

# ASBESTOS

## BASELINE HEALTH MONITORING BEFORE STARTING ASBESTOS RELATED WORK OR REMOVAL WORK

### 1. Collection of demographic data

### 2. Work history

### 3. Medical History

Administration of a standardised respiratory questionnaire - [see Appendix 2](#).

### 4. Physical Examination - [see Appendix 1](#)

A physical examination will only be conducted if indicated by work and medical history. Emphasis should be on the respiratory system.

### 5. Investigation

Standardised respiratory function tests will be conducted to determine the worker's baseline respiratory function. Current evidence does not support screening for lung cancer with chest radiography or sputum cytology.

## DURING ASBESTOS RELATED WORK OR REMOVAL WORK

### 6. Monitoring exposure to asbestos

If a worker is carrying out licensed asbestos removal work, the Work Health and Safety Regulations require health monitoring is conducted prior to the worker commencing the work. The frequency of health monitoring should be determined by a risk assessment and the significance and frequency of past or future exposure. Health monitoring should be conducted at regular intervals, for example once every two years.

Monitoring should include administration of the standardised respiratory questionnaire. It would not ordinarily include respiratory function tests, chest X-ray or physical examination unless clinical indications are present or they are recommended by the medical practitioner.

## AT TERMINATION OF ASBESTOS RELATED WORK OR REMOVAL WORK

### 7. Final medical examination

A final medical examination will be conducted with emphasis on the respiratory system.

## SUPPLEMENTARY INFORMATION ON ASBESTOS

### 8. Work activities that may represent a high risk exposure

Asbestos is the fibrous form of mineral silicates belonging to the serpentine and amphibole groups of rock-forming minerals. The commercial types which have been used in Australia are the serpentine: chrysotile (white asbestos); and the amphiboles: crocidolite (blue asbestos) and amosite (brown or grey asbestos).

Examples of work activities involving asbestos which require special attention when assessing exposure include:

- asbestos removal and demolition work in buildings, power stations, boilers and ships
- maintenance workers, like electricians, and computer cabling installers and air-conditioning installers working in ceiling spaces of buildings where sprayed asbestos has not been removed, sealed or encapsulated.

In some industries, like mining and site excavation, for example during road building, amphiboles, like tremolite and anthophyllite, may be present as geological contaminants.

## POTENTIAL HEALTH EFFECTS FOLLOWING EXPOSURE TO ASBESTOS

### 9. Route of entry into body/absorption/excretion pharmacology

Although asbestos is a hazardous material it can only pose a risk to health if the asbestos fibres become airborne and are inhaled. Inhalation is the primary route of entry to the body. Small fibrous particles may become airborne and inhaled. Respirable fibres are fibres that are more likely to reach the small airways and alveolar region of the lung and are defined as having a length of more than five microns, and an aspect ratio (length/width) greater than 3:1.

### 10. Factors affecting risks of contracting asbestos related disease

This depends on factors including:

- fibre type
- size and shape of fibres
- concentration of asbestos fibres in the inhaled air
- period of time over which the person was exposed.

Long fibres of asbestos have more potential to cause disease than short fibres and a high aspect ratio has also been implicated as an important factor in the pathogenesis of asbestos-related disease, particularly mesothelioma.

Much of the current burden of asbestos-related disease is a result of past heavy industrial exposure among those who manufactured and installed asbestos products. Mesothelioma can result from brief periods of exposure and a pattern of repeated exposure can lead to a substantial cumulative exposure.

### 11. Sources of non-occupational exposure to asbestos

Low levels of asbestos fibres are present in the environment from the breakdown of asbestos products. Environmental weathering of asbestos-cement sheets in roofing and wall cladding, disturbance of asbestos from a variety of building materials like insulation, ceiling tiles, and floor tiles and asbestos release to air from clutches and brakes in cars and trucks results in asbestos fibres being widespread in the environment.

The typical environmental background in outdoor air is 0.0005 fibres/ml and 0.0002 fibres/ml in indoor air<sup>1</sup>. The daily inhalation volume for an average adult is 22 m<sup>3</sup> or 22000 litres<sup>2</sup>. This means 5500 fibres are breathed/day by the average person (proportion of time spent indoors = 20 hours/day). Despite this the general population does not contract asbestos-related disease in significant numbers. The background rate of mesothelioma is less than one per million per year. By comparison, the annual death rate for a 40 year old male in 2008 was 1.6 per thousand or 1600 per million<sup>3</sup>.

### INCIDENTAL EXPOSURE

People who may have been exposed to asbestos are often anxious and concerned about the possible effects on their health. There is at present no post-exposure prophylaxis for the effects of inhaled asbestos fibres, although in smokers the risk of asbestos-induced lung cancer (but not mesothelioma) can be reduced by stopping smoking. There are also no generally available techniques for determining individual lung burdens of asbestos fibres, other than post-mortem. Asbestos related damage to the lungs takes years to develop and become visible on chest X-rays, and X-ray examinations cannot indicate whether or not asbestos fibres have been inhaled. Given this, and the long latency period, there is no reason to subject individuals with a suspected incidental exposure to even a small dose of ionizing radiation.

### DISEASES AND SYMPTOMS OF ASBESTOS EXPOSURE<sup>4</sup>

#### Pleural plaques

An indicator of exposure to asbestos. They are diagnosed with a high degree of accuracy on high-resolution computed tomography (HRCT) imaging. Latency period is usually 20 or more years after the onset of exposure to asbestos dust.

#### Benign asbestos pleural effusion

An exudative pleural effusion that usually resolves spontaneously but may be followed by progressive pleural fibrosis.

#### Progressive pleural fibrosis (diffuse pleural thickening)

Recognised on a plain radiograph as pleural thickening that obliterates a costophrenic angle, and is present on HRCT by definition when a lesion equals or exceeds 8 cm in height and 5 cm in width. It may result in impaired lung function, particularly reduced lung volumes, with elevation of the diffusion constant.

#### Transpulmonary bands (crow's feet)

An extension of subpleural fibrosis along bronchovascular sheaths and arise from visceral pleural plaques and evident on computed tomography (CT).

#### Rounded atelectasis

This is the most common of the benign masses caused by exposure to asbestos. It usually occurs in the subpleural, posterior, or basal region of the lower lobes. Pleural thickening is always present and is commonly greatest near the mass.

■ 1 ATSDR. 2001. Toxicological profile for Asbestos. Atlanta: Agency for Toxic Substances and Disease Registry [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov)

■ 2 Enhealth Dept Health and Ageing Environmental Health Risk Assessment [www.health.gov.au](http://www.health.gov.au)

■ 3 Australian Bureau of Statistics at [www.ausstats.abs.gov.au](http://www.ausstats.abs.gov.au)

■ 4 De Klerk N, Henderson D, Jones M, Leigh J, Musk AW, Shilkin K, Williams V, 'The diagnosis and attribution of asbestos-related diseases in an Australian context', Adelaide Workshop on Asbestos-Related Diseases, *J Occup Health Safety - Aust NZ*, vol 18(5), pp 443-452, 2002.

### Asbestosis

Diffuse interstitial pulmonary fibrosis following asbestos exposure is recognised clinically by the presence of crackles on auscultation, small irregular opacities radiographically, and restrictive changes in lung function. CT has a higher sensitivity for minor interstitial changes compared with chest X-ray and is best seen on prone films. Prone scans abolish the gravity dependent subpleural density at the lung bases which obscures early disease.

The early changes of asbestosis are subpleural dots, subpleural lines, septal lines and small honeycomb cysts. In subjects who have had asbestos exposure, idiopathic pulmonary fibrosis (IPF) is indistinguishable from asbestosis clinically, physiologically, radiologically and pathologically except that the presence of pleural plaques increases the likelihood asbestos is responsible for the fibrosis. Rapidly progressive fibrosis is more likely in IPF than asbestosis.

Typically asbestosis causes a restrictive pattern on pulmonary function tests. A forced vital capacity (FVC), a total lung capacity (TLC) and/or a diffusing capacity of the lung for carbon monoxide, that is DLCO less than the 95% confidence lower limit, suggest the presence of an interstitial fibrotic process consistent with asbestosis. Constriction of bronchioles, with decreased expiratory flow rates at low lung volumes ( $FEF_{25-75}$ ), may be the earliest functional impairment.

### Malignant mesothelioma of the pleura and peritoneum

Malignant mesothelioma has a strong association with a history of asbestos exposure often at levels less than the cumulative exposures required to induce asbestosis or lung cancer. The amphibole varieties of asbestos (crocidolite and amosite) are substantially more potent than chrysotile for mesothelioma induction. There is a long latency period from 10 to 50 years between exposure and the development of mesothelioma with mean latency 37.4 years.

Malignant mesothelioma is locally aggressive and invasive with mean survival of 17.6 months from first symptom appearing.

### Lung cancer

The relative frequencies of the large and small cell varieties are similar to those that are seen in smokers without asbestos exposure. The risk is dose dependent and the effects of tobacco smoking and asbestos are synergistic. The average latency is 20-30 years.

### MESOTHELIOMA REGISTER

The Australian Mesothelioma Registry (AMR)<sup>5</sup> is a database that contains information about people with mesothelioma. It monitors all new cases of mesothelioma diagnosed in Australia from 1 July 2010.

Each state and territory cancer registry provides the AMR with information about each person diagnosed with mesothelioma on or after 1st July 2010 in Australia. Notification of cancer is a legal requirement for all public and private hospitals, radiotherapy departments, nursing homes, pathology laboratories and outpatient departments.

## 12. Carcinogen classification<sup>6</sup>

Asbestos is classified according to the GHS as Carcinogenicity Category 1A (May cause cancer).

■ 5 <http://www.mesothelioma-australia.com/home-page.aspx>

■ 6 This classification information is provided on an advisory basis and is taken from the European Union's Annex VI to Regulation (EC) No 1272/2008, updated by the 1st Adaption to Technical Progress to the Regulation. Other hazard classes and categories may apply - see <http://esis.jrc.ec.europa.eu/index.php?PGM=cla>. These classifications are legally binding within the European Union.

## APPENDIX 1

This health monitoring report is a confidential health record and must not be disclosed to another person except in accordance with the Work Health and Safety Regulations or with the consent of the worker.

1. PERSON CONDUCTING A BUSINESS OR UNDERTAKING		
Company / Organisation name:		
Site address:		
Suburb:		Postcode:
Site Tel:	Site Fax:	Contact Name:
2. OTHER BUSINESSES OR UNDERTAKINGS ENGAGING THE WORKER		
Company / Organisation name:		
Site address:		
Suburb:		Postcode:
Site Tel:	Site Fax:	Contact Name:
3. WORKER <span style="float: right;">(✓) all relevant boxes</span>		
Surname:		Given names:
Date of birth: DD/MM/YYYY	<input type="checkbox"/> Male	<input type="checkbox"/> Female
Home Address:		
Suburb:		Postcode:
Current Job:	Tel(h):	Mobile:
Date examined: DD/MM/YYYY		Length of employment: YEARS/MONTHS
4. WORK TASKS / ENVIRONMENT <span style="float: right;">(✓) all relevant boxes</span>		
Before this work, did you work in any other dusty environment or in a job with exposure to asbestos?		<input type="checkbox"/> Yes <input type="checkbox"/> No
5. OCCUPATIONAL HISTORY		
Date e.g. 2004-2011	PCBU and occupation(s)	Note any exposures to dust, fibres, mists, fumes, chemicals
1.		
2.		
3.		
4.		
5.		
6. QUESTIONS ABOUT PRESENT WORK <span style="float: right;">(✓) all relevant boxes</span>		
1. <input type="checkbox"/> How many years have you worked at your present work?		_____ years
2. <input type="checkbox"/> How many days per week do you usually work?		_____ days
3. <input type="checkbox"/> How many hours per day do you usually work?		_____ hours
4. In what types of work/tasks are you exposed to asbestos?		Hours per week



## HEALTH MONITORING REPORT ASBESTOS

4. Date of last volume calibration: DD/MM/YYYY		
5. Temperature: _____ °C		
6. At least 3 technically acceptable manoeuvres should be obtained with the highest and second highest FEV <sub>1</sub> and FVC within 0.15 L (within 0.100 L for those with an FVC of equal to or less than 1.0 L)*.		
<p>* Miller MR, Hankinson J, Brusasco V, Burgos F, Casaburi R, Coates A, Crapo R, Enright P, van der Grinten CPM, Gustafsson P, Jensen R, Johnson DC, MacIntyre N, McKay R, Navajas D, Pedersen OF, Pellegrino R, Viegi G, Wanger J, 'Standardisation of spirometry', Series "ATS/ERS Task Force: Standardisation of Lung Function Testing", Brusasco V, Crapo R, Viegi G (eds), Number 2 in this series, <i>Eur Respir J</i>, vol 26, pp 319-338, 2005.  <a href="http://www.thoracic.org/statements/resources/pfet/PFT2.pdf">http://www.thoracic.org/statements/resources/pfet/PFT2.pdf</a>.</p>		
Use best result for FEV <sub>1</sub> and FVC, even if from different tests.		
		% Predicted
FEV <sub>1</sub>		
FVC		
FEV <sub>1</sub> /FVC%		
<input type="checkbox"/> Normal		<input type="checkbox"/> Abnormal
<b>Comments</b>		
<b>8. RESULTS / RECOMMENDATIONS</b>		<b>(✓) all relevant boxes</b>
1.	Is appropriate PPE used for all jobs?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.	Respiratory symptoms	<input type="checkbox"/> Yes <input type="checkbox"/> No
3.	Adequate workplace controls in place	<input type="checkbox"/> Yes <input type="checkbox"/> No
4.	Medical counselling required	<input type="checkbox"/> Yes <input type="checkbox"/> No
5.	Remove from exposure	<input type="checkbox"/> Yes <input type="checkbox"/> No
6.	Follow-up medical examination	On DD/MM/YYYY
7.	Referral to Medical Specialist Specialist's name:	On DD/MM/YYYY
8.	<input type="checkbox"/> Control of exposure may not be adequate - recommend a review of work practices	
9.	Respiratory questionnaire completed and reviewed?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Add comments/recommendations below		
<b>Additional comments and/or recommendations arising from health monitoring</b>		
<b>Medical Practitioner</b> (responsible for supervising health monitoring)		
Name:	Signature	Date DD/MM/YYYY
Tel: ( )	Fax:	Registration Number:
Medical Practice		
Address:		
Suburb:		Postcode:

## Appendix 2

Questionnaire based on the MRC (UK) Respiratory Questionnaire 1986, which has been extensively validated. This questionnaire can be completed by the worker at home. Additional questions have been added to cover clinical aspects of bronchial hyper-responsiveness validated by the Department of Occupational and Environmental Medicine, National Lung Institute<sup>1</sup>.

The British Occupational Health Research Foundation (BOHRF)<sup>2</sup> concluded that in the clinical setting, questionnaires that identify symptoms of wheeze and/or shortness of breath which improve on days away from work or on holidays have a high sensitivity, but relatively low specificity for occupational asthma.

### Preamble

Following are questions, mainly about your chest. Answer **yes** or **no** whenever possible.

If you are disabled from walking from any condition other than heart and lung disease, please begin questionnaire at **Question 5** and mark the adjacent box.

BREATHLESSNESS AND WHEEZING		
During the last month:		
1. Are you troubled by shortness of breath when hurrying on level ground or walking up a slight hill?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
2. <b>If Yes to 1</b> - Do you get short of breath walking with other people of your age on level ground?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
3. <b>If Yes to 2</b> - Do you have to stop for breath when walking at your own pace on level ground?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
4. If you run, or climb stairs fast do you ever		
a. cough?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
b. wheeze?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
c. get tight in the chest?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
5. Is your sleep ever broken		
a. by wheeze?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
b. difficulty in breathing?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
6. Do you ever wake up in the morning (or from your sleep if a shift worker)		
a. with wheeze?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
b. difficulty with breathing?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

■ 1 Venables KM, Farrer N, Sharp L, Graneek BJ, Newman Taylor AJ, 'Respiratory Symptoms Questionnaire for Asthma Epidemiology: Validity and Reproducibility', *Thorax*, vol 48, pp 214-219, 1993.

■ 2 The British Occupational Health Research Foundation (BOHRF), *Guidelines for Prevention, Identification and Management of Occupational Asthma: Evidence Review and Recommendations*, London 2004. [www.bohrf.org.uk](http://www.bohrf.org.uk)

## HEALTH MONITORING REPORT ASBESTOS RESPIRATORY QUESTIONNAIRE

7.	Do you ever wheeze		
	a. if you are in a smoky room?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	b. if you are in a very dusty place?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
8.	<b>If Yes to either Q5, Q6, Q7</b> - Are your symptoms better		
	a. at weekends (or equivalent if shift worker)?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	b. when you are on holidays?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	If <b>Yes to Question 8</b> , please record details of any occupational exposure to respiratory hazards e.g. isocyanates, wood dust, aluminium pot room or asbestos, in <b>Additional notes</b> at the end of this questionnaire.		
COUGH			
9.	Do you usually cough first thing in the morning in winter?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
10.	Do you usually cough during the day/ or at night / in the winter?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
11.	<b>If Yes to Q9 or Q10</b> - Do you cough like this on most days for as much as three months each year?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
PHLEGM			
12.	Do you usually bring up phlegm from your chest first thing in the morning in winter?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
13.	Do you usually bring up any phlegm from your chest during the day / or at night / in winter?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
14.	<b>If Yes to Q12 or Q13</b> - Do you bring up phlegm like this on most days for as much as three months each year?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
PERIODS OF COUGH AND PHLEGM			
15.	In the past three years, have you had a period of (increased) cough and phlegm lasting for three weeks or more?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
16.	<b>If Yes to Q15</b> - Have you had more than one such episode?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
CHEST ILLNESSES			
17.	During the past three years, have you had any chest illness that has kept you from your usual activities for as much as a week?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
18.	<b>If Yes to Q17</b> - Did you bring up more phlegm than usual in any of these illnesses?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
19.	<b>If Yes to Q18</b> - Have you had more than one illness like this in the past three years?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

## HEALTH MONITORING REPORT ASBESTOS RESPIRATORY QUESTIONNAIRE

PAST ILLNESSES			
20.	Have you ever had, or been told that you have had any of the following?		
	a. An injury, or operation affecting your chest?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	b. Heart problems?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	c. Bronchitis?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	d. Pneumonia?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	e. Pleurisy?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	f. Asthma?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	g. Other chest trouble?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	h. Hay fever?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
TOBACCO SMOKING			
21.	Do you smoke?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<b>If No to Q21</b>			
22.	Have you ever smoked as much as one cigarette a day for as long as one year?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
23.	How old were you when you started smoking regularly? _____		
24.	a. Do (did) you smoke manufactured cigarettes?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<b>If Yes to Q24a:</b> How many do (did) you usually smoke per day? _____		
	b. on weekdays? _____		
	c. at weekends? _____		
25.	Do (did) you smoke any other forms of tobacco?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<b>If Yes to Q25, record details under Additional notes</b>		
FOR EX-SMOKERS			
26.	When did you give up smoking altogether?	Month _____	Year _____
<b>Additional notes:</b>			