Faculty of Actuaries Students Society (FASS)

Longevity Risk

Stephen Richards
10th October 2005

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- 2005 — consultant on longevity risk

Longevity risk — plan of talk

- Mortality improvements

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- Summary and questions

Quiz

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Which of the following are insurance companies?

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- British Airways

- Prudential

- British Telecom

Spot the difference

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Insurance company	Longevity liability
Standard Life	£12.7bn[1]
British Airways	£12.6bn[2]
Prudential	£20.7bn[3]
British Telecom	£34.3bn[4]

Source: [1] Valuation annuity reserves, Standard Life FSA Returns to 31 December 2004; [2] Present value of pension liabilities, British Airways Annual Report and Accounts to 31 March 2005, section 32, page 57; [3] Valuation annuity reserves for PAL and PRIL, FSA Returns to 31 December 2004; [4] Present value of pension liabilities for BTPS on FRS17 basis as at 31 March 2005.

Retirement life expectancy by socio-economic group
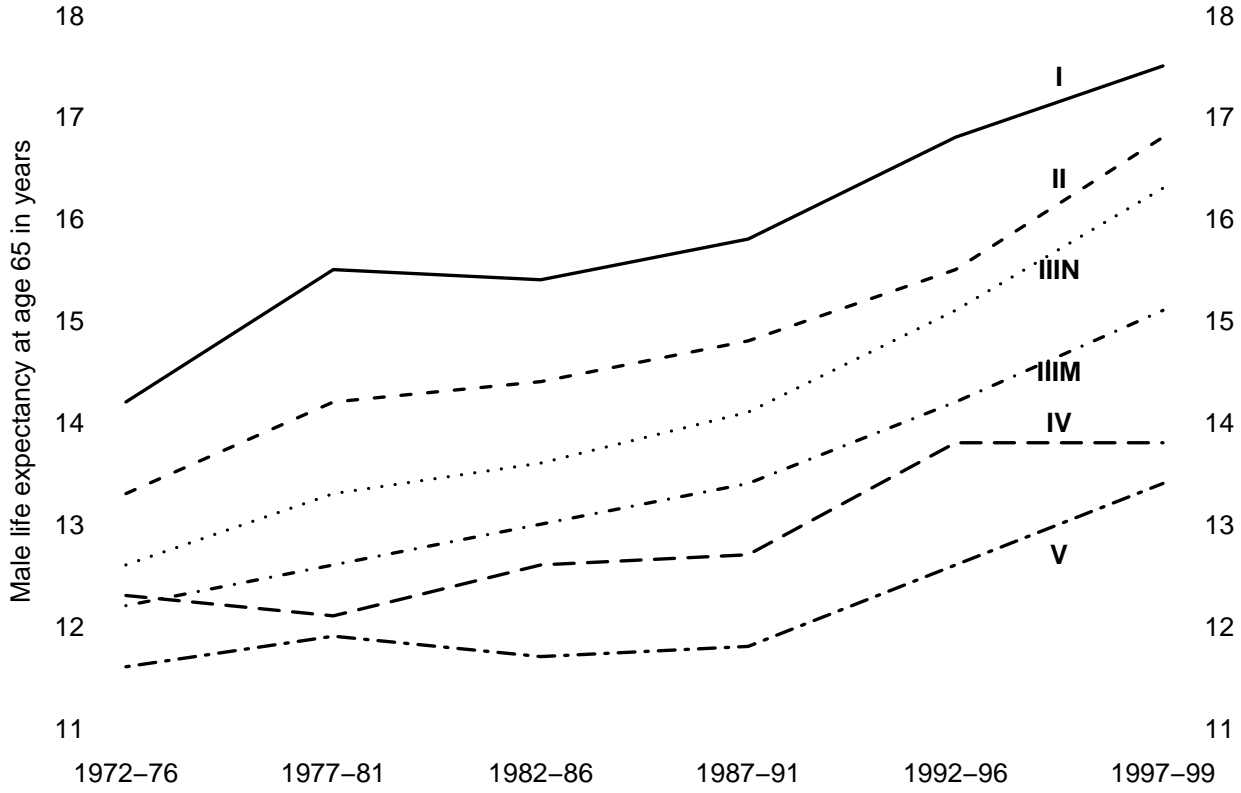
Source: ONS Longitudinal Survey.

Mortality improvements

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- For more details, see Willets (2004) and Richards and Jones (2004).
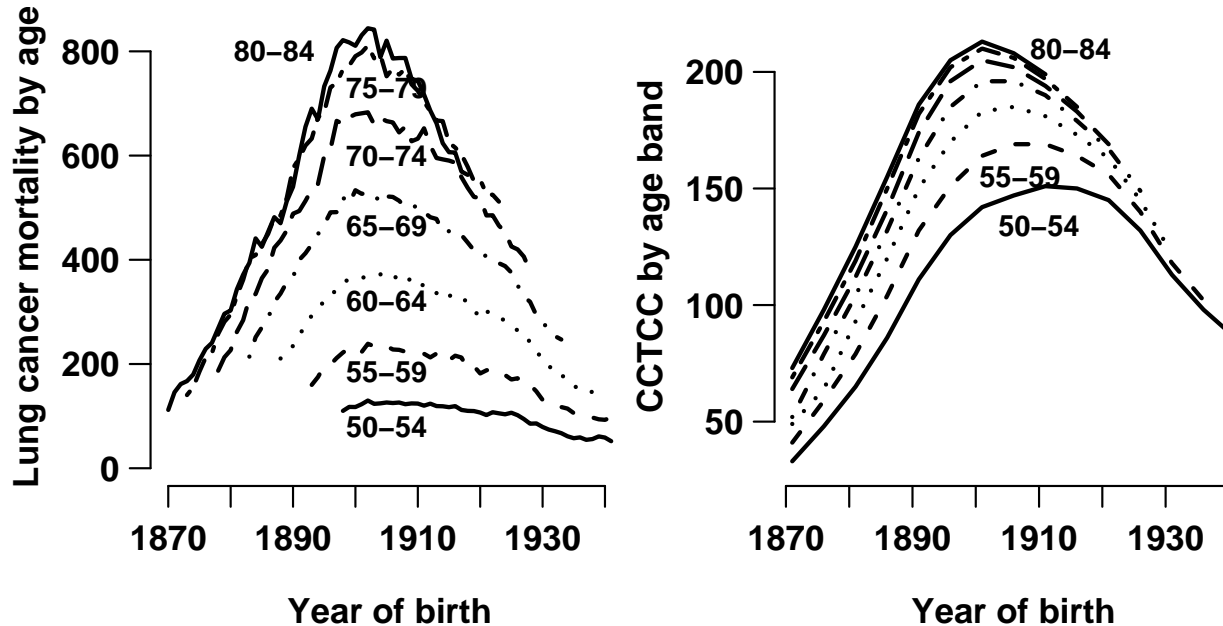
Mortality improvements by year of birth
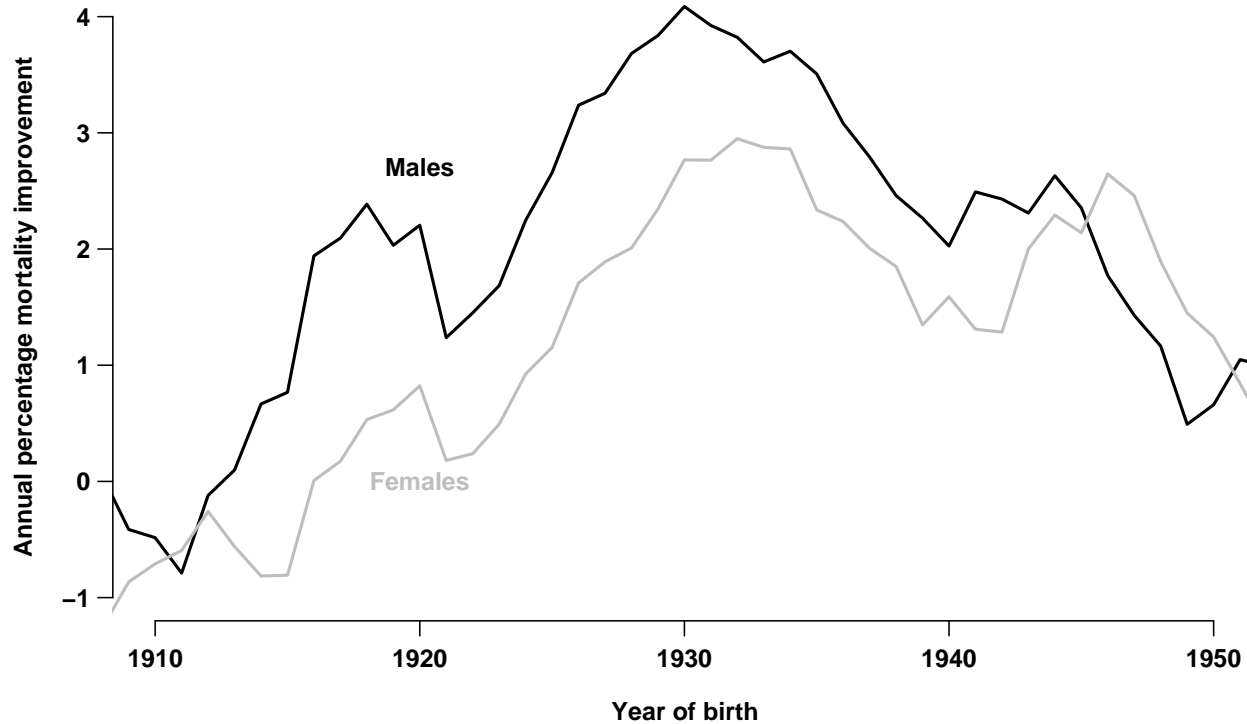
Source: Own calculations with GAD interim life tables for 2000–2002 and 2001–2003.

Possible causes of cohort mortality patterns

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- Changes in smoking incidence.

Lung-cancer mortality rates (left) and lifetime consumption of cigarettes (right) by year of birth
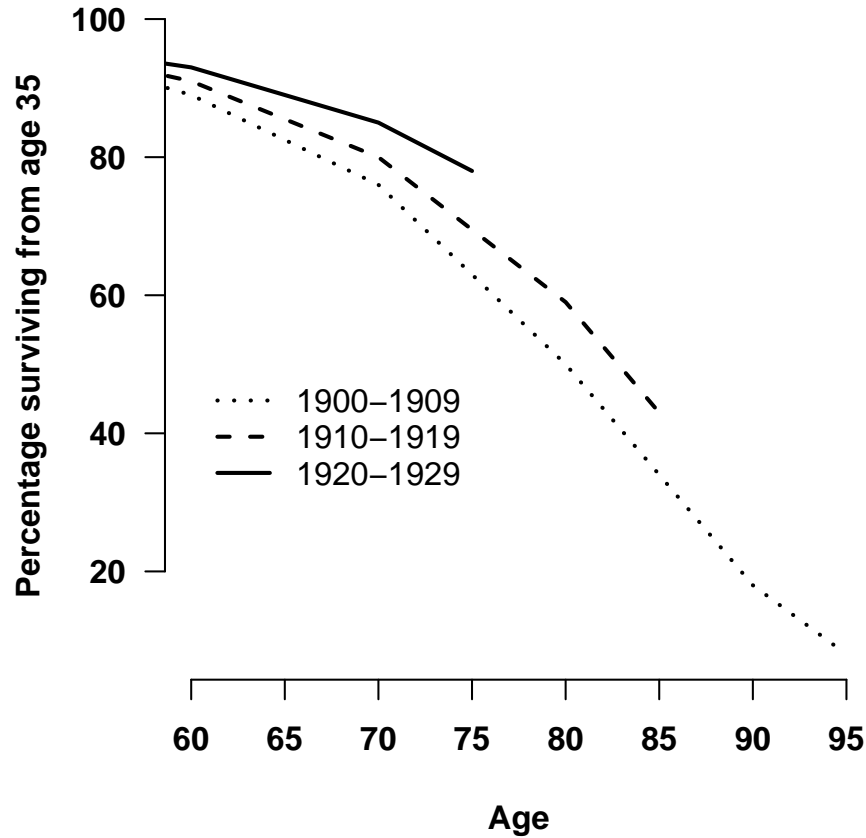
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- ... but this cannot be the whole explanation.

Cohort survival curves for life-long non-smokers
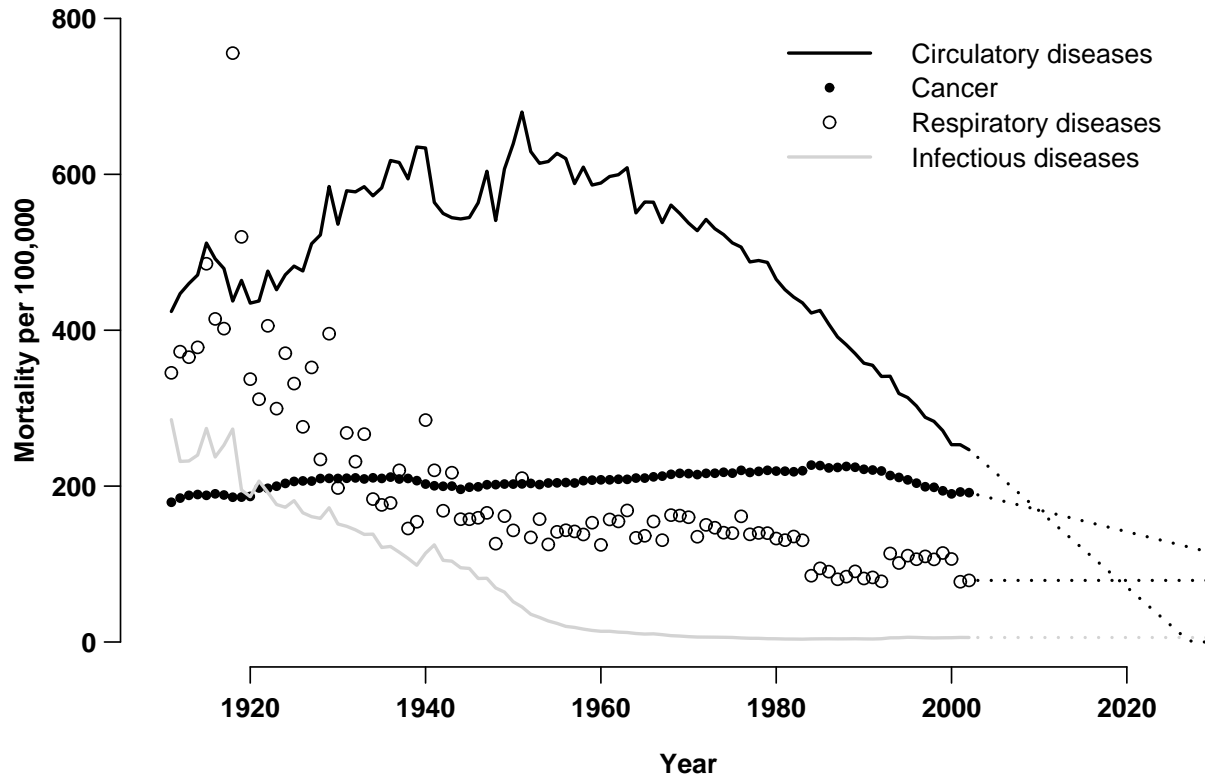

Source: Doll et al (2004).

Possible causes of cohort mortality patterns

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Possible causes of cohort mortality patterns

- Changes in smoking incidence.
- Early-life exposure to pathogens.

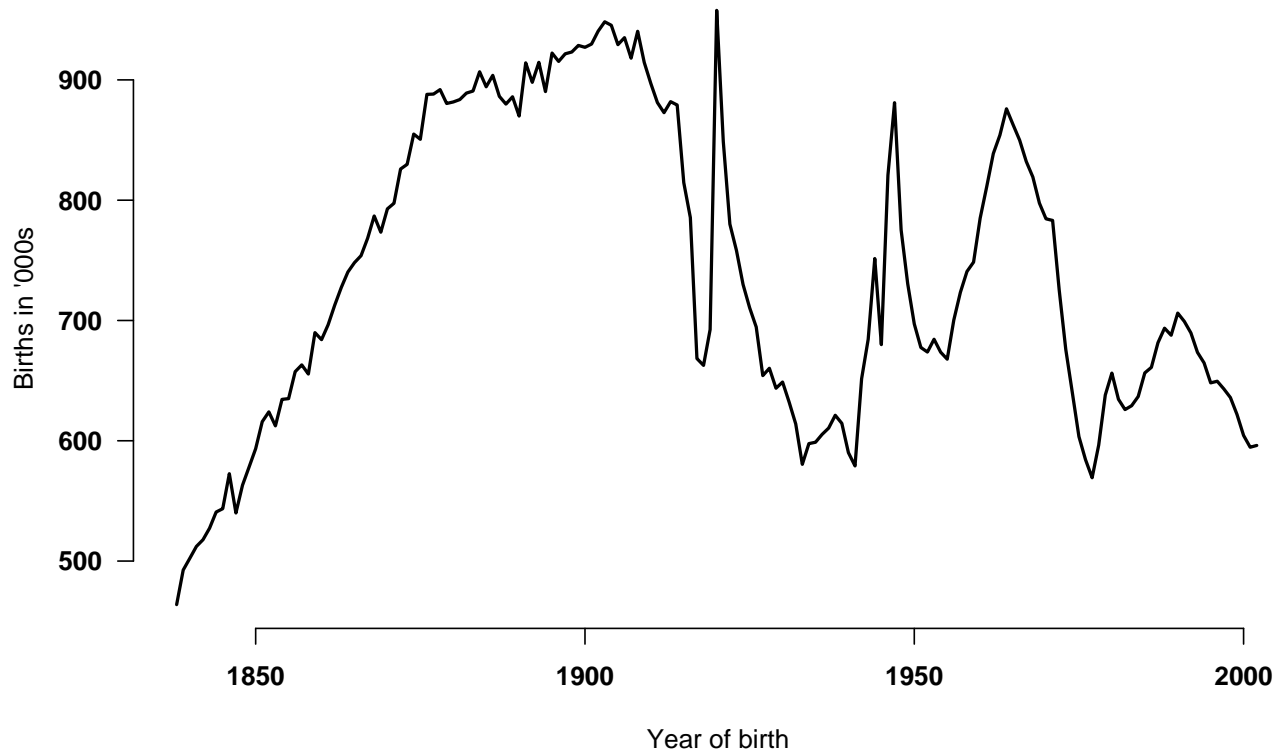# Mortality rates by broad cause of death

Source: ONS data with extrapolations by Richards Consulting.

Possible causes of cohort mortality patterns

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- Family size.

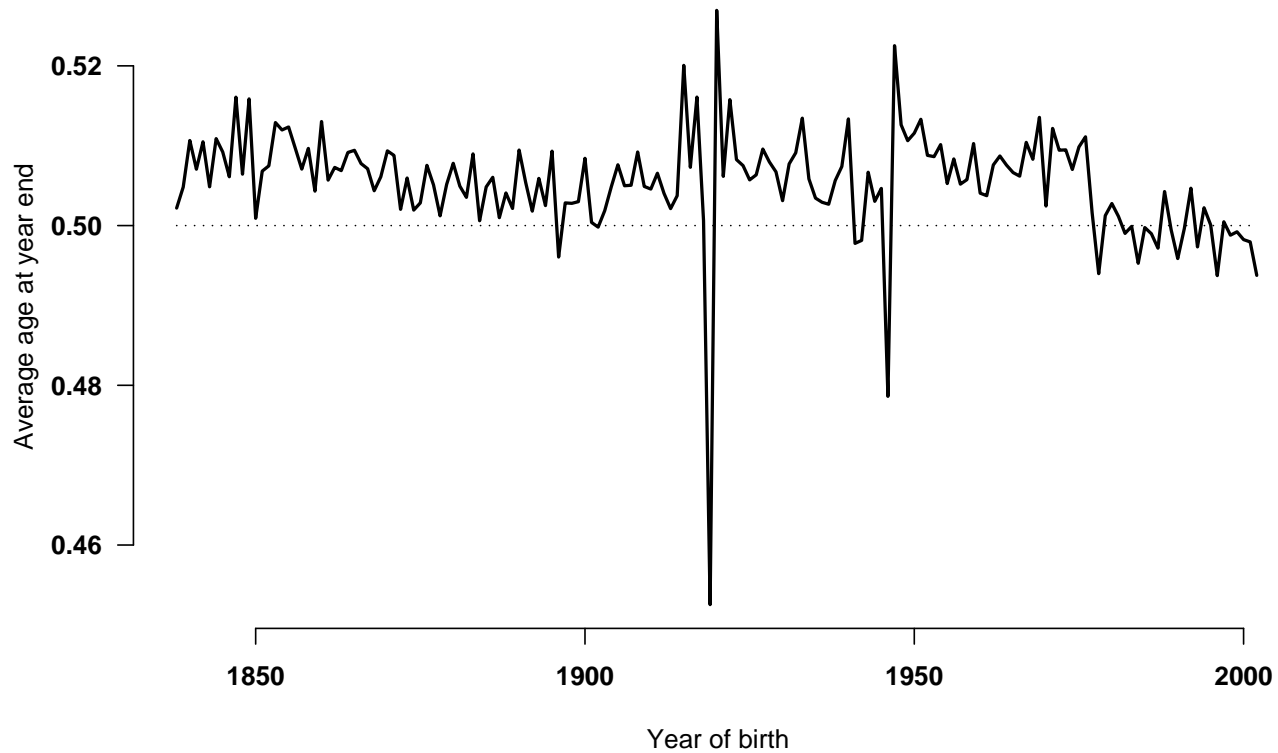# Births in England & Wales

Source: ONS data.

Possible causes of cohort mortality patterns

- Changes in smoking incidence.
- Early-life exposure to pathogens.
- Family size.
- Season of birth.

Average age at end of year of birth

Source: Richards Consulting calculations using ONS data.

Mortality rates by broad cause of death
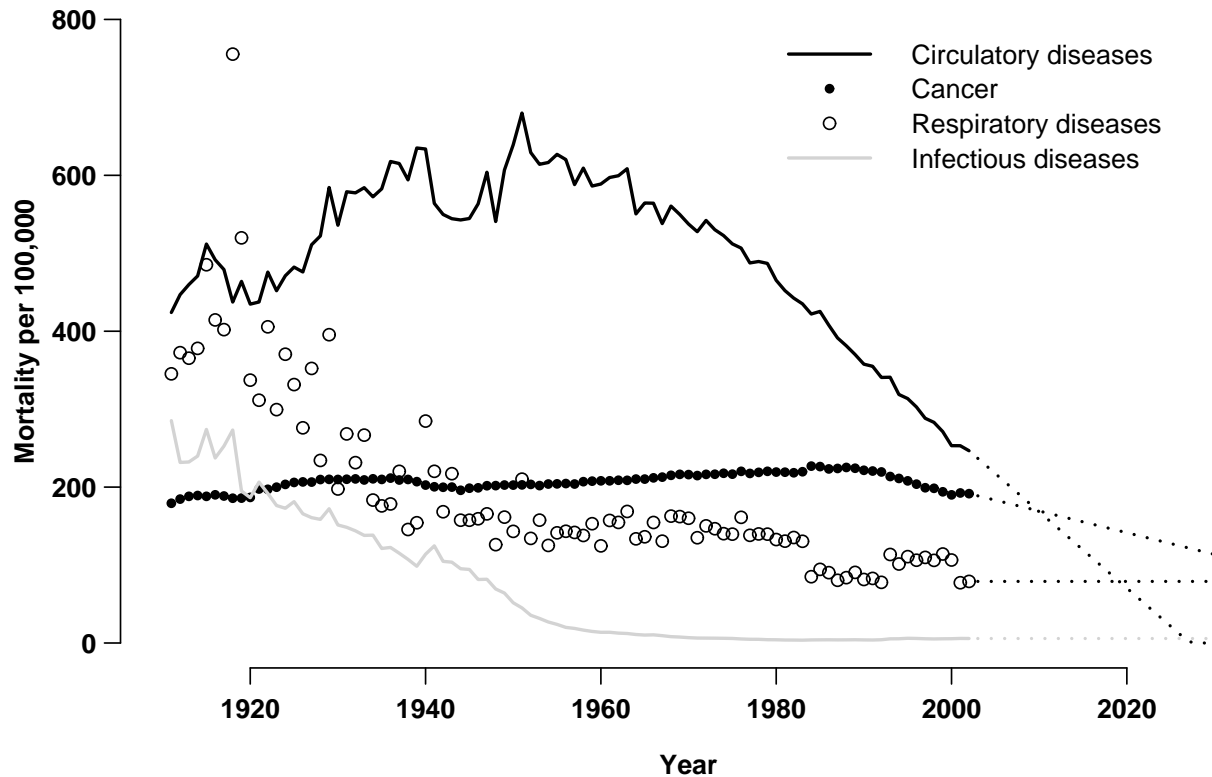
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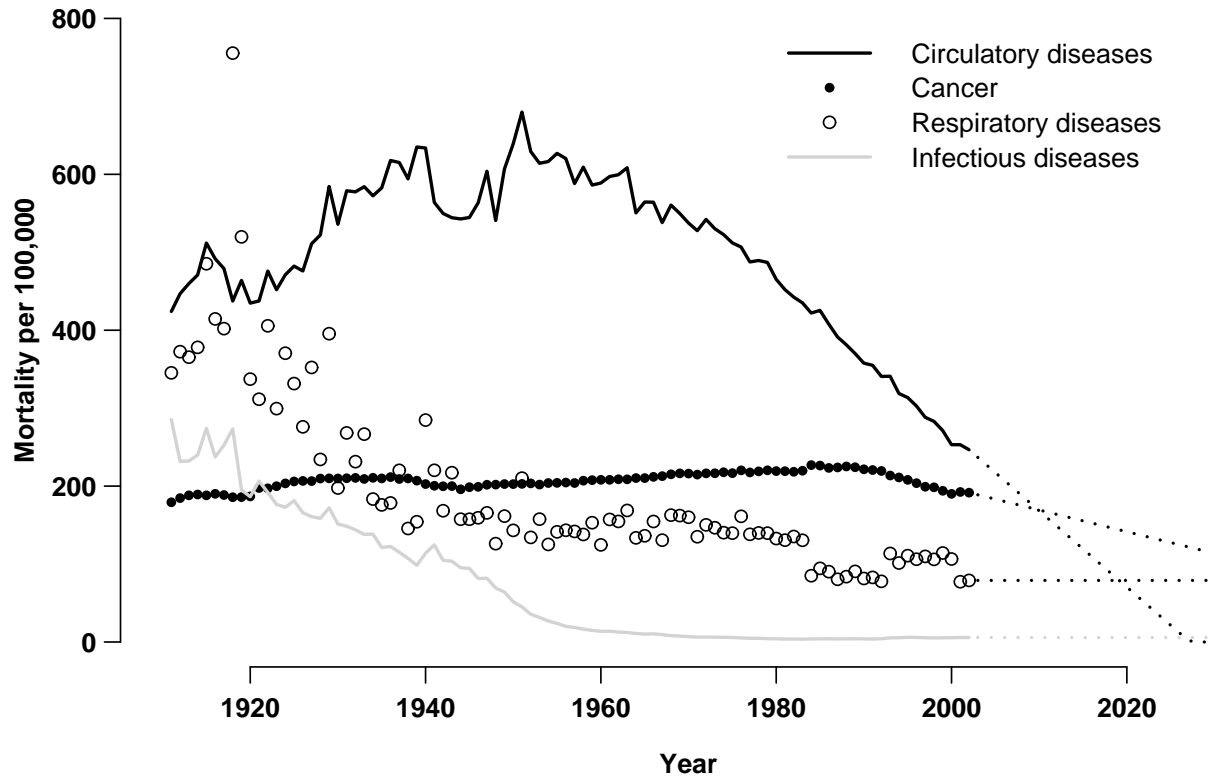Source: Richards Consulting calculations using ONS data.

Direction of future mortality improvements

- Circumstantial evidence suggests improvements are *accelerating.*

- Look again the pattern of mortality rates over the past century...

- ...and consider the implications of circulatory-disease mortality continuing its linear downward trend...

Smoothed annual mortality improvement
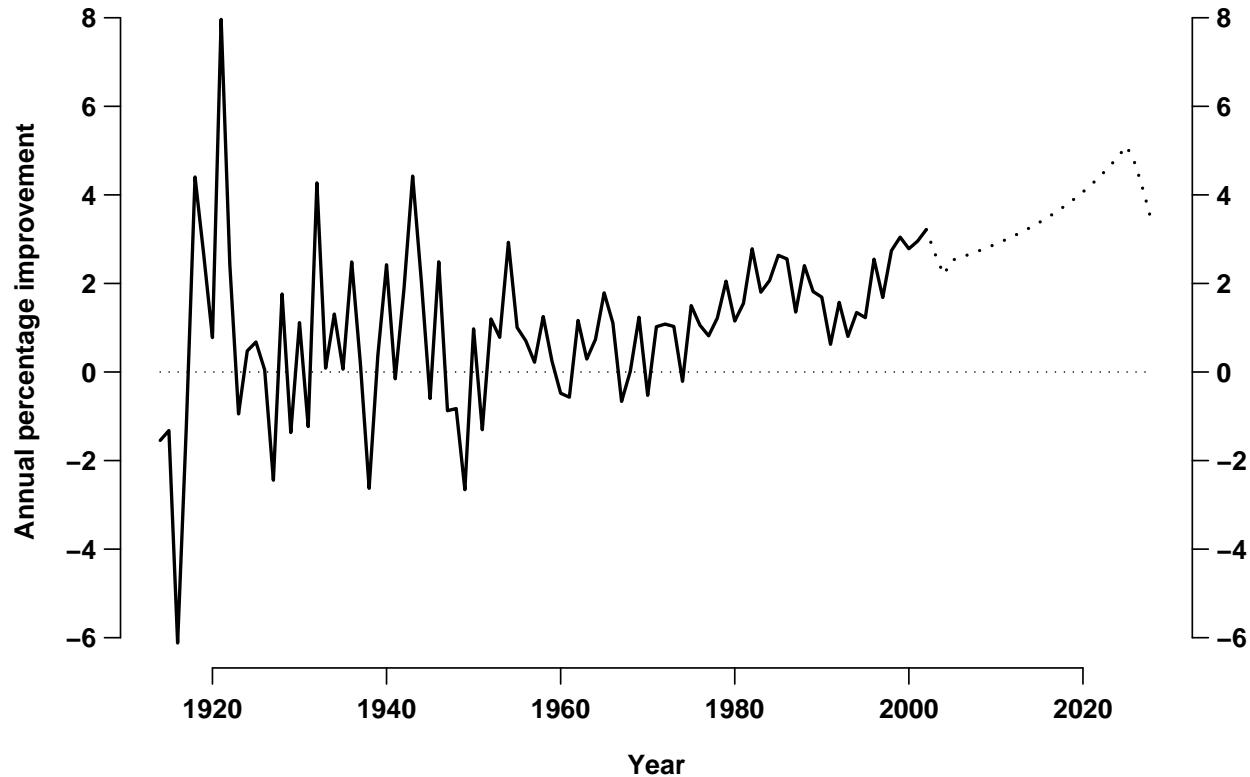
Source: Five-year moving average. Richards Consulting calculations using ONS data.

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- For application to mortality projections, see Currie, Durban and Eilers (2003) and CMIB (2005).

Mortality improvements
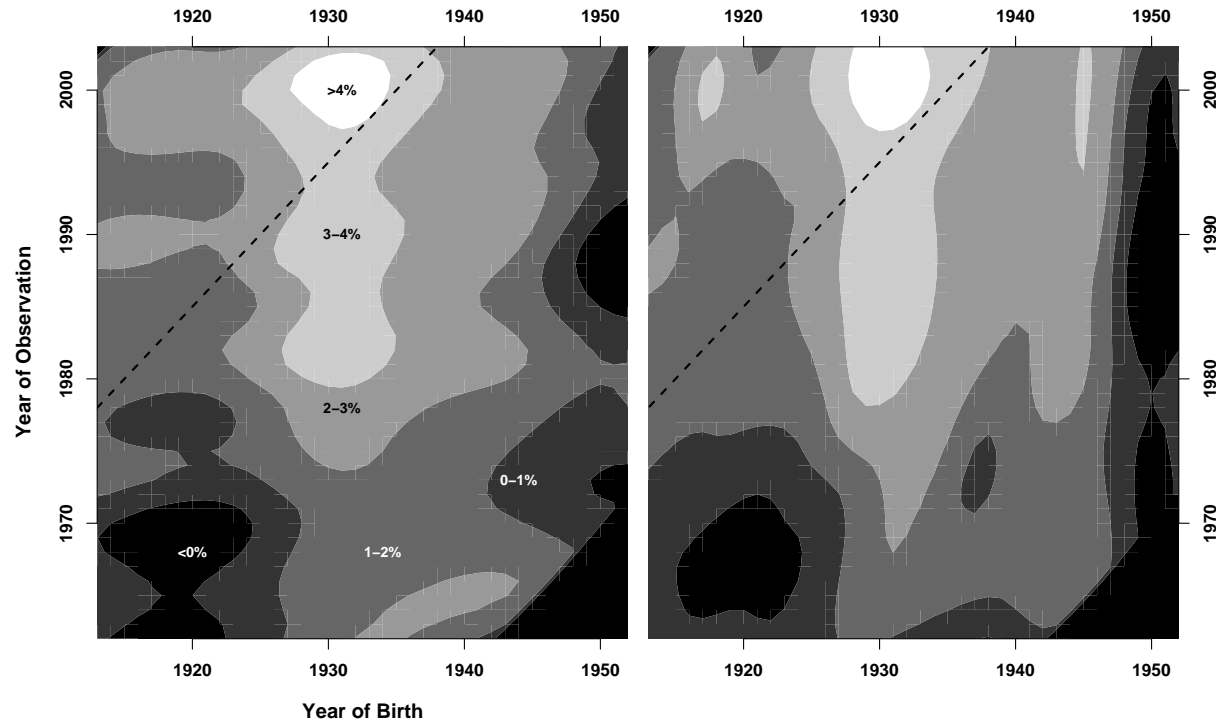
Source: Richards, Kirkby and Currie (2005). Male mortality improvements after smoothing mortality rates in two dimensions using penalised splines.

Financial significance of life expectancy

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- Under IFRS, the pension-scheme deficit comes onto the balance sheet.

- Under IFRS, British Airway's net assets fell from £2.7bn to £1.4bn[2].

Source: [1] British Aerospace: 2004 preliminary results, page 25; [2] British Airways: Release of Financial Information 2004/5 under IFRS, page 3.

www.richardsconsulting.co.uk

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- ...of which £53bn is unfunded[1].

- But is there more to this?

Source: [1] Richards Consulting calculations using data from pages 33–35 of Accounting for Pensions Annual Survey 2005, Lane, Clark Peacock LLP.

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- For example, Hanson's calculations give a 65-year-old male pensioner an expected future lifetime of 18 years.

- Using PMA00, a 65-year-old male pensioner has an expected future lifetime of 18.0 years *with no allowance for future mortality improvements*[1].

Source: [1] Richards Consulting, www.richardsconsulting.co.uk/new_tables.html

Restructuring longevity risk

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- The insurers will restructure first...

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Source: Richards Consulting survey of annuity reinsurance, incorporating [1] XL Capital Ltd press release, July 27th 2005; [2] Canada Life press release, May 2005; [3] Prudential press release, June 2005.

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Restructuring longevity risk

- The insurers are restructuring. . .

- . . .but the big business lies in restructuring pension schemes.

Summary and questions

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- Shouldn't they be regulated as such?

References

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