Institute and Faculty of Actuaries

Update from the UK asbestos working party

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October 2017

Update from the UK asbestos working party

Agenda

- Non-mesothelioma: Estimate
- Mesothelioma: Deaths
- Mesothelioma: Propensity to make a claim
- Mesothelioma: Costs

Everything shown is draft and may change, as we finalise our assumptions and results

The final assumptions, findings and figures will be in the published paper

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Non-mesothelioma estimate

Approach and inflation assumptions

October 2017

Non-mesothelioma estimate
Overview

- Non-mesothelioma diseases include:
  - Lung Cancer
  - Asbestosis
  - Pleural Thickening
  - Pleural Plaques (Scottish & NI exposure only)
- Frequency and severity approach
- Average cost per claim and numbers are including nil claims
  - Lower Lung Cancer average cost
  - Increased notifications of Asbestosis and Pleural Thickening claims

Non-mesothelioma estimate
Key assumptions

Disease types

- Asbestosis and Pleural Thickening combined
  - Definitions of asbestosis and pleural thickening have changed - lead into misusing one for the other
  - Combining the two allows to eliminate this issue

Claim numbers

- Ratio of mesothelioma deaths / claims
- Changing ratio over time to allow for different latency periods

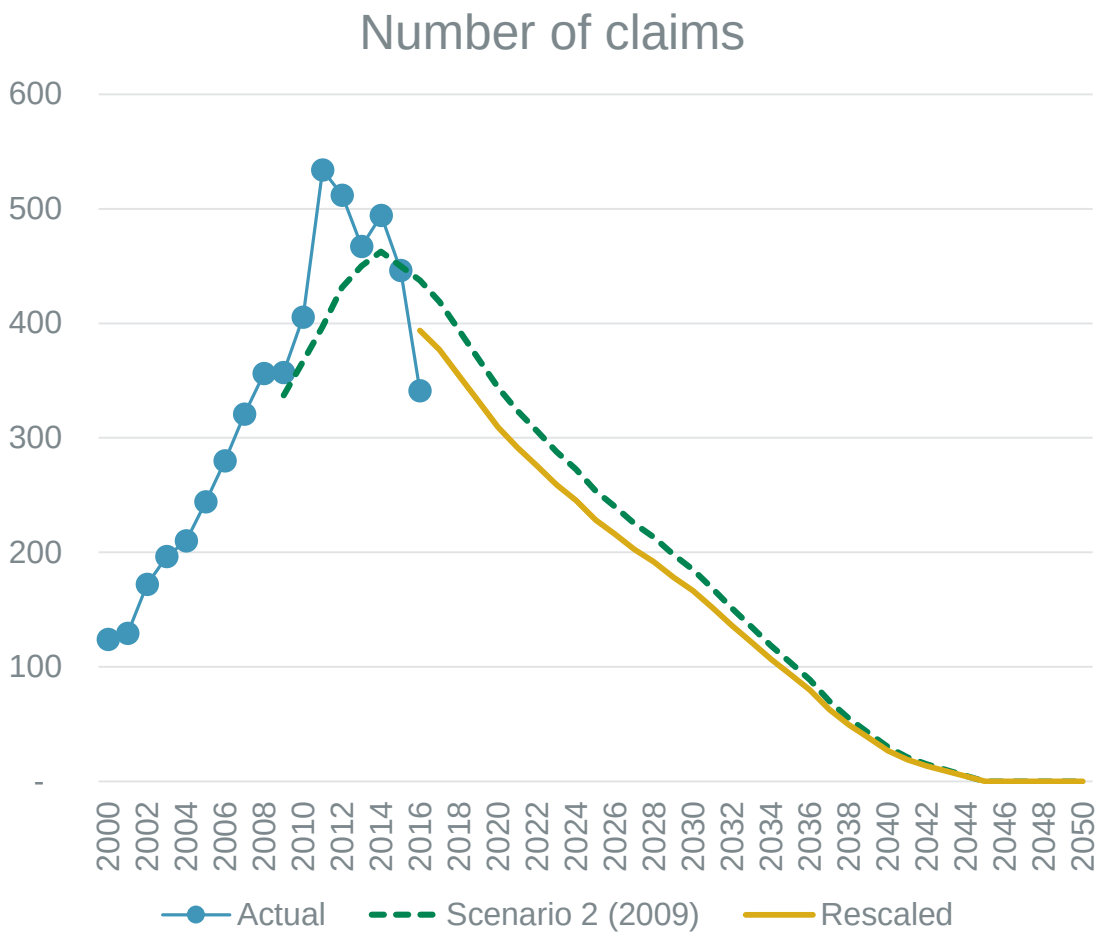
Inflation

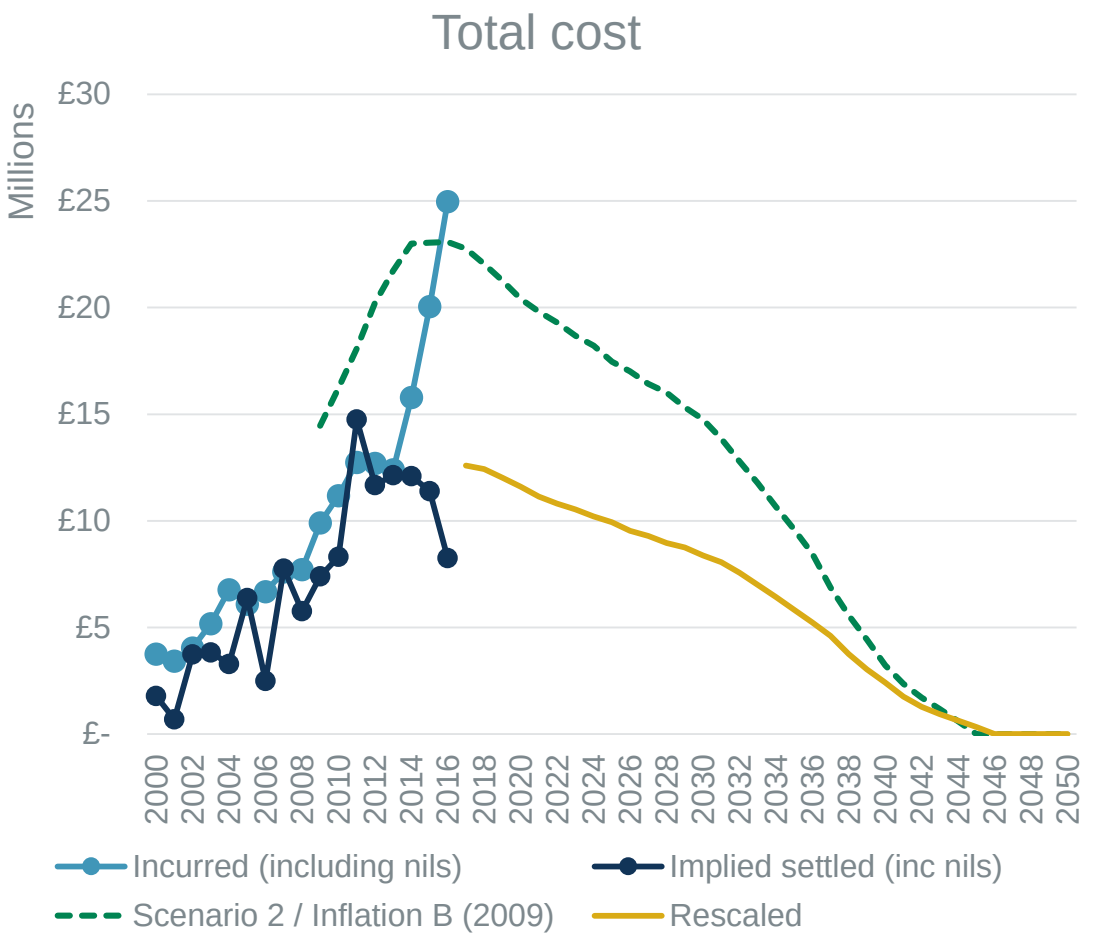
- The same assumptions as in 2009 work
  - 1%, 3% and 5%

ACPC

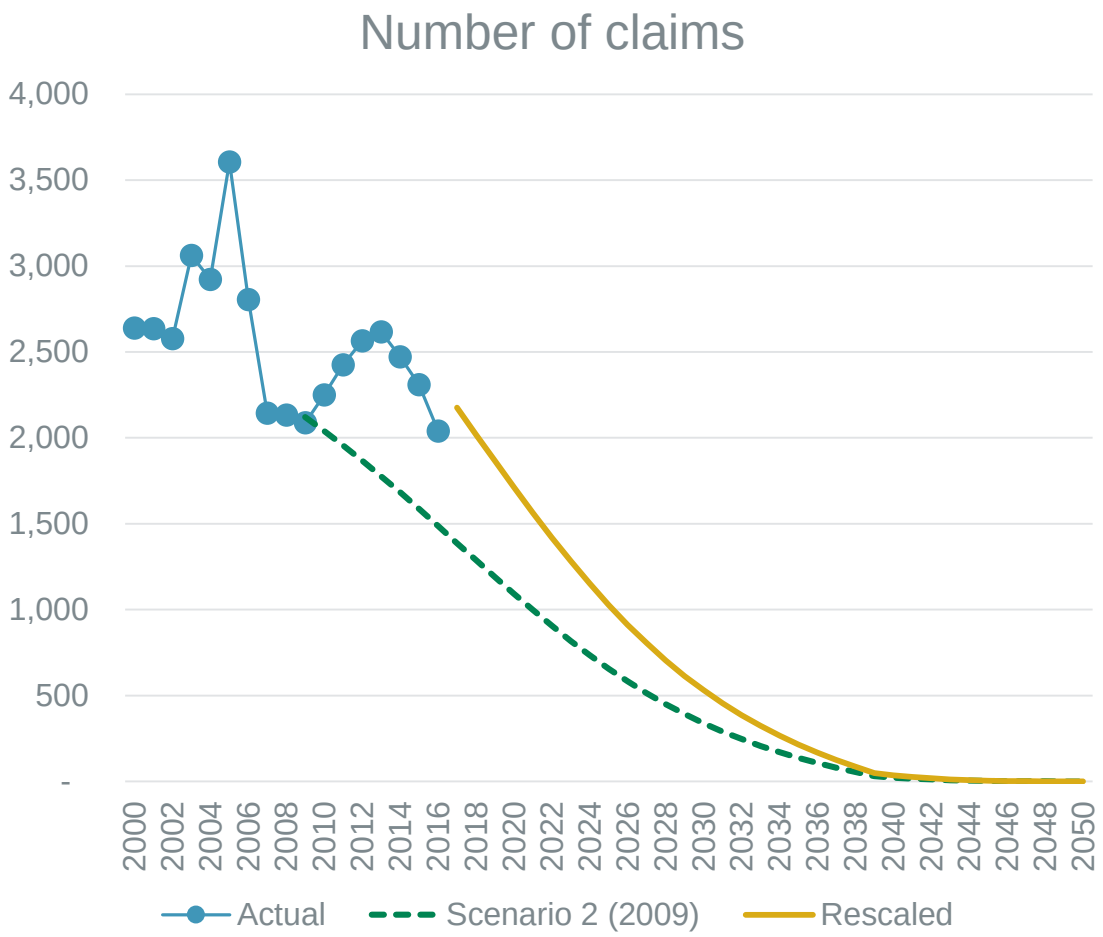
- Based on incurred and settled survey data
- 2009 work - error in the assumptions: used excluding nil average settled cost and including nils average incurred cost
  - Principal reason 2009 Lung Cancer estimates generally higher than actual

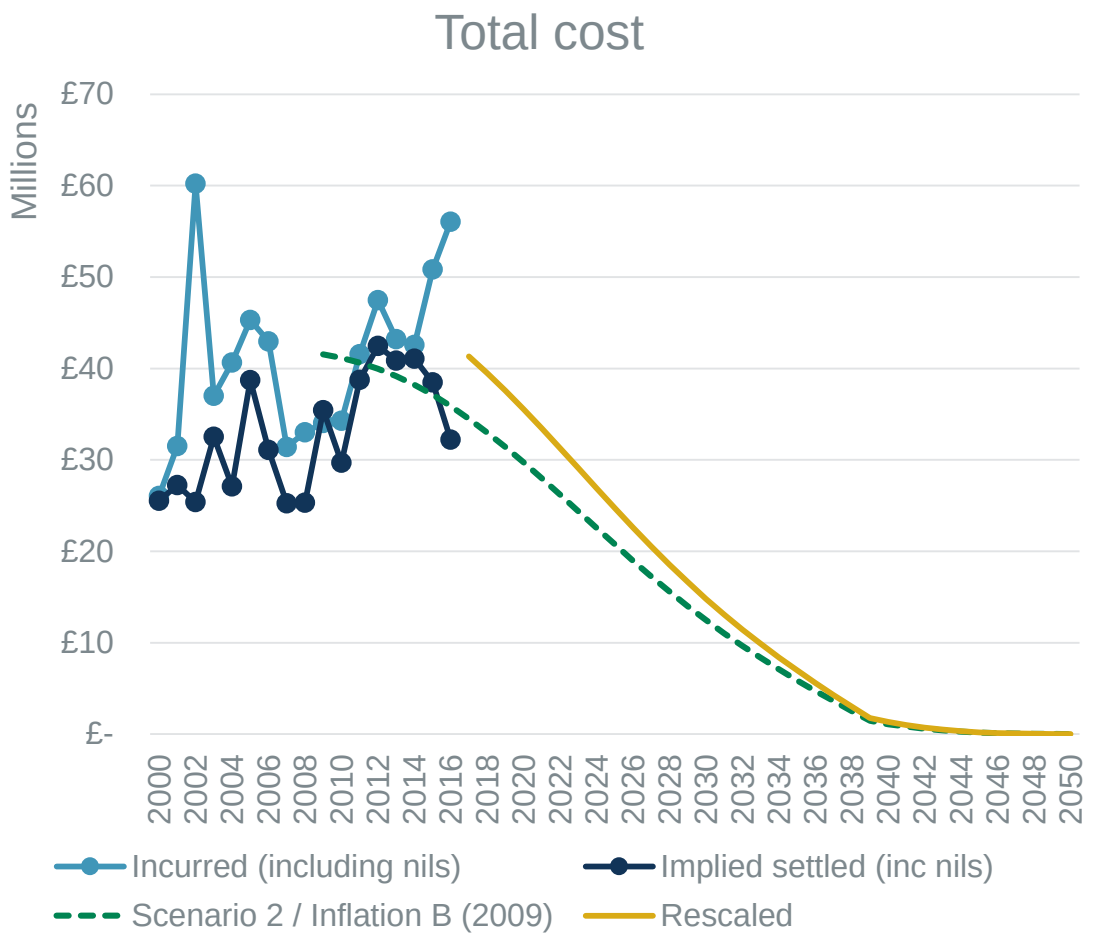
Non-mesothelioma estimate
Lung Cancer





Non-mesothelioma estimate
Asbestosis & Pleural Thickening





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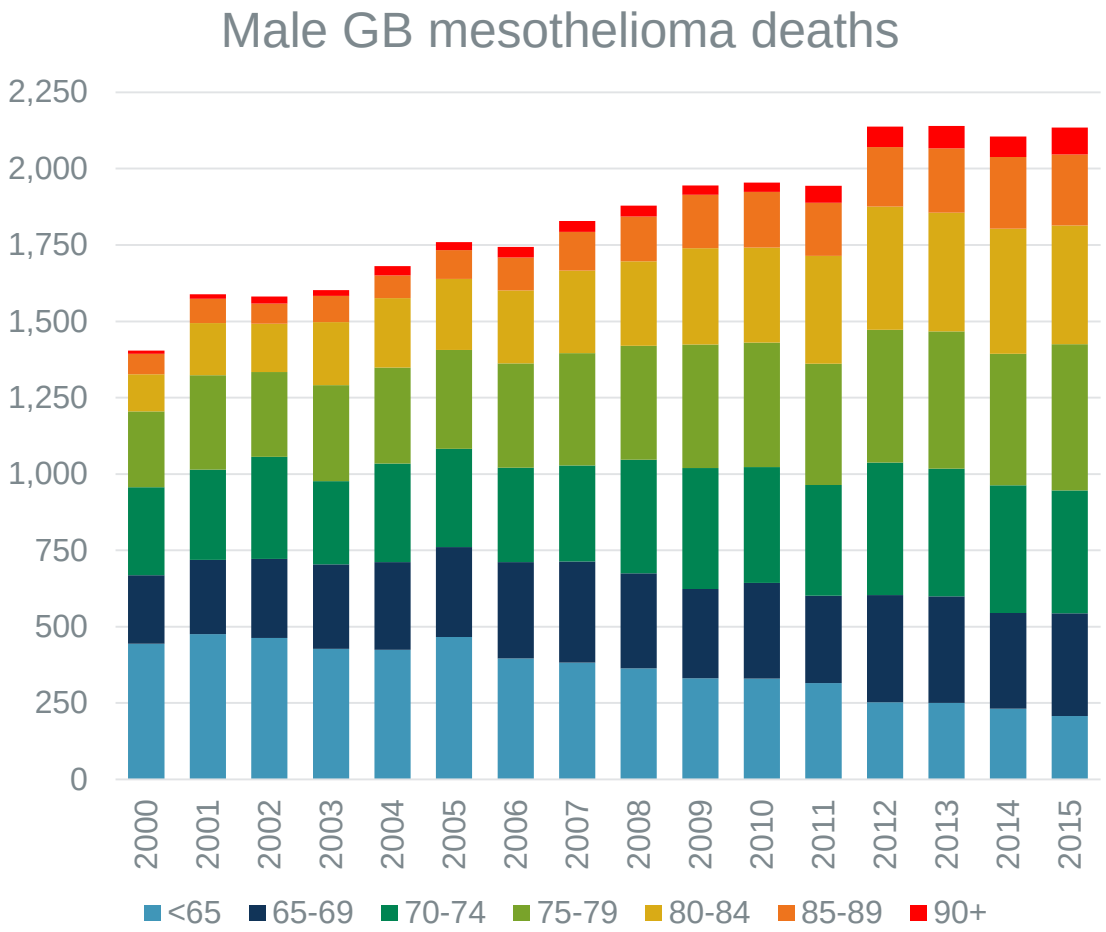
Mesothelioma: Deaths

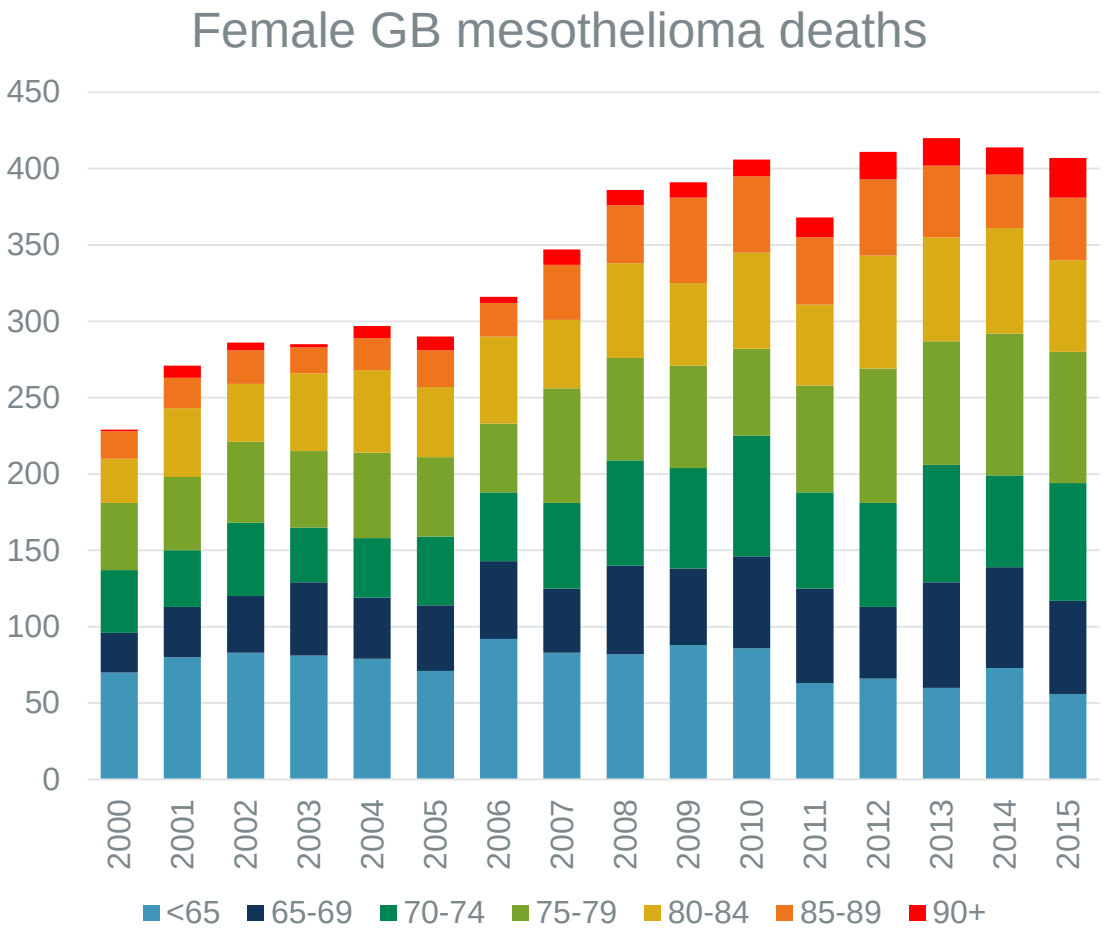
GB male deaths projections

October 2017

Mesothelioma: Deaths

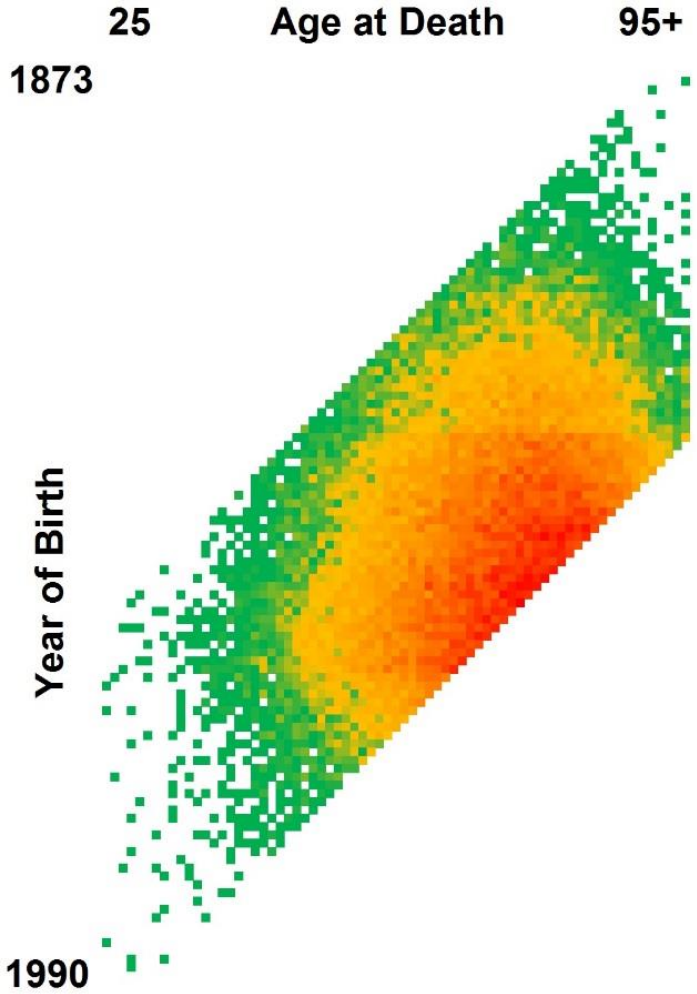
Actual deaths





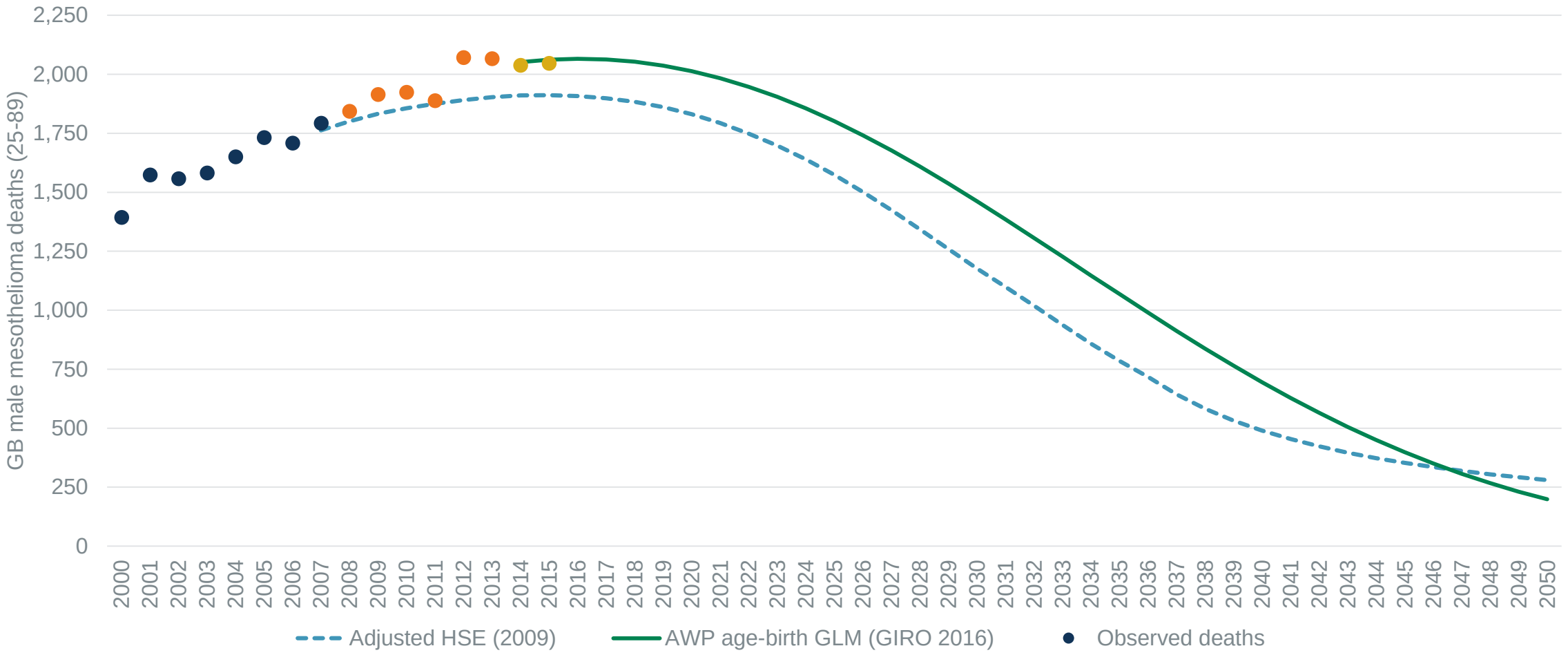
Mesothelioma: Deaths

Male actual deaths



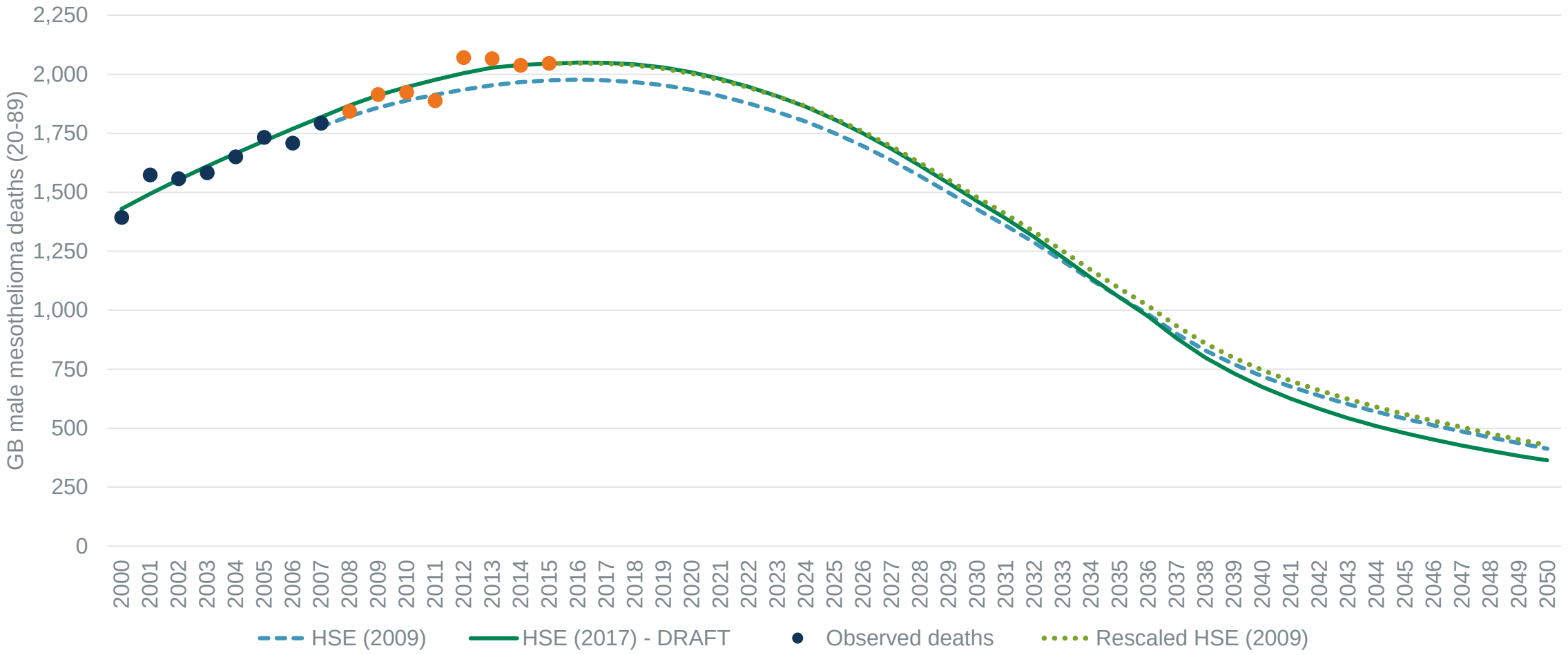
Mesothelioma: Deaths

Adjusted HSE (2009) & AWP Age-Birth GLM (2016)



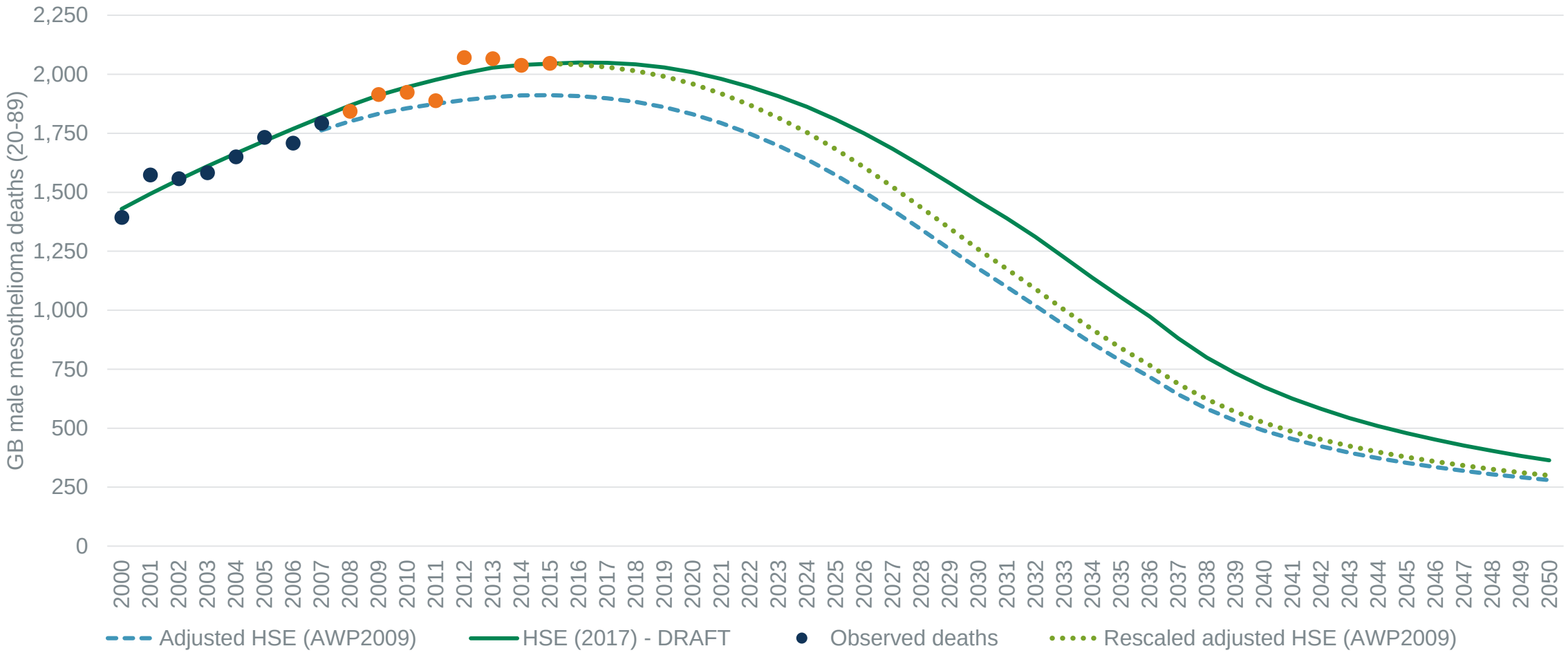
Mesothelioma: Deaths

Latest HSE draft figures



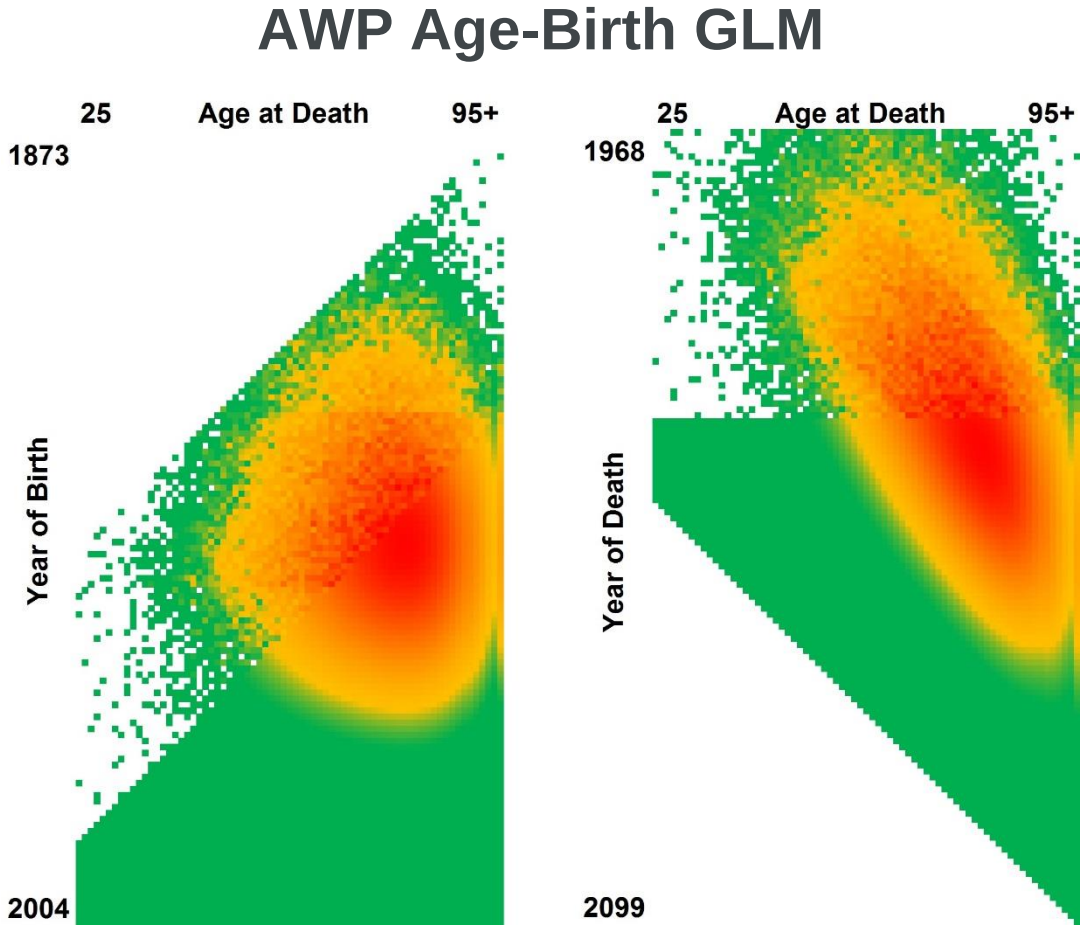
Mesothelioma: Deaths

Adjusted HSE (2009) rescaled



Mesothelioma deaths

Heat maps: Actual and projected



Mesothelioma: Deaths
Draft HSE model parameters

The power relationship between the time from first exposure to asbestos ("k-factor")

- Increased from 2.47 to 2.49
- A higher k-factor leads to a higher deaths

Half-life in years for asbestos fibres to clear from the lungs

- Still (effectively) no clearance assumed
- HSE looked a clearance models (fixed years and variable by cohort) but resulted in a poorer fit

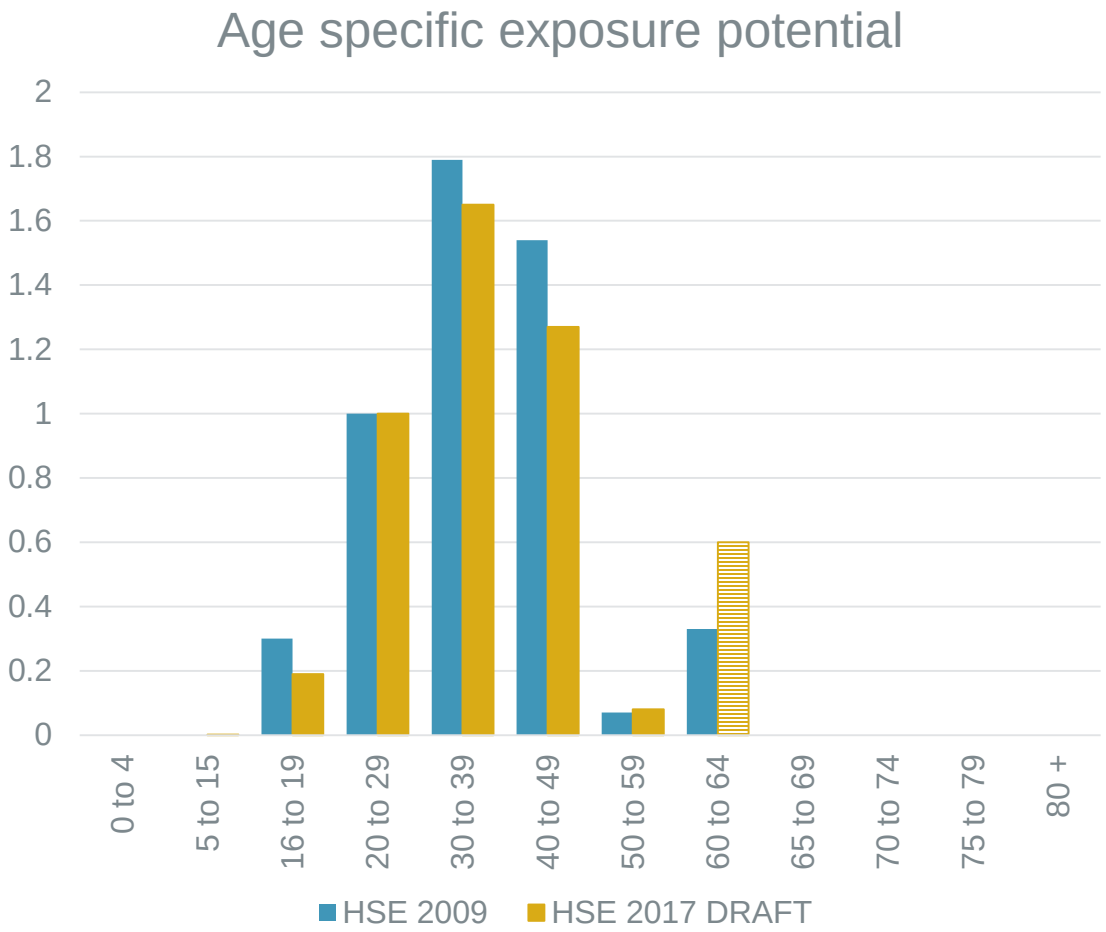
Population

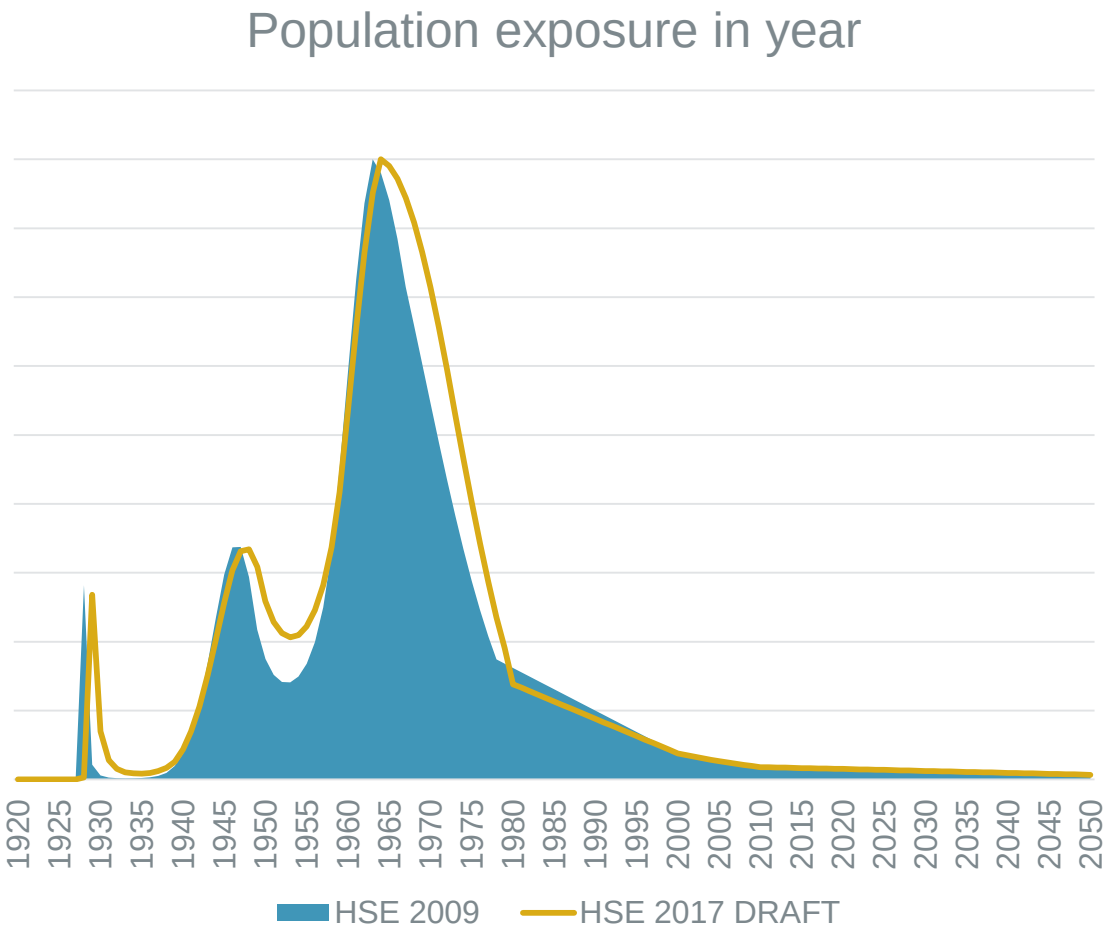
- Using mid-2014 population projections, where the 2009 model used the mid-2006 population projections.
- Reverting to mid-2010 projections because of a step change driven by immigration
  - HSE do not believe is an appropriate change to reflect in their model
  - This issue was raised in our 2009 paper

Background deaths

- Decreased to 1.10 per million compared to 1.22 per million in 2009.

Mesothelioma: Deaths
Draft HSE model parameters





Mesothelioma: Deaths
AWP potential adjustments – population

- Sensitive to the population projection
- Latest ONS estimates take into account improving longevity
  - If the exposed population does not enjoy the same level of improvements, then the HSE model will tend to over-project deaths
  - Also population alive in future is not the same as the exposed population
- ONS estimates take into account more recent data on immigration and emigration
- HSE considering using mid-2010 population projections, to remove step change in mid-2014 projections caused by immigration
- AWP considering three approaches:
  - Same population as HSE;
  - Latest population (if different); and
  - Adjust the latest population to exclude the impact of any immigration or emigration post 1990 (and also any individuals born after 1990).

Mesothelioma: Deaths

AWP potential adjustments – k factor and population

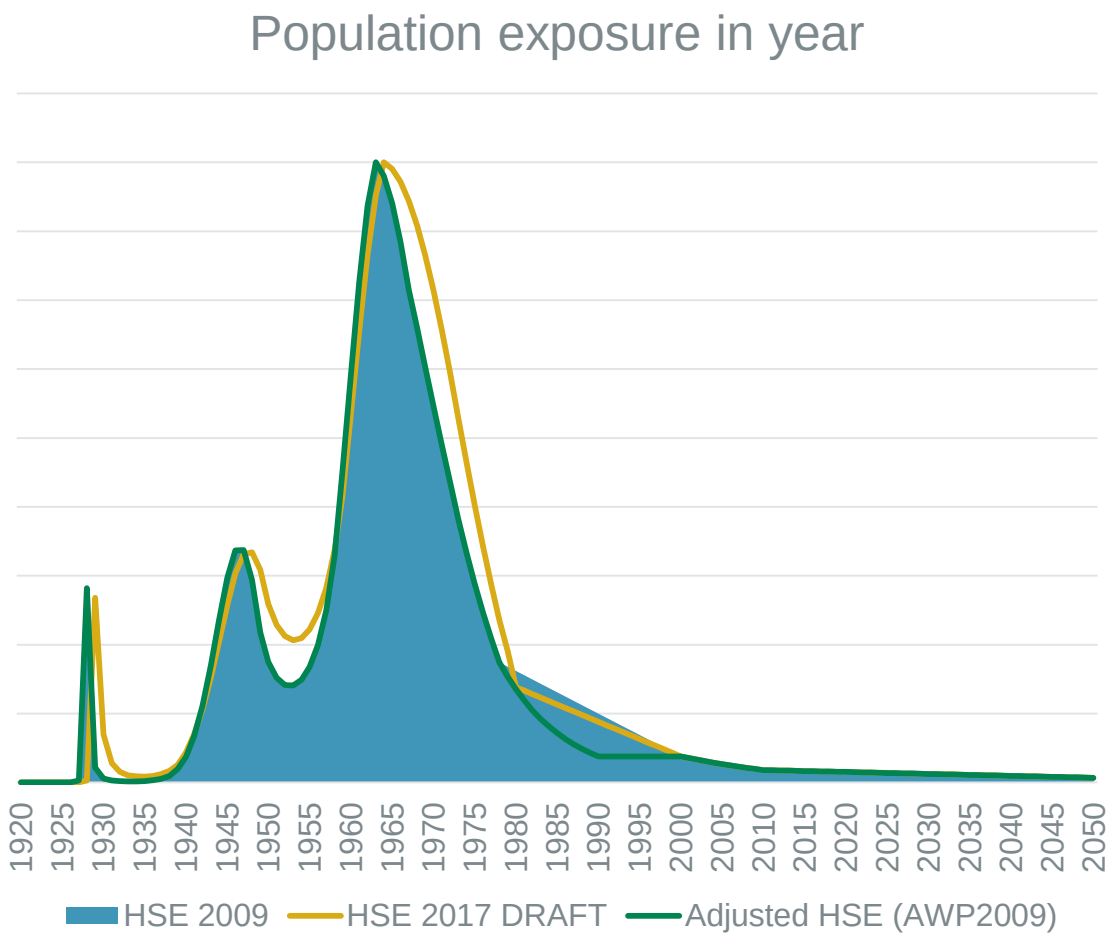
- Capping the increase in the risk of developing mesothelioma after **x** years from first exposure
  - For example using a lag period of 10 years and a cap at 60, the relative risk of an individual aged 80 is:

$$(1^k + 11^k + \ldots + 59^k + 60^k + 60^k + \ldots + 60^k)$$

instead of

$$(1^k + 11^k + \ldots + 59^k + 60^k + 61^k + \ldots + 70^k)$$

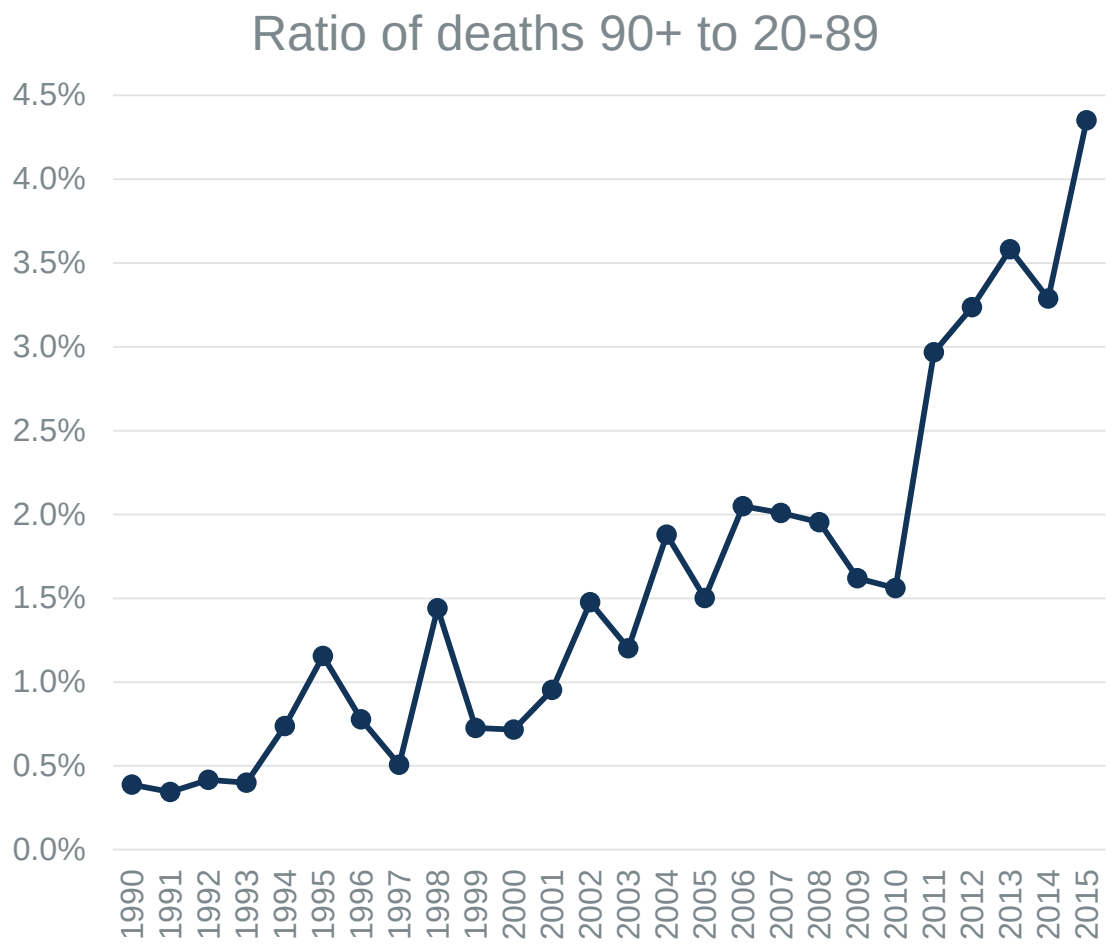
- Allows for uncertainty around whether incidence rates increase or fall as exposed cohorts age
- Since the HSE have assumed zero clearance of asbestos fibres in the lungs, this adjustment tempers the underlying assumed increase in incidence rates as an individual ages



Mesothelioma: Deaths

AWP potential adjustments – ages 90+ and deaths 2050+

- Male GB deaths from age 90+ make up:
  - 2% of all the deaths reported to date; and
  - Around 9% of the future deaths estimated by the HSE
- HSE estimate deaths in ages 90 and over, by applying a ratio to the deaths estimated for ages 20-89
  - They use linear regression on the historical ratio to project the ratio into future years
- We are considering a similar approach to estimate the deaths in the 90+ age band
- We are considering extending the 2050 end of the projections given the allowance for additional deaths from the age 90+ category



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Mesothelioma: Propensity to make a claim (PtC)

Using the Compensation Recovery Unit (CRU) data to estimate the propensity for a mesothelioma suffer to make an insurance claim

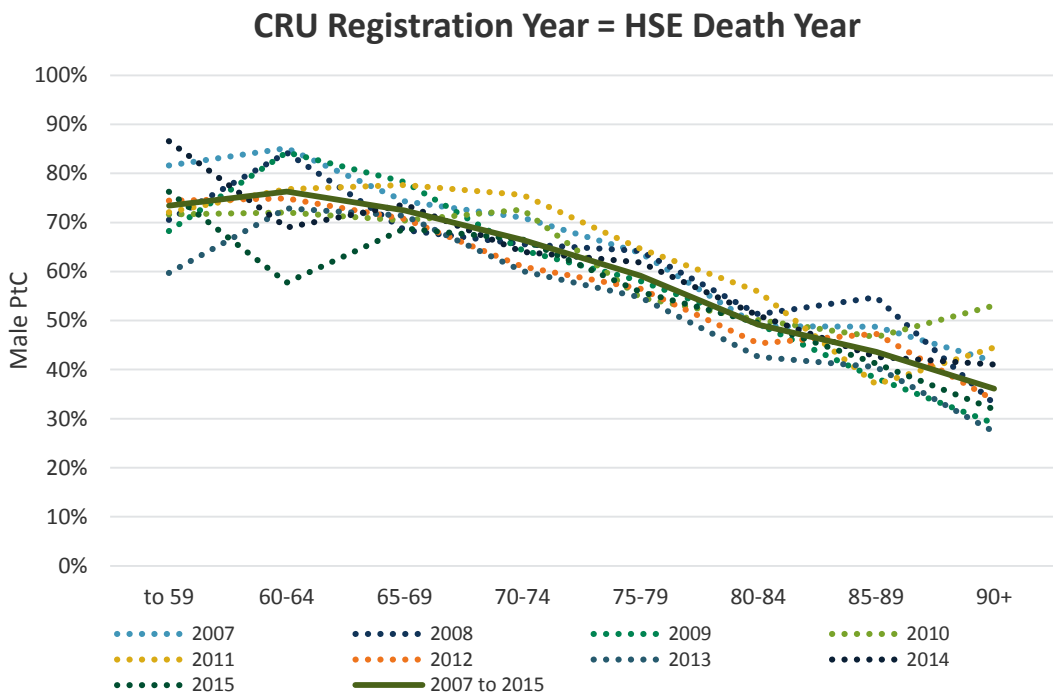
October 2017

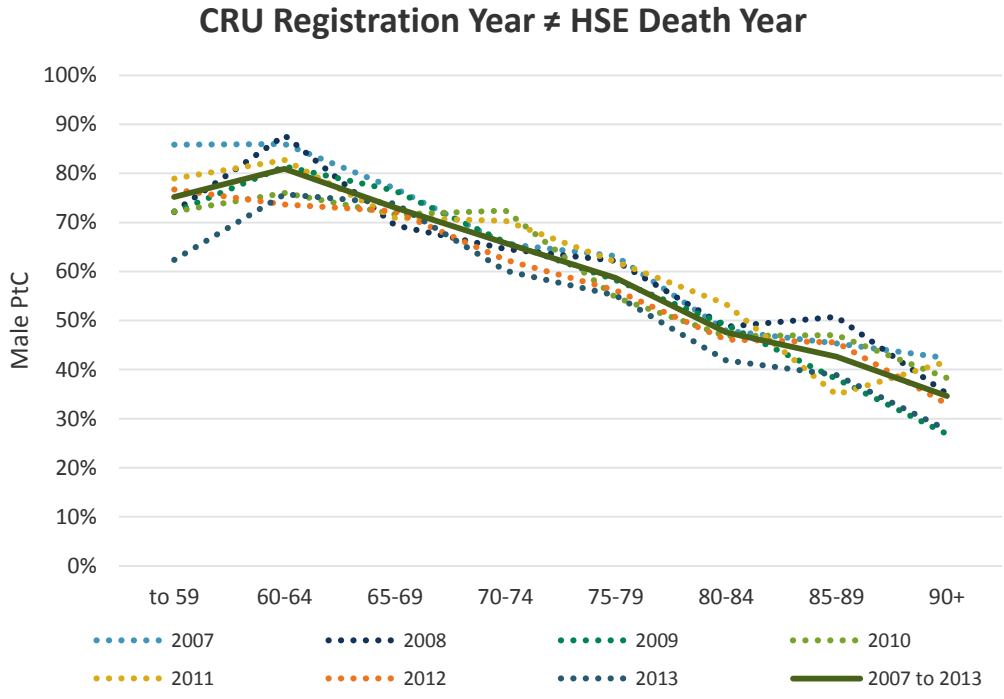
Mesothelioma: Propensity to make a claim
CRU/HSE data used to calculate PtC

- The CRU is informed of all asbestos-related claims giving rise to compensation, whether from the insurance industry or the Government
- The last set of data received from the CRU was in February 2016 covering Mesothelioma claims registered from January 2007 to December 2015
- No data received in 2017 from CRU but we received the 2015 HSE data, which allowed us to add one more year (2015) to our analysis
- The granularity of the CRU data allows us to split out 100% Government claims
- PtC calculated for GB male insurance claims
  - Ratio to allow for Northern Ireland & female claims

Mesothelioma: Propensity to make a claim
HSE Death Years & CRU Registration Years

- Investigated relationship between the registration year (CRU) and the year of death (HSE)





- Adjusting for CRU Registration year to HSE Death year appears to give “tighter fit”
- Overall, impact on average PtC is not material by age band

Mesothelioma: Propensity to make a claim

Updated male Propensity to Claim (PtC) by age band

Age Band / Registered Year	to 59	60-64	65-69	70-74	75-79	80-84	85-89	90+	*Total*
2007	82%	85%	74%	71%	64%	49%	49%	42%	***67%***
2008	71%	84%	68%	66%	64%	51%	55%	33%	***65%***
2009	68%	84%	78%	64%	58%	49%	38%	29%	***62%***
2010	72%	72%	70%	73%	55%	50%	47%	53%	***62%***
2011	72%	77%	78%	76%	65%	56%	37%	44%	***66%***
2012	74%	75%	71%	61%	56%	45%	47%	34%	***58%***
2013	60%	73%	71%	60%	55%	43%	41%	27%	***56%***
2014	87%	69%	74%	64%	62%	51%	43%	41%	***61%***
2015	76%	58%	69%	67%	56%	50%	41%	32%	***57%***
Average	**73%**	**76%**	**72%**	**66%**	**59%**	**49%**	**44%**	**36%**	***61%***

- **Update:** We added the 2015 data using the new HSE death data
- **Assumption:** 1:1 relationship, CRU registration year = HSE death year
- **Conclusion:** Shape of propensity by age over time is consistent and has not changed materially with the latest data

Mesothelioma: Propensity to make a claim

Projecting Propensity to Claim: 3 Scenarios

- 3 PtC scenarios (excl. Government claims):
  - Scenario A: PtC stays the same by age
  - Scenario B: PtC increases slightly over time
  - Scenario C: PtC rapidly increases to maximum
- The scenarios are capped to a maximum
- Compared to 2009, the number of scenarios was reduced from 5 to 3
  - Scenarios 1, 3 and 5 in 2009 correspond to above scenarios A, B and C
- Scenario A being considered a central Best Estimate
  - Reasonable stable experience by age since 2009
  - Scenario B could also be the central Best Estimate (given the increase in by age from 2004 to 2009)

Mesothelioma: Propensity to make a claim

Summary

- AWP updated PtC calculations with new HSE deaths and CRU data
- Overall no material change, PtC stays in line with previous analysis
- After playing with the relationship between CRU registration years and HSE death years, the AWP concluded the impact was not material
- The AWP produced different scenarios regarding the evolution of PtC in the future
  - These are comparable to the 2009 scenarios
- Uncertainty around PtC is and remains high, given the many factors that could influence the making of claims

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Mesothelioma: Costs

Modelling average claimant cost, split by head of damage

Mesothelioma: Costs
Overview of approach

2009 estimates used detailed claims data to construct a model allowing for age effects on heads of damage.

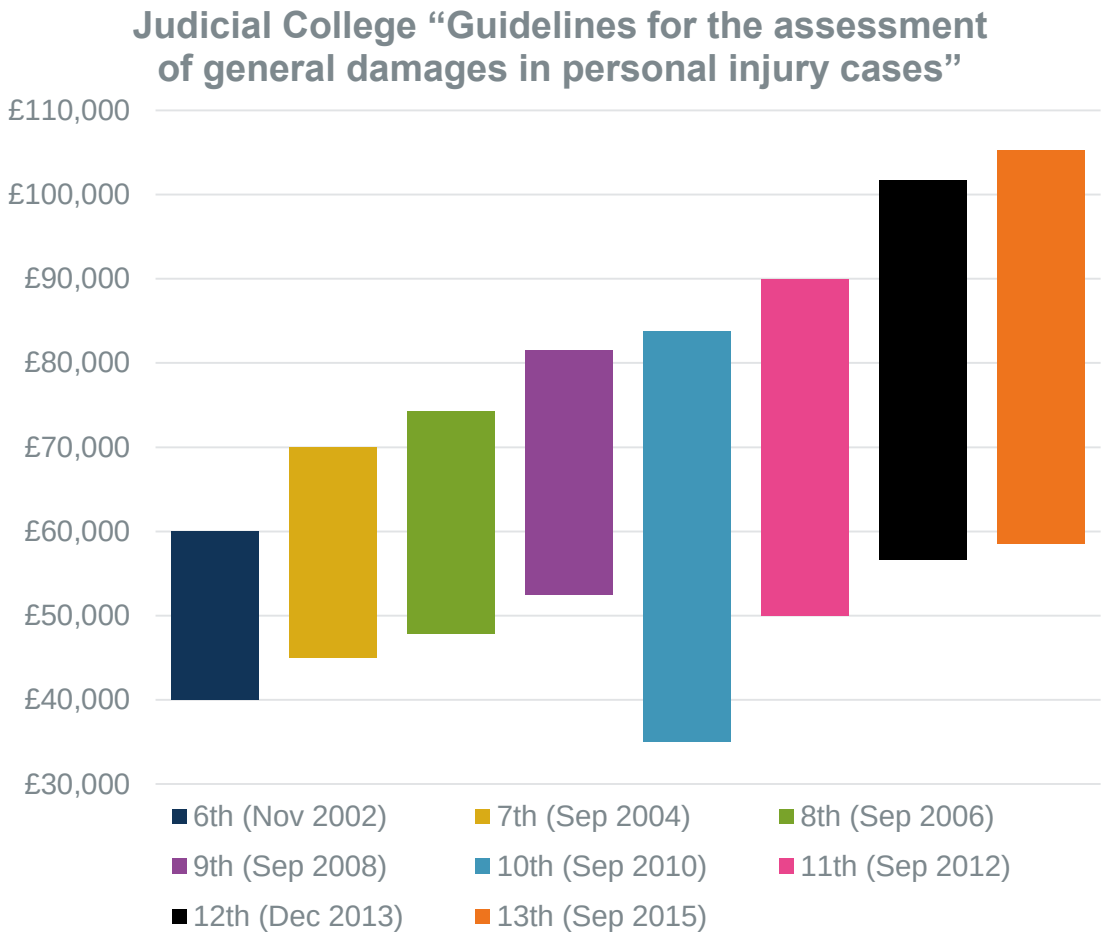
Costs estimated as at 2007 and then inflated

Head of damage	Age Related?	Living/Deceased Differential?	Inflation
General damages	Yes	No	Court
Special damages	Yes	Yes	Wage
PWCA	No	No	RPI
CRU	Yes	Yes	RPI
Bereavement award	No	Yes	RPI
Funeral expenses	No	Yes	RPI
Care expenses	No	No	Wage
Miscellaneous costs	No	No	RPI
Other costs	No	No	Wage
Legal expenses	Yes	No	Wage

- No new detailed data
- Expert views on costs other claim metrics
- Recalibrated based on:
  - Historical claims and average costs from market survey
  - Historical RPI and General Damages
  - Latest Ogden table and discount rate
  - Proportion living at settlement from market survey
  - Settlement pattern

Mesothelioma: Costs

Changes from Scenario 23: Court inflation



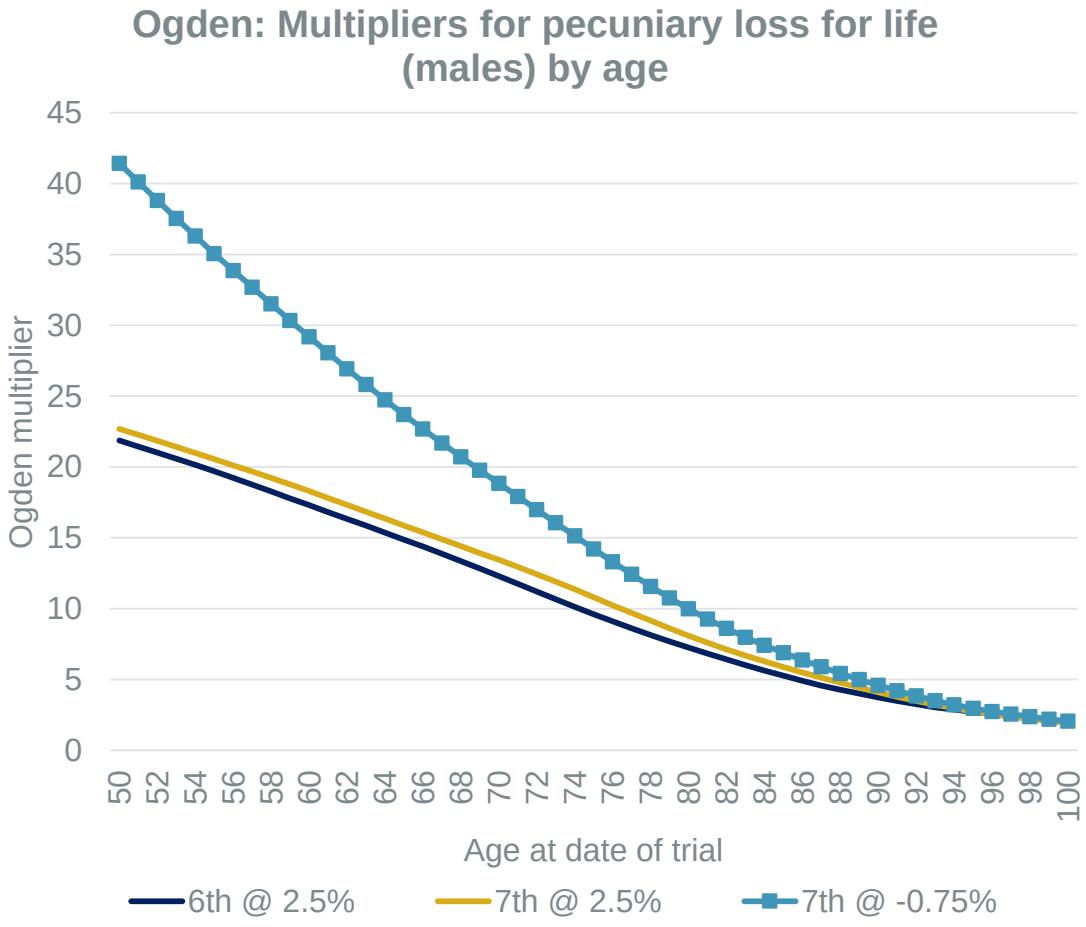
General damages against RPI

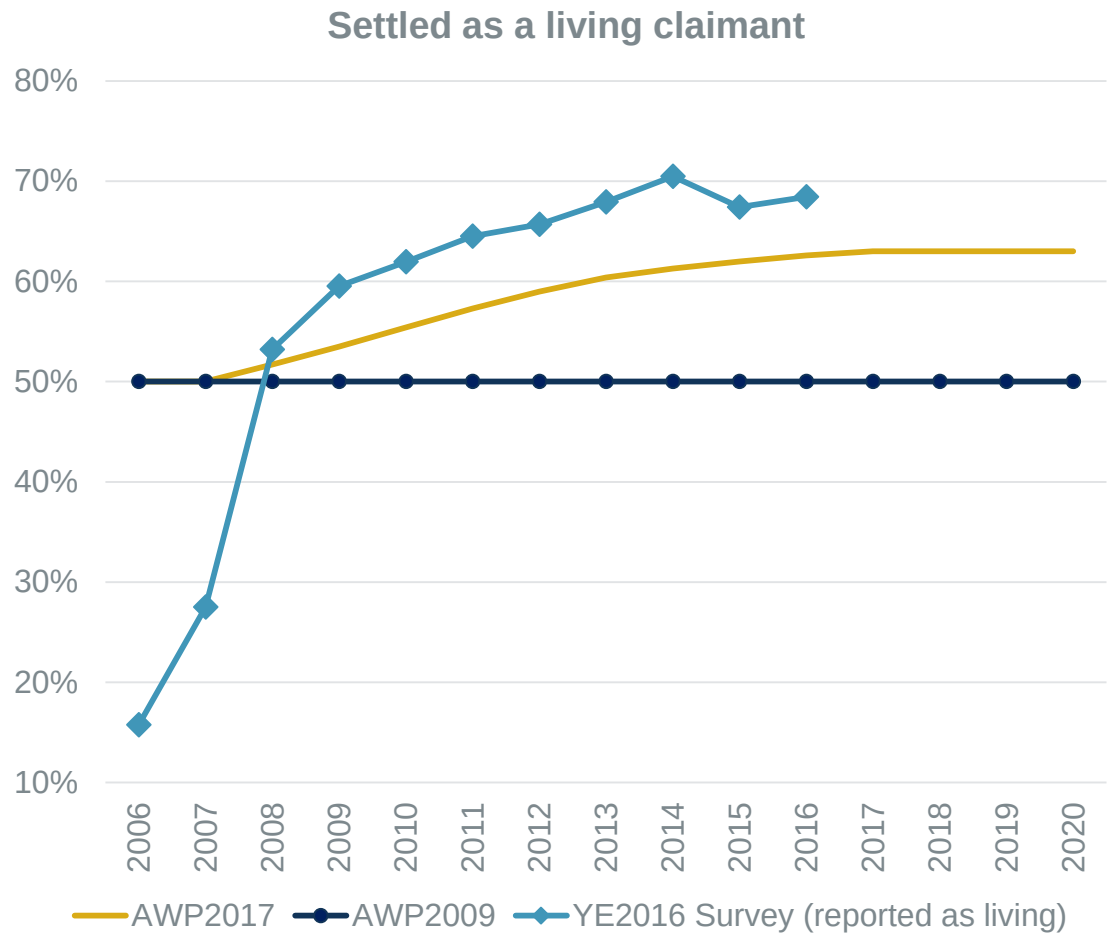
Period	Lower	Upper	Mid-point	RPI*	Mid-point difference
Jul00 to Nov02	*0.0%*	*8.1%*	*4.6%*	*1.9%*	***2.7%***
Nov02 to Sep04	*6.6%*	*8.8%*	*7.9%*	*2.9%*	***5.0%***
Sep04 to Sep06	*3.1%*	*3.0%*	*3.1%*	*3.0%*	***0.1%***
Sep06 to Sep08	*4.7%*	*4.7%*	*4.7%*	*4.4%*	***0.3%***
Jul00 to Sep08	**3.4%**	**6.2%**	**5.0%**	**3.0%**	**2.0%**
Sep08 to Sep10	*(18.4%)*	*1.4%*	*(5.9%)*	*1.8%*	***(7.7%)***
Sep10 to Sep12	*19.5%*	*3.7%*	*8.6%*	*4.5%*	***4.1%***
Sep12 to Dec13	*10.5%*	*10.3%*	*10.4%*	*3.1%*	***7.3%***
Dec13 to Sep15	*1.9%*	*2.0%*	*1.9%*	*1.8%*	***0.1%***
Sep08 to Sep15	**1.6%**	**3.7%**	**2.9%**	**2.8%**	**0.1%**
Jul00 to Sep15	**2.5%**	**5.0%**	**4.0%**	**2.9%**	**1.1%**

Source: Judicial College "Guidelines for the assessment of general damages in personal injury cases" for mesothelioma and RPI All Items: 1948 to 2016

Mesothelioma: Costs

Changes from Scenario 23: Living claimant & Ogden





Mesothelioma: Costs
Changes from Scenario 23: Other

Other changes have minimal impact to the total costs:

- CRU deceased claimants aged 86 and over set to age 85 in 2007
  - Removes negative deceased CRU costs ages 97 and over
- Using individual age data from deaths model instead of age bands
- Settlement pattern, using more detailed survey data
  - Mean term still around 2 years, but smooths out the impact of future Ogden changes

Potential changes:

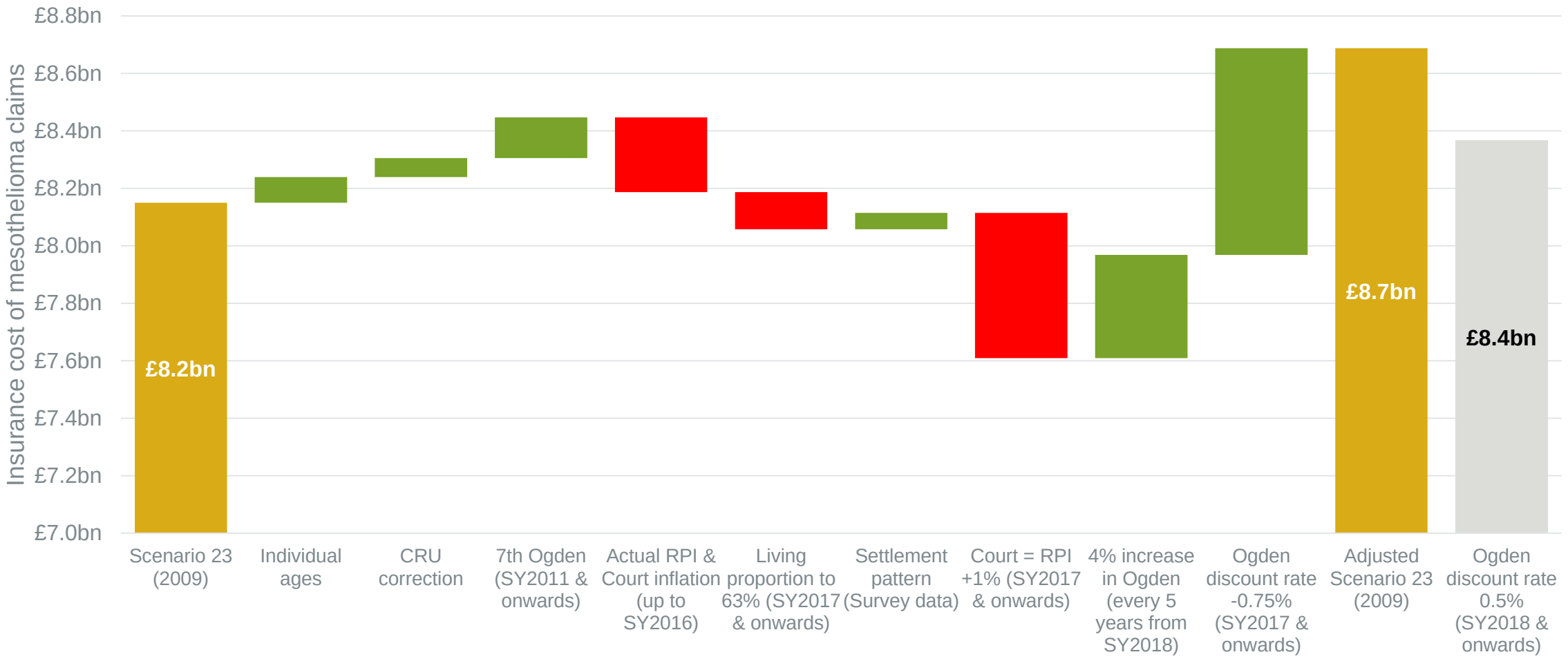
- Changing wage inflation assumptions from RPI+1.5% at mid scenario
  - Limited data – subjective around survey average cost and claims to claimant assumptions

Considered changes:

- Changing RPI assumptions from base of 2.5%
  - Limited data to justify moving the long term assumption

Mesothelioma: Costs

Impact on 2009 Scenario 23 (years 2017 to 2050)



Mesothelioma: Costs
Getting comfort around the output

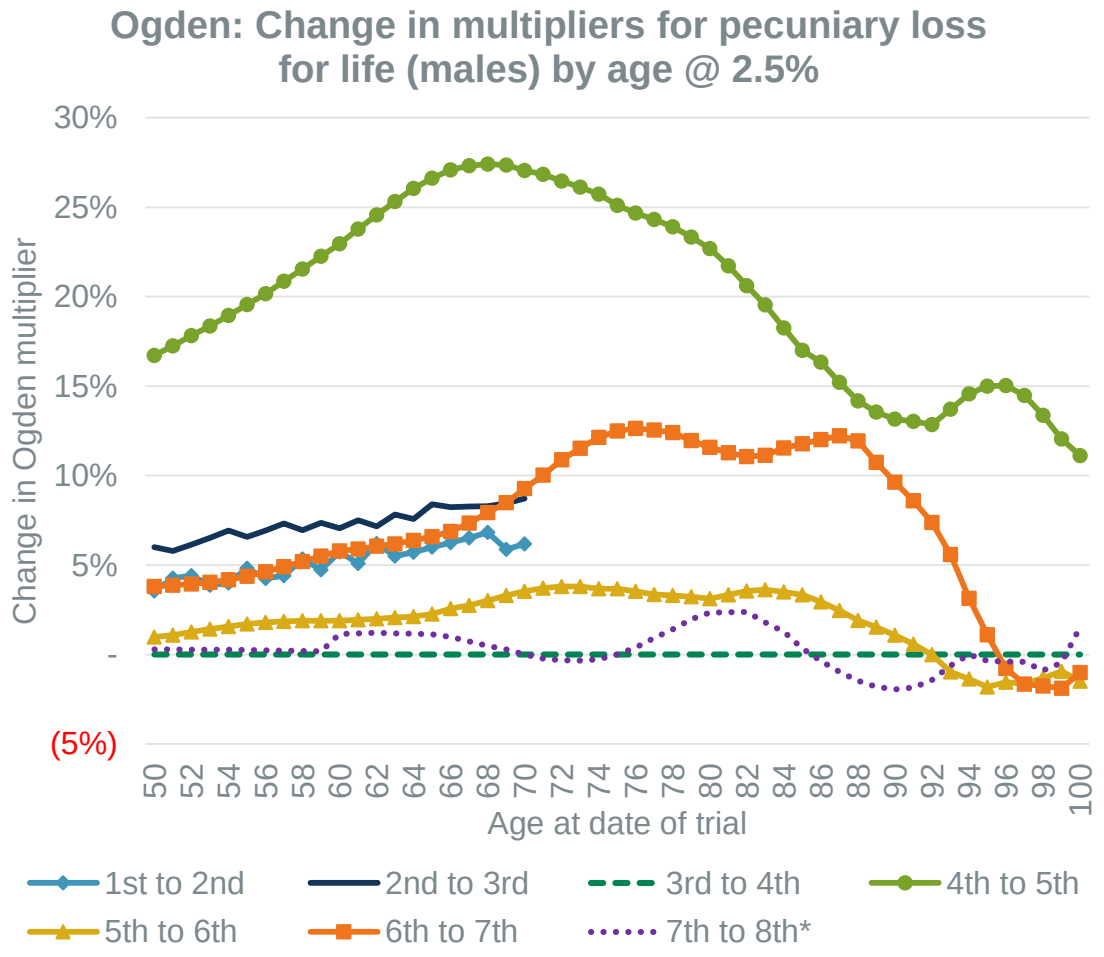
- Expert views from claims handers, claimant and insurer solicitors on:
  - Average living and deceased claimant costs;
  - Number of claims per claimant; and
  - Proportion of settled claims where the claimant is alive.
- Views are before the Ogden discount rate reduction from 2.5% to -0.75%

Expert view in 2016	Median	Interquartile range
Claims per claimant	**2.3**	2.0 to 3.0
Living settlement	**60%**	55% to 65%
*Average claim Living claimant**	***£212,000***	*£215,000 to £229,000*
*Average claim Deceased claimant**	***£249,000***	*£245,000 to £252,000*
Average claim Assuming 60% living*	**£233,000**	£227,000 to £238,000

* rounded to the nearest thousand

Mesothelioma: Costs
Ogden multipliers

- Discount rate set at -0.75%, based on current legal framework
  - The Working Party considers future legislation on the discount rate outside of its scope
  - Running a sensitivity using 0.5%
  - Model will allow users to change the discount rate
- Allowing for future mortality impacting the multipliers based on:
  - Historical increases; and
  - Using the latest population estimate.



* Estimated based on the mid-2014 population estimates on year 2017

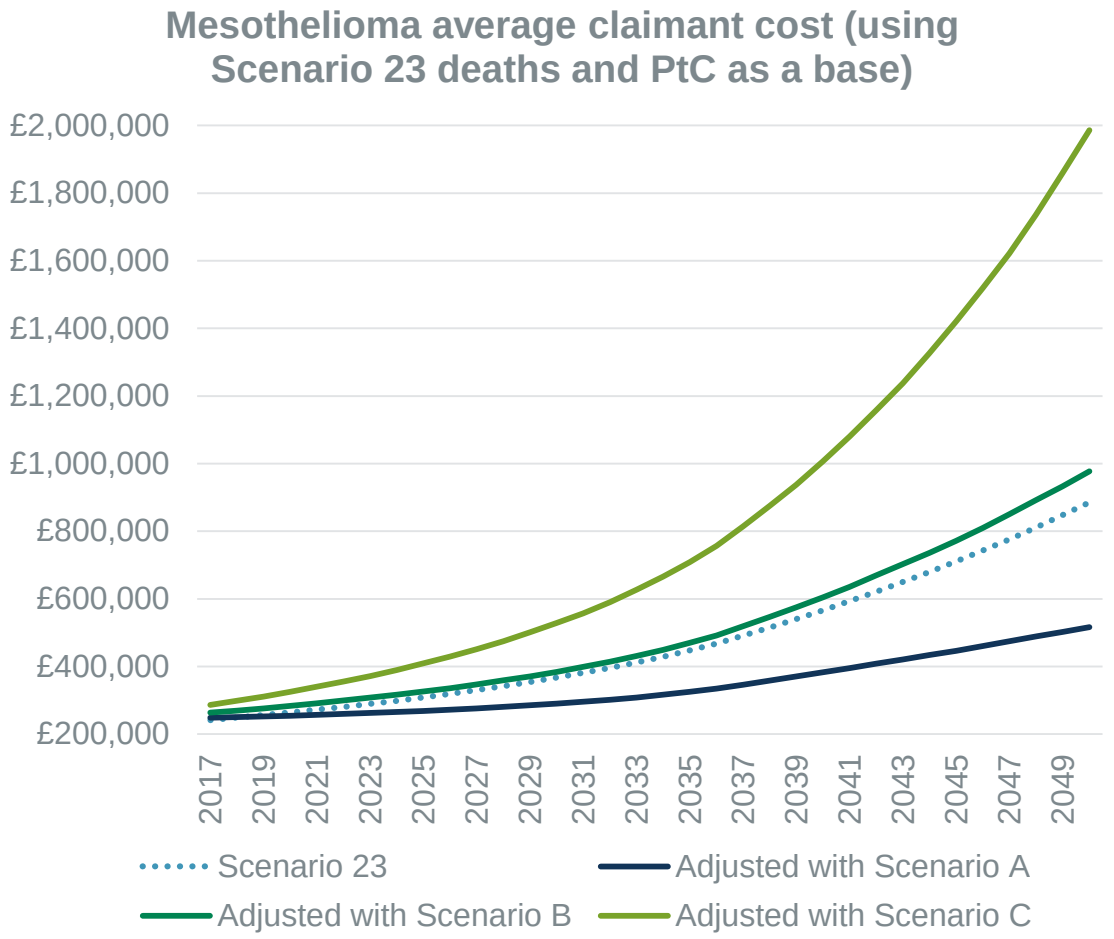
Mesothelioma: Costs

Draft inflation scenarios (using 2009 Scenario 23)

Three draft cost scenarios by considering the future inflation by each type

Inflation type	Scenario A	Scenario B	Scenario C
RPI	1.5%	2.5%	3.5%
Wage	2.5%	4.0%	5.5%
Court	1.5%	3.5%	5.5%
Ogden uplift %	2.0%	4.0%	6.0%
Ogden uplift every	6 years	5 years	4 years
Implied p.a. inflation	*2.2%*	*4.1%*	*6.0%*

Final scenarios will be within a range of possible outcomes (not best estimate), but do not define it



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Summary and plans

What are we going to produce

Mesothelioma cost of claims
Summary

- Not a significant change, but an increase in the insurance market estimates:
  - **Mesothelioma deaths**: Peak higher, but run-off broadly similar;
  - **Mesothelioma claims to death**: More claims per claimant, but propensity has been broadly stable by age;
  - **Mesothelioma cost**: Increase principally due to the discount rate change;
  - **Mesothelioma other increases**: Considering allowing over 89, going beyond 2050 and increasing female claims; and
  - **Non-mesothelioma**: Considering projecting for Pleural Plaques for Scotland and Northern Ireland
- Market estimate is 8 years old whereas insurers will have been updating their reserves based on experience
- We have a reduced number of scenarios compared to paper in 2009
- Most assumptions have been reasonability stable since 2009, but uncertainty remains
- Uncertainty around when mesothelioma claims peak and how they run-off
  - We will only know we peaked with 5 years of data after the peak

Mesothelioma cost of claims
Plans

Plans

- Awaiting HSE confirmation of the re-parameterisation of their model for latest deaths
- Assess the model and adjust parameters
- Combine mesothelioma parts and review output
- Finalise non-mesothelioma
- Timings on finalising: Late Q1/Early Q2

What outputs to expect

- Models for users:
  - Population Male Mesothelioma Deaths
  - GLM AgeBirth Male Mesothelioma Deaths
  - Mesothelioma Cost
  - Mesothelioma propensity to make a claim
- Paper outline results and key sections from previous papers, including:
  - Key legal and other developments
  - Practical guide for actuaries
  - Experience since the 2009 estimates

Questions

Comments