CSI Committee Feedback

Paul Lewis, Gary Velcich, Leza Wells, Norman Kelly, Jenny Ingram

CSI Committee
<table>
<thead>
<tr>
<th>Full Name</th>
<th>Function</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ari Odysseos</td>
<td>Committee Member</td>
<td>Liberty</td>
</tr>
<tr>
<td>Chessman Wekwete</td>
<td>Committee Member</td>
<td>Hannover Re</td>
</tr>
<tr>
<td>Deon Marshall</td>
<td>Committee Member</td>
<td>Sanlam</td>
</tr>
<tr>
<td>Douw de Jongh</td>
<td>Committee Member</td>
<td>Munich Re</td>
</tr>
<tr>
<td>Emil Boeke</td>
<td>Actuarial Society</td>
<td>ASSA</td>
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<tr>
<td>Etienne Le Roux</td>
<td>Committee Member</td>
<td>Metropolitan</td>
</tr>
<tr>
<td>Frans Vergeest</td>
<td>Committee Member</td>
<td>Old Mutual</td>
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<td>Gary Velcich</td>
<td>Committee Member</td>
<td>Alexander Forbes</td>
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<td>Herman Kalmer</td>
<td>Observer</td>
<td>FSB</td>
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<td>Jenny Ingram</td>
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<td>Momentum</td>
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<tr>
<td>Karl Schriek</td>
<td>Committee Member</td>
<td>Gen Re</td>
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<td>Leza Wells</td>
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<td>RGA</td>
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<td>Norman Kelly</td>
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<td>SCOR</td>
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<td>Paul Lewis</td>
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<td>Gen Re</td>
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<td>Peter Temple</td>
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<td>Gen Re</td>
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<td>Pierre Coetzee</td>
<td>Committee Member</td>
<td>Swiss Re</td>
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<td>Randall Hendricks</td>
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<td>Discovery</td>
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<td>Richard Montgomery</td>
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<td>SMRS</td>
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<td>Rob Dorrington</td>
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<td>UCT</td>
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<td>Stephen Jurisich</td>
<td>Committee Member</td>
<td>WITS / Quindiem</td>
</tr>
<tr>
<td>John-Craig Clur</td>
<td>Committee Member</td>
<td>UCT</td>
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</tbody>
</table>
What have we done

• Made sure we have all the bases covered
• Huge focus on the data collection exercise
• Started with new standardised templates
• Have recently collected Assured Lives 2003-2008
• Have just requested data for:
  • Assured Lives 2009
  • Annuitant 2005-2009
  • Disability Lump Sum 2004-2009
  • Critical Illness 2004-2009
What we are doing

• Will publish DLS and CI reports soon
• Sessional meeting early next year
• Graduate and publish Annuitant (2001-2004) report 2012 Q1
• Graduate and publish Assured lives (2004-2008) before end 2012
• Do something on Pensions before end 2012
• (Graduate) and publish CI and DLS (2004-2008) before end 2013
• Graduate and publish Annuitant (2005-2009) report 2014
What we are doing

- Busy requesting funding from the Research Committee
- Will “outsource” the analysis and report writing
- Will speed up the process and ensure that the reports are consistent
Pension Mortality Study

Gary Velcich
Pensioner mortality study

• Background to the investigation
  • Mortality study of pensioners paid by SA pension funds
  • Period: six year period from 2005 to 2010
  • Excludes pensioners who purchased annuity at retirement
  • Means that study only considers defined benefit funds

• Purposes
  • Absolute levels of mortality vs. published (UK) experience
  • Trends – particularly mortality improvements
  • Will consider graduating for SA standard table
Pensioner mortality study

• Sources of data
  1. Large defined benefit funds
  2. Pensioner payroll data from large consultancies
  3. Government and parastatal funds
Pensioner mortality study

- Data received so far:

<table>
<thead>
<tr>
<th>Fund description</th>
<th>Approached</th>
<th>Data received</th>
<th>Number of pensioners</th>
</tr>
</thead>
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<tr>
<td>Large DB funds</td>
<td>22</td>
<td>12</td>
<td>105,000</td>
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<tr>
<td>Consultancies</td>
<td>2</td>
<td>1</td>
<td>114,000</td>
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<tr>
<td>Government / parastatal</td>
<td>3</td>
<td>3</td>
<td>415,000</td>
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<tr>
<td>Total</td>
<td>27</td>
<td>16</td>
<td>634,000</td>
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</tbody>
</table>

- For most part, data received covers the full 2005 to 2010 period
Pensioner mortality study

- **Timing**
  - Still in process of collecting data
  - Analysing data sets already received
  - Expect to be able to report back with preliminary results in Q2 2012
Disability Lump Sum 2000-2003

Leza Wells
Overview of Investigation

- **Period of Investigation:**
  - Current Investigation 2000-2003 (4 yr period)
  - Previous Investigation 1995-1999 (5 yr period)

- **Contributing companies:** 4 of the following 5 companies
  - Liberty, Metropolitan, Momentum, Old Mutual, Sanlam

- **Exposure and Claims**
  - Exposure = 8.16m policy-years (95-99:15.3 m years)
  - Number of disabilities = 10 985 (95-99: 25 000 disabilities)
  - Overall observed crude rate = 1.35 per mille
Data Concerns

- Drop in exposure and claims from previous investigation

<table>
<thead>
<tr>
<th>Year</th>
<th>Claims</th>
<th>Exposure</th>
<th>Crude Observed Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>5 268</td>
<td>2 875 813</td>
<td>0.00183</td>
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<tr>
<td>1996</td>
<td>4 832</td>
<td>3 050 937</td>
<td>0.00158</td>
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<tr>
<td>1997</td>
<td>4 903</td>
<td>3 141 362</td>
<td>0.00156</td>
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<td>1998</td>
<td>5 707</td>
<td>3 171 194</td>
<td>0.00180</td>
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<td>1999</td>
<td>4 233</td>
<td>3 019 498</td>
<td>0.00140</td>
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<tr>
<td>1999 (new)</td>
<td>2 735</td>
<td>2 010 514</td>
<td>0.00136</td>
</tr>
<tr>
<td>2000</td>
<td>2 478</td>
<td>1 958 058</td>
<td>0.00127</td>
</tr>
<tr>
<td>2001</td>
<td>3 105</td>
<td>2 176 097</td>
<td>0.00143</td>
</tr>
<tr>
<td>2002</td>
<td>2 789</td>
<td>2 070 751</td>
<td>0.00135</td>
</tr>
<tr>
<td>2003</td>
<td>2 613</td>
<td>1 959 387</td>
<td>0.00133</td>
</tr>
</tbody>
</table>
Data Concerns

• Amounts or Lives analysis
  • Accurate Sum Insured not provided (amounts analysis difficult)
  • 91% claims settled at full sum insured (lives analysis appropriate?)

• Missing Data Fields - lots of Unknowns for most data fields
  • Disability Definition (Own, Own or Suited or FI) – only 3 companies
  • Cause of claim – only 2 companies
  • Accelerator/ Standalone – 38% unknown
  • Socio-economic rating class – 50% unknown
  • Deferred/ Waiting Period – 62% unknown
  • Province – 58% unknown
Disability Rate by Sex

Crude Observed Rate per mille

Exposure
Males
Females


0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8

Millions
Exposure (Life Years)
Smokers relative to Non-smokers

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Males</th>
<th>Females</th>
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<tr>
<td>15-24</td>
<td>141%</td>
<td>110%</td>
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<tr>
<td>25-29</td>
<td>121%</td>
<td>148%</td>
</tr>
<tr>
<td>30-34</td>
<td>194%</td>
<td>139%</td>
</tr>
<tr>
<td>35-39</td>
<td>155%</td>
<td>175%</td>
</tr>
<tr>
<td>40-44</td>
<td>170%</td>
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<tr>
<td>45-49</td>
<td>165%</td>
<td>148%</td>
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<tr>
<td>50-54</td>
<td>182%</td>
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<tr>
<td>55-59</td>
<td>139%</td>
<td>125%</td>
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</table>
### Males:
**Occ Class relative to Best Occ Class**

<table>
<thead>
<tr>
<th>Occ class</th>
<th>15-24</th>
<th>25-29</th>
<th>30-34</th>
<th>35-39</th>
<th>40-44</th>
<th>45-49</th>
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<tbody>
<tr>
<td>Best Occ Class</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>2nd Best Occ Class</td>
<td>64%</td>
<td>196%</td>
<td>193%</td>
<td>172%</td>
<td>174%</td>
<td>122%</td>
<td>125%</td>
<td>139%</td>
</tr>
<tr>
<td>3rd Best Occ Class</td>
<td>108%</td>
<td>349%</td>
<td>431%</td>
<td>312%</td>
<td>279%</td>
<td>202%</td>
<td>233%</td>
<td>218%</td>
</tr>
<tr>
<td>4th Best Occ Class</td>
<td>55%</td>
<td>729%</td>
<td>738%</td>
<td>452%</td>
<td>464%</td>
<td>313%</td>
<td>279%</td>
<td>199%</td>
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</table>
Males:
Own Occ relative to Own or Suited Occ

<table>
<thead>
<tr>
<th>Own as a Percentage of Own or Suited</th>
<th>30 - 34</th>
<th>35 - 39</th>
<th>40 - 44</th>
<th>45 - 49</th>
<th>50 - 54</th>
<th>55 - 59</th>
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<tbody>
<tr>
<td>All Occ Classes - Own or Suited</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Best Occ Class - Own</td>
<td>95%</td>
<td>105%</td>
<td>80%</td>
<td>94%</td>
<td>100%</td>
<td>114%</td>
</tr>
<tr>
<td>2nd Best Occ Class - Own</td>
<td>103%</td>
<td>106%</td>
<td>188%</td>
<td>161%</td>
<td>128%</td>
<td>95%</td>
</tr>
<tr>
<td>All Occ Classes - Own</td>
<td>74%</td>
<td>78%</td>
<td>88%</td>
<td>100%</td>
<td>103%</td>
<td>100%</td>
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</table>
Duration relative to Ultimate (Dur 4+)

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</thead>
<tbody>
<tr>
<td>Dur 0</td>
<td>15%</td>
<td>20%</td>
<td>12%</td>
<td>13%</td>
<td>10%</td>
<td>14%</td>
<td>12%</td>
<td>0%</td>
</tr>
<tr>
<td>Dur 1</td>
<td>36%</td>
<td>87%</td>
<td>41%</td>
<td>45%</td>
<td>36%</td>
<td>43%</td>
<td>36%</td>
<td>25%</td>
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<tr>
<td>Dur 2</td>
<td>55%</td>
<td>83%</td>
<td>52%</td>
<td>66%</td>
<td>70%</td>
<td>60%</td>
<td>78%</td>
<td>28%</td>
</tr>
<tr>
<td>Dur 3</td>
<td>41%</td>
<td>97%</td>
<td>74%</td>
<td>86%</td>
<td>83%</td>
<td>81%</td>
<td>79%</td>
<td>68%</td>
</tr>
<tr>
<td>Dur 4+</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
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</table>
Calendar Year relative to Average

<table>
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</thead>
<tbody>
<tr>
<td>2000</td>
<td>93%</td>
<td>102%</td>
<td>87%</td>
<td>86%</td>
<td>92%</td>
<td>107%</td>
<td>109%</td>
<td>140%</td>
</tr>
<tr>
<td>2001</td>
<td>121%</td>
<td>131%</td>
<td>117%</td>
<td>116%</td>
<td>113%</td>
<td>111%</td>
<td>103%</td>
<td>102%</td>
</tr>
<tr>
<td>2002</td>
<td>83%</td>
<td>71%</td>
<td>102%</td>
<td>102%</td>
<td>105%</td>
<td>93%</td>
<td>96%</td>
<td>101%</td>
</tr>
<tr>
<td>2003</td>
<td>102%</td>
<td>87%</td>
<td>92%</td>
<td>96%</td>
<td>90%</td>
<td>90%</td>
<td>94%</td>
<td>75%</td>
</tr>
</tbody>
</table>
Next Steps

- Sessional Meeting for 2000-2003 (Q1 2012)
- Next investigation 2004-2007
  - Data to be submitted by year-end 2011
  - Data cleaning/queries immediately
  - Accurate Amounts data
  - Including new generation products
  - Including Functional and Physical Impairment products
  - Report Finalised in 2013
Critical Illness 2000-2003

Norman Kelly
Overview of Investigation

• Period of Investigation:
  • Current Investigation 2000-2003 (4 yr period)
  • Previous Investigation 1995-1999 (5 yr period)

• Contributing companies: 4 of the following 5 companies
  • Liberty, Metropolitan, Momentum, Old Mutual, Sanlam

• Exposure and Claims
  • Exposure = 2.50m policy-years (95-99: 2.96m years)
  • Number of claims = 4 223 (95-99: 3 745 disabilities)
  • Overall observed crude rate = 1.69 per mille
Data Concerns

- Drop in exposure and claims from previous investigation

<table>
<thead>
<tr>
<th>Year</th>
<th>Claims</th>
<th>Exposure</th>
<th>Crude Observed Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>474</td>
<td>507,540</td>
<td>0.00093</td>
</tr>
<tr>
<td>1996</td>
<td>691</td>
<td>569,431</td>
<td>0.00121</td>
</tr>
<tr>
<td>1997</td>
<td>758</td>
<td>610,250</td>
<td>0.00124</td>
</tr>
<tr>
<td>1998</td>
<td>964</td>
<td>630,740</td>
<td>0.00153</td>
</tr>
<tr>
<td>1999</td>
<td>858</td>
<td>643,344</td>
<td>0.00133</td>
</tr>
<tr>
<td>1999 (new)</td>
<td>786</td>
<td>653,445</td>
<td>0.00120</td>
</tr>
<tr>
<td>2000</td>
<td>1,040</td>
<td>656,880</td>
<td>0.00158</td>
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<td>2001</td>
<td>1,090</td>
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<td>2002</td>
<td>987</td>
<td>621,392</td>
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<tr>
<td>2003</td>
<td>1,106</td>
<td>572,061</td>
<td>0.00193</td>
</tr>
</tbody>
</table>
Data Concerns

• Amounts or Lives analysis
  • Accurate Sum Insured not provided (amounts analysis difficult)
  • 91% claims settled at full sum insured (lives analysis appropriate?)

• Missing Data Fields - lots of Unknowns for most data fields
  • Cause of claim – only 2 companies
  • Accelerator/ Standalone – very few standalone policies?
  • Socio-economic rating class – 40% unknown
  • Province – 65% unknown
Claims Rate by Sex

Exposure (Life years)

Claims Rate (per mille)

Exposure  Males  Females

Smokers relative to Non-smokers

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>149%</td>
<td>140%</td>
<td>119%</td>
<td>108%</td>
<td>121%</td>
<td>121%</td>
<td>147%</td>
<td>100%</td>
</tr>
<tr>
<td>Males</td>
<td>99%</td>
<td>171%</td>
<td>178%</td>
<td>198%</td>
<td>192%</td>
<td>193%</td>
<td>155%</td>
<td>118%</td>
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</table>
Duration relative to Ultimate (Dur 4+)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Dur 0</td>
<td>37%</td>
<td>62%</td>
<td>109%</td>
<td>62%</td>
<td>76%</td>
<td>61%</td>
<td>84%</td>
<td>99%</td>
</tr>
<tr>
<td>Dur 1</td>
<td>36%</td>
<td>147%</td>
<td>117%</td>
<td>110%</td>
<td>83%</td>
<td>129%</td>
<td>64%</td>
<td>108%</td>
</tr>
<tr>
<td>Dur 2</td>
<td>72%</td>
<td>98%</td>
<td>109%</td>
<td>96%</td>
<td>107%</td>
<td>101%</td>
<td>110%</td>
<td>149%</td>
</tr>
<tr>
<td>Dur 3</td>
<td>23%</td>
<td>99%</td>
<td>95%</td>
<td>95%</td>
<td>96%</td>
<td>107%</td>
<td>113%</td>
<td>142%</td>
</tr>
<tr>
<td>Dur 4+</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
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## Cause of Claim

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<th></th>
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<tbody>
<tr>
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<td>60%</td>
<td>58%</td>
<td>49%</td>
<td>38%</td>
<td>52%</td>
<td>47%</td>
<td>37%</td>
<td>36%</td>
<td>27%</td>
<td>38%</td>
</tr>
<tr>
<td>Stroke</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>4%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>5%</td>
<td>2%</td>
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<tr>
<td>Cancer</td>
<td>24%</td>
<td>23%</td>
<td>28%</td>
<td>39%</td>
<td>28%</td>
<td>44%</td>
<td>55%</td>
<td>56%</td>
<td>54%</td>
<td>53%</td>
</tr>
<tr>
<td>Coronary Artery Surgery</td>
<td>3%</td>
<td>12%</td>
<td>17%</td>
<td>16%</td>
<td>13%</td>
<td>0%</td>
<td>1%</td>
<td>4%</td>
<td>10%</td>
<td>3%</td>
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<tr>
<td>Kidney Failure</td>
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<tr>
<td>Paraplegia</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Coma</td>
<td>6%</td>
<td>4%</td>
<td>3%</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Blindness</td>
<td>4%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>All Specified Causes</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Number of Claims</td>
<td>246</td>
<td>563</td>
<td>702</td>
<td>277</td>
<td>1 788</td>
<td>188</td>
<td>323</td>
<td>300</td>
<td>83</td>
<td>894</td>
</tr>
</tbody>
</table>

Males Females
Medical underwriting

[Graph showing claim rate per mille by age and gender for medical and non-medical exposures.]
Calendar Year relative to Average

<table>
<thead>
<tr>
<th>Year</th>
<th>26 - 30</th>
<th>31 - 35</th>
<th>36 - 40</th>
<th>41 - 45</th>
<th>46 - 50</th>
<th>51 - 55</th>
<th>56 - 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>75%</td>
<td>112%</td>
<td>102%</td>
<td>101%</td>
<td>101%</td>
<td>104%</td>
<td>102%</td>
</tr>
<tr>
<td>2001</td>
<td>102%</td>
<td>111%</td>
<td>105%</td>
<td>101%</td>
<td>109%</td>
<td>103%</td>
<td>92%</td>
</tr>
<tr>
<td>2002</td>
<td>140%</td>
<td>86%</td>
<td>82%</td>
<td>91%</td>
<td>90%</td>
<td>91%</td>
<td>86%</td>
</tr>
<tr>
<td>2003</td>
<td>88%</td>
<td>87%</td>
<td>112%</td>
<td>107%</td>
<td>100%</td>
<td>102%</td>
<td>117%</td>
</tr>
</tbody>
</table>
Next Steps

- Sessional Meeting for 2000-2003 (Q1 2012)
- Next investigation 2004-2007
  - Data to be submitted by year-end 2011
  - Data cleaning/queries immediately
  - Accurate Amounts data
  - Including new generation products
  - Report Finalised in 2013
Annuitant Mortality investigation

Jenny Ingram
Background

- Previous annuitant investigation covered the period 1996-2000
- Current annuitant investigation covers period 2001-2004
- Companies contributing to current investigation: Liberty, Metropolitan, Momentum, Old Mutual & Sanlam.
- Initial requests for data dates June 2005, last (reviewed) data set was received early 2011.
Data and challenges

- Understanding each company’s data submitted
- Standardizing the data sets before investigation can commence
- Resolving data queries with insurers
- Extent of IBNR deaths
- Very low crude rates observed for annuities within the guaranteed period
Comparisons

<table>
<thead>
<tr>
<th></th>
<th>Males aged 60+</th>
<th>Females aged 60+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaths</td>
<td>28 706</td>
<td>29 828</td>
</tr>
<tr>
<td>Deaths</td>
<td>9 116</td>
<td>8 173</td>
</tr>
<tr>
<td>Central exposed to risk</td>
<td>760 073</td>
<td>816 482</td>
</tr>
<tr>
<td></td>
<td>449 064</td>
<td>393 191</td>
</tr>
<tr>
<td>% of exposed to risk *</td>
<td>89%</td>
<td>84%</td>
</tr>
<tr>
<td></td>
<td>78%</td>
<td>69%</td>
</tr>
<tr>
<td>Crude rate</td>
<td>3.777%</td>
<td>3.653%</td>
</tr>
<tr>
<td></td>
<td>2.030%</td>
<td>2.079%</td>
</tr>
</tbody>
</table>

* % of exposed to risk for particular gender and investigation
Comparisons Continued

Comparison of 2001 - 2004 crude rates with previous investigation - Males

1996 - 2000: \( \mu (x + 0.5) \)
2001 - 2004: Crude \( m_x \) rates
Comparison of 2001 - 2004 crude rates with previous investigation - Females

1996 - 2000: \( \mu (x + 0.5) \)
2001 - 2004: Crude \( m_x \) rates

Interesting findings & facts

- Very low exposure for Voluntary annuities. Observed crude rates for Voluntary annuities lower than for compulsory annuities – but only for ages below 85

- For annuities within the guaranteed period, lower crude rates was observed compared to annuities with no/expired guaranteed period (males and females – total crude rates)

- Gap in expected lifespan after age 65 between males and females, +- 3.6 years (similar for previous investigation)
QUESTIONS