



NATIONAL OCCUPATIONAL HEALTH AND SAFETY COMMISSION

**THE INCIDENCE OF
MESOTHELIOMA IN AUSTRALIA 1998 to 2000**

AUSTRALIAN MESOTHELIOMA REGISTER REPORT 2003

Australian Mesothelioma Register

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SUMMARY

This publication is the fifteenth report of the Australian Mesothelioma Register (the Register), produced by the Data Analysis and Research Unit of the National Occupational Health and Safety Commission (NOHSC). Mesothelioma is a fatal form of cancer usually with a very long period between exposure and diagnosis.

Long-term data from the Register indicates that:

- (a) the incidence rates of malignant mesothelioma have been increasing in Australia since 1965. It is believed that these high rates of mesothelioma are related to the extensive use and production of asbestos in Australia in previous decades;
- (b) mesothelioma incidence rates are higher in males than females, possibly because of a higher exposure in male-dominated industries that produced or used asbestos (e.g. construction and manufacturing);
- (c) the 50-64, 65-79 and 80 plus age groups have the highest age-specific incidences of mesothelioma;
- (d) year-to-year fluctuations in age-specific mesothelioma cases are lower in persons older than 64 years than in younger persons on account of the former having large numbers; and
- (e) most Australian mesothelioma cases are cancerous lesions of the pleura. Mesothelioma cases affecting the peritoneum and other sites are fewer.

Based on the malignant mesothelioma cases recorded in 1998-2000:

- i. a number of jurisdictions (e.g. SA, VIC and NSW) probably underreported cases from cancer registries, especially in 2000. Therefore, figures reported for this period may not accurately reflect the true story. This is particularly so for Victoria in 1999 and 2000;
- ii. the Register is often notified of some backlog cases whose year of diagnosis occurred previous to the year of notification. When this happens, the number of notified cases in that notification year are inflated;
- iii. there is no firm indication of when the incidence rates of mesothelioma will start to decline in Australia;
- iv. incidence rates of malignant mesothelioma continue to be the highest in males; and
- v. Western Australia and South Australia have incidence rates above the national average, while New South Wales and Queensland have incidence rates approximating to the national average of 44-63 cases per million males. Rates for the Australian Capital Territory, Northern Territory and Tasmania are imprecise because they are based on low numbers, but the true underlying rates are likely to be well below the national average.

Since 1986 the Register has received 6,129 notifications of mesothelioma. Past employment history recorded as text on the mesothelioma case notification forms received by the Register in 1998-2000 was used to study occupational exposure to asbestos, given industry and occupation, with the view to improve efficiency in monitoring mesothelioma. The ANZSIC (ABS 1993) and ASCO (ABS 1997) coding systems were used to code for industry and occupation, respectively. Some de-identified cases were notified to the Register in 2002 from Victoria. These cases could not be coded for occupation and industry owing to lack of information on past employment. The remaining 1,172 cases notified to the Register in 1998-2000 were categorised as follows:

- (a) about 50% of the cases were uncodeable for industry and occupation;
- (b) close to 45% of the cases were uncodeable for occupational asbestos exposure and work-relatedness;
- (c) a third of the persons that were exposed to asbestos worked in the *Construction* industry and a quarter worked in the *Manufacturing* industry;

- (d) of the mesothelioma cases with a past asbestos exposure, close to 89% were work-related, about 3% were not work-related and the rest (8%) could not be classified;
- (e) of the persons with work-related mesothelioma, one in three had worked in the *Construction* industry and one in five had worked in the *Manufacturing* industry. Workers in the *Cultural and Recreational Services* industry had the fewest cases of occupational mesothelioma; and
- (f) most occupational asbestos exposures occurred among *Tradespersons/Related workers*, *Labourers/Related workers* or *Intermediate Production/Transport workers*. In general, *Service workers* (e.g. *Advanced Clerical/Service workers* and *Elementary Clerical workers*) had the fewest cases of occupational asbestos exposures.

INTRODUCTION

This document is the fifteenth report of the Australian Mesothelioma Register, produced by the Data Analysis and Research Unit of the National Occupational Health and Safety Commission (NOHSC).

Malignant mesothelioma is a cancer of the outer covering of the lung (the pleura) or the abdominal cavity (the peritoneum). Formerly rare, it is increasing in incidence throughout the industrial world and is very frequently associated with past exposure to asbestos. It is usually fatal and has no direct relation to smoking. Australia has the world's highest incidence rate (Takahashi et al, 1999; Tossavainen and Takahashi, 2000).

ASBESTOS PRODUCTION AND USE IN AUSTRALIA

In Australia, more chrysotile than amphibole asbestos was mined until 1939. With the commencement of mining at Wittenoom, Western Australia in 1937, crocidolite dominated production, until final closure in 1966. New South Wales, the first State to mine asbestos, also produced the largest tonnages of chrysotile (until 1983) as well as smaller quantities of amphibole (until 1949). With the closing of the crocidolite mine at Wittenoom, Australian asbestos production and exports declined. Imports of chrysotile also started to decline. The main sources of raw asbestos imports were from Canada (chrysotile) and South Africa (crocidolite and amosite). Consumption peaked in about 1975 at 70,000 tonnes/year.

In addition to imports of asbestos fibre, Australia also imported many manufactured asbestos products, including asbestos cement articles, asbestos yarn, cord and fabric, asbestos joint and millboard, asbestos friction materials and gaskets. The main sources of supply were the United Kingdom, USA, Federal Republic of Germany and Japan. In Australia, over 60% of all production and 90% of all consumption of asbestos fibre was used by the asbestos cement manufacturing industry. From about 1940 to the late 1960s all three types of asbestos were used in this industry. The use of crocidolite began being phased out from 1967. Amosite was used until the mid 1980s. Much of this industry output remains in service today in the form of "fibro" houses and water and sewerage piping. By 1954 Australia was number four in the Western world in gross consumption of asbestos cement products, after the USA, UK and France, and clearly first on a per capita basis. After World War II to 1954, 70,000 asbestos cement houses were built in the State of New South Wales alone (52% of all houses built). In Australia as a whole, until the 1960s, 25% of all new housing was clad in asbestos cement.

Exposures in the past were very high in some industries and jobs - (eg, 25 million particles per cubic foot (150 fibres/ml) in asbestos pulverisors and disintegrators in the asbestos cement industry; up to 600 fibres/ml in baggers at Wittenoom). Australia still imports about 1,500 tonnes a year of chrysotile fibre and some asbestos products a year, mainly friction material and gaskets. Handling of asbestos in place and removal operations are subject to a National Code of Practice. A series of regulations adopted in the late 1970s and early 1980s by the various States now impose exposure limits of 0.1 fibre/ml for crocidolite, amosite and mixtures and 0.1-1.0 fibre/ml for chrysotile (TWA 8 hr membrane filter method light microscopy, WHO fibres). In July 2003 a new chrysotile standard will be declared by NOHSC. On 17 October 2001, NOHSC declared a prohibition on the use of chrysotile asbestos in Australia. The prohibition will take effect simultaneously under regulations in each Australian OHS jurisdiction by no later than 31 December 2003.

The first reported case of mesothelioma, from Wittenoom, was in 1962 (McNulty, 1962). Retrospective search identified 658 cases (535 male, 123 female) occurring in Australia from 1945-1979 (Musk et al, 1989).

THE AUSTRALIAN MESOTHELIOMA PROGRAM AND REGISTER

The Australian Mesothelioma Surveillance Program (Ferguson et al, 1987) began on 1 January 1980. Formal voluntary notification of cases was actively sought from a network of respiratory physicians, pathologists, general and thoracic surgeons, medical superintendents, medical records administrators, State and Territory departments of occupational health, cancer registries, compensation authorities or any other source. A full occupational and environmental history was obtained for each case, either from the patient or next-of-kin. The history taking was non-directive but included specific questions on asbestos exposure at the end. Occupational and environmental exposure was based on the opinions of two experienced hygienists, who were not independent or blinded as to disease status. The diagnosing pathologist was requested to provide slides and/or tissue specimens. These were circulated among a pathology expert panel for confirmation of diagnosis. Post-mortem examination was actively sought in every case in order to confirm diagnosis and to obtain lung tissue free of tumour for lung fibre content analysis.

From 1 January 1986, a less detailed notification system has operated, with a short questionnaire history, which is followed up by mail. In the case of all WA and most of the NSW notifications (comprising 60% of the total Australian notifications), detailed occupational and environmental exposure histories from interview are available from the WA Mesothelioma Register and the NSW Dust Diseases Board. Only histologically confirmed cases are accepted but there is no pathology panel diagnosis confirmation. This is now known as the Australian Mesothelioma Register but is a continuation of the Program. Cross checks with State cancer registries are regularly carried out. Annual incidence reports are published (NIOHS (AGPS) 1989 – 1996; NOHSC (AGPS) 1997-2002). Recent reviews are available (Leigh, 1994; Leigh 2001a, 2001a; Leigh et al, 2001; Leigh et al, 2002a, 2002b; Leigh and Robinson, 2001).

This report includes data on cases notified to the register and diagnosed in 1998, 1999 and 2000. Reconciliation with only some State cancer registries has been carried out, and under-reporting for 2000, 2001 and 2002 might be expected because of the recent changes in Commonwealth and State privacy legislation.

Full analysis of incidence in 2001, 2002 and 2003 awaits reconciliation checks with State cancer registries. However, notifications for 2001, 2002 and 2003 (to 31 March 2003) were respectively 685, 323 and 97.

NOHSC acknowledges the continued cooperation of the notification network.

STATISTICS

Incidence in a calendar year is defined as the number of new cases of mesothelioma first occurring* in an Australian State or Territory in that year. Age specific incidence rates are computed from population tables published by the Australian Bureau of Statistics for the estimated resident mid year populations for 1998, 1999 and 2000 (estimates based on Census 30 June, 1996). Standardised incidence rates (SI) were calculated using the "World Standard Population" 20 years of age or greater¹.

The cumulative incidence rate (CR) is obtained by summing the annual incidence rates (assumed constant in each 5 year group). It can be shown, for rare diseases like mesothelioma, that the cumulative incidence rate approximates the cumulative risk, or probability, of developing the disease in a lifetime². This can be expressed as a percentage. Thus the figure 0.36 in table 3 for NSW (males) under CR indicates a 0.38% or 0.0038 lifetime (20-75) risk of developing mesothelioma. Therefore, the chance of developing mesothelioma between the ages 20-75 is approximately 1 in 263.

The following section presents information on the number of cases (Tables 1, 2, 5, 6, 9 and 10) and the incidence of cases (Tables 3, 4, 7, 8, 11, and 12). The incidence tables include summary rows for the crude all-age incidence rates (labelled "All ages"), the age-standardised incidence rates (labelled "SI") and the cumulative risks (labelled "CR"). The final row is the inverse of the cumulative risk, which is the lifetime risk expressed in terms of "1 chance in xx".

The occupation and industry of the mesothelioma cases notified to the Register in 1998-2000 are reported in Tables 13-22.

- * "First occurrence" is the earliest known date of diagnosis (presumptive or confirmed). Cases where a presumptive diagnosis had been rejected before the date of this report (December 2003) have been excluded.
- 1. Waterhouse, J., Muir, C., Shanmugaratnam, K., & Powell, J., eds, *Cancer Incidence in Five Continents Volume IV*, Lyon (IARC Scientific Publications No 42, 1982) pp 671- 674.
- 2. Breslow, N. & Day, N., *Statistical Methods in Cancer Research Volume I*, Lyon (IARC Scientific Publications No 32, 1980) pp 51-52.

Table 1: Male cases of mesothelioma in Australia, 1998 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	1	0	1	0	1	0	0	0	3
40-44	2	1	0	1	0	0	0	0	4
45-49	2	3	1	0	0	0	0	0	6
50-54	7	17	1	3	1	0	0	0	29
55-59	17	6	10	5	9	0	0	0	47
60-64	11	8	15	15	11	1	0	0	61
65-69	29	13	9	2	10	2	0	0	65
70-74	26	19	9	7	13	2	0	1	77
75-79	22	16	13	8	6	0	0	0	65
80-84	16	11	5	3	4	0	0	0	39
85+	7	4	2	7	2	0	0	0	22
ALL AGES	140	98	66	51	57	5	0	1	418

Table 2: Female cases of mesothelioma in Australia, 1998 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	0	0	0	0	0	0	0	0	0
40-44	1	0	0	0	0	0	0	0	1
45-49	2	2	0	2	1	0	0	0	7
50-54	1	1	0	2	0	1	0	0	5
55-59	2	1	0	0	0	0	0	0	3
60-64	3	1	2	0	1	1	0	0	8
65-69	4	3	0	1	1	0	0	0	9
70-74	2	3	1	1	1	0	0	0	8
75-79	5	1	1	1	1	0	0	0	9
80-84	3	1	1	0	1	0	0	0	6
85+	2	1	0	0	1	0	0	0	4
ALL AGES	25	14	5	7	7	2	0	0	60

Table 3: Age specific incidence rates for mesothelioma per million males in Australia, 1998 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35-39	3.9	0.0	7.4	0.0	13.4	0.0	0.0	0.0	4.0
40-44	8.5	5.8	0.0	18.1	0.0	0.0	0.0	0.0	5.7
45-49	9.1	18.9	8.1	0.0	0.0	0.0	0.0	0.0	9.2
50-54	34.9	118.4	9.0	63.8	17.3	0.0	0.0	0.0	49.1
55-59	112.0	54.2	121.0	139.1	210.9	0.0	0.0	0.0	105.4
60-64	87.6	87.5	234.8	491.2	337.1	104.3	0.0	0.0	169.3
65-69	246.9	152.4	154.0	68.4	338.3	222.8	0.0	0.0	194.5
70-74	258.2	259.9	181.3	262.5	535.9	259.6	0.0	331.7	269.2
75-79	308.0	316.6	368.6	424.3	363.7	0.0	0.0	0.0	324.2
80-84	412.1	394.0	256.3	284.7	447.4	0.0	0.0	0.0	354.3
85+	304.0	221.0	164.6	1082.8	333.1	0.0	0.0	0.0	322.1
ALL AGES	62.3	59.4	54.3	95.8	88.1	30.7	0.0	9.4	63.1
SI	50.4	48.5	49.4	79.8	86.7	26.7	0.0	11.1	54.0
CR	0.38	0.35	0.36	0.52	0.73	0.29	0.00	0.17	0.40
LIFETIME RISK 1 in:	263	287	280	192	138	341	-	603	248

Table 4: Age specific incidence rates for mesothelioma per million females in Australia, 1998 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35-39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40-44	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
45-49	9.2	12.4	0.0	37.7	15.5	0.0	0.0	0.0	10.8
50-54	5.2	7.0	0.0	42.3	0.0	68.6	0.0	0.0	8.8
55-59	13.5	9.2	0.0	0.0	0.0	0.0	0.0	0.0	7.0
60-64	23.2	10.5	31.3	0.0	29.9	100.2	0.0	0.0	21.6
65-69	32.4	33.3	0.0	32.4	33.2	0.0	0.0	0.0	25.8
70-74	17.0	34.9	18.1	32.5	37.2	0.0	0.0	0.0	24.2
75-79	52.4	14.4	22.2	38.9	46.3	0.0	0.0	0.0	33.6
80-84	46.6	21.6	33.1	0.0	68.2	0.0	0.0	0.0	33.3
85+	36.6	24.1	0.0	0.0	75.2	0.0	0.0	0.0	25.6
ALL AGES	10.7	8.1	4.0	12.5	10.8	11.6	0.0	0.0	8.7
SI	8.0	6.6	3.3	10.6	8.4	12.4	0.0	0.0	7.0
CR	0.05	0.05	0.02	0.07	0.06	0.08	0.00	0.00	0.05
LIFETIME RISK 1 in:	1908	1865	4045	1380	1728	1185	-	-	2008

Table 5: Male cases of mesothelioma in Australia, 1999 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0	1	0	0	0	0	0	0	1
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	1	0	0	0	1
35-39	1	1	0	0	0	0	0	0	2
40-44	0	0	1	1	2	0	0	0	4
45-49	4	1	2	0	0	0	0	0	7
50-54	5	4	3	2	7	0	0	3	24
55-59	8	3	9	6	2	1	0	0	29
60-64	12	9	10	10	6	0	0	0	47
65-69	28	4	10	11	10	0	0	2	65
70-74	30	4	5	10	9	1	0	2	61
75-79	32	4	9	12	8	0	0	1	66
80-84	14	2	5	6	9	1	0	0	37
85+	9	0	7	4	3	0	0	0	23
ALL AGES	143	33	61	62	57	3	0	8	367

Table 6: Female cases of mesothelioma in Australia, 1999 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	2	0	0	0	0	0	0	0	2
35-39	0	0	0	0	0	0	0	0	0
40-44	0	0	0	0	0	0	0	0	0
45-49	3	0	0	0	0	0	0	0	3
50-54	1	1	2	2	0	0	0	0	6
55-59	4	1	0	3	1	0	0	0	9
60-64	1	1	1	2	0	0	0	0	5
65-69	2	0	0	1	0	0	0	0	3
70-74	5	1	1	1	3	0	0	0	11
75-79	5	2	3	0	3	0	0	0	13
80-84	2	1	3	2	0	0	0	0	8
85+	3	0	1	0	0	0	0	0	4
ALL AGES	28	7	11	11	7	0	0	0	64

Table 7: Age specific incidence rates for mesothelioma per million males in Australia, 1999 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	1.4
25-29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-34	0.0	0.0	0.0	0.0	14.1	0.0	0.0	0.0	1.4
35-39	3.9	5.4	0.0	0.0	0.0	0.0	0.0	0.0	2.7
40-44	0.0	0.0	7.7	18.0	27.8	0.0	0.0	0.0	5.7
45-49	18.0	6.2	16.1	0.0	0.0	0.0	0.0	0.0	10.5
50-54	24.2	27.0	25.9	41.0	115.5	0.0	0.0	282.1	39.2
55-59	50.4	26.2	103.0	161.4	44.6	82.7	0.0	0.0	62.2
60-64	91.8	94.9	144.8	320.0	169.7	0.0	0.0	0.0	124.1
65-69	240.8	47.0	170.8	381.4	337.4	0.0	0.0	514.9	195.4
70-74	294.4	54.1	98.5	372.8	363.7	128.5	0.0	644.3	210.3
75-79	425.2	74.2	242.0	601.4	452.4	0.0	0.0	442.5	310.7
80-84	355.0	71.6	252.0	568.2	1010.3	323.4	0.0	0.0	333.1
85+	366.5	0.0	543.6	577.6	468.6	0.0	0.0	0.0	315.5
ALL AGES	62.7	19.7	49.3	115.7	86.2	18.4	0.0	73.9	54.5
SI	48.6	18.2	43.5	88.4	77.0	12.5	0.0	78.1	45.3
CR	0.36	0.13	0.28	0.65	0.54	0.11	0.00	0.72	0.33
LIFETIME RISK 1 in:	276	751	353	154	186	947	-	139	306

Table 8: Age specific incidence rates for mesothelioma per million females in Australia, 1999 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-34	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8
35-39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40-44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45-49	13.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5
50-54	5.0	6.8	18.1	40.8	0.0	0.0	0.0	0.0	10.1
55-59	25.9	8.8	0.0	80.7	23.8	0.0	0.0	0.0	20.0
60-64	7.6	10.3	15.0	61.6	0.0	0.0	0.0	0.0	13.2
65-69	16.4	0.0	0.0	32.7	0.0	0.0	0.0	0.0	8.7
70-74	42.7	11.7	17.9	32.7	110.4	0.0	0.0	0.0	33.4
75-79	49.8	27.3	63.9	0.0	131.4	0.0	0.0	0.0	46.1
80-84	31.3	21.9	98.6	117.3	0.0	0.0	0.0	0.0	44.8
85+	51.9	0.0	36.7	0.0	0.0	0.0	0.0	0.0	24.3
ALL AGES	11.9	4.0	8.7	19.6	10.6	0.0	0.0	0.0	9.2
SI	8.6	2.9	5.3	16.6	7.5	0.0	0.0	0.0	6.7
CR	0.06	0.02	0.03	0.12	0.07	0.00	0.00	0.00	0.05
LIFETIME RISK 1 in:	1670	5318	3919	805	1490	-	-	-	2158

Table 9: Male cases of mesothelioma in Australia, 2000 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	0	0	0	0	0	0	0	0	0
40-44	0	0	0	0	1	0	0	0	1
45-49	2	0	2	0	1	0	0	0	5
50-54	7	1	4	1	1	0	0	1	15
55-59	14	4	8	6	4	0	0	0	36
60-64	18	2	8	3	12	0	0	1	44
65-69	26	2	18	3	4	3	0	0	56
70-74	24	3	11	3	6	4	0	0	51
75-79	15	4	8	3	12	0	0	0	42
80-84	13	0	3	4	6	0	0	0	26
85+	9	1	7	2	5	0	0	0	24
ALL AGES	128	17	69	25	52	7	0	2	300

Table 10: Female cases of mesothelioma in Australia, 2000 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	2	0	0	0	1	0	0	0	3
40-44	1	0	0	0	0	0	0	0	1
45-49	0	0	0	0	1	0	0	0	1
50-54	1	0	1	1	1	0	0	0	4
55-59	0	0	1	1	0	1	0	0	3
60-64	3	1	0	0	1	0	0	0	5
65-69	1	0	0	0	1	0	0	0	2
70-74	7	0	2	1	1	0	0	0	11
75-79	3	1	2	2	0	0	0	0	8
80-84	2	0	1	2	0	0	0	0	5
85+	1	1	2	0	1	0	0	0	5
ALL AGES	21	3	9	7	7	1	0	0	48

Table 11: Age specific incidence rates for mesothelioma per million males in Australia, 2000 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35-39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40-44	0.0	0.0	0.0	0.0	13.6	0.0	0.0	0.0	1.4
45-49	8.9	0.0	15.9	0.0	14.5	0.0	0.0	0.0	7.5
50-54	33.0	6.5	33.4	19.9	15.8	0.0	0.0	90.2	23.8
55-59	84.7	33.6	86.4	154.1	85.2	0.0	0.0	0.0	73.9
60-64	133.6	20.5	110.1	93.7	326.1	0.0	0.0	190.5	112.3
65-69	226.0	23.7	305.3	106.1	134.0	334.6	0.0	0.0	169.2
70-74	233.1	39.8	212.9	111.1	236.4	503.4	0.0	0.0	173.2
75-79	195.1	72.2	209.5	147.2	662.2	0.0	0.0	0.0	193.0
80-84	311.4	0.0	141.7	356.8	627.9	0.0	0.0	0.0	220.2
85+	347.2	49.3	511.3	271.9	747.5	0.0	0.0	0.0	312.1
ALL AGES	55.4	10.0	54.6	46.4	77.3	42.9	0.0	18.3	43.9
SI	46.0	8.3	48.8	34.9	68.6	33.5	0.0	20.2	37.2
CR	0.36	0.06	0.38	0.24	0.41	0.42	0.00	0.14	0.28
LIFETIME RISK 1 in:	278	1611	262	412	242	239	-	712	356

Table 12: Age specific incidence rates for mesothelioma per million females in Australia, 2000 by age and jurisdiction

Age group (Years)	Jurisdiction								
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUST
20-24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35-39	7.9	0.0	0.0	0.0	13.5	0.0	0.0	0.0	4.0
40-44	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
45-49	0.0	0.0	0.0	0.0	14.7	0.0	0.0	0.0	1.5
50-54	4.9	0.0	8.7	19.8	16.9	0.0	0.0	0.0	6.5
55-59	0.0	0.0	11.3	25.7	0.0	81.6	0.0	0.0	6.4
60-64	22.4	10.1	0.0	0.0	28.0	0.0	0.0	0.0	12.9
65-69	8.3	0.0	0.0	0.0	32.6	0.0	0.0	0.0	5.8
70-74	59.8	0.0	35.6	32.9	36.0	0.0	0.0	0.0	33.2
75-79	29.5	13.4	41.5	73.0	0.0	0.0	0.0	0.0	27.9
80-84	30.0	0.0	31.5	112.6	0.0	0.0	0.0	0.0	26.8
85+	16.7	22.1	70.2	0.0	67.6	0.0	0.0	0.0	29.1
ALL AGES	8.8	1.7	7.0	12.4	10.4	5.8	0.0	0.0	6.8
SI	6.4	1.1	4.2	6.6	9.5	5.4	0.0	0.0	4.8
CR	0.05	0.01	0.03	0.04	0.07	0.04	0.00	0.00	0.04
LIFETIME RISK 1 in:	1862	19850	3596	2550	1410	2451	-	-	2791

Table 13: Number of mesothelioma cases associated with a past asbestos exposure and industry (level 1) in Australia, 1998-2000

Industry	Asbestos exposure					Total	%Yes
	Yes	No	Possibly	Unknown			
Construction	174	6	8	20	208	31.4	
Manufacturing	145	4	6	16	171	26.2	
Government Administration and Defence	50	2	3	9	64	9.0	
Transport and Storage	37	1	4	8	50	6.7	
Communication	23	6	7	11	47	4.2	
Retail Trade	13	5	1	2	21	2.3	
Mining	17	1	1	1	20	3.1	
Electricity, Gas and Water	15	0	1	0	16	2.7	
Agriculture, Forestry and Fishing	10	1	1	1	13	1.8	
Cultural and Recreational Services	6	0	0	1	7	1.1	
Not known	64	8	24	459	555	11.6	
Total	554	34	56	528	1,172	100.0	

Table 14: Number of mesothelioma cases associated with a past asbestos exposure and industry (level 2) in Australia, 1998-2000
Percentage distribution of asbestos exposure is shown in each industry.

Industry	Asbestos Exposure					%
	Yes	No	Possibly	Unknown	Total	
<i>Agriculture, Forestry and Fishing</i>						
Agriculture	5	1	1	1	8	0.4
Agricultural Services	2	0	0	0	2	0.2
Forestry and Logging	2	0	0	0	2	0.2
Commercial Fishing	1	0	0	0	1	0.1
<i>Mining</i>						
Metal Ore Mining	14	1	1	0	16	1.2
Coal Mining	1	0	0	0	1	0.1
<i>Manufacturing</i>						
Machinery Equipment Manufacturing	54	0	2	1	57	4.6
Metal Product Manufacturing	30	0	0	8	38	2.6
Non-Metallic Mineral Product Manufacturing	35	0	1	0	36	3.0
Textile, Clothing, Footwear and Leather Manufacturing	9	1	1	1	12	0.8
Petroleum, Coal, Chemical and Associated Product	3	1	1	2	7	0.3
Food, Beverage and Tobacco Manufacturing	5	0	0	1	6	0.4
Other Manufacturing	4	0	0	1	5	0.3
Wood and Paper Product Manufacturing	1	1	1	2	5	0.1
<i>Electricity, Gas and Water</i>						
Electricity and Gas	13	0	1	0	14	1.1
Water Supply, Sewerage and Drainage Services	2	0	0	0	2	0.2
<i>Construction</i>						
Construction and Trade Services	131	6	6	13	156	11.2
General Construction	40	0	2	6	48	3.4
Personal Household Goods Wholesaling	3	1	0	1	5	0.3
Basic Material Wholesaling	2	0	0	0	2	0.2
Machinery and Motor Vehicle Wholesaling	1	0	0	0	1	0.1
<i>Retail Trade</i>						
Motor Vehicle Retailing and Services	10	0	1	2	13	0.9
Accommodation, Cafes and Restaurants	0	4	0	0	4	0.0
<i>Transport and Storage</i>						
Services to Transport	22	1	2	1	26	1.9
Road Transport	8	0	1	5	14	0.7
Rail Transport	6	0	0	0	6	0.5
Other Transport	0	0	0	1	1	0.0
Water Transport	0	0	1	0	1	0.0
Storage	1	0	0	1	2	0.1
<i>Communication</i>						
Business Services	21	4	7	9	41	1.8
Finance	0	1	0	2	3	0.0
Postal and Courier Services	2	1	0	0	3	0.2
<i>Government Administration and Defence</i>						
Defence	43	0	2	0	45	3.7
Education	3	1	0	3	7	0.3
Health Services	2	0	1	4	7	0.2
Government Administration	2	1	0	1	4	0.2
<i>Cultural and Recreational Services</i>						
Printing, Publishing and Recorded Media	4	1	0	0	5	0.3
Other Services	3	0	0	1	4	0.3
Personal Services	2	0	0	0	2	0.2
Community Services	0	0	0	1	1	0.0
Motion Picture, Radio and Television Services	1	0	0	0	1	0.1
<i>Not known</i>	66	8	24	460	558	5.6
Total	554	34	56	528	1,172	47.3

Table 15: Number of work-related mesothelioma cases and industry (level 1) in Australia, 1998-2000
Percentage distribution of work-related cases is shown in each industry.

Industry	Work-relatedness			Total	%
	Yes	No	Unknown		
Agriculture, Forestry and Fishing	12	1	0	13	1.1
Mining	20	0	0	20	1.7
Manufacturing	171	0	0	171	14.6
Electricity, Gas and Water	15	1	0	16	1.4
Construction	205	1	2	208	17.7
Retail Trade	21	0	0	21	1.8
Transport and Storage	49	1	0	50	4.3
Communication	46	1	0	47	4.0
Government Administration and Defence	62	1	1	64	5.5
Cultural and Recreational Services	7	0	0	7	0.6
Not known	11	25	519	555	47.4
Total	619	31	522	1,172	100.0

Table 16: Number of work-related mesothelioma cases and industry (level 2) in Australia, 1998-2000

Percentage distribution of work-related cases is shown in each industry.

Industry	Work-relatedness				
	Yes	No	Unknown	Total	%
<i>Agriculture, Forestry and Fishing</i>					
Agriculture	7	1	0	8	0.6
Agricultural Services	2	0	0	2	0.2
Forestry and Logging	2	0	0	2	0.2
Commercial Fishing	1	0	0	1	0.1
<i>Mining</i>					
Metal Ore Mining	16	0	0	16	1.4
Coal	1	0	0	1	0.1
<i>Manufacturing</i>					
Machinery Equipment Manufacturing	57	0	0	57	4.9
Metal Product Manufacturing	38	0	0	38	3.2
Non-Metallic Mineral Product Manufacturing	36	0	0	36	3.1
Textile, Clothing, Footwear and Leather Manufacturing	12	0	0	12	1.0
Petroleum, Coal, Chemical and Associated Product Manufacturing	7	0	0	7	0.6
Food, Beverage and Tobacco Manufacturing	6	0	0	6	0.5
Other Manufacturing	5	0	0	5	0.4
Wood and Paper Product Manufacturing	5	0	0	5	0.4
<i>Electricity, Gas and Water Supply</i>					
Electricity and Gas	13	1	0	14	1.1
Water Supply, Sewerage and Drainage Services	2	0	0	2	0.2
<i>Construction</i>					
Construction and Trade Services	156	0	0	156	13.3
General Construction	45	1	2	48	3.8
Personal Household Good Wholesaling	5	0	0	5	0.4
Basic Material Wholesaling	2	0	0	2	0.2
Machinery and Motor Vehicle Wholesaling	1	0	0	1	0.1
<i>Retail Trade</i>					
Motor Vehicle Retailing and Services	13	0	0	13	1.1
Accommodation, Cafes and Restaurants	4	0	0	4	0.3
<i>Transport and Storage</i>					
Services to Transport	26	0	0	26	2.2
Road Transport	14	0	0	14	1.2
Rail Transport	6	0	0	6	0.5
Other Transport	0	1	0	1	0.0
Water Transport	1	0	0	1	0.1
Storage	2	0	0	2	0.2
<i>Communication</i>					
Business Services	40	1	0	41	3.4
Finance	3	0	0	3	0.3
Postal and Courier Services	3	0	0	3	0.3
<i>Government Administration and Defence</i>					
Defence	45	0	0	45	3.8
Education	6	0	1	7	0.5
Health Services	7	0	0	7	0.6
Government Administration	3	1	0	4	0.3
<i>Cultural and Recreational Services</i>					
Printing, Publishing and Recorded Media	5	0	0	5	0.4
Other Services	4	0	0	4	0.3
Personal Services	2	0	0	2	0.2
Community Services	1	0	0	1	0.1
Motion Picture, Radio and Television Services	1	0	0	1	0.1
<i>Not known</i>	14	25	519	558	1.2
Total	619	31	522	1172	52.8

Table 17: Number of mesothelioma cases associated with a past asbestos exposure and occupation (level 1) in Australia, 1998-2000
Percentage distribution of asbestos exposure is shown in each occupation.

Occupation	Asbestos Exposure					%Yes
	Yes	No	Possibly	Unknown	Total	
Managers and Administrators	24	2	5	10	41	58.5
Professionals	31	3	3	10	47	66.0
Associate Professionals	21	1	1	6	29	72.4
Tradespersons and Related Workers	258	8	11	24	301	85.7
Advanced Clerical and Service Workers	2	2	0	0	4	50.0
Intermediate Clerical, Sales and Service Workers	8	4	2	4	18	44.4
Intermediate Production and Transport Workers	57	2	3	10	72	79.2
Elementary Clerical, Sales and Service Workers	6	3	1	2	12	50.0
Labourers and Related Workers	84	2	6	6	98	85.7
Not known	63	7	24	456	550	11.5
Total	554	34	56	528	1,172	47.3

Table 18: Number of mesothelioma cases associated with a past asbestos exposure and occupation (level 2) in Australia, 1998-2000
Percentage distribution of asbestos exposure is shown in each occupation.

Occupation	Asbestos Exposure					%Yes
	Yes	No	Possibly	Unknown	Total	
<i>Managers and Administrators</i>						
Generalist Managers	19	1	4	8	32	78.0
Farmers and Farm Managers	4	1	0	1	6	14.6
Specialist Managers	1	0	1	1	3	7.3
<i>Professionals</i>						
Science, Building and Engineering Professionals	23	1	1	3	28	59.6
Business and Information Professionals	3	1	0	1	5	10.6
Health Professionals	2	0	0	3	5	10.6
Social, Arts and Miscellaneous Professionals	3	0	2	0	5	10.6
Education Professionals	0	1	0	3	4	8.5
<i>Associate Professionals</i>						
Other Associate Professionals	14	0	0	3	17	58.6
Science, Engineering and Related Associate Professionals	4	0	1	2	7	24.1
Health and Welfare Associate Professionals	0	1	0	0	1	3.4
Sales and Service Supervisors	3	0	0	1	4	13.8
<i>Tradespersons and Related Workers</i>						
Construction Tradespersons	105	4	5	10	124	41.2
Mechanical and Fabrication Engineering Tradespersons	80	1	0	6	87	28.9
Other Tradespersons and Related Workers	39	2	4	4	49	16.3
Electrical and Electronics Tradespersons	25	1	1	2	29	9.6
Automotive Tradespersons	9	0	1	2	12	4.0
<i>Advanced Clerical and Service Workers</i>						
Other Advanced Clerical and Service Workers	0	2	0	0	2	50.0
Secretaries and Personal Assistants	2	0	0	0	2	50.0
<i>Intermediate Clerical, Sales and Service Workers</i>						
Intermediate Clerical Workers	6	2	2	4	14	77.8
Intermediate Service Workers	1	2	0	0	3	16.7
Intermediate Sales and Related Workers	1	0	0	0	1	5.6
<i>Elementary Clerical, Sales and Service Workers</i>						
Elementary Service Workers	4	1	1	0	6	50.0
Elementary Clerks	1	1	0	1	3	25.0
Elementary Sales Workers	1	1	0	1	3	25.0
<i>Intermediate Production and Transport Workers</i>						
Other Intermediate Production and Transport Workers	32	1	1	1	35	48.6
Intermediate Road and Rail Transport Drivers	10	0	1	5	16	22.2
Intermediate Machine Operators	9	1	0	2	12	16.7
Intermediate Plant Operators	6	0	1	2	9	12.5
<i>Labourers and Related Workers</i>						
Other Labourers and Related Workers	57	2	4	2	65	66.3
Factory Labourers	25	0	1	4	30	30.6
Cleaners	2	0	1	0	3	3.1
<i>Not known</i>	63	7	24	456	550	100.0
Total	554	34	56	528	1,172	

Table 19: Number of work-related mesothelioma cases and occupation (level 1) in Australia, 1998-2000

Occupation	Work-relatedness			Total
	Yes	No	Unknown	
Managers and Administrators	41	0	0	41
Professionals	46	1	0	47
Associate Professionals	28	1	0	29
Tradespersons and Related Workers	299	1	1	301
Advanced Clerical and Service Workers	4	0	0	4
Intermediate Clerical, Sales and Service Workers	17	1	0	18
Intermediate Production and Transport Workers	72	0	0	72
Elementary Clerical, Sales and Service Workers	12	0	0	12
Labourers and Related Workers	97	1	0	98
Not known	3	26	521	550
Total	619	31	522	1,172

Table 20: Number of work-related mesothelioma cases and occupation (level 2) in Australia, 1998-2000
Percentage distribution of work-related cases is shown in each occupation.

Occupation	Work-relatedness				Yes %
	Yes	No	Unknown	Total	
<i>Managers and Administrators</i>					
Generalist Managers	32	0	0	32	78.0
Farmers and Farm Managers	6	0	0	6	14.6
Specialist Managers	3	0	0	3	7.3
<i>Professionals</i>					
Social, Arts and Miscellaneous Professionals	5	0	0	5	11.6
Science, Building and Engineering Professionals	28	0	0	28	65.1
Health Professionals	5	0	0	5	11.6
Health and Welfare Associate Professionals	1	0	0	1	2.3
Education Professionals	4	0	0	4	9.3
<i>Associate Professionals</i>					
Other Associate Professionals	16	1	0	17	51.5
Science, Engineering and Related Associate Professionals	7	0	0	7	21.2
Business and Information Professionals	4	1	0	5	15.2
Sales and Service Supervisors	4	0	0	4	12.1
<i>Tradespersons and Related Workers</i>					
Construction Tradespersons	124	0	0	124	41.2
Mechanical and Fabrication Engineering Tradespersons	86	0	1	87	28.9
Other Tradespersons and Related Workers	48	1	0	49	16.3
Electrical and Electronics Tradespersons	29	0	0	29	9.6
Automotive Tradespersons	12	0	0	12	4.0
<i>Advanced Clerical and Service Workers</i>					
Other Advanced Clerical and Service Workers	2	0	0	2	50.0
Secretaries and Personal Assistants	2	0	0	2	50.0
<i>Intermediate Clerical, Sales and Service Workers</i>					
Intermediate Clerical Workers	13	1	0	14	77.8
Intermediate Service Workers	3	0	0	3	16.7
Intermediate Sales and Related Workers	1	0	0	1	5.6
<i>Elementary Clerical, Sales and Service Workers</i>					
Elementary Service Workers	6	0	0	6	50.0
Elementary Sales Workers	3	0	0	3	25.0
Elementary Clerks	3	0	0	3	25.0
<i>Intermediate Production and Transport Workers</i>					
Other Intermediate Production and Transport Workers	35	0	0	35	48.6
Intermediate Road and Rail Transport Drivers	16	0	0	16	22.2
Intermediate Machine Operators	12	0	0	12	16.7
Intermediate Plant Operators	9	0	0	9	12.5
<i>Labourers and Related Workers</i>					
Other Labourers and Related Workers	64	1	0	65	66.3
Factory Labourers	30	0	0	30	30.6
Cleaners	3	0	0	3	3.1
Not known	3	26	521	550	100.0
Total	619	31	522	1,172	

Table 21: Number of mesothelioma cases classified by industry (level 1) and occupation (level 1) in Australia, 1998-2000

Industry	Occupation										
	Managers and Administrators	Professionals	Associate Professionals	Tradespersons and Related Workers	Advanced Clerical and Service Workers	Intermediate Clerical, Sales and Service Workers	Elementary Clerical, Sales and Service Workers	Intermediate Production and Transport Workers	Labourers and Related Workers	Uncodeable	Total
Agriculture, Forestry and Fishing	6	0	0	0	0	0	0	1	5	1	13
Mining	0	0	0	0	0	0	0	15	5	0	20
Manufacturing	3	9	0	95	0	0	0	22	42	0	171
Electricity, Gas and Water	0	2	0	10	0	0	0	1	2	1	16
Construction	26	3	1	151	0	0	3	9	14	1	208
Retail Trade	0	0	4	10	0	3	2	1	1	0	21
Transport and Storage	0	2	0	5	1	1	1	19	21	0	50
Communication	4	16	3	4	3	8	5	1	3	0	47
Government Administration and Defence	1	13	18	21	0	6	0	2	1	2	64
Cultural and Recreational Services	0	1	2	1	0	0	1	1	1	0	7
Not known	1	1	1	4	0	0	0	0	3	545	555
Totals	41	47	29	301	4	18	12	72	98	550	1,172

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Table 22: Number of work-related, mesothelioma cases and asbestos exposure in Australia, 1998-2000

Percentages based on column totals are shown in brackets.

Asbestos exposure	Work-relatedness			Total
	Yes	No	Unknown	
Yes	491(79.3)	18(58.1)	45(8.6)	554 (47.3)
No	27(4.4)	1(3.2)	6(1.1)	34 (1.4)
Possibly	32(5.2)	3(9.7)	21 (4.0)	56 (4.8)
Unknown	69(11.1)	9(29.0)	450(86.2)	528 (45.1)
Total	619(100.0)	31(100.0)	522(100.0)	1,172 (100.0)

Figure 1: Incident cases of malignant mesothelioma, Australia, 1986-2000

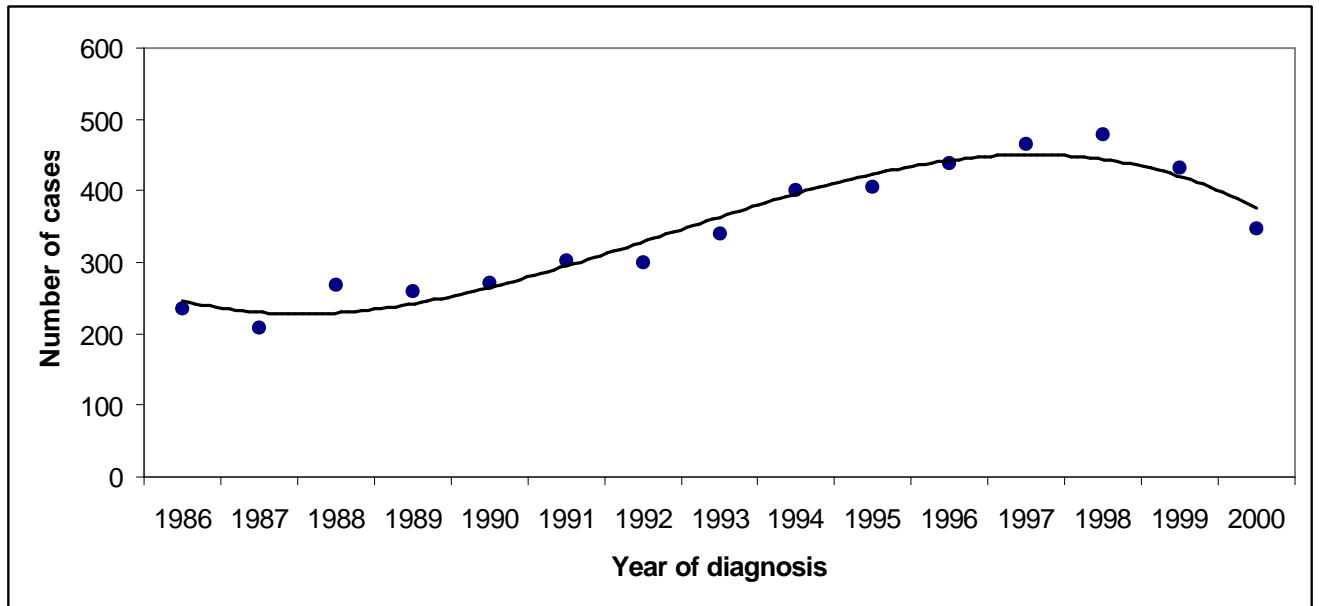


Figure 2: Age-specific incidence rates of malignant mesothelioma in Australian men, 1986-2000

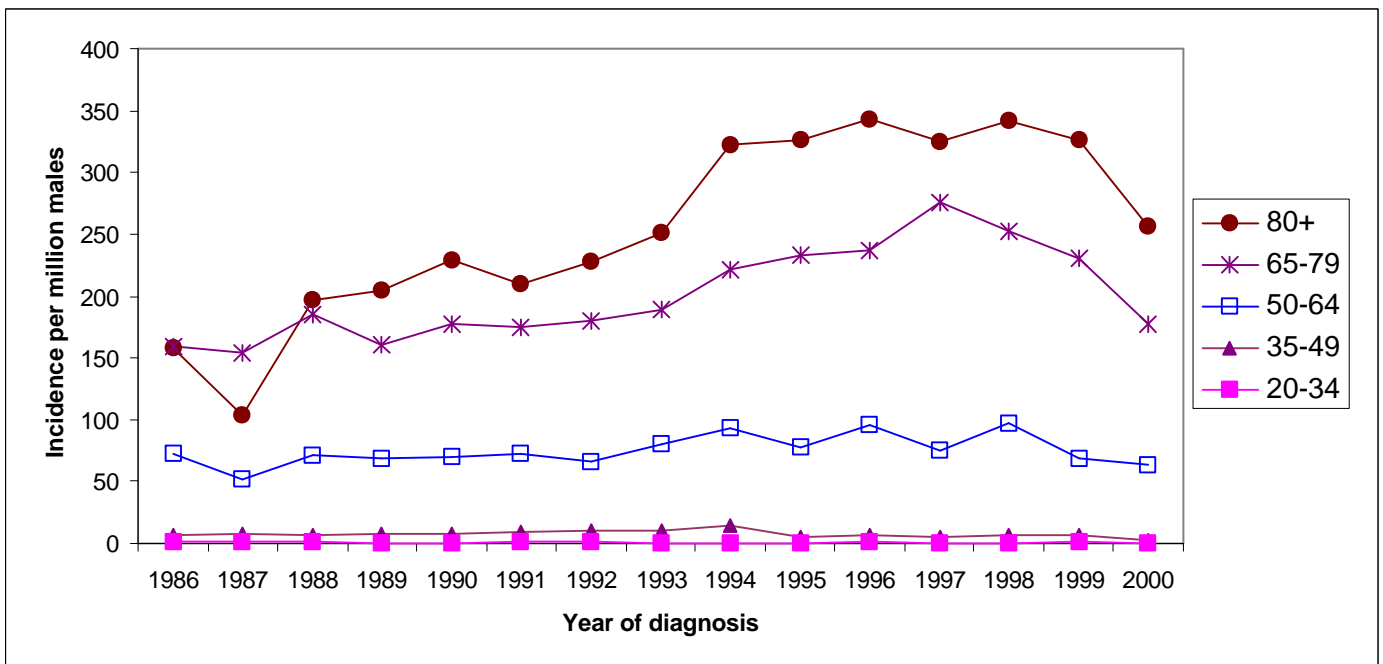


Figure 3: Age-specific incidence rates of malignant mesothelioma in Australian women, 1986-2000

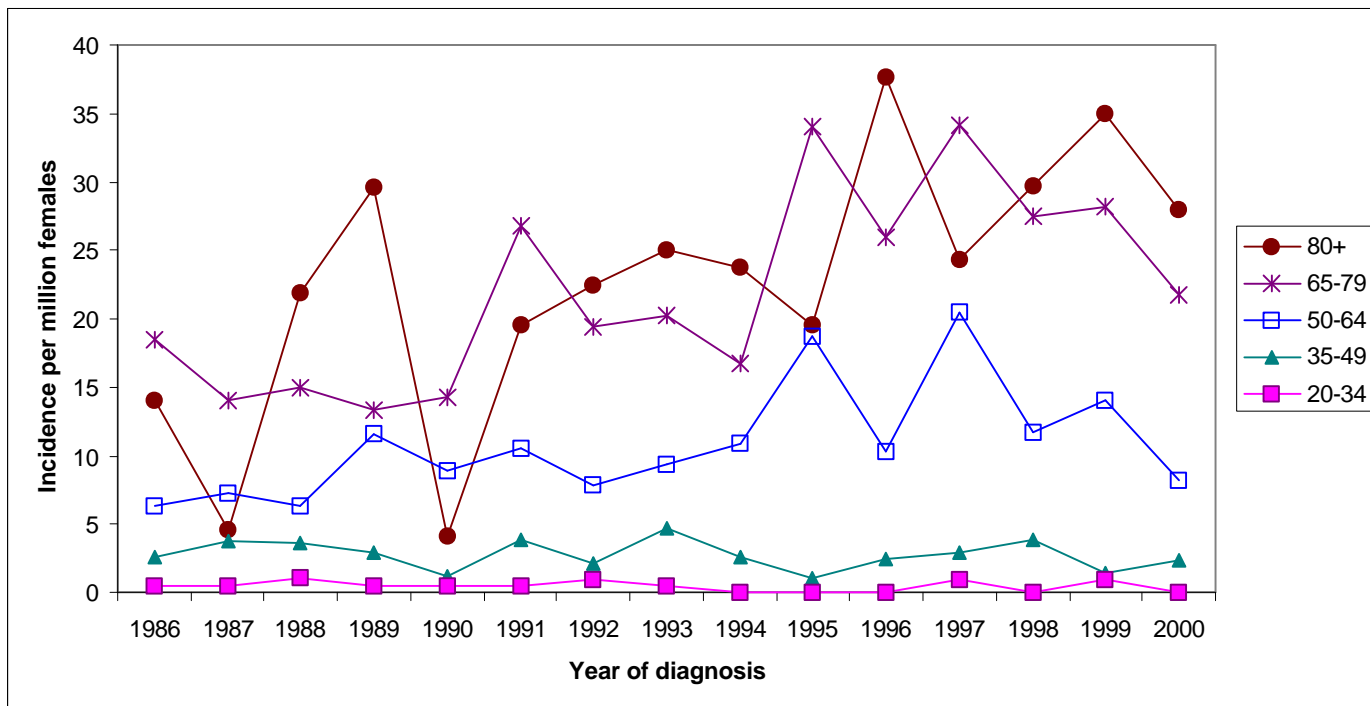


Figure 4: Cases of mesothelioma in Australia, 1998-2000, by site of primary lesion

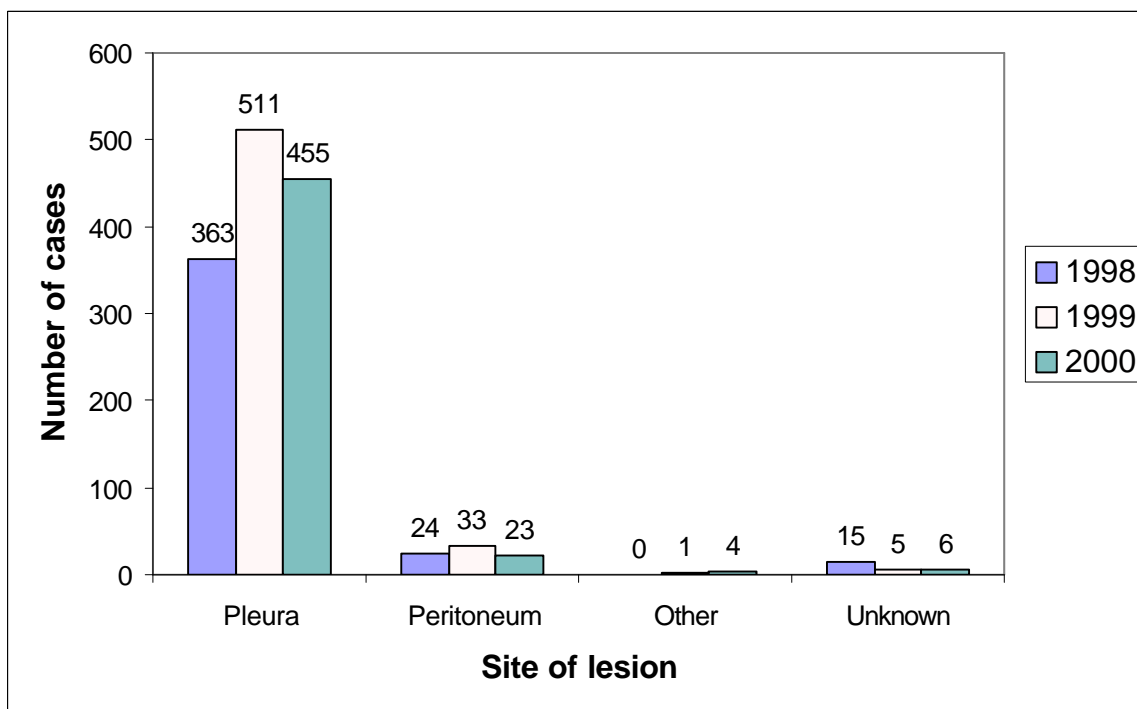


Figure 5 Trends in Australian incidence of mesothelioma per million persons, by jurisdiction, 1982-2000
Standardised to World population 20 years of age or greater

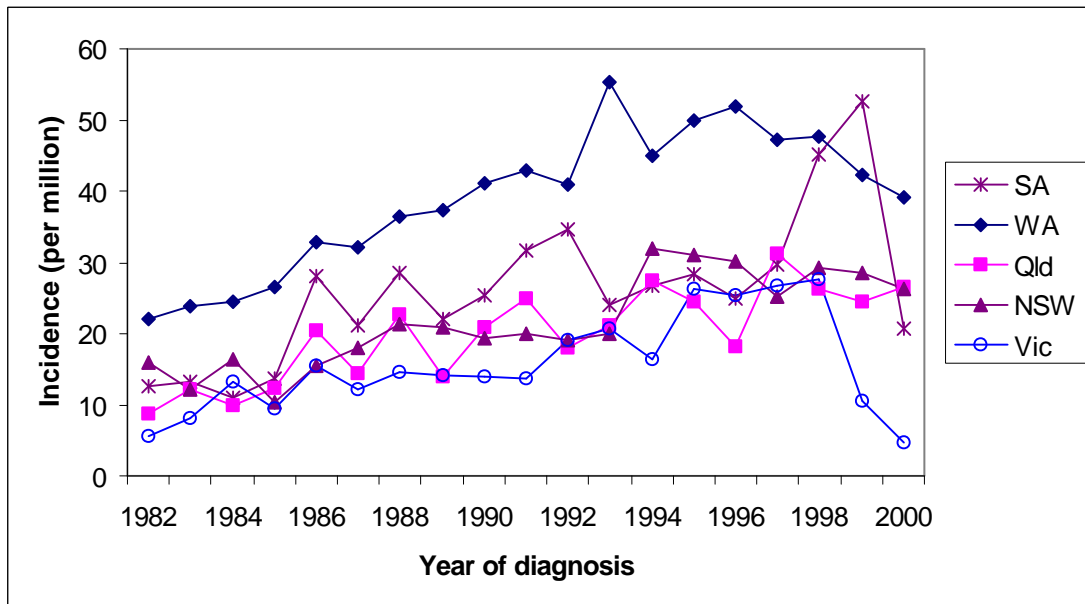
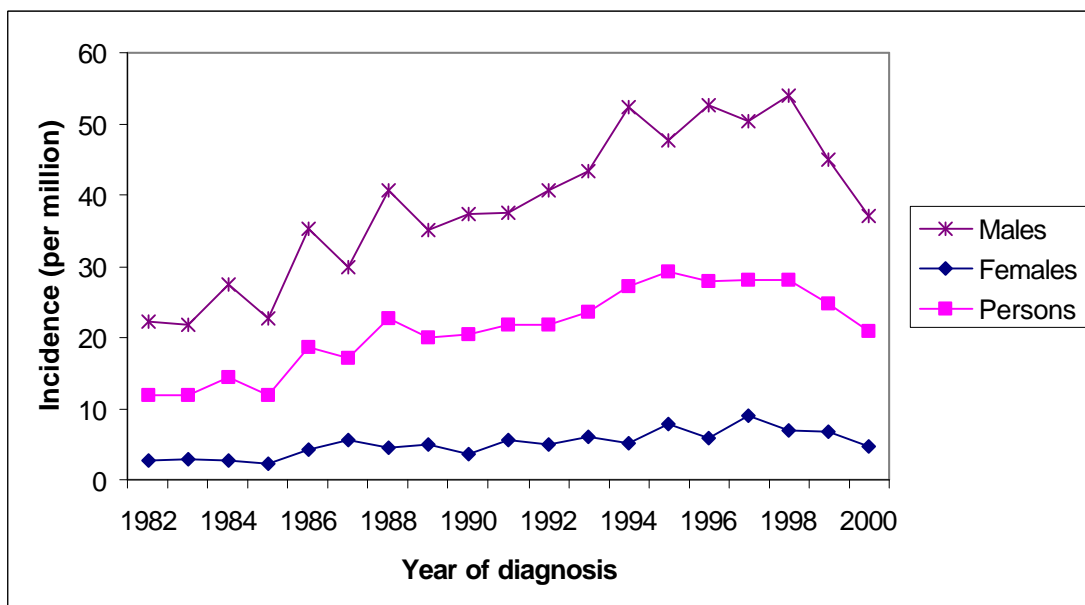


Figure 6: Trends in Australian incidence of mesothelioma per million persons, by sex, 1982-2000
Standardised to World population 20 years of age or greater



APPENDIX A



NATIONAL OCCUPATIONAL HEALTH AND SAFETY COMMISSION

AUSTRALIAN MESOTHELIOMA REGISTER NOTIFICATION

Please direct all correspondence to:

The Registrar
Australian Mesothelioma Register
National Occupational Health and Safety Commission
GPO Box 1577 Canberra ACT 2600
Telephone: (02) 6279 1005

Patient details - please supply ALL available information

SURNAME: FIRST NAMES:
ADDRESS:
STATE: POSTCODE: GENDER: M / F DATE OF BIRTH: / /
IF DECEASED, DATE OF DEATH: / / PLACE OF DEATH:
DATE OF INITIAL DIAGNOSIS: Month Year: HISTOLOGICAL: YES / NO
HOSPITAL DIAGNOSED: PRIMARY SITE:
CLINICIAN'S NAME: NAME OF LOCAL GP:
ADDRESS: ADDRESS:

Please describe briefly main occupation(s) of patient's worklife.

Table with 3 columns: OCCUPATION, INDUSTRY, YEAR. Rows 1, 2, 3 with dotted lines for input.

KNOWN ASBESTOS EXPOSURE: YES / NO

If "YES" please indicate circumstances and duration:

Details of person completing this form.

NAME: SIGNATURE:
ADDRESS: DATE:
Please circle the appropriate category: CLINICIAN PATHOLOGIST CANCER REGISTRY MEDICAL RECORDS ADMIN
DUST DISEASES BOARD OTHER:

Office Use Only
Date Received:

REGISTRATION NO:

Grid for registration number: 8 empty boxes.

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