General Insurance Seminar

Insuring Tomorrow

Actuaries Institute

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DETERMINING ASBESTOS RELATED DISEASE LIABILITIES FOR A SELF INSURER

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Agenda

- Project specification
- Background on asbestos use
- Data Provided
- Methodology
- Uncertainty
- Questions

Description of Client

- Corporate Self-insurer with operations across Australia
- Worksite locations varying from small branches in rural areas with a few employees, to large buildings in major cities
- Client operating for several decades, fairly stable number of employees over time
- Client wanted to understand its exposure to asbestos claims as a corporate employer after a handful of claims had emerged
- This amount had previously never been quantified

Asbestos Risk Profile

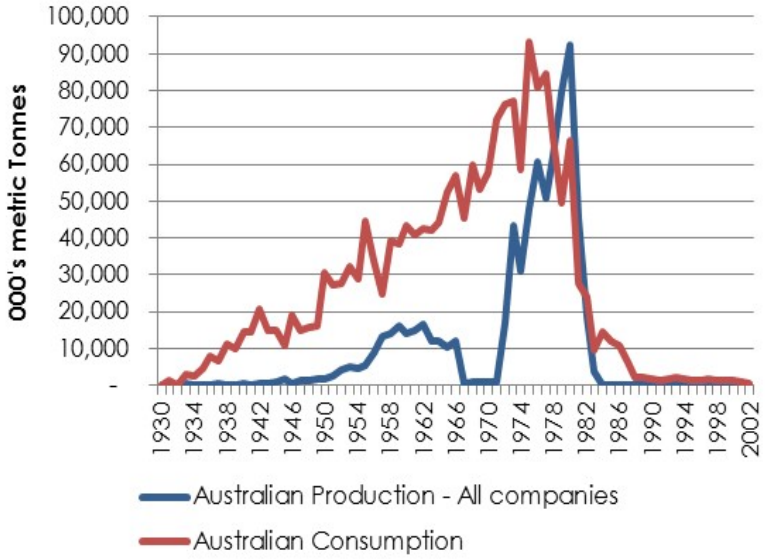
- Client does not operate in industries where there have been significant ARD claim numbers – e.g. mining, manufacturing and construction. Most studies have focussed on these industries
- Very low number of ARD claims to date
- Older buildings have/had asbestos materials
- Employees moving between sites
- Exposure depends on passing through sections of a building with exposed asbestos. Cannot be quantified and creates significant uncertainty

What is asbestos?

- Naturally occurring silicate minerals.
- Up to 90% of the asbestos use was for the manufacture of building products, especially asbestos cement materials.
- Asbestos use continued to increase throughout most of the 20th century until the carcinogenic (cancer-causing) effects of asbestos dust were discovered.
- Properties of Asbestos:
  - Sound absorption
  - Tensile strength
  - Resistance to fire, heat, electrical and chemical damage
  - Affordability.

Asbestos production and consumption

- Consumption of asbestos products peaked in the early to mid 1970s, majority of which was imported.
- Asbestos consumption continued at significant levels until the mid 1980's and then began to fall through to 2002.
- Asbestos use for building construction phased out during the mid 1980's - buildings continue to contain asbestos
- After that it was used for industrial purposes/plant materials
- Since 31 December, 2003, asbestos and all products containing asbestos have been banned throughout Australia.



Source: World Mineral Statistics Dataset, British Geological Survey, www.mineralsuk.com
R Virta, USGS Website Annual Yearbook

Asbestos Related Diseases

- Mesothelioma first diagnosed in 1909
- 1935, A possible link between occupational asbestos and mesothelioma observed, England.
- 1962, The first case of Mesothelioma diagnosed in Australia
- Australia: second-highest rate of mesothelioma deaths in the world

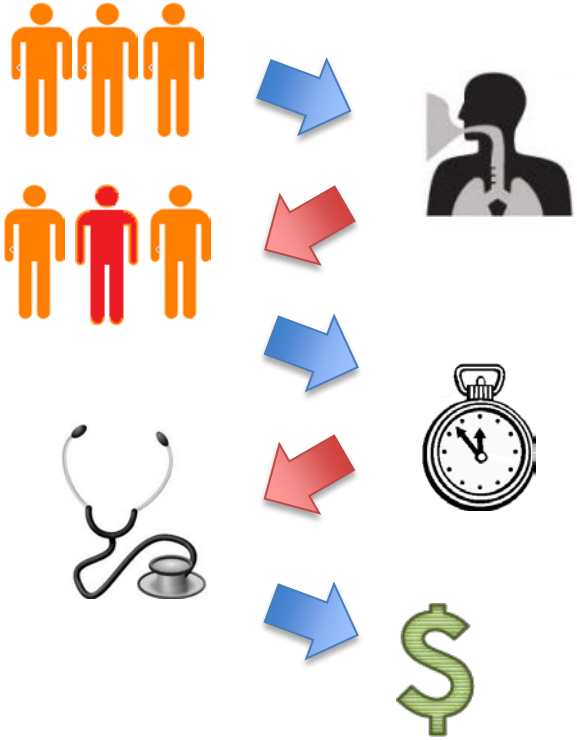
Mesothelioma	Malignant
Lung/Other Cancers	Malignant
Asbestosis	Non-malignant
Asbestos-Related Pleural Disease	Non-malignant(Not modelled)

Data provided

- Details of 5-20 claims reported to date
- Annual employee count from 1970's to current
- Distribution of current workforce: age, occupation type and years of service
- List of all locations including indicator if asbestos was found - most recent audit early 2000's
- Number of employees at each location (2013)

Methodology

- Each exposure year
- Incidence Rate
- Latency Period / IBNR proportion
- Claim Size



Issues in Determining Exposure

- Historical breakdown of employees by site, age, occupation type, and years of service, was not available
- The degree to which sites contain asbestos is based on recent information (early 2000's). % of sites containing asbestos likely reduced over time as asbestos may have been removed from some sites.
- A number of sites with asbestos (at the audit) have since closed down and employee counts were not available at those sites

Calculating Annual Exposure

- 73% of employees and 69% of locations based on the locations/employee file (2013) could be matched to the sites of the early 2000's audit
- 45% of employees (based on matched locations) were in locations with asbestos
- Assumed that clean up measures and better practices were effective at some point between 1985 and 2000.
- Assumed same employee risk mix each year – years of service, occupation type, age

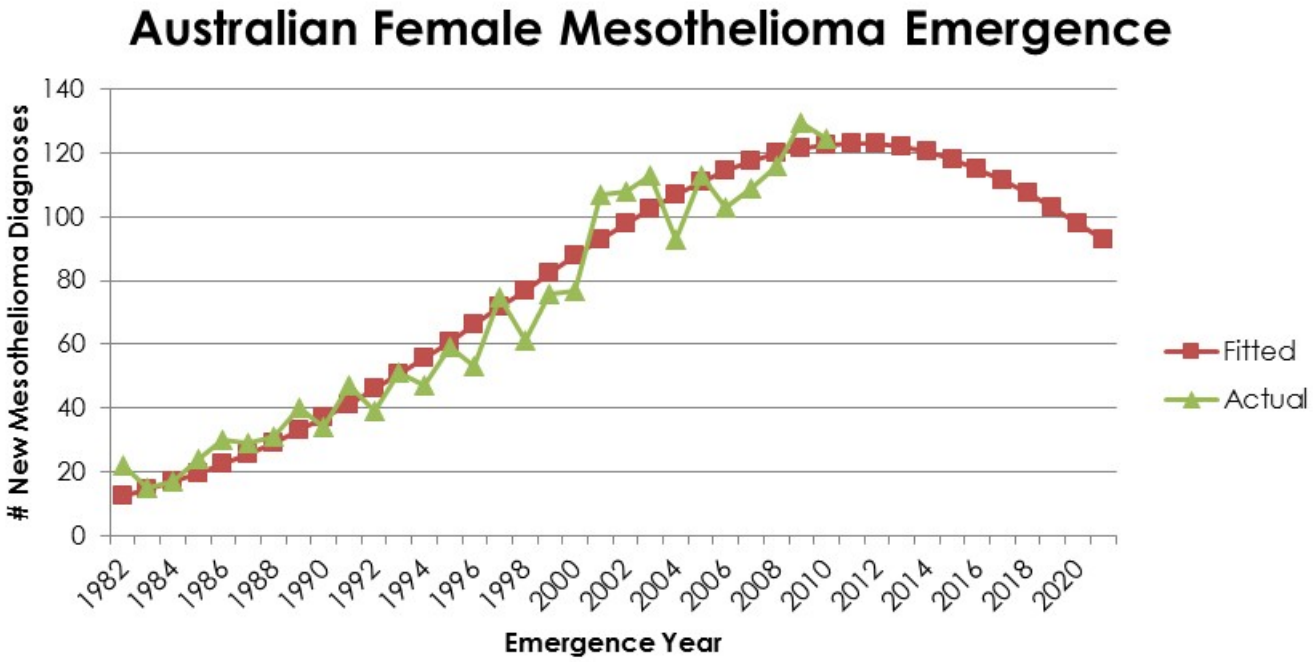
Incidence and Latency Rate

- Need a rate to apply to the exposure in a year.
- Insufficient claims data to derive incidence rates.
- Published Incidence Rates in the literature:
  - Incidence Rates based on population at emergence. Problem is population at emergence not exposure
  - Lifetime Rates: Considered using female rates as a proxy to low risk occupations, but it was not ideal
- Derived our own rate…
- Needed to determine Latency assumption before deriving an incident rate….

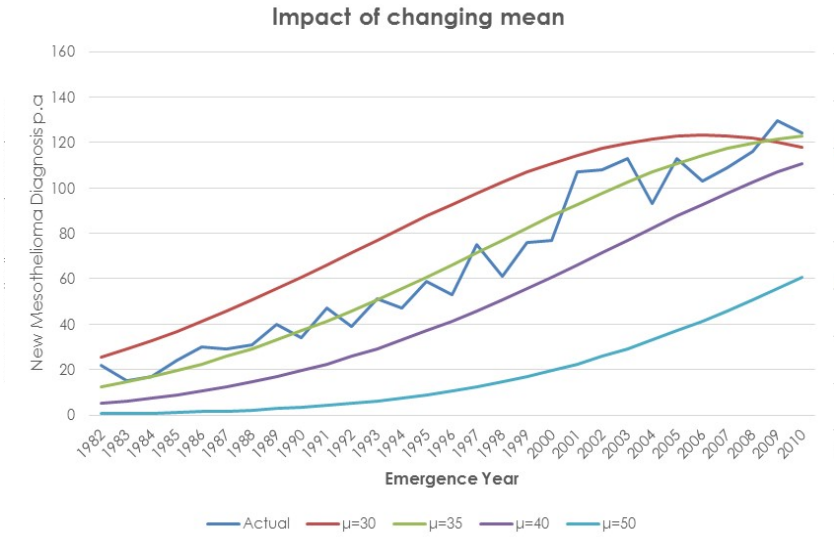
Latency

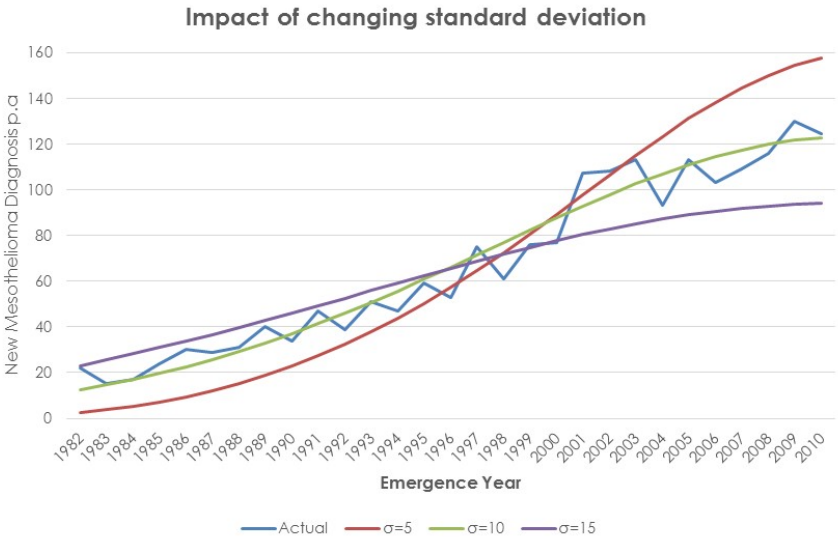
- Industry knowledge suggests the latency period of Mesothelioma claims is distributed Normal(35 years,10 years). Before applying, the assumption was validated Australian female population and claim numbers reported.
- Used same pattern for other disease types.
- Assumed delay to payment from diagnosis is 1 year for Malignant and 2 years for Non-Malignant.

Verification of Latency Assumption



Testing of Latency Assumptions





Portion of diagnoses that have not occurred (at 2014)/IBNR

Exposure Year	Proportion of Claims Expected to Emerge 2014 and later
1975/1976	36%
1976/1977	40%
1977/1978	44%
1978/1979	48%
1979/1980	52%
1980/1981	56%
1981/1982	60%
1982/1983	64%
1983/1984	67%
1984/1985	71%
1985/1986	74%
1986/1987	77%
1987/1988	80%
1988/1989	83%
1989/1990	85%
1990/1991	88%
1991/1992	89%
1992/1993	91%
1993/1994	93%
1994/1995	94%
1995/1996	95%
1996/1997	96%
1997/1998	97%
1998/1999	97%
1999/2000	98%
2000/2001	98%

Incidence Rate

Derived an Australia-wide Low-Risk employee lifetime rate (Mesothelioma) using

- Low Risk Labour Force numbers for Australia
- Published Mesothelioma incidences 1999-2001: Used Low Risk Industries only
- Assumed 45% of buildings had asbestos, and a N(35,10) latency
- Allowed for increase in exposure from 1955 to 1970, and improvement from 1985 to 2000
- Derived a lifetime rate that when applied to the annual exposure (adjusted for the number of buildings that had asbestos) generated the incidences that emerged.
- Based on benchmarks assumed a 1:1:1 relationship in the lifetime rate between Mesothelioma, Lung Cancer, and Asbestosis.

Back-tested derived rate against the actual numbers of claims reported.

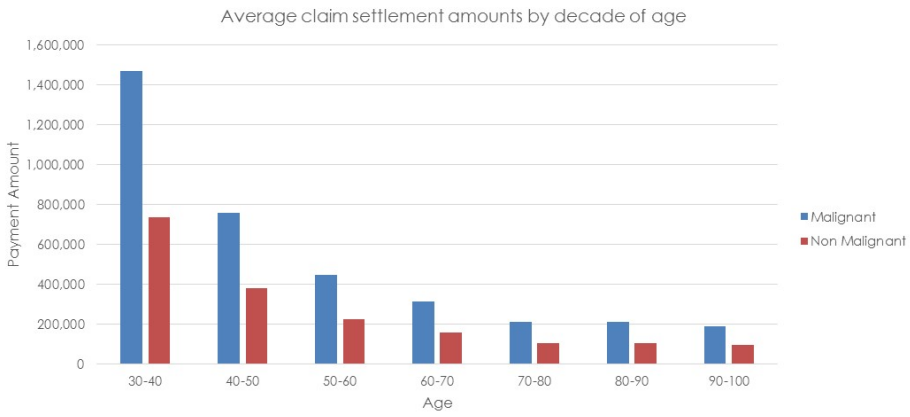
Incidence Rate Benchmarks

The derived rate was in the ballpark of published rates:

- A mesothelioma lifetime rate of 0.05% for females was presented in the paper: Leigh, J., Driscoll,T, D. (2002). Malignant mesothelioma in Australia, 1945–2002.
- A mesothelioma lifetime risk of 0.08% for men in non-industrial and low-risk industrial work was presented in the paper: Peto, J., et al. (2009)."Occupational, domestic and environmental Mesothelioma risks in Britain: A case-control study." Health and Safety Executive: Norwich, UK
- No detail of exact methodology used to derive these rates
- These rates may have included impact of home renovators

Average claim size

- We had insufficient data to differentiate between low earning and high earning occupations.
- Industry benchmarks used
- Claim sizes were based on number of years since exposure (based on an age assumption at exposure)
- Adjusted for Malignant and Non-Malignant diseases



Uncertainty

- **Uncertainty in the overall result from a number of factors**
  - Who in the premises comes into contact with asbestos dust, and when?
  - Unmatched location between employee data and asbestos audit – were they in an asbestos exposed site?
  - Asbestos completely removed before the 2000's audit?
  - Asbestos containment/OH&S measures (1985 – 2000). When was it improved and how effectively?
- **Created a Low and a High Scenario to give the client an indication of plausible range, but not a definitive lower or upper bound**

Impact of scenarios

Issue	Assumption	Low Scenario	High Scenario
- Who in the premises comes into contact with asbestos dust - When exposure occurs	Lifetime rate	1x	2.5x
-Unmatched locations -Asbestos removed prior audit	% Employees exposed	45%	60%
-Asbestos being removed from sites	Improvement Factor	Improvement from 1985 to 2000	Improvement from 2000

Questions