



Society of Actuaries in Ireland

Retirement Benefit Schemes
Transfer Values

Mortality Bases Review

June 2014

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1 Introduction

- 1.1 This report has been prepared by the Demography Committee of the Society of Actuaries in Ireland (“Society”) to review certain assumptions prescribed for use in calculating retirement benefit schemes transfer values.
- 1.2 Actuarial Standard of Practice PEN-2 “Retirement Benefit Schemes transfer values” (“ASP Pen-2”) sets out the requirements relating to the calculation of individual transfer values payable under the Pensions Act 1990.
- 1.3 With effect from 1st June 2014, the financial and mortality assumptions within ASP Pen-2 version 5.10 have been transposed into statutory guidance issued by the Pensions Authority. To this end, the Pensions Authority has published “Prescribed Guidance in relation to Section 34 of the Pensions Act, 1990”¹ (“Statutory Guidance”). This includes the content of the appendices of ASP Pen-2 version 5.10. Accordingly, version 6 of ASP Pen-2 is in effect from 1st June 2014². The Statutory Guidance has been prescribed under the Occupational Pension Schemes (Preservation of Benefits) (Amendment) Regulations 2014 and the Occupational Pension Schemes (Professional Guidance) (Amendment) Regulations 2014. Going forward, revised financial and non-financial assumptions will be reflected in the Statutory Guidance.
- 1.4 Any change to the assumptions to be used in calculating transfer values requires the approval of the Minister for Social Protection. Thus, this report will be provided to the Pensions Authority and to the Department of Social Protection (“DSP”).
- 1.5 The previous review of the post-retirement mortality assumptions took place in 2008, and its conclusions were reflected in version 5.6 of ASP Pen-2 (effective from 1 September 2009).
- 1.6 During 2013, an investigation was conducted into the mortality experience of self-administered pension schemes (“SAPS”) in Ireland. The results of this investigation, as well as emerging trends in other mortality data and projections, indicated that a review of the post-retirement mortality assumptions in ASP Pen-2 would be timely.
- 1.7 This report considers the pre- and post-retirement mortality assumptions to be defined in the standard transfer value basis.
- 1.8 The remainder of this report is laid out as follows:
 - Section 2 provides further background on the purpose of the assumptions under review as well as a summary of the assumptions in the Statutory Guidance;

¹ http://www.pensionsauthority.ie/en/Regulation/Statutory_guidance/Section_34_-_Guidance_In_Relation_To_Transfer_Payments_29_May_2014_.pdf

² https://web.actuaries.ie/sites/default/files/asp/ASP_PEN-2/ASP%20PEN-2%20v%20%206%200.pdf

- Section 3 summarises the results of the SAPS mortality investigation performed in 2013, as well as the views of the Demography Committee as to how the results of this investigation can be translated into a revised set of mortality assumptions for the Statutory Guidance;
- Section 4 considers the issue of future mortality improvements in the context of the Statutory Guidance; and
- Section 5 sets out the Demography Committee’s conclusions and a proposed new set of mortality assumptions for the Statutory Guidance.

2 Purpose and Current Approach

- 2.1 The purpose of this report is to assess the continued appropriateness of the existing mortality basis set out in the Statutory Guidance, in light of the Society's 2013 SAPS mortality investigation and other sources of mortality information, and potentially to make an updated recommendation in relation to the mortality basis to be prescribed in the Statutory Guidance.
- 2.2 ASP Pen-2 applies to individual transfer values including "transfer payments" under the Pensions Act 1990, the assessment of benefits to be granted in respect of incoming transfer values, and gives advice concerning the calculation of individual transfer values. The Statutory Guidance sets out financial and non-financial assumptions to be used in the determination of the minimum transfer value to apply in such situations.

Current Assumptions

- 2.3 The mortality basis incorporated in the Statutory Guidance is as follows:

Pre-retirement

Males: AM92, Females: AF92

Proxy basis – Post retirement

Males: 62% of PNML00, Females: 70% of PNFL00

with an increase to the annuity value of:

- 0.50% p.a. (male with no spouse's pension)
- 0.38% p.a. (female with no spouse's pension)
- 0.39% p.a. (male or female with spouse's pension)

compounded for each year between 2008 and the year in which normal pension date falls.

- 2.4 It was necessary to establish a simplified basis as a proxy for the actual underlying post-retirement mortality assumptions, in order to avoid potentially causing logistical difficulties for some users whose IT systems were not able to handle the two-dimensional nature of the underlying assumptions.

Underlying basis

- 2.5 The simplified proxy basis currently in use represents an approximation for the following, more precise, underlying basis:

108% of the '00 series, lives' tables for both males and females, with 2008 Central Statistics Office ("CSO") population mortality improvements³ applied from 2006 onwards (see Table A.1, Appendix A for details).

- 2.6 This underlying basis was recommended in the "Review of Rates of Mortality Improvement" report, published by the Society's Demography Committee on 14th October 2008⁴. In making its recommendation, the Committee referenced the "Report of the Working Party on Pensioner Mortality Experience under Self-Administered Pension Schemes" dated May 2008⁵, and specifically, the male (lives) results for ages 60+, excluding public sector data.
- 2.7 The Committee's rationale for recommending a 'lives' basis (rather than 'amounts') version of the '00 series' table, was that it would reflect the fact that the transfer value basis specified in ASP Pen-2⁶ is a minimum, and is applied to all pensioners, regardless of income level.
- 2.8 The percentage factors attributable to the male results were adopted for use for both male and female calculations for reasons of data credibility and practicality.

³ http://www.cso.ie/en/media/csoie/releasespublications/documents/population/2008/poplabor_2011-2041.pdf

⁴ https://web.actuaries.ie/sites/default/files/member_story/2010/01/Review_of_Rates_of_Mortality_Improvement/081014%20Review%20of%20Rates%20of%20Mortality%20Improvement.pdf

⁵ https://web.actuaries.ie/sites/default/files/member_story/2008/05/May%202008%20Mortality%20Report.pdf

⁶ The transfer value basis is specified in Statutory Guidance from June 1st 2014 - see section 1.

3 Mortality experience of Self-Administered Pension Schemes (SAPS)

- 3.1 In 2012, the Society initiated an updated study into pensioner mortality experience of Irish SAPS, following the previous May 2008 study. The final report was issued in December 2013⁷.
- 3.2 The objective of the study was to carry out research that would assist pension scheme actuaries when setting mortality assumptions, provide a basis for updating mortality assumptions in relevant ASPs, and help to quantify changes in Irish pensioner mortality experience since the previous study.

SAPS Data

- 3.3 The SAPS study includes data over the period 2006 to 2012 from 5 pension consultancies and the Department of Finance. In total, data in respect of 52 schemes and approximately 105,900 lives on average over the exposure period was submitted. The data received from each scheme did not provide coverage for all policies over the full investigation period with 30% of submissions providing data for longer than 3 years, 60% of submissions providing data for a 3 year period and 10% for less than a 3 year period.
- 3.4 The following table outlines the exposure and deaths on a lives and amounts basis for the 2006-2012 SAPS investigation:

	Male	Female	Total
Lives Exposure	234,741	152,356	387,097
Lives Death	7,536	4,598	12,134
Amount Exposure €m	3,386	1,150	4,536
Amount Deaths €m	90	38	128

SAPS Methodology

- 3.5 Crude mortality rates were derived by age and gender, using the census method based on a life year rate interval. Ill health and dependant lives were included but they were not analysed separately due to insufficient data.

⁷ Report on the 2013 pensioner mortality study of Irish SAPS:
https://web.actuaries.ie/sites/default/files/member_story/2013/12/SAI%20Mortality%20Report%20Final%20Nov%202013.pdf

SAPS Results

- 3.6 The SAPS investigation results were expressed as a percentage of the PN00 tables and as a percentage of the S2 tables. For reference we have summarised the results on a lives and amounts basis for both the PN00 and S2 tables, split between males and females in the following tables:

	Male Lives PNML00	Female Lives PNFL00	Male Amounts PNMA00	Female Amounts PNFA00
All ages	96%	96%	96%	107%
60+	95%	94%	95%	104%

	Male Lives S2PML	Female Lives S2PFL	Male Amounts S2PMA	Female Amounts S2PFA
All ages	102%	102%	104%	107%
60+	101%	101%	103%	105%

- 3.7 The crude mortality rates in the 2013 study were compared against those recorded in the 2008 experience study. The mortality rates in the 2013 study are lighter than those of the 2008 study for the majority of age bands, suggesting an underlying improvement in mortality rates between the two studies.
- 3.8 Based on the time interval of 5.33 years between exposure mid-points for both studies, the implied improvement rate between the two reports was 2.2% per annum for males and 2.0% per annum for females.
- 3.9 In comparison, the underlying mortality assumptions contained in the current Statutory Guidance are based on initial annual mortality improvement rates of 5% for males and 3.5% for females (see Table A1, Appendix A for full details).
- 3.10 The SAPS study therefore indicated that mortality rates continue to improve, but at rates lower than had been assumed in the current Statutory Guidance. This is consistent with the reduction in population mortality improvement rates recorded by the CSO in recent years (see paragraph 4.1), and also consistent with the CSO's decision to reduce the assumed rates of future mortality improvements in its latest set of labour force projections (see paragraph 4.6). The Demography Committee therefore concluded that the mortality bases for the Statutory Guidance should be updated.

2014 Update

- 3.11 Following the publication in December 2013 of the Society's updated study of Irish SAPS mortality experience, the Demography Committee analysed the experience data to ascertain if a new post-retirement mortality assumption in the Statutory Guidance would be required.

Overview of Approach

- 3.12 Four sets of standard tables were considered as possible bases for an updated post-retirement mortality assumption for the Statutory Guidance:

Mortality Table	Central Exposure Year	Types of Lives
S1	2003	UK SAPS Pensioners (excluding dependants)
S2	2007	UK SAPS Pensioners (excluding dependants)
ILT15	2006	Irish Population
PN00	2000 approx	UK Life Office Pensioners (Normal Retirements only)

- 3.13 The following profile was assumed to be the profile of a 'typical' member of a pension scheme for whom a transfer value is to be calculated:

Current age	45
Retirement age	65
Net discount rate	3.25% ⁸

Using the above assumptions, the Committee performed two separate analyses to determine how best to match the actual experience data to the standard tables.

- 3.14 First, the Committee determined that a transfer value for the 'typical' individual above, calculated using the observed mortality rates from the SAPS study, corresponded to a transfer value calculated under each of the four standard tables using the following percentage adjustments to the standard tables⁹:

	Lives Basis		Amounts basis	
	Males	Females	Males	Females
S1	89.5%	99.1%	92.0%	100.6%
S2	106.1%	113.0%	106.0%	109.0%
ILT15	87.7%	97.2%	76.5%	90.6%
PN00	98.8%	103.7%	98.5%	106.4%

⁸ The 3.25% discount rate assumption is equal to a gross discount rate assumption of 4.25%, less a deduction for inflation of 1%. The assumed deduction for inflation reflects the underlying assumptions that 50% of benefits will be subject to index-linking, and that this index-linking will be at an average rate of 2% p.a.

⁹ This exercise made allowance in the transfer value calculation for future mortality improvements in line with those adopted by the CSO in its April 2013 Population and Labour Force Projections (http://www.cso.ie/en/media/csoie/releasespublications/documents/population/2013/poplabfor2016_2046.pdf).

3.15 Second, the Committee used a least-squares analysis to determine the percentage adjustment that should be applied to each standard table to produce mortality rates that closely fitted the actual experience recorded from the SAPS study. This resulted in the following percentage adjustments:

	Lives Basis		Amounts basis	
	Males	Females	Males	Females
S1	88.2%	96.8%	88.4%	96.9%
S2	106.1%	108.5%	104.4%	103.5%
ILT15	86.4%	91.9%	71.7%	84.9%
PN00	95.6%	99.7%	93.8%	100.8%

3.16 The results of the least-squares analysis from paragraph 3.15 were deemed to provide a reasonable independent justification for the percentage adjustments derived directly from the data, particularly for males.

3.17 We note that the vast majority of percentage adjustments from paragraph 3.15 are lower than those shown in paragraph 3.14. This is a consequence of paragraph 3.14 being calibrated to a transfer value result, thereby applying discount factors to future periods, meaning that greater weight is effectively placed on the targeted mortality rates in the years immediately after retirement. In contrast, the ‘least-squares’ check underlying paragraph 3.15 does not use any discounting and instead is weighted only by the volume of data from the SAPS study.

3.18 Based on the above analysis, the Demography Committee’s initial view would therefore be to use the S2 tables as the basis for the transfer value calculation, as the S2 tables are the most recently published of the available mortality tables and, according to the analyses performed by the Committee, provide the closest fit to the experience data.

3.19 We note that ILT15 is now somewhat out-of-date, with a central exposure year of 2006. Ideally, ILT16 would have been available for use in this analysis, to provide a more recent Irish-based set of rates that could be assessed, but its publication has been deferred by the CSO until later in 2014.

Gender

3.20 As there is less experience data in the SAPS study for females than for males, and as the experience data that is available for females is dominated by experience for one specific occupation type (teachers, which account for 2,768 of the total 4,598 deaths) the Committee concluded that the data for females was not suitable for use as a generic basis for transfer value calculations due to credibility and volatility concerns.

3.21 The Committee instead recommends using only the male adjustment factors (from paragraph 3.14) as the basis for the transfer value mortality assumption for both males and females, i.e.:

106.1% S2PML / 106.1% S2PFL; or

106.0% S2PMA / 106.0% S2PFAof the S2 Amounts table.

3.22 We have carried out calculations to determine the percentage adjustment factors to be applied to the other standard tables considered that would lead to results equivalent to those obtained using the recommended percentage adjustment factors in paragraph 3.21. It can be seen from the table below that the male adjustment factors are the same as those shown in paragraph 3.14 above, while the difference in the female adjustment factors compared to paragraph 3.14 represents the impact of moving to using the male adjustment as the “anchor point”:

	Lives Basis		Amounts basis	
	Males	Females	Males	Females
S1	89.5%	93.3%	92.0%	97.8%
S2	106.1%	106.1%	106.0%	106.0%
ILT15	87.7%	91.4%	76.5%	88.2%
PN00	98.8%	97.6%	98.5%	103.5%

Recommended Standard Table

3.23 As described above, the S2 tables are the Committee’s preferred choice for use as the standard table. However, it is necessary to consider also an alternative set of assumptions that is not based on standard tables that are subject to access restrictions imposed by the CMI. The Committee notes that the S2 Tables are among those more recent publications from the CMI to which general access has been limited¹⁰ to organisations that either supply data for CMI investigations or are willing to pay a licence fee. The Committee also recognises the risk of anti-selection in offering actuaries the choice of using the S2 tables or a set of tables without access limitations.

3.24 While it would be preferable for all actuaries performing transfer value calculations to be able to use the S2 tables, it is perhaps inappropriate to effectively compel actuaries performing transfer value calculations to provide sufficient data to the CMI or to pay the necessary licence fee to the CMI in order to access the S2 tables.

3.25 Accordingly, in order to avoid potential practical limitations for actuaries in terms of access to the required tables for transfer value calculations, the Committee instead recommends the use of the ILT15 table as the basis for the transfer value calculation as specified in the Statutory Guidance.

3.26 This table is readily available to all life and pensions actuaries and, although it is not as up to date as the S2 tables, it has the advantage of being based on Irish mortality experience and provides a reasonably good fit to the experience from the SAPS investigation – indeed, the least-squares analysis carried out by the Committee (referred to in paragraph 3.15) showed that the residuals under ILT15 were lower than for the S2 tables for male lives (0.68% compared to 0.80%) but were higher than for male amounts (0.32% compared to 0.15%).

¹⁰ <http://www.actuaries.org.uk/research-and-resources/pages/how-access-cmi-outputs>

3.27 The Committee's recommendation is therefore to use the following as the basis for the Statutory Guidance mortality assumption (as per paragraph 3.22):

Lives: 87.7% of the ILT15 Male table and 91.4% of the ILT15 Female table;
or
Amounts: 76.5% of the ILT15 Male table and 88.2% of the ILT15 Female table.

Lives or Amounts

3.28 Using a uniform transfer value mortality basis for all scheme members is likely to produce over-estimates for some members (e.g. those on relatively low retirement incomes with lower than average life expectancy) and under-estimates for others (e.g. those on relatively high retirement incomes with higher than average life expectancy).

3.29 The Committee recognises that across the totality of pension schemes, the appropriate mortality basis to be used for transfer values would be based on the 'amounts' table, as this could be expected to minimise (in monetary terms) the resulting aggregate over- or under-estimate. However, the lives-based approach could be expected to minimise the over- or under- estimate (in percentage terms) for a greater number of individual members.

3.30 In addition, having regard to the fact that different pension schemes have different membership profiles and that, as noted above, the basis specified in the Statutory Guidance is used to determine the minimum transfer payment that can be made, the Committee considers it appropriate to specify the 'lives' table for use in the Statutory Guidance as a minimum standard.

3.31 However, actuaries using these assumptions for pension schemes where greater-than-average pension amounts are payable should consider the appropriateness of using the 'Lives' tables rather than the 'Amounts' tables.

3.32 Similarly, any actuaries using these assumptions for purposes other than the calculation of minimum individual transfer values should also consider whether the use of the 'Amounts' tables would be more appropriate.

4 Projected future mortality improvements

Recent experience

- 4.1 The CSO has recorded the following population mortality improvement rates as having occurred in recent years:

	Males (p.a.)	Females (p.a.)
2000 to 2005 ¹¹	5.0%	3.5%
2006 to 2010 ¹²	3.0%	2.5%

- 4.2 The 2013 SAPS mortality investigation examined the implied mortality improvement rates for SAPS data over the period 2005 to 2010. These rates are derived by comparing the Actual / Expected experience (measured against PNL00 tables) from both the 2013 and 2008 studies. Based on the period between exposure midpoints for both studies (November 2004 to March 2010), the implied improvement rates over the period were:

	Males (p.a.)	Females (p.a.)
All ages	2.2%	2.0%

- 4.3 It is clear that mortality rates for Irish SAPS pensioners continue to improve, although at rates that are lower than previously expected. The above results imply that mortality improvement rates between 2005 and 2010 within the SAPS population have been slightly lower than those recorded by the CSO for similar periods, and also lower than those anticipated by the most recent CSO population projections (the CSO's 2011-2041 labour force projections published in 2008 anticipated mortality improvements to be slightly lower than the rates recorded between 2000 and 2005 shown in paragraph 4.1, reflecting an assumed gradual decline from that experience to a long-term rate of 1.5% by 2031).

Projection options

- 4.4 The Committee considered the following two projection options for modelling the mortality improvements implied by the 2013 SAPS study.

CSO population and labour force projections

- 4.5 In April 2013, the CSO published its report on the projection of total population for the period 2016 to 2046 and of total labour force for 2016 to 2026. As part of this projection, assumptions were derived in relation to future mortality improvements.

¹¹ http://www.cso.ie/en/media/csoie/releasespublications/documents/population/2008/poplabor_2011-2041.pdf

¹² http://www.cso.ie/en/media/csoie/releasespublications/documents/population/2013/poplabor2016_2046.pdf

- 4.6 The approach adopted by the CSO was to assume a gradual decline in mortality improvements from the levels recorded between 2006 and 2010 towards a long-term rate of mortality improvement that would apply from 2036 onwards. The CSO's assumptions use as a starting point the average recorded annual mortality rate improvements from 2006 to 2010, of 3% for males and 2.5% for females. By comparison, the previous set of CSO assumptions, prepared for the 2011 – 2041 labour force projections, had been based on initial annual mortality improvement rates of 5% for males and 3.5% for females.
- 4.7 The CSO assumes that these mortality improvement rates would apply in 2010 for lives aged up to 90, with 0% mortality improvement for ages of 100 years and over. For ages 91 to 99, the rate of improvement was estimated by linear interpolation between the assumed rate of improvement at age 90 years (3% for males and 2.5% for females) and the zero percent rate of improvement assumed to be applicable at age 100 years.
- 4.8 A long-term average annual improvement rate of 1.5%, to apply from 2036 onwards for both males and females, was assumed for all ages up to 90 years. The projections assume that there is zero long-term mortality improvement from age 100 upwards. Improvements for ages 91 to 99 for 2036 onwards are estimated by linear interpolation between the rate of 1.5% assumed to apply at age 90 and the rate of 0% assumed to apply at age 100.
- 4.9 Assumed mortality improvements between 2010 and 2036 were set by the CSO using linear interpolation at each age and sex between the rate applying in 2010 at that age and the long-term rate applying to that same age from 2036 onwards.

CMI annuitant projection model

- 4.10 The CMI has developed a parameterised model ("CMI_2013") for projecting future rates of mortality improvement. This model is also set up to project a transition from current (or initial) rates of mortality improvement towards a long-term rate of improvement to be reached at some point in the future. The model can be parameterised for bespoke purposes by users, but also offers a default set of parameters, which only require the user to select the assumed long-term rate of improvement (and any margin of prudence or underpin, if required).
- 4.11 The default parameters for the Initial Rate of Mortality Improvement are based on English & Welsh population mortality improvement rates for calendar year 2012. These default initial rates incorporate a cohort effect based on population mortality improvements (in England and Wales) observed from 1961 to 2012.
- 4.12 The model projects a linear convergence from the Initial Rate of Mortality Improvement to the long-term rate of mortality improvement (the assumption for which needs to be selected by the user), with the speed of convergence varying by age.

- 4.13 The long-term rate of mortality improvement (a constant rate selected by the user) is assumed to apply at ages 20 to 90, with a 0% long-term rate of mortality improvement applying at age 120. For ages between 90 and 120, the long-term rate of mortality improvement is found through linear interpolation between those rates applying at age 90 and at age 120.

Proposed post-retirement mortality improvement assumption

- 4.14 Having considered the projection options available and the results of the most recent SAPS survey, the Committee recommends that mortality improvements be included in the transfer value basis (set out in the Statutory Guidance) in line with the method used by the CSO in its 2013 population and labour force projections.
- 4.15 In the Committee's view, the CSO improvements are more relevant in an Irish context than the default CMI model. The alternative would have been to use the CMI_2013 model and derive appropriate parameters for the long-term rate of mortality improvement. In the absence of substantial research into Irish patterns of mortality improvement independent of the work performed by the CSO, the user-defined parameters would be expected to be the same as those used by the CSO.
- 4.16 Furthermore, the incorporation of cohort-based effects in the CMI_2013 model's default parameters has not been validated in an Irish context by evidence available from Irish population mortality studies.

5 Proposed Basis

5.1 The 2013 SAPS mortality investigation indicated that mortality rates continue to improve, but at rates lower than had been assumed in the current Statutory Guidance (see paragraphs 0 to 3.10). This is consistent with the reduction in population mortality improvement rates recorded by the CSO in recent years (see paragraphs 4.1 to 4.3), and also consistent with the CSO's decision to reduce the assumed rates of future mortality improvements in its latest set of labour force projections (see paragraph 4.6). The Demography Committee therefore concluded that the mortality bases for the Statutory Guidance should be updated.

Proposed Basis

5.2 On the basis of the work described in the previous sections of this report, and recognising the need to avoid potential practical limitations for actuaries in terms of access to the required tables for transfer value calculations, the Committee recommends that the following base tables provide the most appropriate set of post-retirement mortality assumptions for Statutory Guidance:

- 88% ILT15 (Males)
- 91% ILT15 (Females)

The rate of future mortality improvements is assumed to be in line with that adopted by the CSO (described in full in section 4).

5.3 The Committee has prepared the following comparison of projected life expectancies at age 65, using the proposed basis in paragraph 5.2 above and the mortality assumptions underlying the current Statutory Guidance basis (see summary of assumptions in Table A.1 Appendix A):

	2014	2034	2054
Male (Proposed basis)	20.79	23.34	25.43
Male (Current basis)	22.68	25.07	26.98
Female (Proposed basis)	23.36	25.54	27.36
Female (Current basis)	24.00	26.08	27.81

Proxy for Recommended Post-Retirement Basis

5.4 The Committee understands that IT systems limitations faced by some users of ASP Pen-2 would significantly complicate the performance of transfer value calculations requiring a two-dimensional table of future mortality improvement rates.

5.5 As such, the Committee has instead developed a set of one-dimensional factors to allow for future rates of mortality improvement. These one-dimensional factors have been derived with the aim of providing a proxy method that produces results which are a reasonable fit to the recommended basis described in sections 3 and 4. The use of one-dimensional improvement factors is consistent with the format of the assumptions currently contained in Statutory Guidance.

5.6 Based upon our analysis, the Committee proposes a proxy post-retirement mortality basis for the purposes of Statutory Guidance as follows:

- Men: 58% ILT15 (Males)
- Women: 62% ILT15 (Females)

with a compounded annual increase to the annuity value of:

- 0.36% (men with no spouse's pension)
- 0.30% (women with no spouse's pension)
- 0.30% (men with spouse's pension)
- 0.25% (women with spouse's pension)

for each year between 2014 and the year in which normal pension date falls.

5.7 The suggested proxy basis provides a close match to the underlying basis and we consider that it is a sufficiently reasonable fit on the basis of the comparison tables outlined in Appendix B.

Proposed pre-retirement mortality assumption

5.8 In light of the proposed change to the post-retirement mortality assumption it is timely to review the assumed rates of mortality specified in Statutory Guidance applying in the pre-retirement phase.

5.9 In the absence of an investigation into mortality experience among pension scheme members prior to retirement, proposing a pre-retirement mortality assumption is a more arbitrary exercise, albeit one that has a less material impact on transfer values than the post-retirement mortality assumption. (In practice, many actuaries do not explicitly allow for pre-retirement mortality on the grounds that the actuarial liability will be paid out on the death of a member, and therefore the financial impact on the scheme from pre-retirement deaths is neutral).

5.10 We propose that the pre-retirement mortality assumptions be changed to the following:

- Males: 73% ILT15 (males)
- Females: 77% ILT15 (females)

For a 45 year old member, these proposed rates are broadly equivalent to the average mortality rates applying to that member over the 20 years to age 65, using the proposed post-retirement basis set out in this paper (implicitly allowing for improvement in mortality rates over the period before retirement).

Summary of proposed changes

5.11 The table below sets out the proposed mortality assumptions for Statutory Guidance, along with those currently in use:

	Proposed	Current
Initial post-retirement male mortality rate	58% ILT15 (Males)	62% PNML00
Initial post-retirement female mortality rate	62% ILT15 (Females)	70% PNFL00
Annual adjustment factor to be applied to male single life cases	0.36%	0.50%
Annual adjustment factor to be applied to female single life cases	0.30%	0.38%
Annual adjustment factor to be applied to joint-life cases where male is primary beneficiary	0.30%	0.39%
Annual adjustment factor to be applied to joint-life cases where female is primary beneficiary	0.25%	0.39%
Pre-retirement mortality rate (male)	73% ILT15 (Males)	100% AM92
Pre-retirement mortality rate (female)	77% ILT15 (Females)	100% AF92

5.12 Appendix A to this paper provides a comparison of the details of the underlying proposed and existing bases, prior to the application of the proxy adjustments.

5.13 As noted previously in this report, actuaries using these assumptions for pension schemes where greater pension amounts are payable, or for purposes other than the calculation of minimum individual transfer values, should consider the appropriateness of using the 'Lives' tables rather than the 'Amounts' tables, and how the proposed assumptions set out in paragraph 5.11 may need to be adjusted accordingly.

5.14 It is also worth noting that the assumptions summarised in paragraph 5.11 reflect two approximations:

- The use of the ILT15 tables instead of the S2 tables (see paragraphs 3.23 to 0); and
- The use of one-dimensional factors for future mortality improvements, as a proxy to the CSO's projected rates of mortality improvement (see paragraphs 5.4 to 5.7).

While there are reasons why one or both of these approximations may be necessary for some users of ASP Pen-2 and the Statutory Guidance, actuaries who have access to the S2 tables, or whose IT systems can handle two-dimensional mortality improvement factors, should consider instead whether to use the underlying mortality assumptions recommended by the Committee.

Sensitivities

- 5.15 The proposed set of assumptions is sensitive to the mortality improvement assumption chosen. For instance, if the long-term rate of mortality improvement is increased by 0.5% to 2.0% pa, transfer values would be expected to increase as set out below.

	Male aged 65	Female aged 65	Male aged 45 (NRA 65)	Female aged 45 (NRA 65)
% increase in transfer value	+1.0%	+0.9%	+2.9%	+2.4%

- 5.16 If, in addition to a 0.5% increase in the long-term rate of improvement, the current rate of mortality improvement is also increased by 0.5% for each gender, transfer values are expected to increase as set out below.

	Male aged 65	Female aged 65	Male aged 45 (NRA 65)	Female aged 45 (NRA 65)
% increase in transfer value	+2.4%	+2.1%	+4.4%	+3.5%

Appendix A: Comparison of underlying mortality assumptions

The table below sets out a comparison of the post-retirement mortality assumptions underlying the proposed and current bases for Statutory Guidance, prior to the application of the simplifying proxy adjustments.

The table also provides a comparison of the change in the future mortality improvements assumed by the CSO between its 2008 and 2013 Labour Force Projections. The 2008 assumptions are an underlying component of the current basis in Statutory Guidance, while the 2013 assumptions are an underlying component of the proposed new basis.

Table A.1: Comparison of underlying mortality assumptions in current version of Statutory Guidance and proposed changes

	Proposed	Current
Initial post-retirement male mortality rate	88% ILT15 (Males)	108% PML00
Initial post-retirement female mortality rate	91% ILT15 (Females)	108% PFL00
Future mortality improvements	2013 CSO Labour Force Projections	2008 CSO Labour Force Projections
Initial rate of annual mortality improvement assumed by CSO for males	3.0%	5.0%
Initial rate of annual mortality improvement assumed by CSO for females	2.5%	3.5%
Long-term rate of annual mortality improvement assumed by the CSO (males and females)	1.5%	1.5%
CSO assumption for the convergence period from initial rates of mortality improvement to long-term rate	25 years	25 years

Appendix B: Proxy basis fit

As mentioned in paragraph 5.7, we have performed a series of comparisons to quantify how well the proxy basis outlined in paragraph 5.6 matches the basis specified in paragraph 0.

Table B.1: Male Single Life

<i>Male age 65 in....</i>	Annuity Value			
	2014	2026	2034	2054
88% ILT15 (Males) with CSO improvements	13.91	14.76	15.22	16.23
Proxy - 58% ILT15 (Males) with an increase to the annuity value of 0.36% p.a. compound for each year between 2014 and the year in which normal pension date falls	14.04	14.65	15.08	16.21
Difference	0.9%	-0.7%	-0.9%	-0.2%

Table B.2: Male Joint Life (50% reversion; Age Difference -3)

<i>Male age 65 in....</i>	Annuity Value			
	2014	2026	2034	2054
88% ILT15 (Males) with CSO improvements	16.06	16.77	17.16	17.99
Proxy - 58% ILT15 (Males) with an increase to the annuity value of 0.30% p.a. compound for each year between 2014 and the year in which normal pension date falls	16.08	16.67	17.08	18.13
Difference	0.1%	-0.6%	-0.5%	0.8%

Table B.3: Female Single Life

<i>Female age 65 in....</i>	Annuity Value			
	2014	2026	2034	2054
91% ILT15 (Females) with CSO improvements	15.27	15.94	16.33	17.17
Proxy - 62% ILT15 (Females) with an increase to the annuity value of 0.30% p.a. compound for each year between 2014 and the year in which normal pension date falls	15.38	15.94	16.33	17.33
Difference	0.7%	0.0%	0.0%	0.9%

Table B.4: Female Joint Life (50% reversion; Age Difference +3)

<i>Female age 65 in....</i>	Annuity Value			
	2014	2026	2034	2054
91% ILT15 (Females) with CSO improvements	16.14	16.78	17.14	17.91
Proxy - 62% ILT15 (Females) with an increase to the annuity value of 0.25% p.a. compound for each year between 2014 and the year in which normal pension date falls	16.16	16.65	16.99	17.86
Difference	0.2%	-0.8%	-0.9%	-0.3%



Society of Actuaries in Ireland, Clanwilliam House, Clanwilliam Place, Dublin 2

tel: +353 1 634 0020 | fax: +353 1 634 0039 | web: www.actuaries.ie

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