

6.6 Mortality and Longevity risk

Q104

Q104 Section 6.6.2 Should the trend component be explicitly considered within Mortality risk? Please explain.

Organisation	Jurisdiction	Role	Confidential	Answer	Answer Comments
China Insurance Regulatory Commission	China	IAIS Member	No	Yes	
EIOPA	EIOPA	IAIS Member	No	No	Generally, EIOPA believes that a trend component should be included in the calculation of the current estimate as this reflects the expected mortality rates in an adequate manner. Thus, a trend component should also be considered within the Mortality risk as trend in mortality rates is likely to change over time. However, for the sake of simplicity we prefer the trend to be implicitly included in the shock on mortality rates. Experience shows that similar results will be achieved compared to separate shocks on mortality rates and mortality trend.
BaFin	Germany	IAIS Member	No	No	For simplicity reasons the shock on the mortality rates should be implicitly captured in the shock for mortality rates by including a certain prudence margin.

Financial Supervisory Service	Korea	IAIS Member	No	No	It is observed that significant number of insurers either not reflecting the future trends or not explicitly managing it in the best estimate assumptions due to lack of credible information. In such cases, it is better reflecting the trend component implicitly together with other best estimate assumptions provided that the stress level produces appropriate level of risk.
National Association of Insurance Commissioners	USA	IAIS Member	No	Yes	Companies are likely to include a trend in their base case as this is in line with current expectations. A conservative approach would be to have a negation of such assumption.
Ageas	Belgium	Other	No	No	
Canadian Institute of Actuaries	Canada	Other	No	Yes	
Ping An Insurance (Group) Company of China Ltd.	China	Other	No	No	As the mortality rate improvement is a long term trend, and the products covered in mortality risk are mainly those suffer the loss of deteriorated mortality. Therefore, the trend component should not and is unnecessary to be considered in mortality risk.
Insurance Europe	Europe	Other	No	No	To maintain simplicity, the trend should not be explicitly considered within mortality risk. A unique factor should be keep for the mortality risk.
Actuarial Association of Europe	European Union	Other	No	No	If the improvement of mortality according to the observed trend is considered appropriately in the current estimate mortality rates, (generation dependency) an explicit consideration is not necessary.
Institut des Actuaire	France	Other	No	No	The mortality trend should not be explicitly considered within mortality risk. A unique factor should be keep for the mortality risk.

Allianz	Germany	Other	No	No	
GDV - Gesamtverband der Deutschen Versicherungswirtschaft	Germany	Other	No	No	Regarding the extent vs. appropriateness of the mortality and longevity risk modelling an approach based on a proportional level shock factor is preferred, instead of applying shocks to both the trend and the level risk component. In general, the area of conflict between using a simpler approach and designing a more detailed concept can hardly be overcome. In our view, nevertheless, focusing on a properly derived and adequately calibrated stress factor that – ideally – implicitly also allows for including the possibility for adverse trend assumptions should be considered adequate.
Munich Re	Germany	Other	No	No	Regarding the extent vs. appropriateness of the mortality and longevity risk modelling we prefer an approach based on a proportional level shock factor, instead of applying shocks to both the trend and the level risk component. In general the area of conflict between using a simpler approach and designing a more detailed concept can hardly be overcome. In our view, nevertheless, focusing on a properly derived and adequately calibrated stress factor, that – ideally – implicitly also allows for including the possibility for adverse trend assumptions, should be considered adequate.
AIA Group	Hong Kong	Other	No	No	In general we do not think a trend component is necessary as it only complicates the system with no additional benefit. We do propose that in order for results to be comparable among IAIG's that mortality improvement for products which are subject to mortality risk not be permitted.
International Actuarial Association	International	Other	No	No	Could be a "nice to have", but it is not really a "must have" for the purpose of the ICS. Having a similar model next to the longevity risk model means it is possible to calculate a real offset between positive and negative risk. But if included, then the model should be more detailed, including age dependency. ICS Model for life risk, mortality and longevity

					<p>Trend Level shock shock Longevity 1% -15% Mortality 0% 10%</p> <p>Proposal: Trend Level shock shock Longevity 0.75% -10% Mortality 0% 10%</p>
Dai-ichi Life Holdings, Inc.	Japan	Other	No	No	<ul style="list-style-type: none"> • Sometimes it is difficult to calculate "trend risk" practically. It depends on CF model. Therefore simplification (like a conversion from trend risk to level risk) should be allowed.
The Life Insurance Association of Japan	Japan	Other	No	No	<ul style="list-style-type: none"> • We think an approach that does not explicitly consider trend components would be one of the most viable options. • Where the IAIGs explicitly consider trend components, we would like the IAIS to carefully consider alternative approaches that define a certain period to take into account the trend shock. So it does not result in overly high risk for the IAIGs.
Great Eastern Holdings Ltd	Singapore	Other	No	No	Trend component would differ from region to region, and any prescribed trend component would likely not be a true reflection of future mortality trends.
Swiss Re	Switzerland	Other	No	Yes	Mortality trend is a real and relevant risk that should be accounted for. Swiss Re accounts for this risk in its internal model. Internal models are best suited to account for this risk.

Aegon NV	The Netherlands	Other	No	No	Aegon supports the current approach for assessing mortality risk. Although an explicit trend component has theoretical merit, we do not believe the additional precision outweighs the additional complexity. If a trend component is included, it should be assumed to be independent of the mortality level stress.
American Council of Life Insurers	United States	Other	No	Yes	Yes, the trend component is a key risk for mortality and should be considered. However, the overall level and trend risks included in the consultation document and field testing specifications are far too high and need to be recalibrated. There are two key risks for large insurers with credible experience: a mortality catastrophe, which is captured as a separate risk, and unexpected changes in the trend of mortality. Mortality risk is more appropriately captured through a stress on the trend component directly as opposed to a stress on base mortality.
MetLife	United States	Other	No	No	Of the three components of mortality risk for mortality (catastrophe, level mis-estimation, and trend risk), MetLife suggests that a mortality catastrophe, which is captured as a separate risk, is the only material risk and that the other components could be excluded. Our rationale follows: For Level mis-estimation, the risk of mis-estimation is very low for insurers with very large and credible portfolios. Therefore, there should be no shock or a much lower shock than the 10% currently required, and most certainly a much smaller than 10% uplift for all future times. While trend risk can be a significant longevity risk, it is a relatively minor and immaterial risk for mortality products, in particular for term products.
New York Life	United States	Other	No	Yes	Mortality trend is a key component of mortality risk. Companies assume various levels of mortality improvement. We recommend that all companies be required to run an identical mortality trend stress (potentially varying by age, gender, geography).

Prudential Financial, Inc.	United States of America	Other	No	Yes	The trend component should be explicitly considered within Mortality risk. There are two key risks for large insurers with credible experience: a mortality catastrophe, which is captured as a separate risk, and unexpected changes in the trend of mortality. Mortality risk is more appropriately captured through a stress on the trend component directly as opposed to a stress on base mortality.
MassMutual Financial Group	USA	Other	No	Yes	

Q105

Q105 Section 6.6.2 Are the stress levels for Mortality risk appropriate? Please explain. If “no”, please provide supporting evidence and rationale for a different stress level.

Organisation	Jurisdiction	Role	Confidential	Answer	Answer Comments
China Insurance Regulatory Commission	China	IAIS Member	No	Yes	We view that the current stress level is not too unreasonable for China, however, from a long term prospective, as the risk profile and claim experience could vary significantly across markets, we suggest calibrate the stress based on each market's actual data and experience.
EIOPA	EIOPA	IAIS Member	No	No	The stress levels for Mortality risk were reduced from 15% in the Field Test 2015 to 10% in the Field Test 2016 without sufficient justification. EIOPA believes that the stress levels in the Field Test 2015 were more appropriate - at least with respect to some geographical regions where the stress levels were geared to existing solvency regimes in those regions. The calibration formerly was based on studies on mortality rates and calibrations in internal models.
BaFin	Germany	IAIS Member	No	No	10 % seems to be low, particularly with regard to the implicitly included trend in the shock component. Something around 15 % seems to be more appropriate.
Financial Supervisory Service	Korea	IAIS Member	No		It is difficult to assess the appropriateness of the stress level at the moment. Korean FSS plans to calibrate the stress levels based on Korean Insurance market in the near future and the appropriateness of the stress level can be assessed afterwards.

National Association of Insurance Commissioners	USA	IAIS Member	No	Yes	The suggested stresses for the U.S. are not too dissimilar from stresses currently used by U.S. companies for their asset adequacy testing for U.S. entities. Some IAIGs will however have significant, credible, homogeneous claims data to assist in the calibration of this and other demographic risks.
Ageas	Belgium	Other	No	No	We believe that a shock of 15% is more appropriate. We refer to the documentation drafted by EIOPA for the substantiation of this percentage.
Canadian Institute of Actuaries	Canada	Other	No	Yes	
Ping An Insurance (Group) Company of China Ltd.	China	Other	No	No	We suggest calibrating the stress levels with the data from China market, for example reference to C-ROSS calibrations. If the data is not sufficient to achieve a reasonable level of calibration, we would accept the current stress levels, however, we recommend updating the experience data regularly and reflecting the China experience gradually into setting the stress levels.
Actuarial Association of Europe	European Union	Other	No	Yes	Comparable to Solvency II standard formula. But a review of these rates has started. Results of this are not just yet available.
Institut des Actuaire	France	Other	No	Yes	
Allianz	Germany	Other	No	Yes	
GDV - Gesamtverband der Deutschen Versicherungswirtschaft	Germany	Other	No	Yes	The calibration of the level stress is considered appropriate. A stress for the trend component is generally not considered appropriate (see answer to Q 104).
Munich Re	Germany	Other	No	Yes	We deem the calibration of the level stress for Mortality risk appropriate.

Global Federation of Insurance Associations	Global	Other	No	No	We are concerned that the stress levels are overly high in some jurisdictions. We would like the IAIS to consider defining appropriate stress levels, with reference to the input from stakeholders including historical data of Volunteer IAIGs obtained from the results of Phase 2 + of 2016 Field testing.
AIA Group	Hong Kong	Other	No	Yes	
International Actuarial Association	International	Other	No	Yes	The level shock is based more on the expected number of deaths within the portfolio. The number of deaths depends on the size of the portfolio and age distribution of each IAIG. For setting both the BE assumption and the volatility the outcome is better described using a (compound) Poisson model. The compound Poisson model is preferred because the variance of the sum insured is also important in modelling the risks. In Solvency II the level shock for mortality is set at +15%. This is higher than the 10% shock proposed in the ICS. This difference is valid since the IAIG's portfolios are on average larger than in Solvency II.
Dai-ichi Life Holdings, Inc.	Japan	Other	No	No	<ul style="list-style-type: none"> • We believe that the publication of the data and method regarding the calibration of current stress level is essential in order to determine whether it is appropriate. • We believe that it is necessary to consider the appropriate stress level by referring to the historical data of the volunteer companies in Phase 2+. • At that time, we think that it is necessary to verify whether diversification effect is observed between jurisdictions and to reflect the effect in risk aggregation if it is observed. • The calibration method should be published to the volunteer companies so that they are able to check the appropriateness of the calibration.

General Insurance Association of Japan	Japan	Other	No	Yes	
The Life Insurance Association of Japan	Japan	Other	No	No	<ul style="list-style-type: none"> • We would like the IAIS to consider defining appropriate stress levels for Mortality risk, by referencing the historical data of Volunteers, which will be obtained from the results of Phase 2 + of 2016 Field testing, and be based on the trend of declining mortality rates observed in major developed countries. • In addition, we believe that calibration methods should be disclosed to Volunteers so that they will be able to validate the appropriateness of the calibration by referencing the data collected from Volunteers.
Great Eastern Holdings Ltd	Singapore	Other	No	Yes	NA
Swiss Re	Switzerland	Other	No	No	The stress levels seem to be calibrated too high for reinsurers. This issue can best be addressed by allowing the use of regulatory approved internal models.
American Council of Life Insurers	United States	Other	No	No	<p>The current proposed mortality stress remains unrealistic and the calibration greatly exceeds the notional 99.5 VAR or 1 in 200 concept, especially for companies that have significant, credible homogeneous claims data. Additionally, if a trend stress is added, then they should be considered independent stresses with zero correlation.</p> <p>The primary driver of base risk is mis-estimation risk. Limited Fluctuation Credibility Theory, which is widely accepted and used throughout the US insurance industry, can be used to show that only 3,100 claims (approximately) are required in order for the estimate to be within 5% of the true mean at a 99.5% confidence level. Companies with significant, credible, homogeneous claims data will have this quantity of experience data.</p>
MetLife	United States	Other	No	No	MetLife proposes that it is not appropriate to shock a trend component. More importantly, level and trend risks as included now are excessive and need to be

					<p>recalibrated to more reasonable levels. Please see our response to 104 above which also applies here.</p> <p>While addressed in Question 216 below, we take this opportunity of emphasizing the importance of taking geographic diversification into account.</p>
New York Life	United States	Other	No	No	<p>It is not clear to us whether the 10% shock is meant to be tested over one year or considered for all future years in the projection. Over one year, this stress seems reasonable. If this stress is meant to be applied for all future projection years, then this stress is far too harsh for a company with a mature block of in-force business.</p> <p>A better approach would be to consider the mortality credibility of each insurer and apply a more tailored level of shock based upon the credibility of each insurer's mortality experience.</p> <p>Further, trend and shock should not be considered to be correlated.</p>
Prudential Financial, Inc.	United States of America	Other	No	No	<p>The current proposed mortality stress remains unrealistic, as such a deviation between actual and expected base mortality in all years is not remotely plausible. The calibration greatly exceeds the notional 99.5 VAR or 1 in 200 concept, especially for companies that have significant, credible homogeneous claims data.</p> <p>The primary driver of base risk is mis-estimation risk. Limited Fluctuation Credibility Theory, which is widely accepted and used throughout the US insurance industry, can be used to show that only 3,100 claims (approximately) are required in order for the estimate to be within 5% of the true mean at a 99.5% confidence level. Companies with significant, credible, homogeneous claims data will have this quantity of experience data.</p>
MassMutual Financial Group	USA	Other	No	Yes	

Q106

Q106 Section 6.6.2 Should the trend component be explicitly considered within Longevity risk? Please explain.

Organisation	Jurisdiction	Role	Confidential	Answer	Answer Comments
China Insurance Regulatory Commission	China	IAIS Member	No	Yes	
EIOPA	EIOPA	IAIS Member	No	No	EIOPA considers the merits of the inclusion of an explicit trend component within Longevity risk not to be sufficient to justify the additional complexity in the calculation of the required capital for Longevity risk. Thus, we prefer an allowance for the trend component in the calibration of the level stress (see also our answer to Question 104). This approach is likely to achieve comparable results.
BaFin	Germany	IAIS Member	No	No	Same argumentation as for mortality risk.
Financial Supervisory Service	Korea	IAIS Member	No	No	
National Association of Insurance Commissioners	USA	IAIS Member	No	Yes	Longevity improvement has been consistently underestimated in the past. Experience has shown that expectations for the length of life have improved beyond actuarial expectations by half a year per decade. Additionally, the continued low interest rate environment exacerbates the impact of an insurer's exposure to longevity risk. Given the increases in annuity and pension business by many insurers, it is therefore appropriate to include a trend component within longevity risk.

					It is however important to consider this element in conjunction with the allowance already being made by IAIGs in their basic evaluations.
Ageas	Belgium	Other	No	No	We would like to follow SII.
Canadian Institute of Actuaries	Canada	Other	No	Yes	
Ping An Insurance (Group) Company of China Ltd.	China	Other	No	Yes	We agree to consider the trend component in longevity risk, which reflects the trend of mortality rates. As the annual improvement of mortality rate leads to increased uncertainties of benefit payments for some products (such as annuity products), it should be reflected in the longevity risk.
Insurance Europe	Europe	Other	No	No	The trend should not be explicitly considered within longevity risk as it is not observable over one year and therefore not consistent with the one-year approach of the ICS. A unique factor should be kept for mortality risk. In particular, the application of the formula described in §347 could be implemented differently across companies as the order between a) and b) is important.
Actuarial Association of Europe	European Union	Other	No	No	If the improvement of mortality according to the observed trend is considered appropriately in the current estimate mortality rates, (generation dependency) an explicit consideration is not necessary.
Institut des Actuaire	France	Other	No	Yes	The trend should be explicitly considered within longevity risk and is already monitor in various life insurance companies in Europe. However, the calculation should be clarified as the application of the formula described in §347 could be implemented differently across companies as the order between a) and b) is important: The shock to Longevity risk is a simultaneous shock to mortality rates and mortality improvement rates, defined as: a) An increase of 1% in mortality improvement rates (i.e. base mortality improvement

					<p>assumptions + 1%); and b) A decrease of 15% in mortality rates (i.e. (0.85 x base mortality assumptions)).</p> <p>The maximum between level and trend factors could be used to determine the Longevity risk.</p>
Allianz	Germany	Other	No	Yes	In our view trend is the main risk driver.
GDV - Gesamtverband der Deutschen Versicherungswirtschaft	Germany	Other	No	No	Regarding the extent vs. appropriateness of the mortality and longevity risk modelling an approach based on a proportional level shock factor is preferred, instead of applying shocks to both the trend and the level risk component. In general, the area of conflict between using a simpler approach and designing a more detailed concept can hardly be overcome. In our view, nevertheless, focusing on a properly derived and adequately calibrated stress factor, that – ideally – implicitly also allows for including the possibility for adverse trend assumptions should be considered adequate.
Munich Re	Germany	Other	No	No	See Q104
AIA Group	Hong Kong	Other	No	No	See our response to Q104
International Actuarial Association	International	Other	No	Yes	The proposed model with a trend factor is preferred above the SII longevity model. The Solvency II model for longevity is only based on a simple -20% shock. Longevity is not based on a linear shock but will develop over the future and hence there should be a trend component in the ICS model.
Dai-ichi Life Holdings, Inc.	Japan	Other	No	No	<ul style="list-style-type: none"> • Sometimes it is difficult to calculate "trend risk" practically. It depends on CF model. Therefore simplification (like a conversion from trend risk to level risk) is needed.

The Life Insurance Association of Japan	Japan	Other	No	No	<ul style="list-style-type: none"> • We think an approach that does not explicitly consider trend components would be one of the most viable options. • Where the IAIGs explicitly consider trend components, we would like the IAIS to carefully consider alternative approaches that define a certain period to take into account the trend shock. So it does not result in overly high risk for the IAIGs.
Great Eastern Holdings Ltd	Singapore	Other	No	No	See response to Q104.
Swiss Re	Switzerland	Other	No	Yes	For the same reasons as provided in our response to question 104.
Aegon NV	The Netherlands	Other	No	Yes	Aegon could support explicit consideration of the trend component. The trend component should be considered independent of the level component.
American Council of Life Insurers	United States	Other	No	Yes	Yes, the trend component is a key risk for longevity business and should be considered. The key risk for large insurers with credible experience is unexpected changes in the trend of mortality. Longevity risk is more appropriately captured through a stress on the trend component directly without a simultaneous stress on base mortality rates.
MetLife	United States	Other	No	Yes	We feel that a trend component should be included for Longevity Risk. However, level and trend shocks are currently excessive and need to be recalibrated to more reasonable levels.
New York Life	United States	Other	No	Yes	Yes, this is a key risk for business that generates longevity risk for an IAIG. As opposed to mortality, where a pandemic can cause a significant shock, which is captured in the pandemic risk, there is no such risk for longevity. We are unaware of any situation in which mortality has dropped by a significant amount in any given year. Mortality trend is the most significant component when considering longevity risk.

Prudential Financial, Inc.	United States of America	Other	No	Yes	The trend component should be explicitly considered within Longevity risk. The key risk for large insurers with credible experience is unexpected changes in the trend of mortality. Longevity risk is more appropriately captured through a stress on the trend component directly without a simultaneous stress on base mortality rates.
MassMutual Financial Group	USA	Other	No	Yes	

Q107

Q107 Section 6.6.2 Are the stress levels for Longevity risk appropriate? Please explain. If “no”, please provide supporting evidence and rationale for a different stress level.

Organisation	Jurisdiction	Role	Confidential	Answer	Answer Comments
China Insurance Regulatory Commission	China	IAIS Member	No	No	We view that the current stress level is not too unreasonable for China, however, from a long term prospective, as the risk profile and claim experience could vary significantly across markets, we suggest calibrate the stress based on each market's actual data and experience.
EIOPA	EIOPA	IAIS Member	No	No	The stress on mortality rates for the Longevity risk was reduced from 20% in 2015 to 15% in 2016 and additionally an explicit stress on mortality improvement rates was introduced for the Longevity risk. However, the IAIS did not provide sufficient justification for this reduction. We believe that the stress levels in the Field Test 2015 were more appropriate - at least with respect to some geographical regions. The latter stress levels were geared to existing solvency regimes where the calibration was formerly based on historical mortality rates.
BaFin	Germany	IAIS Member	No	No	
Financial Supervisory Service	Korea	IAIS Member	No		It is difficult to assess the appropriateness of the stress level at the moment. Korean FSS plans to calibrate the stress levels based on Korean Insurance market in the near future and the appropriateness of the stress level can be assessed afterwards.

National Association of Insurance Commissioners	USA	IAIS Member	No	Yes	Given that most insurers already incorporate some longevity improvement into their work, the proposed stress appears to be appropriate.
Canadian Institute of Actuaries	Canada	Other	No	Yes	
Ping An Insurance (Group) Company of China Ltd.	China	Other	No	No	We suggest calibrating the stress levels with the data from China market, for example reference to C-ROSS calibrations. If the data is not sufficient to achieve a reasonable level of calibration, we would accept the current stress levels, however, we recommend updating the experience data regularly and reflecting China experience gradually into setting the stress levels.
Insurance Europe	Europe	Other	No	No	The current stress overstates the actual longevity risk, especially in the case of markets that have significant experience in managing this risk. In addition, the addition between the stresses on longevity level and trend implicitly assumes a 1 correlation between the two, which is not proven.
Actuarial Association of Europe	European Union	Other	No	Yes	Comparable to Solvency II stress in standard formula. Assessment of appropriateness is part of the review process. Result not just yet available. But: The strong dependency of life expectancy from socio-demographic status requires a due consideration of this fact when determining the current estimate for mortality rates.
Allianz	Germany	Other	No	No	
GDV - Gesamtverband der Deutschen Versicherungswirtschaft	Germany	Other	No	Yes	The calibration of the level stress is considered appropriate. A stress for the trend component is generally not considered appropriate (see answer to Q 106).

Munich Re	Germany	Other	No	No	The level stress is similar to the Solvency II standard formula approach. In combination with the proposed trend stress the calibration appears to be too high to meet the target.
Global Federation of Insurance Associations	Global	Other	No	No	We are concerned that the stress levels are overly high in some jurisdictions, particularly where there is significant experience in managing longevity risk. Further, the requirement to model longevity trend and longevity levels simultaneously implicitly assumes a 100% correlation, when there would be no to low correlation between these two risks. We would like the IAIS to consider defining appropriate stress levels, with reference to the input from stakeholders including historical data of Volunteer IAIGs obtained from the results of Phase 2 + of 2016 Field testing.
AIA Group	Hong Kong	Other	No	Yes	
International Actuarial Association	International	Other	No	No	Similar to the response to Q 105, the longevity shock can be a bit lower (10%) and also the trend shock should use 0.75% (instead of 1%) as this is more in line with observed practice. In Appendix 2 (submitted via a separate document/letter to the IAIS) this is shown and compared with the Solvency II model that works for average portfolios.
Dai-ichi Life Holdings, Inc.	Japan	Other	No	No	<ul style="list-style-type: none"> • We believe that the publication of the data and method regarding the calibration of current stress level is essential in order to determine whether it is appropriate. We believe that it is necessary to consider the appropriate stress level by referring to the historical data of the volunteer companies in Phase 2+. • At that time, the term to reflect the trend risk shock should be considered carefully because current estimate has a high sensitivity about the trend parameters . (for example, to shorten the period to reflect the trend shock)

					<ul style="list-style-type: none"> The calibration method should be published to the volunteer companies so that they are able to check the appropriateness of the calibration.
General Insurance Association of Japan	Japan	Other	No	No	They are not appropriate. Assuming that the level of uncertainty of both an increase and a decrease in the mortality rate is similar, the shock applied to the mortality risk should also be applied to the decrease in mortality. Therefore, a decrease of 10% in the mortality rate is appropriate.
The Life Insurance Association of Japan	Japan	Other	No	No	<ul style="list-style-type: none"> We believe the stress levels for longevity risk are overly high. The IAIS should reference the historical data collected from Volunteers in Phase 2+ of 2016 Field testing. If the trend component is explicitly considered, the IAIS should carefully consider the period to take into account the trend shock in order to ensure that the calibration level of longevity risk is not overly high for the IAIGs. Additionally, we believe calibration methods should be disclosed to Volunteers in order that they will be able to validate the appropriateness of the calibration by referencing the data collected from Volunteers.
Great Eastern Holdings Ltd	Singapore	Other	No	Yes	NA
Swiss Re	Switzerland	Other	No	No	The stress levels seem to be calibrated too high for reinsurers. This issue can best be addressed by allowing the use of regulatory approved internal models.
Aegon NV	The Netherlands	Other	No	No	Aegon believes that the stress levels for longevity risk are extremely high in the context of the 99.5% stress and a 1-year horizon. There is also a clear lack of substantiation for the shocks. Please also see our answer on Q110, where we elaborate further on this.
Association of British Insurers	United Kingdom	Other	No	No	The component under ICS is too high, particularly in markets where there is significant experience in managing longevity risk such as the UK. Further, the

					requirement to model longevity trend and longevity level simultaneously implicitly assumes 100% correlation. However, we would expect no or low correlation between these two risks.
American Council of Life Insurers	United States	Other	No	No	<p>No. The longevity level stress of an additional 15% is too high for insurance companies that have significant amounts of longevity business and credible historical data on which to base their assumptions.</p> <p>Additionally, it is inappropriate to hold the trend stress level for all ages. As people age, longevity improvements are limited because changes in longevity drivers show decreasing returns. The stress should reflect this reality and be decreased for older ages.</p> <p>Further, the level and trend risks should be considered independent stresses. They are currently simply added together in the current proposal and, as a result, considered 100% correlated. The industry view is that these are uncorrelated.</p>
New York Life	United States	Other	No	No	<p>As in Q105, we suggest prescribing the stress considering the credibility of the insurer's underlying data backing the baseline assumption. In general, the assumption that mortality may drop by 15% instantaneously or miss expectation by 15% for a mature block of inforce seems unreasonable. The focus should be on trend.</p> <p>For both mortality and longevity, trend and shock should not be assumed to be correlated.</p>
Prudential Financial, Inc.	United States of America	Other	No	No	<p>Prudential believes a more moderate stress is required. Please see our response to question 105 for our thoughts on the mortality / longevity base stresses.</p> <p>Additionally, it is inappropriate to hold the trend stress level for all ages. As people age, longevity improvements are limited because changes in longevity drivers show</p>

					decreasing returns. The stress should reflect this reality and be decreased for older ages.
MassMutual Financial Group	USA	Other	No	Yes	

Q108

Q108 Section 6.6.3 Is there evidence to support the use of stresses for Mortality and Longevity risk that vary by geographical region? Please explain and provide supporting evidence.

Organisation	Jurisdiction	Role	Confidential	Answer	Answer Comments
China Insurance Regulatory Commission	China	IAIS Member	No	Yes	The mortality tables of each country shows that the shape and the level of mortality rates vary across regions, therefore we suggest calibrate the shocks based on each market's actual data and experience.
EIOPA	EIOPA	IAIS Member	No	No	The mortality characteristics of different geographical regions should be taken into account when valuating liabilities (with homogeneous risk categories). As the stress to apply to shock the mortality rates is a permanent increase (or decrease) of a given percentage, EIOPA is of the opinion that there would be no need for further geographic groupings for mortality and longevity risks. However, the design of the data collection exercise will potentially allow for a differentiation by geographical regions. If the data provides valid evidence that the development of mortality rates (i.e. observed volatility) behaves differently in specific regions this should also be reflected in the recalibration of Mortality and Longevity stresses.
BaFin	Germany	IAIS Member	No	No	
Financial Supervisory Service	Korea	IAIS Member	No	No	

Ageas	Belgium	Other	No	No	Even if one would include geographical region to define the stresses for Mortality and Longevity Risks, the portfolio of each company can vary and hence it is believed that the stresses defined should be in line with the portfolio of the company.
Canadian Institute of Actuaries	Canada	Other	No	No	Studies of mortality and mortality improvement rates have indicated that mortality levels differ by geography due to socio-economic factors, health systems, diet, and level of prosperity. Conceptually, it seems reasonable to differentiate, but it is difficult to prove or to determine an appropriate factor, and the evidence is not readily available.
Ping An Insurance (Group) Company of China Ltd.	China	Other	No	Yes	According to the average life expectancy released lately, there are significant differences across countries. Therefore, we recommend calibrating the stresses based on experience data of each region.
Actuarial Association of Europe	European Union	Other	No	No	Independent from geographic regions mortality /longevity is influenced by socio-demographic factors. Only considering the geographic region without detailed analysis can therefore only give a rough assessment that cannot be used for the calculation of insurance liabilities. The portfolio of the insurance company has to be considered carefully when determining the current estimate.
Institut des Actuaire	France	Other	No	No	Theoretically, the level stresses for Mortality and Longevity risk should vary by geographical region. However it could lead to data quality difficulties and additional complexity. The standard method should allow using “Undertaking Specific Parameters” (USP) as in Solvency II. The stresses would be calculated by the IAIG and would reflect the regional particularities of the portfolios.

GDV - Gesamtverband der Deutschen Versicherungswirtschaft	Germany	Other	No	Yes	
Munich Re	Germany	Other	No	Yes	
AIA Group	Hong Kong	Other	No	Yes	“Region” is far too broad a categorization. We believe that it may be possible to vary mortality stresses by geographic location but ONLY based on facts. This should be done country by country, not region by region. “Emerging markets” is far too broad a classification. We see variations in mortality country by country. There is no reason why, for example mortality risk in Thailand should be the same as mortality risk in Argentina. It is far better to use the same stress worldwide than to create non-scientific distinctions that discriminate against emerging markets.
International Actuarial Association	International	Other	No	No	Not needed for the level shocks as long as the insurer uses the data from its own country (industry). The proposed shocks are applied to the portfolio and the number of expected deaths. For the trend shock the ICS model can be used for developed countries. Comparable countries will grow to similar trends and shocks. See also the response to Q109 and the graphs in appendix 3 (submitted via a separate document/letter to the IAIS).
Dai-ichi Life Holdings, Inc.	Japan	Other	No	Yes	<ul style="list-style-type: none"> If the results of the calibration based on Phase 2+ are different among jurisdictions, it could be an evidence to support to use various stress levels in each jurisdictions. At that time, we think that it is necessary to verify whether diversification effect is observed between jurisdictions and to reflect the effect to risk aggregation if it is observed.

The Life Insurance Association of Japan	Japan	Other	No	Yes	• If the results of the calibration of stresses under Phase 2 + are dependent on jurisdictions, this could be supporting evidence for the differential use of stress levels by geographical region.
Great Eastern Holdings Ltd	Singapore	Other	No	No	We do not have such evidence on hand.
Swiss Re	Switzerland	Other	No	Yes	Stresses may indeed vary by region. The severity of a given stress and its impact will depend on the characteristics of local population. However, the increased complexity associated with taking this into account may not be justified by the benefits in precision. Ideally, for groups for whom this effect is material, the IAIS should allow for the use of regulatory approved internal models.
Prudential Financial, Inc.	United States of America	Other	No	No	Prudential does not believe the geographical segmentation is relevant when determining Mortality or Longevity risk amount. The stresses and methods should be consistent across all geographical areas; regional differences, if any, should be captured in best estimate assumptions.
MassMutual Financial Group	USA	Other	No	No	While we are responding no, the IAIS should consider where geographical regions are today – e.g. a country with low mortality or morbidity has less room for improvement than a country with high mortality or morbidity. A comparison of general population data might indicate where there material enough differences in the starting point. For health – the situation is further affected by different health coverage. E.g. countries with socialized medicine might be less stressed than those without?

Q109

Q109 Section 6.6.3 Is there a specific methodology and reference data that the IAIS should use to determine appropriate mortality and longevity stress levels by geographic region? Please explain.

Organisation	Jurisdiction	Role	Confidential	Answer	Answer Comments
EIOPA	EIOPA	IAIS Member	No		From EIOPA's point of view the current data collection exercise should provide a sufficient data base for the determination of appropriate mortality and longevity stress levels by geographical region. With regard to methodology EIOPA currently does not have a clear preference for a specific approach. Broadly, generally accepted empirical and stochastic methods should deliver reliable and comparable results.
Financial Supervisory Service	Korea	IAIS Member	No	No	
Ageas	Belgium	Other	No	No	
Canadian Institute of Actuaries	Canada	Other	No	No	
Ping An Insurance (Group) Company of China Ltd.	China	Other	No	Yes	If there is no related statistical data of the insured population, we suggest using the statistical data of the whole population released by each country to calibrate the risk parameter of mortality and trend component.
Actuarial Association of Europe	European Union	Other	No	No	See Q108.

Allianz	Germany	Other	No	Yes	If available we propose that IAIS leverages official local mortality tables and corresponding supporting documentation to assess variability/trend in mortality rates.
GDV - Gesamtverband der Deutschen Versicherungswirtschaft	Germany	Other	No	No	
Munich Re	Germany	Other	No	No	
AIA Group	Hong Kong	Other	No	No	This would be a major undertaking that would need to be done on a country by country basis.
International Actuarial Association	International	Other	No	Yes	<p>The human mortality database (www.mortality.org) shows detailed data for many countries over long periods. For countries not in this database, or who don't have their own detailed information, data from comparable countries (economic development, region, climate) can be used. Expert Judgement will be needed.</p> <p>In general, the model for developed countries can be based on a rather linear trend such as Lee Carter or a drift model .</p> <p>Some general remarks: Following the IAA Blue Book: a global framework for insurer solvency (2004) each risk should be analysed split into its Volatility, Uncertainty and Extreme events components</p> <p>Under Life risk we are missing a discussion on the level of life calamity (extreme events) in the ICS questionnaires. Life calamity is mentioned in the technical specifications on Pandemics in Catastrophe Risk which is applied to life business too. In general a shock is needed to cover a serious pandemic, for example the shock of adding 0.1% (or 0.15% like in SII). The 0.15% is based on a pandemic like the Spanish Flu, but translated to the medical situation in the present time. This level of 0.15% is more in line with the risk related to a pandemic under a 1 in 200 situation. In addition, the life and morbidity risk both have a strong dependency with calamity</p>

					(pandemic) risk and we believe they should be taken care of in the aggregation method. See the response to Q214.
Dai-ichi Life Holdings, Inc.	Japan	Other	No	Yes	• The IAIS could analyze the calibration results based on ICS Field Testing Phase 2+ by geographic region.
The Life Insurance Association of Japan	Japan	Other	No	Yes	• We would like the IAIS to analyse the results of the calibration of stresses under Phase 2 + by each jurisdiction.
Great Eastern Holdings Ltd	Singapore	Other	No	No	
Swiss Re	Switzerland	Other	No	No	See the response to Question 108 above.
MassMutual Financial Group	USA	Other	No	No	

Q110

Q110 Section 6.6.4 Are there any further comments on Mortality and Longevity risk that the IAIS should consider in the development of ICS Version 1.0? If “yes”, please explain with sufficient detail and rationale.

Organisation	Jurisdiction	Role	Confidential	Answer	Answer Comments
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China Insurance Regulatory Commission	China	IAIS Member	No	No	
National Association of Insurance Commissioners	USA	IAIS Member	No	Yes	<p>The current IAIS approach is for mortality and longevity stresses to be applied separately with the thought that the populations that underlie these two classes of products are different in age, product selection, underlying mortality qualities and underwriting. Some allowance is made, however, through the correlation matrix and currently the postulated interaction is at negative 0.25. Recent, very preliminary U.S. studies appear to indicate a potential range from the negative 0.25 to negative 0.5. To the extent that it may include a certain degree of conservatism, this is not inappropriate.</p> <p>Regarding the mortality and longevity risks, the drivers between the base and trend shocks are considered by some to be different and should therefore be treated independently.</p>
Ageas	Belgium	Other	No	No	
Canadian Institute of Actuaries	Canada	Other	No	Yes	Companies that sell both life insurance and annuities have natural mortality hedges.
Ping An Insurance (Group) Company of China Ltd.	China	Other	No	No	
Insurance Europe	Europe	Other	No	Yes	<p>The level at which the shock is applied should not be the policy level, but rather a larger group such as: product level; group of policies level; portfolio level.</p> <p>In fact, as a consequence of the nature of Mortality/Longevity risks, factors such as pollution, new diseases, and breakthrough in medicine that could modify the risk profile of a liability will most often apply to larger groups of policies.</p>

Actuarial Association of Europe	European Union	Other	No	No	
Institut des Actuaire	France	Other	No	Yes	The level at which the shock is applied should not be the “policy” but a larger group such as: - Product ; - Group of policies ; or - Portfolio. Due to the nature of the Mortality/Longevity risks, factors (pollution, new diseases / breakthrough in medicine, etc.) that could modify the risk profile would affect larger groups than only policies where the stress decreases the NAV. An approach too granular would allow for the recognition of mutualisation and/or diversification of portfolios.
Allianz	Germany	Other	No	No	
GDV - Gesamtverband der Deutschen Versicherungswirtschaft	Germany	Other	No	No	
Munich Re	Germany	Other	No	No	
AIA Group	Hong Kong	Other	No	Yes	We feel the IAIS should be fully transparent about the basis for all risk charges.
General Insurance Association of Japan	Japan	Other	No	Yes	Diversification between jurisdictions should be considered in addition to stress levels.
Great Eastern Holdings Ltd	Singapore	Other	No	No	

Swiss Re	Switzerland	Other	No	No	
Aegon NV	The Netherlands	Other	No	Yes	Aegon is concerned that the current ICS approach for mortality and longevity risk is excessively calibrated and inadequately substantiated. It appears that the proposed shocks have simply been copied from Solvency II and amended to add a longevity trend shock. Substantiation for all of the proposed shocks is lacking, including the shocks borrowed from Solvency II. We believe that the shocks are excessive particularly in light of the one-year time horizon. Moreover, the addition of the trend component to the level component of longevity risk, effectively assuming 100% correlation, is unrealistically prudent. The layering of prudence upon prudence for these risks, which are foundational to the life insurance business, is concerning to us.
Prudential Financial, Inc.	United States of America	Other	No	Yes	<p>It is excessive to run both the base and trend shocks simultaneously. The drivers between the two are different. If both are required, they should be treated as independent.</p> <p>Within the Life Type Risk correlation matrix, Prudential believes the -25% correlation between mortality and longevity understates the natural hedge between these risks. When measuring risk we are concerned about distribution tails. In these stress scenarios, mortality/longevity will be highly correlated across age groups and businesses as they are influenced by major events or trends (ex. A cure for cancer will benefit all). Since the tail mortality scenarios determine the risk level, mortality/longevity netting is disproportionately affected by these highly correlated scenarios.</p>
MassMutual Financial Group	USA	Other	No	No	

End of Section 6.6