The Next Big Mortality Improvement

Andrew D Smith
andrewdsmith8@deloitte.co.uk

Acknowledgements and Disclaimer

I am grateful for input from Khurram Khan and Prof Brendan Delaney. All views expressed are mine alone, as are any errors or omission. These do not necessarily represent the views of my employer, Deloitte, nor of the Institute and Faculty of Actuaries.
What Lies behind the Patterns?

• Although there is a general increasing trend in life expectancy, we know that some historic causes have had particularly large impact:
  – Discovery of penicillin and other antibiotics
  – Reduction in smoking

• It is difficult to argue these can be repeated; smoking in the UK has fallen from 50% to 20% in the last 40 years and it cannot feasibly fall to -10% over the next 40 years

• Feasible forecasts should look behind the causes of death.
Do You Know the Biggest Cases of Deaths?

Death Causes (England and Wales, 2009-13)

This is based on the international classification of diseases.
Total deaths (M+F) = 2,464,479
Source: ONS
Lifetime Influences on Disease

Longevity Catalysts: Underlying Causes

• “What future events are we aware of today whose occurrence is likely to be coupled with a significant impact on UK longevity?”
  - Introduction of plain cigarette packaging in the UK
  - Use of novel diagnostic biomarkers
  - KRAS targeted cancer treatment
  - Genetic screening
  - NHS Bowel Cancer Screening Programme
  - Stem cell therapy and Parkinson’s disease
  - Polypill scenario
  - Development of a universal influenza vaccine

• Source: Longevity Catalysts working party
Social Trends

• To understand the range of possible longevity outcomes we should consider what clusters of diseases are affected by common social trends.

• We may not be able to forecast the social trends, but we can monitor them and hold capital against losses from adverse trends.

• In this session, I will look at the impact of transport policy.

Thinking about Transport Deaths: This Affects me Personally
Total Transport Deaths E&W 2009-2014

<table>
<thead>
<tr>
<th></th>
<th>All ages</th>
<th>Aged 15-19</th>
<th>Aged 20-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male deaths all causes</td>
<td>1 196 461</td>
<td>3 032</td>
<td>5011</td>
</tr>
<tr>
<td>Male deaths transport</td>
<td>7 214</td>
<td>770</td>
<td>903</td>
</tr>
<tr>
<td>% transport deaths</td>
<td>0.60%</td>
<td>25.40%</td>
<td>18.02%</td>
</tr>
<tr>
<td>Female deaths all causes</td>
<td>1 278 617</td>
<td>1 422</td>
<td>2022</td>
</tr>
<tr>
<td>Female deaths transport</td>
<td>2 341</td>
<td>216</td>
<td>221</td>
</tr>
<tr>
<td>% transport deaths</td>
<td>0.18%</td>
<td>15.19%</td>
<td>10.93%</td>
</tr>
</tbody>
</table>

The vast majority of transport deaths relate to road collisions. More than 1900 road deaths per year in England and Wales. Male victims outnumber female victims by more than 3-to-1. Think about the insurance implications of a reduction in road deaths.

Road Deaths: Killed and Seriously Injured

Pollution Impact of Transport Policy

- Particulate matter from UK combustion emissions causes approximately 13,000 premature deaths a year (lung disease, cancers, circulatory)
- Transport emissions (from road and other transport) are the biggest cause of pollution death, causing approximately 7,500 premature deaths a year.
- Road transport alone is estimated to cause 4,900 deaths.
- Power generation caused approximately 2,500 and industrial emissions approximately 830 premature deaths a year. A further 6,000 deaths are caused by non-UK emissions produced in the European Union.

Exercise Impact of Transport Policy

- Effect of 2.5 hours / week of moderate physical activity include reductions in
  - Circulatory disease: - 23%
  - Breast cancer: -11%
  - Diabetes: -19%
  - Colon cancer: -8%
  - Depression: -7%
- Compare statins (cholesterol, blood pressure lowering) –0.1%
- Exercise does not benefit from pharma lobbying
- Source: Prescription cost analysis, 2013, ONS
UK Contributions to DALYs Loss

Figure 7: Burden of disease attributable to 20 leading risk factors for both sexes in 2010, expressed as a percentage of UK disability-adjusted life-years


Key Motor Transport Mortality Impacts

Collisions + Emissions ++ Exercise

10/12/2014
Increasing Awareness of Traffic Deaths

National Funeral for the Unknown Victim of Traffic Violence. 15 Nov 2014
Photo: Frederique Bellec.

Benefit / Cost Ratio for Infrastructure

Concluding Remarks

• A good mortality forecast is more than just a statistical extrapolation of past trends.

• Many insurers already analyse improvements by cause of death, with particular regard to medical treatment advances.

• Incidence of diseases are related to environmental and social trends, which we can also attempt to forecast, or at least understand the range of possibilities.

• Trends in transport can affect mortality in three major ways: road collisions, air pollution and exercise. Government and businesses increasingly factor the benefits of active transport into decision-making.
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 presenters.