Asbestos-Related Cancer Research and Prevention

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Content:

- Global and local data on Asbestos-related disease
- High-quality population-based cancer registry data (Australian Mesothelioma Registry) and its role in preventing Asbestos-related cancer
- Other ways of preventing Asbestos-related disease
- Research at the Asbestos Diseases Research Institute (ADRI)
Malignant Mesothelioma in the global context
Global Asbestos consumption

Source: Analysis performed by the Dr Matthew Soeberg (Asbestos Diseases Research Institute) based on data provided on global asbestos consumption by the U.S. Geological Survey.
Exposure-Outcome Lag Time:
The Mesothelioma Epidemic Curve only appears at least two decades after Asbestos Consumption.

Malignant mesothelioma incidence and mortality is a function of asbestos exposure.

Measurement of asbestos exposure

Asbestos ban

Mesothelioma incidence or mortality rate

Calendar period

- Decade 1
- Decade 2
- Decade 3
- Decade 4
- Decade 5
- Decade 6
- Decade 7
- Decade 8
- Decade 9
- Decade 10

Asbestos consumption
Mesothelioma incidence rate
Median age-standardised Malignant Mesothelioma incidence rates per 100,000 by geographic region and calendar period (males)

Overall trend
Incidence rates still increasing but evidence for deceleration in some countries.

Differences by age group
Increase over time in incidence rate greater for people aged 65-74 years than for people aged 40-64 years.

The epidemic curve of Malignant Mesothelioma in Australia
Asbestos consumption: Australia, 1920-2013

Australia’s asbestos consumption peaked in the 1970s.

Asbestos import/export data, 1988-2013, are currently being analysed by the Asbestos Diseases Research Institute.

Monitors all new cases of Malignant Mesothelioma in Australia from 1 July 2010.

Includes fast-tracked incidence and mortality data.

Collects information from consenting patients in order to monitor patterns and levels of occupational and environmental asbestos exposure.

Allows people diagnosed with Mesothelioma to self-notify to the Australia Mesothelioma Registry.

Aims to prevent Mesothelioma in the future by informing government policy and providing a resource to researchers.

Funded by Safe Work Australia and Comcare and overseen by a consortium of key organisations.
Malignant Mesothelioma: Number of incident cases, Australia, 1982-2013

Between 1982 and 2013, 14,225 people were newly diagnosed with Malignant Mesothelioma.

Interpretation:

Recent data should be interpreted with care due to delays in notification of recent incident cases.

Source: Data from the Australian Institute of Health and Welfare (1982-2010) and the Australian Mesothelioma Registry (2011-2013) graphed by the ADRI
### Classification scheme for probability of asbestos exposure

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlikely</td>
<td>Low likelihood of asbestos exposure</td>
</tr>
<tr>
<td>Possible</td>
<td>Asbestos exposure may have occurred</td>
</tr>
<tr>
<td>Probable</td>
<td>Convincing information on asbestos exposure</td>
</tr>
</tbody>
</table>
Australian Mesothelioma Registry
Exposure assessment at 30 April 2014

Total new cases

Mesothelioma patients interviewed (n=350)

Occupational exposure indicated (n=213 (61%))

Occupational exposure not indicated (n=137 (39%))
Non-occupational exposure assessment summary, at 30 April 2014

Total new cases

Occupational exposure not indicated (n=137)

Non-occupational exposure indicated (n=114)

Non-occupational exposure not indicated/known (n=23)
### Job-specific interview modules assigned to Mesothelioma patients diagnosed in 2010–2014

<table>
<thead>
<tr>
<th>Job category</th>
<th>Types of jobs</th>
<th>No. participants*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trades</strong></td>
<td>Construction worker, Electrician, Plumber, Boilermaker, Welder etc.</td>
<td>203</td>
</tr>
<tr>
<td><strong>Land Transport</strong></td>
<td>Driver, Mechanic/Fitter/Panel beater etc.</td>
<td>56</td>
</tr>
<tr>
<td><strong>Water Transport</strong></td>
<td>Marine engineer/Mechanic</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Other seagoing jobs (including military navy)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shipwright/boat builder etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Asbestos users/Other</strong></td>
<td>Laundry worker &amp; many other jobs</td>
<td>35</td>
</tr>
</tbody>
</table>

*Allocated job questions at least once
## Asbestos exposure, 2010–2014
Sources of non-occupational asbestos exposure among participants without occupational exposure

<table>
<thead>
<tr>
<th>Non-occupational module section</th>
<th>Probability of exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unlikely</td>
</tr>
<tr>
<td>Lived in house made mainly of fibro</td>
<td>73</td>
</tr>
<tr>
<td>Lived near asbestos mine or asbestos products factory</td>
<td>130</td>
</tr>
<tr>
<td>Did major home renovations (asbestos products)</td>
<td>86</td>
</tr>
<tr>
<td>Lived in house during major renovations</td>
<td>68</td>
</tr>
<tr>
<td>Ever serviced car brakes/clutch</td>
<td>115</td>
</tr>
<tr>
<td>Lived with someone with asbestos-exposed job</td>
<td>114</td>
</tr>
<tr>
<td>Visited Wittenoom in Western Australia</td>
<td>125</td>
</tr>
<tr>
<td>Visited another Australian asbestos mining town</td>
<td>137</td>
</tr>
<tr>
<td>Other credible evidence</td>
<td>125</td>
</tr>
</tbody>
</table>
Prevention of Cancer

• **Primary prevention** = avoid exposure to carcinogens (smoking, asbestos etc.)

• **Secondary prevention** = preventing, delaying the occurrence of cancer in people with elevated risk (exposed to carcinogens)
Primary Prevention

- Lag time!
- Carefully review all dangerous exposures
- Make sure that occupational circumstances in Australia are safe
- Make sure that the Australian environment is safe
- Help developing countries in increasing their awareness (show them what we have learned)
Secondary Prevention

- Aspirin tested in Mouse Mesothelioma Model (WA, Perth) & checked in Human cohort (negative)
- Statins: no effect in Mouse Mesothelioma Model (WA, Perth) and Human cohort (negative)
- Animal studies at UTS (Sydney)
- Negative effect of vitamins (beta-carotene)
Research at the Asbestos Diseases Research Institute

- Systematic Review of the World’s literature on diagnosis and treatment of Malignant Pleural Mesothelioma
- Epidemiology & Prevention: Carefully studying the epidemiological data NSW, assist AMR, increase awareness in South East Asia (+APHEDA)
- Prognostic Markers for patient selection
- Study the biology of Tumour Suppressors in Malignant Mesothelioma (cell cultures, animal models)
- MesomiR-1 study, new treatment concept based on supplementing missing microRNAs for Malignant Mesothelioma and Lung Cancer (Phase I)
- Psychosocial research: emotional burden of (diagnosis of) Malignant Mesothelioma in patients and carers
Novel solution for microRNA delivery: Minicells or EngeneIC Delivery Vesicles (EDVs)
Conclusions

• Prevention of Asbestos-related diseases based on registration/exposure data (vital role for AMR)

• Better diagnostic pathways, better (treatment) selection of patients and new treatment avenues for Asbestos-related cancer are only identified by continued (collaborative) disease-oriented research

• We must show the world how Australia is dealing with its Asbestos Legacy and increase the awareness of the dangers of Asbestos in developing countries
Funding and acknowledgements

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