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Dear Sir

Response to consultation: Discussion paper on actuarial mortality assumptions

We welcome the discussion paper from the Board for Actuarial Standards (BAS) as prompting debate over the selection of appropriate mortality assumptions. We are pleased to provide Watson Wyatt's response to the consultation, and note the following the key points:

- We would suggest that there is a greater need for education and further research on suitable mortality assumptions than for setting standards, although such activity may fall outside the role of BAS.
- Any standards should be limited to disclosure of information over mortality assumptions. The needs of different users of mortality assumptions will differ widely, and whilst detailed reporting requirements may be useful for mortality experts and regulators, they may be of little value to pension scheme trustees or directors.
- Any reporting standard should focus on the need to communicate the significant uncertainty over future mortality experience.
- Legislators and regulators should be educated as to this uncertainty, and should be strongly encouraged to design legislation and structures that recognise the potential for significant variation in future mortality experience.
- We would disagree with any standard that required the use of the most recently applicable published tables. Insurers and pension schemes should be allowed to refer to older series of tables where the insurer or pension scheme has credible experience and such tables in combination with appropriate mortality improvements over the intervening period provide a better fit to actual mortality experience.
- Standard mortality tables are of limited importance to the setting of mortality assumptions for impaired lives, with such assumptions based largely on assessment by insurers and reinsurers of the mortality associated with the underlying medical conditions.

- Drivers to mortality improvements may be significantly different between healthy and impaired populations. There is considerable subjectivity in the selection of any future mortality improvement assumption. We would suggest that it is appropriate to select different future mortality improvement assumptions for different population groups of any size, provided that a suitable rationale can be advanced for their selection.

We reply to each of the specific questions raised in the discussion paper, followed by further comments on particular paragraphs in the discussion paper.

Question 1: Do respondents have any views on the significance of the adverse effects that over- or underestimation of future mortality may have on pension scheme members, scheme sponsors, life insurance policyholders and life insurance companies?

Although forecasts by actuaries have tended to over-estimate mortality rates in recent decades, different plausible scenarios can be proposed whereby current expectations of future mortality experience would either over-estimate or under-estimate actual future mortality experience. Both over-estimation and under-estimation of future mortality experience could have very significant financial consequences for the parties involved, depending on the structure or financial product involved.

There has been less attention to potential uncertainty over future mortality experience for protection products than on annuitants and pensioners, with scenario analysis being particularly focused on Individual Capital Assessment (ICA) stress tests on the impact of a future influenza pandemic.

In the context of pension schemes, under- or over-estimation of future mortality experience could have severe consequences for members and sponsors and indeed for the overall economy. This is particularly an issue in the UK given the complex and rigid legislative structures that have developed regarding pension provision that may be affecting the allocation of risk in ways that were not foreseen and may not be desirable.

A reasonable objective for legislators and those setting standards would be to promote education on mortality risks and to support appropriate allocation of risk between the different parties involved. Legislators and those setting standards, as well as those designing and funding financial products, should understand the uncertainty of future mortality experience, and legislation and financial products should include mechanisms that allow the economic effects of emerging experience to be reasonably managed, without placing excessive risk on the individual policyholder or pension scheme member.

Question 2a: Do respondents have views on appropriate methods of communicating the extent and impact of the inherent uncertainty involved in mortality assumptions?

In the context of insurers, appropriate methods of communication would normally involve illustrating the effect of different sets of mortality assumptions on policy reserves. Such sets would include those on a best-estimate basis, those including an appropriate margin for prudence for the purposes of statutory valuations and those appropriate to a 99.5^{th} percentile scenario over a one-year period for the purposes of ICA.

In the context of pension schemes, appropriate methods of communication would normally involve illustrating the effect of a number of different scenarios on technical provisions and on the resulting

contribution requirements. Supplementary information is sometimes of value to users, for example the change in the discount rate that would have similar financial consequences to a particular scenario.

Question 2b: Do respondents agree that the use of separate assumptions for base mortality and future changes in mortality, not taking the form of margins in other assumptions, would be desirable?

We believe that separate explicit assumptions for base mortality and future changes in mortality would normally be appropriate, although alternative assumptions that model the approximate overall impact of particular mortality assumptions may be appropriate, depending on the objectives of the work being undertaken.

Question 2c: Do respondents have views on appropriate methods of communicating the significance of assumptions, both in absolute terms and relative to that of other assumptions?

We would normally adopt similar methods of communicating the significance of assumptions to those described by BAS in the discussion paper. In particular we would consider the effect on the capital value of liabilities of adopting different assumptions, and may consider equivalences between a change in the discount rate and a change in a particular mortality assumption.

Question 3a: Do respondents foresee any practical difficulties in communicating the assumptions about subsequent changes in mortality rates underlying life expectancy statistics?

No summary statistics or sample analyses can capture the full complexity of mortality improvements varying by both calendar year and attained age in combination with a base mortality table. Surface charts of mortality improvements only capture single year differences between generations of policyholders and pension scheme members, whilst life expectancies may not explain adequately the financial importance of survival over different periods.

To the extent that life expectancies provide non-experts with a statistic that is intuitive and relevant, we would note the ability of cohort life expectancies to provide a benchmark that combines both current and future mortality experience.

Period life expectancies make no allowance for future changes in mortality rates and are not intended to relate to any single individual. Period life expectancies would significantly under-estimate future expected longevity in the presence of reducing mortality rates and disguise the presence of any genuine cohort mortality improvements in the historical experience. These issues need to be reflected in any communication that uses period life expectancies.

A comparison between period and cohort life expectancy is a useful way to illustrate to a lay person (such as many pension scheme trustees) the allowance for future changes in mortality.

Question 3b: Do respondents have suggestions for summary statistics that can be used to describe changes in mortality rates?

Most insurers and pension schemes are only concerned with the financial implications of a particular set of current and future mortality assumptions, and with the financial uncertainty associated with those assumptions. Summary mortality statistics are likely only to be of secondary interest. However, the value of particular summary mortality statistics will depend on the circumstances of the particular matter under consideration.

Question 3c: Do respondents think that the use of benchmarks is useful, and if so, should the development of standard benchmarks for future changes in mortality be encouraged?

Whilst the use of benchmarks may assist in comparing different sets of mortality assumptions, we believe that significant further research is needed over the selection of appropriate benchmarks. The example benchmark provided in paragraph 3.60 of deaths from heart disease halving over the next ten years could be misinterpreted, and the impact on aggregate mortality experience may be different to that intended. The wording of the example benchmark might refer to a reduction in cause-specific mortality rates where heart disease is the underlying cause of death or to a reduction in all-cause mortality rates where the individual had a prior history of heart disease.

In the former case, any reduction in cause-specific mortality rates might be offset by deaths from other diseases where the individuals involved may have diagnosed and undiagnosed co-morbidities. In the latter case, the overall impact on all-cause mortality rates may be under-estimated to the extent that some individuals would be recorded as having died from heart disease, without there being a prior history of diagnosed heart disease.

Question 4a: Do respondents agree that the BAS should set some standards for mortality assumptions?

We are not convinced of the value of BAS setting standards on mortality assumptions, except perhaps in the area of disclosure. We think that the primary focus should be on education and encouragement of further research.

Paragraph 4.16 identifies the failure of mortality assumptions for guaranteed annuity options to match recent mortality experience. However, it is hard to see how the existence of standards would have had a beneficial effect when the collective opinion of actuaries and other professionals was that such assumptions were appropriate when they were adopted.

Paragraph 4.17 refers to the need for statements that provide supporting evidence for such assumptions. To the extent that such assumptions relate to future mortality improvements, we would suggest that it would be more appropriate to require a statement as to the rationale for such assumptions.

Question 4b: Do respondents agree that reporting standards would play a significant role in increasing the transparency of assumptions and their comprehensibility to users of actuarial information?

We agree that reporting standards that were carefully crafted might play a useful role in increasing the transparency of assumptions. However, we would suggest that there is a significant risk that the

understanding of such information by non-expert recipients would not be improved where information was prepared according to such reporting standards. A parallel example would be the mass of "small print" that accompanies communications relating to financial services products. We doubt that much of that information is of significant value to most consumers and it may well obscure important messages that do need to be communicated and understood.

Question 4c: Do respondents have any comments on how to assess the likely impact of possible BAS standards for mortality assumptions?

We would recommend that BAS undertakes separate pilot projects for pension trustees and directors before committing to any particular standards for mortality assumptions. The groups under each pilot need to be large enough to reflect the range of backgrounds and abilities that may be encountered amongst trustees and on boards of directors.

Question 5a: Do respondents believe that it would be desirable for a BAS standard to require the use of the most recent applicable published tables, taking into account both the communication problems and the practicality of setting a limit on the tables to be used?

We would disagree with any standard that required the use of the most recently applicable published tables. Insurers and pension schemes should be allowed to refer to older series of tables where the insurer or pension scheme has credible experience and such tables in combination with appropriate mortality improvements over the intervening period provide a better fit to actual mortality experience. There may be merit in requiring the use of the most recent applicable published tables for insurers or pension schemes where there is insufficient credible experience.

Further, standard mortality tables are of limited importance in the setting of mortality assumptions for impaired lives, with such assumptions based largely on assessment by insurers and reinsurers of the mortality associated with the underlying medical conditions.

Question 5b: Do respondents have any comments on the proposals for possible requirements for reporting on assumptions about base mortality, criteria that assumptions should meet, or limits that should be observed when setting assumptions?

We would agree that it should be reasonably practical to comply with suggested reporting requirements, although we are not convinced that this would increase the comprehensibility of assumptions for some users of this mortality information.

Further to our earlier comments on question 5a, the suggested requirement to use tables published after a certain date would need to be qualified to the extent that the newer series contained at least as varied a selection of tables for different products and subgroups of the population, such as smokers and non-smokers, as was the case under the older series.

We would further note that there would need to be consistency between the data requirements for constructing a new mortality table and the underlying experience that had been used to construct existing tables. This is particularly relevant given the differences in the experience underlying the insured pensioner tables and that from the self-administered pension scheme (SAPS) study.

Question 6a: Do respondents agree there is no objective basis for differentiating the future changes in mortality likely to be experience by a particular small group of lives from those likely to be experience by the population as a whole?

We would suggest that objective evidence can only be used to set current mortality assumptions. Any future changes in mortality are based on a subjective assessment, either that it is appropriate to assume that historical trends in mortality improvement will continue in future years or that predictive scenarios relating to developments in risk factors and medical treatments are reasonable and appropriate to their purpose.

We would further suggest that where there are significant differences in the health of different populations, it would be appropriate to consider alternative mortality improvements to the extent that the drivers to mortality improvements may differ between the populations.. For example, in a healthy population, mortality improvements might be achieved by increased levels of screening for subclinical disease, whereas in a population of cancer patients, mortality improvements would be most likely related to developments in treatment.

Question 6b: Do respondents have any comments on the proposals for possible requirements for reporting on assumptions about future changes in mortality, criteria that assumptions should meet, or limits that should be observed when setting assumptions?

We can foresee practical problems in determining which parameters used in a particular mortality projection model should be disclosed. We would further note significant dangers associated with inappropriate simplification and the consequent risk of misleading users of mortality information. This is illustrated by paragraph 6.31 where the Long Cohort projection and "92" series projections are stated to be the same for the 1960-64 cohort, whereas only the annual mortality improvements are similar. Projected mortality rates would depend on the cumulative effect of annual mortality improvements for all calendar years after the application date of the base table.

We are doubtful as to the practicality of producing a single standard that encompasses the different needs of the various users of mortality information without providing a significant amount of detailed information that may obscure the applicability of the standard.

We would further note that the requirements set out paragraph 6.51 for developing a basis for future changes in mortality might not be met by some of the published projections that are currently included in the CMI Library. For example, our understanding is that the periods over which the Short, Medium and Long cohorts were expected to differ from the "92" series projections were illustrative and not based on reasoning or consultation with demographers or medical professionals. The implication is that higher standards would be required of new projections of mortality improvement than those that are currently in widespread use.

General comments:

1.5 – The need to provide detailed explanations of projections should be of secondary importance to communicating the inherent uncertainty in projected mortality rates. Legislators and designers of products and services should be made aware that structures should not be critically dependent on particular mortality projections, and the inherent instability of those structures that are. An example

would be the current generation of final salary pension schemes where the economic resources allocated to those schemes are perhaps double those originally anticipated and there is no mechanism to allow a reasonable unwinding of some or all of that excess resource allocation. It is not clear whether standards of the types proposed in the discussion paper would have avoided such risks but legislators may have designed more flexible and enduring structures if they had been better informed.

2.26 - Previous paragraphs describe the different impact of deviations in mortality experience on protection products and annuities. The implication might be that there would be an offsetting financial impact between different age groups of policyholders in the event of an influenza pandemic. This may be inaccurate to the extent that the relative change in mortality rates might be greater for younger lives than older lives as a result of immunological reaction to infection.

3.13 - Whilst we would agree that a long-term projection model might be based on trends in mortality experience spanning a long period, other models could be based on large population databases considered over a shorter time period where trends over that time period were more consistent within the data period and more likely to be replicated in future years.

3.19 – We would agree that presenting the impact of uncertainty as equivalent changes in discount rates and/or equivalent changes in the capital value of liabilities is a sensible way of communicating the uncertainty.

3.31 - Whilst we would agree that the mortality experience after allowing for statistical fluctuations would not be expected to "jump sharply" between ages, the relative proportion of early retirements as a result of ill-health at ages leading up to the standard retirement age may lead to a different progression of mortality rates by age as compared to that which might be expected in a healthy population.

4.17, 3rd bullet – It may only be possible to state that the level of uncertainty in a set of assumptions is itself uncertain. The resulting financial effects may be quantified but the likelihood of that set of assumptions may be unquantifiable.

4.20 – An evidence-based approach assesses the impact of identified changes on historical experience, such as the reduction in blood pressure caused by treatment with ACE inhibitors. The application of such relationships to a different population in a future time period is extrapolation, and cannot be said to be justified by the evidence in the historical data period. It is inappropriate to expect that such relationships will hold in any circumstances other than those seen in the historical period.

5.11 - The Office for National Statistics (ONS) Longitudinal study and comparisons between insured and general population mortality experience have indicated that mortality experience is worse for those in lower socio-economic classes.. Further investigation of mortality experience by "super output areas" from the ONS can identify a number of other factors that are captured in the census data that are correlated either positively or negatively to a degree with mortality experience. The statement in paragraph 5.11 that mortality experience is correlated with postcode is an over-simplification that should be qualified still further.

5.15 - Our understanding is that the ONS does not intend to produce an English Life Table for the 2001 censuses. The ONS has taken over the production of Interim Life Tables from the Government

Actuary's Department (GAD). Each table is based on unsmoothed mortality experience over a three year period, with the most recent table relating to population mortality experience over the period 2004-2006.

6.17 - The reference to Oeppen and Vaupel's paper "Broken Limits to Life Expectancy" refers to analytical comparisons that identified the highest period life expectancy in different calendar year across a number of developed nations. As such it is a construct that relates neither to individual lives nor experience in an individual country.

6.20 - We are aware of three stochastic extrapolative models that have been used to publish projections. These are Lee Carter and P-spline methodologies as presented by the CMI, and the Cairns, Blake and Dowd model as presented in association with JPMorgan Lifemetrics.

6.21 - We would suggest that the P-spline methodology is particularly sensitive to the edge effect in comparison to other mortality models that are typically considered, and would further note the impact of mortality experience at very old ages during the 2003 summer heatwave on mortality projections using the P-spline methodology.

6.58 - Prudent and best-estimate assumptions are presented as if these are alternative point estimates based on an objective assessment or statistical analysis. The assessment of a set of assumptions as being "prudent" requires a subjective judgement as to the margin of conservatism that would be appropriate, and this margin might be expected to vary for different purposes and between different users of mortality information.

6.61 - We would suggest that it would only be necessary to make allowance for continued cohort effects where historical mortality experience at the level of aggregation considered by the particular model had shown evidence of a cohort pattern to mortality improvements, and where there was reason to assume that such cohort patterns would continue to older ages.

Yours faithfully

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