Institute and Faculty of Actuaries, Regulatory Board

Subject	Horizon scan focus – the ever-changing mortality landscape
Meeting date	14 May 2025
Previous Steer/Approval	February 2024
Related horizon scan code	HS09 – insufficient challenge of established practices and theory
International issues considered?	Relevant
Author	Alan Marshall, Review Actuary
Reviewer	David Gordon, Senior Review Actuary
Purpose	Steer

A: Executive summary

1. This paper is to aid the Board in a discussion on Horizon Scan entry HS09, which covers challenging established theory in the context of actuarial work:

    - *"**Actuaries insufficiently challenge established practices and theory, in the face of significant economic, environmental, and societal changes**"*

2. The Covid-19 pandemic resulted in significant shocks to mortality, and there remains uncertainty and debate around both short-term and longer-term impacts. Alongside this we continue to see other potential significant influences on mortality, both positive and negative, across a range of aspects, economic, health-related, and environmental.

3. The growing influence of machine learning techniques is also beginning to take hold in mortality modelling, bringing into play both enhanced predictiveness, but with added complexity.

4. Both within and outside of the actuarial profession there is continued significant reliance on mortality statistics and it is important that there is ongoing challenge on the methodologies applied, and promoted through learning resources.

5. The Board is asked to provide views on this topic, and to what extent the IFoA Regulatory Toolkit could be utilised to help actuaries, and wider society, manage and mitigate this key risk. Stuart McDonald MBE, Deputy Chair, CMI Executive Committee, and a recognised expert in this field, will be in attendance to participate in the discussion.

B: Background

6. The Horizon Scan definition provided above also contains sub-bullets which focus on market valuations, a topic which was visited by the Regulatory Board in February of this year. However, the scan additionally highlights the following:

    - *"This could be extended to other aspects of the actuarial skillset, where established thinking may need constructive challenge."*

7. The understanding of mortality risk, and beyond this the ability to provide advice and insight, is one of the core actuarial skills, and perhaps even the 'original' one. It is important that the profession continues to challenge the theory and practice around this, and in particular in the face of significant global events and changes.

8. The IFoA Regulatory Board previously discussed Covid-19 specific risks in February 2024 when the prevailing version of the Horizon Scan highlighted a potential risk that inappropriate allowance is made for experience of the pandemic in current or future modelling of mortality. Given the extensive activity of the CMI, and other member-led activities, it was felt this was relatively low risk compared to other horizon scan entries and removed as a separate entry when the scan was reviewed in September 2024.

9. However, further discussion by the Horizon Scan focus group has indicated the potential wider risk of established theories on mortality not being sufficiently challenged, in the face of significant societal influences and changes.

10. The Continuous Mortality Investigation (CMI) has continued to produce working papers and material which provides updates to both mortality analysis and modelling. This continues to highlight uncertainties following the pandemic experience, and allows users to adjust models to reflect their own data.

11. IFoA members continue to be heavily involved in research in this area, beyond that by the CMI, through both working parties and thought leadership activity. One particularly strong source is the Longevity Bulletin[1] series of publications that has covered a range of aspects related to mortality and longevity.

C: Considerations for actuaries

12. This section of the paper is intended to be provide a basis for Board discussion. The points raised and highlighted should not be considered as a 'house' IFoA view, rather a starting point for debate.

13. There continues to be a steady stream of new drugs and treatments to mitigate and tackle some of the key causes of illness and death. One key example is the recent significant developments in diabetes medication is extending more widely to the treatment of obesity. However, there are also risks in relation to antibiotic resistance which may lead to increased deaths from existing known infections.

14. Climate change impacts are starting to feature to some extent, very much geographically dependent. In addition to the well-established feature of winter death spikes from colder weather, some areas are beginning to see summer spikes[2] where high temperatures put vulnerable people at greater risk. Additionally, there are still many areas of the world where pollution continues to increase, which in turn brings higher respiratory-condition related deaths.

[1] IFoA Research publications – Longevity Bulletin
[2] GAD Mortality Insights April 2023

15. In the UK, and other countries, there are wide socio-economic disparities in life expectancy, with gaps often becoming worse over time. There are potential financial inclusion consequences where product design may be focused on certain groups and not others.

16. As previously trailed, the impact of the Covid-19 pandemic is still to be fully understood and application to mortality models involves significant judgement.

17. Actuaries may have to consider the impacts of these, and other, issues on assumptions and modelling, including:

    - best-estimate mortality assumptions used in valuation, reserving and pricing work;
    - tail assumptions (for example 1-in-20, or 1-in-200 years) required for scenario and stress testing, or solvency capital requirements; and
    - the application of actuarial insight and challenge in wider fields, in particular linking to the health sector.

18. Actuaries are likely to be viewed as experts in some, or all of these areas and it is critical that appropriate methodologies are applied when providing advice.

19. What might this mean in practice?

    - For ‘best estimate’ assessments it may be worth thinking about highlighting general uncertainty, and also more specific uncertainty relating to specific factors.
    - Actuaries will often be involved in considering stress-testing and scenarios. This provides an opportunity to challenge existing views on the veracity of expert judgements, and the extent to which they are appropriately capturing tail-risk.

20. Previously held views on what is insurable and how to measure insurance risks are being constantly challenged, as events that used to be viewed as extreme and highly unlikely, appear to be occurring far more regularly, and with greater impact, than expected.

21. We know actuaries are already involved and utilising their skills to highlight potential issues with established theories and with IFoA support this influence can continue to grow. This brings with it responsibility and a reputational risk which ongoing regulatory focus can help to mitigate.

D: Conclusions

22. There are likely to be further developments on this topic, and the Executive recommends the Board continues to regularly monitor this risk. The Board is asked to consider whether any of the points raised during the course of the discussion indicate the need for further IFoA regulatory activity to address current or emerging public interest risks.

23. Some potential steps and discussion points the Board might consider include:

    a) Would further deep-dive activity on this topic be helpful?

    b) Would non-mandatory guidance be appropriate and helpful for members?

    c) Would a Risk Alert highlighting key points on this topic be helpful to members?

d) Are there aspects of education and lifelong learning that should be considered either within the Board remit, or collaboratively with other parts of the IFoA?

e) Would thematic review activity be helpful to gather further information on the most recent work of actuaries in this space?

f) Are there collaboration opportunities that could be explored with other regulators?

g) Should there be consideration of mandatory standards? (either internally to the IFoA, or through liaison with other relevant regulators)

E: Common mortality terms

24. **What is a mortality improvement?**

A mortality improvement measures the reduction in mortality rates from one year to the next. Actuaries usually refer to “improvements” rather than “changes” because mortality rates have tended to fall over the long term. A positive improvement represents a fall in mortality rates. A negative improvement represents a rise in mortality rates.

For example, if:

Last year, 100 of every 1,000 85-year old males died within a year (a mortality rate of 10%).

This year, only 98 of every 1,000 85-year old males die within a year (a mortality rate of 9.8%).

Then this year’s mortality improvement for 85-year old males is +2%, as there are 2% fewer deaths than in the previous year.

25. **What are period and cohort life expectancies?**

Life expectancy is a measure of how much longer, on average, a person in a particular group (by age, gender etc) is expected to live. For example, if females aged 65 have a life expectancy of 25 years, then they are expected to live to 90 on average. Individuals within the group could have much shorter or longer lives.

There are two distinct types of life expectancy, which measure different things:

Period life expectancy takes no account of future mortality improvements, only historical data. This means that it is an objective measure for comparing mortality between populations and over time, but it isn’t a realistic assessment of how long people may actually live.

Cohort life expectancy does take account of expected future changes in mortality. This makes it useful to actuaries who need to make realistic assumptions about what may happen in the future. Consequently, the CMI tends to focus on cohort life expectancy. However because future changes in mortality are unknown, cohort life expectancy is subjective, and different actuaries will have different views of cohort life expectancy.