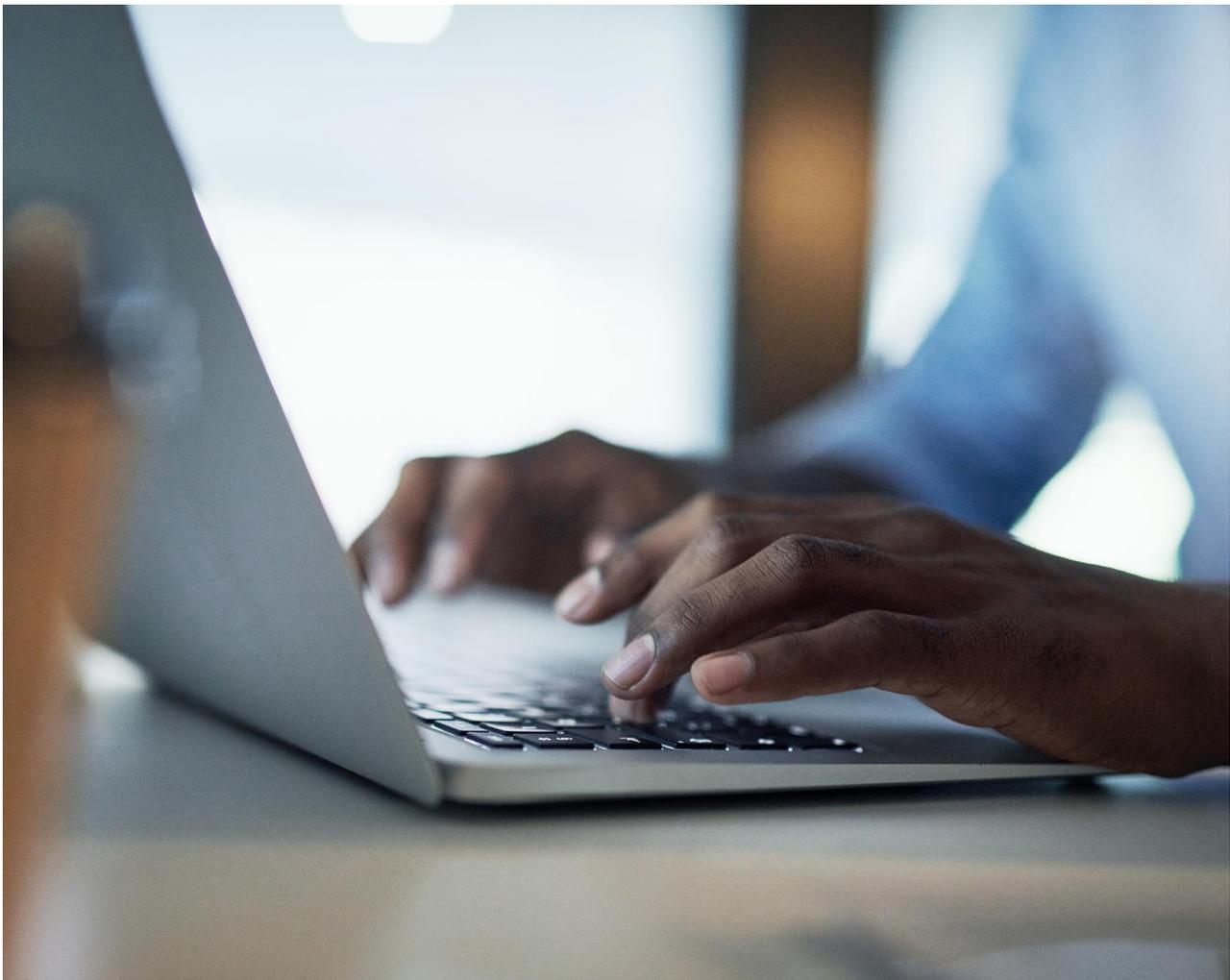


Exposure to lead in Great Britain, 2021



Medical surveillance of blood-lead levels in British workers, 2020/21

March 2022



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Summary

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

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 those included in this report relating to the number of workers under medical surveillance due to working with lead during 2020/21.

More details of the effects of the pandemic on other data sources 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>]

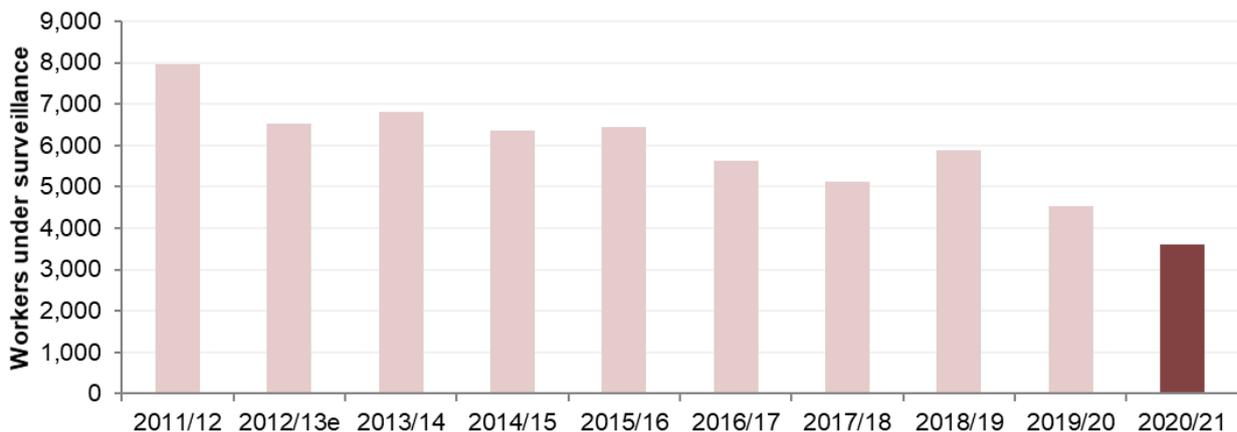
3,602

Lead workers under medical surveillance
in Great Britain, 2020/21

6

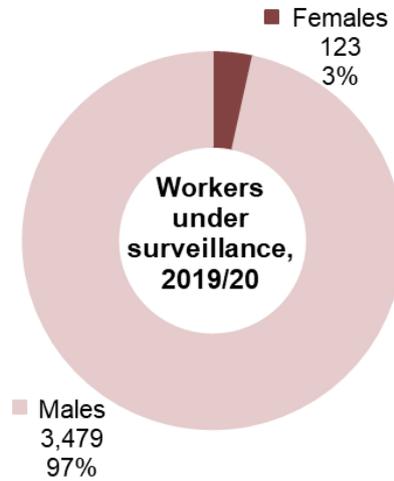
Lead workers suspended from
work due to excess blood-lead
levels

British lead workers under medical surveillance

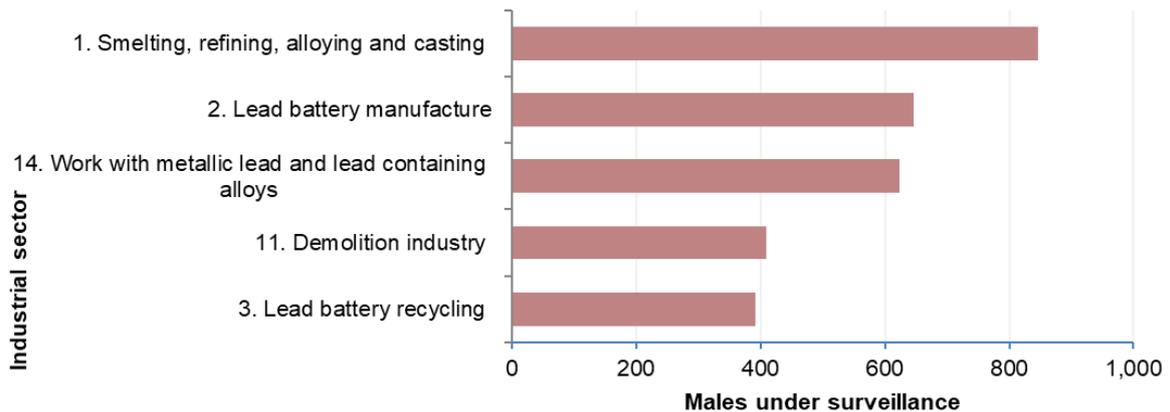


e - estimated figure

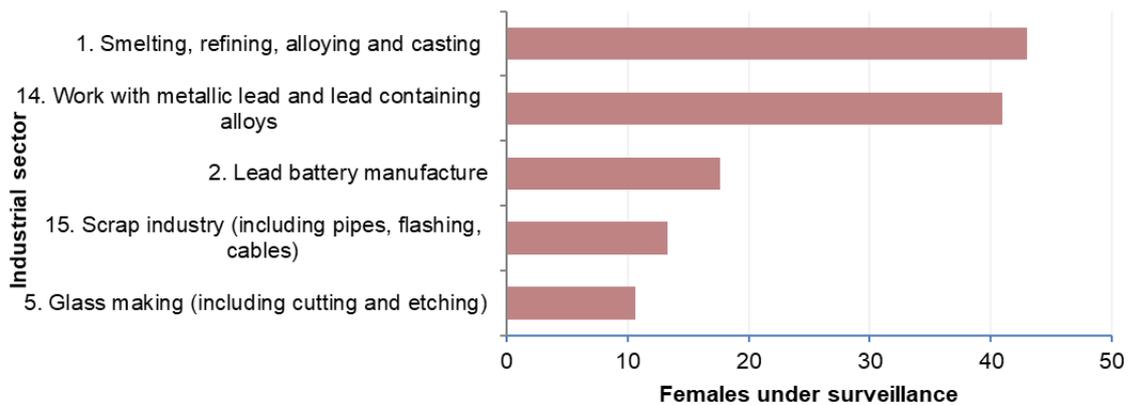
Male / Female split of British lead workers under medical surveillance



Top five industry sectors for males under medical surveillance (3-year average)



Top five industry sectors for females under medical surveillance (3-year average)



Introduction

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 those included in this report relating to the number of workers under medical surveillance due to working with lead during 2020/21.

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Exposure to lead can result in a range of serious medical problems. All workers with *significant* lead exposure – as defined in the Control of Lead at Work (CLAW) Regulations – are required to undergo medical surveillance which includes measurement of blood-lead concentrations. Employers are responsible for deciding whether workers should be under medical surveillance, which is then carried out at least every 12 months by a HSE appointed doctor.

The statistics in this report are compiled from annual summaries from appointed doctors of blood lead levels among workers they have examined under this surveillance regime. The coverage of the statistics is limited by the extent of medical surveillance that occurs in practice, and this may not be completely aligned with what is required under the CLAW regulations. Some employers may keep workers under surveillance on a precautionary basis where exposure is not likely to be significant, whereas others may fail to implement surveillance where it is in fact required. A more detailed discussion of the basis for the statistics and their potential limitations is available on the data sources page, see www.hse.gov.uk/statistics/sources.htm for more information.

The CLAW regulations specify blood-lead concentration levels (measured in micrograms per decilitre, $\mu\text{g}/100\text{ml}$) at which an appointed doctor must decide if a worker should no longer be exposed to lead (known as the 'suspension level').

HSE's medical inspectors, HSE appointed doctors (who are the main group of doctors carrying out statutory medical surveillance of lead-exposed workers in GB), and a body of scientific evidence, would indicate that it is often the case that individuals with blood-lead levels at or above the suspension limit and who are suspended from working with lead do not have symptoms normally described as "lead poisoning". Such workers are therefore

removed from further exposure to lead to reduce the likelihood of such symptoms developing.

In April 1998, updated regulations introduced a lower 'action level' at which employers must take additional steps to help ensure workers' blood-lead levels are reduced. Separate information was also collected on young people (aged under 18 years) under medical surveillance from this time.

Before the introduction of the CLAW Regulations in August 1981, there were ten individual regulations that covered the use of lead, including regulations on 'paint and colour manufacture', 'lead smelting and manufacture' and 'lead compounds manufacture'.

Blood lead concentration levels of importance within the CLAW regulations 1980 and subsequent amendments are summarised in **Table 1** below.

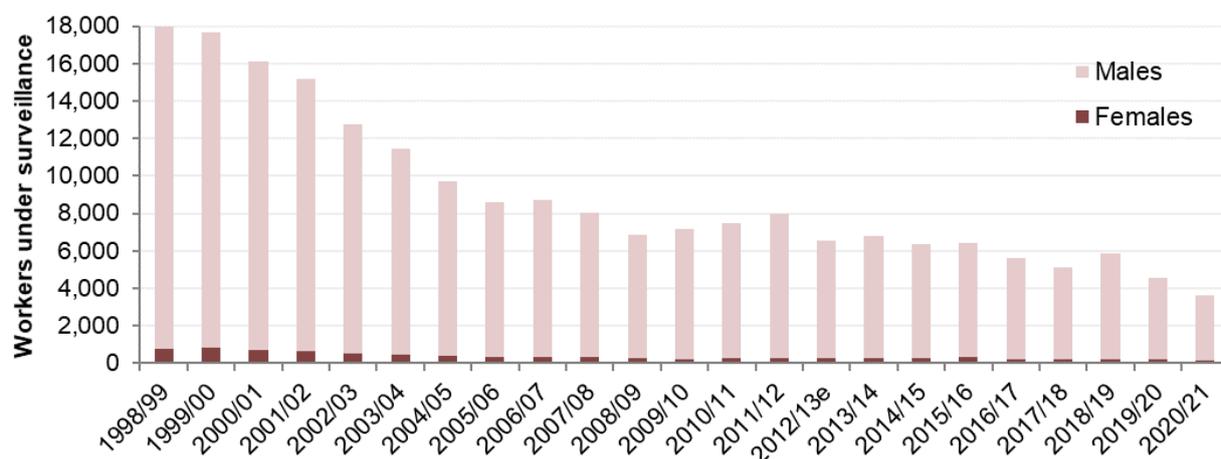
Table 1: Summary of the Control of Lead at Work (CLAW) Regulations 1980, 1998 and 2002

	CLAW Regulations 1980	CLAW Regulations 1998 and 2002
Came into force	August 1981	April 1998 Unchanged in November 2002
Collection	Calendar years 1982-1986 Financial years 1987/88 onwards	Financial years
Male and other workers		
Suspension level	80µg/100ml 1982-1985 70µg/100ml 1986 onwards	60µg/100ml
Action level	-	50µg/100ml
Female workers of reproductive capacity		
Suspension level	40µg/100ml	30µg/100ml
Action level	-	25µg/100ml
Young workers (aged under 18 years)		
Suspension level	-	50µg/100ml
Action level	-	40µg/100ml

Workers under medical surveillance

Summary tables of blood-lead levels of all workers under medical surveillance including breakdowns by industry sector, sex and year can be found at www.hse.gov.uk/statistics/tables/#lead

The number of workers under surveillance provides an indication of the extent of potential occupational lead exposure in the British population. Figure 1 shows the number of male and female workers under medical surveillance for each reporting year (April to March) since 1998/99.



e - estimated figures (see Appendix 1)

Figure 1 The total number of British lead workers under medical surveillance since 1998/99 by sex

There were 3,602 workers (3,479 males and 123 females) under medical surveillance in 2020/21 (Table 2), a decrease of 21% from the 4,534 workers under medical surveillance in 2019/20. Statistics for 2020/21 are likely to have been affected by the COVID-19 pandemic: the lower number of workers under medical surveillance during 2020/21 may be at least partly a result of some workers being on furlough.

Prior to 2020/21, there had been a long-term downward trend in the numbers under surveillance. Similar reductions in numbers under surveillance have been seen among both men and women. Women have consistently accounted for a small proportion of the total under surveillance over this period (3% of all workers under medical surveillance in 2020/21).

There were two young people (under 18 years) under medical surveillance in 2020/21, all young males. Although this is a small number, it is similar to the typical numbers in recent years, with the exception of 2018/19 (numbers shown in brackets in **Table 2** below).

Table 2 Breakdown of workers under medical surveillance since 2011/12

Year	Males	% Males	Females	% Females	Total
2011/12	7,689 (14)	97%	260 (1)	3%	7,949 (15)
2012/13e	6,232 (1)	95%	294	5%	6,526 (1)
2013/14	6,505 (1)	96%	301	4%	6,806 (1)
2014/15	6,075 (6)	95%	299	5%	6,374 (6)
2015/16	6,139 (4)	95%	312	5%	6,451 (4)
2016/17	5,399 (2)	96%	221	4%	5,620 (2)
2017/18	4,918 (5)	96%	208	4%	5,126 (5)
2018/19	5,648 (13)	96%	227 (2)	4%	5,875 (15)
2019/20	4,323 (5)	95%	211	5%	4,534 (5)
2020/21	3,479 (2)	97%	123	3%	3,602 (2)

e – estimated figures (see Appendix 1)

Number of lead workers by industry sector

The current industry sector categories apply to statistics for 2010/11 onwards and were produced to best reflect the main industry sectors in which lead exposure may currently occur. Lead battery and glass recycling are identified separately from battery and glass manufacture, and a category for the paint removal sector is also included. The 'other processes' category includes any industries not covered by the specific categories.

Males under surveillance

The smelting, refining, alloying and casting sector has generally accounted for the highest number of males under medical surveillance in recent years (17% during the three-year period 2018/19-2020/21 as shown in Figure 2). In 2020/21, the next two sectors with the highest number of workers under surveillance were working with metallic lead and lead containing alloys (13% of all male workers), and the lead battery manufacture sector (12% of all male workers).

The decrease in the total number of males under surveillance in 2020/21 compared with 2019/20 was driven by substantial reductions in most sectors. This is likely to be at least partly due to the effects of the coronavirus pandemic, including some workers being furloughed. However, some sectors saw little change or even an increase in the numbers under surveillance, including, lead battery recycling, the manufacture of inorganic or organic lead compounds, and paint removal.

For the period 2018/19-2020/21, the top five sectors accounted for 59% of males under surveillance (see Figure 2).

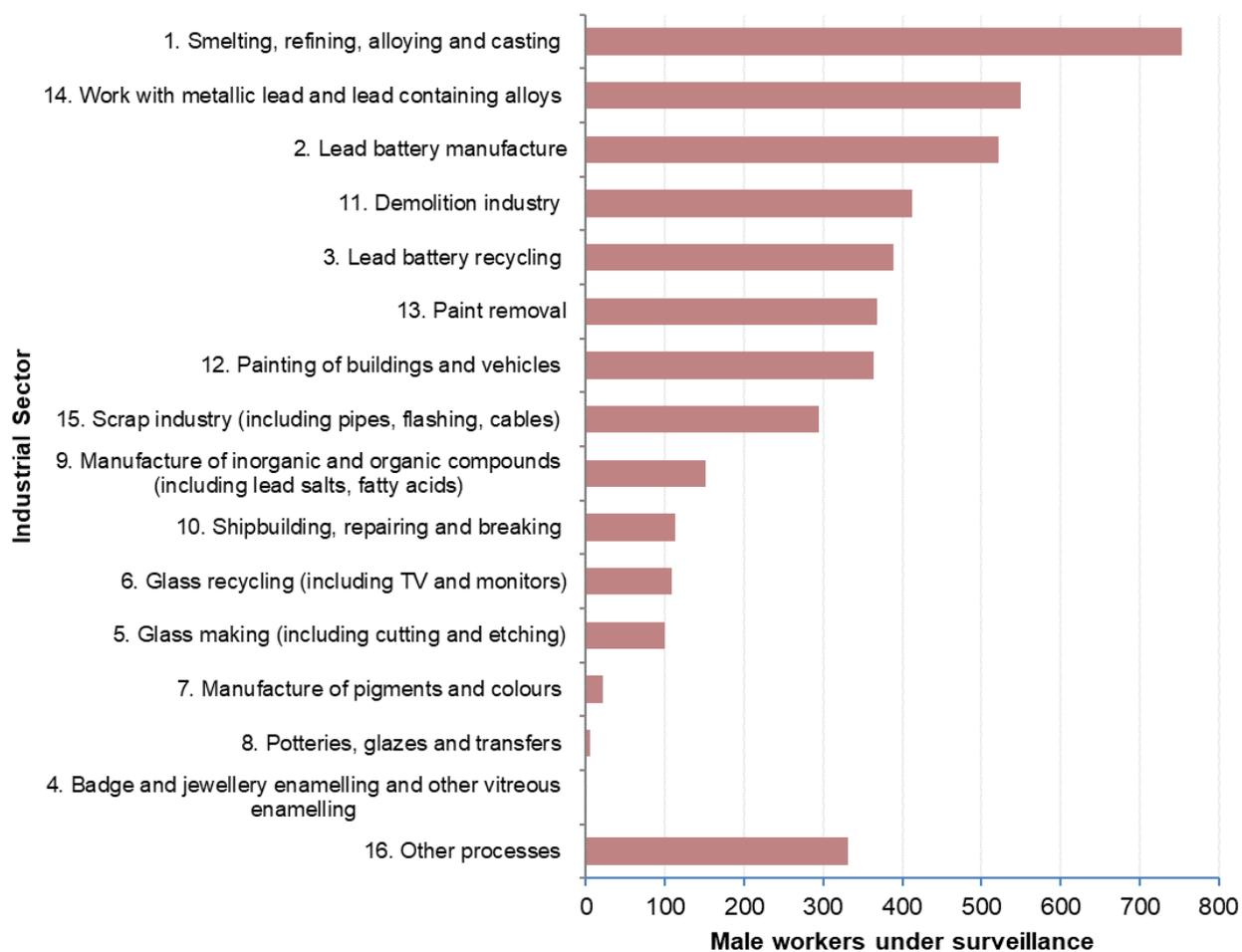


Figure 2 The breakdown of male lead workers under medical surveillance by industrial sector, three-year average 2018/19 – 2020/21

Females under surveillance

For females, the industrial breakdown shows a slightly different pattern to that of males. Due to the relatively small numbers of females involved, year-on-year comparisons are subject to considerable variability.

The two industry sectors with the highest number of females under surveillance in 2020/21 were working with metallic lead and lead containing alloys (22% of all female workers), and the scrap industry (11% of all female workers).

As for males, the decrease in the total number of females under surveillance in 2020/21 compared with 2019/20 was driven by reductions in most sectors, but particularly the smelting, refining, alloying and casting sector, work with metallic lead and lead containing alloys sector, and the lead battery manufacture sector.

The top five industry sectors accounted for 55% of the females under surveillance during 2018/19-2020/21 (see Figure 3).

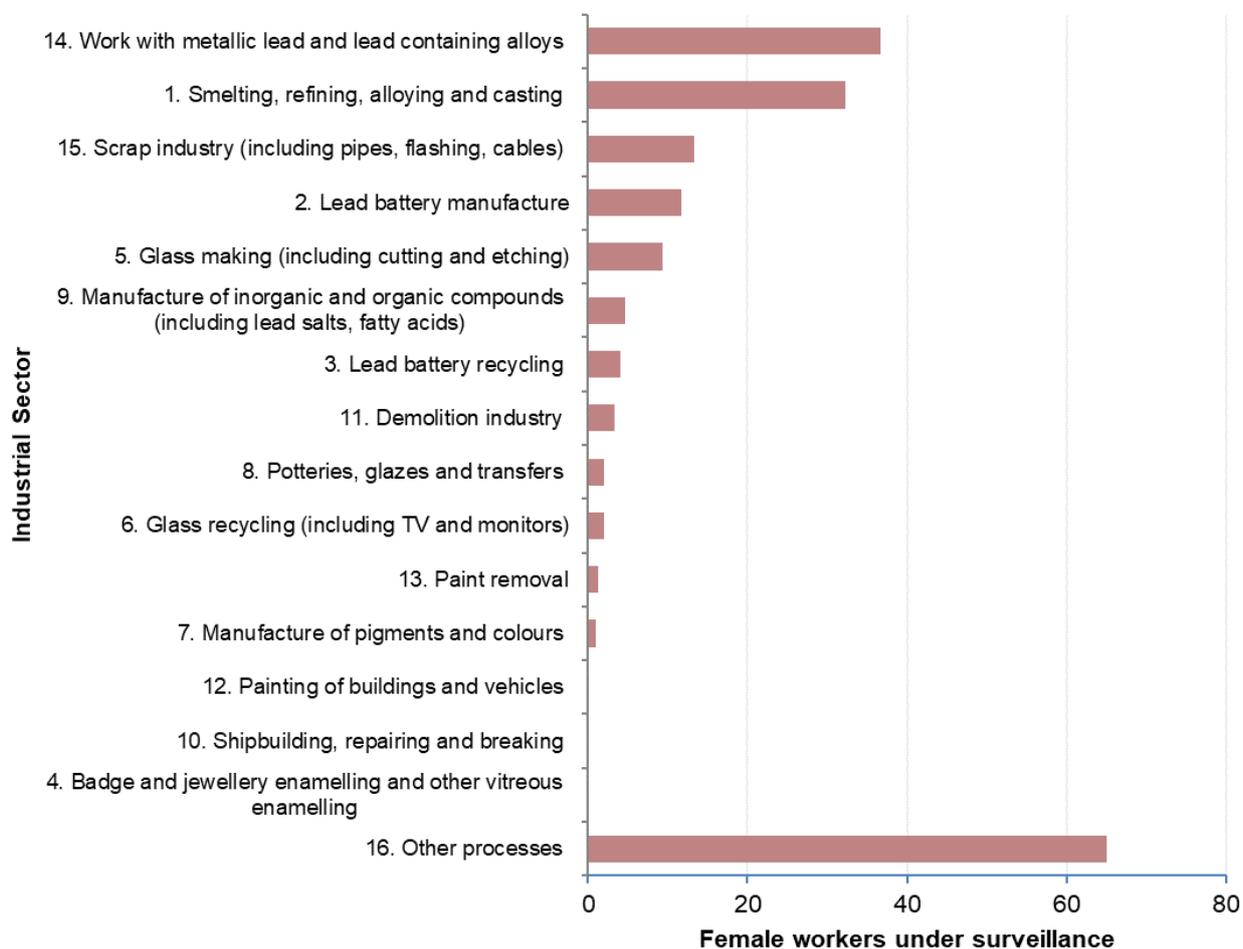


Figure 3 The breakdown of female lead workers under medical surveillance by industrial sector, three-year average 2018/19-2020/21

Blood-lead levels in British workers

The majority of workers under medical surveillance have blood-lead concentrations below 25µg/100ml. In 2020/21, 3,100 (89%) of the 3,479 male workers and 121 of the 123 female workers had levels below this value.

If the lead concentration in a worker's blood reaches or passes specified levels, the worker may be suspended from working with lead until the concentration reduces naturally. Figure 4 shows males with blood-lead levels greater than 50µg/100ml, and Figure 6 shows females with blood-lead levels greater than 25µg/100ml. All statistics are based on the highest recorded blood-lead level for each individual.

A worker whose maximum reading is at or above the suspension level will not necessarily be suspended from working with lead; a repeat measurement may be below the level, or in the case of females the worker may not be of reproductive capacity. These statistics do not indicate whether or not women were of reproductive capacity.

Male blood-lead levels

Numbers of males under surveillance by recorded blood-lead level are shown in Figure 4. Cut-off points for blood-lead categories represent: the suspension level under the previous (1980) Regulations (70µg/100ml); the current suspension level (60µg/100ml); and the current action level (50µg/100ml).

In 2020/21 the number of males with blood-lead levels at or above 60µg/100ml was 7 (0.2% of all male workers under surveillance), down from 32 males in 2010/11 (0.4% of all male workers under surveillance). These figures have reduced from 322 males (1.9% of all male workers under surveillance) in 1998/99 (the first year of the lower suspension levels).

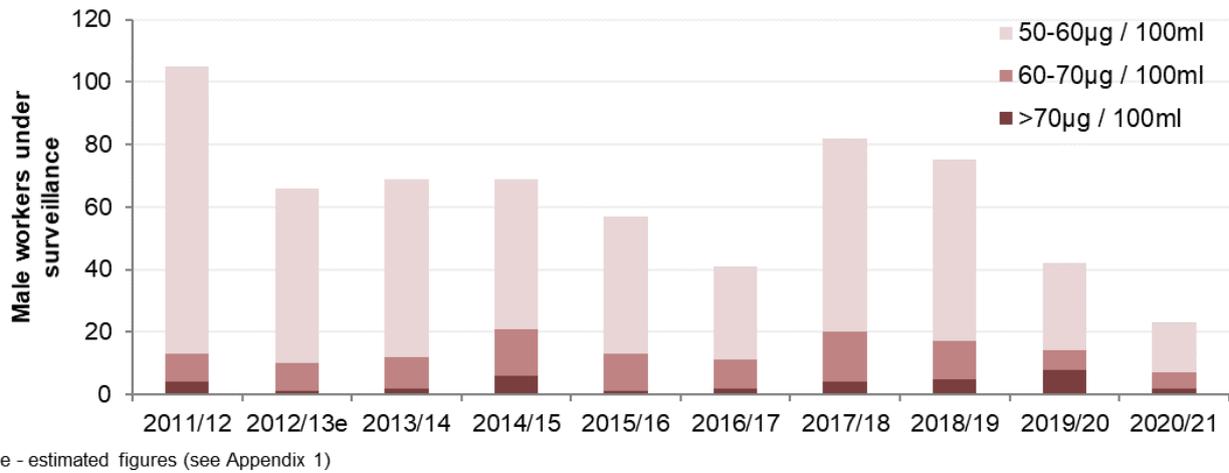


Figure 4 The breakdown of male lead workers under medical surveillance since 2011/12 with elevated blood-lead levels (>50µg/100ml)

In 2020/21, there were 23 males (0.7% of all male workers under surveillance) with blood-lead levels at or above 50µg/100ml. The most notable industry sectors with the highest blood-lead level readings involved working with metallic lead and lead containing alloys (5 males) and the painting of buildings and vehicles (4 males).

There were no young males recorded with a blood-lead level above the action limit of 40µg/100ml in 2020/2021.

The proportion of males within each industry sector with blood-lead levels at or above 25µg/100ml is shown in Figure 5, based on figures averaged over the last three years. The glass making sector and work with metallic lead and lead containing alloys had the largest proportions of male workers with blood-lead levels above 25µg/100ml (39% and 27%, respectively).

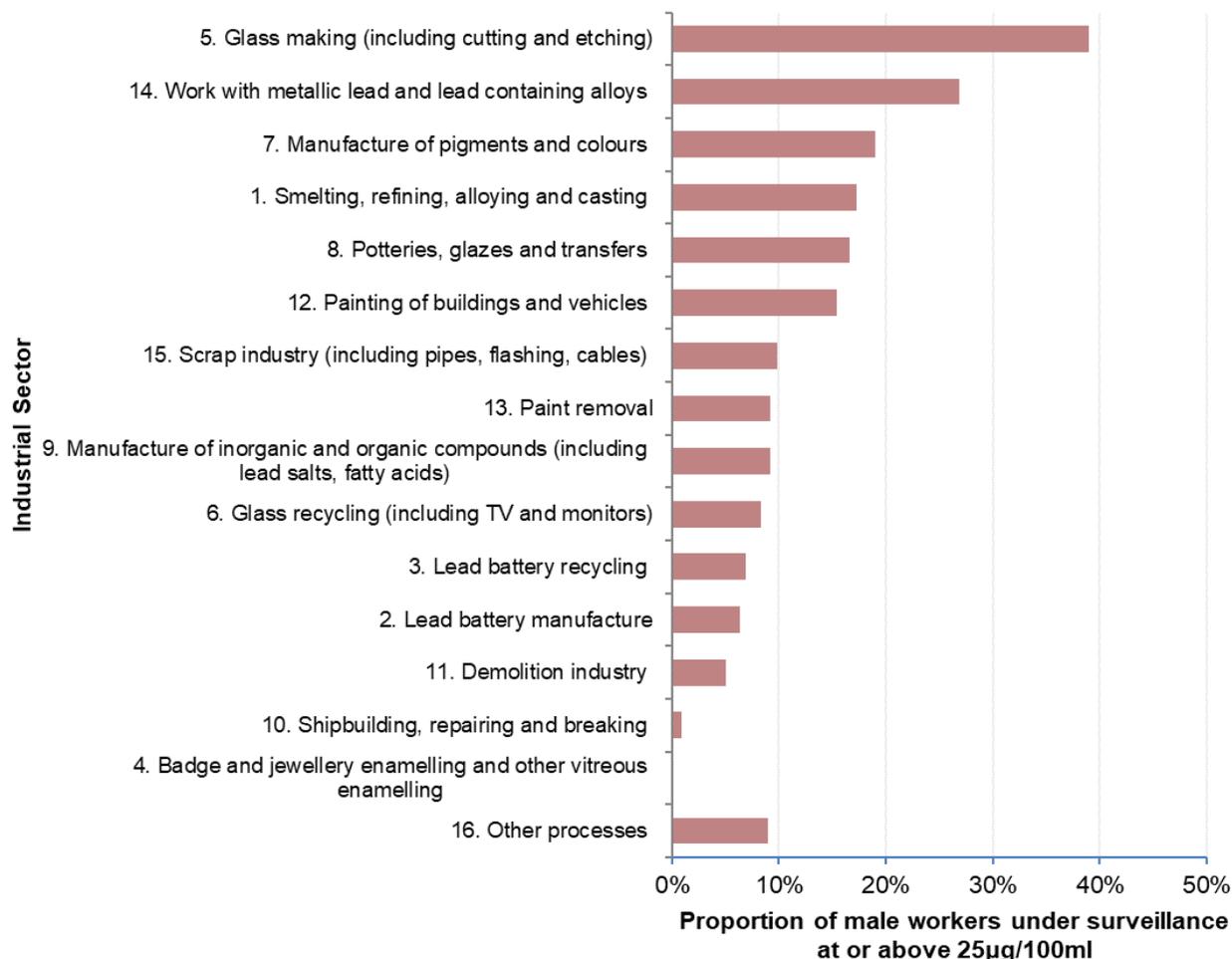


Figure 5 The proportion of male lead workers under medical surveillance with blood-lead levels at or above 25µg/100ml by industrial sector, three-year average 2018/19 – 2020/21

Female blood-lead levels

The number of women with high blood-lead levels is small and so the proportion tends to fluctuate from year to year, making changes over time difficult to interpret.

Numbers of females under surveillance by recorded blood-lead level are shown in Figure 6. Cut-off points for blood-lead categories represent: the suspension level under the previous (1980) Regulations (40µg/100ml); the current suspension level (30µg/100ml); and the current action level (25µg/100ml).

There were two females in 2020/21 with a blood-lead level at or above 25µg/100ml.

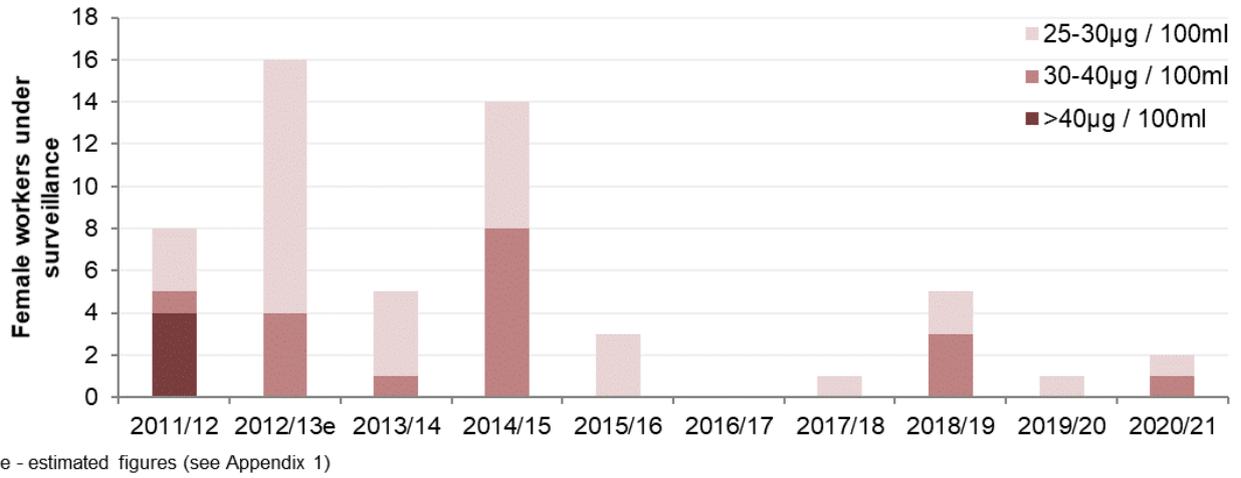
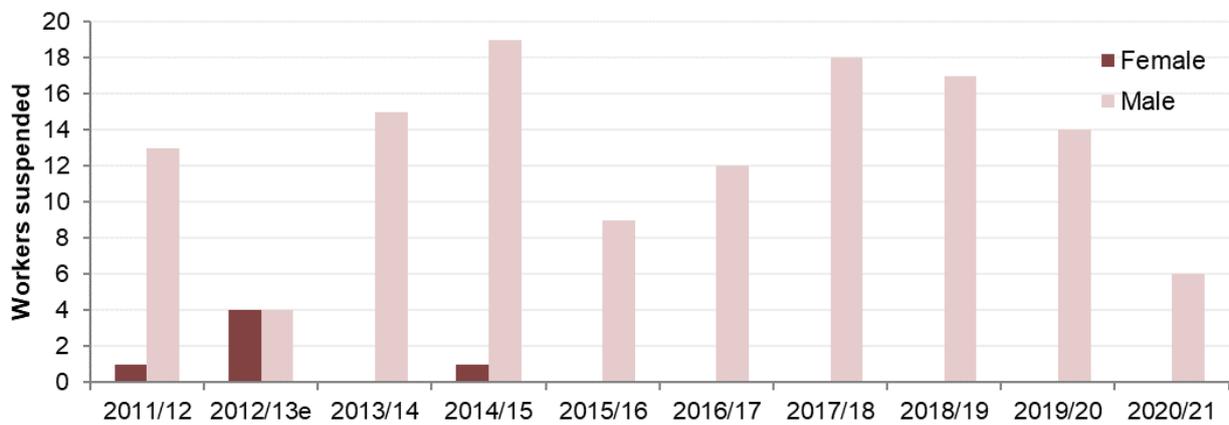


Figure 6 The breakdown of female lead workers under medical surveillance since 2011/12 with elevated blood-lead levels (>25µg/100ml)

Suspensions

Figure 7 shows the number of workers suspended from work due to excess blood-lead levels each year from 2011/12.

Neither the number of workers with measurements over the suspension level nor the number suspended should be interpreted as the number of lead poisonings; the purpose of the arrangements under the CLAW Regulations is to remove workers from exposure to lead to reduce the likelihood of symptoms of lead poisoning developing.



e - estimated figures (see Appendix 1)

Figure 7 Number of male and female lead workers under medical surveillance suspended from working with lead since 2011/12

In 2020/21, 6 males (0.2% of all male workers under surveillance) were suspended from work due to excess blood-lead levels. No females were suspended due to an excess of blood-lead in 2020/21.

Appendix 1

Figures for 2012/13, originally published in March 2014, were subject to undercounting. An investigation suggested that some of the annual returns providing data for individual companies were missing, although overall summary information from appointed doctors was available for analysis. These figures were withdrawn in March 2015. Estimated figures for 2012/13 were subsequently produced by taking into account all available information relating to the number of returns made for the years 2010/11 - 2013/14. These figures were first published in December 2015 and are also included in this publication.

The total number of workers under medical surveillance during 2012/13 was estimated using information about the overall number of workers and measurements recorded by doctors identified as having missing returns for specific companies, taking into account information they reported in years 2010/11, 2011/12 and 2013/14. Estimates by industry sector and sex for 2012/13 were then produced by taking into account the numbers under surveillance working at specific companies in these other years. Finally, the distributions of blood-lead levels within each industry sector averaged over these years were used to estimate the number of workers by blood-lead level category within each industry sector for 2012/13.

National Statistics

National Statistics status means that statistics meet the highest standards of trustworthiness, quality and public value. They are produced in compliance with the Code of Practice for Statistics, and awarded National Statistics status following assessment and compliance checks by the Office for Statistics Regulation (OSR). The last compliance check of these statistics was in 2013.

It is the Health and Safety Executive's responsibility to maintain compliance with the standards expected by National Statistics. If we become concerned about whether these statistics are still meeting the appropriate standards, we will discuss any concerns with the OSR promptly. National Statistics status can be removed at any point when the highest standards are not maintained, and reinstated when standards are restored.

Details of OSR reviews undertaken on these statistics, quality improvements, and other information noting revisions, interpretation, user consultation and use of these statistics is available from www.hse.gov.uk/statistics/about.htm

An account of how the figures are used for statistical purposes can be found at www.hse.gov.uk/statistics/sources.htm.

For information regarding the quality guidelines used for statistics within HSE see www.hse.gov.uk/statistics/about/quality-guidelines.htm

A revisions policy and log can be seen at www.hse.gov.uk/statistics/about/revisions/

Additional data tables can be found at www.hse.gov.uk/statistics/tables/.

General enquiries: Statistician: Lucy.Darnton@hse.gov.uk

Journalists/media enquiries only: www.hse.gov.uk/contact/contact.htm

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Published by the Health and Safety Executive 03/22.