



Society of Actuaries in Ireland

Mortality Assumptions Review

Retirement Benefit Schemes Transfer Values

April 2022

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1. Introduction

- 1.1 This report has been prepared by the Demography Committee¹ of the Society of Actuaries in Ireland (“Society”) to review the mortality assumptions prescribed for use in calculating retirement benefit schemes standard transfer values (herein after referred to as “TV mortality assumptions”) and to recommend a new basis for use. It is written for an audience which is familiar with the subject and not for a wider audience.
- 1.2 The previous review of the TV mortality assumptions was set out in the Society’s note dated June 2014 based on a study published in 2013 (“2013 study”). The basis recommended in the report is specified in Statutory Guidance (version 2 – Oct 2016) as it was adopted in the “Prescribed Guidance in relation to section 34 of the Pensions Act, 1990” issued by the Pensions Authority.
- 1.3 After 7+ years a review is warranted as recent experience should be considered in defining these assumptions. In addition, the current assumptions are based upon ILT 15 and the CSO has since issued ILT 17 and also adopted updated recommendations on mortality projections (improvements) for the purposes of population and labour force projections². This paper is based upon the Report on the 2020 Pensioner Mortality study of Irish self-administered pension schemes (“SAPS Study”) and also on the paper “Review of best estimate mortality projection methods”. Both of these papers were also produced by the Society’s Demography Committee.
- 1.4 Projected mortality improvements are usually age dependent which means that q_x rates are dependent on age and year of projection. It was felt at the time of the previous recommendation that the practicality of assuming a constant rate of increase to annuity values (“proxy approach”) outweighed the value of more accurate calculations. The existing basis used in the Statutory Guidance uses such an approximation to allow for expected mortality improvements. The Demography Committee now recommends to discontinue the proxy approach. There are a number of reasons for this:
- Two-dimensional mortality tables are now the established norm
 - Anecdotal evidence from practitioners is that the approximations are no longer very accurate and can generate anomalous results in certain circumstances
 - Computing power has increased in the last seven years
 - It is hard to justify using any approximations if an easy remedy is available
 - Low interest rates amplify approximation errors.
- 1.5 The remainder of this report is laid out as follows:
- Section 2 provides the background of the current TV mortality assumptions

¹ Members of the Committee as of writing are Karl Murray, Aidan Kennedy, Shane Prendergast, Caroline Twomey, Kevin Reynolds, Linda Daly, Evan Hanley, Niall Quinn & Tony Jeffery

² <https://www.cso.ie/en/releasesandpublications/ep/p-plfp/populationandlabourforceprojections2017-2051/mortalityassumptions/>

- Section 3 describes the most recent SAPS study
- Section 4 describes the methodology used to review the TV mortality assumptions
- Section 5 considers pre-retirement mortality
- Section 6 considers mortality improvement rates
- Section 7 has some brief comments about COVID
- Section 8 presents the Demography Committee's proposed new mortality assumptions for calculating retirement benefit schemes transfer values

2. Background to Current TV Mortality Assumptions

- 2.1 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 (minimum values).
- 2.2 With effect from 1 June 2014, the financial and mortality assumptions within ASP Pen-2 version 5.10 were 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” (“Statutory Guidance”).
- 2.3 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. The Statutory Guidance (version 2) was last updated with effect from 1 January 2017 and reflects the proxy basis recommended by the previous review of the post-retirement mortality assumptions which took place in 2014.
- 2.4 Any change to the assumptions to be used in calculating transfer values requires the approval of the Minister for Social Protection. Therefore, if approved by Council, this report will be provided to the Pensions Authority and to the Department of Social Protection.

Current Assumptions

- 2.5 The mortality assumptions incorporated in the Statutory Guidance are as follows:

Pre-retirement

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

Proxy basis – Post retirement

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

with a compounded annual increase to the annuity value of:

- 0.36% (male with no spouse’s pension)
- 0.30% (female with no spouse’s pension)
- 0.30% (male with spouse’s pension)
- 0.25% (female with spouse’s pension)

for each year between 2014 and the year in which normal pensionable age falls.

2.6 It was deemed necessary at the time 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

2.7 The simplified proxy basis currently in use represents an approximation for the following, more precise, underlying basis for post-retirement mortality:

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

where the rate of future mortality improvements is assumed to be in line with that adopted by the CSO in its 2013 population and labour force projections³.

This underlying basis was recommended in the “Retirement Benefit Schemes Transfer Values Mortality Bases Review” report, published by the Society’s Demography Committee in June 2014.

2.8 In that report the Committee had initially recommended use of the following tables:

- 106.1% S2PML / 106.1% S2PFL (lives basis); or
- 106.0% S2PMA / 106.0% S2PFA (amounts basis)

but noted that while it would be preferable for all actuaries performing standard transfer value calculations to use the S2 tables, the S2 tables are not freely available to all actuaries and therefore, recommended the use of ILT15 with an appropriate adjustment to best mirror the recommended S2 tables.

2.9 The percentage factors attributable to the male results were adopted for use in fitting the experience to the S2 table for both male and female calculations as there were concerns about the validity of the female results as most of the data came from a single profession (teachers).

³ <https://www.cso.ie/en/statistics/population/populationandlabourforceprojections2016-2046/>

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

- 3.1 In 2019, the Society initiated an updated study into pensioner mortality experience of Irish SAPS, following the previous 2013 study. The final report was issued on 10 September 2020 (“the 2020 study”).
- 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 2012 to 2017 from 4 pension consultancies and the Department of Public Expenditure and Reform (DPER). In total, data in respect of 51 schemes was submitted.
- 3.4 The following table outlines the exposure and deaths on a lives and amounts basis for the 2012-2017 SAPS investigation:

	Male	Female	Total
Lives Exposure	298,999	265,477	564,476
Lives Deaths	8,227	5,724	13,951
Amount Exposure €m	6,770	4,737	11,407
Amount Deaths €m	143	91	234

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.

SAPS Results

- 3.6 The SAPS investigation results were expressed as a percentage of a number of standard tables in the report. We have summarised the results on a lives and amounts basis for ILT17 split between males and females in the following tables including and excluding data provided by the DPER⁴. It should be noted that the originally published SAPs report does not include the comparison between the SAPs amounts experience and ILT 17 which is a “lives” table. Nevertheless, this was done as part of the SAPs work, from the same data and using the same methodology and the results are equally valid. A supplement to the SAPS report is also being published at the same time at this paper which contains further details.

⁴ The SAPS study presented results including and excluding data from the DPER. Tables excluding DPER data can be considered to represent the mortality experience of the private sector (including the commercial state companies)

Age Band	Including DPER data		Excluding DPER data	
	Male Lives	Female Lives	Male Lives	Female Lives
Under 60	193.2%	278.7%	177.8%	175.1%
60-69	87.4%	85.5%	91.1%	92.5%
70-79	84.9%	79.1%	91.6%	90.4%
80-89	86.0%	84.0%	86.7%	88.7%
90+	102.3%	96.3%	99.0%	95.5%
All ages	89.6%	90.2%	91.2%	92.2%

Age Band	Including DPER data		Excluding DPER data	
	Male Amounts	Female Amounts	Male Amounts	Female Amounts
Under 60	150.1%	268.8%	116.4%	176.7%
60-69	69.4%	80.9%	67.0%	91.5%
70-79	67.4%	69.8%	71.5%	78.7%
80-89	78.1%	78.0%	83.5%	81.2%
90+	100.4%	96.5%	101.1%	97.3%
All ages	76.4%	85.3%	78.6%	87.7%

- 3.7 It is noticeable that pensioners aged below 60 exhibit very high mortality compared to standard tables. Those who the submitting sources knew were ill-health retirements were excluded but it seems probable that there was some impact from people in ill-health taking early retirement. The effect is large expressed as a percentage but less in the aggregate.
- 3.8 ILT17 is representative of mortality experience in Ireland in 2016 as it uses the 2015, 2016 and 2017 estimates and census of population and deaths recorded in the three years. As the central year in this base table closely coincides with the midpoint of the SAPS experience no allowance for improvements over the intervening period was necessary.

4. Approach to derive recommended Transfer Value mortality assumptions

- 4.1 With insufficient data to produce a bespoke mortality table for the purpose, it is necessary to use the measured Irish SAPs experience to adjust a standard table. It is also necessary to use a standard table that is freely available to Irish practitioners. In practice this means a population mortality table and therefore the most recent Irish population table (ILT17⁵) is the obvious choice.

Lives or Amounts

- 4.2 Amounts experience shows lower mortality than Lives experience. This is due to a correlation between pension amount and level of mortality. Allowing for this correlation in the transfer value basis by having a table that changed with quantum of pension is not viable as we do not have sufficient data to create a credible table and implementing it might prove onerous.
- 4.3 The Committee's rationale for recommending a 'lives' basis (rather than 'amounts') continues to reflect the fact that the standard transfer value basis is a minimum, and is applied to all pensioners, regardless of income level. A Lives basis will result in lower transfer values on average compared to an Amounts basis. Pension schemes are free to (and empirical evidence suggests that some do) use a scheme specific basis which results in higher transfer values. 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.
- 4.4 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.

Gender

- 4.5 In the SAPs study the analysis was subdivided into the genders of males and females. In this respect no attempt was made to ascertain the definition used by data providers but the classification used was accepted. We do not believe that any distortion to results from use of potentially inconsistent definitions of genders would be significant.
- 4.6 The experience expressed as a percentage of ILT17 is very similar for Male and Female Lives, (89.6% and 90.2%). However, for amounts experience the difference is more marked (76.4% and 85.3%). The Committee recommends the use of a 'lives' basis for minimum transfer values and as such the difference between Male and Female SAPs experience is not material. A multiple of 90% of the ILT17 tables is being recommended for both genders.
- 4.7 No attempt was made to collect or analyse data for any person identifying as non-binary. It is unlikely there would be sufficient data to perform valid analysis for such. In choosing transfer values for anybody identifying as such, actuaries are recommended to use professional judgment.

⁵ <https://www.cso.ie/en/releasesandpublications/er/ilt/irishlifetablesno172015-2017/>

Standard Table

- 4.8 The volume of data in the SAPS study is not sufficient to permit a graduated table to be produced. Therefore, it is necessary to use a standard table and apply an adjustment factor. The table recommended for this purpose is ILT 17. This table has the major advantage that it is publicly available, it is based on Irish data and its methods of projecting future changes are straightforward. This latter issue is discussed in considerable detail in the Paper “Review of best estimate mortality projection methods”.

5. Pre-Retirement mortality

- 5.1 As described above, the Committee considered ILT17 as the appropriate standard table to use.
- 5.2 In addition to considering changes to the post-retirement mortality assumption it is necessary to consider the assumed rates of mortality specified in Statutory Guidance applying in the pre-retirement phase.
- 5.3 In the absence of a specific 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 (value) will be paid out on the death of a member, and therefore the financial impact on the scheme from pre-retirement deaths is neutral.
- 5.4 The previous recommendation was to use 73% (males) and 77% (females) of ILT 15. The reason being given as:
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).
- 5.5 Given that the post-retirement recommendation is now being based on ILT 17 and with a two-factor improvement assumption, this pre-retirement assumption needs to be changed. In the absence of any evidence to the contrary we propose using the same assumption as for post-retirement mortality.

6. Projected future mortality improvements

6.1 The 2020 SAPS mortality investigation examined the implied mortality improvement rates for SAPS data over the period 2012 to 2017. These rates are derived by comparing the Actual / Expected experience (measured against PNL00 tables) from both the 2020 and 2013 studies. Based on the period between exposure midpoints for both studies the implied improvement rates over the period were:

	Males (p.a.)	Females (p.a.)
All ages	2.9%	2.0%
60+	3.1%	2.4%

6.2 It should be noted that these improvement rates are slightly different according to which Standard Mortality Table is used as a reference benchmark. For example, the 60+ male figure is 3.4% p.a. on PNA00, 2.8% on S2PL and 3.3% on S2PA. These differences are due to slightly different weightings and some rounding issues.

6.3 This table shows how mortality has changed in the periods between the mid-points of the three SAPS mortality studies:

Study Published	Study Period		Rate of Improvement between studies (% p.a.)	
	From	To	Males	Females
2008	2003	2006		
			2.2%	2.0%
2013	2006	2012		
			2.9%	2.0%
2020	2012	2017		

6.4 These rates of improvement differ somewhat to the expected rates of improvement over the same period which were embedded in the previous recommended TV mortality assumptions.

6.5 In the report “Review of best estimate mortality projection methods” the Committee considered the most appropriate projection option for modelling the mortality improvements for the Statutory Guidance to be in line with the method used by the CSO in its 2018 population and labour force projections. The assumption in this is that improvements will be initially at the rate of 2.5% males and 2.0% for females but falling to a long-term rate of 1.5% p.a.

7. COVID

- 7.1 The SAPs study was completed before the arrival of COVID. As this paper is recommending a mortality basis for future use it is germane to consider what the effect of COVID might be in future years.
- 7.2 It is of course impossible to know what the impact on longer term mortality will be but we can identify some factors that might have an impact:
- It is possible that COVID may become like Flu where it becomes a disease that continually mutates and needs annual vaccine programs to minimise deaths but that previous vaccinations do ameliorate both spread and morbidity
 - On the other hand, it may be that the extraordinary high profile that it has may encourage higher uptake rates of all vaccines in the future
 - In the shorter term some frailer people have died so there might be a short-term depression to mortality among these groups
 - Equally some people may be frailer, having survived COVID but not unscathed
 - Greater awareness of the need to keep healthy may lead to healthier members and therefore longer life expectancies
 - The financial cost of COVID still remains to be paid and that will leave less money for other causes.
 - If commuting diminishes there might be better air quality.

Overall, it is simply impossible to draw conclusions. Without clarity on even the direction of impact post COVID it seems sensible to base calculations on pre-COVID mortality.

8. Recommended Transfer Value mortality assumptions

8.1 The conclusions of previous sections are:

- It is appropriate to revisit the transfer value mortality assumptions because
 - The current assumptions are based upon experience data that is stale and there is more recent data available
 - We believe that adjusting for projected future changes using a single factor rather than using a 2-dimensional table is inappropriate (see paragraph 1.4)
- The most appropriate standard table to use as a foundation for the transfer value basis is ILT 17 (see paragraph 4.8)
- This table should be adjusted for experience as measured by the SAPS study (see Section 3)
- Such adjustment should be the lives experience (90% of ILT17 (Males & Females), this being applied as at 2016 (see paragraph 4.6)
- Future projected changes should be accounted for by explicit projections of improvements and not by an adjustment factor (see paragraph 1.4)
- The rate of future mortality improvements should be assumed to be in line with that adopted by the CSO in its 2018 population and labour force projections (see section 6)
- No account should be taken of the effects of COVID 19 (see section 7)

8.2 The tables below show a comparison of projected life expectancies and transfer values at age 65, using the proposed basis in paragraph 8.1 above and the current TV mortality assumptions.

Life Expectancies					
	Males			Females	
	Current Basis	Proposed Basis		Current Basis	Proposed Basis
2022	21.93	22.19		24.31	24.37
2032	23.12	23.41		25.34	25.38
2042	24.20	24.50		26.30	26.32
2062	26.20	26.52		28.02	28.01

Transfer Values (life annuity rate at net interest rate 1%)					
	Males			Females	
	Current Basis	Proposed Basis		Current Basis	Proposed Basis
2022	19.33	19.56		21.26	21.32
2032	20.29	20.53		22.08	22.12
2042	21.15	21.39		22.82	22.85
2062	22.73	22.98		24.17	24.17

9. Appendix: Summary of Proposed and Current TV Mortality Assumptions

The table below compares the mortality assumptions underlying the proposed and current bases.

Table: Comparison of underlying mortality assumptions for proposed and current transfer value basis

	Current (non-proxy)	Proposed
Base table	ILT15 population mortality 2005-2007 centred around 2006	ILT17 population mortality 2015-2017 centred around 2016
Male mortality rate	88% ILT15 (Males)	90% ILT17 (Males)
Female mortality rate	91% ILT15 (Females)	90% ILT17 (Females)
Future mortality improvements	2013 CSO Labour Force Projections 2016-2046	2018 CSO Labour Force Projections 2017-2051
Initial rate of annual mortality improvement assumed by CSO for males	3.0% (in 2010)	2.5% (in 2015 [^])
Initial rate of annual mortality improvement assumed by CSO for females	2.5% (in 2010)	2.0% (in 2015 [^])
First year for improvement	2011	2017
Long-term rate of annual mortality improvement assumed by the CSO (males and females)	1.5% by 2036	1.5% by 2041
Pre-retirement mortality rate (male)*	73% ILT15 (Males)	90% ILT17 (Males)
Pre-retirement mortality rate (female)*	77% ILT15 (Females)	90% ILT17 (Females)

[^] 90% of ILT17 applies in 2016. This is reduced by 2.42% improvements in 2017, 2.38% in 2018 and so on, in line with the linear extrapolation of improvement factors under the CSO approach.

* The current pre-retirement basis reflects the proxy approach. The proposed basis explicitly models future improvements under a two-dimensional approach.



Society of Actuaries in Ireland, Pembroke House, 28 - 32 Pembroke Street Upper, Dublin, D02 NT28

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

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