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Dear Sir

**Actuarial Mortality Assumptions: Discussion Paper**

PwC supports BAS's initiative to investigate whether to publish technical actuarial standards covering mortality assumptions.

We believe that mortality standards, in some form, are necessary, particularly in the light of Sir Derek Morris' comments about actuaries being perceived not to have responded quickly enough to changes in the past. We are pleased to respond to BAS with comments and hope these will be useful to BAS and will result in standards that are of real value and assistance to actuaries. Our comments reflect the views of actuaries in both the pensions and insurance practices of PwC.

**Summary**

We believe the primary aim of any standard should be to require actuaries to communicate clearly and unambiguously the assumptions about mortality that underlie their advice. This includes making clear when their judgements are evidence-based and when no evidence-based judgement has been possible. It should also include illustrating the implications of the assumptions not being borne out, set out in a transparent and comprehensible way. BAS's proposed reporting and criteria standards are a big step in the right direction.

In our view, the key principles that should underlie any standards are:

- Actuaries should be free to select, or recommend, whichever base table they believe is most appropriate in the circumstances, provided it is justifiable on the basis of credible, evidence-based analysis.
- Allowance for future improvements in mortality requires a judgement to be made. Actuaries should be free to make, or recommend, whichever assumption they believe to be most appropriate in the circumstances, provided they are fit for purpose and fall within a generally acceptable range.

- Often, the best way to communicate mortality assumptions, particularly to a lay audience, is by illustrating life expectancies – for advice in connection with pension schemes, for example, by illustrating life expectancies at age 65 for a 65 year old and for, say, a 40 year old, it is possible to convey information about both base mortality and future improvements in an understandable and transparent way.
- Advice should include illustrations of the sensitivity of the outcomes to changes in the assumptions made, both for base mortality and future improvements.

Our responses to the questions raised in Section 7 of the paper are given in the Appendix. Please contact me if you would like to discuss our comments in more detail.

Yours faithfully



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## 1. Significance of the adverse effects of over- or underestimating future mortality

*Do respondents have any views on the significance of the adverse effects that the over- or underestimation of future mortality may have on pension scheme members, scheme sponsors, life insurance policyholders and life insurance companies, as set out in section 2?*

As a rule, we agree both under and over-estimating can have a significant effect on pension scheme members and sponsors, for all the reasons BAS cites. We estimate that a one year increase in longevity would increase the total pension liabilities in the UK by 3%.

For some purposes, such as determining contribution levels, it may be possible to “correct” the consequences of any over- or understatement over time (e.g. by increasing or decreasing contributions in future). However, this may be some hostage to fortune and, for others, such as calculating transfer values, this is not possible: the choice of mortality assumption has an immediate impact on the transfer amount the member receives. It is worth noting that trustees are statutorily required to make a best estimate of mortality for transfer values and to consulting their actuary as part of this process.

We also recognise that mortality is a key assumption for the majority of life insurers and thus the adverse effect of over or under-estimation of mortality is potentially very significant. Market forces may encourage under-estimation of future mortality, with the extreme result being company insolvency.

In general, the potential of misestimating mortality should be considered from the viewpoint of all the various stakeholders, including the providers of capital. We note that many companies have significantly revised future mortality assumptions in the recent past. When this immediately reflects changes in understanding, this may require more education of stakeholders; where it lags, it could result in less credible reporting.

Lastly, it is vital that the standards applied to setting best estimates for mortality for life insurance companies and for pension funds are consistent; otherwise all estimates could lose credibility.

## 2. Issues surrounding mortality assumptions

*The BAS has discussed some of the issues surrounding mortality assumptions in section 3. In that context:*

- a) Do respondents have views on appropriate methods of communicating the extent and impact of the inherent uncertainty involved in mortality assumptions?*
- b) 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?*
- c) Do respondents have views on appropriate methods of communicating the significance of assumptions, both in absolute terms and relative to that of other assumptions?*

### **a) Methods of communicating the extent and impact of the inherent uncertainty**

It is important that information reported meets the needs of users and that there is consistency between different companies, enabling meaningful comparison.

In our opinion, the assumptions need to be communicated in 3 ways, depending upon the audience:

- i. Description in “layman” terms, that can be understood and used by those with a non actuarial background;

- ii. Exhaustive, technical description of basis, suitable for use by those with a more specialised actuarial background; and
- iii. For any audience, information on the sensitivity of outcomes to changes in these assumptions.

In our view, appropriate methods are scenario testing and, in some circumstances, stochastic modelling.

The *extent* of uncertainty could be communicated by pointing out that, increasingly, some people live to 110 and beyond; and that life expectancy in the population at large has increased by [x] years over the last [y] decades. And then going on to list, qualitatively, a range of factors (to be agreed) (a) which are known to have an impact and (b) which some speculate may have an impact.

Confidence intervals may be useful in illustrating random variability (e.g. for small pension schemes) but must be qualified with statements about bad winters, pandemics etc.

The *impact* of uncertainty in base mortality can be communicated by stochastic methods – i.e. by providing confidence intervals to quantify how likely it is that a dataset of experience does or does “fit” a base mortality table. However, for future changes this is much less straightforward because of the difficulty of generating a meaningful and credible – and generally accepted - probability distribution.

#### **b)(i) Separate assumptions for base mortality and future changes in mortality**

We agree with BAS that actuaries should always use (and disclose) separate assumptions for base mortality and future changes. Transparency is vital. Any other approach would not in our view meet the aim of improving understanding and comprehensibility amongst recipients of advice.

#### **b)(ii) Margins in other assumptions**

For the same reason we agree that assumptions about mortality should ideally be explicit and not made by taking margins in other assumptions. Convenience of calculation should not compromise transparency, understanding and comprehensibility.

#### **(c) Communicating the significance of assumptions**

To some extent, the type of illustrations envisaged in 2(a) above will communicate the significance of assumptions. However, these figures will not illustrate the importance of mortality compared with other assumptions. We think the idea of illustrating the impact of, say, a 1% change in investment return, for comparison is a good one, although this can disguise how rapidly changes are taking effect (e.g. cohort effects can be “smoothed out”).

In addition, a potential mortality assumption change should be communicated as the absolute impact on all the products an insurance firm holds, since worsening experience on one product (e.g. increased longevity on annuity business) may have a corresponding financial gain on another product (e.g. term assurance).

### **3. Summary statistics and benchmarks**

*Some proposals regarding the use of summary statistics and benchmarks in reporting on mortality assumptions are considered in section 3.*

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

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

c) 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?

### **3(a) Practical difficulties in communicating assumptions about future changes in mortality underlying life expectancy statistics**

We do not foresee insurmountable difficulties in communicating this in a clear and informative manner. Some areas that may require attention are:

- *Clearly defining “age-cohort” and “age-period” mortality projections* - Our experience in gathering details of the mortality bases used by insurers for benchmarking exercises is that there is confusion about the difference between them.
- *Providing sufficient information* – We have found that in many cases the information insurers provide for reporting purposes is not sufficient to define the company’s mortality improvement basis, which means it is of limited use. For example, a typical improvement basis may include a choice of cohort projection, a percentage of that projection, type of projection (age period versus age cohort), a year of projection, an improvement underpin and a year from which the underpin is applied.
- *Not providing too much information* - There is also a danger of providing too much information and thus overcomplicating the message. The challenge for actuaries is to ensure the needs of all stakeholders are met and to tailor the information they provide and the explanations they give to different audiences. Any standards must recognise this. For example, corporate investment teams may need a very detailed description of assumptions whereas, for other users, something simpler would be more appropriate.
- *Ensuring statistics are not open to manipulation* – This is particularly important where assumptions are complex (e.g. future improvements) and where there may be trade-offs (for example between prudence in base mortality and in future improvements).
- *Recognising commercial considerations* – How much information are actuaries’ clients prepared to disclose within the public domain? Whilst a large volume of publically available information could make businesses more transparent, companies may be reluctant to provide a high level of detail to competitors.

### **3(b) Summary statistics that can be used to describe changes in mortality rates**

The most useful and accessible (particularly for a lay audience) statistic for describing this is life expectancy (or life expectancy for those who have already survived to a particular age). We agree that period life expectancy is often misleading and that the focus should be on communicating cohort life expectancy.

Changes are best illustrated by illustrating life expectancy for people of a particular age “today” and people of that same age at some appropriate time in the future. For example, in the pensions area, it would typically be useful to illustrate life expectancy for 65 year olds and life expectancy at 65 for people who are now, say, age 40 (i.e. life expectancy for a 65 year old in 2033).

Alternatively, it would be possible to calculate equivalent level annual rates of change. However, these could be confusing (e.g. until the cohorts have run off) and in our view are less accessible to users of actuarial advice.

### 3(c) Use of benchmarks

We believe a standard benchmark for the sensitivity of mortality assumptions could be useful. However, we recognise that the individual nature of business held by each firm makes producing “sensible” results for all companies a challenge. We would also encourage the development of a standard benchmark for future changes in mortality, although we agree with BAS that this may be impracticable.

There is a danger that benchmarks could be used to set mortality assumptions. It is important that this is discouraged by clearly communicating what the benchmark represents and its purpose.

### 4. Possible standards

*The BAS would welcome any general comments that respondents may have on the various possibilities for standards set out in section 4. In particular:*

- a) Do respondents agree that the BAS should set some standards for mortality assumptions?*
- b) 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?*
- c) Do respondents have any comments on how to assess the likely impact of possible BAS standards for mortality assumptions?*

#### 4(a) Should BAS set some standards for mortality?

Yes. There is a clear need for reporting and credibility standards but we would not support a standard that addresses limits for mortality assumptions. One reason is that it is difficult to envisage a standard that is appropriate for all firms and pension schemes. In practice, with market discipline and required disclosure, insurance firms are already reluctant to use assumptions which are outside a reasonable range.

#### 4(b) Role of reporting standards in increasing transparency and comprehensibility

Yes, we agree reporting standards would play a significant role in increasing transparency and comprehensibility.

#### 4(c) How to assess the likely impact of standards

The response to this question will be driven by the proposed standard and the likely impact on companies. The impact of a standard requiring greater disclosure of assumptions would be best assessed through discussion with the affected companies. A standard which sets limits on the assumptions that can be used (e.g. minimum underpins) may also be assessed through discussions. However, it may also be possible for BAS to make a “broad-brush” assessment of the financial impact, using information in the public domain.

### 5 Possible standards for base mortality

*In section 5 the BAS considers possible standards for assumptions about base mortality.*

- a) 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?*
- b) 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? Respondents are asked to focus on:*
  - *any practical problems that might arise in complying with them; and*
  - *whether they would further the BAS’s aim of increasing the transparency of assumptions and their comprehensibility to users of actuarial information.*

**5(a) Use of most recent applicable published tables**

We think any standard should require use of the most recent tables (that have been subject to scrutiny by the actuarial profession, and after a little time to adapt experience investigations and other systems) unless there is (credible) evidence that older tables are a better fit for the specific circumstances (in such cases, reporting standards should ensure that sufficient information is provided for the recipient of the advice to understand why the latest table has not been used).

**5(b)(i) Reporting on assumptions about base mortality**

A reporting standard on base mortality will further BAS's aim of transparency and comprehensibility. Again, we think that illustrating life expectancy is the most useful way to achieve these goals (and we note that, in this respect, any reporting standard must address assumptions on base mortality and future improvements together – for the reason BAS identifies (see 3(b)) about the potential confusion attaching to period life expectancy).

We foresee no major practical difficulties provided the standard is clear as to what actuaries are expected to do in terms of reporting and the disclosures are meaningful to the recipient. BAS's proposals so far are heading in the right direction in this respect.

**5(b)(ii) Criteria that assumptions about base mortality should meet**

We agree that any departure from or adjustment to published tables must be evidence-based and based on statistically valid methods, including a sufficiently large dataset of experience.

The criteria BAS suggests in 5.50 to 5.55 will be very useful guidance for actuaries, particularly if some of the points of detail are expanded (e.g. what is the minimum volume of data or, perhaps, how increasing volumes of experience data should be given increased credibility, how recent does it have to be?). Whether a BAS standard is the best place to communicate these points is unclear. Perhaps this is an area where BAS could ask the profession to proceed with the fine points of detail?

We also note that compliance with a criteria standard should be subject to materiality. If the recipient of advice is clear about the immateriality of any mortality assumption, it may be appropriate to relax some of the criteria.

A criteria standard will increase transparency, although whether assumptions will be more comprehensible to users is questionable.

**5(b)(iii) Limits to be observed when setting assumptions about base mortality**

We do not believe BAS should produce a limits standard. Ensuring assumptions are evidence-based and derived using statistically valid methods should suffice.

**6 Possible standards about future changes in mortality**

*In section 6 the BAS considers possible standards for assumptions about future changes in mortality.*

*a) Do respondents agree there is no objective basis for differentiating the future changes in mortality likely to be experienced by a particular small group of lives from those likely to be experienced by the population as a whole? If respondents disagree, the BAS would be interested in examples to the contrary, together with supporting evidence.*

*b) 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? Respondents are asked to focus on:*

- *any practical problems that might arise in complying with them; and*
- *whether they would further the BAS's aim of increasing the transparency of assumptions and their comprehensibility to users of actuarial information.*

**6(a) Differentiating the future changes in mortality for a small group of lives**

Yes, we agree there is currently no objective basis for differentiating the future changes in mortality likely to be experienced by a particular small group of lives from those likely to be experienced by the population as a whole (with the exception of age, year of birth and sex).

Of course, should research emerge that demonstrates different rates of improvement for different groups, then we would expect there would be flexibility to take this into account.

**6(b)(i) Requirements for reporting on assumptions about future changes**

BAS's suggestions in 6.51 to 6.58 are sound and will increase transparency and possibly comprehensibility. We support them.

However, there are practical problems. In particular, in 6.58, actuaries are asked to provide a statement in their advice about whether their assumptions about future changes are "a best estimate, a prudent assumption or neither" and explain why. It is far from clear how actuaries can do this other than on pure intuition – we note BAS's own belief that objective judgements are not possible. In effect, BAS is asking actuaries to make entirely subjective assumptions and yet be able to say where in the spectrum of prudence they lie.

Maybe this is an area where the profession could provide more assistance to actuaries.

**6(b)(ii) Criteria that assumptions about future changes should meet**

It will be useful to have criteria and the proposals in 6.61 to 6.64 are a good start. We question whether future changes in mortality should always differentiate between sexes, although many actuaries will often wish to do this.

**6(b)(iii) Limits that should be observed when setting assumptions about future changes**

We can see why BAS may consider a limit for prudent assumptions (6.66). However, we would caution against this. How would BAS derive such a limit, bearing in mind the difficulties with evidence-based judgements?

**Other comments**

See main text.