Asbestos-related disease statistics, Great Britain 2022

July 2022

Contents

Summary

Over 5,000

Asbestos-related disease deaths per year currently, including mesothelioma, lung cancer and asbestosis

2,544

Mesothelioma deaths in 2020, with a similar number of lung cancer deaths linked to past exposures to asbestos

530

Deaths in 2020 mentioning asbestosis on the death certificate*

*Excluding deaths that also mention mesothelioma

- Inhalation of asbestos fibres can cause cancers such as mesothelioma and lung cancer, and other serious lung diseases such as asbestosis and pleural thickening

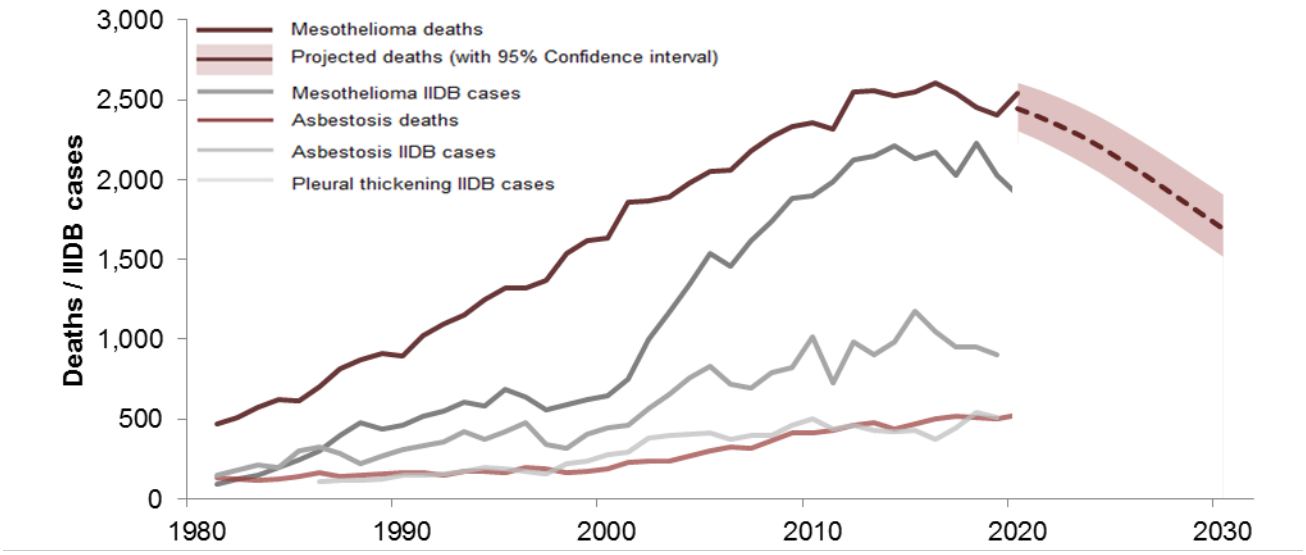


Figure 1 - Mesothelioma, asbestosis, and pleural thickening: time trends in annual deaths and Industrial Injuries Benefit Disablement (IIDB) cases*

**Latest statistics are for 2020 for deaths and 2020 for IIDB cases*

- All asbestos-related diseases typically take many years to develop so current statistics reflect the legacy of past working conditions.
- Widespread use of asbestos containing products in the past – particularly in the post-WWII building industry – led to a large increase in asbestos-related disease in Great Britain over the last few decades.
- The cancer, mesothelioma, has such a strong relationship with asbestos that annual deaths give a particularly clear view of the effect of past exposures.
- Annual deaths increased steeply over the last 50 years, largely as a result of asbestos exposure prior to 1980, and are now expected to continue at current levels for the rest of the decade.

More detailed information on mesothelioma:

- Mesothelioma Mortality in Great Britain by Geographical area, 1981–2020: www.hse.gov.uk/statistics/causdis/mesothelioma/mesoarea.pdf .
  Results are also available as interactive maps available at: https://arcg.is/1qO0G40.
- Mesothelioma Occupation Statistics – male and female deaths aged 16-74 in Great Britain 2011-2020 and 2001-2010: www.hse.gov.uk/statistics/causdis/mesothelioma/mesothelioma-mortality-by-occupation.pdf and www.hse.gov.uk/statistics/tables/mesooccupation.xlsx.
- Mesothelioma occupation statistics for males and females aged 16-74 in Great Britain, 1980-2000 www.hse.gov.uk/statistics/pdf/occ8000.pdf

The document can be found at: www.hse.gov.uk/statistics/causdis

The information in this document relates to Health and Safety Statistics published by the Health and Safety Executive in 2022.

Introduction

Inhalation of asbestos fibres can cause a number of serious diseases most of which affect the lungs or pleura (the external lining of the lung). These include a number of forms of cancer and chronic conditions such as asbestosis and pleural thickening. This document summarises the latest statistics on these diseases.

All of these diseases have a long latency, meaning it takes a long time – typically decades – for symptoms to occur following exposure to asbestos. However, for cancers such as mesothelioma and lung cancer, cases are often rapidly fatal following disease onset, while conditions such as asbestosis may progress over time to seriously affect normal daily activity and lead to complications which can be fatal.

Asbestos was used extensively in Great Britain in a wide range of products, but particularly in insulation and building materials, following World War II. Widespread asbestos-exposures during the 1950s, 1960s and 1970s led to a large increase in asbestos-related disease in Great Britain.

For some diseases – for example, mesothelioma and asbestosis – statistics can be derived from data sources that rely on counting of individual cases or deaths. For diseases that are regularly caused by other agents as well as asbestos – for example, lung cancer – statistics can be derived based on epidemiological evidence about the Attributable Fraction (AF) of cases or deaths due to asbestos exposure.

Asbestos-related cancers

Mesothelioma

Mesothelioma is a form of cancer that principally affects the pleura (the external lining of the lung) and the peritoneum (the lining of the lower digestive tract). It takes many years to develop following the inhalation of asbestos fibres. Cases are often diagnosed at an advanced stage as symptoms are typically non-specific and appear late in the development of the disease. It is almost always fatal, and often within twelve months of symptom onset.

Mesothelioma has such a strong relationship with asbestos that annual cases give a particularly clear view of the effect of past exposures, and as the disease is usually rapidly fatal following disease onset, the number of annual deaths closely approximates to the annual number of new cases (i.e. the annual disease incidence).

Annual deaths in Britain increased steeply over the last 50 years, a consequence of mainly occupational asbestos exposures that occurred because of the widespread industrial use of asbestos during 1950-1980.

The latest statistics are as follows:

- There were 2,544 mesothelioma deaths in Great Britain in 2020, a rise of 6% compared with 2019, but similar to the average of 2523 deaths per year over the previous 8 years.
- There were 2,085 male deaths in 2020. Although this is a rise of 6% compared with 2019, it is consistent with projections that annual male deaths will reduce beyond year 2020.
- There were 459 female deaths in 2020, a rise of 7% compared with 2019 and higher than the average of 416 deaths per year over the previous 8 years. This is consistent with predictions that there will continue be 400-500 female deaths per year during the 2020s.
- Figures for 2020 may have been affected to some extent by the coronavirus pandemic. A small number of individuals with mesothelioma and who developed COVID-19 may not have died of in 2020 had pandemic not occurred. Conversely, delays in the death certification system could mean that a small number of additional 2020 deaths will be identified in the future.
- Around two thirds of annual deaths for both males and females now occur in those aged over 75 years. Annual deaths in this age group continue to increase while deaths below age 65 are decreasing.

- There were 1,910 new cases of mesothelioma assessed for Industrial Injuries Disablement Benefit (IIDB) in 2020 of which 280 were female. This compares with 2,025 new cases in 2019, of which 240 were female.
- Men who worked in the building industry when asbestos was used extensively in the past continue to be most at risk of mesothelioma.

A more detailed description of the latest mesothelioma statistics, including analyses by region and occupation is available at:

www.hse.gov.uk/statistics/causdis/mesothelioma/mesothelioma.pdf

Asbestos-related lung cancer

Asbestos is one of the most common causes of lung cancer after tobacco smoking. Lung cancer usually has no specific clinical signs associated with particular causes and so it is very difficult to be sure about the causes of individual cases. However, the overall proportion of annual deaths that are attributable to past asbestos exposures can be estimated from epidemiological information. Lung cancer is still typically fatal within a few years of diagnosis and so, as with the mesothelioma, the number of annual deaths is broadly similar to the annual incidence of new cases.

Epidemiological studies of specific groups of workers that were heavily exposed to asbestos in the past have typically estimated a greater number of lung cancers attributed to asbestos than there were mesotheliomas [note 1]. However, other studies that are more representative of the British population as a whole provide the best basis for estimating the overall number of asbestos-related lung cancers nationally. Such evidence suggest that there are around as many lung cancer cases attributed to past asbestos exposure each year as there are mesotheliomas, though this estimate is uncertain [Note 2 and 3].

A ratio of one asbestos-related lung cancer for every mesothelioma implies there are currently around 2,500 asbestos-related lung cancer deaths each year.

It is expected that there will be fewer asbestos-related lung cancers per mesothelioma in the future as a consequence of reductions in both asbestos exposure and smoking – which act together to increase the risk of lung cancer – in past decades.

Data sources that rely on the counting of individual cases attributed to asbestos exposures, such as the Industrial Injuries Disablement Benefit (IIDB) and the Health and Occupation Reporting (THOR) schemes, tend to substantially underestimate the true scale of asbestos-related lung cancer.

In recent years there have been, on average, around 250 new cases of asbestos-related lung cancer each year, with 185 reported in 2020, within the IIDB scheme (see table IDB01 www.hse.gov.uk/statistics/tables/iidb01.xlsx). There were an estimated 74 cases of lung cancer identified by chest physicians in 2019 within the THOR scheme, close to the average of 73 per year over the previous ten years. Most of these cases are associated with asbestos. In 2020 there was only one reported case, the low number was due to the coronavirus. (See table THORR01 www.hse.gov.uk/statistics/tables/thorr01.xlsx.) Typically, females account for 2% of IIDB cases and less than 1% of THOR cases.

Estimates of the burden of lung cancer attributable to occupational exposures other than asbestos are available based on the Burden of Occupational Cancer research (www.hse.gov.uk/cancer/research.htm) [note 4].

Other asbestos-related cancers

In their most recent review, the International Agency for Research on Cancer (IARC) concluded that in addition to mesothelioma and lung cancer there is sufficient evidence that asbestos can cause cancer of the larynx, ovary, pharynx and stomach [note 5].

Two of these cancers (larynx and stomach) were already known to be caused by asbestos when the Burden of Occupational Cancer research (www.hse.gov.uk/cancer/research.htm) [note 4] was carried out and so estimates of the current annual number of new cases and deaths are available.

Based on mortality data for 2016-2020 and cancer incidence data for 2015-2019, the current estimated annual number of cases and deaths attributed to past asbestos exposure were:

- for cancer of the larynx: 9 cases and 3 deaths;
- for cancer of the stomach: 39 cases and 25 deaths.

Non-malignant asbestos-related diseases

Important Note
The coronavirus (COVID-19) pandemic and the government's response has impacted recent trends in health and safety statistics published by HSE including some of the data sources used in relation to non-malignant asbestos related disease: in particular, the Industrial Injuries and Disablement Benefit (IIDB) scheme and The Health and Occupation Reporting (THOR) network. More details can be found in our technical report on the impact of the coronavirus pandemic on health and safety statistics. [https://www.hse.gov.uk/statistics/coronavirus/covid-19.pdf]

Asbestosis

Asbestosis is a form of pneumoconiosis caused by the inhalation of asbestos fibres, which is characterised by scarring and inflammation of the lung tissue. It is a chronic and irreversible condition in which symptoms typically start to develop several decades following exposure to asbestos. These often progress to seriously affect normal daily activity and can lead to various complications which can be fatal.

It is generally recognised that heavy asbestos exposures are required in order to produce clinically significant asbestosis within the lifetime of an individual. Current trends therefore still largely reflect the results of heavy exposures in the past.

The latest statistics for deaths where asbestosis contributed as a cause of death based on the Asbestosis Register show:

- Deaths mentioning asbestosis (excluding those that also mention mesothelioma) have increased substantially over a number of decades: there were 530 such deaths in 2020 compared with around 100 per year in the late 1970s. Typically, in recent years, around 2-3% of these deaths were among women.
- Deaths also mentioning mesothelioma are excluded from this figure, since in such cases the term 'asbestosis' may have been used incorrectly to indicate the role of asbestos in causing the separate disease mesothelioma. There were 34 such deaths in 2020.
- In around a third of the 530 deaths in 2020, asbestosis was mentioned on the death certificate, but not as the underlying cause of death.
- 112 of the 530 deaths in 2020 also mentioned COVID-19 on the death certificate and in 103 of these deaths it was recorded as the underlying cause of death. Some of these deaths where both asbestosis and COVID-19 played a role may not have occurred in 2020 in the absence of the pandemic.

- In 188 of the 564 total deaths in 2020 asbestosis was recorded as the underlying cause of death compared with 223 of 523 such deaths in 2019. The reduction could be at least partly due to some deaths where both asbestosis and COVID-19 played a role being recorded as COVID-19 in the underlying cause rather than asbestosis.
- Interpretation of these figures is further complicated by the fact that cases of asbestosis may sometimes not be recorded as such because they may be mistaken for other types of lung fibrosis – or recorded as "idiopathic" cases (i.e. lung fibrosis without a known cause) [note 6] – or may go undiagnosed.

Table IIDB06 www.hse.gov.uk/statistics/tables/iidb06.xlsx shows the number of new cases of asbestosis (and other forms of pneumoconiosis) assessed under the Industrial Injuries and Disablement Benefit (IIDB) scheme. The number of cases of asbestosis has increased substantially over the long term from 132 in 1978 to 905 in 2019 (see Figure 2) of which 1-2% were among women. There were 275 cases in 2020 but this figure is likely to have been affected by a substantial reduction in new cases assessed during the coronavirus pandemic.

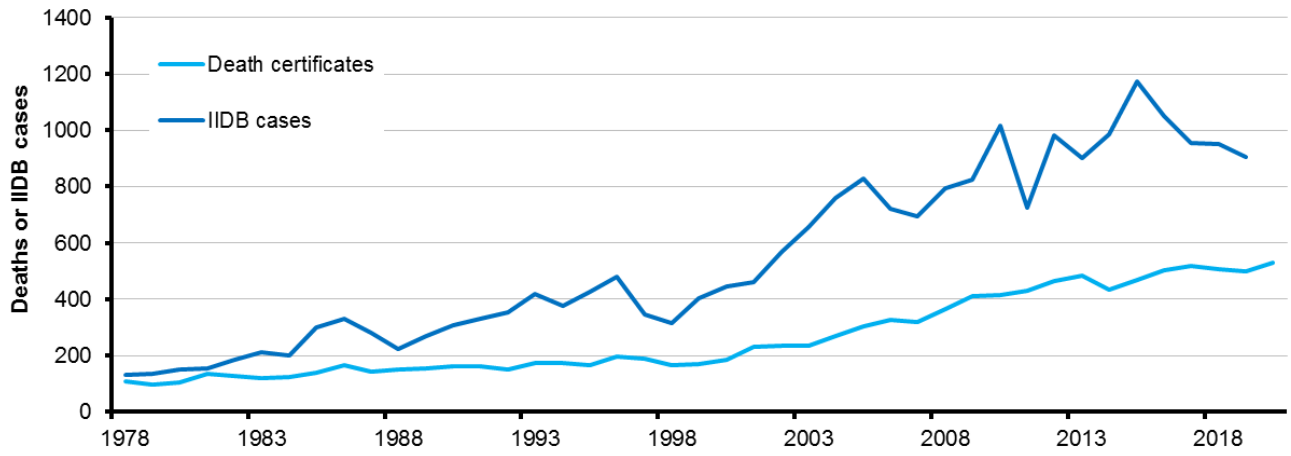


Figure 2 – Annual deaths where death certificates mentioned asbestosis but not mesothelioma 1978-2020, and IIDB cases 1978-2019*

*Data for 2020 not shown due to the impact of the coronavirus pandemic

Table THORR01 (www.hse.gov.uk/statistics/tables/thorr01.xlsx) gives a breakdown of the pneumoconiosis cases seen by chest physicians in the THOR scheme. There were 159 cases of asbestosis out of the estimated 236 pneumoconiosis cases reported to respiratory physicians in 2019. Reporting of new cases during 2020 was disrupted by the coronavirus pandemic: there were an estimated 80 pneumoconiosis cases in 2020, of which 49 were asbestosis. Typically, less than 1% of cases were among females.

The statistics based on reporting by chest physicians in the THOR scheme prior to the coronavirus pandemic also support a continuing increase in annual asbestosis cases. Analyses of trends in THOR data [note 7] suggest that the incidence of all pneumoconiosis – the majority of which is known to be asbestosis within that scheme – has been increasing with an average change of + 3.6 % per year (95% CIs: +2.1, +5.0) over the time period 1999-2019. For the more recent period 2010-2019, the equivalent estimate was +5.7% per year (95% CIs: +2.2, +9.3), with the increase largely due to asbestos rather than silica, coal etc.

Asbestosis deaths by age group and time period

Table ASIS02 www.hse.gov.uk/statistics/tables/asis02.xlsx shows the total number of death certificates mentioning the term asbestosis without mention of mesothelioma among males, and equivalent death rates, by age group for the three-year time periods during 1978-2020.

Age-specific death rates for males are also shown in Figure 3 below.

There are large differences in the magnitude of the rates between the different age groups:

- Death rates at ages below 65 years have been falling since the 1980s;
- This contrasts with strongly increasing rates for deaths at ages 75 years and above.

This is consistent with those that were born more recently tending to have lower asbestos exposures than those born earlier and who were of working age during the period when asbestos was most widely used.

Due to the small number of female deaths, age-specific death rates for women have not been shown, but also indicate an increase in rates in the 85-89 and 90+ age bands over the last 10 years.

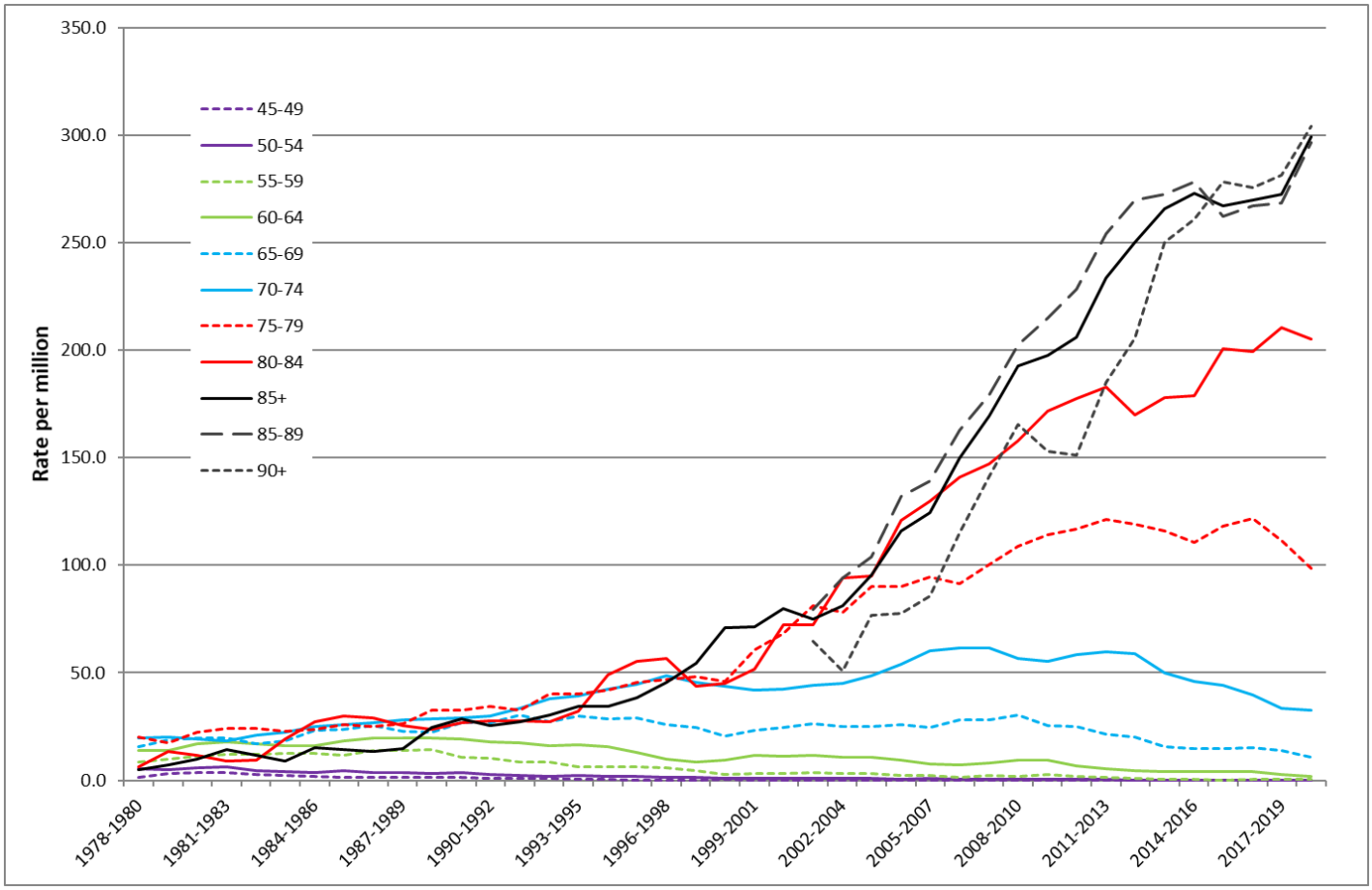


Figure 3 – Average annual male death rates based on death certificates mentioning asbestosis but not mentioning mesothelioma by age and time period, 1978-2020(p)

Note: rates for the age band 85+ years can be split into 85-89 and 90+ from year 2001 only (broken black lines).

Asbestosis deaths by region

Age-standardised death rates for males by 3-year time period and region (again restricted to deaths mentioning asbestosis but not mesothelioma) are available in Table ASIS03 www.hse.gov.uk/statistics/tables/asis03.xlsx.

Age-standardisation allows comparison of rates taking account of changes in the age-structure of the underlying population over time and between regions. The period 2018-2020 was taken as the base for standardisation over time and Great Britain for standardisation over region. A small number of deaths with overseas addresses were excluded.

For Great Britain as a whole, male asbestosis death rates increased from 5.6 per million in 1981-83 (the earliest period available for regional data) to 16.8 in 2018-20. Male regional rates have similarly increased over time, although to a lesser extent in Wales and London.

The highest rates are now in the North East (where they have declined from a peak of 47.4 in 2010-12 to 27.0 per million in 2018-20), the East of England (23.7) and in the North West (19.9).

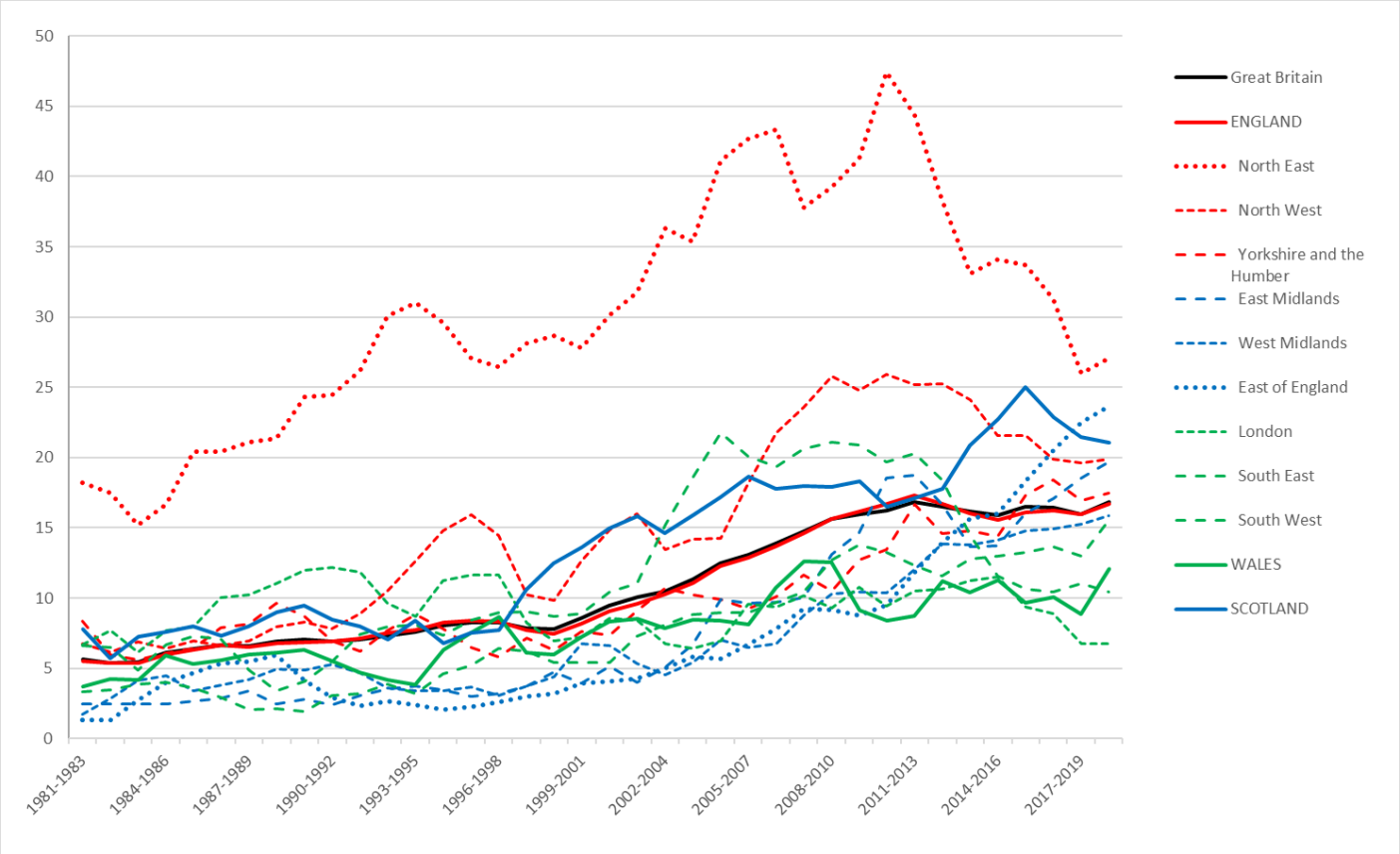


Figure 4 – Average annual regional male death rates per million based on death certificates mentioning asbestosis but not mentioning mesothelioma by time period, 1978-2020(p)

The female asbestosis death rates for GB have remained broadly constant since the 1980s with an average of 0.3 per million per year. The only region with substantially higher rates than this was the North East with a rate of 1.2 per million in 2018-20.

More detailed analyses of asbestosis mortality by Unitary Authority (UA) and Local Authority (LA) area for the period 1981 to 2020 are available in Annex 1, with associated data tables available at www.hse.gov.uk/statistics/tables/ASISAREA.xlsx and interactive maps at https://arcg.is/1mS5aj.

Non-malignant pleural disease

Non-malignant pleural disease is a non-cancerous condition affecting the outer lining of the lung (the pleura). It includes two forms of disease: diffuse pleural thickening and the

less serious pleural plaques. A substantial number of cases continue to occur each year in Great Britain, mainly due to workplace asbestos exposures many years ago.

- There were 510 new cases of pleural thickening assessed for Industrial Injuries Disablement Benefit in 2019. There were 185 cases in 2020 but this figure is likely to have been affected by a substantial reduction in new cases assessed during the coronavirus pandemic. (See table IIDB01 www.hse.gov.uk/statistics/tables/iidb01.xlsx.)
- The annual number has been fairly constant over the last 10 years, with an average of around 460 new cases per year of which around 1% are female.
- An estimated 366 new cases of non-malignant pleural disease mainly caused by asbestos were reported by chest physicians in 2019. Reporting of new cases during 2020 was disrupted by the coronavirus pandemic: there were an estimated 146 cases in 2020. Typically, around 2-3% of cases are female. A substantial proportion of these were cases of pleural plaques. (See table THORR01 www.hse.gov.uk/statistics/tables/thorr01.xlsx.)
- Pleural plaques are usually symptomless and are often identified in the THOR scheme when individuals have chest x-rays for other conditions. For these reasons, there are likely to be substantially more individuals in the population with pleural plaques than those identified by chest physicians.

Annex 1: Asbestosis deaths by geographical area 1981-2020

Introduction

This analysis of asbestosis mortality by Unitary Authority (UA) and Local Authority (LA) area includes deaths occurring during the period 1981 to 2020, the longest period for which data are available according to the current UA and LA structure. It also provides detailed analysis of temporal trends within selected geographical areas using Generalised Additive Models.

The analyses presented in the maps and charts in this annex are based on the 10,742 male and 367 female deaths occurring during 1981 to 2020 due to asbestosis, defined as any death with asbestosis recorded on the death certificate (either as the underlying cause or otherwise mentioned) but excluding deaths that also mentioned mesothelioma. During this period, male asbestosis deaths increased from 130 in 1981 to 515 in 2020; female deaths fluctuated between 5 and 17 a year.

Annual deaths with asbestosis as the underlying cause and all deaths mentioning asbestosis (including those that also mention mesothelioma) are shown in Figure A3.1 in Annex 3 for comparison with the deaths included is this analysis.

Results are available as interactive maps at: https://arcg.is/1mS5aj

Full results are also available in Excel tables at www.hse.gov.uk/statistics/tables/ASISAREA.xlsx , including additional analyses based on all death certificates mentioning asbestosis (including those that also mention mesothelioma) and analyses restricted to where the underlying cause of death was recorded as asbestosis.

The analysis is based on the last area of residence of the deceased, as recorded on death certificates, and uses Standardised Mortality Ratios (SMRs) which compare the mortality rate in a particular area with the mortality rate for GB, taking account of age differences. SMRs are expressed as a percentage: values higher or lower than 100 indicate mesothelioma rates that are higher or lower, respectively, than for GB as a whole.

The analyses of temporal trends for geographical areas within Great Britain should be interpreted in the context of increasing annual asbestosis deaths in Great Britain as a whole. Overall deaths have increased substantially since the 1970s. Since Standardised Mortality Ratios (SMRs) compare the mortality rate in a particular region with that for GB as a whole, trends in SMRs for a particular area indicate whether rates for that area have increased relatively more or less rapidly than for GB as a whole. No change in the SMR for an area over time indicates that the mortality rates have increased in line with the trend for GB as a whole.

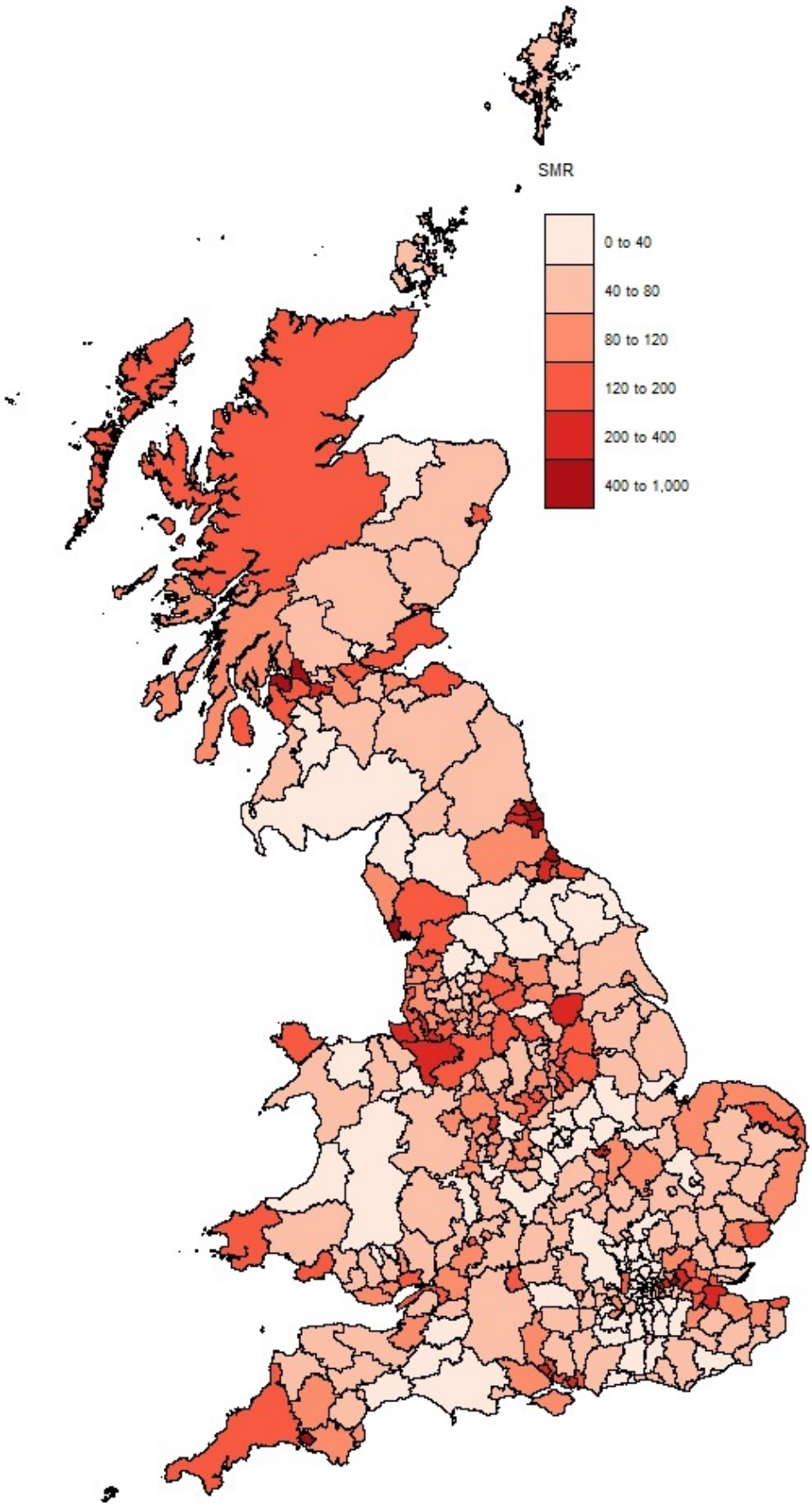

SMR
0 to 40
40 to 80
80 to 120
120 to 200
200 to 400
400 to 1,000

Figure A1.1 – Asbestosis SMRs for males by geographical area 1981-2020

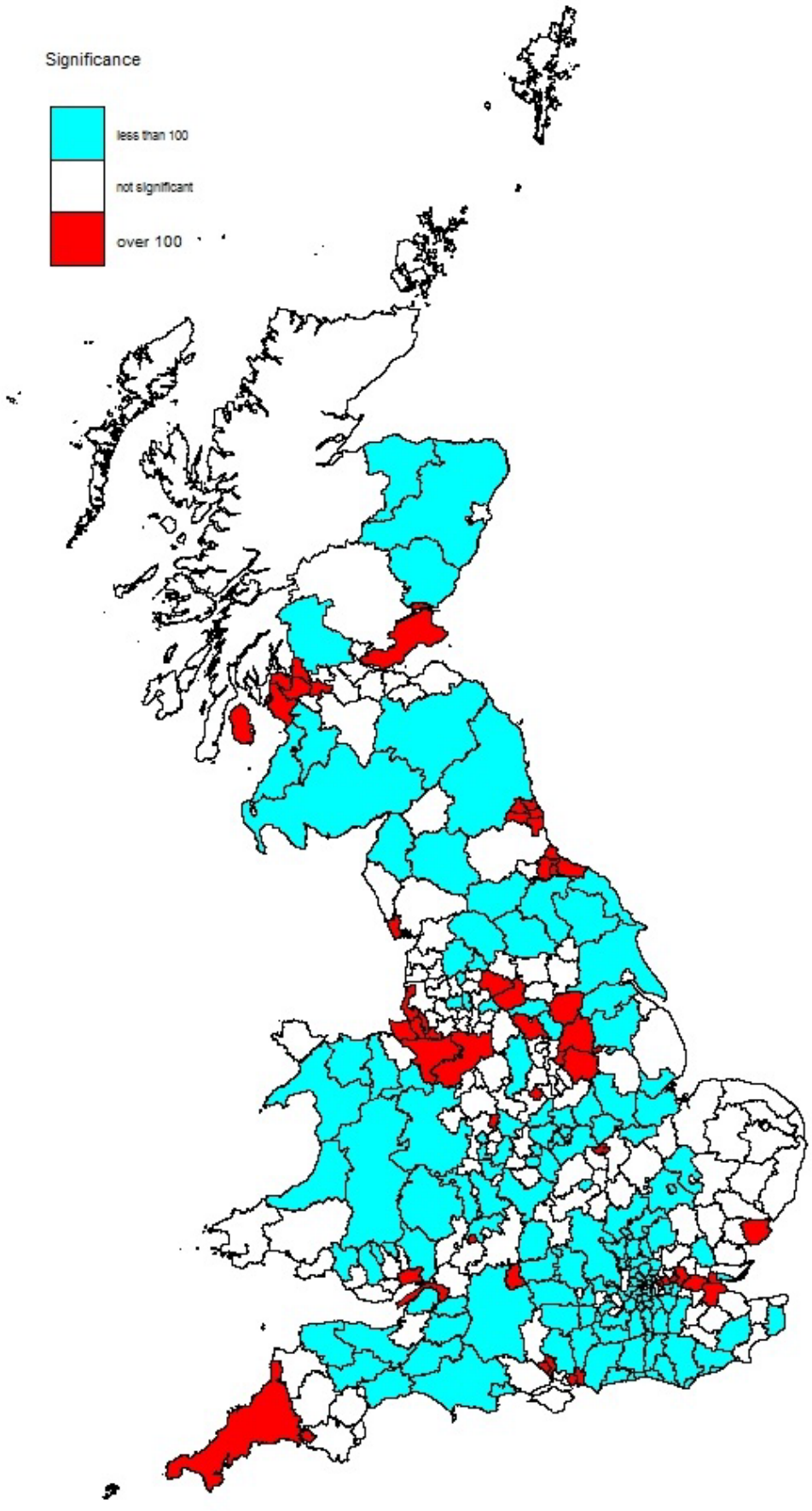

Significance
less than 100
not significant
over 100

Figure A1.2 – Statistical significance of asbestosis SMRs for males by geographical area 1981-2020

Results

Figure A1.1 is a map showing SMRs by Unitary/Local Authority area for males for the overall period 1981-2020. Figure A1.2 highlights those areas for which the mortality rate was statistically significantly higher or lower than for GB as a whole.

Temporal trends in asbestosis mortality

Temporal variation in asbestosis SMRs for regions within Great Britain and selected Unitary/Local Authority areas are shown graphically in this section.

Charts with trend lines shown with solid bold **black** lines indicate statistically significant temporal changes, those with **green** lines indicate trends of borderline significance, while those with **blue** lines trends were not significant. The dashed lines represent the 95% confidence intervals.

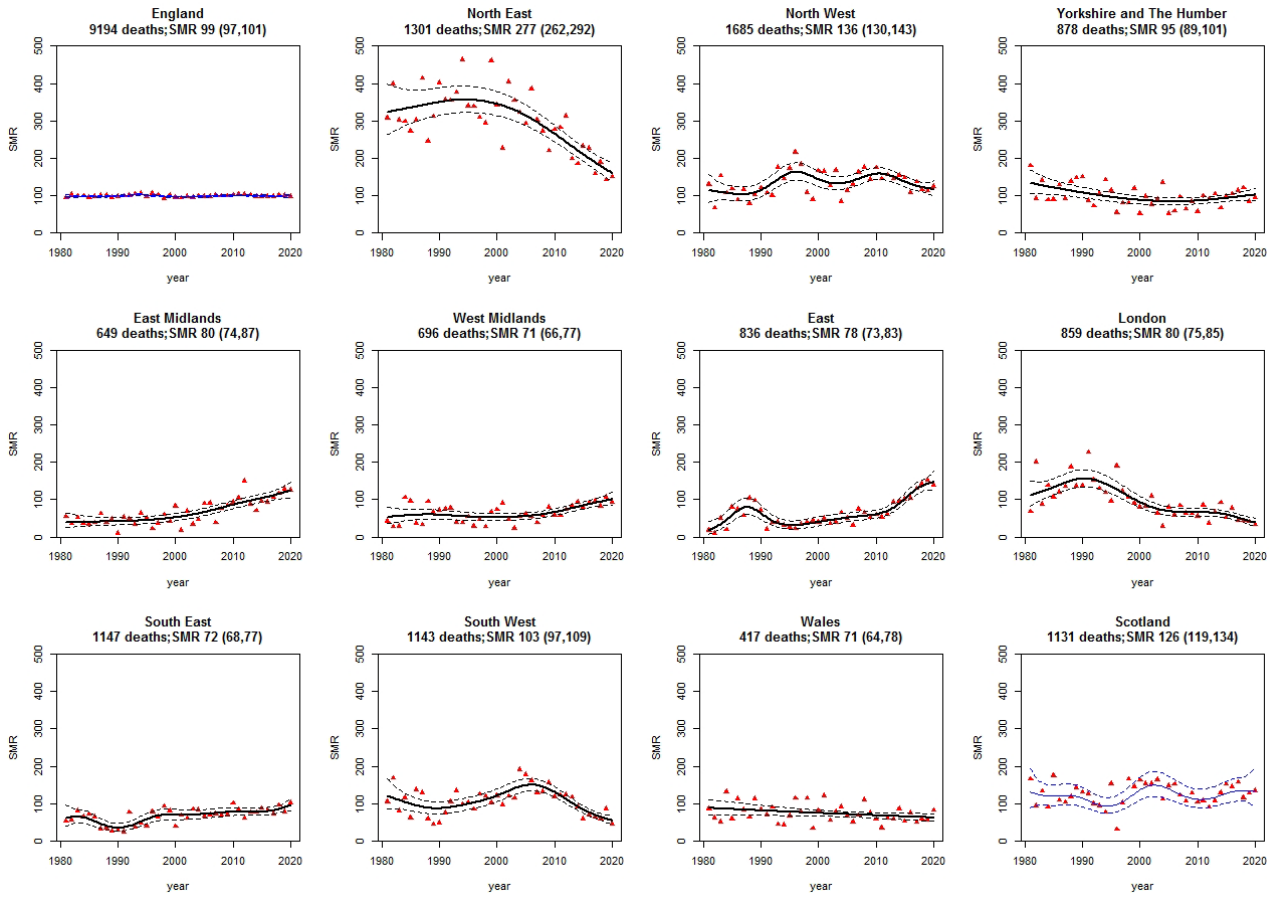


Figure A1.3 – Annual asbestosis SMRs for males by region, 1981-2020

Male asbestosis deaths by area 1981-2020

Figure A1.3 shows the regional variation for male SMRs calculated annually along with 95% confidence intervals.

There were statistically significant temporal changes in the SMR in all regions except Wales and England as a whole. The highest male SMR for asbestosis was seen in the North East (SMR 276.7, 95% Confidence Interval 261.8 to 292.1, 1301 deaths), although there was a significant declining trend over time. SMRs elsewhere were much lower. For example, in the South West, whilst the SMR for 1981-2020 as a whole was significantly higher than 100, the trend analysis suggests it has reduced to being significantly lower than 100 in recent years.

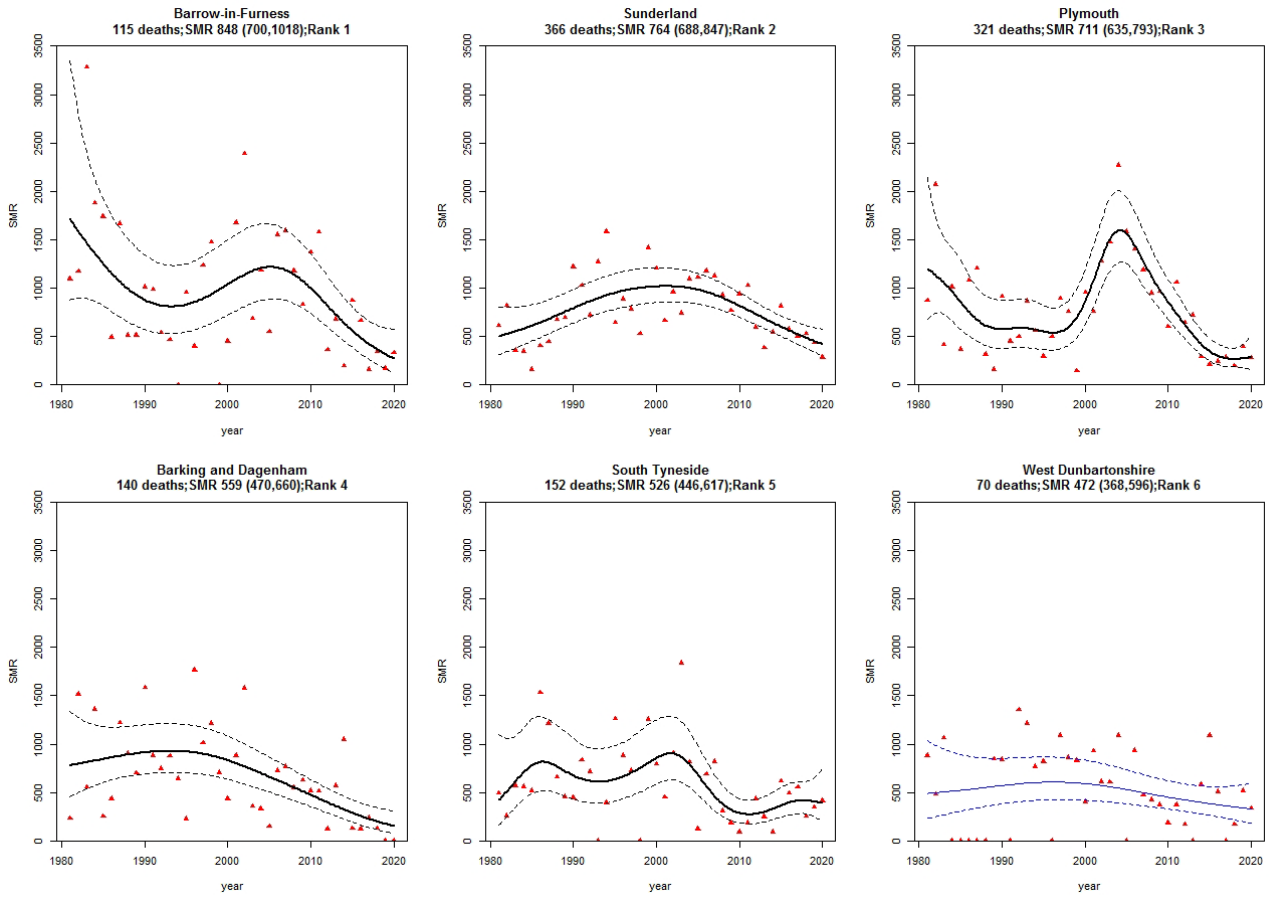


Figure A1.4 – Annual asbestosis SMRs for males for the top six UA/LA areas, 1981-2020

Unitary/Local authority areas with the highest male asbestosis SMRs for the period 1981-2020 were:

- 1 Barrow-in-Furness (SMR 848.2, 95% CI 700.1 to 1018.1, deaths 115)
- 2 Sunderland (SMR 764.3, 95% CI 687.9 to 846.7, deaths 366)
- 3 Plymouth (SMR 710.9, 95% CI 635.2 to 793, deaths 321)
- 4 Barking and Dagenham (SMR 559.3, 95% CI 470.5 to 660, deaths 140)
- 5 South Tyneside (SMR 526.2, 95% CI 445.8 to 616.8, deaths 152)
- 6 West Dunbartonshire (SMR 472, 95% CI 368 to 596.3, deaths 70)
- 7 Hartlepool (SMR 465.5, 95% CI 365.5 to 584.4, deaths 74)
- 8 North Tyneside (SMR 430.2, 95% CI 366.1 to 502.3, deaths 160)
- 9 Inverclyde (SMR 422.2, 95% CI 323.7 to 541.2, deaths 62)

10 Newham (SMR 399.8, 95% CI 327.9 to 482.7, deaths 108)

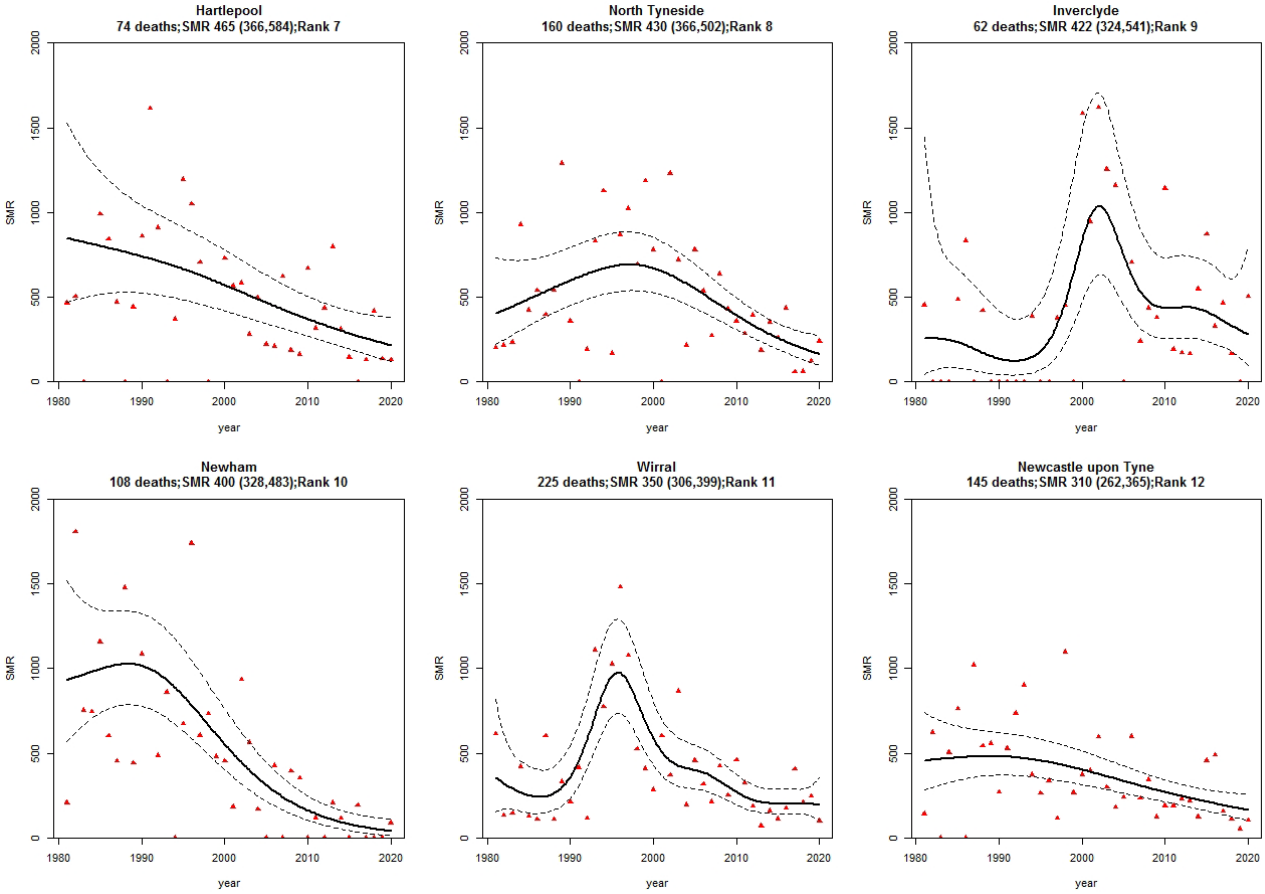


Figure A1.5 – Annual asbestosis SMRs for males for UA/LAs ranked 7-12, 1981-2020

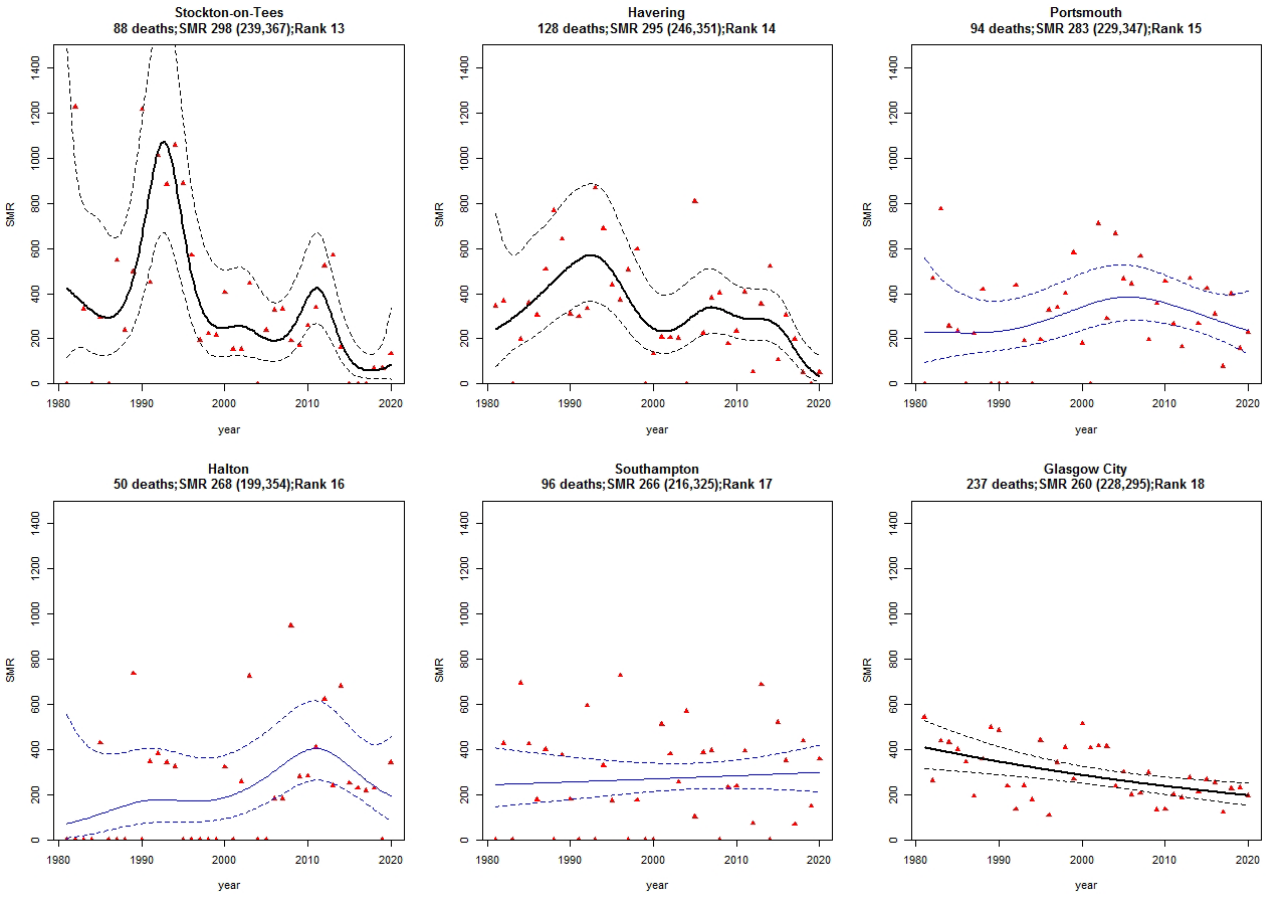


Figure A1.6 – Annual asbestosis SMRs for males for UA/LAs ranked 13-18, 1981-2020

Female asbestosis deaths by area 1981-2020

There were far fewer asbestosis deaths among females than males. SMRs for many UA/LA areas were therefore associated with considerable uncertainty due to there being small numbers of actual deaths observed, and no analyses of temporal trends for females are presented. Nevertheless, the results for the whole period 1981-2020 show that certain areas known to be associated with industries with heavy historic asbestos exposures have particularly high SMRs.

The North East region accounted for 128 deaths of the 367 deaths for GB as a whole during 1981-2020 (SMR 779.7, 95% CI 650.4 to 927.1), and the top five Unitary/Local Authority areas were:

- 1 Sunderland (SMR 4711.9, 95% CI 3742.2 to 5856.8, deaths 81)
- 2 Barking and Dagenham (SMR 1828.5, 95% CI 1064.9 to 2927.8, deaths 17)
- 3 Newham (SMR 1402.2, 95% CI 746.4 to 2397.8, deaths 13)
- 4 South Ribble (SMR 1100.8, 95% CI 441.9 to 2267.7, deaths 7)
- 5 Darlington (SMR 881.9, 95% CI 323.3 to 1919.5, deaths 6)

Annex 2 – Methodology for the mortality analyses by geographical area

Data for death certificates mentioning asbestosis occurring during the period 1981-2020 were obtained from the Health and Safety Executive Asbestosis Register. SMRs were derived using mid-year population estimates provided by the Office for National Statistics.

The method of age standardisation used in the production of SMRs is commonly referred to as the indirect method. Age-specific death rates in a standard population (in this case Great Britain by gender) are applied to the age structure of the population for each geographical area in order to calculate expected numbers of deaths. The ratio of the observed number of deaths to the expected number of deaths in the area is calculated and multiplied by 100 to give the SMR. The SMR of the standard population is 100. An SMR greater or less than 100 indicates a respectively higher or lower than expected mortality rate in a specific area. If the lower bound of the 95% Confidence Interval for the SMR is greater than 100 this indicates that the observed number of deaths was statistically significantly higher than expected. A worked example of the SMR calculation is provided below.

The statistical models involved fitting a smoothed term for the year in a Generalized Additive Model (GAM) to identify annual trends. In a most cases a Poisson error term was assumed; for a small number of cases a Negative Binomial or Normal (Gaussian) error term was assumed.

SMR calculation – worked example

Table A2.1 illustrates the calculation of an SMR for men in geographical area ‘A’. The total population of Great Britain is used as the standard population (column 1). The asbestosis death rate in the population for each age group (column 3) is the total number of male asbestosis deaths (column 2) divided by the total number of men in Great Britain (column 1) to give age-specific death rates in the standard population. These rates are applied to the total population in area A, given in column 4, to give the expected numbers of deaths in this area, in column 6. The total observed number of deaths summed over the age groups (532, column 5) divided by the expected number of deaths (210.57, column 6), multiplied by 100, gives an SMR of 252.7.

Age group	Total persons in Great Britain			Persons in geographical area 'A'		
	Population	Asbestosis deaths	Asbestosis death rate	Population	Observed asbestosis deaths	Expected asbestosis deaths
	(1)	(2)	(3) = (2) / (1)	(4)	(5)	(6) = (3) x (4)
0 - 4	285,545	0	0	6,926	0	0
5 - 9	296,837	0	0	8,514	0	0
10 - 14	323,242	0	0	9,286	0	0
15 - 19	350,617	1	<0.00001	8,729	0	0.02
20 - 24	349,316	1	<0.00001	7,833	0	0.02
25 - 29	329,490	5	0.00002	7,907	0	0.12
30 - 34	311,884	16	0.00005	7,770	3	0.40
35 - 39	292,209	76	0.00026	6,443	6	1.68
40 - 44	274,546	199	0.00072	6,222	14	4.51
45 - 49	249,834	402	0.00161	6,243	40	10.05
50 - 54	243,985	699	0.00286	6,391	66	18.31
55 - 59	240,015	1,141	0.00475	6,269	75	29.80
60 - 64	221,551	1,412	0.00637	5,367	77	34.21
65 - 69	195,541	1,531	0.00783	4,997	89	39.12
70 - 74	152,322	1,319	0.00866	3,729	78	32.29
75 - 79	102,328	1,308	0.01278	2,176	45	27.81
80 - 84	51,761	472	0.00912	1,007	25	9.18
85+	25,034	145	0.00579	525	14	3.04
Total, all ages	**4,296,057**	**8,727**		**106,334**	**532**	**210.57**

SMR = 100 x 532 / 210.57 = 252.7

Table A2.1: Example of SMR calculation

Annex 3 – Impact of the coronavirus pandemic

Assessment of the impact of the coronavirus pandemic on asbestosis deaths occurring in 2019 and 2020 registered during 2020-2022

Statistics for asbestosis deaths occurring in years 2019 and 2020 may have been affected by the coronavirus pandemic for various reasons including the following:

- Some individuals suffering from asbestosis during 2020 may have died in that year due to also developing COVID-19, and may otherwise have died after 2020 from asbestosis had the pandemic not occurred.
- Some deaths where both COVID-19 and asbestosis played a role where may have been likely to be attributed to asbestosis as the underlying cause of death than if the pandemic had not occurred.

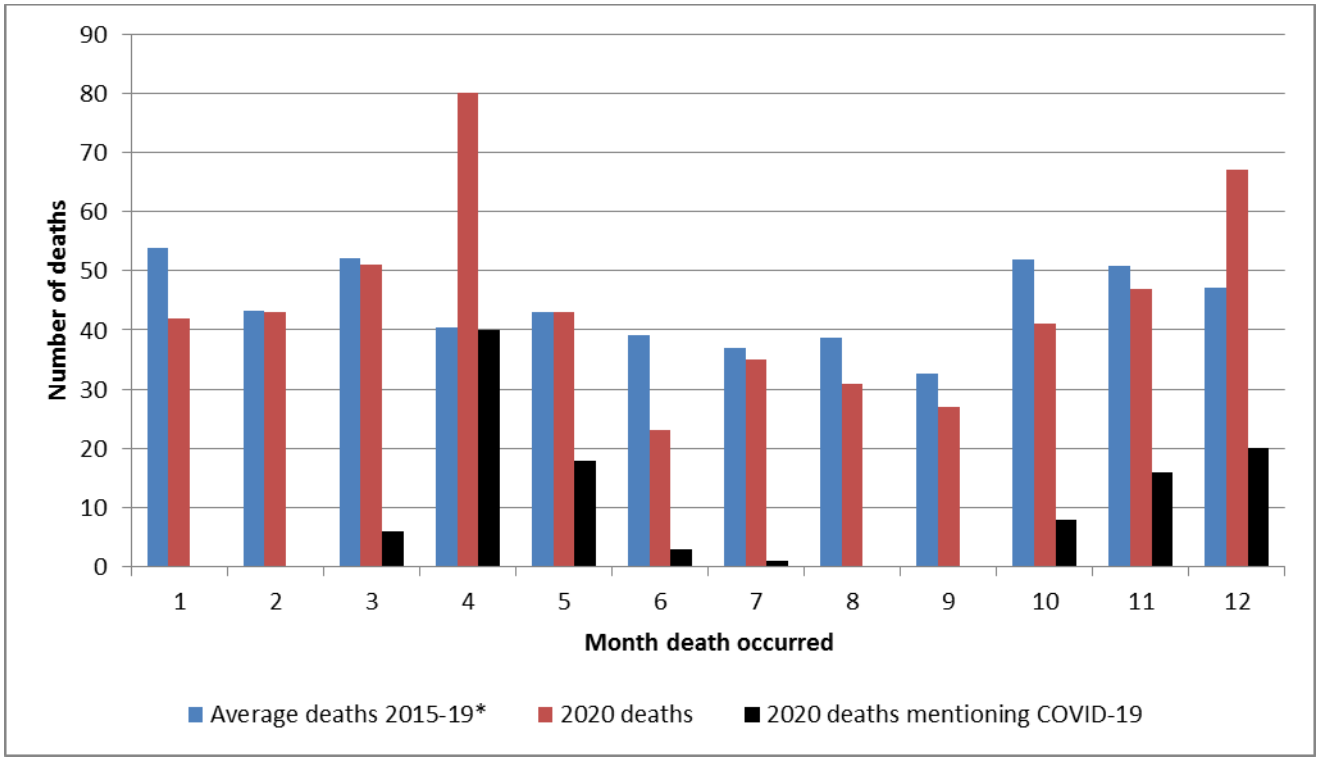
In the case of asbestosis, pressures on the death certification system do not have appeared to have delayed the registration of many deaths beyond the cut-off for inclusion in the initial release of the statistics.

Deaths occurring in 2020 where death certificates mentioned both asbestosis and COVID-19

Figure A1.1 shows the 530 asbestos deaths (excluding deaths that also mentioned mesothelioma) occurring in 2020 by each month of the year (red bars) compared with the average annual deaths occurring in each month for deaths in the period 2015-19 (blue bars). The latter figures are normalised so the total for the period equates to the total for 2020 to allow assessment of any evidence of excess deaths in 2020 during months corresponding to the first two waves of the pandemic (i.e. particularly April-June and October-December of 2020).

There is some evidence of an excess of deaths during April 2020 and December 2020 – both months that coincided with the first two waves of the coronavirus pandemic. However, there is also a suggestion of deficits in other months, particularly June 2020. This crude comparison suggests that there may have been some additional deaths where both COVID-19 and asbestosis played a role in the deaths occurring in 2020, and some of these cases may have occurred after 2020 had the pandemic not occurred.

The chart also shows the 112 deaths where the death certificate mentioned both asbestosis and COVID-19 (black bars), the majority of which (103) had COVID-19 recorded as the underlying cause of death. These deaths again occurred in months that coincided with the first two waves of the pandemic. It is possible that some of these deaths may have occurred after 2020 had the pandemic not occurred.

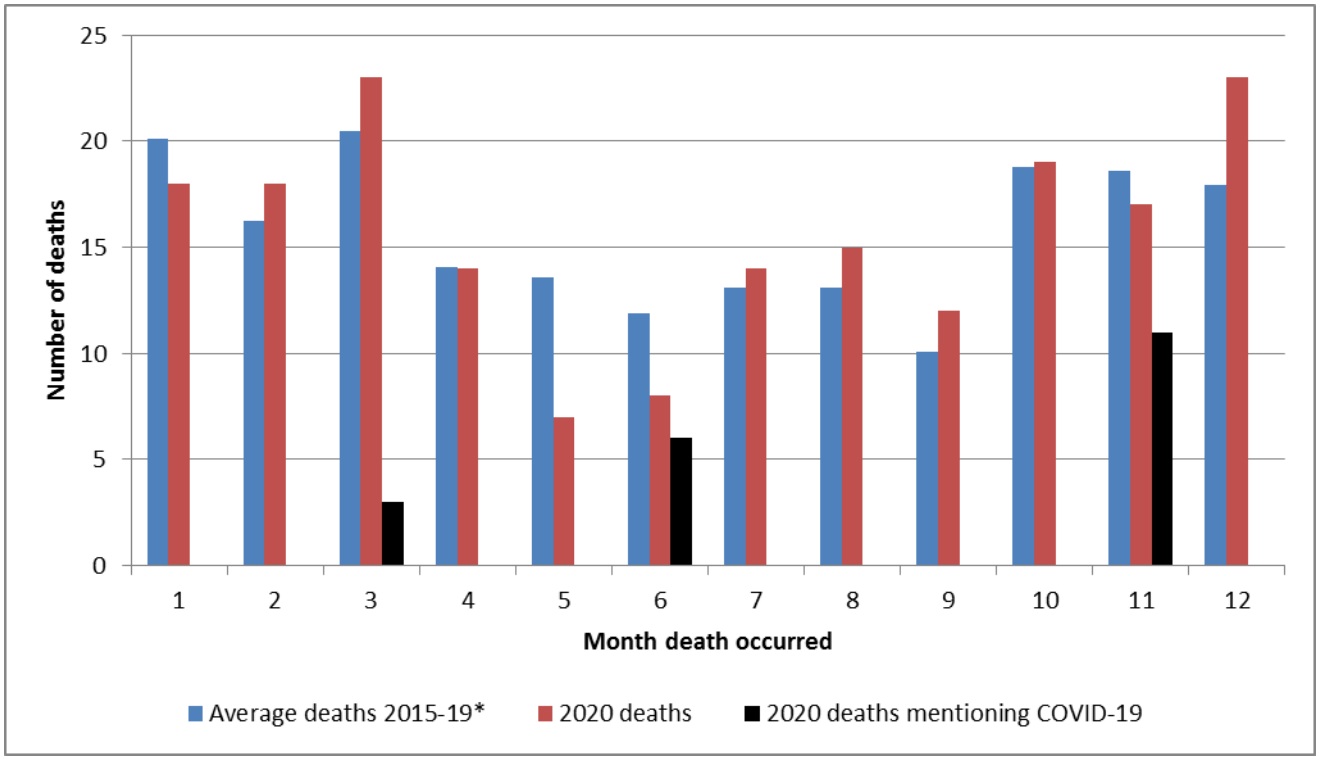


**Figures normalised so the total across the 12 months equates to the total for 2020*

Figure A1.1: Comparison of asbestosis deaths (excluding those that mentioned mesothelioma) occurring in 2020 with the average for the previous 5 years, and deaths mentioning both asbestosis and COVID-19, by month of death

Figure A1.2 shows a similar chart but restricted to deaths where asbestosis was recorded as the underlying cause of death. In this case it is more difficult to determine whether COVID-19 deaths have resulted in excesses in some months due to the increased variability in the monthly data caused by smaller counts. Since there can only be one underlying cause of death on the death certificate, all of the relatively small number of deaths that also specifically mentioned COVID-19 (black bars) mentioned this as an associated cause of death. Again some of these deaths may have occurred after 2020 had the pandemic not occurred.

Finally, it is also possible that some deaths where both COVID-19 and asbestosis played a role where less likely to be recorded as asbestosis as the underlying cause of death than if the pandemic had not occurred. This may account for some of the reduction in the number of deaths seen in 2020. (There were 188 such deaths in 2020 vs 223 in 2019.)



**Figures normalised so the total across the 12 months equates to the total for 2020*

Figure A1.2: Comparison of deaths with asbestosis as the underlying cause occurring in 2020 with the average for the previous 5 years, and deaths mentioning both asbestosis and COVID-19, by month of death

Comparison of timing in death registrations for deaths occurring pre- and post-pandemic

Table A1.1 shows a breakdown of asbestos deaths occurring in the 5-year period 2014-2018 and deaths occurring in 2019 and 2020 by month the death was registered (excluding deaths that also mentioned mesothelioma). A small number of deaths occurring in 2019 and a majority of those occurring in 2020 were registered during the pandemic when there could have been unusual pressures on the death certification system.

Based on data for deaths occurring during the five-year period 2014-18, 74.4% of asbestosis deaths were registered by the end of December of the year in which the death occurred, with 24.8% registered the following year, and 1.4% registered in the first three months of the year after that (up to the end of March, 15 months after the end of the year in which the death occurred). Very few deaths are usually registered after this point, which is the cut-off for inclusion in the statistics when they are first released.

An analysis of late registrations for asbestosis deaths occurring in 2019 does not suggest any strong effect on the number of late registrations during April to June 2020, the period coinciding with the first wave of the coronavirus pandemic. Fewer deaths than usual were

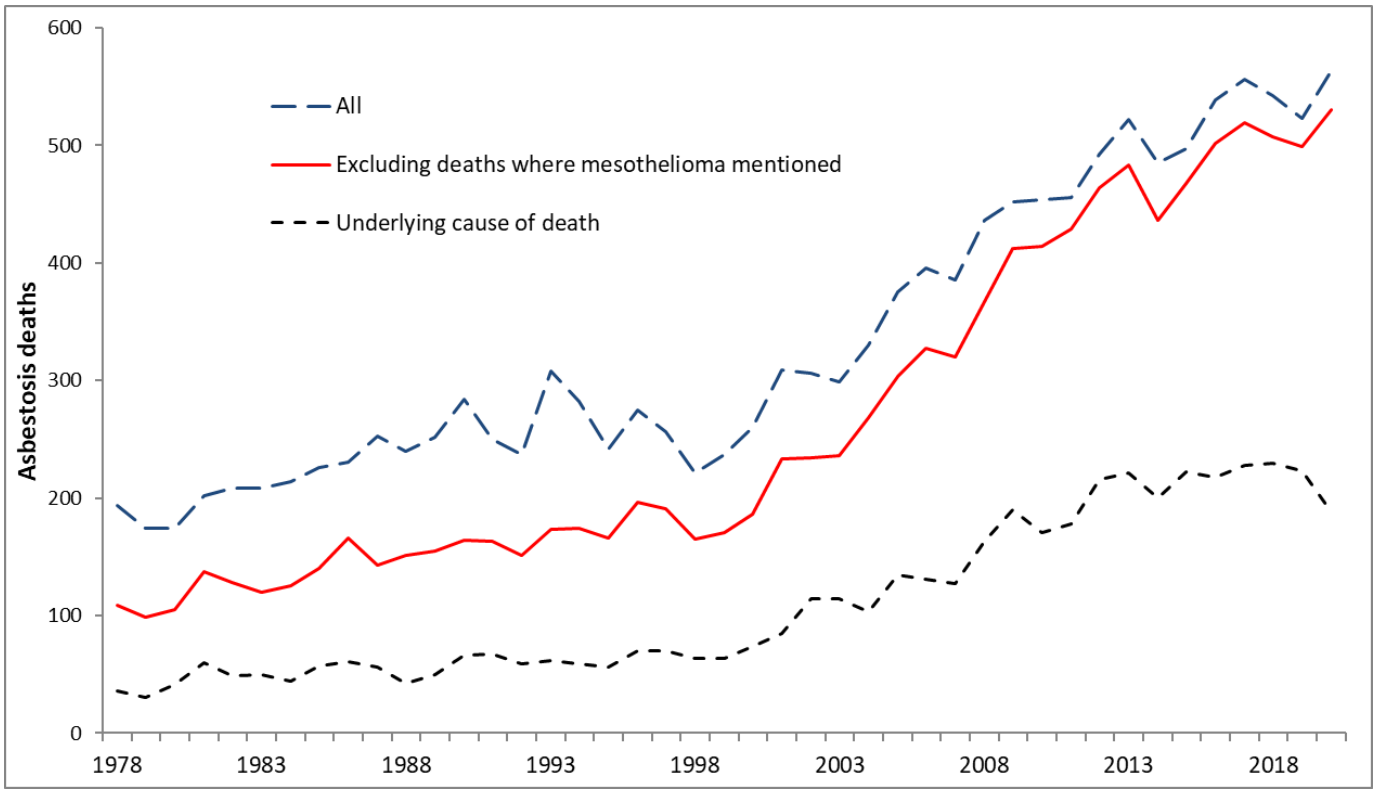
registered overall in the year that the death occurred (70.1%), and more were registered in the year following the year of the death (27.1%) By March 2022 there were an additional 9 deaths in 2019 registered after March 2021, which is higher than usual but small in absolute terms from a statistical perspective. Overall, while the pandemic may have caused some delays in asbestosis deaths being registered, the vast majority of deaths were still registered before the cut-off for inclusion in the statistics when first published.

For deaths occurring in 2020, more deaths were registered than usual in April 2020, but fewer in June 2020 (months that coincided with the first wave of the pandemic). However, overall, the pattern of registrations over time is similar to that for 2014-18. This provides some reassurance that there is unlikely to be a disproportion number of deaths occurring in 2020 that were not registered by March 2022 due to the effects of the pandemic.

Table A1.1 Deaths occurring in 2014-18, 2019 and 2020 by month of registration

	Year death occurred							
Deaths registered during:	2014	2015	2016	2017	2018	*Average 2014-2018*	2019	2020
Year death occurred								
January	14	14	14	12	17	*14.2*	8	18
February	18	14	21	22	18	*18.6*	16	17
March	16	18	29	24	19	*21.2*	20	24
April	24	28	27	20	23	*24.4*	26	64
May	27	21	36	41	32	*31.4*	28	40
June	25	40	34	45	41	*37.0*	24	17
July	45	44	31	30	26	*35.2*	39	33
August	30	31	38	33	45	*35.4*	37	30
September	37	34	34	32	32	*33.8*	25	36
October	35	41	37	39	43	*39.0*	36	31
November	23	36	42	43	42	*37.2*	42	47
December	36	29	39	28	40	*34.4*	49	48
Total	**330**	**350**	**382**	**369**	**378**	***361.8***	**350**	**405**
Percentage of all deaths	***75.7***	***74.8***	***76.1***	***71.1***	***74.6***	***74.4***	***70.1***	***76.4***
Year of death + 1								
January	20	20	28	26	25	*23.8*	25	22
February	22	29	27	23	23	*24.8*	32	21
March	13	13	20	20	19	*17.0*	23	14
April	14	22	11	28	17	*18.4*	8	18
May	14	12	9	15	13	*12.6*	10	11
June	3	7	8	12	7	*7.4*	12	7
July	4	4	7	6	4	*5.0*	5	7
August	4	4	4	5	5	*4.4*	7	2
September	0	3	2	3	4	*2.4*	3	5
October	5	0	1	3	2	*2.2*	3	3
November	1	0	0	3	3	*1.4*	3	5
December	0	1	0	2	2	*1.0*	4	4
Total	**100**	**115**	**117**	**146**	**124**	***120.4***	**135**	**119**
Percentage of all deaths	***22.9***	***24.6***	***23.3***	***28.1***	***24.5***	***24.8***	***27.1***	***22.5***
Year of death + 2								
January - March	1	2	1	2	1	*1.4*	5	6
April - December	3	1	2	2	3	*2.2*	7	
Total	**4**	**3**	**3**	**4**	**4**	***3.6***	**12**	**6**
Percentage of all deaths	***0.9***	***0.6***	***0.6***	***0.8***	***0.8***	***0.7***	***2.4***	***1.1***
Later than Year of death + 2								
Total	**2**	**0**	**0**	**0**	**1**	***0.6***	**2**	**0**
Grand Total	**436**	**468**	**502**	**519**	**507**	**486.4**	**499**	**530**

Annex 4: Figure A3.1 – Annual asbestosis deaths 1978-2020



Annex 3: Figure A3.1 – Annual asbestosis deaths 1978-2020

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