



Institute
and Faculty
of Actuaries

Applying insights to mortality projection models

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International Mortality & Longevity Symposium, September 2014



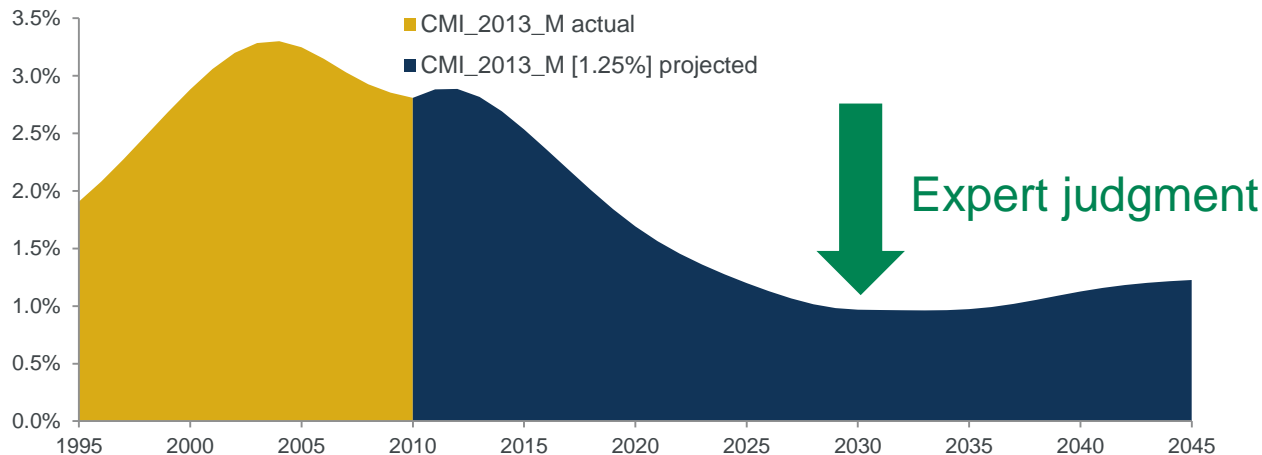
Typical improvement assumptions used by actuaries

91% of companies with DB schemes are using the **CMI projection model** to produce future improvement assumptions

75% of these companies are using a long-term improvement rate assumption of **1.0%** or **1.25% p.a.**

Source: KPMG Pensions Accounting Survey (2014)

Average annual mortality improvement rate, males aged 65-89, 1995 to 2045, derived using CMI_2013_M [1.25%]



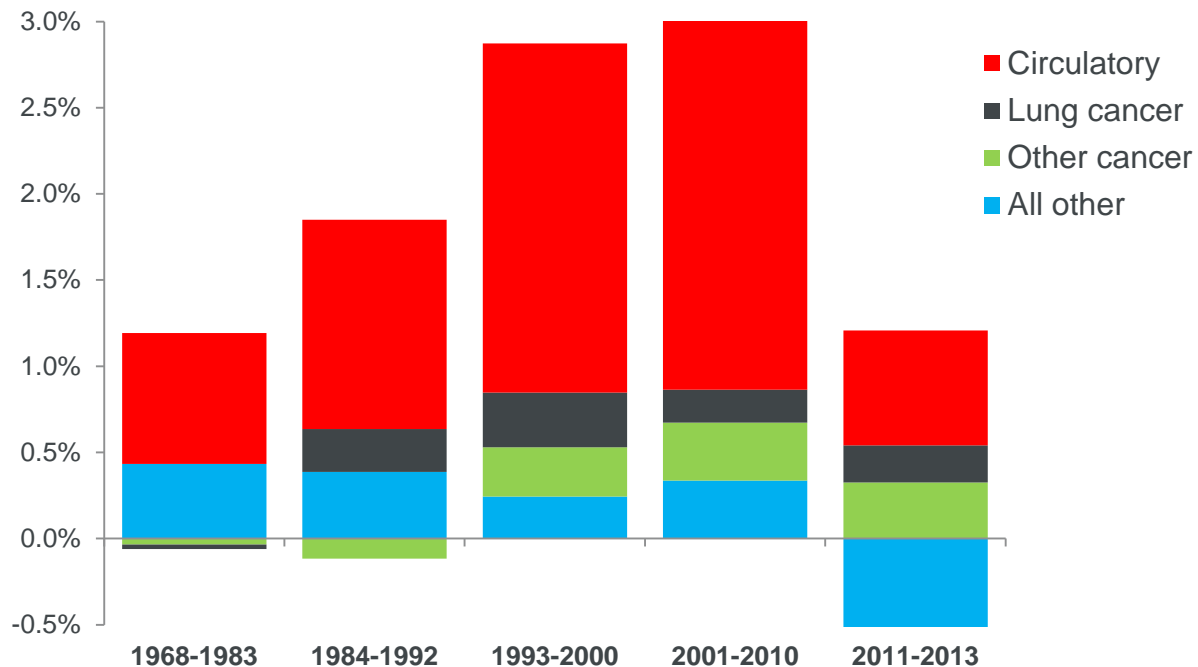
Source: own calculations using CMI projection model

How can insights be applied?

- Most basic approach
 - Decompose past improvements into constituent causes
 - Use this analysis to help parameterise 'aggregate' projection model (e.g. CMI model)

Decomposition of recent improvements

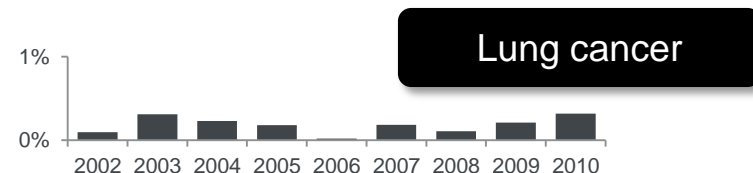
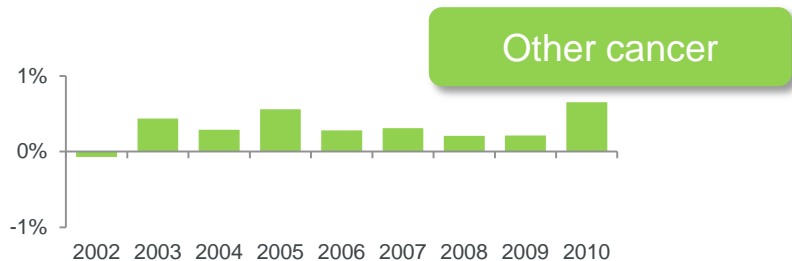
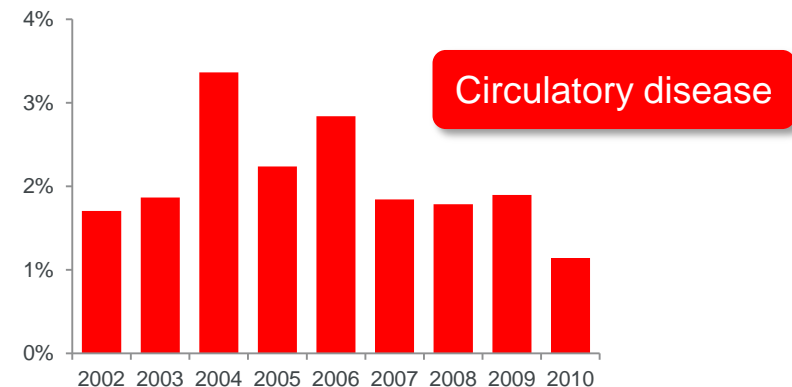
Average annual mortality improvement, split by cause, males aged 60-89, England & Wales, 1968-2013



Source: Own calculations using ONS data

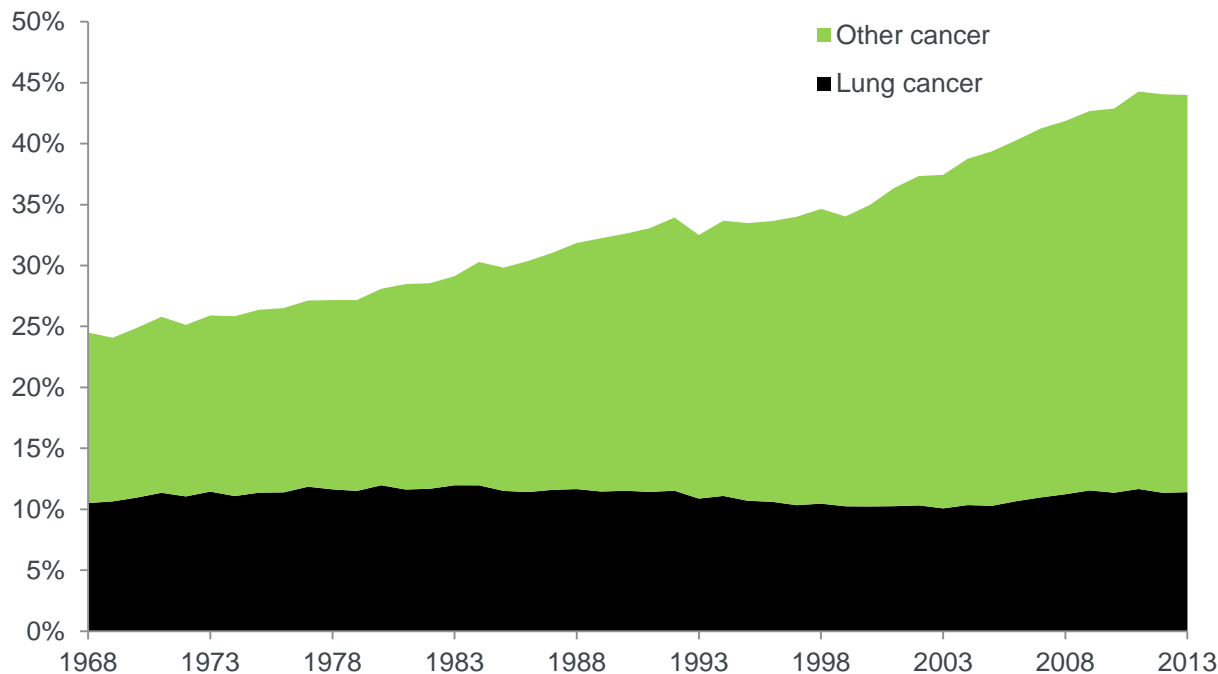
Decomposition of recent improvements

Average annual mortality improvement, split by cause, males aged 60-89, England & Wales, 2002-2010



Increase in proportion of deaths due to cancer

Proportion of deaths for males aged 65-74 due to cancer, England & Wales, 1980-2013



Source: Own calculations using ONS data

How can insights be applied?

- Most basic approach
 - Decompose past improvements into constituent causes
 - Use this analysis to help parameterise an ‘aggregate’ projection model (e.g. CMI model)
- Preferable to use a conceptual model (e.g. cause-based or disease-based) to capture expert opinion

Preferred approach:

- Develop model with (5-10) cause-of-death groups
- Allow for changes in classification over time
- Parameterise model for each cause group using historic data
- Allow future projections to be modified to reflect expert opinion
- Blend into aggregate model at high ages

Canvassing expert opinion

- Discuss with specialists, epidemiologists, CMOs, etc...
- Consider form of question to get meaningful response ...

Poor questions	Better questions
What will life expectancy be in 2050?	Heart disease mortality rates fell by 50% over the last decade, by how much are they likely to fall over the next ten years?
How much will improved cancer survival add to life expectancy over the next decade?	Five year survival after lung cancer diagnosis is currently 10%. What is it likely to be in ten years time?

- Ask questions about underlying drivers of mortality change and the likelihood of different scenarios occurring
- Get views on opinions related to possible mortality improvements...

Sample opinions/statements

It is a realistic goal to eliminate death and suffering from cancer by 2015

Andrew von Eschenbach, Former Director of the National Cancer Institute (2003)

Premature deaths from heart disease could be virtually eliminated within ten years

Professor Sir Roger Boyle, Former Heart Disease Director (2004)



Questions



Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.