Asbestos-related disease statistics, Great Britain 2025

Accredited

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Contents

Summary

Around **5,000**	**2,218**	**497**
Asbestos-related disease deaths per year, including mesothelioma, lung cancer and asbestosis	Mesothelioma deaths in 2023, with a similar estimated number of lung cancer deaths linked to past asbestos exposures	Deaths in 2023 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.
- 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 mesothelioma deaths increased substantially over a number of decades, largely as a result of asbestos exposure prior to 1980. Figures for the latest two years suggest overall numbers may now be starting to reduce.

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

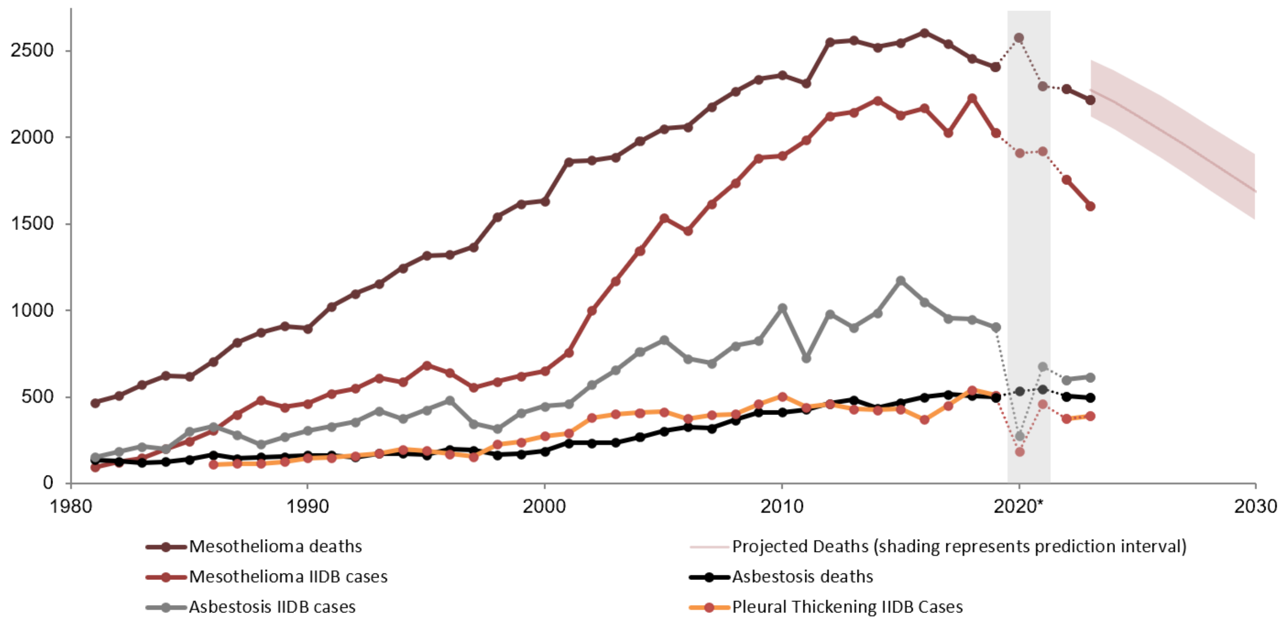

Chart notes:

- Latest available data is for 2023 for mesothelioma and asbestosis deaths and 2023 for IIDB cases.
- Data for 2020 and 2021 (shown inside the shaded grey column) may have been particularly affected by the coronavirus pandemic.
- Some individuals with occupational diseases who then developed COVID-19 may have died earlier than otherwise. Delays in death certification or omission of occupational disease recording on death certificates of those with COVID-19 could also have occurred.
- Assessments of new IIDB cases were substantially reduced in 2020 and may also have been affected during 2021, though this less likely for mesothelioma due to its prioritisation for assessment.

More detailed information on mesothelioma:

- Mesothelioma in Great Britain www.hse.gov.uk/statistics/assets/docs/mesothelioma.pdf
- Interactive RShiny dashboard: https://lucydarnton.shinyapps.io/meso_rshiny/
- Mesothelioma Mortality in Great Britain by Geographical area, 1981–2023: www.hse.gov.uk/statistics/assets/docs/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 2011-2023 and 2001-2010: www.hse.gov.uk/statistics/assets/docs/mesothelioma-mortality-by-occupation.pdf and www.hse.gov.uk/statistics/assets/docs/mesooccupation.xlsx.
- Mesothelioma occupation statistics for males and females aged 16-74 in Great Britain, 1980-2000 www.hse.gov.uk/statistics/assets/docs/occ8000.pdf

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 2,218 mesothelioma deaths in Great Britain in 2023. This is slightly lower than the 2,280 deaths in 2022, and substantially lower than the average of 2,508 deaths per year over the 10-year period 2011 to 2020.
- Male deaths reduced in the last two years whereas female deaths remained broadly level:
  - There were 1,802 male deaths in 2023 compared with 1,856 in 2022 and an average of 2,091 deaths per year over the period 2011-2020.
  - There were 416 female deaths in 2023 compared with 424 in 2022 and an average of 417 deaths per year over the period 2011-2020.

- These trends are consistent with projections that annual deaths in males would reduce during the 2020s whereas in females there would continue be 400-500 annual deaths per year during the 2020s, after which numbers would begin to reduce.
- An earlier decline in annual male deaths may be due to particularly heavy asbestos exposures in certain industries that mainly affected men (such as shipbuilding) being eliminated first – whereas exposures due to the use of asbestos in construction, which affected many men, but also some women – continued after 1970.

- Over 70% 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 1,605 new cases of mesothelioma assessed for Industrial Injuries Disablement Benefit (IIDB) in 2023 of which 205 were female. This compares with 1,755 new cases in 2022, of which 250 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/assets/docs/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.

Earlier epidemiological studies likely to be representative of the British population as a whole (rather than specific studies of highly exposed workers) provide a basis for estimating the overall number of asbestos-related lung cancers nationally. These suggest there are around as many lung cancer cases attributed to past asbestos exposure each year as there are mesotheliomas, though this is uncertain [1, 2].

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 the ten years prior to the coronavirus pandemic (2010-2019) there were, on average, around 260 new cases of asbestos-related lung cancer each year within the IIDB scheme (prescribed diseases D8 and D8A combined). There were 180 cases in 2021, 125 in 2022 and 125 in 2023. (see table IDB01 www.hse.gov.uk/statistics/assets/docs/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. There were six reported cases in 2022, four in 2021 and one in 2020. The low numbers in these latest three years are likely to be due to the effect of the coronavirus pandemic on reporting by chest physicians in the THOR scheme (See table THORR01 www.hse.gov.uk/statistics/assets/docs/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/research/rrpdf/rr931.pdf) [4].

Note about evidence from epidemiological studies of specific worker groups

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 [3]. However, the ratio of asbestos-related lung cancer to mesothelioma varies considerably between studies and depends on the exposure circumstances (particularly the kind of asbestos fibre). Ratios tend to be more even with amphibole (blue and brown asbestos) exposure since it is a much more potent cause of mesothelioma than chrysotile (white asbestos). The ratio seen in a specific epidemiological study or group of studies cannot therefore be assumed to apply to the entire GB population.

In a recent meta-analysis [5], in three studies involving exposure to crocidolite (blue) asbestos there were 160 excess lung cancer deaths vs 341 mesotheliomas: a ratio of less than 0.5. For studies involving amosite (brown asbestos) the ratio was higher at around 3 (137 excess lung cancers vs 44 mesotheliomas) and for chrysotile it was higher still at around 9 (over 500 excess lung cancers vs 55 mesotheliomas). These differences result from the fact that mesothelioma risks are considerably higher for a given amount of exposure to crocidolite or amosite asbestos than for chrysotile, whereas in the case of lung cancer, differences in risk by asbestos type are less extreme. This means, for example, that a high chrysotile exposure will produce many excess lung cancers but relatively few mesotheliomas, whereas a high crocidolite exposure will produce many cases of both cancer types.

Other research shows that a key reason Britain has high mesothelioma rates is the extensive use of amphibole (blue and brown) asbestos in the past, and that the majority of mesotheliomas were caused by these kinds of asbestos. Whilst high chrysotile exposures in certain specific contexts in the past may have caused more lung cancers than mesotheliomas, the ratio of asbestos-related lung cancer to mesothelioma at the national level is likely to be more balanced due to the important role of past amphibole exposures in Britain.

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 [6].

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

Based on mortality data for 2019-2023 and cancer incidence data for 2017-2021, the current estimated annual number of cases and deaths attributed to past asbestos exposure were:

- for cancer of the larynx: 8 cases and 3 deaths;
- for cancer of the stomach: 38 cases and 22 deaths.

Non-malignant asbestos-related diseases

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 497 such deaths in 2023 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 27 such deaths in 2023.
- In around 40% of the 497 deaths in 2023, asbestosis was mentioned on the death certificate as the underlying cause of death.
- In 205 of the 525 total deaths (i.e. including those that mentioned both asbestosis and mesothelioma) in 2023, asbestosis was recorded as the underlying cause of death. This compares with 202 of the 504 such deaths in 2022.
- Interpretation of these figures is further complicated by the fact that cases of asbestosis may sometimes not be recorded as such due to being mistaken for other types of lung fibrosis – or recorded as "idiopathic" cases (i.e. lung fibrosis without a known cause) [7] – or may go undiagnosed.
- Figures for 2020 and 2021 may have been affected by the coronavirus pandemic. Death certificates mentioned COVID-19 as well as asbestosis in 34 of the 493 deaths in 2022, 116 of the 546 deaths in 2021, and 112 of the 533 deaths in 2020. Some of these deaths may have occurred earlier than otherwise had the pandemic not taken place.

Table IIDB06 www.hse.gov.uk/statistics/assets/docs/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 615 cases assessed for IIDB in 2023, 600 in 2022 and 675 in 2021. The 2020 figure was particularly affected by a reduction in IIDB assessments carried out during the coronavirus pandemic but the figure for 2021 may also have been affected to some extent.

Figure 2: Annual deaths where death certificates mentioned asbestosis but not mesothelioma 1978-2023, and IIDB cases 1978-2023

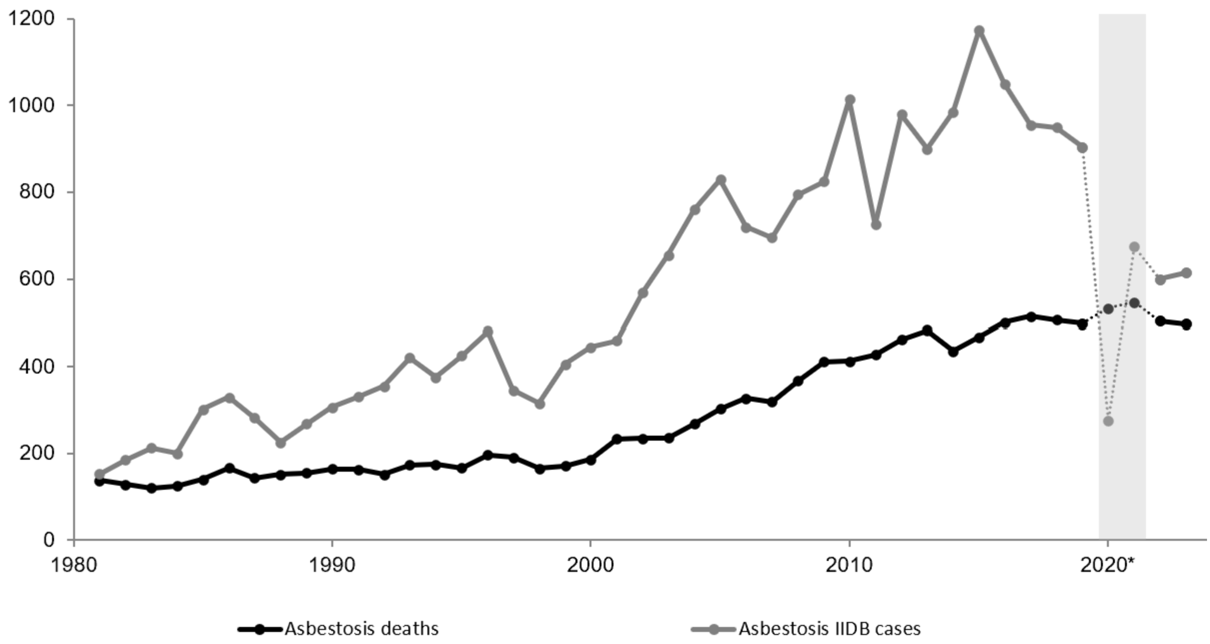

Chart notes:

- Latest available data is for 2023 for asbestosis deaths and 2023 for IIDB cases.
- Data for 2020 and 2021 (shown inside the shaded grey column) may have been particularly affected by the coronavirus pandemic.
- Some individuals with occupational diseases who then developed COVID-19 may have died earlier than otherwise. Delays in death certification or omission of occupational disease recording on death certificates of those with COVID-19 could also have occurred.
- Assessments of new IIDB cases were substantially reduced in 2020 and may also have been affected during 2021.

Table THORR01 (www.hse.gov.uk/statistics/assets/docs/thorr01.xlsx) gives a breakdown of the pneumoconiosis cases seen by chest physicians in the THOR scheme. There were 160 cases of asbestosis out of the estimated 238 pneumoconiosis cases reported to respiratory physicians in 2019. Reporting of new cases during 2020, 2021 and 2022 was disrupted by the coronavirus pandemic. In 2022, there were an estimated 132 new pneumoconiosis cases, of which 82 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 [8, 9] 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 or other agents.

Asbestosis deaths by age group and time period

Table ASIS02 www.hse.gov.uk/statistics/assets/docs/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 1978-2023.

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 continuing 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.

Asbestosis remains relatively rare in females in GB with an average of around 30 deaths per year over the long term. Death rates have remained broadly constant since the 1980s with an average of around 0.3 per million per year. Due to the small number of female deaths, age-specific death rates for women have not been shown in Table ASIS02.

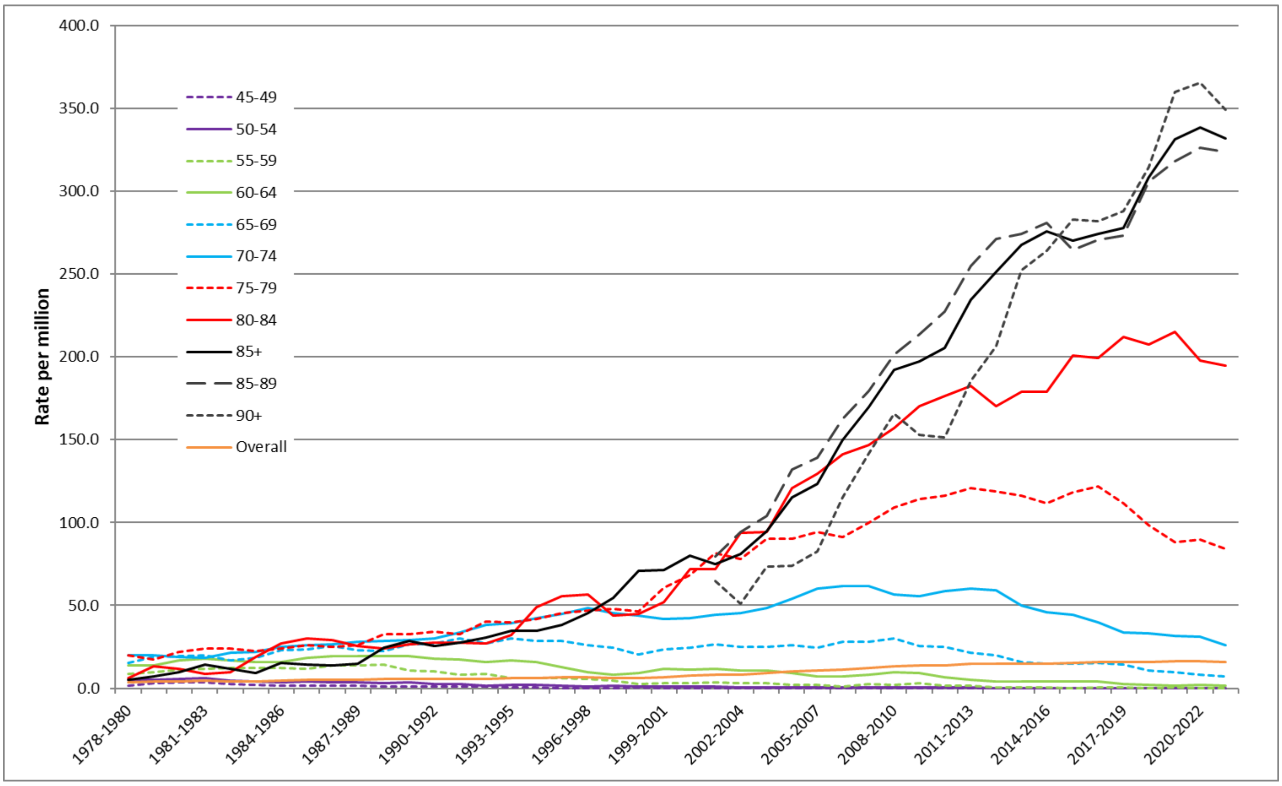

Figure 3: Average annual male death rates based on death certificates mentioning asbestosis but not mentioning mesothelioma by age and time period, 1978-2023(p)

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/assets/docs/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 2021-2023 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 5.8 per million per year in 1981-83 (the earliest period available for regional data) to 17.0 per million in 2021-23. Male regional rates have similarly increased over time, although to a lesser extent in Wales and London. The highest rates are now in Scotland (31.1 per million), the North East (although the latter have declined from a peak of 49.9 per million in 2010-12 to

19.8 per million in 2021-23), the East of England (22.3 per million) and in the North West (19.5 per million).

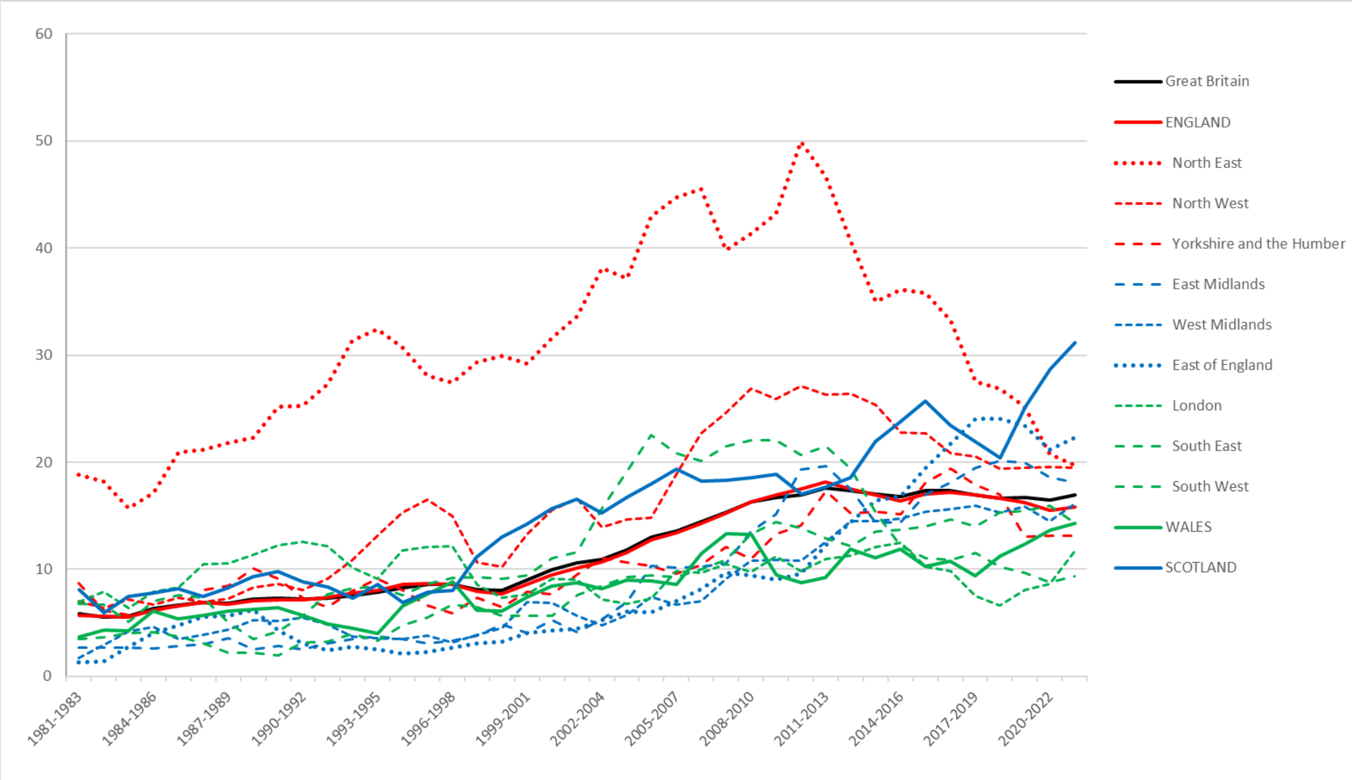

Figure 4 – Average annual regional male death rates per million based on death certificates mentioning asbestosis but not mentioning mesothelioma by time period, 1978-2023(p)

More detailed analyses of asbestosis mortality by Unitary Authority (UA) and Local Authority (LA) area for the period 1981 to 2022 are available in Annex 1, with associated data tables available at www.hse.gov.uk/statistics/assets/docs/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.

- In 2023 there were 390 new cases of pleural thickening assessed for Industrial Injuries Disablement Benefit compared with 375 in 2022 and 460 in 2021. These figures – particularly that for 2020 – are likely to have been affected by a reduction in new cases assessed during the coronavirus pandemic. (See table IIDB01 www.hse.gov.uk/statistics/assets/docs/iidb01.xlsx.)
- The number of new cases in 2023 is below the annual number over the 10 years prior to 2020 which has been fairly constant, 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, 2021 and 2022 was disrupted by the coronavirus pandemic: there were an estimated 136 cases in 2022, 105 in 2021 and 148 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/assets/docs/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 1981-2023

Introduction

This analysis of asbestosis mortality by Unitary Authority (UA) and Local Authority (LA) area includes deaths occurring during the period 1981 to 2023, 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 12,245 male and 397 female deaths occurring during 1981 to 2023 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 137 in 1981 to 497 in 2023.

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/assets/docs/ASISAREA.xlsx

This includes 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.

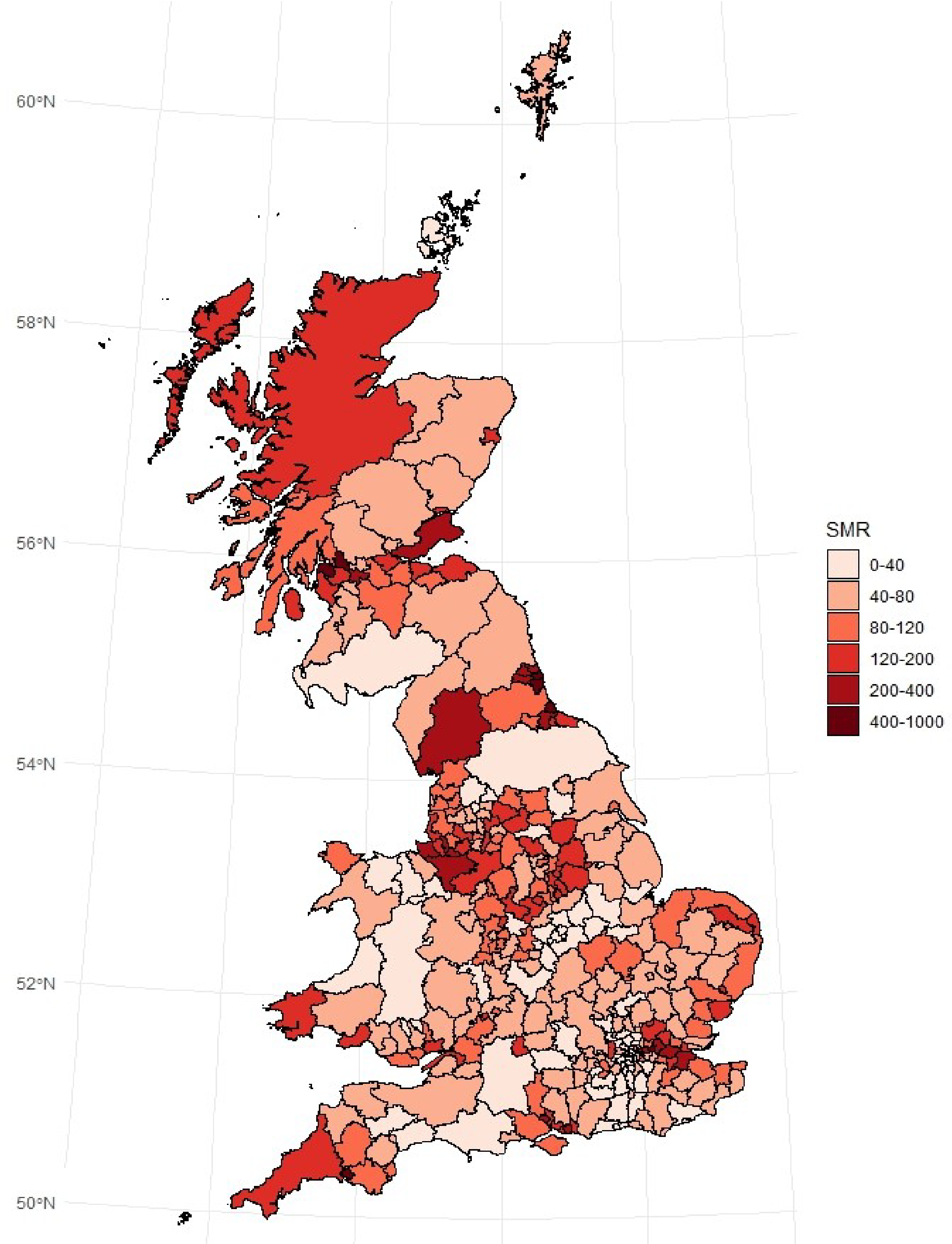

Figure A1.1 – Asbestosis SMRs for males by geographical area 1981-2023

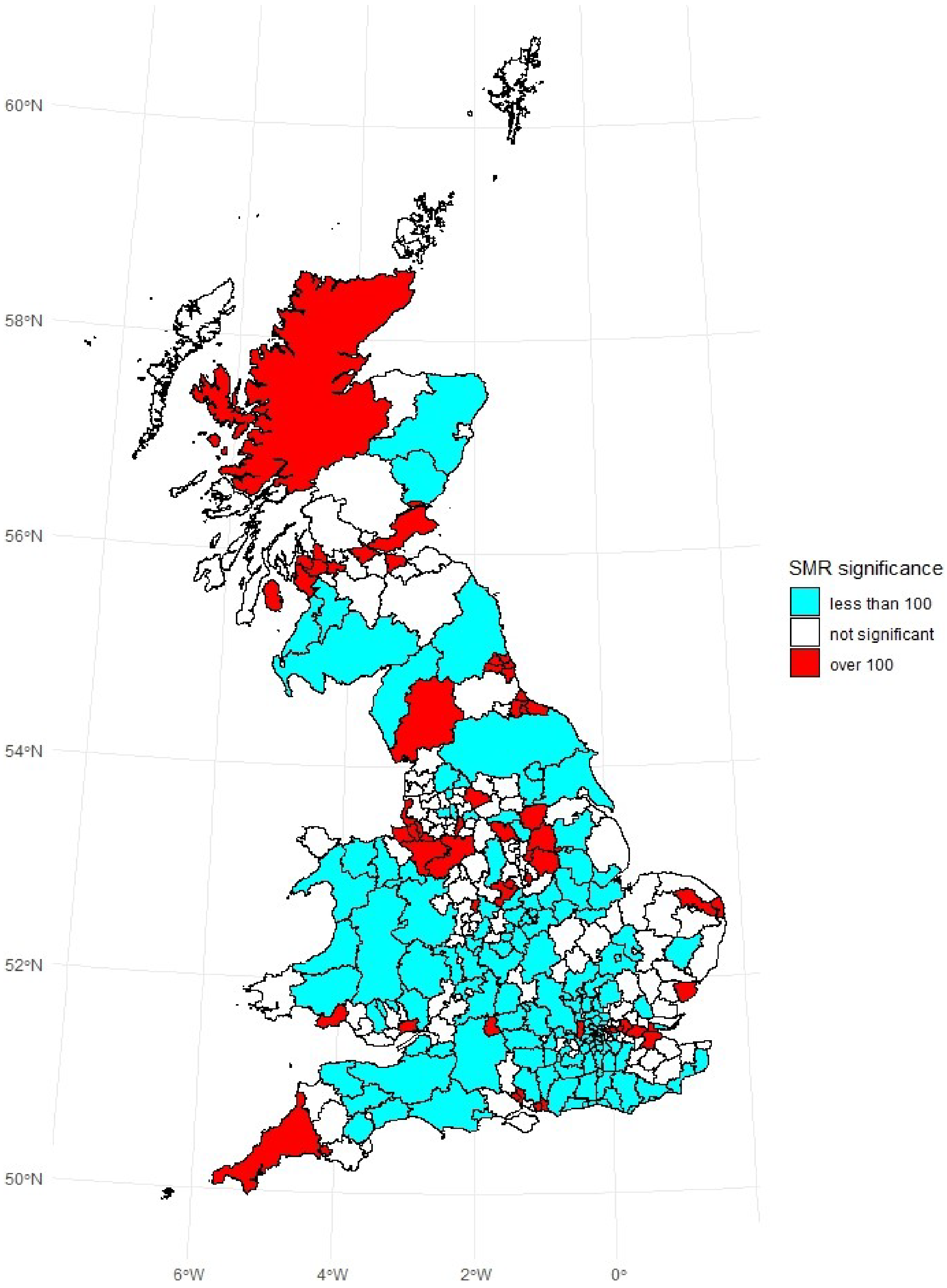

Figure A1.2 – Statistical significance of asbestosis SMRs for males by geographical area 1981-2023

Results

Figure A1.1 is a map showing SMRs by Unitary/Local Authority area for males for the overall period 1981-2023. 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.

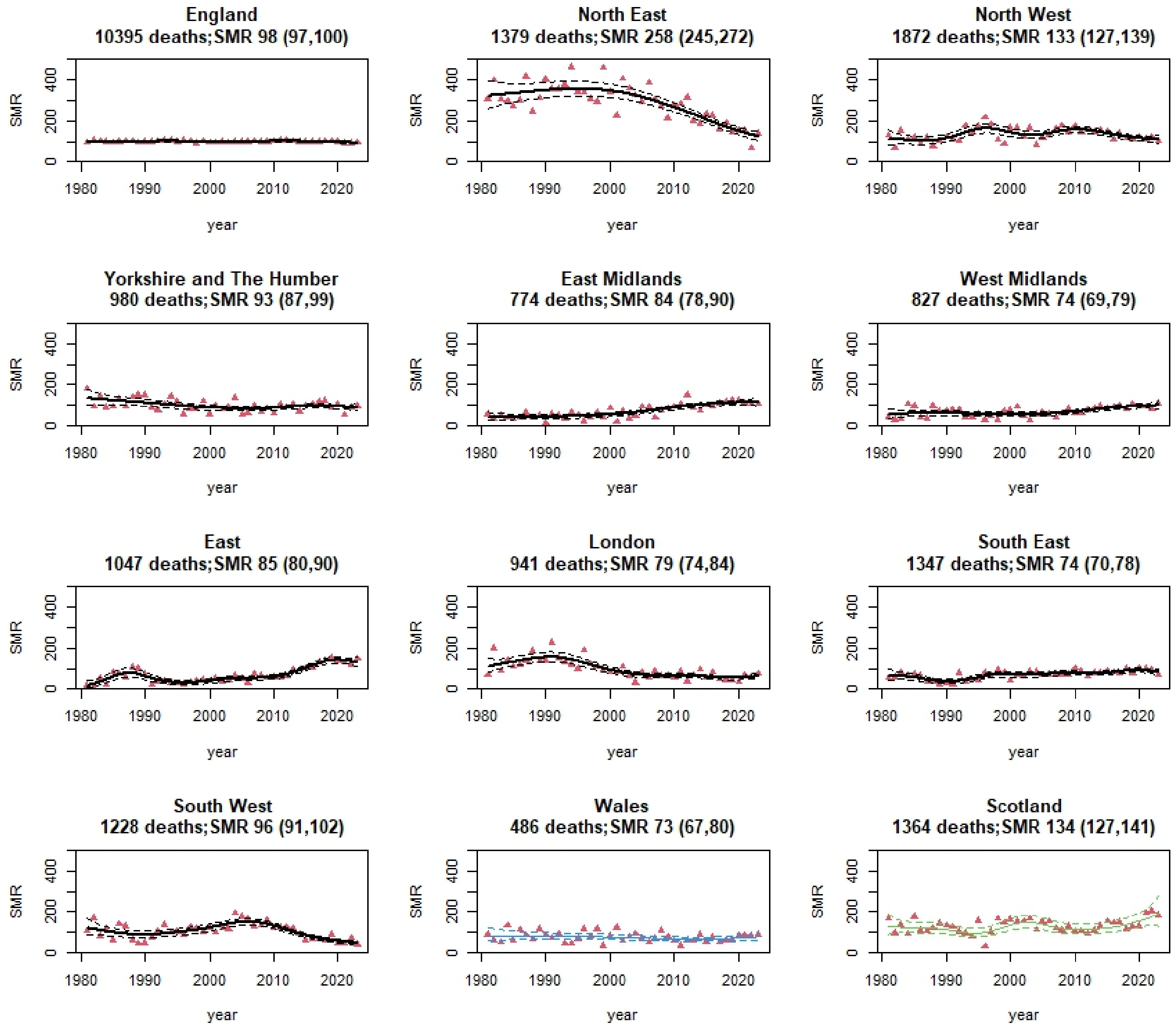

Figure A1.3 – Annual asbestosis SMRs for males by region, 1981-2023

Male asbestosis deaths by area 1981-2023

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 258.2, 95% Confidence Interval 244.8 to 272.2, deaths 13790), although there was a significant declining trend over time. SMRs elsewhere were much lower.

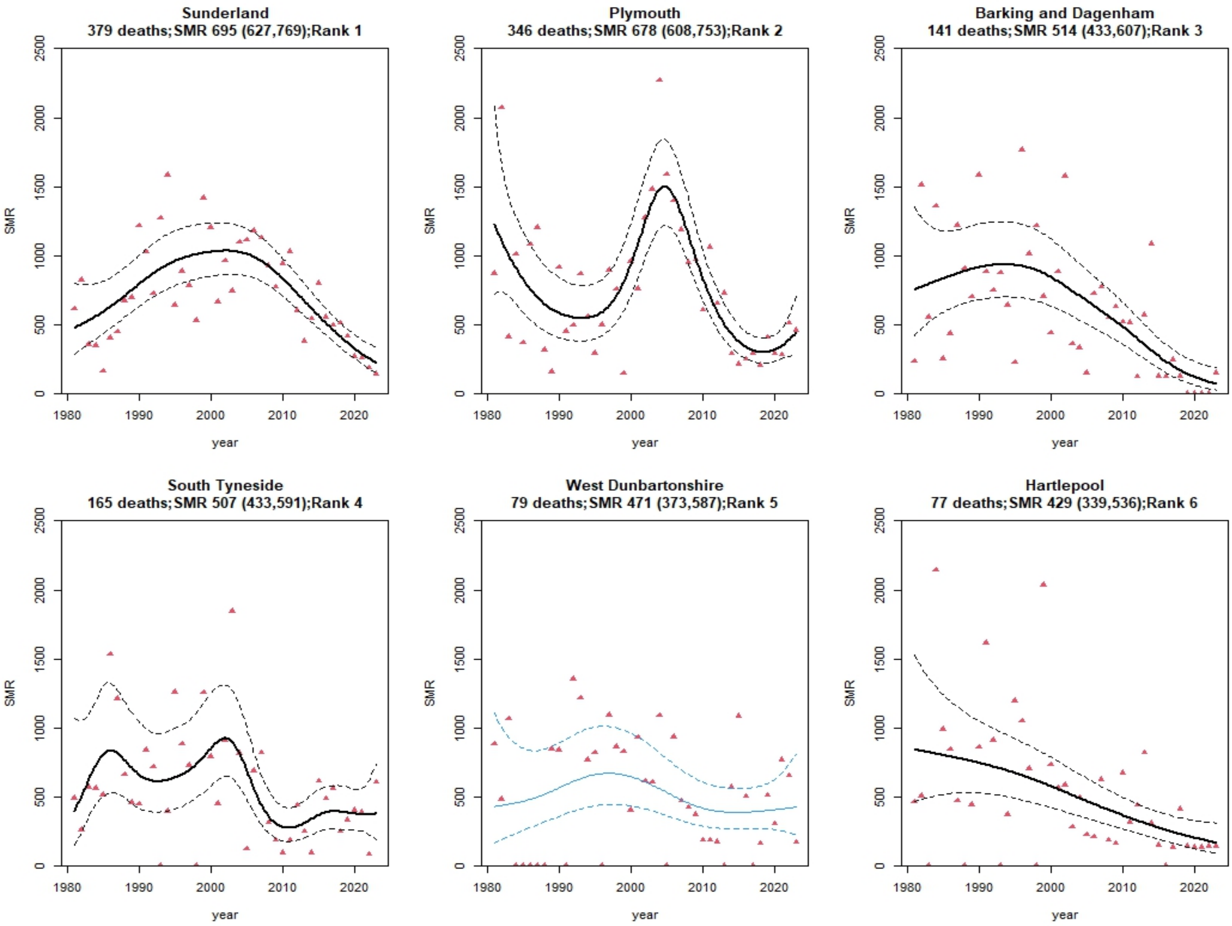

Figure A1.4 – Annual asbestosis SMRs for males for the top six UA/LA areas, 1981-2023

Unitary/Local authority areas with the highest male asbestosis SMRs for the period 1981-2023 were:

- 1 Sunderland (SMR 695, 95% Confidence Interval 626.8 to 768.6 deaths 379),
- 2 Plymouth (SMR 677.9, 95% Confidence Interval 608.3 to 753.2 deaths 346),
- 3 Barking and Dagenham (SMR 514.3, 95% Confidence Interval 432.9 to 606.5 deaths 141),
- 4 South Tyneside (SMR 507, 95% Confidence Interval 432.5 to 590.5 deaths 165),
- 5 West Dunbartonshire (SMR 470.8, 95% Confidence Interval 372.8 to 586.8 deaths 79),
- 6 Hartlepool (SMR 428.9, 95% Confidence Interval 338.5 to 536.1 deaths 77),
- 7 Inverclyde (SMR 414.9, 95% Confidence Interval 322.9 to 525.1 deaths 69),
- 8 North Tyneside (SMR 394.7, 95% Confidence Interval 337 to 459.3 deaths 167),
- 9 Newham (SMR 371.7, 95% Confidence Interval 305.1 to 448.4 deaths 109),
- 10 Wirral (SMR 330.5, 95% Confidence Interval 290.1 to 375 deaths 241).

Due to local government in 2023, the area that had the highest SMR (790.8) Barrow-in-Furness became part of the new Westmorland and Furness unitary authority.

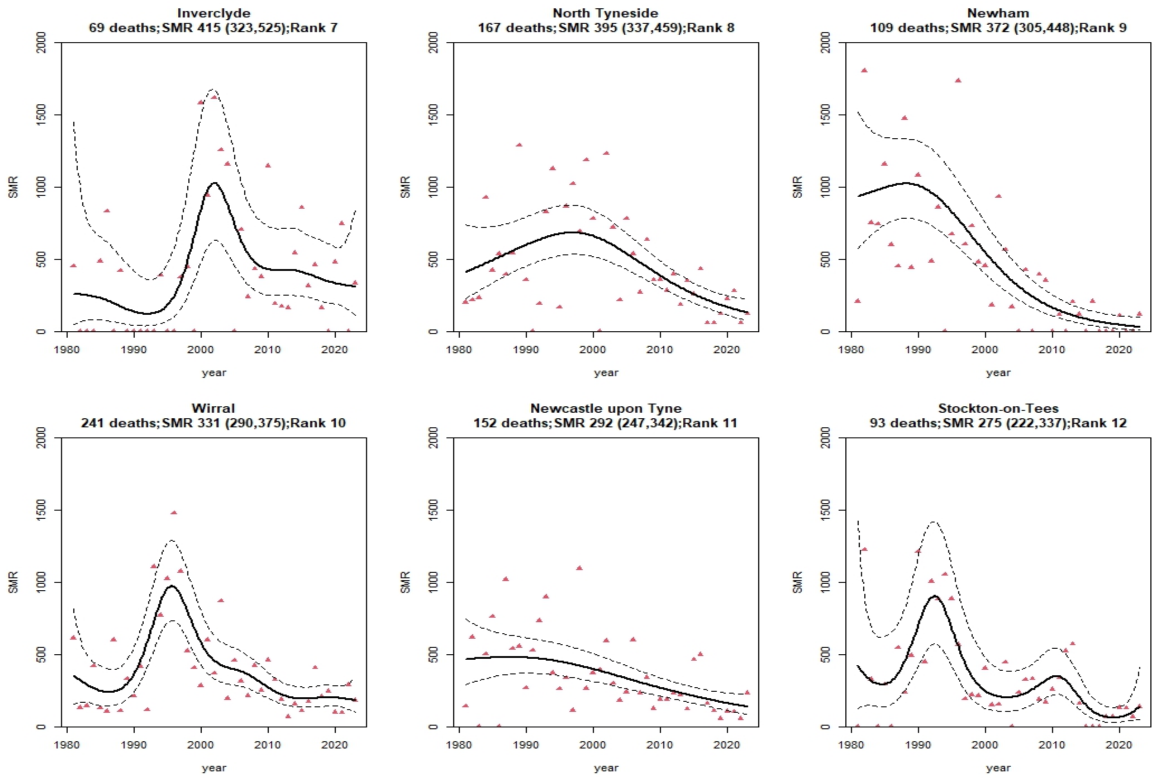

Figure A1.5 – Annual asbestosis SMRs for males for UA/LAs ranked 7-12, 1981-2023

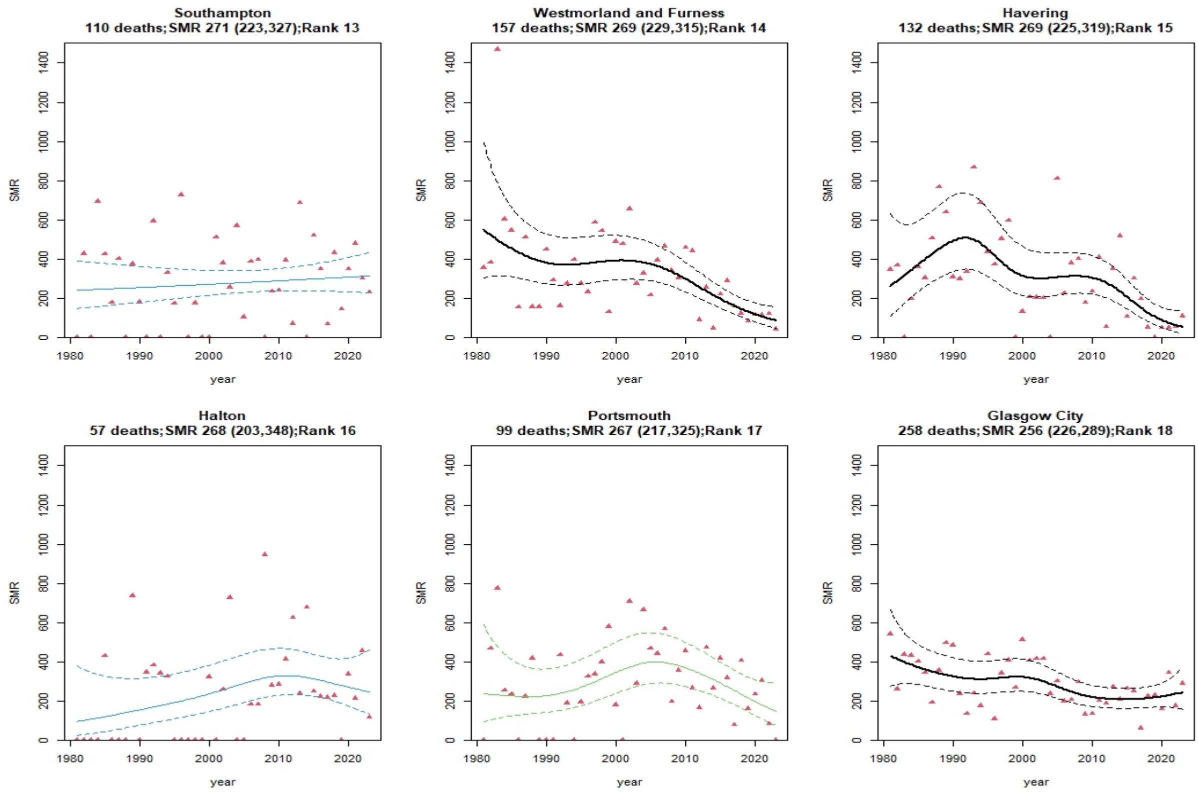

Figure A1.6 – Annual asbestosis SMRs for males for UA/LAs ranked 13-18, 1981-2023

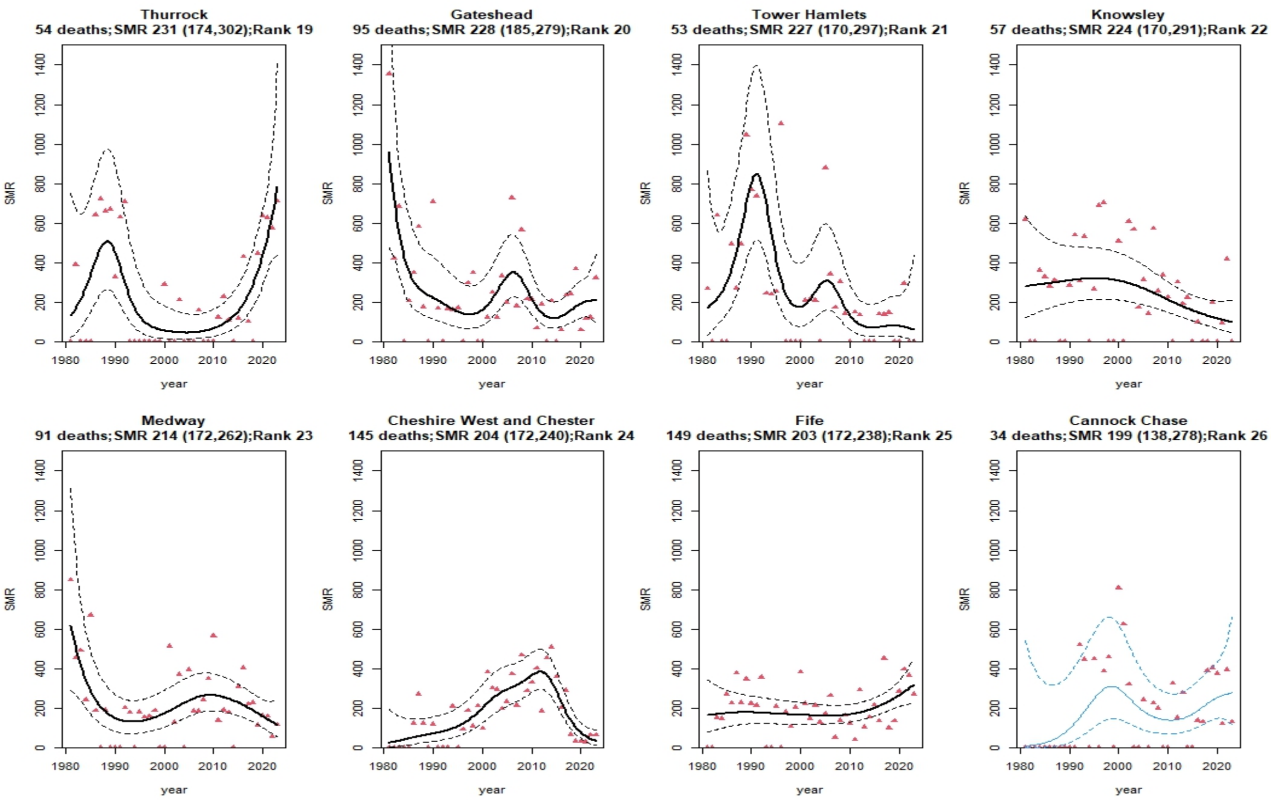

Figure A1.7 – Annual asbestosis SMRs for males for UA/LAs ranked 19-26, 1981-2023

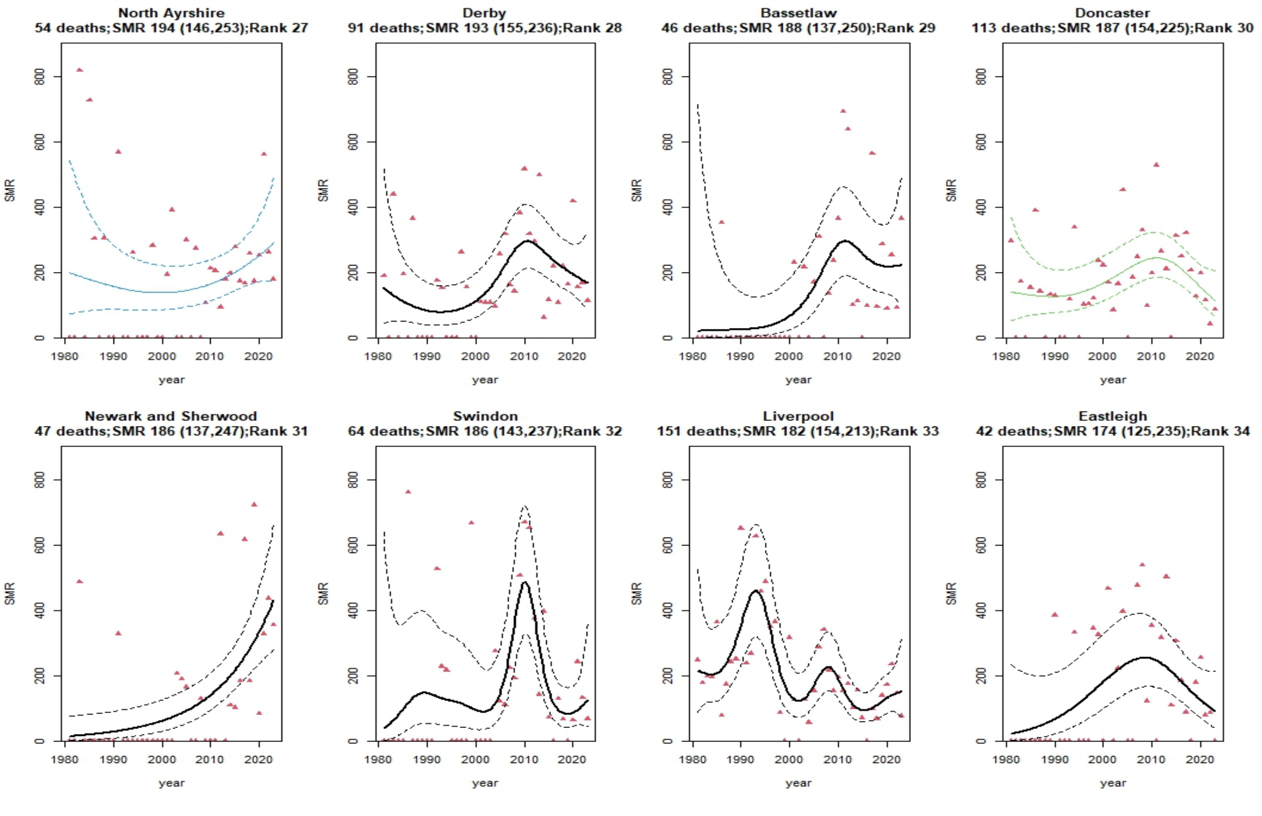

Figure A1.8 – Annual asbestosis SMRs for males for UA/LAs ranked 27-34, 1981-2023

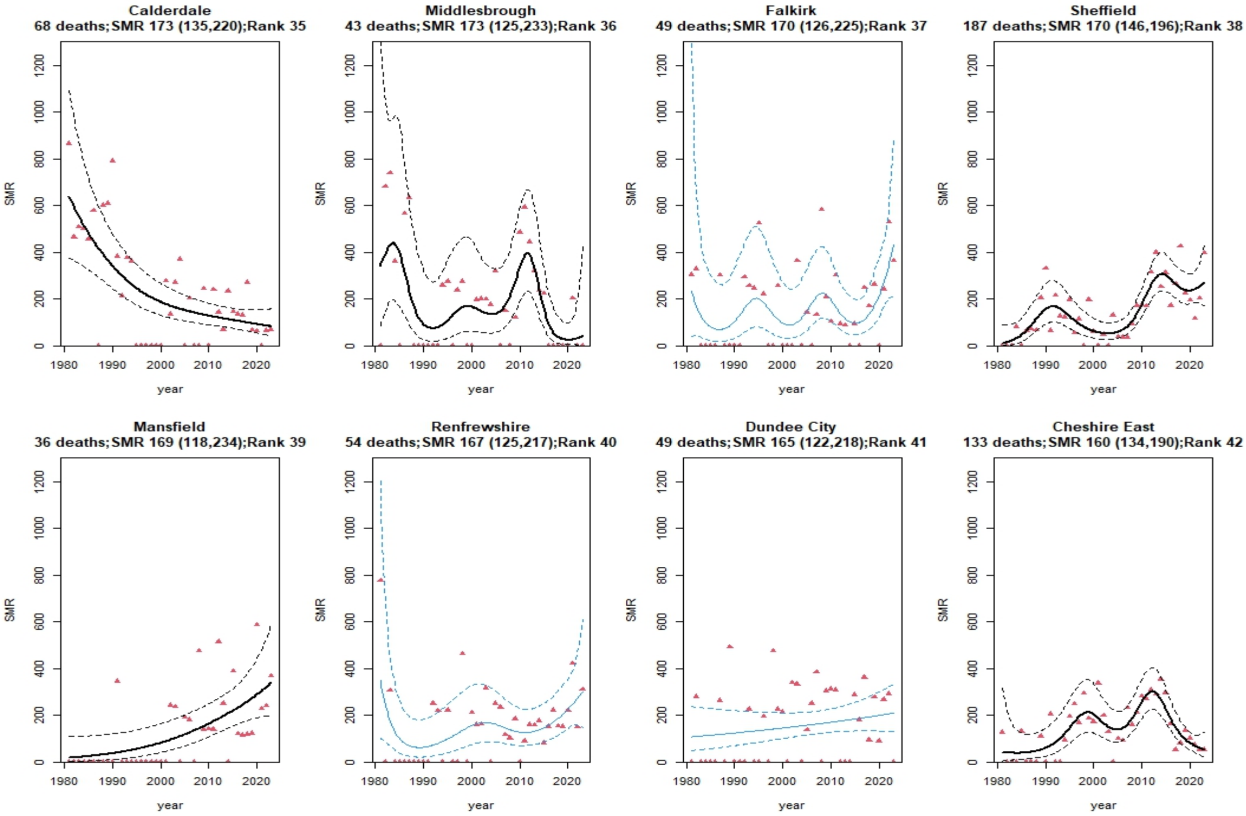

Figure A1.9 – Annual asbestosis SMRs for males for UA/LAs ranked 35-42, 1981-2023

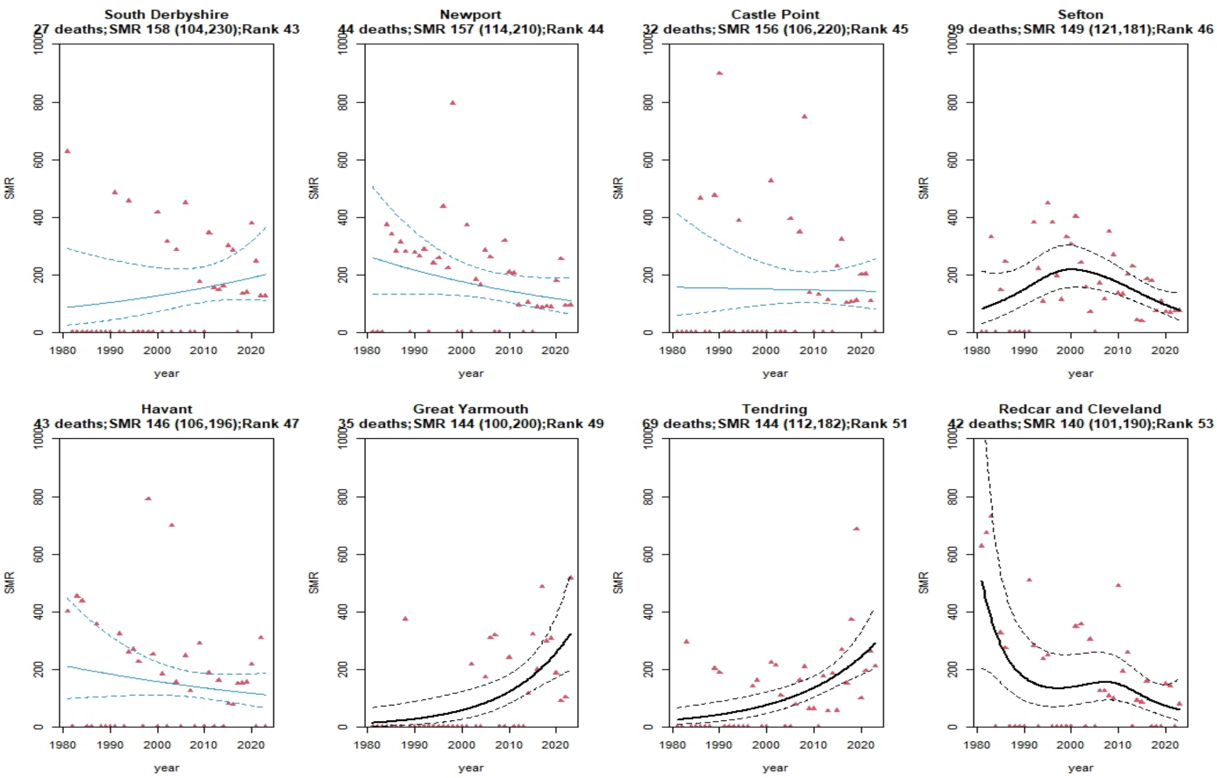

Figure A1.10 – Annual asbestosis SMRs for males for UA/LAs ranked 43-50, 1981-2023

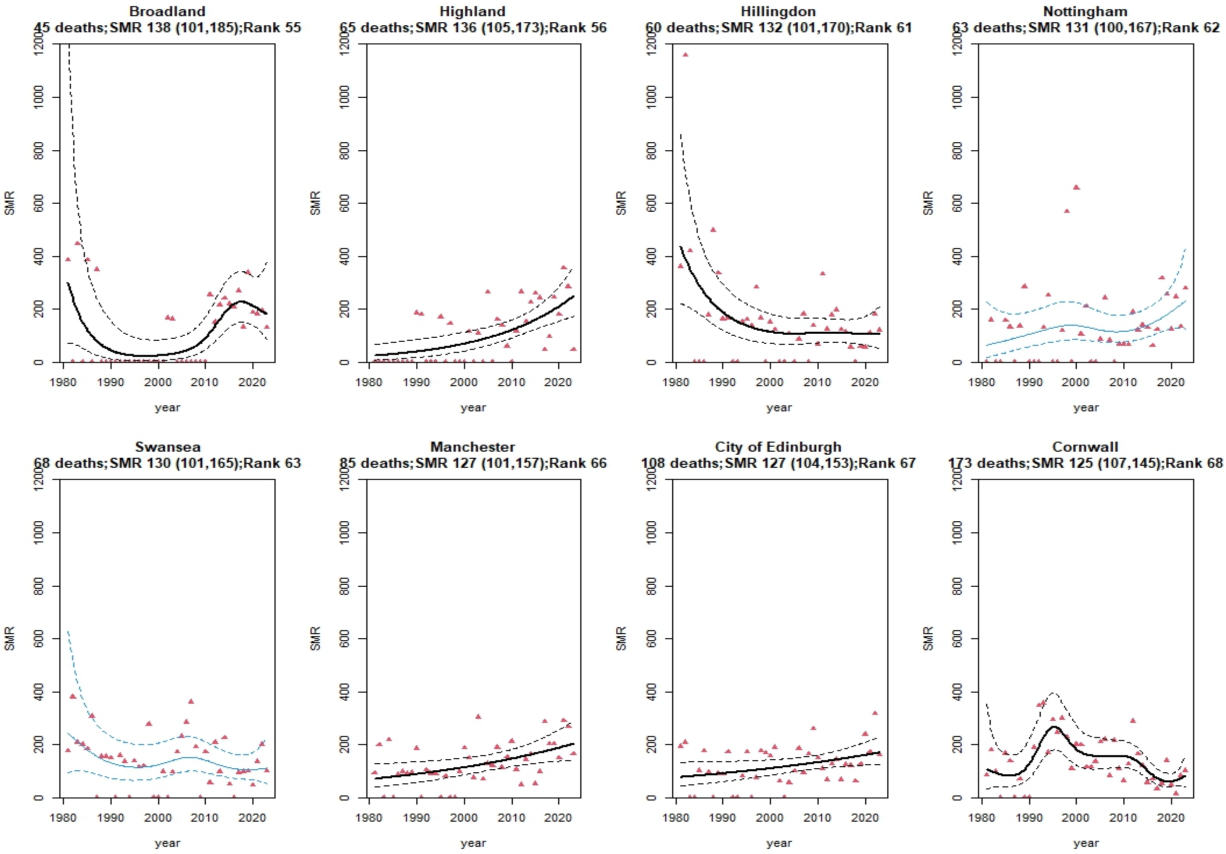

Figure A1.11 – Annual asbestosis SMRs for males for UA/LAs ranked 51-58, 1981-2023

Female asbestosis deaths by area 1981-2023

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 1981-2023 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 131 deaths of the 397 deaths for GB as a whole during 1981-2023 (SMR 740.6, 95% CI 619.1 to 878.7), and the top five Unitary/Local Authority areas were:

- 1 Sunderland (SMR 4486.4, 95% Confidence Interval 3573.4 to 5561.5 deaths 83),
- 2 Barking and Dagenham (SMR 1744, 95% Confidence Interval 1015.6 to 2792.5 deaths 17),
- 3 Newham (SMR 1539, 95% Confidence Interval 861.9 to 2538.4 deaths 15),
- 4 South Ribble (SMR 1009.6, 95% Confidence Interval 405.3 to 2079.7 deaths 7),
- 5 Darlington (SMR 818.3, 95% Confidence Interval 300.1 to 1781.2 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 (1)	Asbestosis deaths (2)	Asbestosis death rate (3) = (2) / (1)	Population (4)	Observed asbestosis deaths (5)	Expected asbestosis deaths (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 – Asbestosis deaths by occupation in Great Britain

Background

These statistics are based on the last occupation of the deceased, as recorded on death certificates for deaths mentioning asbestosis as a cause of death. The Proportional Mortality Ratio (PMR) presented for each occupation compares the frequency that the occupation is recorded for asbestosis deaths with the frequency that it is recorded for deaths from all causes of death as a whole. PMRs thus provide a way of highlighting occupations that may be associated with higher-than-average mortality from asbestosis.

Full results of the PMR calculations by occupation in Great Britain are available in Excel tables at:

www.hse.gov.uk/statistics/assets/docs/asisoccupation.xlsx.

Tables show the numbers of asbestosis deaths and PMRs for males by Standard Occupational Classification (SOC) major (1-digit code), sub-major (2-digit code), minor (3-digit code) and unit (4-digit code) groups.

Previous statistics included the 10-year time-period 2011-2020 as well as the previous period of 2001-2010. Occupations in the latest two year's data (2021-2022) are still coded to SOC2010 and are therefore incorporated into an analysis of the 12-year period 2011-2022 rather than presenting PMRs for two years (2021-2022) as this would lead to many results being based on small numbers. The previous statistics for 2011-2020 and 2001-2010 are also presented for completeness.

Two versions of each analysis are presented: the first includes deaths mentioning asbestosis but excluding those also mentioning mesothelioma (our preferred measure of asbestosis mortality – see main section of report), in Tabs 1, 1A and 3; the second includes all deaths mentioning asbestosis (Tabs 2, 2A and 4). All figures quoted in this Annex and in the analyses of time trends are based on the former preferred measure.

Due to the small number of asbestosis deaths among women it was not feasible to carry out PMR analyses for females.

SOC codes form a nested hierarchy: the first digit of any full 4-digit unit group code gives its major group, the first two digits gives it sub-major group and the first three digits gives its minor group.

Tables include ranks from highest to lowest PMR within each 1- to 4-digit level separately (groups with 10 or fewer observed or expected asbestosis deaths are not included in the rankings due to the uncertainty associated with smaller numbers).

Methods and limitations

The observed number of deaths in a particular occupation does not represent the actual number of deaths that are attributable to asbestos exposures in that occupation.

PMRs summarise mortality among occupational groups relative to the average level across all occupations for Great Britain as a whole and do not represent absolute measures of risk.

PMRs are expressed as a percentage: values higher or lower than 100 indicate asbestosis rates that are higher or lower, respectively, than the average for all occupations combined. The corresponding confidence interval should be used to assess whether such an effect could merely be due to random variation.

Occupations with the highest PMRs and where the lower limit of the associated Confidence Interval (CI) are above 100 constitute those that can most reliably be said to have an excess of asbestosis deaths compared to the average for all occupations, and are, therefore, those most likely to be reflecting an effect due to past occupational asbestos exposure.

Last occupation of the deceased

Occupation is recorded on death certificates for deaths at ages 16-74 as a matter of course. These analyses are limited by the fact that death certificates record only the last occupation of the deceased. For example, a case of asbestosis caused by work in the construction industry will only be assigned to that occupation in this analysis if the individual is still in that kind of work when they retired or died.

Occupations with the highest PMRs will tend to be those which are genuine sources of risk, but PMRs may understate the true relative risk level. PMRs of other occupations will overstate the level of any risk associated with these jobs.

A further consideration for asbestosis mortality statistics by occupation relates to the fact that the diagnosis of asbestosis itself requires knowledge of a person’s job history as an indication of the likelihood of asbestos exposure in combination with the clinical features of the disease. Information about job histories may thus affect both whether cases are correctly recognised as asbestosis at initial diagnosis and the job assigned on death certificates.

Overall PMRs for 2011-2022 and temporal trends for 2001-2023

This section presents time trends in PMRs for selected occupations within different levels of the SOC hierarchy where occupational categories based on SOC2000 and SOC2010 were equivalent. The results for 2011-2022 by SOC2010 give the best indication of the overall PMR. The time trends also used SOC2000 codes for the period 2001-2010 and SOC2020 codes for the year 2023. Some of the codes have changed for SOC2020 but these have been matched up with SOC2010 codes and checked for compatibility.

Trends for a particular occupation indicate how the proportion of deaths with a particular occupation recorded has changed over time, rather than the absolute numbers.

The charts show trend lines with solid bold **black** lines to indicate a statistically significant annual trend. Those with **green** lines indicate trends of borderline significance, and for those with **blue** lines trends were not significant. The dashed lines represent the 95% confidence intervals.

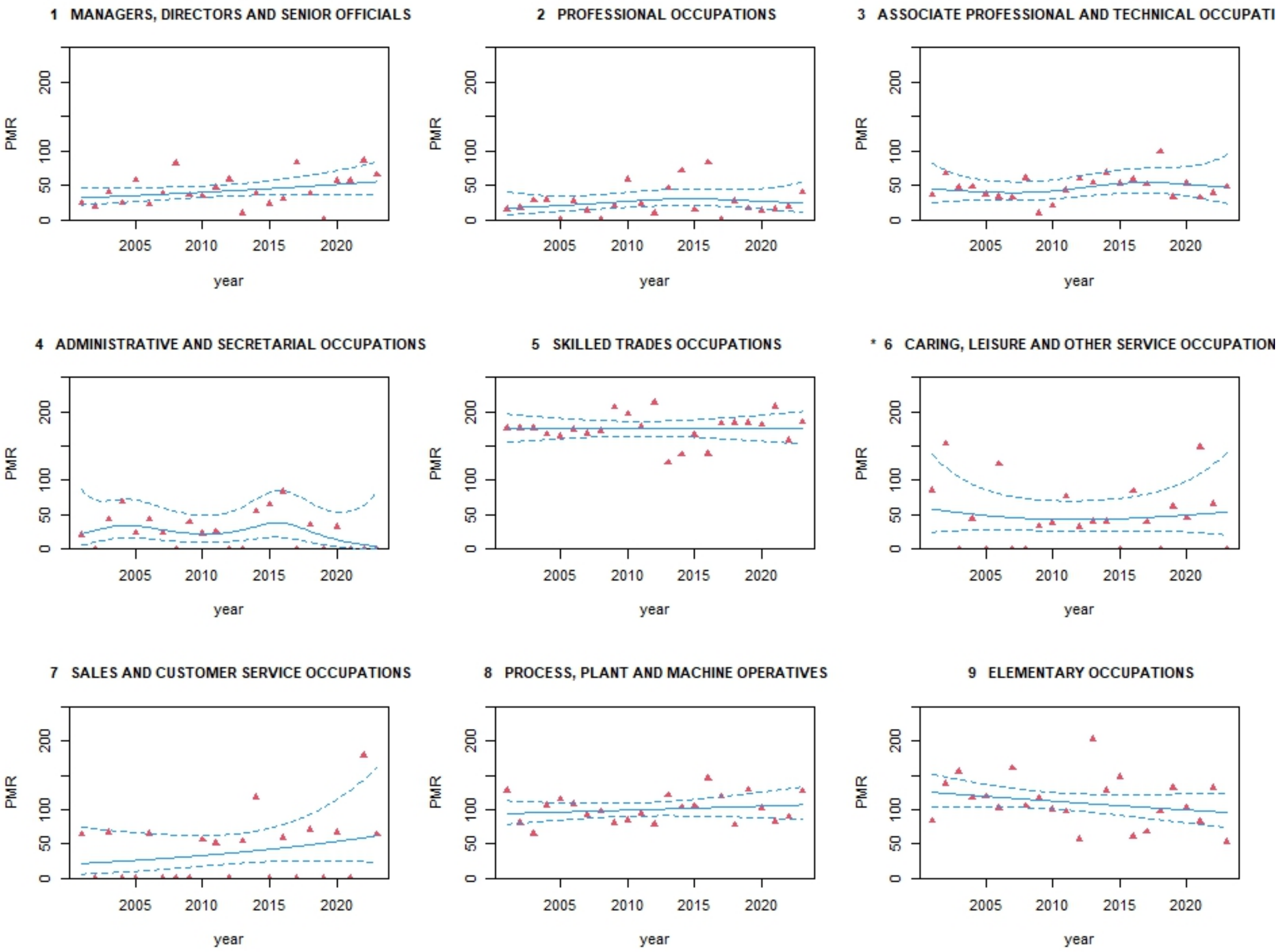

Figure A3.1: Asbestosis PMRs by SOC major group, males, 2001-2023

SOC major group (1-digit)

Among males, there was only one major group with statistically significantly elevated asbestosis mortality during 2011-2022:

- 5 SKILLED TRADES OCCUPATIONS: PMR 171.5 (157.1 to 187), n=516

This major group showed no significant time trend. The group contains a number of more specific codes with significantly elevated PMRs, including the two of the four elevated 2-digit sub-major group codes, four of the seven highest ranking 3-digit minor group codes and nine of the thirteen highest ranking 4-digit unit codes.

Six out of the remaining eight major groups have significantly lower PMRs compared to the average for all occupations, the exceptions being group 8 (Process, plant and machine operatives) and group 9 (Elementary occupations), which are not significantly elevated but do contain the only other sub-groupings that are elevated.

SOC sub-major group (2-digit)

There were four statistically significantly elevated sub-major occupational groupings in the period 2011-2022 for males:

- 1. 53 Skilled construction and building trades: PMR 281.3 (251.4 to 313.7), n=323
- 2. 81 Process, plant and machine operatives: PMR 173.4 (145.3 to 205.2), n=135
- 3. 91 Elementary trades and related occupations: PMR 164.8 (133.3 to 201.4), n=95
- 4. 52 Skilled metal, electrical and electronic trades: PMR 141.7 (121.4 to 164.3), n=174 (which showed a decreasing trend over time).

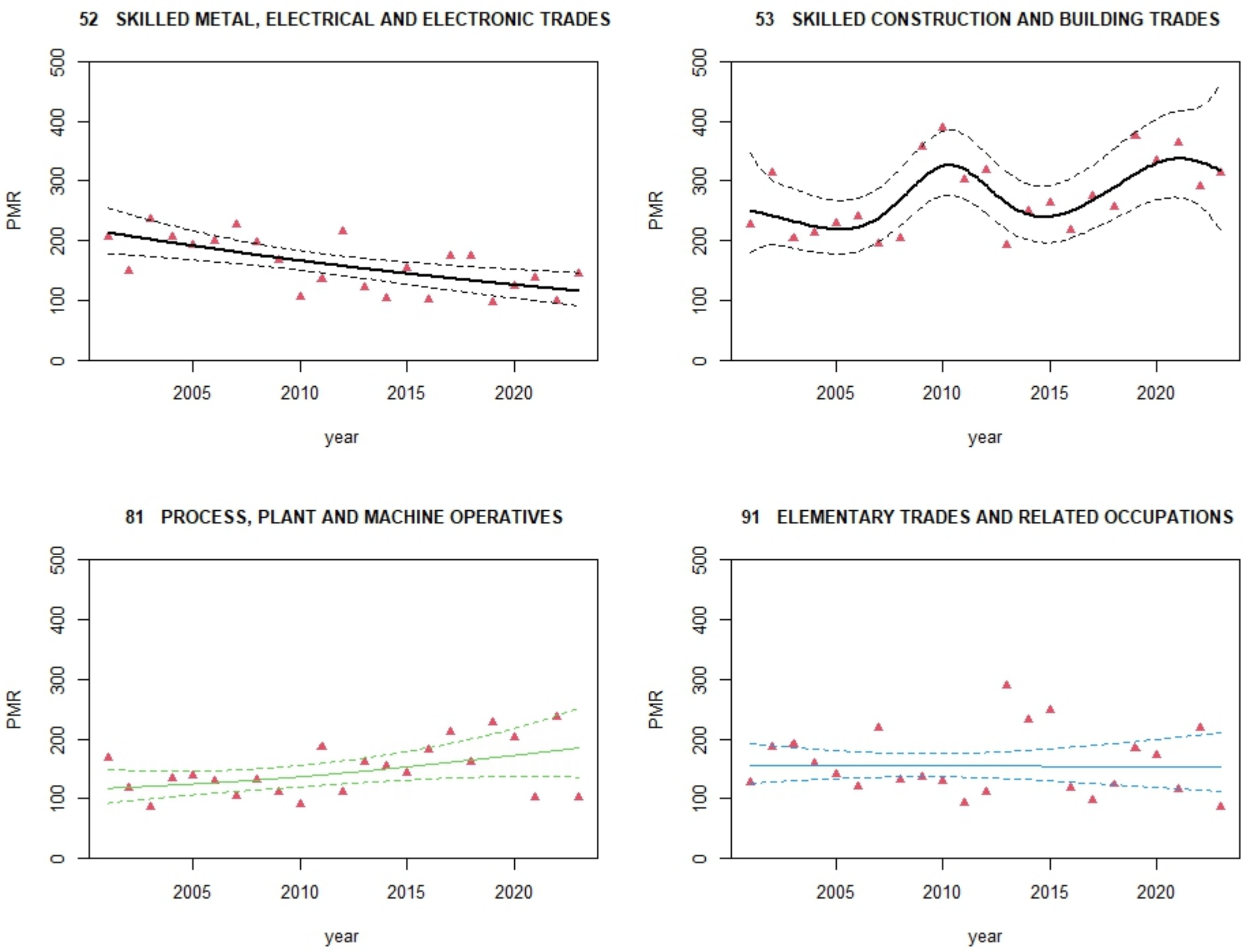

Figure A3.2: Asbestosis PMRs by SOC sub-major group, males, 2001-2023

SOC minor group (3-digit)

For males, asbestosis PMRs for seven SOC minor groups were statistically significantly elevated for the period 2011-2022, all of which have at least some association with building-related activities:

- 1. 814 Construction Operatives: PMR 434.6 (331.6 to 559.4), n=60
- 2. 531 Construction and Building Trades: PMR 304.6 (268.8 to 343.9), n=261
- 3. 521 Metal Forming, Welding and Related Trades: PMR 258.8 (188.1 to 347.5), n=44 (downward time trend)
- 4. 912 Elementary Construction Occupations: PMR 231.9 (175.7 to 300.5), n=57
- 5. 532 Building Finishing Trades: PMR 217.2 (164.9 to 280.7), n=58
- 6. 812 Plant and Machine Operatives: PMR 148.4 (112.1 to 192.7), n=56
- 7. 524 Electrical and Electronic Trades: PMR 143.4 (108.6 to 185.7), n=57

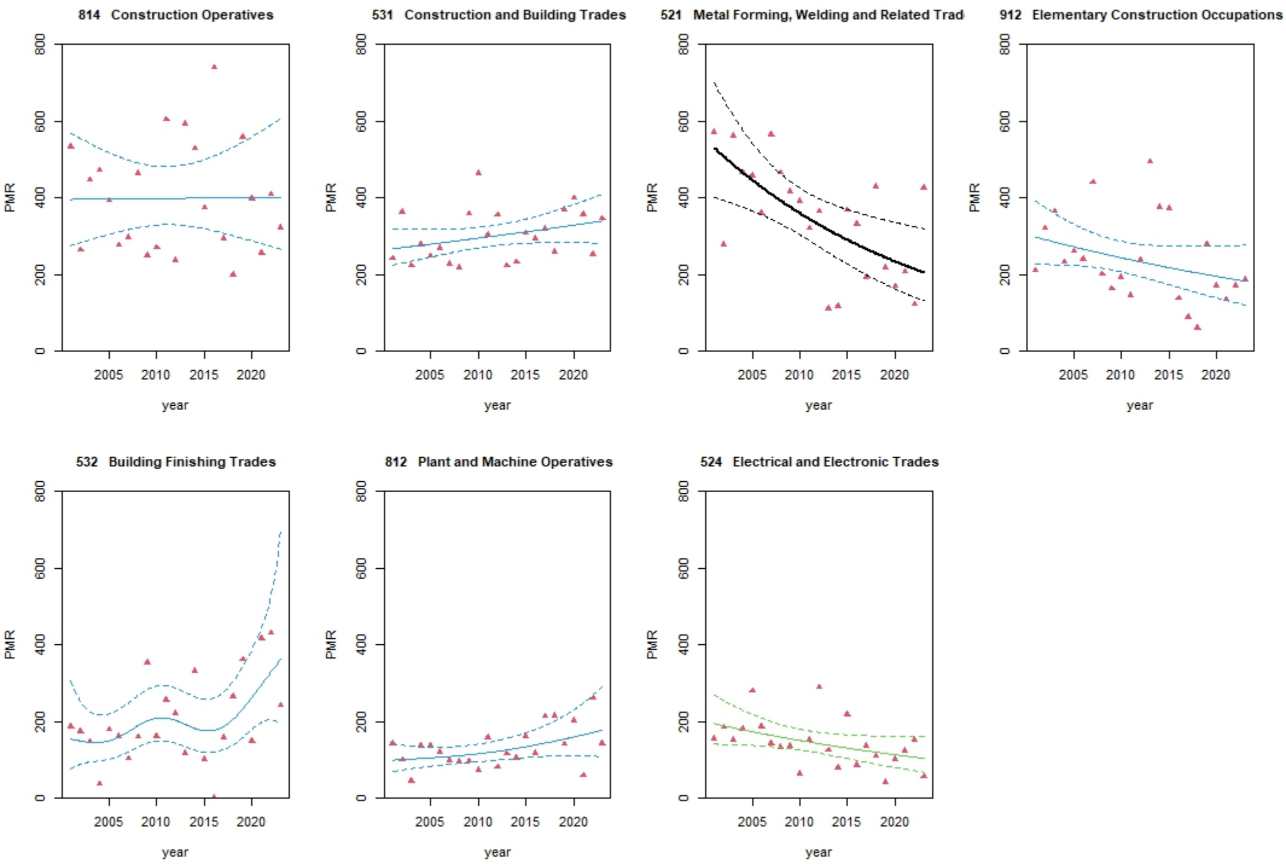

Figure A3.3: Asbestosis PMRs by SOC minor group, males, 2001-2023

SOC unit group (4-digit)

For males, PMRs were statistically significantly elevated for 13 of the 186 SOC unit groups with at least 10 observed or expected non-mesothelioma asbestosis deaths. Results for these groups are listed below. Again, a substantial proportion of these unit groups were associated with building activities.

Unit groups with the highest PMRs:

- 1. 5216 Pipe fitters: PMR 859.3 (500.4 to 1375.9), n=17
- 2. 5236 Boat and ship builders and repairers: PMR 642.4 (380.8 to 1015.3), n=18
- 3. 8149 Construction operatives n.e.c: PMR 581 (415.1 to 791.1), n=40
- 4. 8141 Scaffolders, stagers and riggers: PMR 499.2 (285.5 to 810.6), n=16
- 5. 5314 Plumbers and heating and ventilating engineers: PMR 465.1 (363.9 to 585.6), n=72
- 6. 5315 Carpenters and joiners: PMR 400.6 (324.1 to 489.7), n=95
- 7. 5313 Roofers, roof tilers and slaters: PMR 352.8 (205.4 to 564.9), n=17
- 8. 9120 Elementary construction occupations: PMR 231.9 (175.7 to 300.5), n=57
- 9. 5323 Painters and decorators: PMR 229.7 (166.9 to 308.4), n=44
- 10. 5319 Construction and building trades n.e.c.: PMR 202.3 (154 to 261), n=59
- 11. 5215 Welding trades: PMR 197 (116.8 to 311.4), n=18
- 12. 8125 Metal working machine operatives: PMR 197 (134.7 to 278), n=32
- 13. 5241 Electricians and electrical fitters: PMR 190 (140.1 to 252), n=48

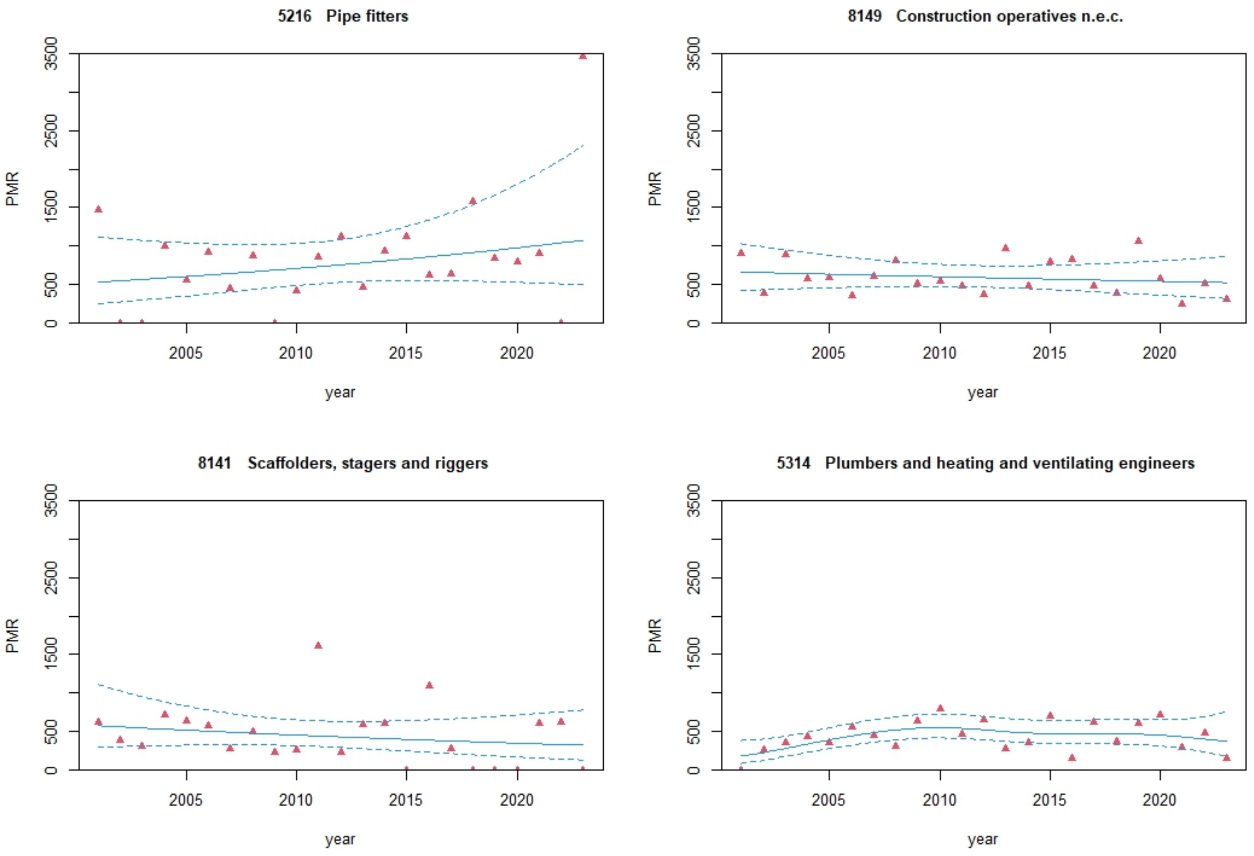

Figure A3.4a: Asbestosis PMRs by SOC unit group, males, 2001-2023

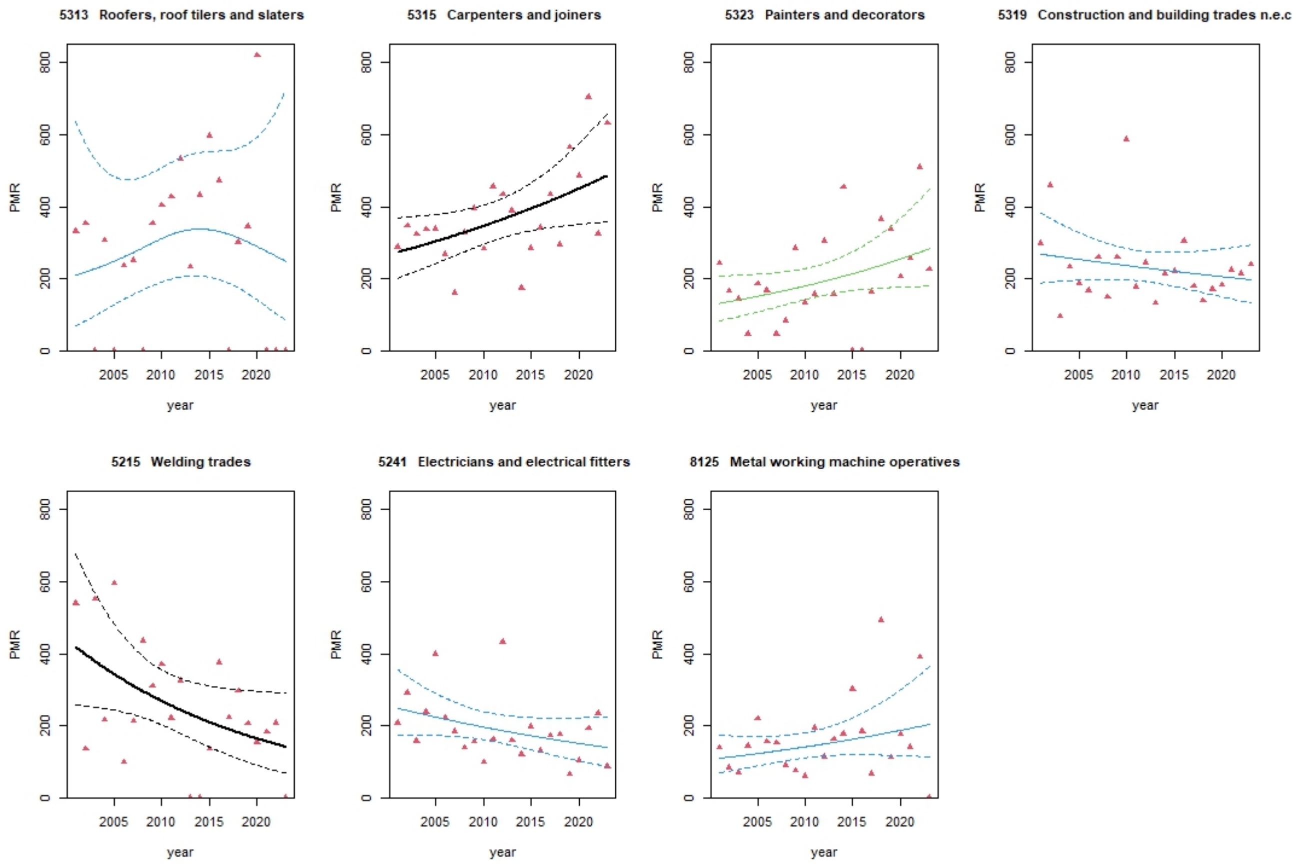

Figure A3.4b: Asbestosis PMRs by SOC unit group, males, 2001-2023

There is no evidence of trends over time for the 11 unit groups shown in the graphs above, with the exception of an increasing trend for unit group 5215 (Welding trades) and a decreasing trend for 5241 (Electricians and electrical fitters).

Two of the 13 unit groups could not be shown because of differences between SOC2000 and SOC2010 coding: unit group 5236 (Boat and ship builders and repairers), and unit group 9120 (Elementary construction occupations). Within unit group 9120, laggers accounted for 22 out of the 60 deaths (with an all-cause deaths total of 31,993). In contrast, for the previous ten years (2001 to 2010), laggers accounted for 46 out of 52 deaths for the highest ranked unit group 9129 (Labourers in other construction trades n.e.c: PMR=2296.5, 95% CI: 1715.3, 3011.5, all-cause deaths total 2181).

Annex 4 – Impact of the coronavirus pandemic

Assessment of the impact of the coronavirus pandemic on asbestosis deaths registered during 2020-2024

Statistics for asbestosis deaths occurring in years 2020 and 2021 may have been particularly affected by the coronavirus pandemic for various reasons. These include direct effects (individuals with asbestosis – whether or not diagnosed – dying earlier than otherwise due to also developing COVID-19), and indirect effects due to factors affecting health services, and effects on systems for recording and certifying deaths. For example, some deaths where both COVID-19 and asbestosis played a role may have been less 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 to 2022 where death certificates mentioned both asbestosis and COVID-19

Figure A1.1 shows asbestosis deaths (excluding deaths that also mentioned mesothelioma) occurring in 2020 to 2022 by month of occurrence (grey squares) compared with expected monthly figures (grey line) calculated assuming the annual totals were distributed according to the pre-pandemic monthly distribution (based on the periods 2015 to 2019).

There is some evidence of an excess of deaths in April 2020 and December 2020 to February 2021, periods that coincided with waves of the coronavirus pandemic. However, there is also a suggestion of deficits in other months between, particularly in June of both years. 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 2021, and some of these cases may have occurred in later years had the pandemic not occurred.

The chart also shows the deaths where the death certificate specifically mentioned both asbestosis and COVID-19 (black bars). During 2020 and 2021 these deaths occurred in months that coincided with documented waves of the pandemic. It is possible that some of these deaths may have occurred in later years had the pandemic not occurred. During 2022 (when the Omicron variant was dominant) there is a less clear pattern but most months showing a small number of deaths mentioning COVID-19.

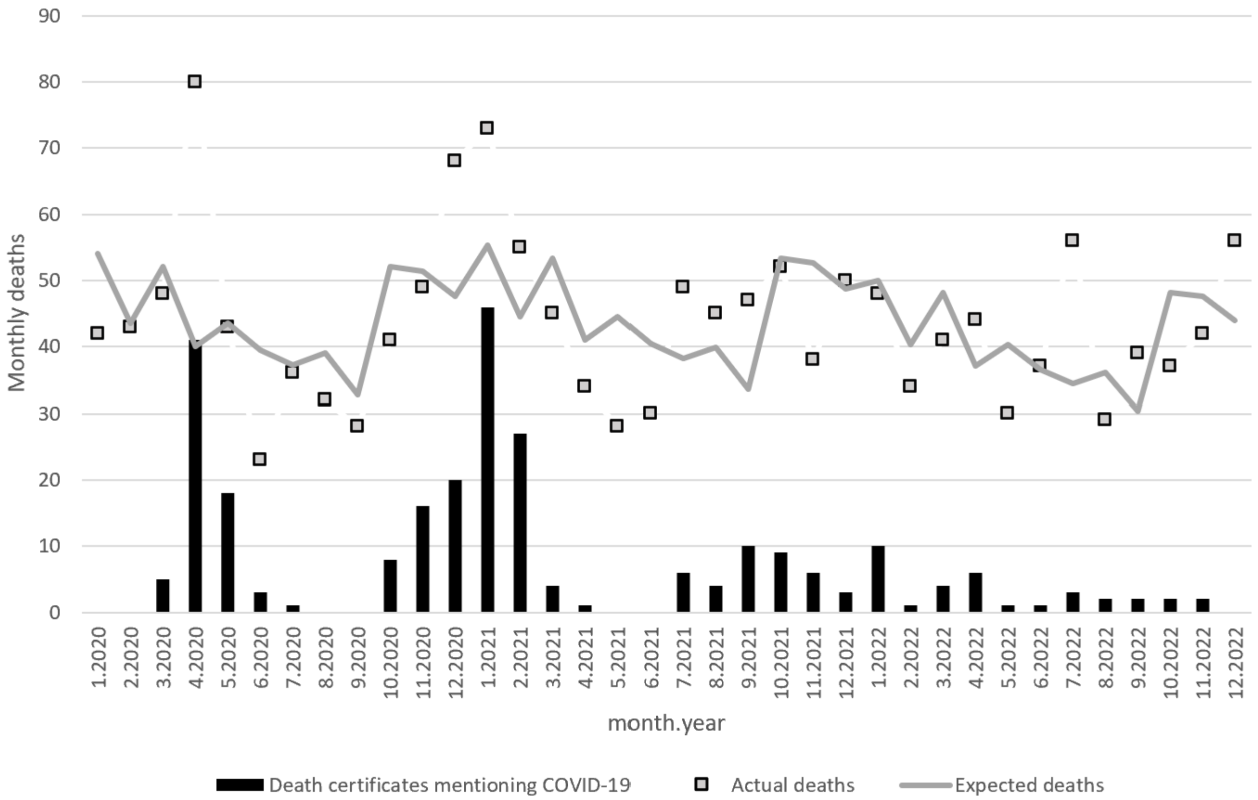

Figure A4.1: Monthly asbestosis deaths in 2020 to 2022 compared with the number expected based on pre-pandemic monthly pattern (2015-2019), and death certificates mentioning COVID-19 as well as asbestosis.

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.

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

Table A1.1 shows a breakdown of asbestosis deaths occurring in the 5-year period 2014-2018 and deaths occurring during 2019-22 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 from 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, 74.3% 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 1.3% 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 (69.9%), and more were registered in the year following the year of the death (27.1%) By March 2024 there were an additional 10 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). For deaths occurring in 2021, more deaths were registered than usual in February 2021 (coinciding with the ‘alpha’ wave). However, for both years taken as a whole, the pattern of registrations is similar to that for 2014-18. There is some indication of an increase in late registrations for deaths occurring in 2021 and 2022, however, the numbers registered at least 12 months after the end of the year in which the death occurred remain small.

Overall, these analyses do not suggest delays in deaths registration have had any appreciable impact on the published statistics.

Table A4.1 Deaths occurring in 2014-18, and 2019-22 by month of registration

	Year death occurred:									
Deaths registered during:	**2014**	**2015**	**2016**	**2017**	**2018**	***Average 2014-2018***	**2019**	**2020**	**2021**	**2022**
Year death occurred										
January	14	14	12	12	17	***13.8***	8	18	29	15
February	18	14	21	21	18	***18.4***	16	17	40	24
March	16	18	29	22	19	***20.8***	20	23	28	21
April	24	28	27	19	23	***24.2***	25	62	34	23
May	27	21	36	40	32	***31.2***	28	40	27	30
June	25	40	34	45	41	***37.0***	24	17	28	36
July	45	44	31	30	26	***35.2***	39	33	33	26
August	30	31	38	33	45	***35.4***	37	30	37	38
September	37	34	34	32	32	***33.8***	24	36	39	32
October	35	41	37	39	43	***39.0***	36	31	34	39
November	23	36	42	43	42	***37.2***	42	47	37	28
December	36	29	39	28	39	***34.2***	49	48	31	37
Total	**330**	**350**	**380**	**364**	**377**	***360.2***	**348**	**402**	**397**	**349**
Percentage of all deaths	***75.7%***	***74.8%***	***76.0%***	***70.8%***	***74.5%***	***74.3%***	***69.9%***	***75.4%***	***72.7%***	***70.8%***
Year of death + 1										
January	20	20	28	26	25	***23.8***	25	21	25	15
February	22	29	27	23	23	***24.8***	32	21	18	15
March	13	13	20	20	19	***17.0***	23	14	19	13
April	14	22	11	28	17	***18.4***	8	18	16	14
May	14	12	9	15	13	***12.6***	10	11	12	21
June	3	7	8	12	7	***7.4***	12	7	17	7
July	4	4	7	6	4	***5.0***	5	7	6	5
August	4	4	4	5	5	***4.4***	7	2	4	13
September		3	2	3	4	***3.0***	3	5	7	11
October	5		1	3	2	***2.8***	3	3	5	10
November	1			3	3	***2.3***	3	5	1	12
December		1		2	2	***1.7***	4	4	1	3
Total	**100**	**115**	**117**	**146**	**124**	***120.4***	**135**	**118**	**131**	**139**
Percentage of all deaths	***22.9%***	***24.6%***	***23.4%***	***28.4%***	***24.5%***	***24.8%***	***27.1%***	***22.1%***	***24.0%***	***28.2%***
Year of death +2										
January	1		1	2	1	***1.3***		1	4	3
February						***0.0***	2	3	2	1
March		2				***2.0***	3	2	3	1
Total January - March	**1**	**2**	**1**	**2**	**1**	***1.4***	**5**	**6**	**9**	**5**
Percentage of all deaths	***0.2%***	***0.4%***	***0.2%***	***0.4%***	***0.2%***	***0.3%***	***1.0%***	***1.1%***	***1.6%***	***1.0%***
Total later than March of year +2	**5**	**1**	**2**	**2**	**4**	***2.8***	**10**	**7**	**9**	-
Percentage of all deaths	***1.1%***	***0.2%***	***0.4%***	***0.4%***	***0.8%***	***0.6%***	***2.0%***	***1.3%***	***1.6%***	-
Grand Total	**436**	**468**	**500**	**514**	**506**	***484.8***	**498**	**533**	**546**	**493**

Annex 5: Figure A5.1 – Annual asbestosis deaths 1978-2023

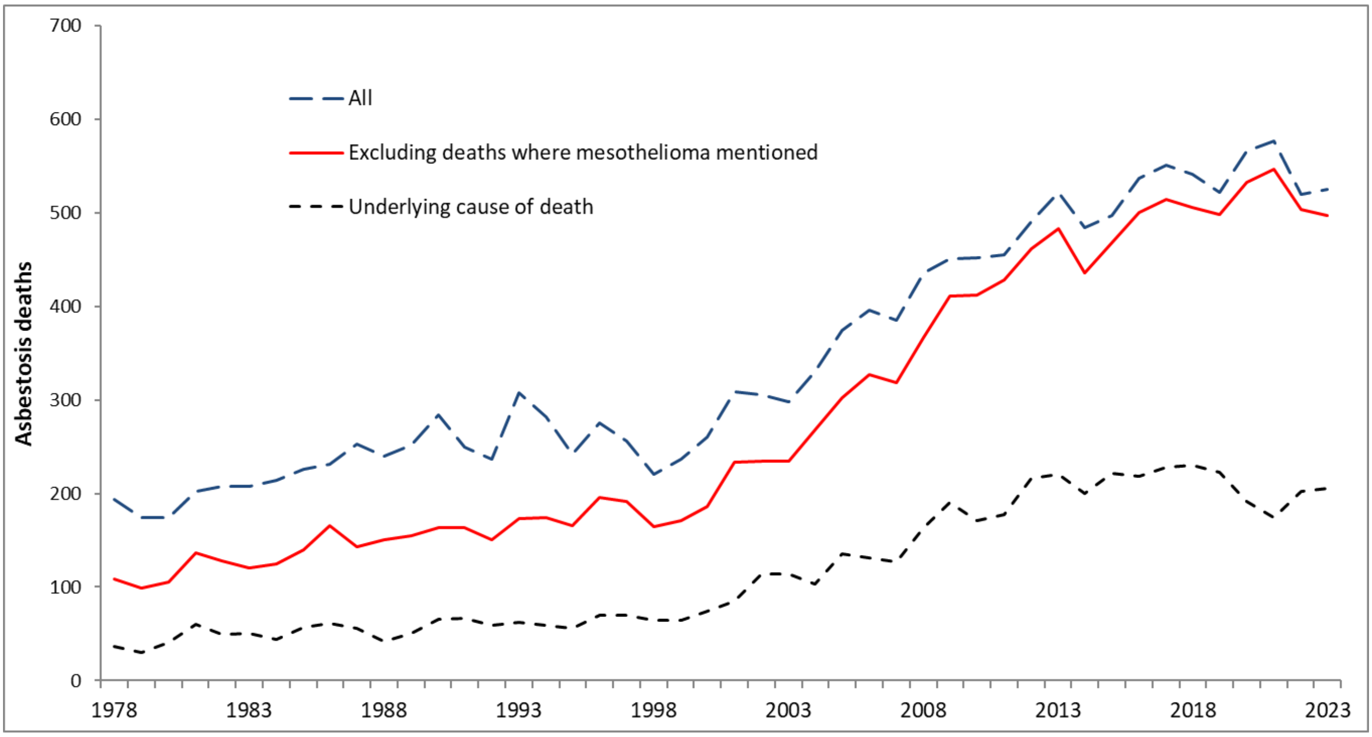

Figure A5.1 – Annual asbestosis deaths 1978-2023

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