



## **Continuous Mortality Investigation**

Institute and Faculty of Actuaries

# **CILA 2018: CMI Update**

**Matthew Edwards**

Deputy Chair of the CMI Executive Committee

# CMI

## CMI

- Wholly owned by Institute and Faculty of Actuaries
- Independent executive and management

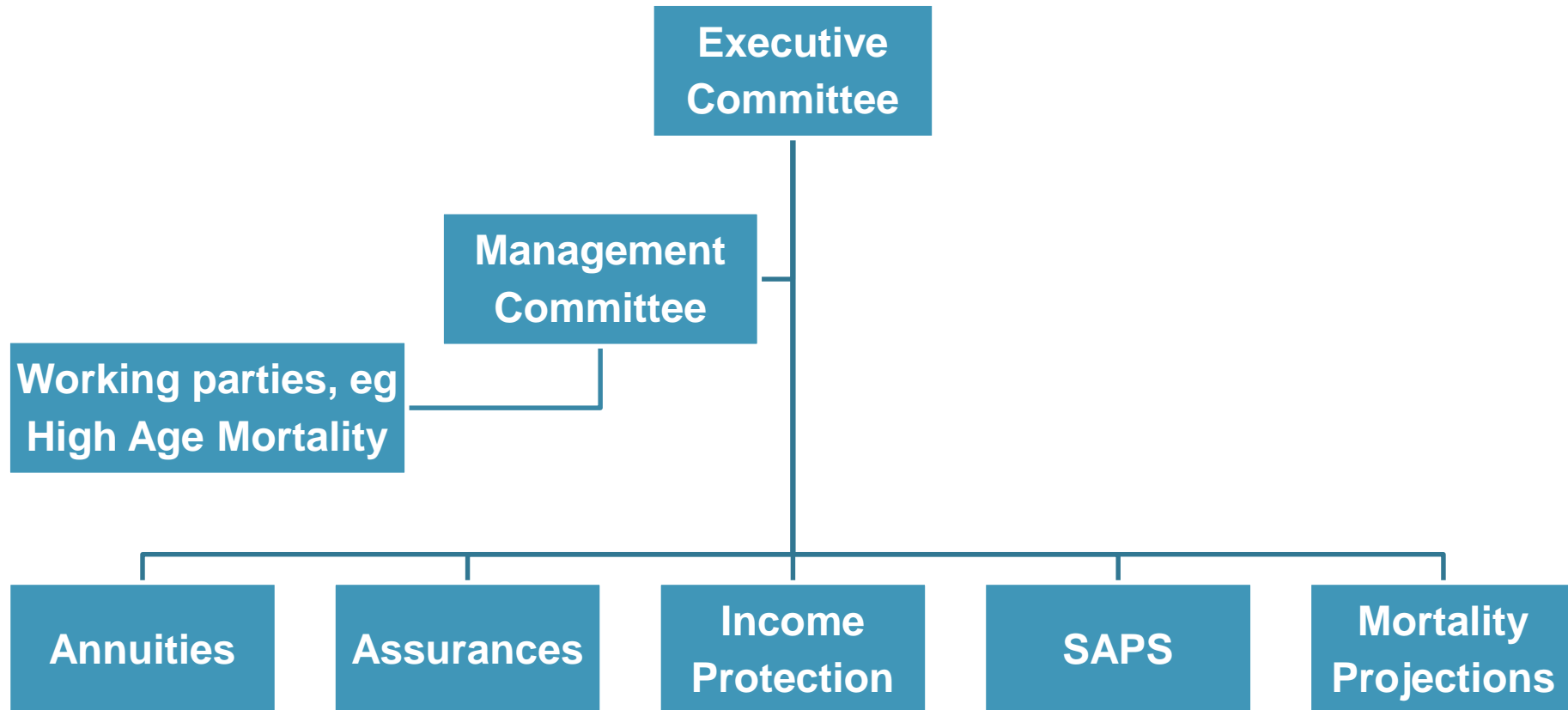
Funded by subscription but free for academics and non-commercial research

## Mission

*To produce high-quality impartial analysis, standard tables and models of mortality and morbidity for long-term insurance products and pension scheme liabilities on behalf of subscribers and, in doing so, to further actuarial understanding.*

Our vision is to be regarded across the world as setting the benchmark for the quality, depth and breadth of analysis of industry-wide insurance company and pension scheme experience studies

# CMI structure

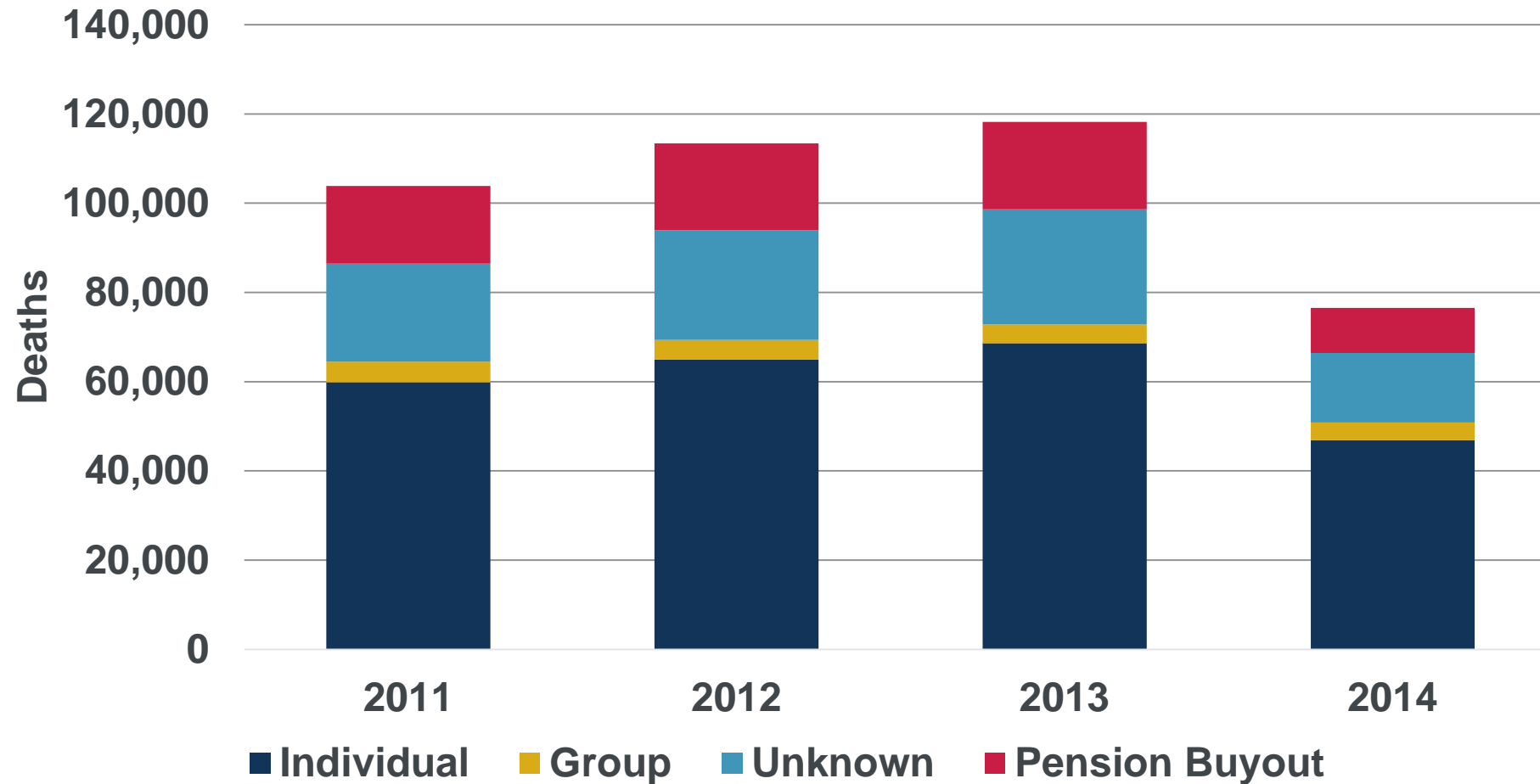


# **Annuities Committee update**

# Annuities Committee activity

Date	Activity
October 2013	Experience report for 2007-2010 (WP70)
April 2015	Proposed “08” Series annuitant mortality tables released for consultation (WP78)
June 2015	Final “08” Series annuitant mortality tables released (WP81)
December 2015	Experience report for Enhanced Annuities in 2007-2010 (WP87)
July 2017	Experience report for 2011-2014 (WP101)
October 2017	Results of survey of data contributors
June 2018	Working paper on further analysis of 2011-2014 data
31 July 2018	Target date for data submissions to 2017
December 2018	Experience report for 2011-2017

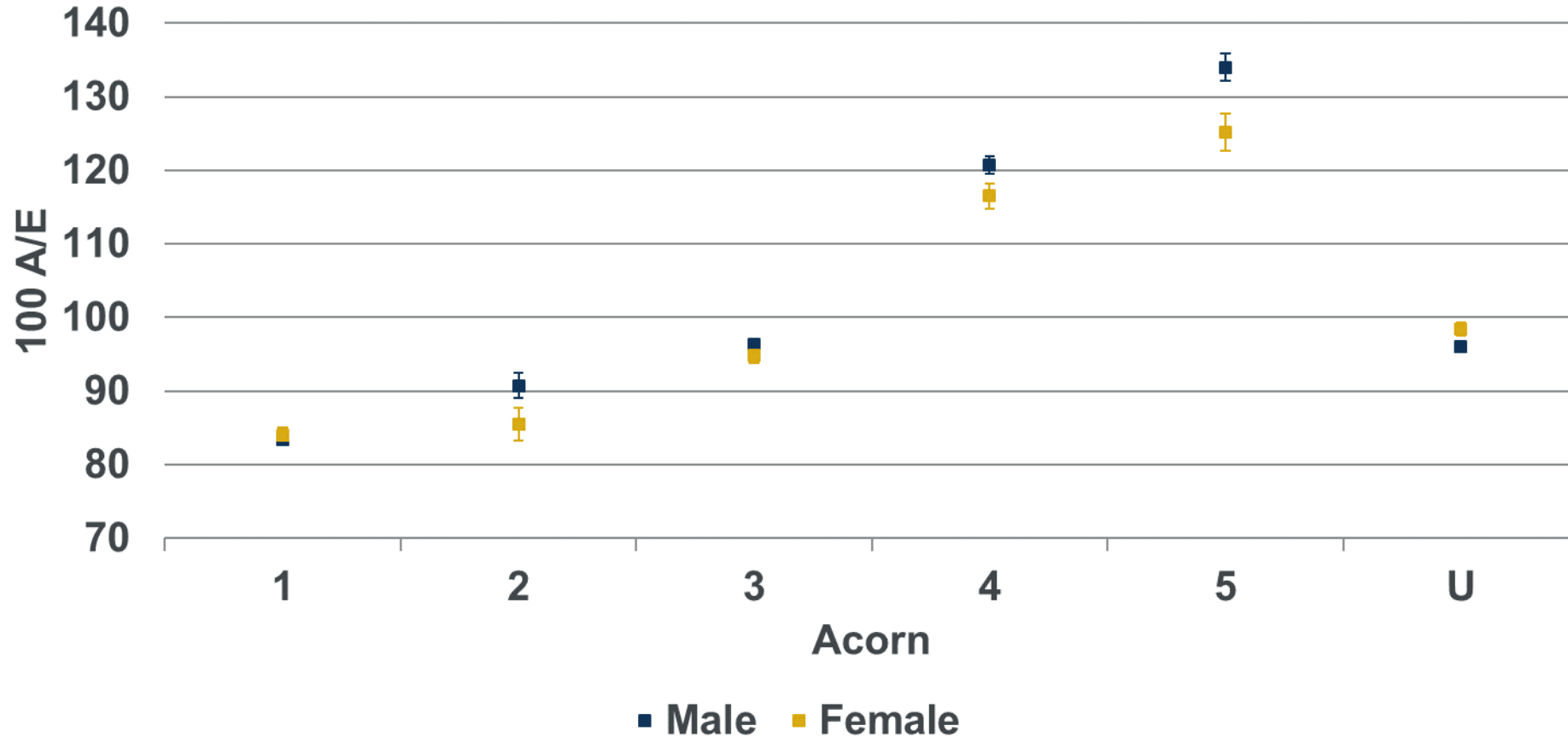
# Data volumes: Pension annuities in payment by calendar year (2011-2014)



# Further analysis of pension annuities in payment (2011-4)

- Two sub-groups of Annuities are currently analysing the current dataset:
  - Graduations
    - Graduated tables for “all products” would be similar to “08” Series (with improvements)
    - However graduations by product type would be quite different
    - Current intention is to release indicative graduations by product type...
    - ... but not to produce formal tables until after this year’s data submissions
  - GLMs
    - Investigating experience in 2007-2014 by a number of variables – including office, product, amount band and socio-economic indicator

# Analysis of 2011-2014 data – indicative results by socio-economic type



Expected calculated using PML08/PFL08 without improvements

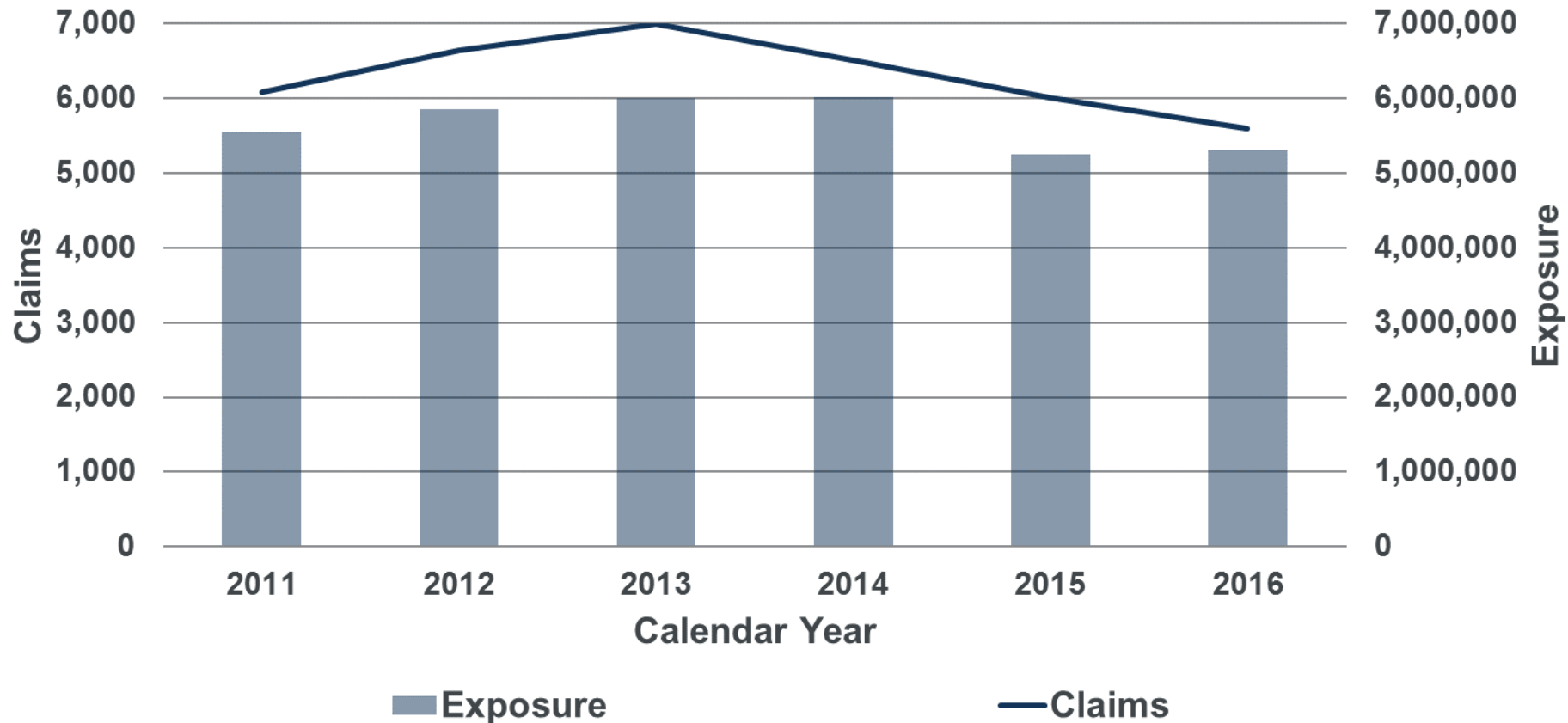


# Assurances Committee update

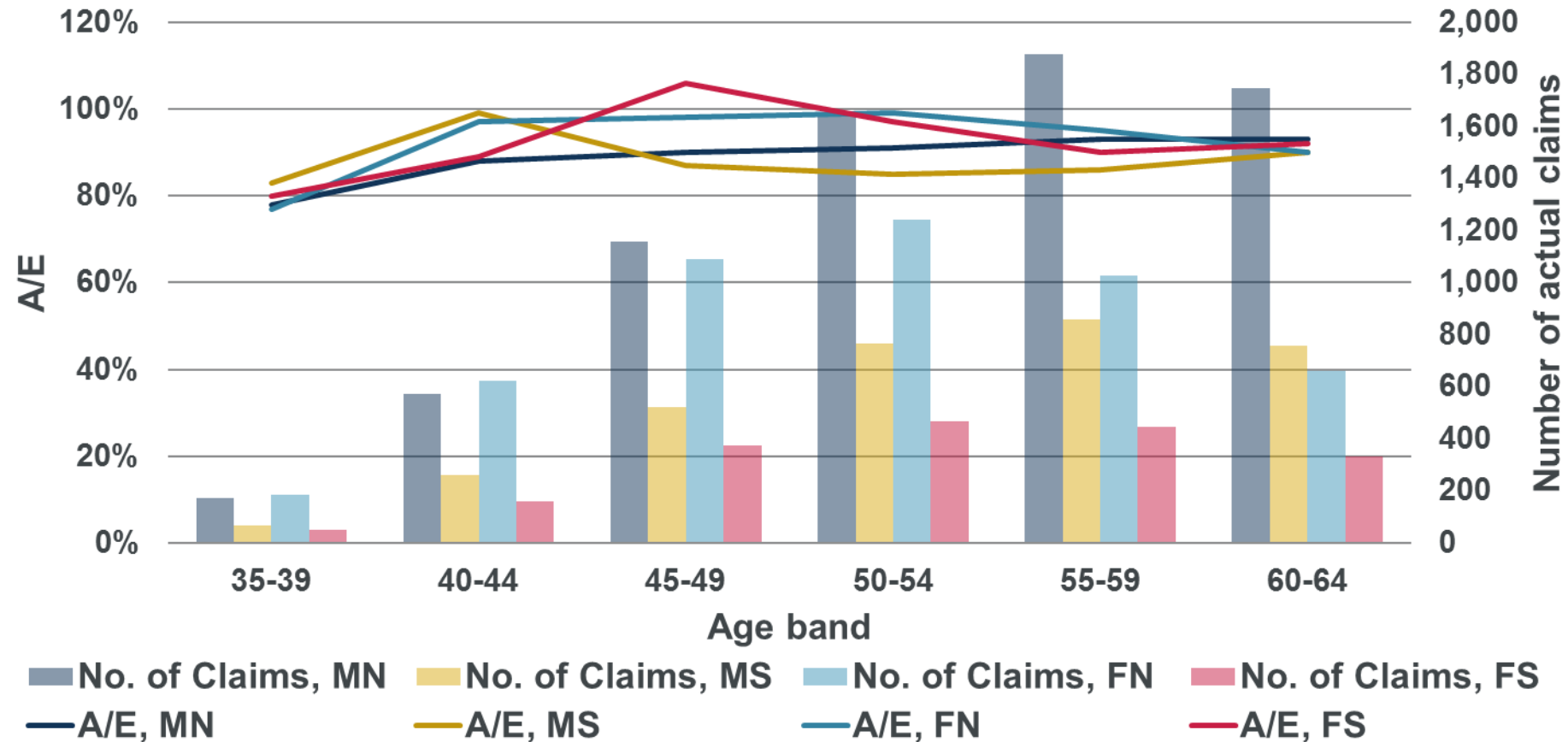
# Assurances Committee activity

Date	Activity
December 2014	Experience report for 2007-2010 (WP75)
May 2016	Proposed “08” Series accelerated critical illness tables released for consultation (WP89)
October 2016	Proposed “08” Series term assurance mortality tables released for consultation (WP92)
January 2017	Final “08” Series accelerated critical illness and term mortality tables released (WP94)
October 2017 – April 2018	Processing data submissions for 2011-2016
May 2018	Experience report for 2011-2015 and survey on future data collection / analyses
July 2018	“Guidance” on using the CMI Model for term assurances
30 Sept 2018	Target date for data submissions to 2017
Feb 2019	Experience report for 2011-2017

# Data volumes: Mortality term assurances by calendar year (2011-2016)



# Mortality term assurances – draft experience 2011-2015



Durations 5+ only

Expected calculated using TMNL08/TFNL08 without improvements

# **Income Protection Committee update**

# Income Protection Committee activity

Date	Activity
July 2010	IPM 1991-98 graduations finalised (WP48)
February 2012	Experience report for 2003-2006 (WP60) Summary statement of revised methodology (WP59)
April 2014	IP Rate Table Tool released to help practitioners make use of published graduations
April 2014	Report and database of experience by cause of sickness, 1991-2009 (WP72)
March 2017	Experience report for 2007-2010 (WP96)
August 2017	Report on 2003-2010 experience by benefit amount and policy duration (WP102)
May/June 2018	Target date for last submissions of 2011-2016 data
June 2018	New inceptions graduations expected to be released for consultation
August 2018	Target date for 2011-16 experience report (dependent on data!)
2019	New terminations graduations expected to be released for consultation

# Experience by benefit amount & policy duration (WP102)

## Benefit amounts

### Inceptions

- Males: lighter experience for larger amounts
- Females: little impact

### Recoveries

- Evidence of higher recovery rates for smaller amounts

## Policy duration

### Inceptions

- Select effect ~50% for males & females (OC1; less clear for OCs2-4)
- Effect lasts up to five years

### Recoveries

- Mixed/little impact

*Note: not all data subsets exhibit the above features*

# Graduation of 2003-2010 experience: motivation

- IPM 1991-98 inceptions graduations released in July 2010 (WPs46-48)
  - Out of date
  - Covered males, OC1 only: limitation

- Inceptions experience has rapidly improved; e.g. 2007-2010:

DP1	DP4	DP13	DP26	DP52
66%	53%	52%	55%	54%

- Recoveries experience less different (esp. short DPs) so less pressing; e.g. 2007-2010:

DP1	DP4	DP13	DP26	DP52
103%	101%	107%	127%	172%



# Sickness rates or claim rates?

## Sickness rates

- Traditional approach (used in IPM 1991-98)
- Combined with termination rates to derive claim rates

## Claim rates

- Used by practitioners
- Do not require termination rates

We have chosen to graduate **claim rates**:

- Minor modification to exposure methodology, no longer allowing for sicknesses that do not become claims
- Age still defined at date of sickness

# Life insurer data collection

# Life insurer data collection

- We are keen to improve the flow of data into CMI so that we can return to regular reporting for primary products
- We have provisionally agreed the high-level data prioritisation shown below:

	Status of 2007-2010 data	Status of 2011-14 data	Target date for next data
Annuities	Issued and graduated	Results issued	31 July 2018 for data to 2017
Assurances	Issued and graduated	Results schedule to be issued this month	30 Sept 2018 for data to 2017
IP	Issued; graduations underway	Material gaps in the data	30 June 2018 for data to 2016

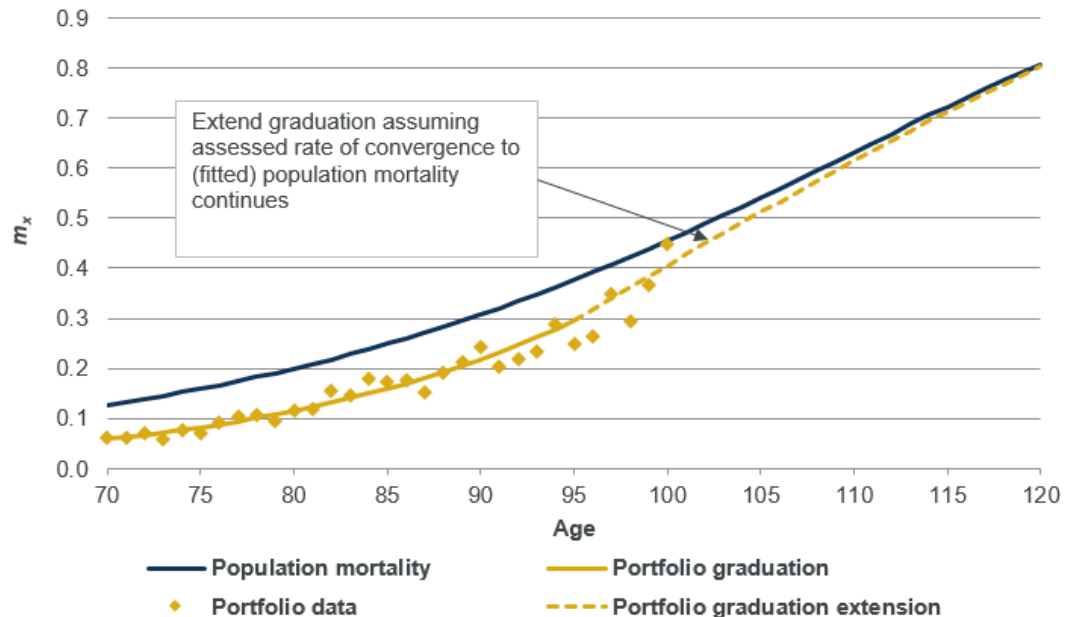
# High Age Mortality Working Party update

# Working Paper 100 (June 2017)

- Shape of mortality at high ages
  - On balance, evidence supports old-age deceleration (not Gompertz)
  - Assumption of  $\mu_{120} = 1$  is justified
- High-age extensions of graduated tables
  - New method proposed – convergence to national population mortality
  - Illustrative examples published for SAPS S2 and Annuities 08 Series
- Exposure modelling for England & Wales
  - ONS currently applies Kannisto-Thatcher method from age 90
  - HAMWP proposes implementation of K-T method at a younger age of 85
  - Further refinements include: explicit allowance for mortality trend and addressing abnormal cohort exposures.
  - Reduces life expectancy at 95 by 2% for males, and 1% for females
- Next steps – discussing use for future CMI tables

# High-age extensions

- The CMI published analysis of mortality at high ages in Working Paper 100
- Includes a new method for extending tables to high ages, where data is unreliable – mortality rates converge to national population rates as age increases
- HAMWP are refining their approach – “S3” likely to use this



# **Mortality Projections Committee update**

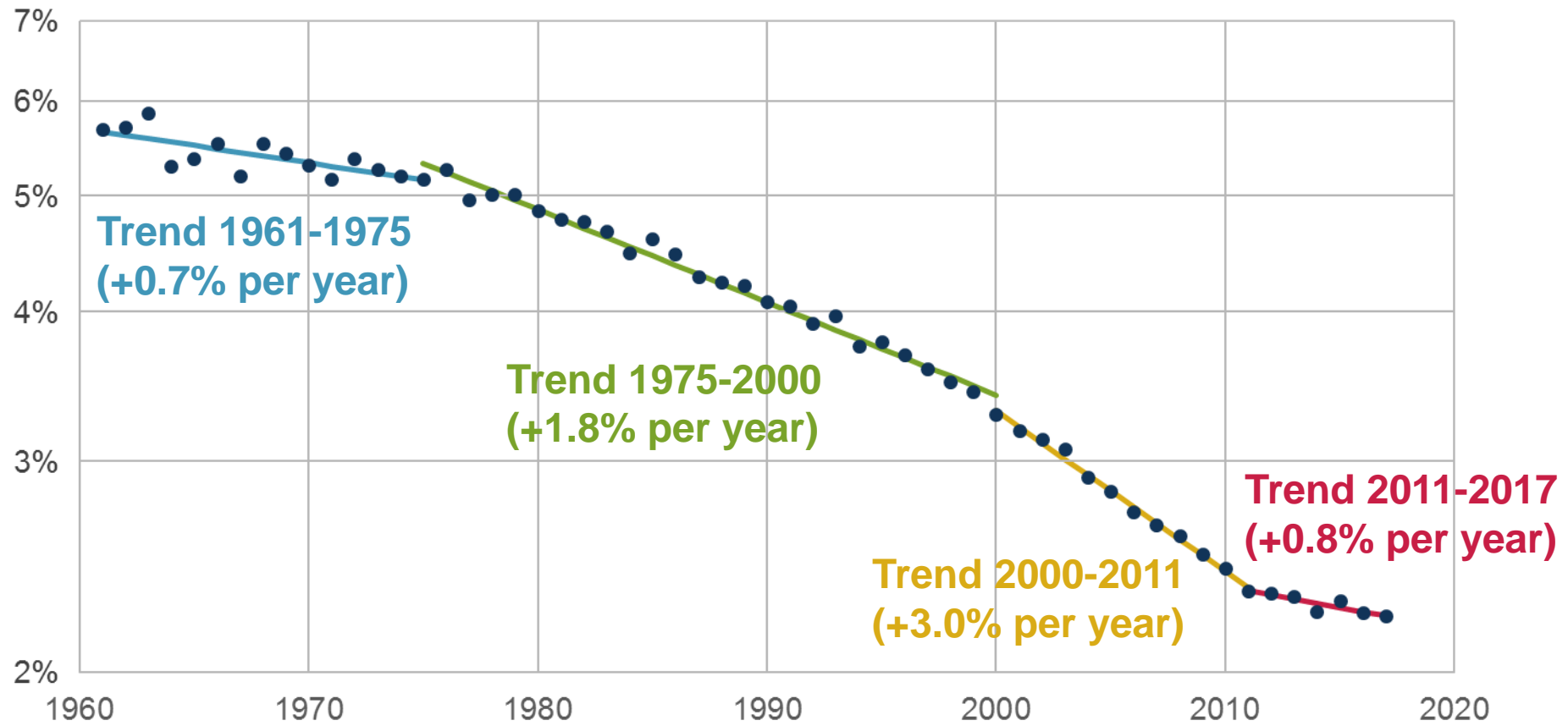
# CMI Model versions

- CMI\_2009 to CMI\_2015
  - Annual updates to data; and some tweaks to method
- CMI\_2016
  - Larger changes in method, although same principle
  - Addition of period smoothing parameter to control responsiveness
  - Change in tapering (at high ages) and definition of long-term rate
  - Overhaul of software – faster, simpler, more transparent
- **CMI\_2017 (published on 1 March 2018)**
  - **“Business as usual” update – Working paper 105**
- CMI\_2018 (due by end of March 2019)
  - May refine high age (85+) exposure data (c.f. Working Paper 100)



# Male standardised mortality ratio (SMR)

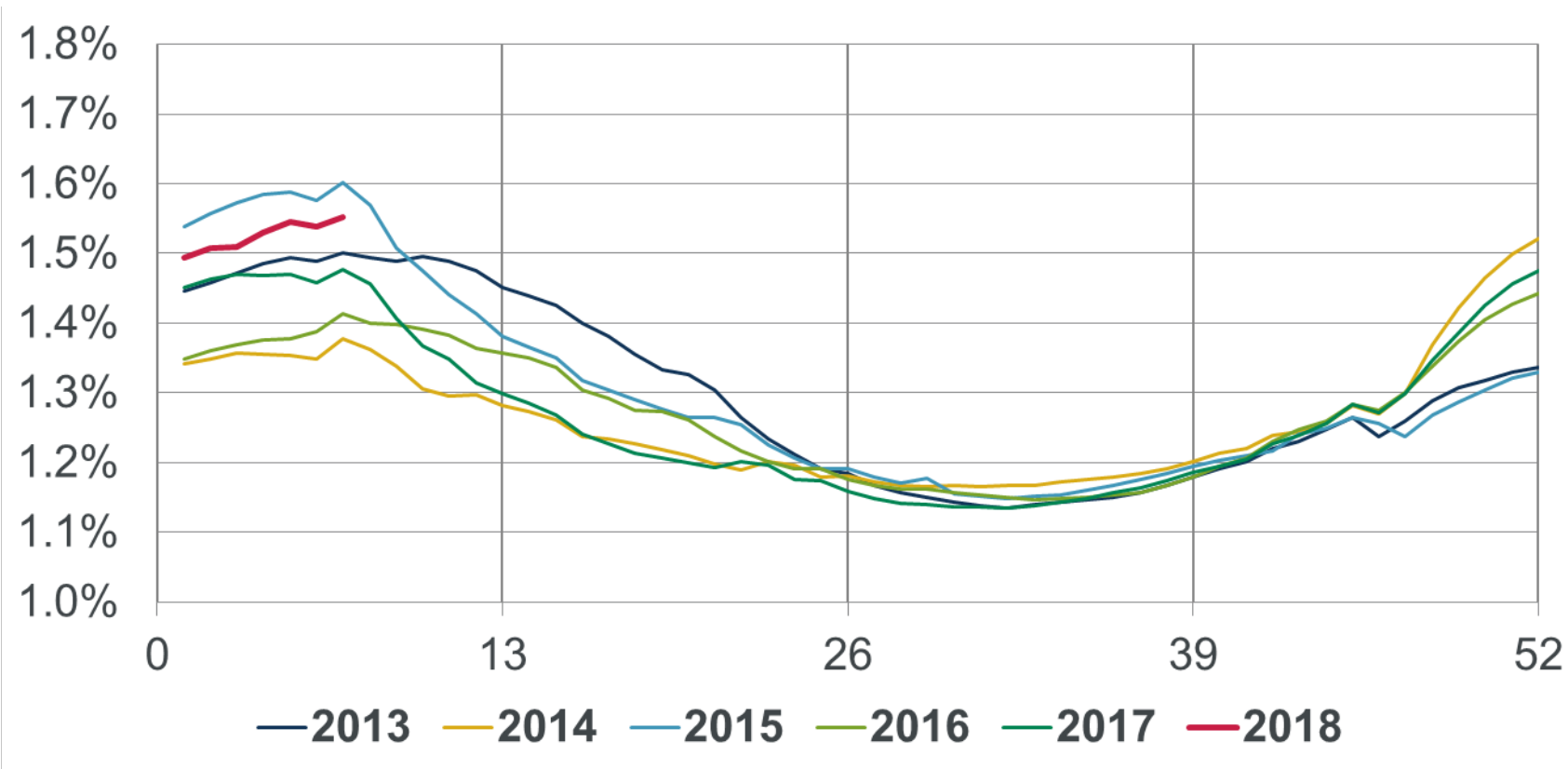
Male SMR (log scale) for England & Wales ages 50 to 89



Source: CMI calculations. Standard population is European Standard Population 2013. Trend is  $\Delta \log \mu$ .

# Quarterly mortality update (provisional)

## Quarterly moving average of Standardised Mortality Rate (England & Wales)



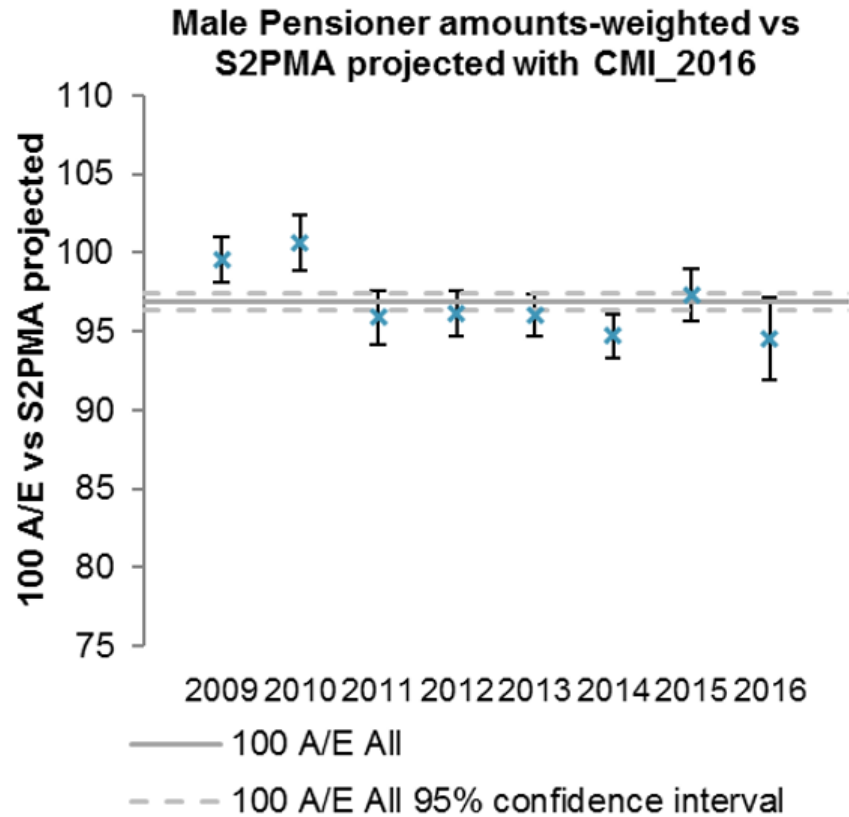
# **SAPS Committee update**

# SAPS Committee activity

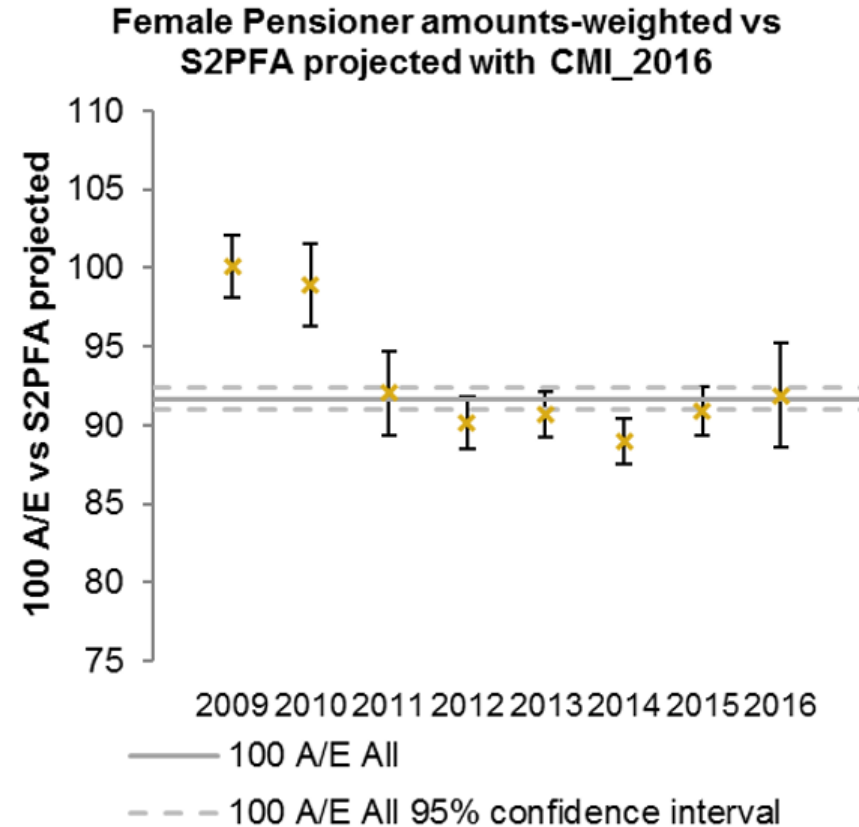
Date	Activity
November 2015	Investigation into mortality experience by industry classification of SAPS pensioners for the period 2006-2013 (WP86)
February 2016	Mortality experience of SAPS pensioners for the period 2007-2014 (WP88)
February 2017	Mortality experience of SAPS pensioners for the period 2008-2015 (WP95)
30 June 2017	Deadline for data submissions to be included in “S3” Series dataset
January 2018	Mortality experience of SAPS pensioners for the period 2009-2016 (WP104)
May 2018	Proposed “S3” Series mortality tables expected to be released for consultation
30 June 2018	Deadline for this year’s data submissions
October 2018	Target date for final “S3” Series mortality tables
January 2019	Target date for mortality experience of SAPS pensioners for the period 2010-2017

# SAPS: latest experience compared to “S2”

## Male

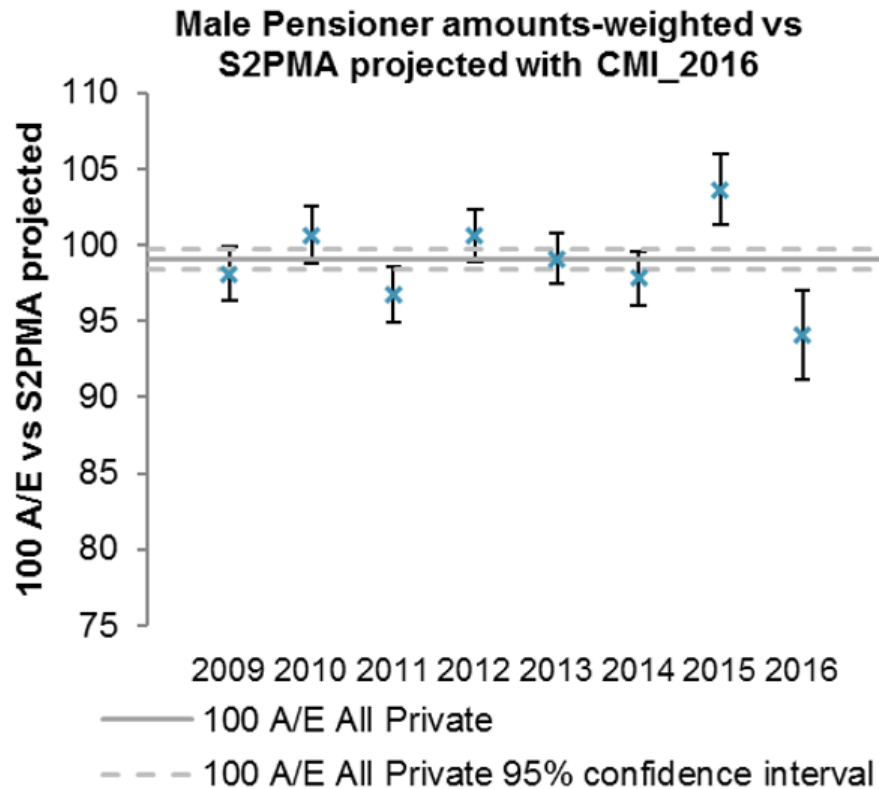


## Female

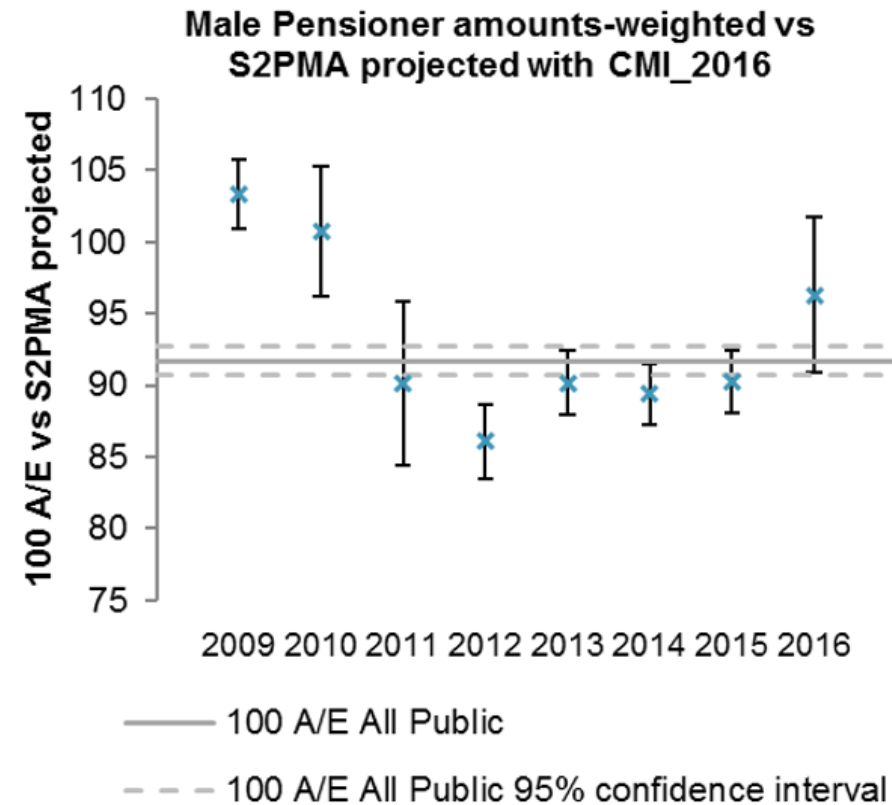


# SAPS: Male experience – public vs private

## Private sector



## Public sector



# SAPS: Public vs private sector

- For the schemes that have been submitted to SAPS, public sector experience is lighter than private sector for each type of member, however:
  - Variation between schemes (split by industry in WP86) is greater than variation between public and private
  - Public sector schemes submitted do not necessarily reflect all public sector experience
- Conclusion:
  - The Committee currently intends to publish combined tables i.e. not splitting these out by sector
  - Prefer to use as much of the data as possible
  - Shape of tables should be appropriate
  - Level of mortality generally reasonably consistent with “S2”
  - Females Light arguably different – but concentrated in public sector
    - Users may find that Heavy / Middle tables are more appropriate shape than All

**And finally...**



# GDPR

- CMI has reviewed all its practices -> minor tweaks, not wholesale revisions!
- We reaffirmed that CMI could justifiably be regarded as a “processor” for Research data
- We have made some changes to the Research data we seek:
  - Date of birth – exact date is not necessary and increases likelihood of a person being identifiable – moving to month and year
  - Similarly date of retirement
  - Large benefit amounts – again could increase the likelihood of a person being identifiable and may be “interesting” – capping these at:
    - Annuities / SAPS – £100,000 pa
    - Assurances – £1,000,000
    - IP – £75,000 pa
  - We are ceasing to collect postcode
- We have issued revised Terms & Conditions (etc) to Subscribers and to Data Contributors

# Socio-economic analysis – IMD measure

- CMI wants to analyse mortality/morbidity by socio-economic status but firms use different models (eg ACORN and MOSAIC) and CMI is reluctant to favour a single commercial provider
- Proposal: collect a data field that data contributors have pre-mapped from postcode to the Index of multiple deprivation (IMD) using a CMI tool:
  - Used by local governments/authorities to target funding at most-deprived areas
  - Based on series of measures: employment and income levels are biggest factors
  - Calculated for geographical areas that contain ~ 1,500 people
  - Unfortunately each nation within the UK has their own index, making comparison difficult
- Proposed approach is to collect two measures:
  - A UK-wide measure based on a method developed by academics (but some concerns, including its applicability to more recent data)
  - A Country- or region-specific measure (splitting England into nine regions)
- Next step is to develop the mapping tool and accompanying documentation

# And finally...

- We do regularly advertise positions on CMI Committee – in newsletters and on the [Volunteer vacancies page on the IFoA website](#)
- Changes to subscriptions for life insurers needed for Solvency II
- “Briefing notes” aimed at NEDs and scheme trustees – first for CMI\_2017 and planned for future key outputs
- Surveys:
  - Past “requests for feedback” have generated limited response
  - Survey of Annuities data contributors provided very useful input
  - “400 Club” also provided wider range of views
  - Assurances Committee will be seeking views on its future work in June
  - A survey of all subscribers is planned for 2018
  - Your feedback is important!!



Questions



Comments

The views expressed in this presentation are those of the presenter.

Please send any questions, views or feedback to  
[info@cmilimited.co.uk](mailto:info@cmilimited.co.uk)



# Continuous Mortality Investigation

Institute and Faculty of Actuaries

Continuous Mortality Investigation Limited  
Registered in England & Wales (Company number: 8373631)  
Registered Office: 7<sup>th</sup> floor, Holborn Gate, 326-330 High Holborn, London, WC1V 7PP

Correspondence address: Cheapside House, 138 Cheapside, London, EC2V 6BW, United Kingdom  
Email: [info@cmilimited.co.uk](mailto:info@cmilimited.co.uk)  
Tel: +44 20 7776 3820

Website: [www.cmilimited.co.uk](http://www.cmilimited.co.uk) (redirects to [www.actuaries.org.uk](http://www.actuaries.org.uk))

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