Mesothelioma mortality by occupation statistics in Great Britain, 2025

July 2025

Contents

Summary

The information in this document relates to Health and Safety Statistics published by the Health and Safety Executive in 2025. The document can be found at: https://www.hse.gov.uk/statistics/causdis/overview.htm

Introduction

This fact sheet presents updated mesothelioma mortality statistics by last recorded occupation of the deceased within Great Britain from 2011-2023 and time trends over the longer period of 2001-2023. The document can be found at https://www.hse.gov.uk/statistics/causdis/overview.htm

Background information about mesothelioma and statistics for mesothelioma deaths in Great Britain as a whole and by geographical area within Great Britain are also available at https://www.hse.gov.uk/statistics/causdis/overview.htm.

These statistics are based on the last occupation of the deceased, as recorded on death certificates. The Proportional Mortality Ratio (PMR) presented for each occupation compares the frequency that the occupation is recorded for mesothelioma deaths with the frequency that it is recorded for deaths from all causes of death as a whole.

PMRs provide a way of highlighting occupations that may be associated with higher-than-average mortality from mesothelioma.

The analyses of temporal trends in occupational PMRs within Great Britain should be interpreted as an indication of how the proportion of deaths with a particular occupation recorded has changed over time, rather than the absolute numbers.

The PMR statistics are limited by the fact that only the last occupation of the deceased is recorded on death certificates which, given the typically long period that the disease takes to develop, may not always be the relevant occupation in terms of past exposure to asbestos. The analysis is restricted to deaths occurring at ages 16-74 years since occupations are routinely recorded on death certificates only for deaths in this range in England and Wales.

Overall deaths increased more than 35% over the period of analysis (i.e. since 2001), and around 10-fold since the late 1960s when consistent recording of mesothelioma in Britain began. However, deaths below age 75 years – those included in this analysis – have reduced over the last 10 years. Nevertheless, since the value of these statistics is in the relative comparison of the frequency of recording of different occupations on mesothelioma death certificates rather than in the absolute number of deaths for each occupation, the statistics still provide useful information about the occupations that are more likely to have been a source of past asbestos exposure.

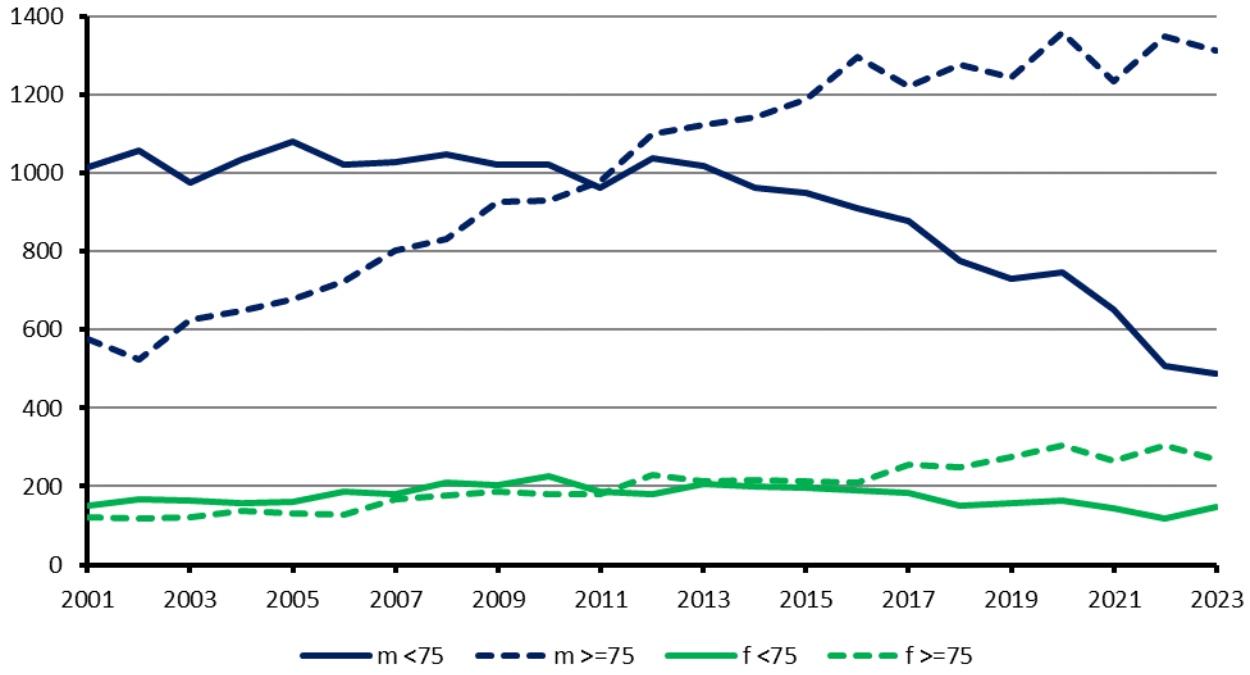

Figure 1: Male and female mesothelioma deaths 2001-2023 by age category

Results

Data tables

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

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

The spreadsheet contains 8 tables, each on a separate worksheet, showing the number of mesothelioma deaths and PMRs with associated 95% confidence intervals. The tables show results for both males and females in four time periods by Standard Occupational Classification (SOC) major (1-digit code), sub-major (2-digit code), minor (3-digit code) and unit (4-digit code) groups.

This spreadsheet now includes two new tables giving provisional results for the period 2021 to 2023 using the latest version of the Standard Occupational Classification (SOC2020) – see below.

Introduction of the Standard Occupational Classification 2020 (SOC2020)

Coding of last occupation of the deceased to the latest version of the Standard Occupational Classification began in England and Wales for deaths registered in 2023 and this introduced changes to the way some jobs are categorised.

To provide a more robust analysis than possible based on one single year of data (i.e. 2023 alone) we have combined data for years 2021 to 2023. However, this required recoding occupations for mesothelioma deaths occurring in England and Wales in 2021 and 2022 and all causes of death data used in the PMR analyses to the SOC2020 classification. Deaths occurring in Scotland for 2021-23 were also recoded. These results are provisional.

PMRs in following tables are now available in the MESOOCCUPATION spreadsheet:

- Males, 2021-23 by SOC2020
- Females, 2021-23 by SOC2020
- Males, 2011-22 by SOC2010
- Females, 2011-22 by SOC2010
- Males, 2011-20 by SOC2010
- Females, 2011-20 by SOC2010
- Males, 2001-10 by SOC2000
- Females, 2001-10 by SOC2000

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 mesothelioma deaths are not included in the rankings due to the uncertainty associated with smaller numbers).

Notes about interpreting the PMRs and their 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 for all occupations in 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 mesothelioma 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 mesothelioma 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

These analyses are limited by the fact that death certificates record only the last occupation of the deceased. For example, a case of mesothelioma 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). The long latency period of mesothelioma means that individuals may move between occupations before the onset of the disease and thus there is considerable potential for dilution of the observed difference in risk between occupations.

The dilution will be stronger for those kinds of work where there have been substantial reductions in the relevant workforce (e.g. shipyards, railway rolling stock). The 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 risk (if any) associated with these jobs; occupations with the lowest PMRs will be those which do not entail asbestos exposure, and which are unlikely to be the final full-time occupation for individuals with asbestos exposure.

Role of environmental asbestos exposure

Occupation is recorded on death certificates for deaths at ages 16-74 as a matter of course: for mesothelioma deaths occupation is recorded regardless of whether the deaths were caused by ‘occupational exposure’ to asbestos. This is particularly important to the interpretation of mesothelioma PMRs for women. Whilst some occupations are recorded as the last occupation on female mesothelioma deaths in appreciable numbers, those occupations that do show increased PMRs in women are generally not those where the direct handling of asbestos materials at work was likely to have been taking place routinely. Many of these deaths may reflect ‘background’ or ‘environmental’ asbestos exposure. This means exposures not directly related to work but potentially includes past exposures accrued indirectly in the built environment during work time.

Deaths occurring in the latest periods (i.e. 2011-2020 and 2021-2023) are still influenced by the cohort of people who were younger during the period of peak asbestos use in the 1960s and 1970s when there were far less stringent controls than that required today.

The latest occupational analyses of female mesothelioma deaths suggest there is some variation in proportionate mesothelioma mortality among those who worked in jobs not involving the use of asbestos. For example, proportional mortality ratios are higher for teachers and administrative occupations than those for nurses, sales occupations and process operatives, and this may suggest the potential for asbestos exposure during work time was somewhat higher in these jobs in the past. The results by birth cohort (see tables: Males 2011-22 by SOC2010, and Females 2011-22 by SOC2010) suggest that these effects may have been the case even after 1980. However, past exposures in buildings may have contributed to the background risk seen across all of these kinds of jobs to some extent, and other sources of exposure – for example, in housing stock – are also likely to have contributed.

Earlier population-based research showed that, while still caused by asbestos, a majority of mesotheliomas among women (and a similar absolute number among men, though these constitute a smaller proportion of the larger male total) in Britain were not directly attributable to occupational or domestic asbestos exposures [1]. This, together with an overall increase in mesothelioma deaths among women, suggests there was an increase in the average ‘background’ risk among those who did not work with asbestos, but who lived through the period of peak asbestos use. During this period the opportunities for unwitting exposure may have been widespread. This average background risk – which has since reduced [2] – will reflect the average effect of past exposures via the buildings occupied in childhood and working life and any other sources of exposure in the environment. However, exposures contributing to this average risk could vary substantially from person to person and are likely to at least partly account for deaths with occupations not typically associated with asbestos exposure recorded on the death certificate. The background risk will also apply to men of the same generation.

Reliability of unit group coding

The coding of occupation is likely to be more reliable at the minor group (3-digit code) level than the unit group (4-digit code) level since the recorded information about the job title on death certificates does not always give sufficient information to accurately assign a 4-digit code.

Provisional PMRS by SOC2020 for the period 2021-23

National Records of Scotland (NRS) supplied mortality data, both mesothelioma and all cause deaths, by occupation coded to SOC2010 for 2021-23. The Office for National Statistics (ONS) supplied: i) mesothelioma deaths coded to SOC2010 for those occurring in 2021 to 2023 that were registered before April 2023, or coded to SOC2020 for deaths registered after April 2023; ii) all cause deaths by occupation by the year of registration coded to SOC2010 for 2021 and 2022 and coded to SOC2020 for 2023.

Provisional PMRs for the period 2021 to 2023 were produced by recoding occupations for mesothelioma deaths to SOC2020 codes for any originally coded to SOC2010 in this period. For the large number of all cause deaths used as the denominators in the calculations we used a conversion routine supplied by ONS which was tested on census data.

The recoding of occupations in this latest time period may have introduced some additional uncertainty in relation to how well the coded occupation represents the last recorded job of the deceased.

Overall PMRs and time 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.

Trends for a particular occupation over the period 2001 to 2023 indicate how the proportion of deaths with a particular occupation recorded has changed during this period, rather than the absolute numbers. Where PMRs are changing over the last 20 years, this will reflect the impact of past changes in historical exposure, given the long latency of the disease. For example, occupations with high PMRs overall (those most clearly indicating the role of past occupational exposure) and which show a downward trend may reflect the effect of heavy past exposures being reduced or eliminated after the period of peak asbestos usage in the 1960s and 1970s.

Changes in the PMRs for lower risks jobs over the last 20 years will also reflect changes in past exposure, and particularly the extent to which the effect of past background exposures (including any contribution that working in buildings made to this) is evident in mesothelioma outcomes over this period. For example, increases in the PMR for jobs not

associated with the direct handling of asbestos at work may be because the effects of past background exposures are seen more clearly in the most recent mesothelioma outcomes rather than earlier ones. Other research suggests that background exposures that coincided with the period of peak asbestos use (prior to 1980) subsequently reduced [2].

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.

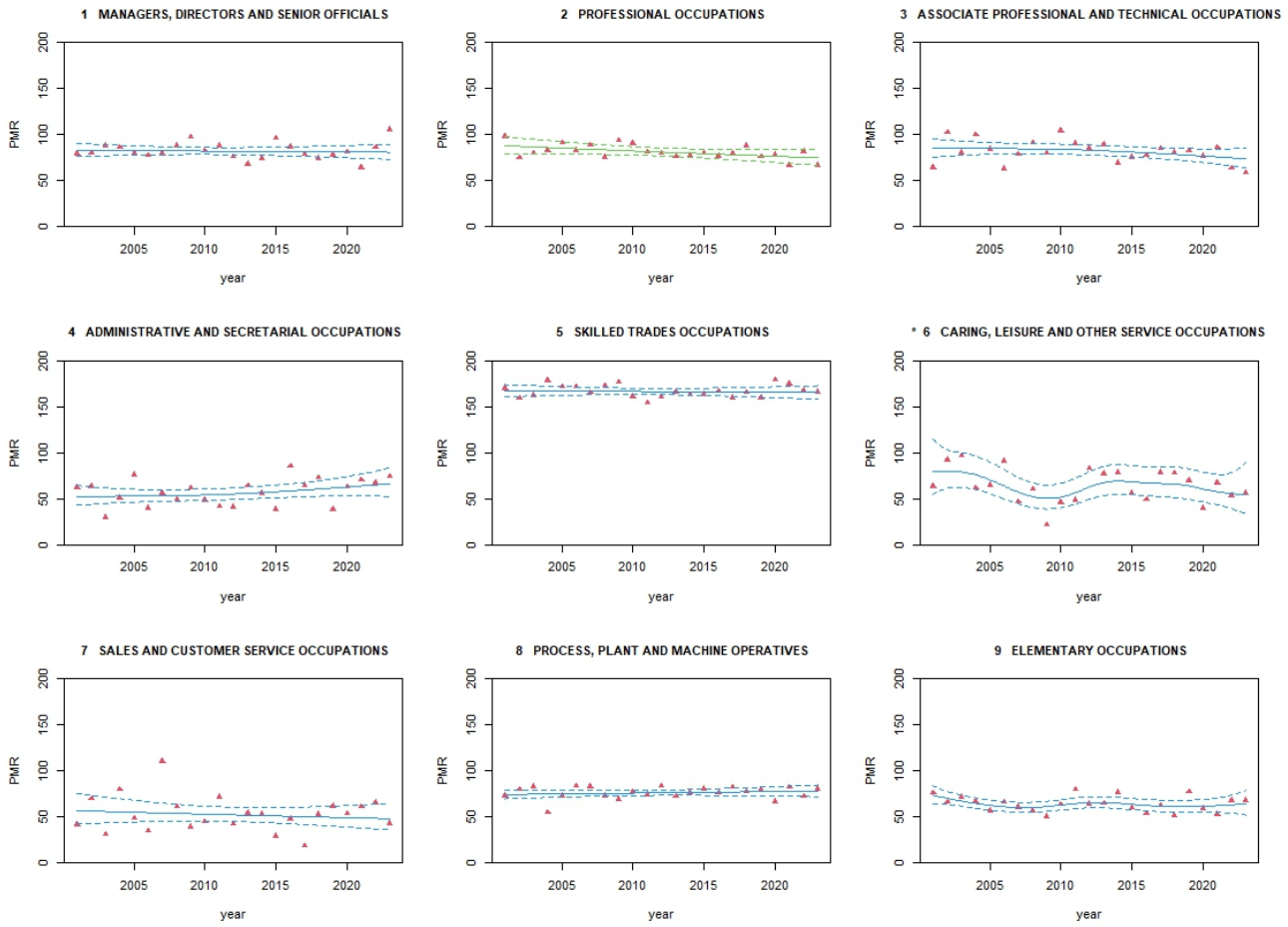

Figure 2: Mesothelioma PMRs by SOC major group, males, 2001-2023

SOC major group (1-digit)

Among males, there was the only one major group with statistically significantly elevated mesothelioma mortality amongst those aged 16-74 for the period 2011-22:-

- 1. 5 Skilled trades occupations: PMR 164.9 (160.2 to 169.7), n=4717

This major group contains a number of more specific codes with significantly elevated PMRs, including the only two elevated 2-digit codes, seven of the ten highest ranking 3-digit codes and the 1st (5315: Carpenters and joiners), 2nd (5314: Plumbers and heating and ventilating engineers), 4th (5216: Pipe fitters), 6th (5236: Boat and ship builders and repairers), 7th (5241: Electricians and electrical fitters), 8th (5225: Air-conditioning and refrigeration engineers) and 10th (5322: Floorers and wall tilers) highest ranking 4-digit codes.

The remaining eight major groups generally have consistently significantly lower PMRs compared to the average for all occupations.

Figure 2 shows the temporal trends in the mesothelioma PMRs for males for the nine SOC major groups. There was little evidence of any change in the PMRs over the period 2001-2023 at the major group level.

Among females there were two major groups with statistically significantly elevated mesothelioma mortality:

- 1. 4 Administrative and secretarial occupations: PMR 127.7 (116.4 to 139.9), n=465
- 2. 2 Professional occupations: PMR 118.2 (104.8 to 132.9), n=281.

Both these groups show an increasing trend with group 8 showing a decreasing trend over the period 2001-2023, otherwise there was no evidence of any change over time in the PMRs for these groups (Figure 3).

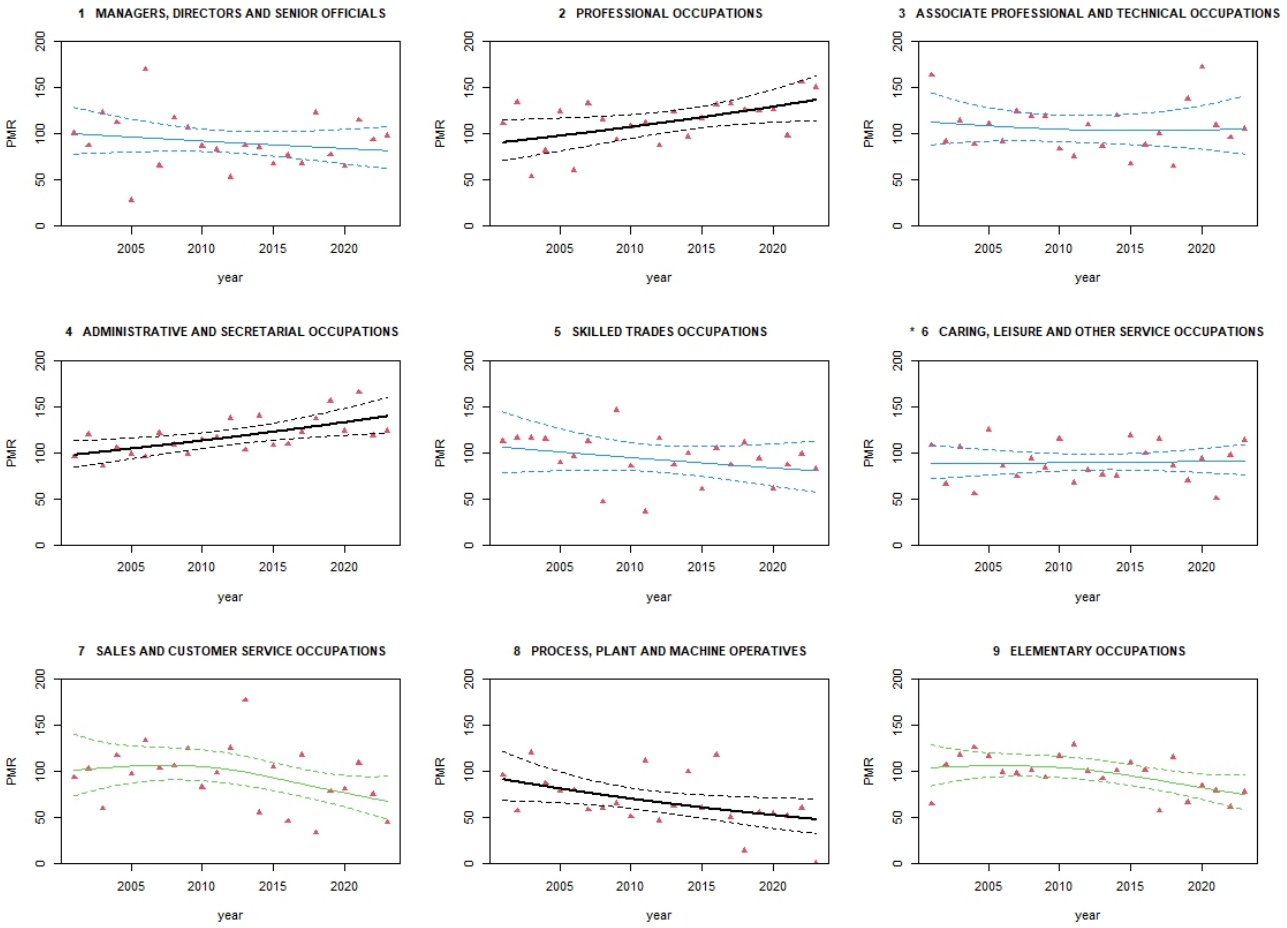

Figure 3: Mesothelioma PMRs by SOC major group, females, 2001-2023

SOC sub-major group (2-digit)

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

- 1. 53 Skilled construction and building trades: PMR 248.7 (239.5 to 258.2), n=2745
- 2. 52 Skilled metal, electrical and electronic trades: PMR 145.7 (138.8 to 152.9), n=1671

The corresponding PMRs for SOC2000 codes for 2001-2010 were also similarly elevated.

Figures 4 shows the results of the trend analyses for these two sub-major groups. There is some evidence of a reduction in the PMR for sub-major group 52 and an increase in 53 over time.

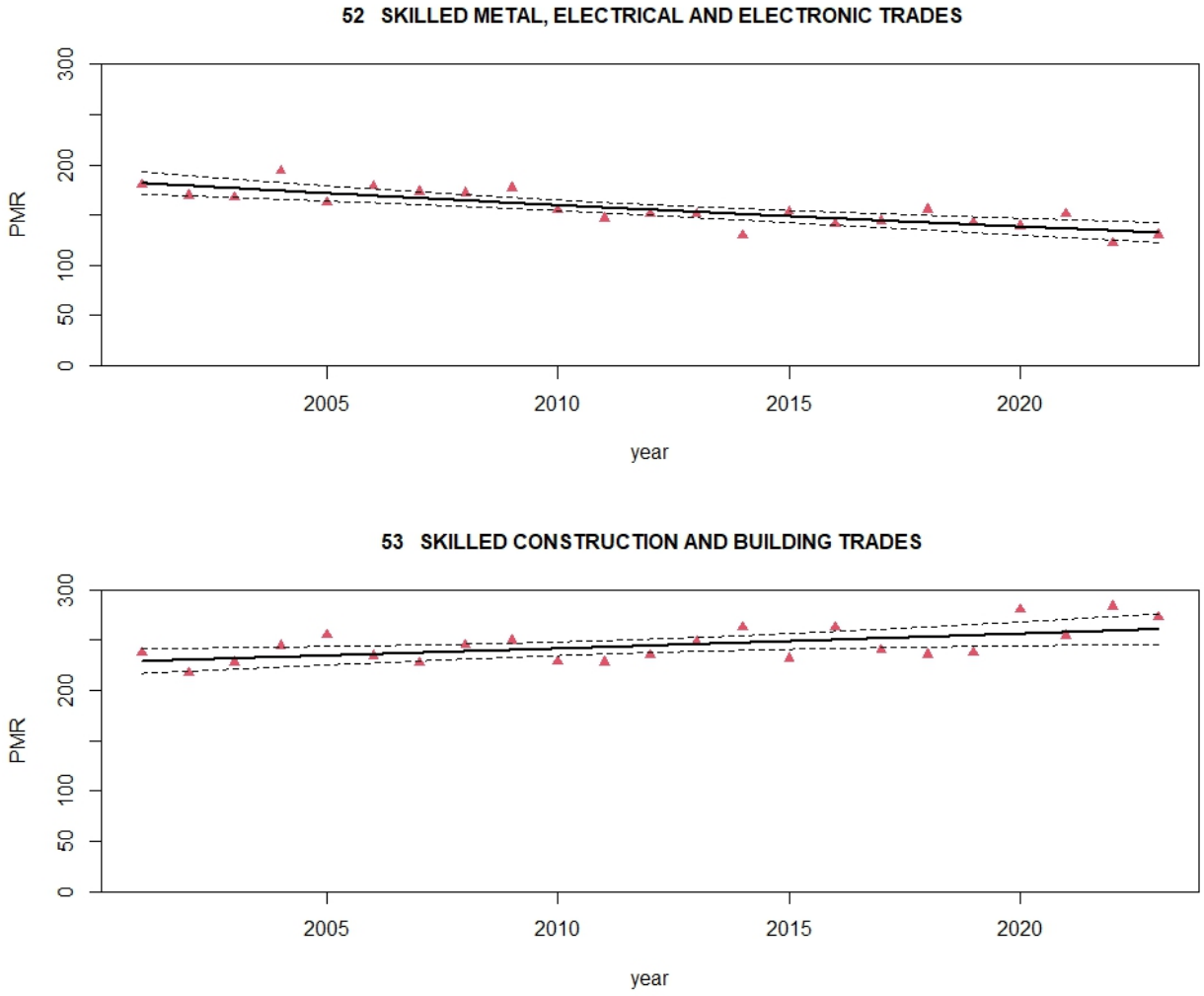

Figure 4: Mesothelioma PMRs for SOC sub-major group 52 and 53, males, 2001-2023

For females (see figure 4A), sub-major groups with statistically significantly elevated PMRs during the period 2011-2022 were:

- 1. 23 Teaching and educational professionals: PMR 141.2 (117.9 to 167.8), n=129. The PMR for the corresponding SOC2000 code for 2001-2010 was not elevated, however the group 23 additionally contained 232 Research Professionals.
- 2. 35 Business and public service associate professionals: PMR 135.9 (103.5 to 175.3), n=59. The PMR for the corresponding SOC2000 code for 2001-2010 was not elevated.
- 3. 41 Administrative occupations: PMR 130.2 (115.7 to 146.1), n=292. The PMR for the corresponding SOC2000 code for 2001-2010 was not elevated.
- 5. 42 Secretarial and related occupations: PMR 123.7 (106 to 143.6), n=173. The PMR for the corresponding SOC2000 code for 2001-2010 was not elevated.

There is some evidence of an increasing trend for group 42.

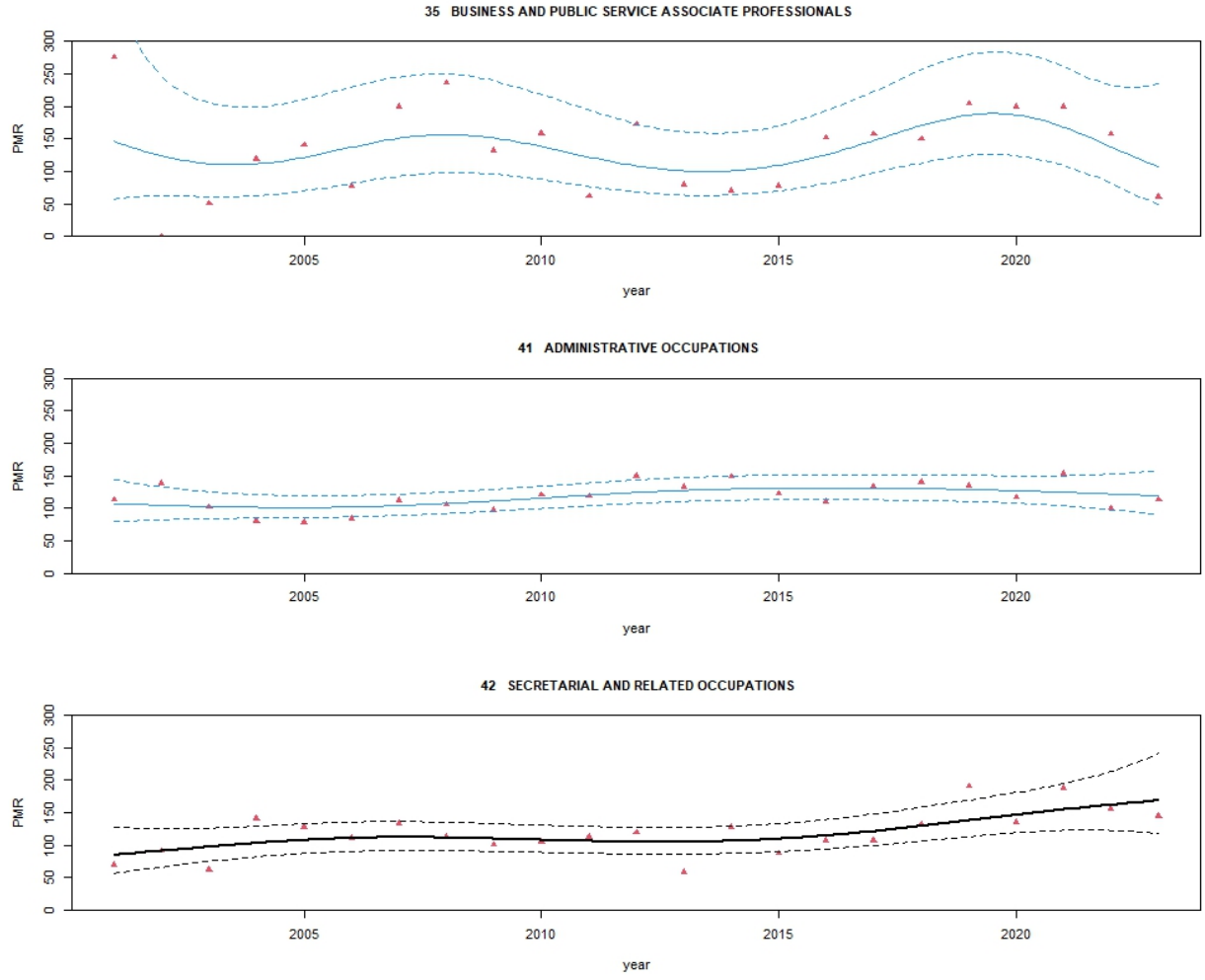

Figure 4A: Mesothelioma PMRs for SOC sub-major groups 23, 41 and 91, females, 2001-2023

SOC minor group (3-digit)

For males, mesothelioma PMRs for ten 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. 531 Construction and Building Trades: PMR 276.6 (265.3 to 288.2), n=2265
- 2. 524 Electrical and Electronic Trades: PMR 210.1 (195.6 to 225.4), n=781
- 3. 532 Building Finishing Trades: PMR 170.1 (154.7 to 186.6), n=446
- 4. 814 Construction Operatives: PMR 159.9 (139.2 to 182.7), n=215
- 5. 533 Construction and Building Trades Supervisors: PMR 150 (103.9 to 209.5), n=34
- 6. 521 Metal Forming, Welding and Related Trades: PMR 140.9 (123 to 160.6), n=224
- 10. 812 Plant and Machine Operatives: PMR 127.5 (115.8 to 140), n=438

- 11. 522 Metal Machining, Fitting and Instrument Making Trades: PMR 125.5 (114.2 to 137.5), n=456
- 13. 243 Architects, Town Planners and Surveyors: PMR 123.6 (101.9 to 148.6), n=113
- 15. 212 Engineering Professionals: PMR 121.7 (103 to 142.8), n=150

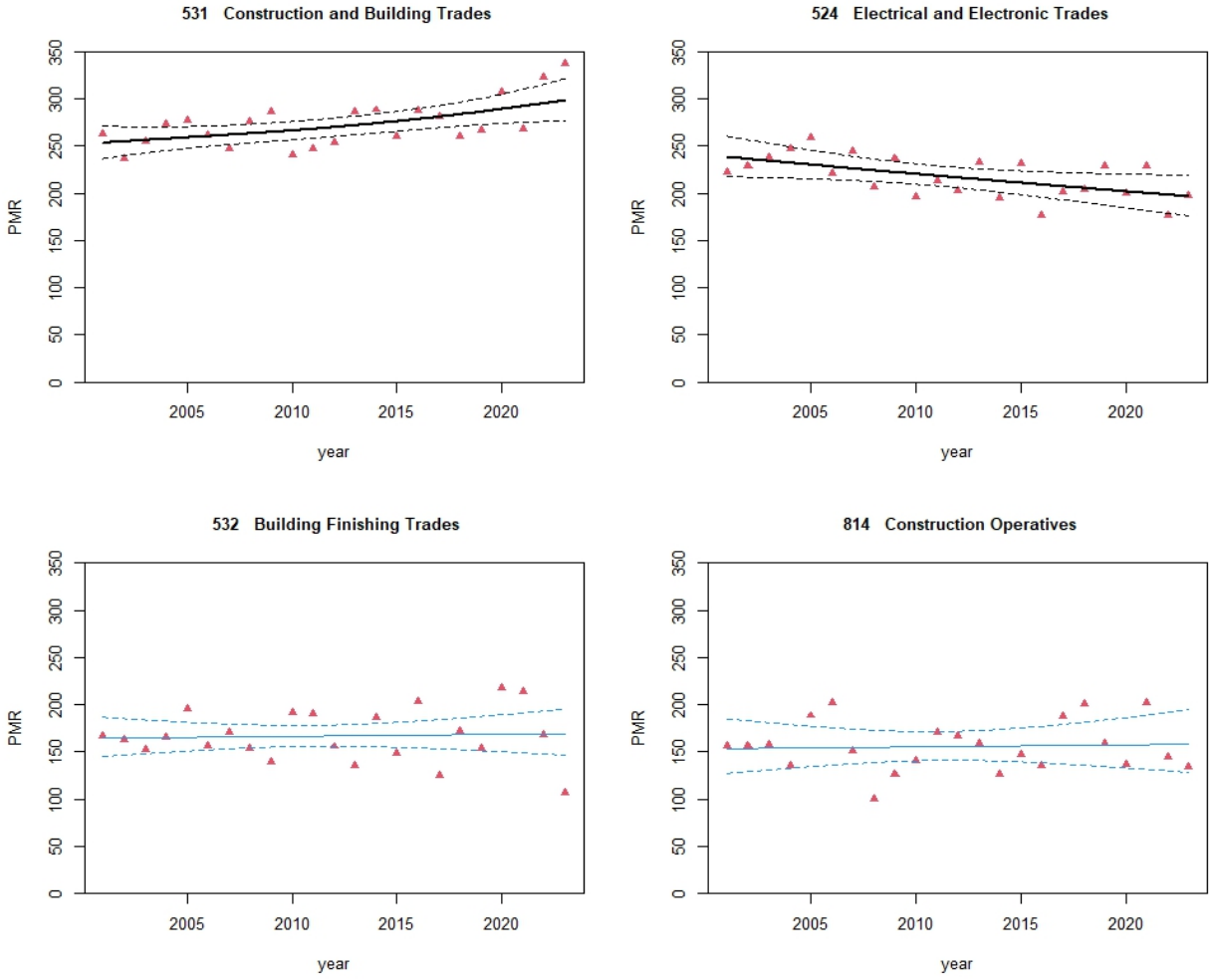

Figure 5A: Mesothelioma PMRs for selected SOC minor groups, males, 2001-2023

There is some evidence of an increase in the PMR 531 Construction and Building Trades for minor group and reductions in the PMRs for minor groups 524 Electrical and Electronic Trades and 521 Metal Forming, Welding and Related Trades (Figures 5A and 5B).

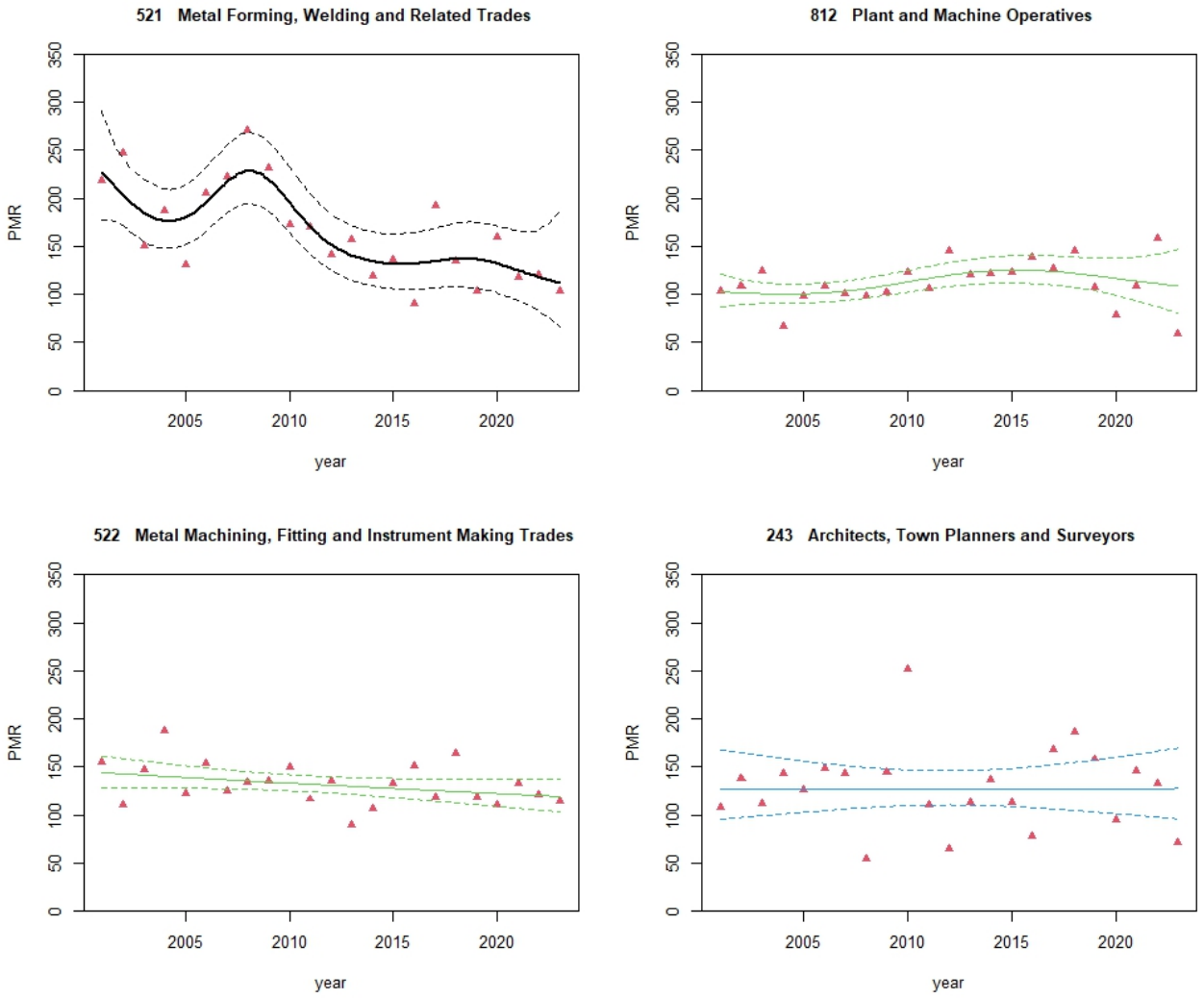

Figure 5B: Mesothelioma PMRs for selected SOC minor groups, males, 2001-2023

For females, mesothelioma PMRs for six SOC minor groups were statistically significantly elevated for the period 2011-2022:

- 1. 241 Legal Professionals: PMR 250.3 (120.1 to 460.3), n=10
- 2. 413 Administrative Occupations: Records: PMR 174.9 (121.2 to 244.4), n=34
- 4. 354 Sales, Marketing and Related Associate Professionals: PMR 158.3 (103.4 to 232), n=26
- 5. 415 Other Administrative Occupations: PMR 154.2 (126.3 to 186.3), n=107
- 9. 231 Teaching and Educational Professionals: PMR 141.2 (117.9 to 167.8), n=129
- 12. 421 Secretarial and Related Occupations: PMR 123.7 (106 to 143.6), n=173

Figure 5C shows evidence of an increasing trend amongst Teaching and educational professionals and among Secretarial and related occupations.

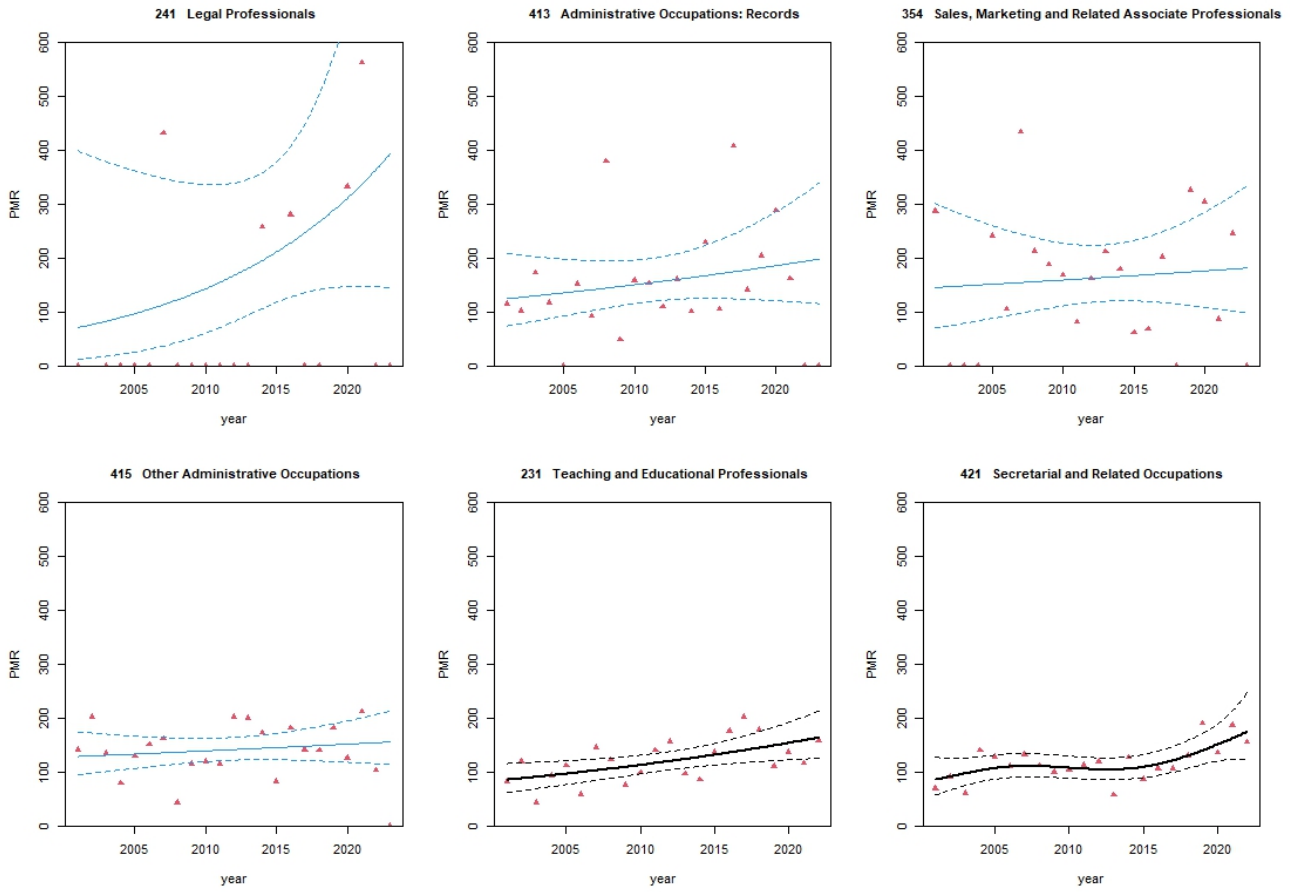

Figure 5C: Mesothelioma PMRs for selected SOC minor groups, females, 2001-2023

SOC unit group (4-digit)

For males, PMRs were statistically significantly elevated for 27 of the 203 SOC unit groups with at least 10 observed or expected mesothelioma 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 (higher than 300 the top four):

- 1. 5315 Carpenters and joiners: PMR 484.9 (456.5 to 514.5), n=1092
- 2. 5314 Plumbers and heating and ventilating engineers: PMR 344.9 (315.4 to 376.4), n=503
- 3. 8124 Energy plant operatives: PMR 329.2 (233 to 451.9), n=38
- 4. 5216 Pipe fitters: PMR 310.4 (235.1 to 402.2), n=57.

(Note. The SOC2020 code for carpenters and joiners is 5316.)

Unit groups with high PMRs (PMR of 200 to 300, 5th to 11th):

- 5. 2123 Electrical engineers: PMR 280.4 (166.2 to 443.1), n=18
- 6. 5236 Boat and ship builders and repairers: PMR 276 (215.2 to 348.7), n=70

- 7. 5241 Electricians and electrical fitters: PMR 270.7 (250.1 to 292.6), n=637
- 8. 5225 Air-conditioning and refrigeration engineers: PMR 259.5 (162.7 to 393), n=22
- 9. 2424 Business and financial project management professionals: PMR 256.1 (190 to 337.6), n=50
- 10. 5322 Floorers and wall tilers: PMR 225.7 (173.4 to 288.7), n=63
- 11. 5213 Sheet metal workers: PMR 217.5 (165.5 to 280.5), n=59.

Other unit groups with elevated PMRs (PMRs of 100 to 200, 12th to 22nd, 26th and 29th and 35th):

- 12. 1259 Managers and proprietors in other services n.e.c.: PMR 196.1 (169.3 to 226), n=191
- 13. 8125 Metal working machine operatives: PMR 195.2 (173.5 to 218.9), n=293
- 14. 1122 Production managers and directors in construction: PMR 194.4 (160.9 to 232.9), n=118
- 15. 8149 Construction operatives n.e.c.: PMR 194.2 (162.5 to 230.3), n=132
- 16. 5442 Furniture makers and other craft woodworkers: PMR 186.2 (134.2 to 251.6), n=42
- 17. 5214 Metal plate workers, and riveters: PMR 184.2 (119.2 to 271.9), n=25
- 18. 5319 Construction and building trades n.e.c.: PMR 182.6 (167.1 to 199.2), n=508
- 19. 8141 Scaffolders, stagers and riggers: PMR 177.5 (133.7 to 231), n=55
- 20. 5323 Painters and decorators: PMR 173.5 (155.1 to 193.4), n=325
- 21. 1139 Functional managers and directors n.e.c.: PMR 173.4 (125 to 234.4), n=42
- 22. 3563 Vocational and industrial trainers and instructors: PMR 167.9 (118.2 to 231.5), n=37
- 26. 5330 Construction and building trades supervisors: PMR 150 (103.9 to 209.5), n=34
- 27. 2122 Mechanical engineers: PMR 145.3 (102.8 to 199.4), n=38
- 28. 2434 Chartered surveyors: PMR 139.5 (102.2 to 186.1), n=46
- 30. 5223 Metal working production and maintenance fitters: PMR 138.7 (124.9 to 153.8), n=364
- 36. 5249 Electrical and electronic trades n.e.c.: PMR 131.9 (102 to 167.8), n=66.

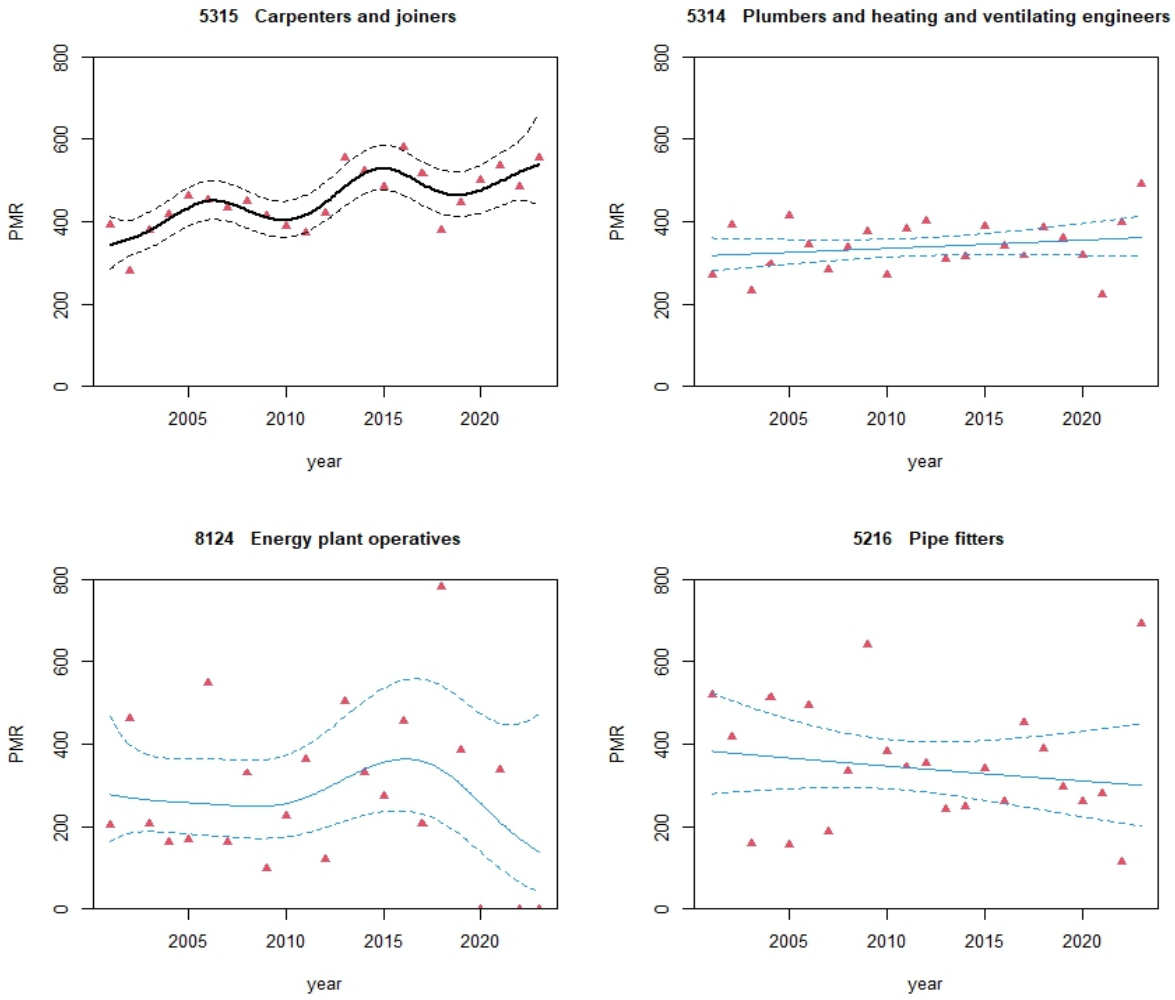

Figure 6A: Mesothelioma PMRs for selected SOC unit groups, males, 2001-2023

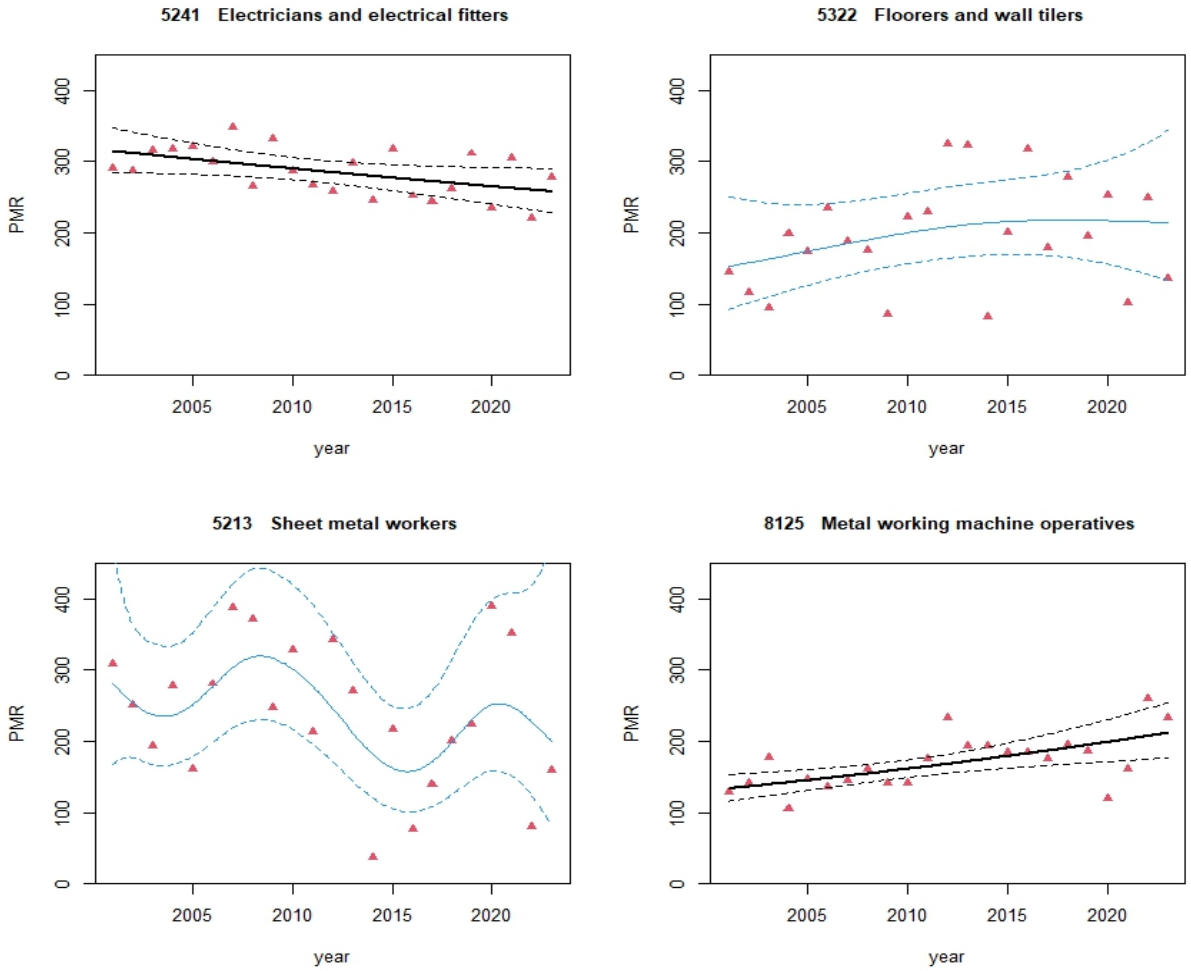

Figure 6B: Mesothelioma PMRs for selected SOC unit groups, males, 2001-2023

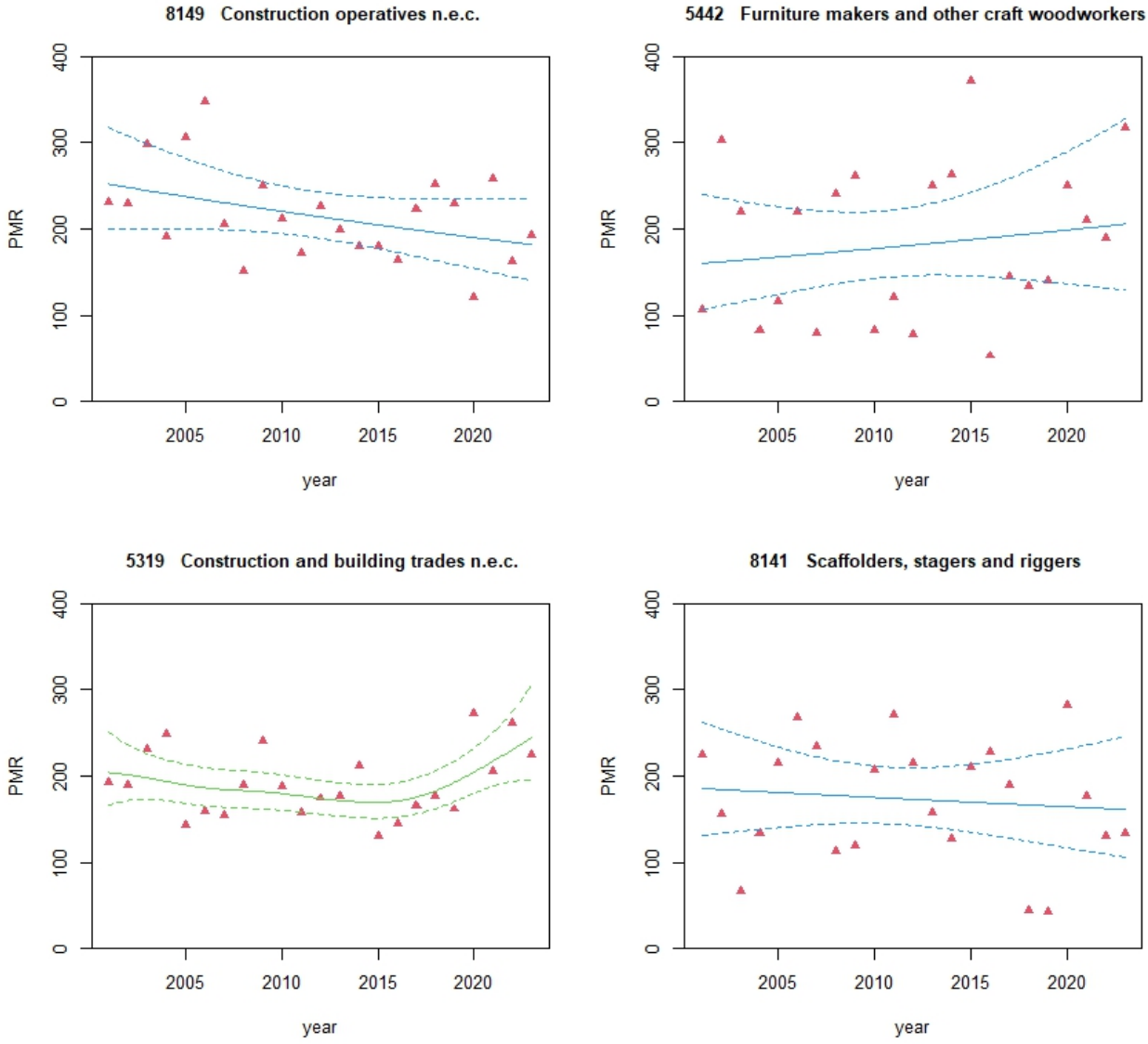

Figure 6C: Mesothelioma PMRs for selected SOC unit groups, males, 2001-2023

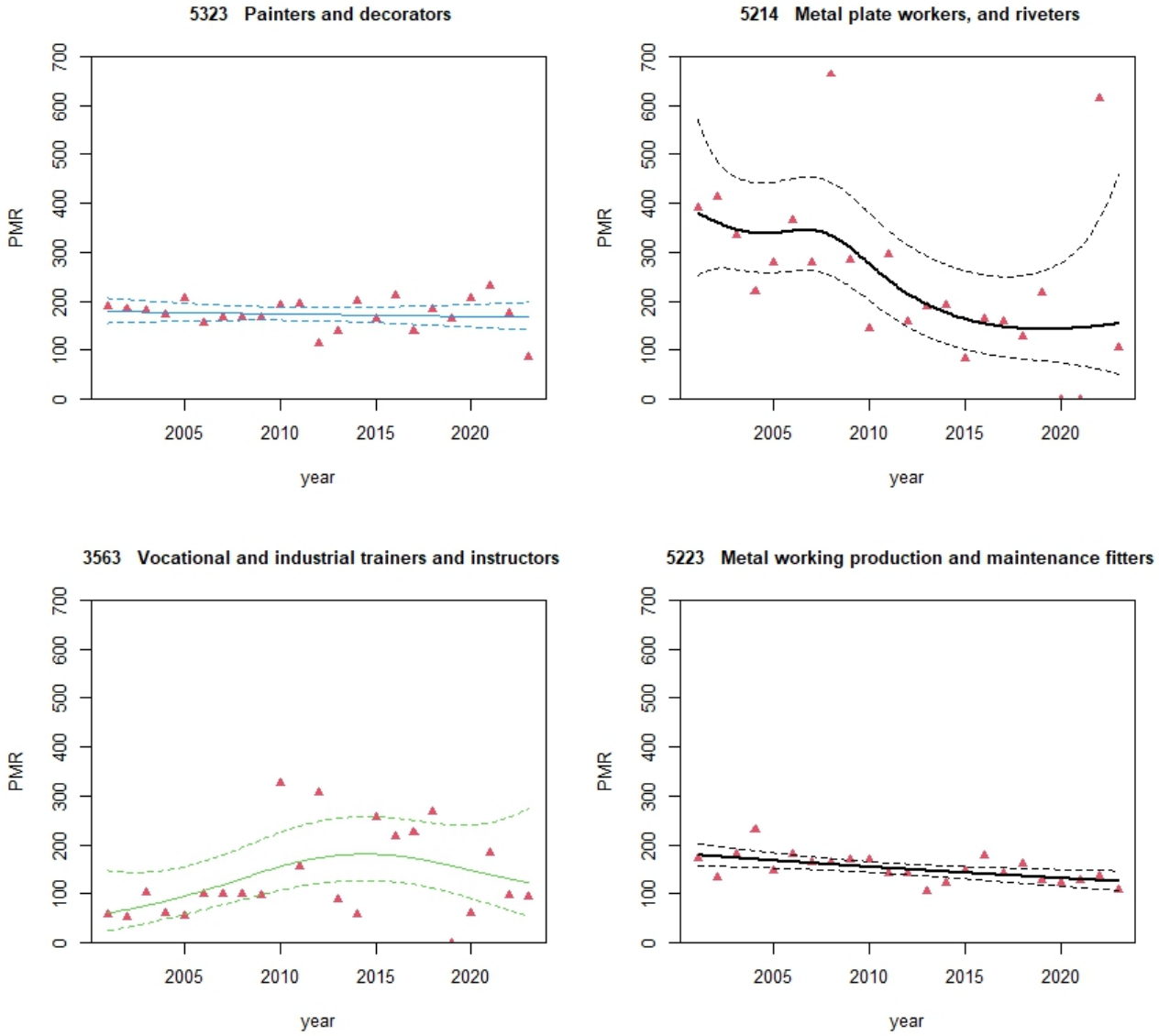

Figure 6D: Mesothelioma PMRs for selected SOC unit groups, males, 2001-2023

For females, PMRs were statistically significantly elevated for five of the 42 SOC unit groups with at least 10 observed or expected mesothelioma deaths:

- 1. 9219 Elementary administration occupations n.e.c.: PMR 304.7 (162.2 to 521.1), n=13
- 2. 4131 Records clerks and assistants: PMR 234.5 (136.5 to 375.4), n=17
- 3. 2315 Primary and nursery education teaching professionals: PMR 207.9 (167.4 to 255.2), n=91
- 5. 4211 Medical secretaries: PMR 175.2 (105.5 to 273.6), n=19
- 6. 4159 Other administrative occupations n.e.c.: PMR 159.4 (130.6 to 192.6), n=107

- 15. 4215 Personal assistants and other secretaries: PMR 128.7 (102.5 to 159.6), n=83.

References

1. Rake C, Gilham C, Hatch J, et al. Occupational, domestic and environmental mesothelioma risks in the British population: a case control study. *British Journal of Cancer* 2009;100(7):1175-83.

2. Gilham C, Rake C, Hodgson J at al. Past and current asbestos exposure and future mesothelioma risks in Britain: The Inhaled Particles Study (TIPS). *International Journal of Epidemiology* 2018;47(6):1745-1756.

Annex 1 – Technical notes

These analyses are based on 47% of male and 39% of female mesothelioma deaths on the mesothelioma register for the period 2001-2022. This is mainly due to the age restriction of 16-74 years (the age range for which last occupation of the deceased is routinely recorded on death certificates in England and Wales), but also due to missing or invalid occupation codes for some deaths below age 75 years (1.5% of male and 9.2% of female deaths).

Death data for all causes of death combined required for the calculation of PMRs from 2011-20 for England and Wales were supplied by the Office for National Statistics (ONS). For deaths registered after 1 April 2011, occupations have been classified according to the Standard Occupational Classification 2010 (SOC2010), and for deaths during 2001-2010 occupations have been classified according to the Standard Occupational Classification 2000 (SOC2000).

A small number of deaths in this analysis occurring during 2001-2010 originally coded to either SOC90 or SOC2010 were recoded SOC2000 using a probability matching algorithm provided by the ONS combined with additional checks made against the job description.

Information about the Standard Occupational Classification is available from the Office for National Statistics:

www.ons.gov.uk/methodology/classificationsandstandards/standardoccupationalclassificationsoc

In this analysis, mortality in the different occupational groups is represented by Proportional Mortality Ratios (PMRs) and associated 95% confidence intervals. A PMR for a particular occupation is the ratio of the observed number of deaths for that occupation to the expected number of deaths, with that ratio expressed as a percentage (i.e. multiplied by 100).

The expected number of deaths is calculated as the number of mesothelioma deaths that would have been recorded for that occupation if the proportion of mesothelioma deaths was equal to the proportion of total deaths from all causes in that occupation. Since mesothelioma incidence is also strongly related to age, the calculation also takes account of differences in the distribution of ages between occupational groups. A worked example of how the PMR is calculated for a particular occupation is given below.

Statistics have been calculated for 1 to 4 digit codes i.e. major, sub-major, minor, and unit groups of SOC2010 for the period 2011-20 and SOC2000 for the period 2001-10.

The statistical models shown in the graphs, involved fitting a smoothed term for the year in a Poisson 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 as this provided a better fit to the data.

Example PMR calculation

The table below illustrates the calculation of a PMR for men in “occupation X”. Column 3 gives the proportion of all mesothelioma deaths by age (=column 2 divided by column 1). This proportion is applied to the number of deaths from all causes by age in occupation X, given in column 4, to give the expected number of deaths from mesothelioma in this occupation in column 5. The total observed number of mesothelioma deaths in occupation X was 500 (not shown in table). Dividing this by the total expected number of deaths (sum of column 5 = 230 deaths) expressed as a percentage gives a PMR of 217 in this case.

	Deaths				
	All occupations			Last occupation X	
Age group	All causes (1)	Mesothelioma deaths (2)	Proportion from mesothelioma (3) = (2) / (1)	All-cause deaths (4)	Expected deaths (5) = (3) * (4)
16-19	16,500	1	0.000061	6,400	0.388
20-24	21,732	1	0.000046	7,833	0.360
25-29	18,072	5	0.000277	7,907	2.188
30-34	20,544	16	0.000779	7,770	6.051
35-39	27,300	76	0.002784	6,443	17.937
40-44	42,576	199	0.004674	6,222	29.082
45-49	61,236	402	0.006565	6,243	40.984
50-54	102,900	705	0.006851	6,391	43.787
55-59	187,416	1,145	0.006109	6,269	38.300
60-64	308,988	1,436	0.004647	5,367	24.943
65-69	433,956	1,499	0.003454	4,997	17.261
70-74	550,296	1,315	0.002390	3,729	8.911
All ages 16-74	1,791,516	6,800		75,571	230

Confidence intervals and statistical significance

A PMR calculated for an occupational group may be greater or less than 100 by chance. Confidence intervals are used to give an indication of the uncertainty associated with each PMR due to this random variation. A 95% confidence interval is such that, if the calculation could be repeated many times with different samples of the events, then the confidence interval will contain the true value of the PMR 95% of the time. If the lower confidence limit is greater than 100 then the PMR is said to be statistically significantly elevated. Likewise, if the upper confidence interval that is presented is lower than 100 then the PMR is said to be statistically significantly reduced. In this analysis, confidence intervals are calculated assuming Poisson variability in the mesothelioma count for each occupation.

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