Mesothelioma incidence projections

Sharma P Riaz , Victoria H Coupland, Mick D Peake, Henrik Møller

THAMES CANCER REGISTRY

Introduction

Mesothelioma is a form of cancer found most commonly in the membranes around the lungs (the pleura). It is almost always fatal and most patients die in the first year of diagnosis. [1] The current incidence of mesothelioma in the UK is approximately 1,800 cases per annum [2] and is expected to rise. [3] The leading cause of mesothelioma is exposure to asbestos fibres and occurs most commonly in people who worked in the following industries; mining, shipbuilding, manufacture of asbestos textiles and cement, plumbing, insulation and building. [4]

Previous predictions [3], of future deaths per year in Britain, suggested that male mesothelioma deaths would peak around 2020.

Objective

The aim of this project is to project the past and future age-standardised incidence rates for mesothelioma by birth cohort and by period of diagnosis.

Methods

We extracted data on 7,376 patients diagnosed with mesothelioma (ICD-10 C45) between 1960 and 2007 from the Thames Cancer Registry. We used a Poisson regression age-cohort model to estimate the age specific rates in the cohort dimension and a Poisson regression age-period model to estimate the age specific rates in past and future periods. We then calculated the age-standardised rates (per 100,000 European standard population) (ASR(E)). We refer to all age groups and periods by their midpoint. The 3-year period 2005-2007 represents the 5-year period 2005-2009 and is indexed by the value "2007". We report estimates from 1875 to 1965 birth cohorts, and from 1947 to 2057 calendar periods.

Table 1: Number of cases, proportion and age-standardised incidence rates (per 100,000 European standard population) with 95% confidence interval (CI) of mesothelioma patients diagnosed between 1960 and 2007, South East England, by sex

	Male				Female				Male/Female ratio
	Cases	%	ASR	(95% CI)	Cases	%	ASR	(95% CI)	
Period									
1962	20	64	0.14	(0.21-0.08)	11	36	0.05	(0.08-0.02)	2.81
1967	49	70	0.32	(0.41-0.23)	21	30	0.09	(0.13-0.05)	3.58
1972	71	63	0.42	(0.52-0.32)	42	37	0.19	(0.25-0.13)	2.23
1977	162	78	0.97	(1.13-0.82)	45	22	0.20	(0.27-0.14)	4.77
1982	263	83	1.56	(1.76-1.37)	54	17	0.25	(0.32-0.18)	6.20
1987	753	83	2.79	(2.99-2.58)	155	17	0.43	(0.50-0.36)	6.47
1992	963	83	3.59	(3.82-3.36)	201	17	0.59	(0.68-0.50)	6.11
1997	1155	83	4.18	(4.42-3.93)	229	17	0.64	(0.73-0.55)	6.48
2002	1563	81	5.35	(5.62-5.08)	361	19	0.98	(1.08-0.87)	5.48
2007	1007	80	5.42	(5.76-5.08)	252	20	1.08	(1.22-0.94)	5.02

Results

The proportion of male mesothelioma patients increased from 64% in 1962 to 80% in 2007% (table 1). ASR(E) were higher for males than females.
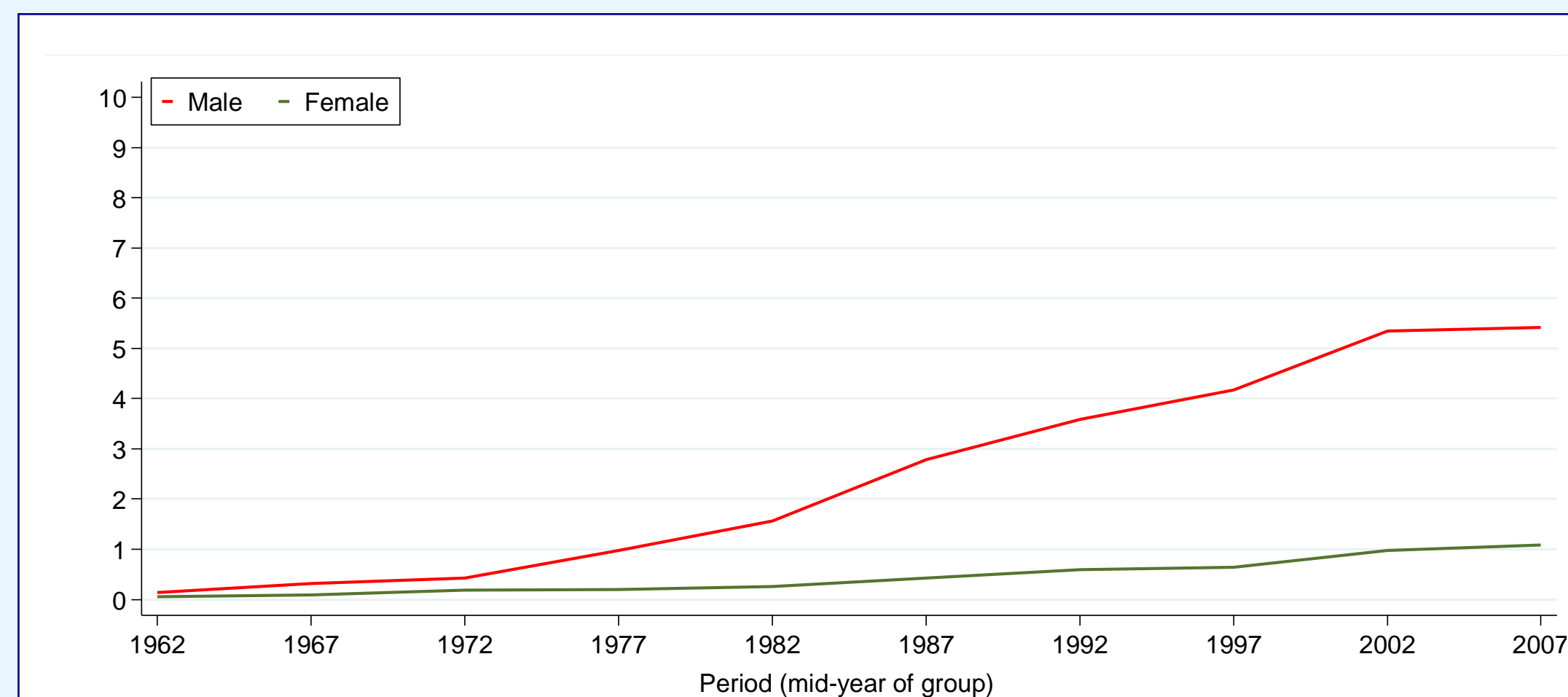

Figure 1: ASR (per 100,000 European standard population) of 7,376 mesothelioma patients diagnosed between 1960 and 2007, South East England, by sex.

Figure 2: ASR (per 100,000 European standard population) of mesothelioma patients, South East England,1875-1965, by sex and cohort of birth.

Figure 3: Observed (thick lines) and predicted (dashed lines) age standardised rates (per 100,000 European standard population) of mesothelioma patients, South East England, 1947-2057, by sex.

Figure 1 shows the age-standardised rate (per 100,000 European population) of mesothelioma for male and female patients in South East England. In male patients there was a rapid increase in incidence rate from 0.14 in 1962 to 5.42 in 2007. In female patients there was a gradual increase in incidence rate from 0.05 in 1962 to 1.08 in 2007.

Figure 2 shows the trends in ASR(E) by birth cohort. In the cohort dimension, age-standardised rates increased in successive generations up to 1945 cohort, where the estimated ASRs were 9.5 in males and 1.9 in females. The incidence rate decreased in successive generations born after 1945.

We predict that the ASR(E) in men will increase until 2022, and that the rate will decrease during the 2020s, 2030s and 2040s (Figure 3). Among women we predict that the ASR(E) will increase gradually until it reaches a maximum in 2027 and will remain relatively stable thereafter.
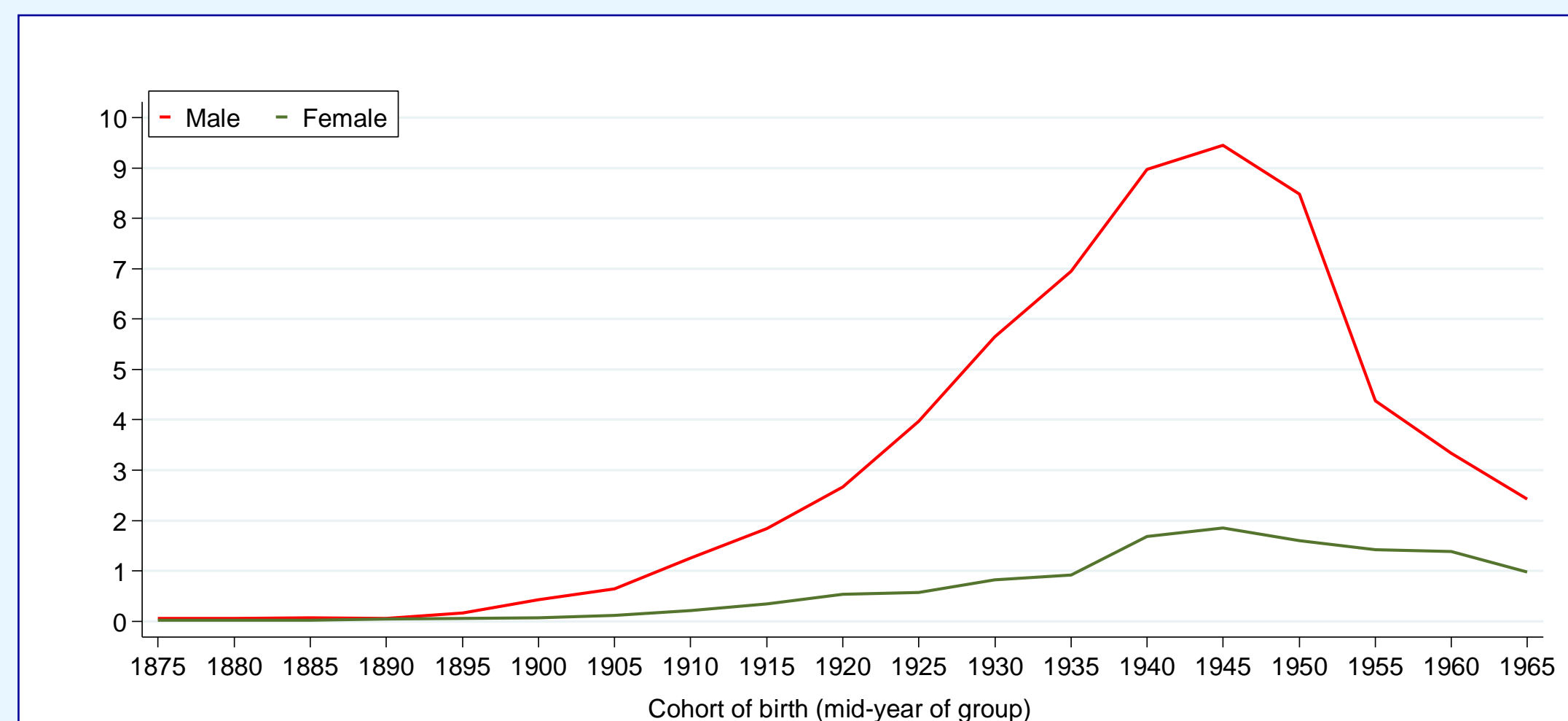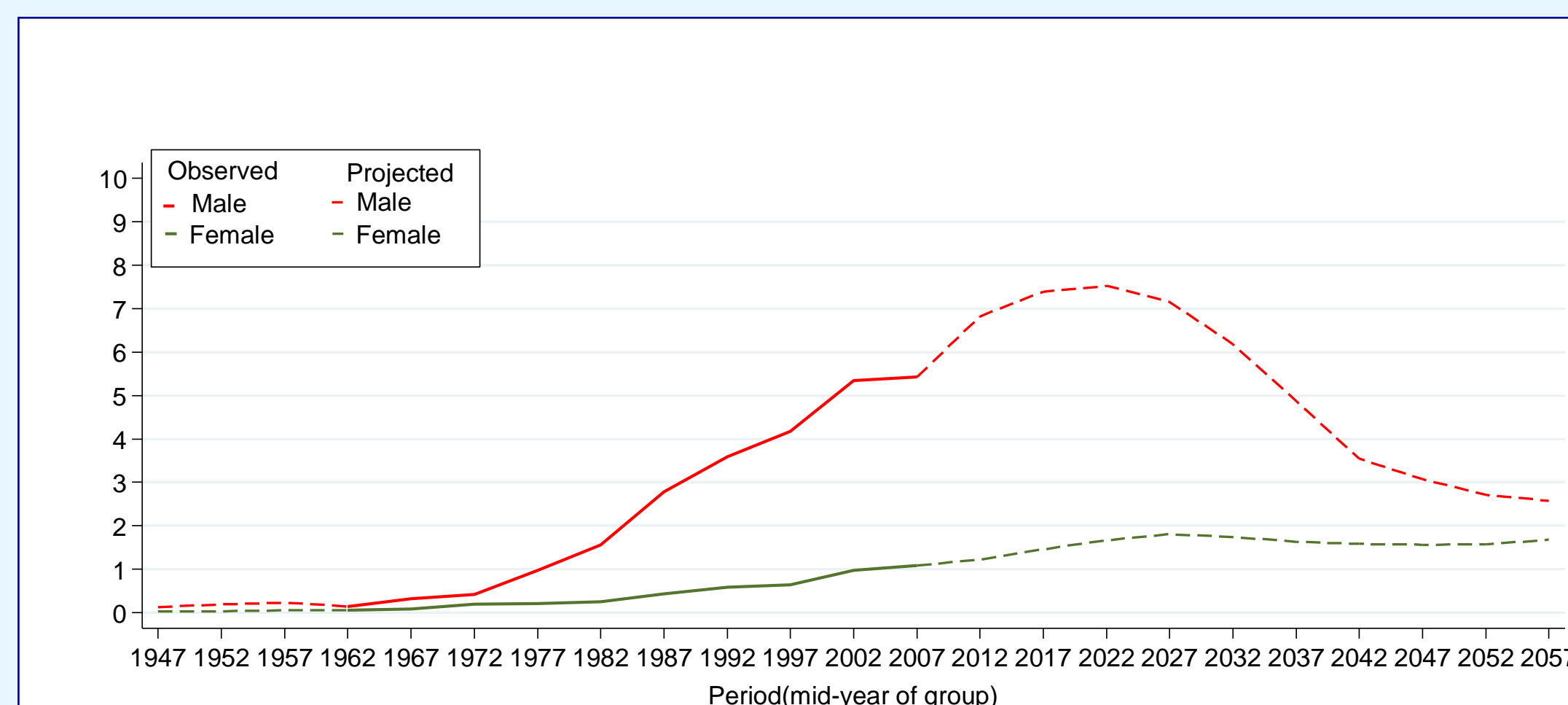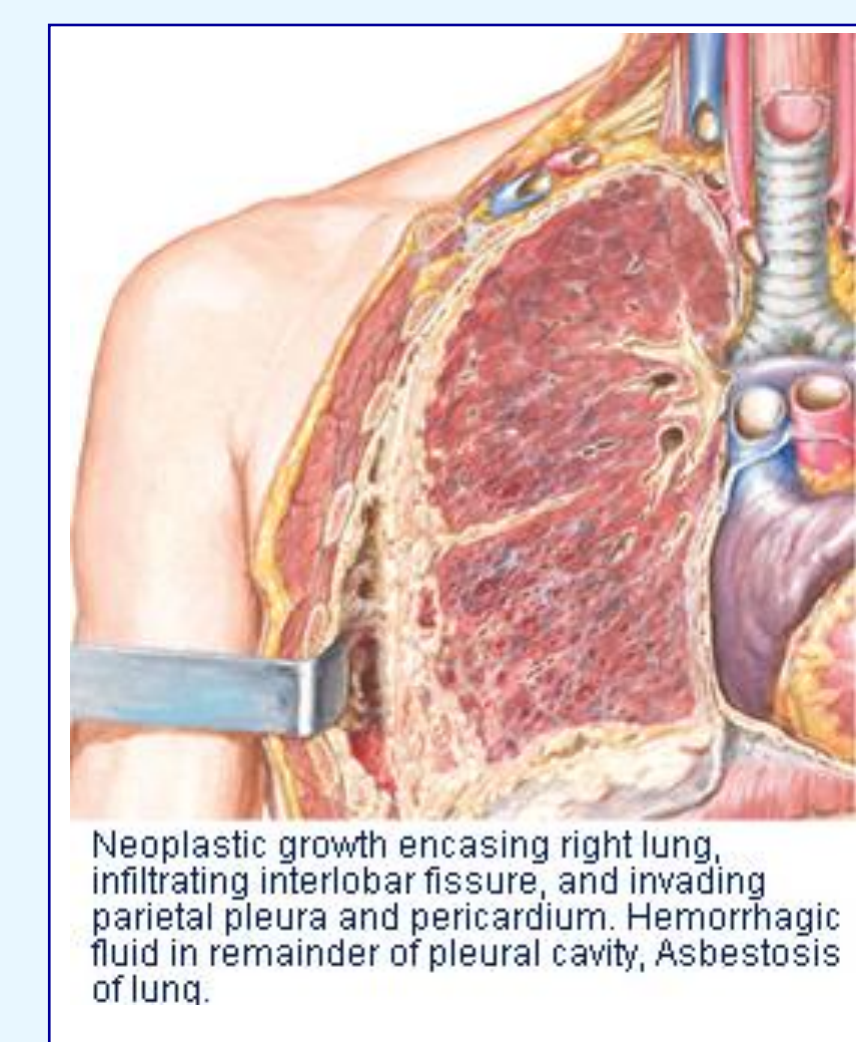
Conclusion

The occurrence of mesothelioma is closely linked to occupational exposure to asbestos. We expect the incidence of mesothelioma to increase in coming years. This is due to high exposures to asbestos in the 1960s and 1970s. Recent generations have had little or no exposure, and this will lead to low population incidence in future periods.

Neoplastic growth encasing right lung, infiltrating interlobar fissure, and invading parietal pleura and pericardium. Hemorrhagic fluid in remainder of pleural cavity, Asbestosis of lung.

Reference

1. Mak V, Davies E, Putcha V, Choodari-Oskooei B, Møller H. The epidemiology and treatment of mesothelioma in South East England 1985-2002. *Thorax* 2008; **63**:160-166.
2. National Lung Cancer Audit. Key findings about quality of care for people with Lung Cancer in England and Wales. *National Lung Cancer Audit* 2006;12.
3. Peto J, Hodgson JT, Matthews FE, Jones JR. Continuing increase in mesothelioma mortality in Britain. *Lancet* 1995; **345**:535-39.
4. Mak V, Davies E, Putcha V, Choodari-Oskooei B, Møller H. The epidemiology and treatment of mesothelioma in South East England 1985-2002. *Thorax* 2008; **63**:160-166.
Picture1: http://www.mesotheliomasettlementcash.com/pleural_mesothelioma.asp
Background: http://www.consrv.ca.gov/cgs/geologic_hazards/hazardous_minerals/Pages/index.aspx