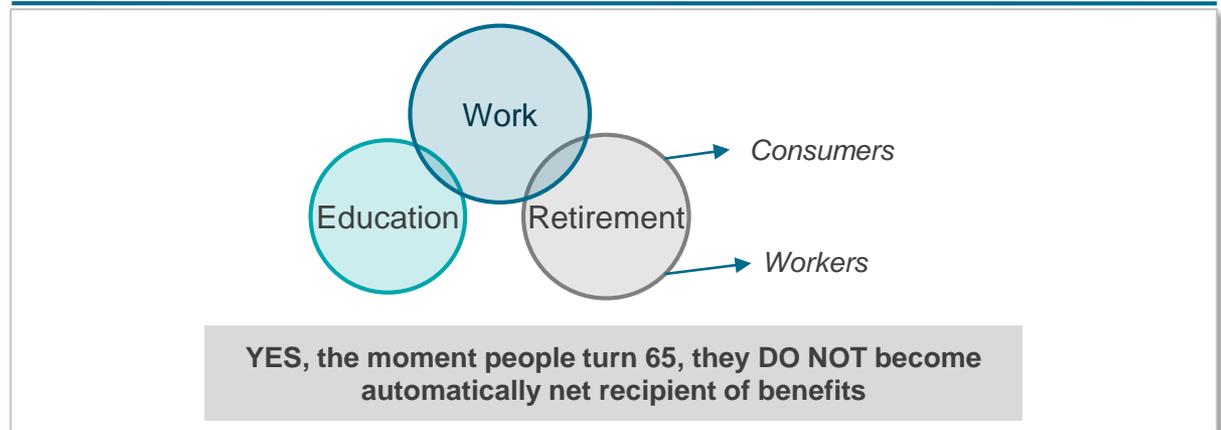
3 Challenges for the (re)insurance industry

Redefining retirement?

Undeniably ageing population...



...but the 3-stage life circle widespread belief is changing



wahve[®]
Work At Home Vintage Experts

Leveraging on the knowledge of hundreds of former finance and insurance professionals in their 60s and 70s

Rethinking the life cycle?

More and more people
change careers



Continuous education



Learning new professions



“Silver entrepreneurs” or “olderpreneurs” are gradually taking over the entrepreneurship scenery:

▶ **Raymond Kroc** founded McDonald’s at age 52, turnover over \$24 billion in 2016

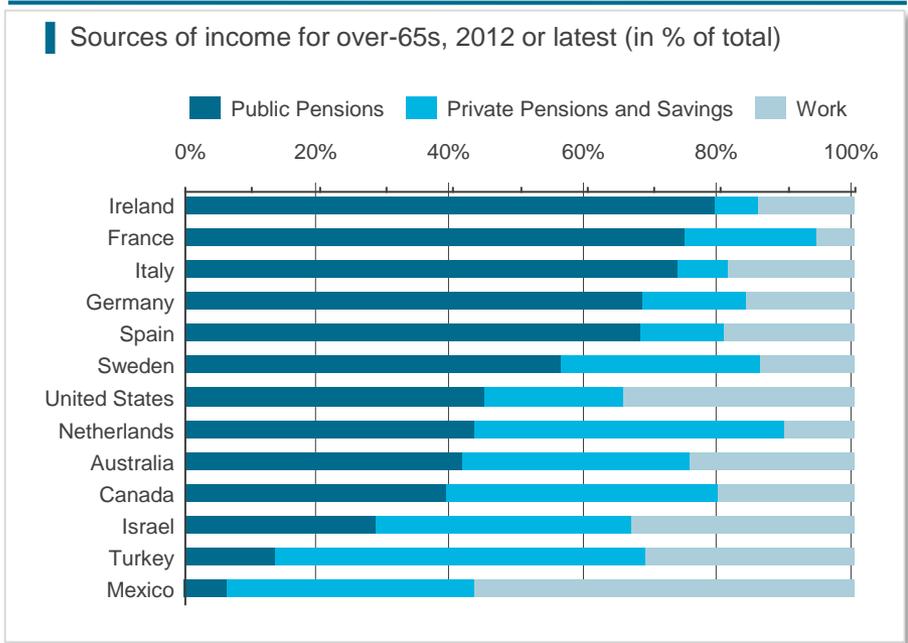
▶ **Sam Taylor & Jo Taylor** – ages 71 & 66
Founded the Creative Arts Gallery in Scotland: has exposed the work of close to 500 artists, holds 16 running events in 2017

▶ **Julie Wainwright**
Former CEO of Pets.com founded The RealReal at age 54, a second-hand luxury marketplace website, becoming one of the female icons of the Silicon Valley.

➔ According to a Global Entrepreneurship Monitor (GEM) report based on data collected between 2009 and 2016, the number of entrepreneurs aged over 50 has for the first time exceeded those under age 30.

Increasing longevity raises the question of the balance between public & private welfare

Public pensions are the main source of income for over-65s but it varies between countries



Underestimating longevity is costly



- In 1965, Andre-Francois Raffray, a (French lawyer) persuaded widow Jeanne Calment, who was aged 90 at the time, to accept 2,500 francs per month until her death in exchange for her apartment in her will.
- He died before her and she died ages 122 having been paid more than twice the value of her apartment.

Overgenerous governments and private pension schemes struggle to meet promises made in easier times. It creates an intergenerational burden with current pensioners being the wealthiest (more leisure time than any prior generation and likely any future)

Decisive action is needed to protect retired population, in particular for low income groups

Low incentives to save for retirement create a population at risk in some countries...

US



~40%

40% of Americans approach retirement with no savings at all in widely used retirement accounts (IRAs or 401(k)s)²⁾

UK



20% of women

12% of men

between 55 and 65 have no retirement savings¹⁾

... whereas others take decisive actions to protect everyone's future

**Denmark
Netherlands
Singapore
etc.**



Close to mandatory enrolment in pension schemes

UK



Auto-enrolment and auto-escalation (unless opt-out) since 2012 (Pensions Act 2008)

Encouraging flexible retirement age, promoting working in older ages and providing healthcare and education can help address the longevity challenge

Encouraging flexible retirement age



1998, Spain – Blue-collar workers have the possibility to progressively reduce working hours before early retirement at 58 (Ford)



2001, Sweden – Official retirement age is 65 but one can work after to increase its pension



2011, Cambridgeshire County Council, UK – Eligible employees can request a permanent reduction in working hours or a transition to a role with downgraded duties/responsibilities

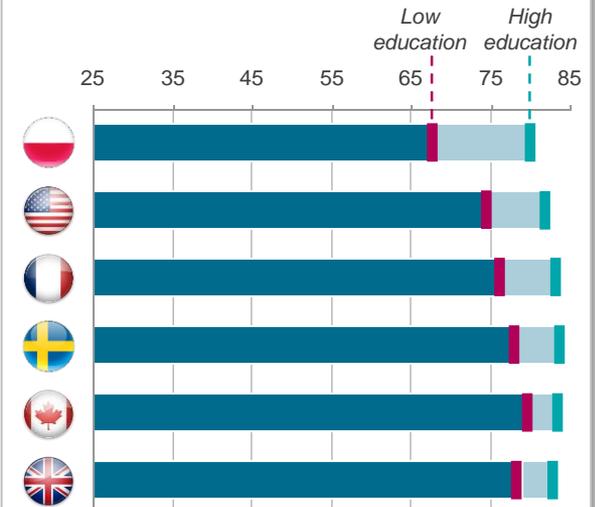
Promoting professional re-qualification/ re-orientation

- Technology will continue to help reduce the manual intensity of some jobs allowing employees to work till they are older
- Some companies do value a generational mix as the best factor to drive efficiency (speed & no mistakes)



Providing universal access to healthcare and low-cost high-quality education for all

Life expectancy for 25-year-olds, by education level, 2013 or latest (in years)



(Re)Insurance Industry: extending existing products to higher ages and providing new services to higher age population

Accompanying longer working life



Borrower's insurance



Mortgage



Disability



LTC insurance

~90% of workers would be interested in at least one health and wellness program if their employer were to offer it¹⁾

Rethinking products using the latest technology

- Monitoring health to take preventive actions:
 - CI prevention (heart rate problems, sugar level, etc)
 - LTC prevention (sensors to track feeding/bathing, facilitating communication, etc)
- Providing long term care to slow/limit transition to heavier dependency states :

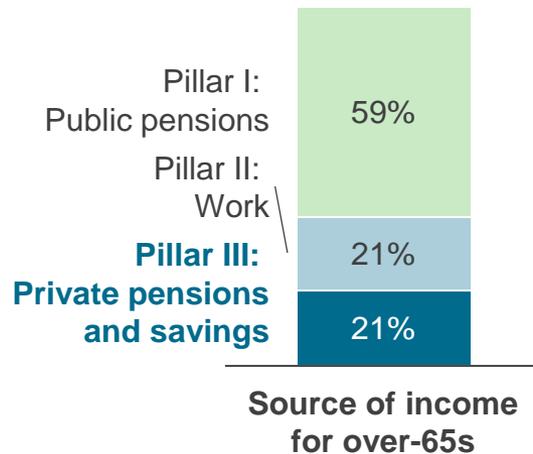


- Network of caregivers
- « Buddy » :
 - Detection of falls or lack of activity
 - Medication reminders
 - Facilitating social ties and access to technology

Challenges facing the (re-)insurance industry

Public vs. private pensions

Sources of income for OECD over-65s, 2012 or latest (in % of total)



New products: regulation uncertainty

- Government policy may keep changing to win votes
 - political positioning may mean citizens are given the impression that a generous public pension system and/or long term care provision will be maintained
- Little incentive for individuals to consider:
 - saving for retirement
 - purchasing insurance for longevity
 - purchasing insurance for long-term care needs

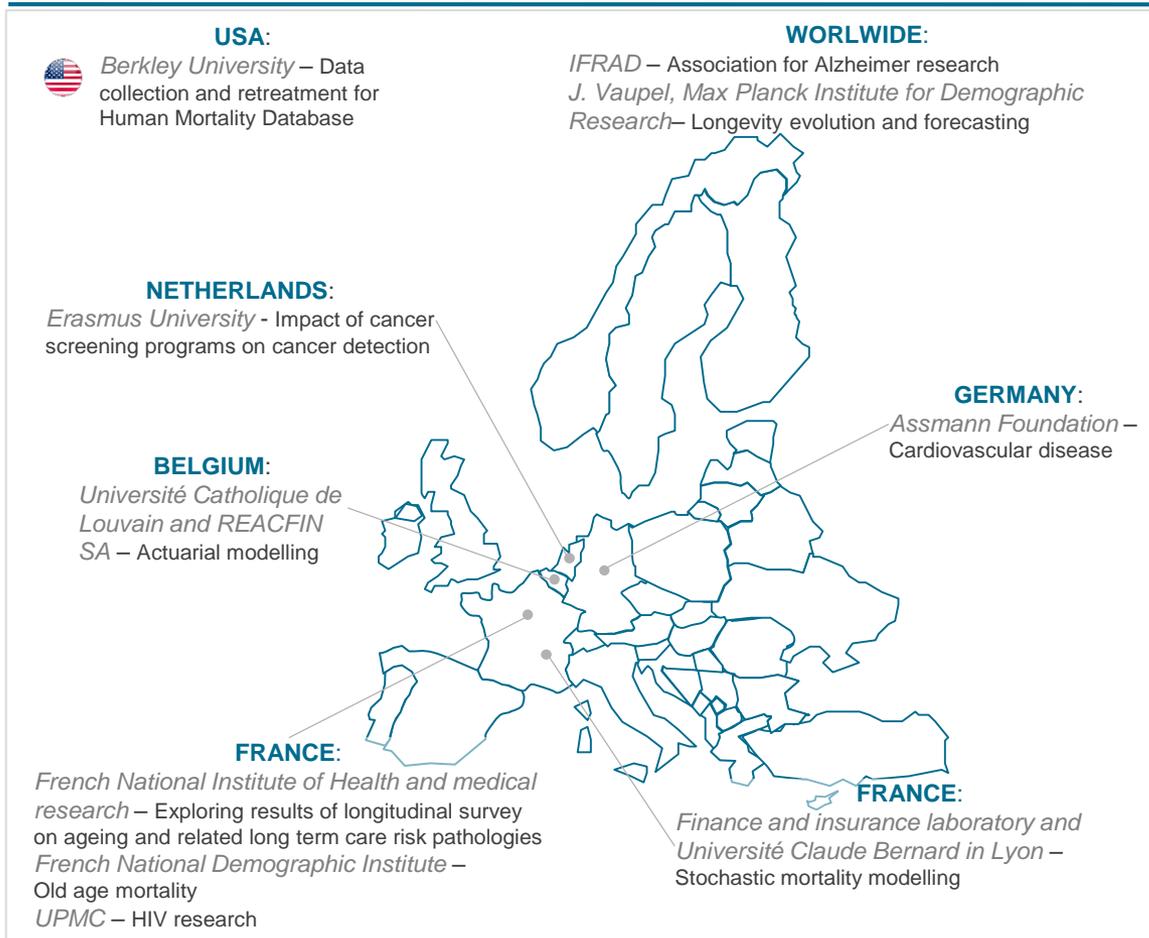


Compulsion helps create large pools but needs political will

Great uncertainty for insurers for launching products

SCOR is very committed to R&D through many partnerships & initiatives around the world

Partnerships around the world to develop R&D expertise and enhance risk assessment capabilities



SCOR encourages Actuarial Science development



Rewarding of academic projects to:

- Promote actuarial science
- Develop & encourage research
- Contribute to improve risk knowledge and management



- Employment of PhD students who finish their thesis at SCOR, in a finance/ insurance environment



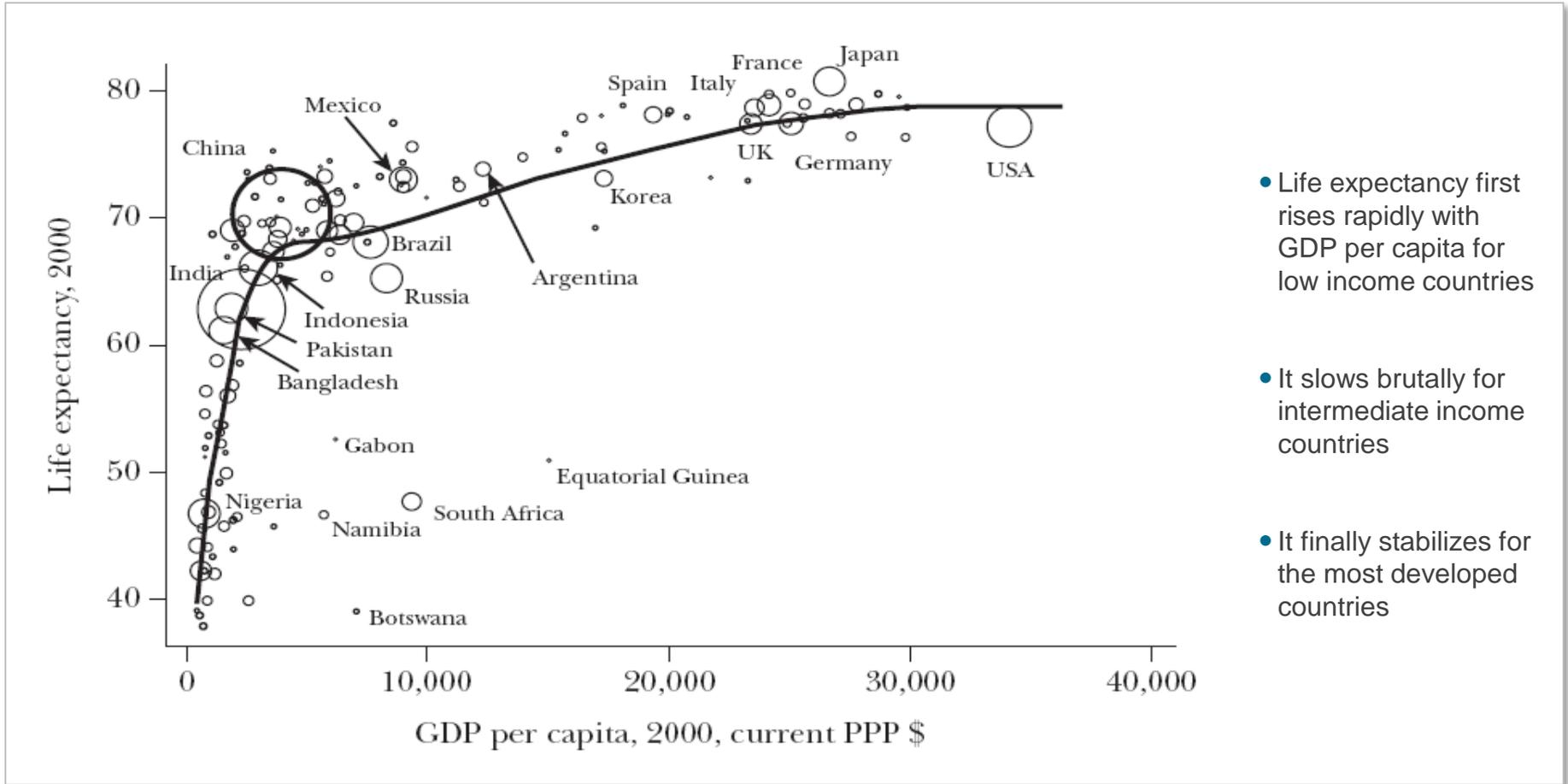
- Member of the Geneva Association to support research in the risk and insurance economy (finances studies, seminars)

Questions

Appendix

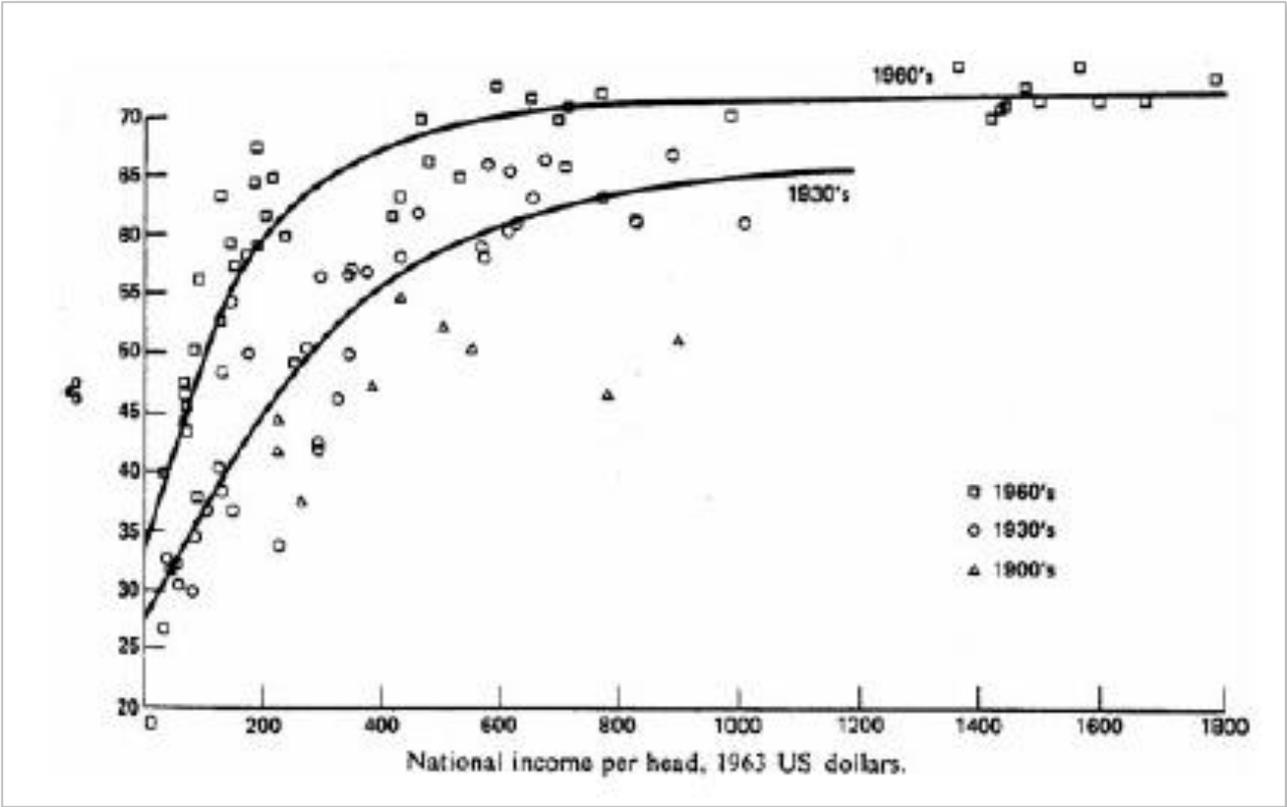
GDP per capita and life expectancy

The Preston curve : a “Γ” curve that relates the average life expectancy to the level of the GDP per capita



Preston curve

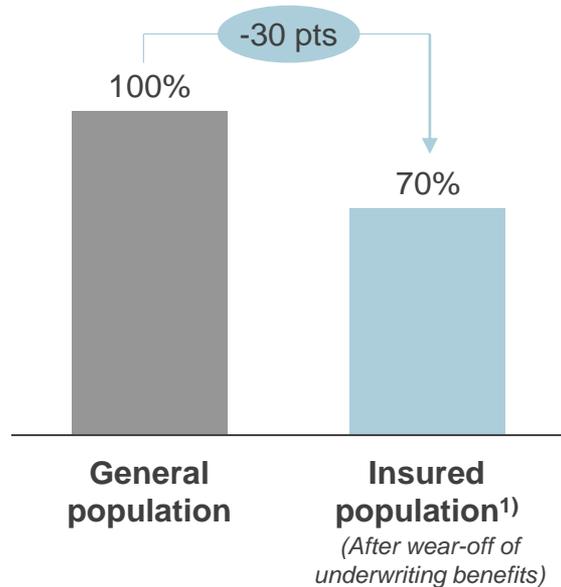
Figure 5 Preston curve, Preston [7], 1975



Insured population does not have the same risk profile as the general population

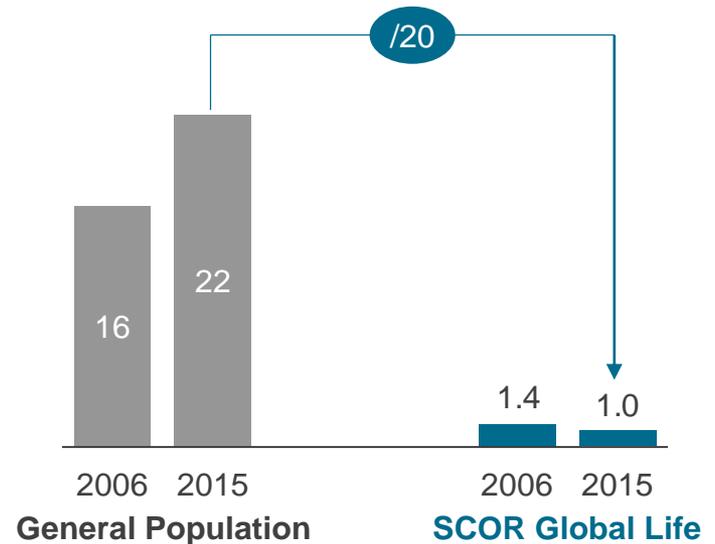
Insured population have lower mortality risk than the general population, even after wear-off of medical underwriting benefits

Relative mortality – 20 years+ after policy purchase (as % of general population)¹⁾



Causes of mortality trend slowdown in the general population is not observed in SCOR's portfolio – Example of poisoning

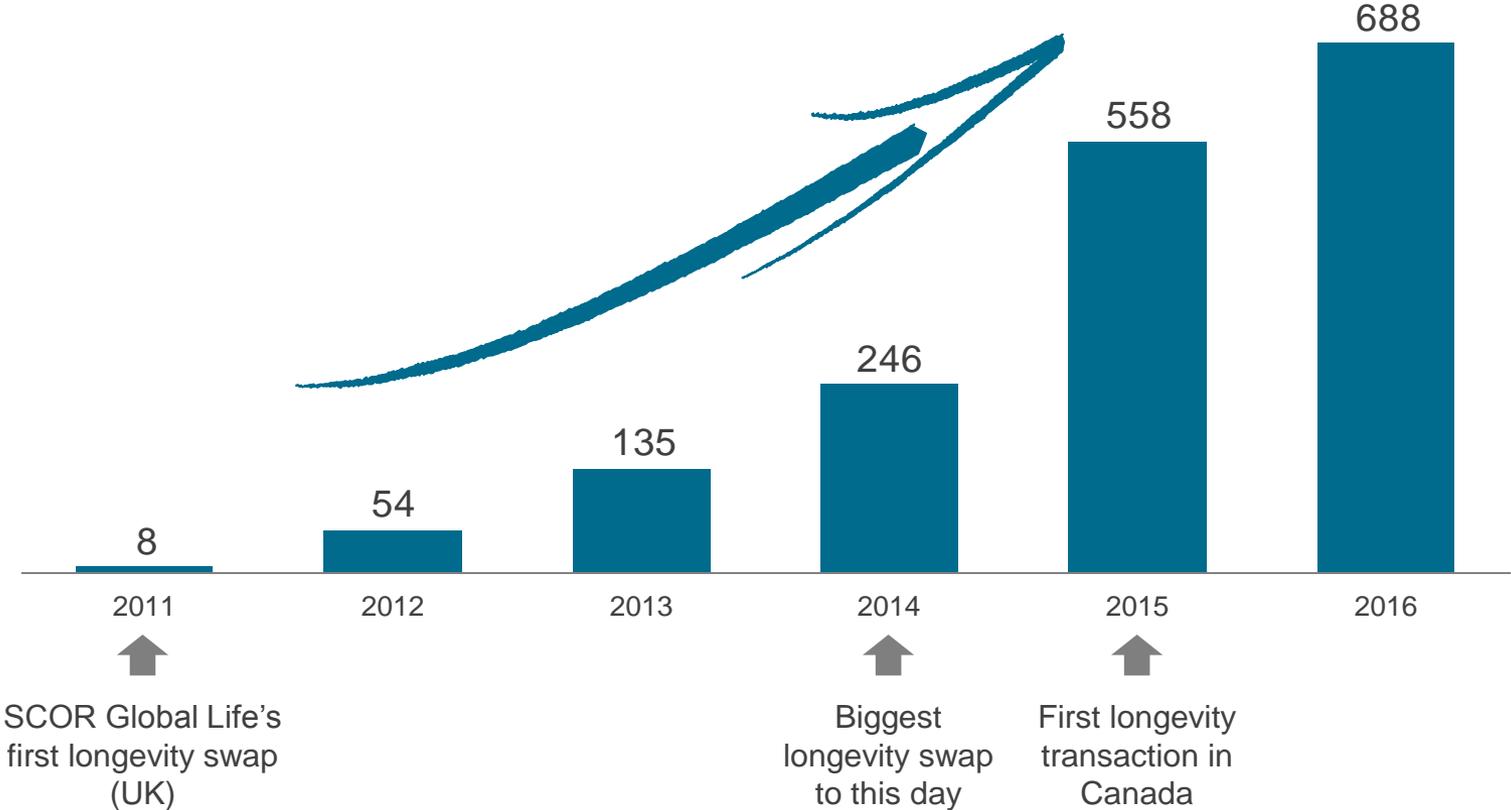
US mortality experience from poisoning (# deaths per 100,000) – population aged 35-54; General population & SCOR's US portfolio



SCOR Global Life's US portfolio does not show the same mortality level and trend as the general population due to very different risk profiles

This demographic evolution presents new opportunities in reinsurance: SCOR's expertise provides solutions to face longevity risk

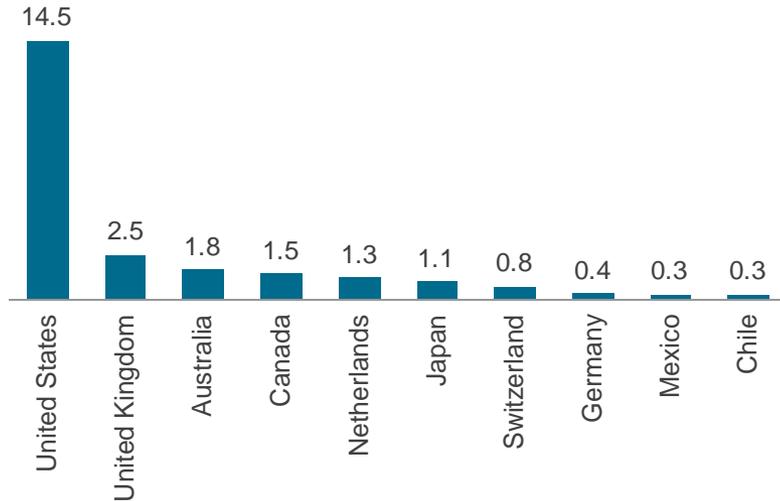
Gross Written Premiums for longevity (in €m) – SCOR Global Life



The size of the potential market for longevity transfers is considerable, hence reinsurers must cautiously use their capabilities

A vast longevity risk transfer potential

10 largest private pension fund schemes by asset size (in USD trillions)¹⁾



- Considering approximately 60% of these pension funds are on defined benefits, a total of **~\$16,000 billion carry longevity risk**
- Throughout the past decade, **about \$200 billion obligations were transferred to the UK**, and about \$70 billion to the USA.

An existing longevity reinsurance market in the UK and North America

Insurance solutions in amount of insured obligations (in USD billions)



- **United Kingdom:** Transactions covering all risks (buy-out or buy-in) or simply biometric (swap)
- **United States:** Transactions covering all risks (buy-out or buy-in)
- **Canada:** Recent swap transactions

Longevity risk is composed of 3 components; trend is the most material

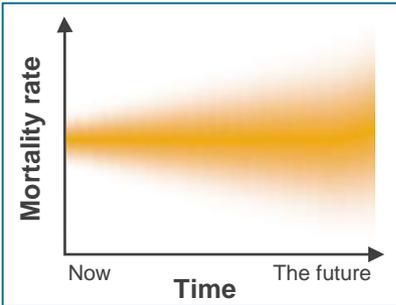
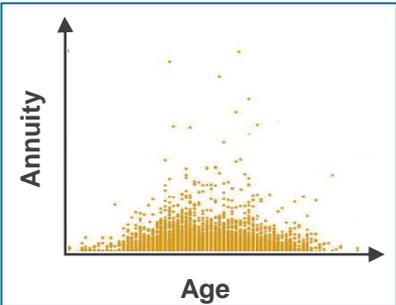
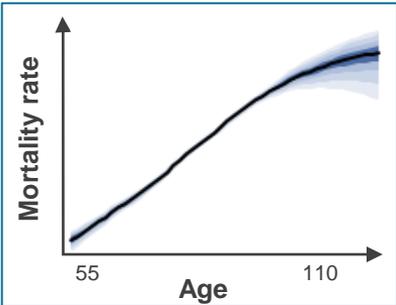
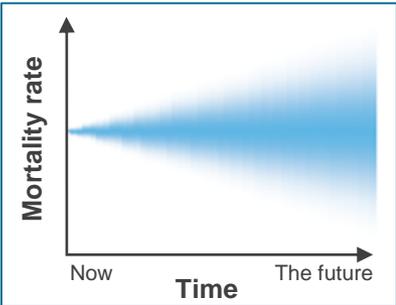
Trend risk + Level risk + Volatility risk = Longevity risk

Risk that mortality rates improve faster than expected

Risk of an inaccurate assessment of current mortality rates

Risk of volatile mortality rates due to insufficient mutualisation, heterogeneous portfolio

Combination of all components

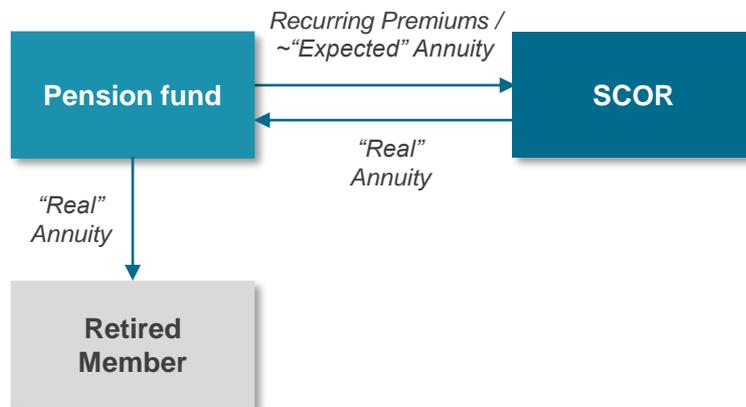


It is the main risk component, the most material

Controlled approach of the risk: longevity “swap” only covers biometric risk, for aged portfolios of annuities in payment

Longevity swap covers biometric risk: Swapping of “expected” annuity for “real” annuity

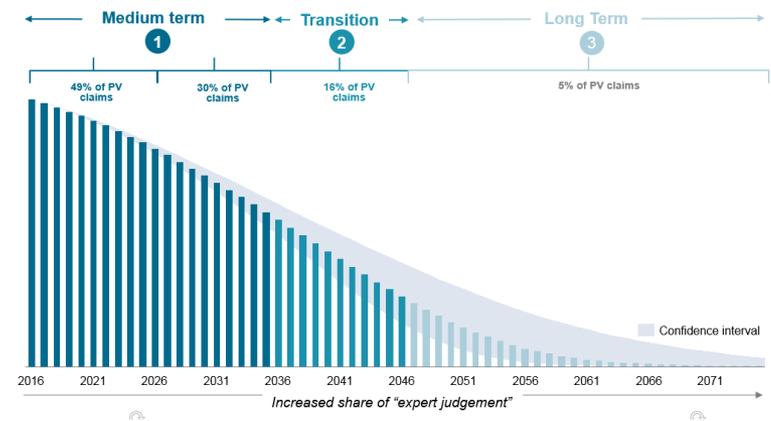
Longevity swap structure



- The pension fund only transfers **the biometric longevity risk** to the insurance institution
- **An assured flow of “expected” annuities is swapped for a variable flow of “real” annuities** that depends on the real mortality of the pension fund members.
- Economic risks remain within the pension fund

SCOR only covers readily cleared annuities with longevity swaps, therefore reducing risk

Present value of damages



- **Better control of amounts payable** for annuities in payment in case of survival – no unscheduled payments
- By choosing aged portfolios, **SCOR limits the share of entirely judgement-based highly uncertain obligations**
 - Increasing trend risk with the projection horizon