Working Party Members

Andy Whiting          Jerome Schilling
Brian Gravelsons      John Wilson
Charlie Kefford       Matthew Wilde
Dan Beard              Matthew Ball
Dan Sykes             Naomi Couchman
Darren Michaels       Patrick Nolan
Emiliano Ruffini      Peter Taylor
Graham Sandhouse      Robert Brooks
Gregory Overton       Stephen Robertson-Dunn

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Introduction – Recap of 2008 Workshop

Modelled male mesothelioma deaths and claims

- HSE modelled deaths
- Scaled meso claim data (AWP 2004)
- Scaled meso claim data (AWP 2007)
- Observed deaths

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Working Party Plans for 2008/9

- Understand revised future population projection of deaths due to mesothelioma by the HSE / Peto and update working party model if appropriate.
- Further explore key drivers of claims to deaths ratio.
- Develop average cost per claim model.
- Update UK insurance industry estimates for asbestos-related claims.
Content

- Mesothelioma population deaths projections
- Claimant to deaths ratio
- Mesothelioma average cost per claim model
- Insurance industry mesothelioma projections
- Insurance industry non-mesothelioma projections
ALL FIGURES PRESENTED IN THIS WORKSHOP ARE DRAFT - FINAL ESTIMATES WILL BE PUBLISHED IN OUR PAPER LATER THIS YEAR
Mesothelioma Deaths’ Projections

- AWP considered three model structures:
  - Latency Model
  - Simple Birth Cohort Model
  - HSE/HSL Model

- The three models are summarised as follows:
Latency Model

Past Import Data and assumed ‘risk’ relativities

Create ‘index’ for propensity to develop mesothelioma

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Latency Model

Advantages:
- common sense approach
- ‘real-world’ inputs
- can achieve a good fit

Disadvantages:
- projection very sensitive to inputs
- …and key assumption choices very subjective
- implicit population assumption
Simple Birth Cohort Model

- analyse age-specific death rates
- by birth cohort

Year of Death

Fit Relative Risk factors

Fit Death Rates

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Simple Birth Cohort Model

Advantages:
- simple structure
- allows for relative differences between YOB cohorts

Disadvantages:
- background deaths may ‘swamp’ low value cells
- factor selection and fitting not straightforward
- incomplete observations…
- reliance on future population projections
- projection largely dependent on incomplete cohorts
Major Disadvantage

…consider development of the incident rates…
Development of Incidence Rates

Development of death rates between age bands for different YOB cohorts

Observed data shows that death rate development varies by YOB cohort
Development of Incidence Rates

Development of death rates between age bands for different YOB cohorts

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Development of Incidence Rates

Development of death rates between age bands for different YOB cohorts

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Development of Incidence Rates

Development of death rates between age bands for different YOB cohorts

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Development of Incidence Rates

Development of death rates between age bands for different YOB cohorts

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Development of Incidence Rates

Development of death rates between age bands for different YOB cohorts

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Development of Incidence Rates

Development of death rates between age bands for different YOB cohorts

Relative difference in death rates

Age bands (5-year)
Development of Incidence Rates

Development of death rates between age bands for different YOB cohorts

Simple Birth Cohort model assumes the same development across all YOB cohorts…

…and the Latency Model can’t capture the observed trend
HSE/HSL parameters

- **Background rate**
  Deaths not related to exposure from asbestos

- **Exposure level**
  Exposure at any year for 20-29 year olds

- **Age-specific exposure**
  Scale factor for exposure given the age at that point in time

- **Population**
  GB historic and projected

- **Exponent of time (k)**
  Increasing risk of developing mesothelioma since exposure

- **Half-life (H)**
  Clearance of fibres from the lung

- **Diagnostic trend**
  Percentage of mesothelioma deaths diagnosed in any year
Comparing HSE/HSL to 2003

Male mesothelioma deaths (includes background deaths)

- Increased population; and
- Change in post 1978 exposure

HSL Non-clearance (2009) - ages 20 to 89
HSE Non-clearance (2003) - ages 20 to 89
Observed deaths (all ages)
HSE (2003) with 2006 ONS population projections

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HSE/HSL Model

Pros
- More flexible as a result of its many parameters
- Allows different death rates
- Takes into account exposure explicitly

Cons
- Lots of parameters – difficult to parameterise
- May overestimate the number of deaths from 80+ year olds
- Uses GB population and not exposed population
AWP scenario assumptions

**Base**
- Exposure post-1978 based on imports
- Cap on k for 60+ years since exposure
  - This stops the risk of developing mesothelioma continuing to increase 60 years from exposure; and
  - Reduces 80+ old years deaths.
- No exposure for 50+ year olds

**Other scenarios**
- Population – Removing the impact of immigration
- Population – Mortality
  - Claims data shows exposed population experience heavier mortality than GB population
AWP assumptions – Exposure level

Exposure in year (for 20-29 age band)

Year of exposure


Exposure to asbestos in the year

0 20,000 40,000 60,000 80,000 100,000 120,000 140,000 160,000 180,000 200,000

- HSE Non-clearance (2009)
- AWP

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AWP assumptions – Cap on k

Death rate per 100,000 for the 1945 - 1949 birth cohort

Death rate per 100,000 for the 1945 - 1949 birth cohort
AWP scenarios – Population deaths

Male mesothelioma deaths (includes background deaths)

- Birth Cohort Model
- HSL Non-clearance (2009) - AWP adjusted
- HSL Non-clearance (2009)
Claimants to Deaths Ratio – Historical Trends

Insurance Market Mesothelioma Notifications

- 1990 - 2008
- Notifications Per Annum
- CD Ratio
- HSE Trend
- 2004 AWP - claim notifications
- 2009 AWP - claim notifications
- CD Ratio Estimated 2004
- CD Ratio Estimated 2009

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Claimants to Deaths Ratio – Work Undertaken

Current position determined by age band

Estimate proportion of deaths with no insured occupational involvement:

- Assume 1% of deaths relate to the armed forces
- Assume 2% of deaths relate to solely self-employed individuals
- Assume 10% do not arise out of occupational exposure
- Suggesting 13% of deaths have no insured occupational involvement

The effect of potential changes in future CD ratios were then tested using a number of scenarios.
Claimants to Deaths Ratio – Scenarios used

Assumed CD Ratio (ave across age bands)

- **No Change**
- **Increase towards 90% of deaths with insurer involvement. Gap reduces at 8%pa for 10yrs.**
- **Increase towards 90% of deaths with insurer involvement. Gap reduces at 8%pa for 50yrs.**
- **Increase towards 90% of deaths with insurer involvement. Gap reduces at 30%pa for 10yrs.**
- **Increase towards 100% of deaths with insurer involvement in all age bands by 2013.**

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The Actuarial Profession
making financial sense of the future
Average Cost Per Claim (ACPC) Model

Changes since the 2004 Model:
- 2004 AWP assumed only lost income was age related
- 2008 review suggests that further claim elements are age related
- 2008 review also highlighted differences for living and deceased claimants
- Data for around 300 claimants reviewed
- Discussion with claims handlers
## Average Cost Per Claim Model Assumptions

<table>
<thead>
<tr>
<th>Item</th>
<th>Age Related</th>
<th>Inflation</th>
<th>Live/Deceased</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Damages (pain / suffering / loss of amenity)</td>
<td>Yes</td>
<td>Court</td>
<td>No</td>
</tr>
<tr>
<td>Special Damages (loss of future income)</td>
<td>Yes</td>
<td>Wage</td>
<td>Yes</td>
</tr>
<tr>
<td>PWCA</td>
<td>No</td>
<td>RPI</td>
<td>No</td>
</tr>
<tr>
<td>CRU</td>
<td>Yes</td>
<td>RPI</td>
<td>Yes</td>
</tr>
<tr>
<td>Bereavement award (proxy deceased indicator)</td>
<td>No</td>
<td>RPI</td>
<td>Yes</td>
</tr>
<tr>
<td>Funeral costs</td>
<td>No</td>
<td>RPI</td>
<td>Yes</td>
</tr>
<tr>
<td>Care costs</td>
<td>No</td>
<td>Wage</td>
<td>No</td>
</tr>
<tr>
<td>Misc (travel / medication etc.)</td>
<td>No</td>
<td>RPI</td>
<td>No</td>
</tr>
<tr>
<td>Other (interest on pre-settlement expenses / loss of past income)</td>
<td>No</td>
<td>Wage</td>
<td>No</td>
</tr>
<tr>
<td>Legal Fees</td>
<td>Yes</td>
<td>Wage</td>
<td>No</td>
</tr>
</tbody>
</table>
Draft Mesothelioma scenarios

60 Scenarios run:

<table>
<thead>
<tr>
<th>Population Projections</th>
<th>CD Ratio</th>
<th>Progression speed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CD Cap</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No Change</td>
<td>No Change</td>
</tr>
<tr>
<td></td>
<td>90% of claims with insured involvement</td>
<td>gap reduced at 8%pa for 10yrs</td>
</tr>
<tr>
<td></td>
<td>90% of claims with insured involvement</td>
<td>gap reduced at 8%pa for 50yrs</td>
</tr>
<tr>
<td></td>
<td>90% of claims with insured involvement</td>
<td>gap reduced at 30%pa for 10yrs</td>
</tr>
<tr>
<td></td>
<td>100% of claims with insured involvement</td>
<td>Cap reached by 2013</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.50%</td>
</tr>
<tr>
<td>2.50%</td>
</tr>
<tr>
<td>3.50%</td>
</tr>
</tbody>
</table>

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## Draft Mesothelioma scenarios

<table>
<thead>
<tr>
<th>Incurred Insurance Claim notifications (100% Market)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>£m</strong></td>
</tr>
<tr>
<td>2004-2008</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Estimated 2004 AWP MidMid</td>
</tr>
<tr>
<td>Actual</td>
</tr>
<tr>
<td>Rebased 2004 AWP MidMid</td>
</tr>
<tr>
<td>Estimated 2009 AWP Indication</td>
</tr>
</tbody>
</table>
Key Uncertainties in Projection

- Future deaths due to mesothelioma very uncertain
- Models unlikely to be reliable beyond 10 years
- Number of people claiming in the future against employers / insurers difficult to predict
- Future inflation could be higher or lower than estimated
- Any point estimate is therefore very subjective
Non-Meso – Lung Cancer Claim Nos.

2004 Projections – The Need For A Revision

- Original Actual LC Numbers
- Original Low Projection
- Original Medium Projection
- Original High Projection
- New Actual LC Numbers

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Non-Meso – Lung Cancer Claim Nos.

Revised Predictions

- Red: New Actual LC Numbers
- Orange: Scenario 1
- Blue: Scenario 2
- Light Blue: Scenario 3
## Lung Cancer Projected Claim Amounts

### Summary Results (£m)

<table>
<thead>
<tr>
<th></th>
<th>Average Cost Per Claim</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inflation 1</td>
<td>Inflation 2</td>
<td>Inflation 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0%</td>
<td>4%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td><strong>Old Lung Cancer Projections</strong> (Post 2009 Claims Only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 1</td>
<td>455</td>
<td>17</td>
<td>26</td>
<td>38</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>1,650</td>
<td>63</td>
<td>115</td>
<td>220</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>2,959</td>
<td>112</td>
<td>264</td>
<td>706</td>
</tr>
<tr>
<td><strong>New Lung Cancer Projections</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 1</td>
<td>3,799</td>
<td>171</td>
<td>201</td>
<td>238</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>8,378</td>
<td>395</td>
<td>512</td>
<td>679</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>19,504</td>
<td>952</td>
<td>1,332</td>
<td>1,913</td>
</tr>
</tbody>
</table>
Non-Meso – Asbestosis Claim Nos.

Revised Predictions

- Actual Asbestosis
- Scenario 1
- Scenario 2
- Scenario 3
## Asbestosis Projected Claim Amounts
### Summary Results (£m)

#### Old Asbestosis Projections
(Post 2009 Claims Only)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Claim Numbers</th>
<th>Inflation 1</th>
<th>Inflation 2</th>
<th>Inflation 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>15,087</td>
<td>291</td>
<td>378</td>
<td>496</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>20,671</td>
<td>404</td>
<td>539</td>
<td>728</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>32,570</td>
<td>649</td>
<td>902</td>
<td>1,274</td>
</tr>
</tbody>
</table>

#### New Asbestosis Projections

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Claim Numbers</th>
<th>Inflation 1</th>
<th>Inflation 2</th>
<th>Inflation 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>9,702</td>
<td>192</td>
<td>216</td>
<td>243</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>20,224</td>
<td>415</td>
<td>503</td>
<td>619</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>34,576</td>
<td>728</td>
<td>932</td>
<td>1,214</td>
</tr>
</tbody>
</table>

### Average Cost Per Claim

#### Old Asbestosis Projections

- **Inflation 1**: 1%
- **Inflation 2**: 3%
- **Inflation 3**: 5%

#### New Asbestosis Projections

- **Inflation 1**: 1%
- **Inflation 2**: 3%
- **Inflation 3**: 5%
Non-Meso – Thickening Claim Nos.

Revised Predictions

0 100 200 300 400 500 600 700

Actual Thickening
Scenario 1
Scenario 2
Scenario 3

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## Thickening Projected Claim Amounts

### Summary Results (£m)

#### Old Plaques/Thickening Proj. (Post 2009 Claims Only)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Claim Numbers</th>
<th>Inflation 1</th>
<th>Inflation 2</th>
<th>Inflation 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>900</td>
<td>11</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>7,900</td>
<td>93</td>
<td>107</td>
<td>122</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>30,900</td>
<td>366</td>
<td>425</td>
<td>491</td>
</tr>
</tbody>
</table>

#### New Thickening Projections

Note: Pleural Thickening only

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Claim Numbers</th>
<th>Inflation 1</th>
<th>Inflation 2</th>
<th>Inflation 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>4,176</td>
<td>74</td>
<td>85</td>
<td>98</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>7,024</td>
<td>157</td>
<td>197</td>
<td>253</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>11,986</td>
<td>276</td>
<td>375</td>
<td>522</td>
</tr>
</tbody>
</table>
## Total Non-Meso Projected Claim Amounts

### Summary Results (£m)

<table>
<thead>
<tr>
<th>Old Non-Meso Projections (Post 2009 Claims Only)</th>
<th>Average Cost Per Claim</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inflation 1</td>
</tr>
<tr>
<td>Scenario 1</td>
<td>16,442</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>30,221</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>66,429</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>New Non-Meso Projections excluding pleural plaques</th>
<th>Average Cost Per Claim</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inflation 1</td>
</tr>
<tr>
<td>Scenario 1</td>
<td>17,676</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>35,625</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>66,066</td>
</tr>
</tbody>
</table>
Pleural Plaques

- Government in England and Wales have not yet made an announcement following the consultation paper.
- Scottish Government has legislated to make pleural plaques compensable.
- This decision is currently under Judicial Review.
- Large uncertainty in respect of potential pleural plaques claims.
- Working Party has not estimated an insurance market cost for pleural plaques.
- Estimate a cost only if they are deemed compensable in the future.
Summary

- DRAFT UK asbestos insurance market estimates.
- Final report in the next couple of months.
- Reserving Actuaries need apply their own judgement.
UK Asbestos Working Party Update 2009

Brian Gravelsons
Matthew Wilde
Robert Brooks
Charlie Kefford
Andy Whiting

7th October 2009

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