



safe work australia

Asbestos-related Disease Indicators

August 2010



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Report summary

This is the first Safe Work Australia report on *Asbestos-related Disease Indicators*. In this report, only mesothelioma and asbestosis have been used to indicate the extent of asbestos-caused disease in Australia. Asbestosis is caused exclusively by asbestos and asbestos is the only known cause of mesothelioma.

This report uses data from the Australian Institute of Health & Welfare for the number of new cases of mesothelioma, the number of deaths attributed to mesothelioma, and the number of asbestosis-related hospitalisations; NSW Dust Diseases Board and the National Data Set for Compensation-based Statistics for the number of accepted workers' compensation claims for mesothelioma and asbestosis; and the Australian Bureau of Statistics for cause of death data. Although compensated cases of mesothelioma and asbestosis have been accepted as work-related, the number of new cases, deaths and hospitalisations related to asbestos-caused diseases are not necessarily work-related.

The main findings in this report follow.

Changes in the nature of occupational exposure

- > In the past, exposure to asbestos fibres usually occurred while mining asbestos; manufacturing asbestos containing products; or using those products, primarily while constructing buildings.
- > Currently, the main source of exposure to asbestos fibres are old buildings undergoing renovation or demolition where building maintenance and demolition workers are employed.

Mesothelioma

- > Over the period 1982 to 2006 the total number of new cases of mesothelioma increased from 156 in 1982 to 649 in 2003. Since then, the number of new cases has decreased to 579 in 2006.
- > Since 1997 the overall number of deaths resulting from mesothelioma increased from 416 to 628 in 2008.

Asbestosis

- > Over the period 1998–99 to 2007–08, there were 1146 hospitalisations related to asbestosis of which 97% were for men.
- > There were 258 accepted asbestosis-related compensation claims in 2008; this is a 25% decrease from the 342 compensated claims in 2003.
- > Since 1998 the number of deaths attributed to asbestosis increased from 43 to 109 in 2008.

Prevention policy

- > The development of national model regulations for asbestos aim to harmonise jurisdictional regulations and provide, for the first time, a consistent framework for the minimisation of exposure; the removal of asbestos; and the management of remaining asbestos materials in workplaces.

Introduction

Asbestos-related diseases are responsible for an increasing number of deaths in Australia. In 2008, the most recent year covered by this publication, 628 deaths attributable to mesothelioma were registered, and 109 to asbestosis. The number of deaths caused by lung cancer and other diseases possibly related to asbestos exposure is unknown.

These deaths are the direct result of, in most cases, work-related exposure to asbestos fibres up to 40 years ago. Asbestos is a mineral rock that is made up of masses of tiny fibres and occurs in a number of forms, three of which were used commercially in Australia. They are amosite, crocidolite and chrysotile.

Asbestos was mined in Australia for over 100 years — ceasing by 1983. This domestic production, combined with asbestos imports, gave rise to Australia having the world's highest per-capita use of asbestos in the 1950s (Leigh et al, 2002). This high rate of usage reflected the very useful thermal and mechanical properties of the material. These properties led to its extensive use in a multitude of domestic and industrial products and, in particular, in fibre-cement products like pipes, wall panels, and roof sheeting. The use and importation of all forms of asbestos (with a few very specialised exceptions) was prohibited in Australia from December 2003.

When asbestos is mined or processed, or when asbestos-based products are sanded, sawn or drilled, it can form a fine airborne dust made up of tiny fibres. These fibres are easily breathed in to the lung where they can become embedded. Due to the small size and elongated shape of the particles they can resist the lung's natural cleaning process and may cause serious health problems in later years. In particular, the fibres can work their way through the lung tissue and into the pleura – the membrane that surrounds the lungs.

Exposure to asbestos can cause respiratory diseases and cancers including:

- > lung cancer
- > mesothelioma, (pleural, peritoneal or pericardial)
- > asbestosis, and
- > some other cancers.

Besides this report, Safe Work Australia has undertaken a number of initiatives to better monitor and improve the understanding of asbestos-related diseases.

These include:

- > The publication of the *Mesothelioma in Australia* report: a detailed examination of diagnosis and deaths data collected by cancer registries and the Australian Bureau of Statistics.
- > The establishment of the Australian Mesothelioma Registry to replace the Australian Mesothelioma Register which was suspended in 2008 because of the considerable reduction in the number of notifications under new state privacy laws. In 2010, Safe Work Australia contracted a consortium led by the Cancer Institute of New South Wales to manage the new Australian Mesothelioma Registry which will combine the mandatory notification of mesothelioma to the cancer registries with timely follow up of consenting patients to collect exposure information.
- > The instigation of a survey to examine exposure to asbestos among construction workers and their attitudes, perceptions and behaviours related to asbestos (*Asbestos Exposure and Compliance Study of Construction and Maintenance Workers*).

1

Asbestos-related diseases

Exposure to asbestos

Asbestos has been used for thousands of years in pottery, fabrics and other artefacts. During the Industrial Revolution in the nineteenth century, it was used extensively for its insulation and fire retardant qualities (Greillier & Astoul 2008). The association between asbestos and respiratory illness among asbestos workers was suspected by the medical profession as early as the beginning of the twentieth century. By the middle of the twentieth century there was indisputable evidence of the health risk asbestos fibres posed to workers and others (Asthma Foundation of SA, 2010).

Changes in the nature of occupational exposure

To prevent further exposure to asbestos fibres and asbestos containing materials, national and jurisdictional governments and regulators have developed and imposed strict regulations on its use and handling (see Prevention Policy on page 10 for more information on this topic).

The end of mining in Australia in the early 1980s, and the national ban on asbestos production, importation and use in December 2003, brought about a change in the way workers were, and still are, exposed to asbestos. In the past, exposure to asbestos fibres usually occurred while mining asbestos; manufacturing asbestos containing products; or using those products, primarily while constructing buildings.

Currently, the main source of exposure to asbestos fibres are old buildings undergoing renovation or demolition where building maintenance and demolition workers are employed. This is an outcome of the heavy reliance on asbestos products in buildings during the 1950s, 1960s and 1970s (NOHSC 2005). Asbestos containing materials were used as thermal insulation for pipes, ducts in buildings, plant and furnaces, ceilings and wall cavities. Asbestos cement sheets and roofing were also used extensively.

Occupations

The burden of asbestos-related disease on occupations associated with asbestos mining in Australia should diminish in the longer term because of the cessation of asbestos mining in 1983. However, the widespread use of asbestos in construction and manufacturing during the post-war decades may mean there will be more, as yet undiagnosed, cases of asbestos-related diseases among workers from these two industries.

The Australian Mesothelioma Register, which operated from 1986 to 2007, collected and monitored data on the number of new cases of mesothelioma and past exposure to asbestos. The Register's data shows that in the past workers who had the highest rates of mesothelioma were those who had worked in occupations associated with asbestos mining or dust forming operations such as handling, sawing, sanding, grinding, drilling, turning or general maintenance and renovation. Specific occupations recording high numbers of workers exposed included: carpenters & joiners; Wittenoom workers; builders & builders' labourers; navy & merchant navy workers; railway workers; boiler makers (cleaners, attendants, installers & welders); and power station workers.

The National Dataset for Compensation Based Statistics (NDS) contains information from 2000–01 onwards (2007–08 are preliminary data) on workers' compensation claims that involve work-related disease. The NDS data shows that occupation groups with higher than average rates of workers' compensation claims for mesothelioma over the three-year period 2005–06 to 2007–08p included; Power

generation plant operators; Carpentry and joinery tradespersons; Communications tradespersons; Metal fitters and machinists; Electricians; and Plumbers.

For asbestosis, the occupation groups with higher than average rates of workers' compensation claims over the same three-year period included Railway labourers; Freight & furniture handlers (includes Stevedores); Bricklayers, Painters & decorators; and Carpentry & joinery tradespersons. Half of all asbestosis claims were made by workers in the manufacturing industry, of these 70% were Labourers & related workers.

Onset of asbestos-related disease

Extent of exposure

Asbestosis and other asbestos-related diseases usually only occur following lengthy periods of exposure to high levels of asbestos fibres; mesothelioma, on the other hand, can develop from short or lengthy periods of low or high concentrations of asbestos, although exposure to asbestos fibres does not make the development of the disease inevitable.

Onset of disease

It can take up to 40 years or more after initial asbestos exposure for disease caused by asbestos to become evident. Each asbestos-related disease differs in the extent of exposure to asbestos fibres and time between exposure and the onset of disease.

- > **Benign pleural disease** takes at least seven years to develop following exposure to asbestos fibres and is only evident on chest x-rays. It generally causes no symptoms and does not require any treatment other than cessation of smoking and regular check ups with a health professional (CCV 2010).
- > **Asbestosis** usually takes around 10 years or more to develop following heavy and prolonged exposure to asbestos (CCV 2010) before the disease advances to a stage where symptoms become apparent. Although it is a chronic rather than a fatal disease, it is a serious condition that can lead to death from other causes such as respiratory or cardiac failure. Ongoing medical treatment is necessary to maintain good quality of life and to reduce the burden it places on the body's vital organs. People with asbestosis have a greater risk of developing lung cancer or mesothelioma than other people who have been exposed to asbestos fibres.
- > **Lung cancer** can take 20 years or more before the cancer develops and asbestos is only one of many agents linked to its development (Workers Health Centre 2010). It is reported to occur only following levels of exposure similar to those for asbestosis and is strongly associated with workplace exposure to asbestos fibres (Queensland Health 2002). It is much more likely to occur in people who smoke and/or who have asbestosis (CCV 2010).
- > **Mesothelioma** has the longest latency of any asbestos-related disease, usually taking between 20 and 40 years or more to develop. Symptoms of the disease usually only become evident when the disease has progressed to an advanced stage when treatment is ineffective and necessarily focussed at maintaining good quality of life for as long as possible.

Further information

Asbestos and lung disease - Cancer Council Victoria <http://cancervic.org.au/asbestos_and_lung_disease> accessed 26 February 2010.

2 Mesothelioma

The condition

Mesothelioma is a fatal cancer of the mesothelium: the membrane lining that protects vital organs such as the lungs, heart and abdomen. The mesothelium is made up of two layers of membrane containing a lubricating fluid that allows the organs to move within the chest (for example, contraction and expansion of the lungs). The disease is strongly associated with asbestos and can usually be traced back to past exposure to asbestos fibres, particularly to amphibole (blue and brown) asbestos (Leigh & Driscoll 2002, and CCV 2010).

Although the time between exposure to asbestos and the onset of mesothelioma is between 20 and 40 years or more, once the disease develops, it spreads very rapidly: generally, before symptoms become apparent, thus making its early diagnosis and treatment very difficult (NHMRC 2010 and CCV 2010). This rapid onset usually results in a survival period following diagnosis of only 6 to 18 months.

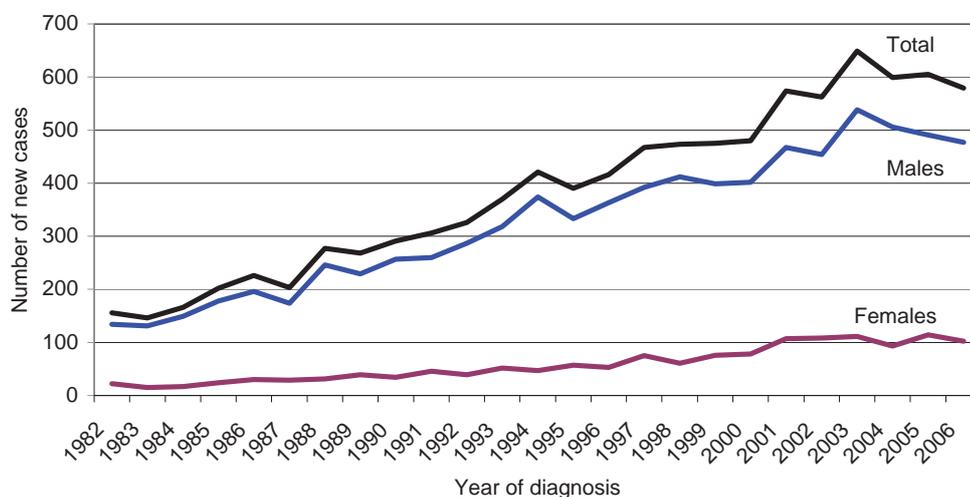
There are three main types of mesothelioma which are named according to where the cancer occurs in the body; mesothelioma of the pleura (chest), peritoneum (abdomen) and pericardium (heart). Pleural mesothelioma is the most common form (representing 94% of cases of mesothelioma since 1982), followed by peritoneal and pericardial. Mesothelioma can also develop in other parts of the body, such as the reproductive organs: but these types are more uncommon (CCV 2010).

New cases

Australia has one of the highest incidence rates of mesothelioma in the world. This can largely be attributed to the extensive use of all types of asbestos fibres in various settings in the past (Leigh & Driscoll 2002).

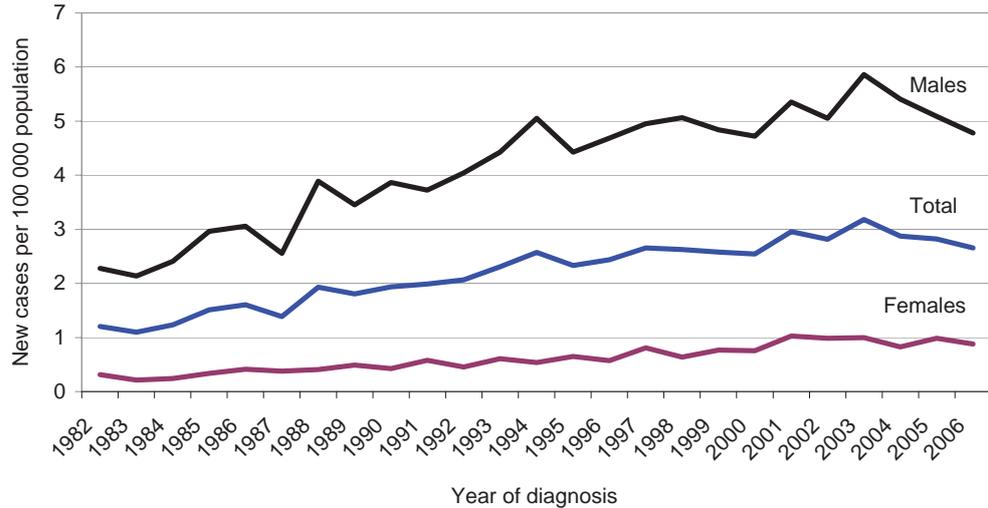
Despite the comparatively high rates of diagnosis and death, mesothelioma is still a relatively rare condition: accounting for 0.6% of all cancers diagnosed in Australia in 2006. Mesothelioma is a disease that most often occurs among older people, mainly because of the long latency period between exposure to asbestos and the development of the disease. However, there have been 25 cases of mesothelioma diagnosed in people aged under 30 over the period 1982 to 2006.

Figure 1 Number of new cases of mesothelioma by sex, 1982 to 2006



Source: AIHW Australian Cancer Incidence and Mortality Books (compiled by AIHW from data supplied by state and territory cancer registries).

Figure 2 New cases of mesothelioma: age-standardised incidence rate by sex, 1982 to 2006



Note: Age-standardisation is a method used to improve comparability of data over time.

Source: AIHW Australian Cancer Incidence and Mortality Books (compiled by AIHW from data supplied by state and territory cancer registries).

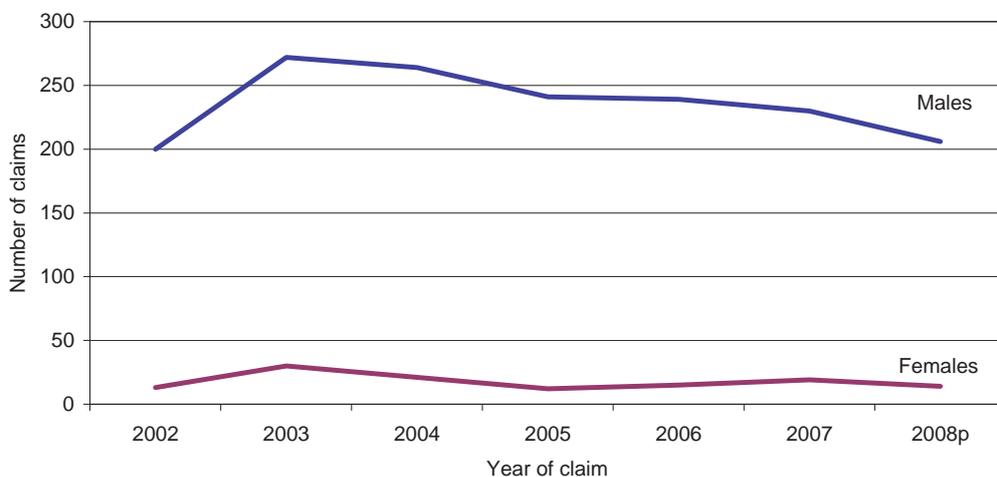
Figure 1 shows there was an upward trend in the total number of new cases of mesothelioma diagnosed: from 156 in 1982 to 649 in 2003. Since then, the number of new cases has decreased to 579 in 2006. Although this decrease is promising, it is too early to identify it as a turning point. Several studies have predicted that the number of cases of mesothelioma diagnosed each year in Australia will continue to rise until after 2010 (Clements et al., 2007a).

Men are more likely to be diagnosed with mesothelioma than women: they accounted for an average of 86% of cases since 1982.

Figure 2 shows the age-standardised incidence of new cases of mesothelioma (per 100 000 population) over the period 1982 to 2006. The overall incidence rate increased over the period: from a minimum of 1.1 new cases per 100 000 population in 1983 to a maximum of 3.2 in 2003. Since that date, the rate declined slightly: to 2.8 and 2.7 in 2005 and 2006 respectively.

Figure 3 shows the combined number of claims for mesothelioma compensated by the NSW Dust Diseases Board and state, territory and Commonwealth workers' compensation schemes from 2002 to 2008. The number of accepted claims for both men and women increased between 2002 and 2003 but have been declining since 2003. In 2008, there were 206 claims for men and 14 for women.

Figure 3 Compensated mesothelioma claims: number by sex, 2002 to 2008p



Note: Data for workers compensation for 2008 are preliminary data only.

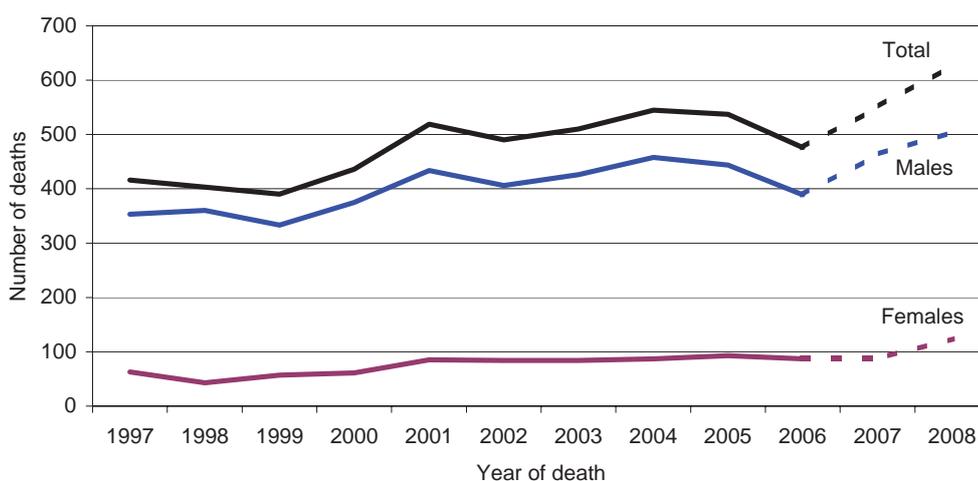
Sources: NSW Dust Diseases Board and NDS.

Deaths

Figure 4 shows that the overall number of deaths resulting from mesothelioma increased over the period between 1997 and 2008. The number of deaths reached a maximum of 628 registered deaths in 2008; this followed a brief decline after an earlier peak of 545 in 2004. Most of these decedents were male, with an average of 81% of total deaths over the eleven-year period.

Care should be taken interpreting the data for the last two years as they are based on year of registration rather than year of death. The increase may be due to an accumulation of deaths being held over from one calendar year to the next; however, this usually only affects around 5% of deaths. It is possible the decline and subsequent increase may smooth out when the data are updated.

Figure 4 Deaths due to mesothelioma: number by sex, 1997 to 2008^(a)



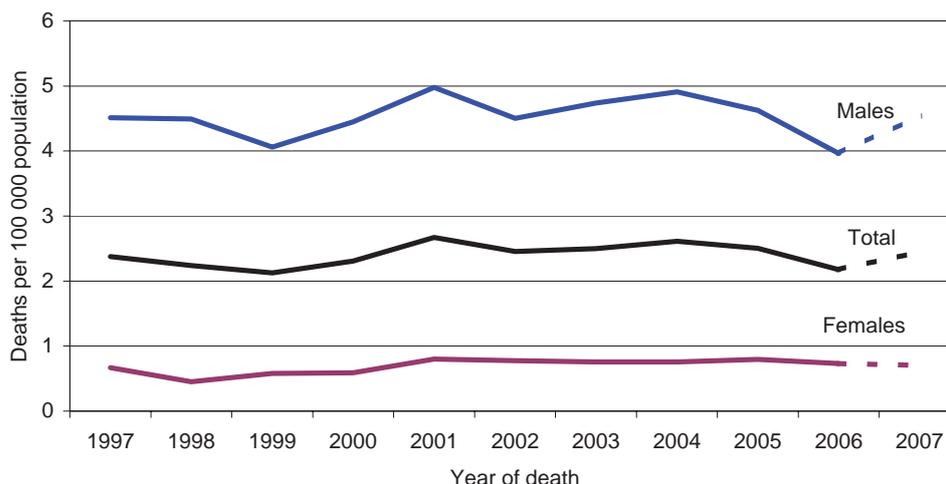
(a) Dotted line indicates data for 2007 and 2008 which are based on year of registration, not year of death.

Note: Data on the number of mesothelioma deaths are only available from 1997 when the WHO International Coding of Diseases allocated mesothelioma a unique code (it had previously been grouped with other cancers of the pleura). In contrast, the number of new cases of mesothelioma diagnosed each year is available from 1982 because it is disease notifiable by legislation to state and territory cancer registries who release this data to AIHW.

Sources: AIHW Australian Cancer Incidence and Mortality Books (compiled by AIHW from data supplied by state and territory cancer registries) and ABS Cause of Death data.

Figure 5 shows that the overall age-standardised rate of death due to mesothelioma has remained relatively stable over the 11 years for which data are available. Over the period the standardised rate has ranged between a minimum of 2.1 deaths per 100 000 in 1999 and a maximum of 2.7 in 2001. The standardised rate in 2007 was 2.4 deaths per 100 000 population.

Figure 5 Deaths due to mesothelioma: age-standardised mortality rate by sex, 1997 to 2007^(a)



(a) Dotted line indicates data for 2007 based on year of registration, not year of death.

Note: Age-standardisation is a method used to improve comparability of data over time.

Source: AIHW Australian Cancer Incidence and Mortality Books (compiled by AIHW from data supplied by state and territory cancer registries).

Data sources

All cases of cancer in Australia (except basal cell and squamous cell carcinomas of the skin) are notifiable by legislation to state and territory cancer registries. These registries report to the National Cancer Statistics Clearing House (NCSCH) which is operated by the Australian Institute of Health and Welfare (AIHW) in collaboration with the Australasian Association of Cancer Registries (AACR).

The cause of every Australian death is certified by a medical practitioner and recorded on a death certificate. These death certificates are required by state and territory Registrars of Births, Deaths and Marriages under jurisdiction specific legislation. On behalf of the Registrars these data are assembled, coded to the underlying cause of death, and released by the Australian Bureau of Statistics (ABS). The data are released to the AIHW who publish the data on its website.

- > The NSW Dust Diseases Board records the number of compensation claims for mesothelioma in NSW. Although representing only one state, NSW accounts for around one-third of the Australian population and as such may be considered as an important resource for estimating the incidence of asbestosis in Australia.
- > NDS are data based on information received annually from Australian workers' compensation authorities.

Further information

Mesothelioma in Australia: Incidence 1982 to 2006 and Deaths 1997 to 2007, Safe Work Australia, 2010.

Greillier L and Astoul P. Mesothelioma and Asbestos-Related Pleural Diseases. Respiration 2008;76:-15.

Leigh J & Driscoll T. Malignant Mesothelioma in Australia, 1945-2002. International Journal of Occupational and Environmental Health 2003;9:206-217.

National Health and Medical Research Council 2010. Asbestos related diseases. Accessed 12 February 2010, <www.nhmrc.gov.au/your_health/issues/asbestos.htm>.

3

Asbestosis

The condition

Asbestosis is a chronic lung disease caused by the inhalation of large numbers of asbestos fibres over an extended period. Symptoms of the disease typically appear about 10 years after initial exposure to asbestos fibres: a much shorter latency period than that for mesothelioma. However, unlike the rapid development of mesothelioma after onset, asbestosis is a disease that progresses slowly.

Asbestosis is characterised by the formation of scar tissue (fibrosis) around inflammation caused by asbestos fibres that have lodged deep within the lung. As the disease progresses, the scarred lung tissue hardens, making it increasingly difficult for the lungs to expand and contract: consequently making it more difficult to breathe. This leads to shortness of breath on exertion, or a dry cough or chest pain. As the disease progresses this becomes more extreme, even when not exercising (Workers Health Centre 2010).

There is no cure for asbestosis, only treatment to relieve the symptoms. Although asbestosis does not directly cause death, it may be an underlying cause of death in people diagnosed with the condition because the reduced lung function places great stress on the body's vital organs. Many deaths among people diagnosed with asbestosis are caused by respiratory or cardiac failure. In addition, people with asbestosis also have a greater likelihood of developing lung cancer or mesothelioma.

New cases

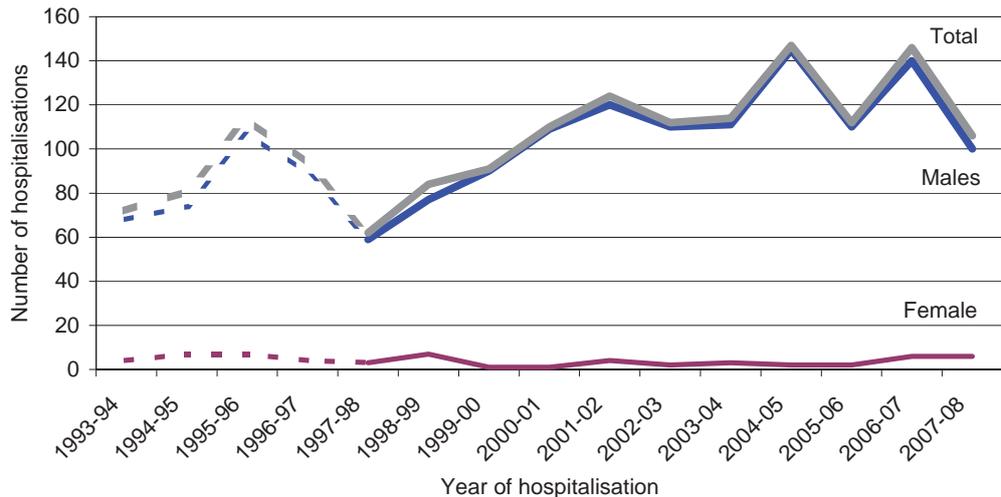
Unlike mesothelioma, asbestosis is not a notifiable disease; so the number of new cases diagnosed each year is unknown. This report uses the number of asbestosis-related hospitalisations; the number of compensation claims for asbestosis accepted by the NSW Dust Diseases Board; and the number of accepted workers' compensation claims for asbestosis as indicators for the prevalence of the disease in the community. Although compensated cases of asbestosis have been accepted as work-related, hospitalisations for asbestosis are not necessarily work-related. However, the degree of exposure to asbestos fibres necessary for asbestosis to develop was usually only found in workplace environments.

Figure 6 shows that the number of hospitalisations attributed to asbestosis has varied over the period 1993–94 to 2007–08. However, care should be taken interpreting the data because it includes people who may have been admitted to hospital more than once. Asbestosis often leads to other serious conditions so people with the disease may be admitted to hospital for other illnesses not coded as related to asbestosis.

The number of hospitalisations ranged from a minimum of 62 in 1997–98 to a maximum of 147 in 2004–05. The rise and fall in numbers each year is consistent with chance variation when reporting small numbers. Asbestosis is a disease that predominately affects men because they usually worked in those occupations exposed to high levels of asbestos fibres. Over the period 1998–99 to 2007–08, there were 1146 hospitalisations related to asbestosis, of which 97% were for men.

The decline from 1995–96 to 1997–98 coincided with a change in the way diseases were coded internationally (for further information see Explanatory notes on page 13). The changes to the coding of diseases and the associated switch from manual to automated coding were likely to have been a factor in the decline.

Figure 6 Hospitalisations for asbestosis: number by sex, 1992–94 to 2007–08



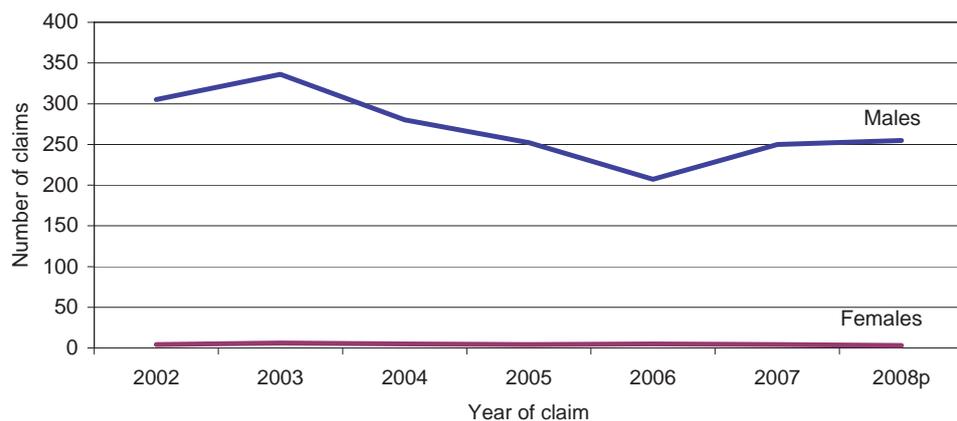
Note: Dotted line indicates data were coded under ICD9 system, solid line indicates ICD10-AM coding used.

Source: AIHW National Hospital Morbidity Database.

In addition, changes to, and advances in, the treatment of asbestosis, such as home-based treatment with oxygen etc., may also affect the overall number of hospitalisations related to asbestosis.

Data from the NSW Dust Diseases Board and the state, territory and Commonwealth workers' compensation schemes have been combined to produce another measure of the prevalence of asbestosis in Australia. Figure 7 shows the number of asbestosis-related compensated claims for men decreased between 2003 and 2006: since then the number has increased. In 2008p, 255 men were compensated for asbestosis-related claims.

Figure 7 Compensated claims for asbestosis: number by sex, 2002 to 2008p



Notes

1. Workers' compensation data are usually collated and presented by financial year: in order to combine claims with data from the NSW Dust Diseases Board they have been compiled by calendar years.

2. Workers' compensation data for 2008 are preliminary.

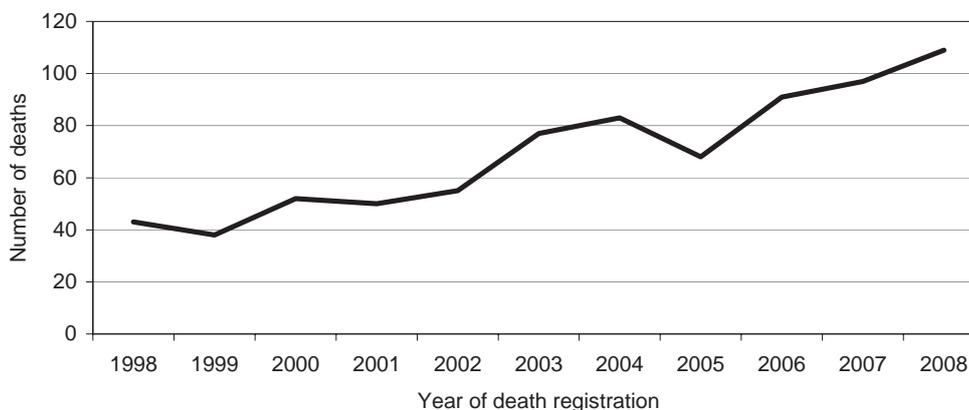
Sources: NSW Dust Diseases Board and NDS.

Deaths

People with asbestosis do not usually die of the disease itself, but rather of other serious conditions triggered by the disease. In these cases, asbestosis should be recorded as an 'underlying' cause of death on death certificates. In 2008, there were 109 deaths recorded with asbestosis as the underlying cause of death; of these, 64% reported asbestosis with three or more other causes of death. The number of deaths attributed to asbestosis represents only around one-third of the deaths where the condition is mentioned on death certificates: this indicates that asbestosis is more prevalent than the data suggests (ABS 2010).

Figure 8 shows that over the period 1998 to 2008 the number of deaths attributed to asbestosis has been steadily increasing, apart from a drop in numbers in 2005. In 2008, 109 deaths were attributed to asbestosis.

Figure 8 Deaths due to asbestosis: 1998 to 2008



Source: ABS Cause of Death data.

Data sources

The number of people diagnosed with asbestosis each year is unknown since, unlike mesothelioma, the disease does not have to be notified to jurisdiction authorities. However, there are four data sources that can provide an indication of the prevalence of asbestosis in the general population:

- > The AIHW compiles national hospitalisation data on the number of hospital stays where the patient was recorded as having asbestosis.
- > The NSW Dust Diseases Board records the number of compensation claims for asbestosis in NSW. Although representing only one state, NSW accounts for 32% of the Australian population and as such the Dust Diseases Board is an important resource for estimating the incidence of asbestosis in Australia.
- > The ABS Causes of Death data can identify the number of deaths registered in a year where the underlying cause of death was asbestosis.
- > NDS are data based on information received annually from Australian workers' compensation authorities.

Further information

National Health and Medical Research Council 2010. *Asbestos related diseases*. Accessed 12 February 2010, <www.nhmrc.gov.au/your_health/issues/asbestos.htm>.

Asthma Foundation of South Australia . *Asbestos Related Lung Diseases*. Accessed 4 March 2010, <www.asthmasa.org.au/index.php/selectedContent/1038736473>.

Workers Health Centre. *Asbestos - A Major Health Hazard for Workers*.

4 Prevention policy

Asbestos products were gradually removed from production and sale in Australia from the 1980s. An Australia-wide ban took effect on 31 December 2003. Due to this prohibition, materials containing asbestos fibres are no longer able to be imported, manufactured, supplied, stored, transported, sold, used, reused, installed or replaced (Safe Work Australia 2010b).

The prohibition bans all uses of asbestos but does not extend to the removal of asbestos products that were in place on 31 December 2003. For this reason, some asbestos products are still present and need regulation to ensure that management or removal does not result in exposure to airborne asbestos fibres.

Despite the Australia-wide ban, some asbestos materials may continue to be unintentionally imported into the country. Importers or retailers who suspect they may have products that contain asbestos are required to immediately inform their state or territory workcover authority. The suspect materials are to be tested by a National Association of Testing Authorities (NATA) accredited testing facility.

The development of national model regulations for asbestos aims to harmonise jurisdictional regulations and provide, for the first time, a consistent framework for the minimisation of exposure; the removal of asbestos; and the management of remaining asbestos materials in workplaces. The Safe Work Australia website contains further information on the model work health and safety laws.

According to the *Code of Practice for the Management and Control of Asbestos in Workplaces*, "The ultimate goal is for all workplaces to be free of asbestos containing materials. Where practicable, consideration should be given to the removal of asbestos containing materials during renovation, refurbishment, and maintenance, rather than other control measures such as enclosure, encapsulation or sealing." Asbestos products which were in-situ on 31 December 2003 may only be replaced by products which do not contain asbestos.

The substantial risk to workers from exposure to asbestos fibres necessitates strict adherence to work health and safety guidelines when working with in-situ asbestos. A recent Safe Work Australia report titled, *Asbestos Exposure and Compliance Study of Construction and Maintenance Workers*, determined current levels of awareness; compliance with legislation; attitudes; and levels of exposure to asbestos.

The study found that although most construction and maintenance tradespersons were aware of the potential health risks of asbestos, this was not accompanied by a knowledge of how to recognise asbestos containing materials. It also found that most tradespersons in the study thought they were protecting themselves adequately against exposure. But they were not generally complying with safety procedures as well as they believed. The study also found that there was inappropriate disposal of asbestos and asbestos-contaminated materials.

The results of this report will be used to develop better strategies to eliminate, or reduce, worker exposure to asbestos. For more information, a copy of the report can be downloaded from the Safe Work Australia website.

Further information can be found by searching for 'asbestos' on the Safe Work Australia website as well as the relevant state and territory workcover websites listed over the page.

New South Wales

WorkCover NSW <www.workcover.nsw.gov.au>

NSW Workers' Compensation Commission <www.wcc.nsw.gov.au>

Victoria

Victorian WorkCover Authority <www.workcover.vic.gov.au>

Queensland

Office of Fair and Safe Work Queensland <www.justice.qld.gov.au>

Q-Comp <www.qcomp.com.au>

South Australia

SafeWork South Australia <www.safework.sa.gov.au/>

WorkCover SA <www.workcover.com>

Western Australia

WorkSafe WA <www.worksafe.wa.gov.au>

WorkCover WA <www.workcover.wa.gov.au>

Tasmania

WorkCover Tasmania <www.workcover.tas.gov.au>

Workplace Standards Tasmania <www.wst.tas.gov.au>

Northern Territory

NT WorkSafe <www.worksafe.nt.gov.au>

Australian Capital Territory

Workcover/Worksafe ACT <www.ors.act.gov.au/workcover/index.html>

Other contacts

Comcare <www.comcare.gov.au>

ACTU (Australian Council of Trades Unions) <www.actu.asn.au>

ACCI (Australian Chamber of Commerce and Industry) <www.acci.asn.au>

Australian Industry Group <www.aigroup.com.au>

Safe Work Australia <www.safeworkaustralia.gov.au>

5

Explanatory notes

Several data sources were used and analysed in the preparation of this report. These are:

- > AIHW National Cancer Statistics Clearing House (NCSCH)
- > AIHW Australian Cancer Incidence and Mortality Books (ACIM)
- > AIHW National Hospital Morbidity Database (NHMD)
- > NSW Dust Diseases Board
- > National Data Set for Compensation-based Statistics (NDS)
- > Australian Bureau of Statistics Causes of Death (ABS)

Table 1 Summary of data sources

Mesothelioma	Number of new cases of mesothelioma in Australia	ACIM
	Age-standardised incidence of mesothelioma in Australia	ACIM
	Number of compensated mesothelioma-related claims	NDS & DDB
	Number of deaths attributed to mesothelioma	ACIM & ABS
	Age-standardised mesothelioma death rates	ACIM
	Age-standardised mesothelioma death rates	ACIM
Asbestosis	Number of compensated asbestosis-related claims	NDS & DDB
	Number of asbestosis deaths	ABS

National Data Set for Compensation-based Statistics (NDS)

The NDS data used in this report comprised all accepted workers' compensation claims lodged in the reference year.

NDS data is based on information received annually from Australian workers' compensation authorities. Supplied data includes both new data, for the most recent year available, and updated data for the five years prior. Because some claims lodged in the most recent year may not be accepted until the following year, the number of accepted claims reported lodged in the most recent year is likely to increase by about 3% when updated.

The NDS is the only national data set that provides information on workers' compensation claims that involve work-related disease. For a claim to be accepted, the workers' compensation authorities require that the connection between workplace and disease be made by a medical practitioner. This may lead to considerable under-reporting of occupational disease in the NDS. The reader should also note that claims data are based on date of lodgement of claims which is usually closer to the data of diagnosis than the date of exposure. Further information on the NDS can be found on the Safe Work Australia website.

NSW Dust Diseases Board

The Workers' Compensation Dust Diseases Board provides statutory no-fault compensation to NSW workers disabled by dust diseases resulting from exposure to dusts in the workplace. One of the Dust Diseases Board's responsibilities is to maintain a database of statistical and related data to facilitate actuarial valuations of the liabilities of the Dust Diseases Scheme and research into dust diseases (Dust Diseases Board 2010).

The Dust Diseases Board provided Safe Work Australia with data on the number of compensated claims awarded to workers disabled by asbestos-related diseases for each calendar year from 2002 to 2009. For the purposes of this report, only data for mesothelioma and asbestosis up to 2008 has been used and combined with NDS data (2008 NDS data is preliminary). The Dust Diseases Board data is an important source of data on asbestosis because, apart from NDS data, there is little data available to Safe Work Australia to estimate its prevalence in Australia.

Australian Cancer Incidence and Mortality (ACIM)

The AIHW ACIM Books are interactive Excel workbooks comprising cause-specific Australian cancer incidence and mortality information for the most recent years and historically, for some data, to 1968. Individual workbooks have been created for selected cancers (AIHW 2010).

Cancer (except basal cell and squamous cell carcinomas of the skin) is a notifiable disease in all Australian jurisdictions and, by law, data on every cancer diagnosis must be collected and reported to state and territory cancer registries who release this information to the AIHW NCSCCH. The ACIM books use data from the NCSCCH for the number of new cases of mesothelioma diagnosed each year.

The ABS provides AIHW with the cause of death data contained in the ACIM books. To begin with, the cause of death data is collected by the state and territory Registrars of Births Deaths and Marriages who then provide this data to the ABS for coding and compilation into national statistics.

The ACIM Book for mesothelioma contains incidence data from 1982 to 2006 and mortality data from 1997 to 2007. Data on the number of deaths each year is only from 1997 when mesothelioma was allocated a distinct code in the tenth revision of the International Classification of Diseases—previously, mesothelioma had been included with other cancers of the pleura.

Deaths information for asbestosis contained in this workbook were sourced electronically from the ABS website.

World Health Organization (WHO) International Classification of Diseases (ICD)

The ICD is a WHO maintained classification system used internationally to code causes of death and illness since the early twentieth century. To date there have been 10 versions of the coding system with each subsequent version expanding because of medical science's better understanding of diseases. Often revisions include changes in the coding rules aimed at improving comparability of data within and between countries over time.

AIHW National Hospital Morbidity Database (NHMD)

The hospitalisation data used in this report were downloaded from the AIHW website's online data cubes. The source of these data is the NHMD. This database, compiled by the Institute from data supplied by the state and territory health authorities, is a collection of records of admitted public and private hospital patients. For further information go to < <http://www.aihw.gov.au/hospitals/datacubes/index.cfm>>.

The AIHW NHMD contains diagnosis and treatment information for hospitalisations of admitted patients from almost all public and private hospitals in Australia starting from the financial year 1993–94.

Australian Bureau of Statistics (ABS)

The ABS data used in this report have been obtained from the Causes of Death data published on their website.

In Australia it has been compulsory since the mid-nineteenth century for information on all deaths to be certified by a medical practitioner and the details conveyed to state and territory Registrars of Births, Deaths and Marriages. The Registrars release this data to the ABS for determining and coding the underlying (the main cause) and multiple (or contributing) causes of death into national statistics.

For further information on multiple causes of death please go to the ABS website or click on this link <<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3303.02008?OpenDocument>>.

Age-standardised rates

Age-standardisation is a technique used to remove the influence of gradual shifts over time in the age and sex composition of the Australian population on rates calculated using those figures. By applying the age-specific incidence or death rates in each year to a standard population, the expected number of deaths can be calculated and an aggregate, age-standardised, rate can be calculated.

Types of asbestos

Amphibole: a category of asbestos that includes crocidolite (blue), amosite (brown), tremolite, anthophyllite and actinolite types of asbestos.

Serpentine: white (chrysotile) asbestos obtained from serpentine rocks that is characterised by curly fibres rather than the needle like amphibole fibres.

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