



Exposure to lead in Great Britain, 2024

Medical surveillance of blood-lead levels in British workers, 2023/24

Data up to March 2024

Annual statistics

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Contents

Introduction	4
Workers under medical surveillance	6
Numbers of lead workers by industry sector	8
Males under surveillance	8
Females under surveillance	9
Blood-lead levels in British workers	11
Male blood-lead levels	11
Female blood-lead levels	13
Suspensions	15
Appendix	16
Accredited Official Statistics	17

Introduction

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.

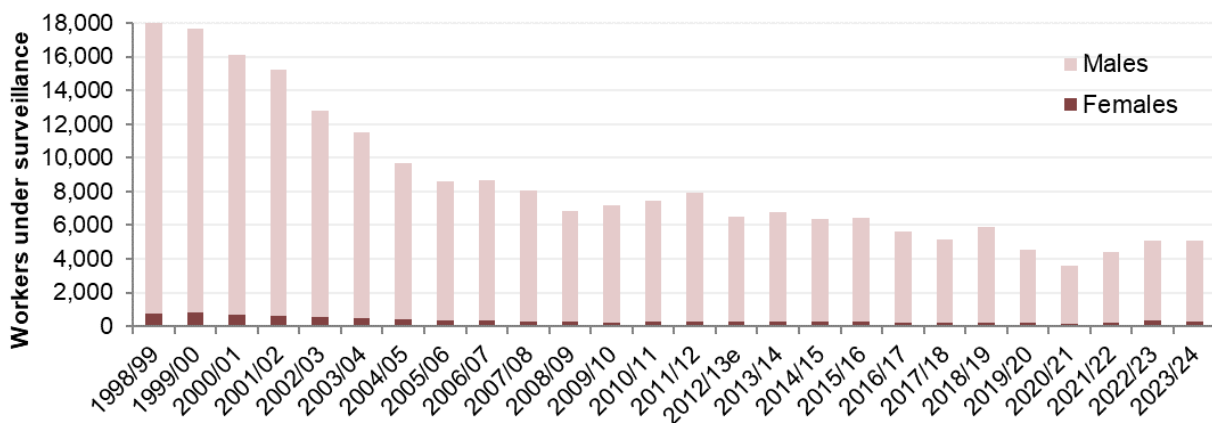
Table 1: Summary of the Control of Lead at Work (CLAW) Regulations 1980, 1998 and 2002

	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 5,094 workers (4,799 males and 295 females) under medical surveillance in 2023/24 (Table 2), a similar number to those under surveillance in 2022/23 (5,091 workers).

There has been a long-term downward trend in the numbers under surveillance over the last two decades. 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. The 295 women under surveillance in 2023/24 constitutes 6% of all workers under medical surveillance.

There were two young males (under 18 years) under medical surveillance in 2023/24. Although this is a small number, it is similar to the typical numbers in recent years, with the exception of 2018/19; in which 15 young people were under surveillance (numbers shown in brackets in Table 2 below).

Table 2: Breakdown of workers under medical surveillance since 2014/15

Year	Males	% Males	Females	% Females	Total
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)
2021/22	4,186 (1)	94%	252	6%	4,438(1)
2022/23	4,733 (5)	93%	358	7%	5,091 (5)
2023/24	4,799 (2)	94%	295	6%	5,094 (2)

Numbers 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

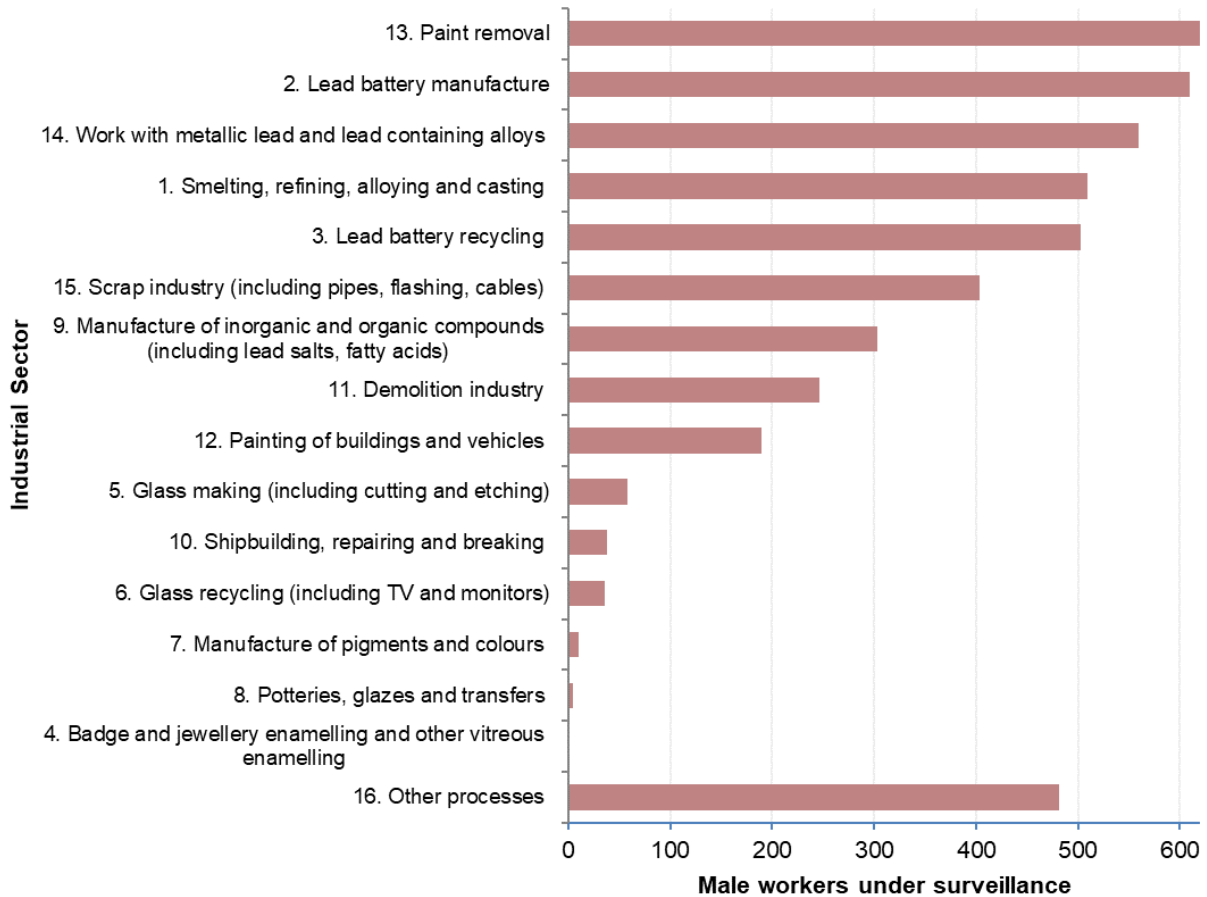
The smelting, refining, alloying and casting sector has historically accounted for the highest number of males under medical surveillance. Workers in this sector accounted for 11% of all males under surveillance in 2023/24 and 11% during the three-year period 2021/22-2023/24 (the period shown in Figure 2).

In 2023/24, the sectors with the highest number of workers under surveillance were the paint removal sector (14% of all male workers), the lead battery manufacture sector (14% of all male workers), the lead battery recycling sector (13% of all male workers), and working with metallic lead and lead containing alloys (12% of all male workers).

Working with lead batteries (either manufacturing or recycling) accounted for around a quarter of male workers under medical surveillance in 2023/24. In addition, working with lead paint (using or removing paint) accounted for nearly 20% of male workers under surveillance in 2023/24.

The total number of males under surveillance in 2023/24 and 2022/23 remained fairly similar and the distribution of males under surveillance by industry sector was also similar in most respects. However, there was a substantial decrease in the proportion of males under surveillance in the manufacture of inorganic and organic compounds (accounting for 10% of males under surveillance in 2022/23 and 5% in 2022/24). Alongside this, there was a slight increase in the proportion of males under surveillance in the lead battery recycling sector (accounting for 10% of males under surveillance in 2022/23 and 13% in 2023/24).

The top five sectors in 2023/24 accounted for 63% of the males under surveillance, and were the same as the top five sectors averaged over the period 2021/22 to 2023/24 (accounting for 61% of males under surveillance), see Figure 2.



Note: Sector 16 includes results for companies which cannot be readily assigned to any of the other categories.

Figure 2: The breakdown of male lead workers under medical surveillance by industrial sector, three-year average 2021/22 – 2023/24

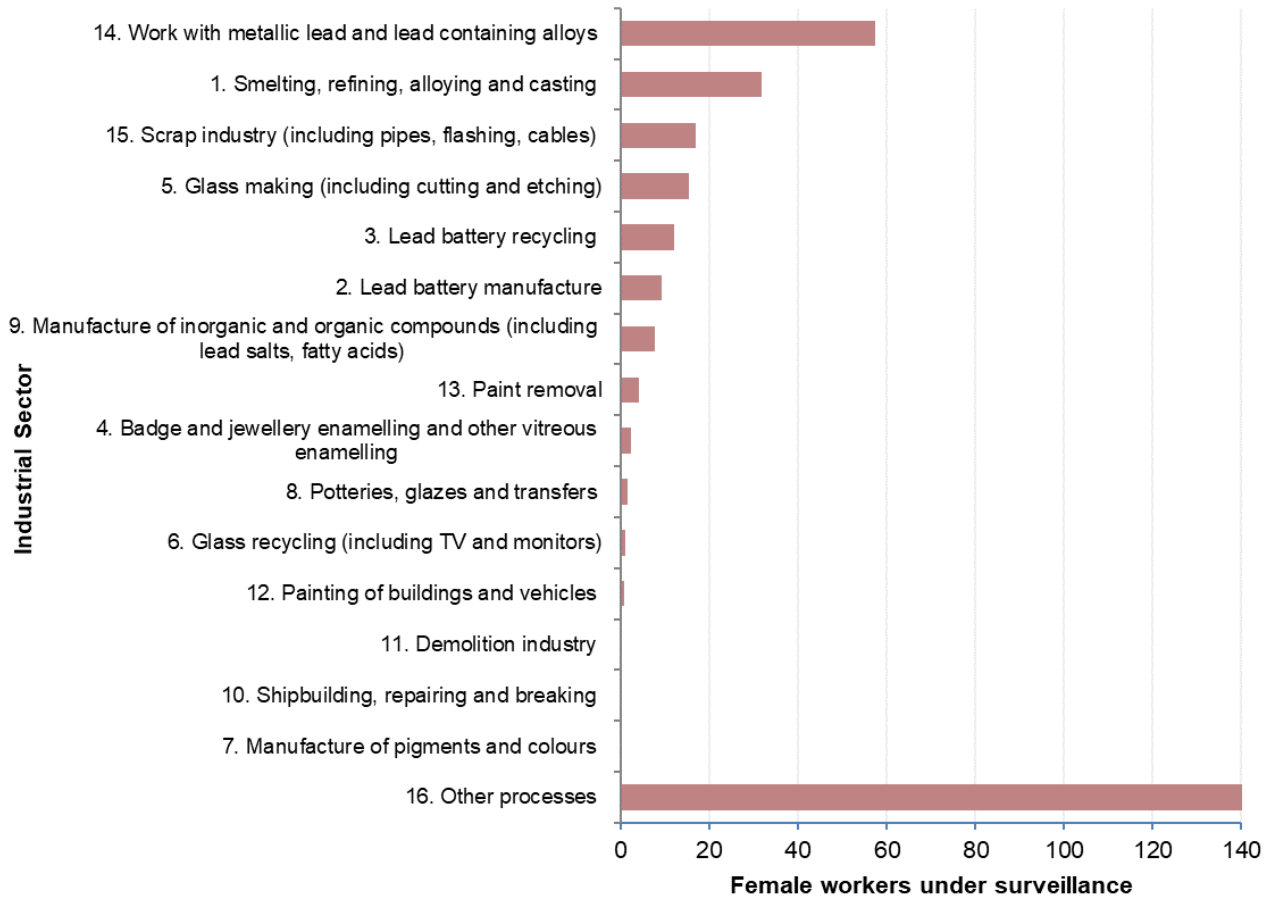
Females under surveillance

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 industry sector with the highest number of females under surveillance in 2023/24 was working with metallic lead and lead containing alloys (19% of all female workers).

There was a slight decrease in the total number of females under surveillance in 2023/24 compared to 2022/23. This was mainly due to a decrease in the number of females under surveillance in other non-specific sectors.

The proportions of females accounted for by each of the industrial sectors in 2023/24 were broadly similar to those averaged over the period 2021/22 to 2023/24 (see Figure 3). The top five industry sectors accounted for 44% of the females under surveillance during 2021/22 to 2023/24.



Note: Sector 16 includes results for companies which cannot be readily assigned to any of the other categories. One particular company accounted for a substantial proportion of the workers under surveillance assigned to this category.

Figure 3: The breakdown of female lead workers under medical surveillance by industrial sector, three-year average 2021/22-2023/24

Blood-lead levels in British workers

The majority of workers under medical surveillance have blood-lead concentrations below 25µg/100ml. In 2023/24; 4,303 (90%) of the 4,799 male workers and 290 (98%) of the 295 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 2023/24 the number of males with blood-lead levels at or above 60µg/100ml was 6 (0.1% of all male workers under surveillance), slightly down from the average of 17 per year above this level in the three-year period before the coronavirus pandemic (0.3% of all male workers under surveillance). These figures are substantially lower than for the late 1990s; for example there were 322 males with a level above 60µg/100ml (1.9% of all male workers under surveillance) in 1998/99 (the first year of the lower suspension levels).

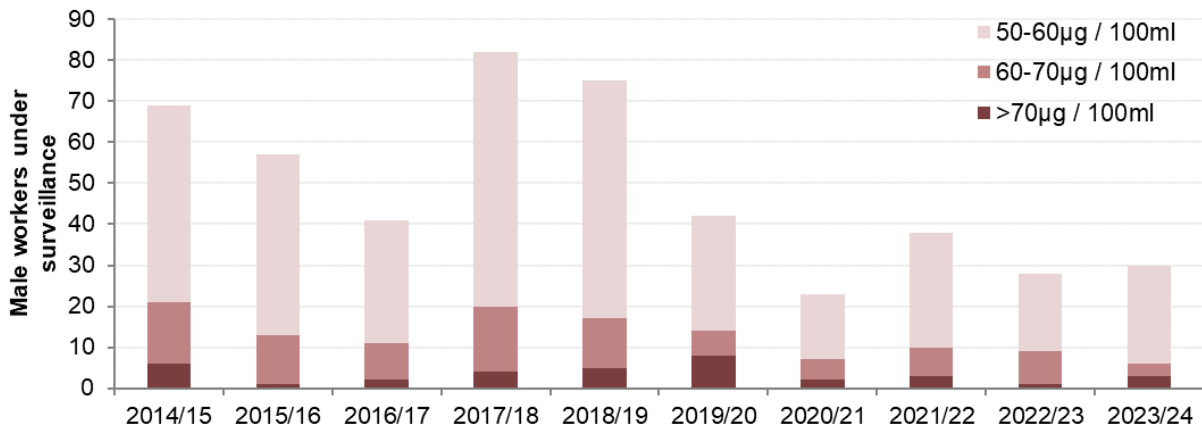


Figure 4: The breakdown of male lead workers under medical surveillance since 2014/15 with elevated blood-lead levels (>50µg/100ml)

In 2023/24, there were 30 males (0.6% 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 (12 males), the lead battery recycling sector (5 males), and the paint removal sector (5 males).

There was one young male recorded with a blood-lead level above the action limit of 40µg/100ml in 2023/24.

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. Working with metallic lead and lead containing alloys had the largest proportion of male workers with blood-lead levels above 25µg/100ml (accounting for 23% of males).

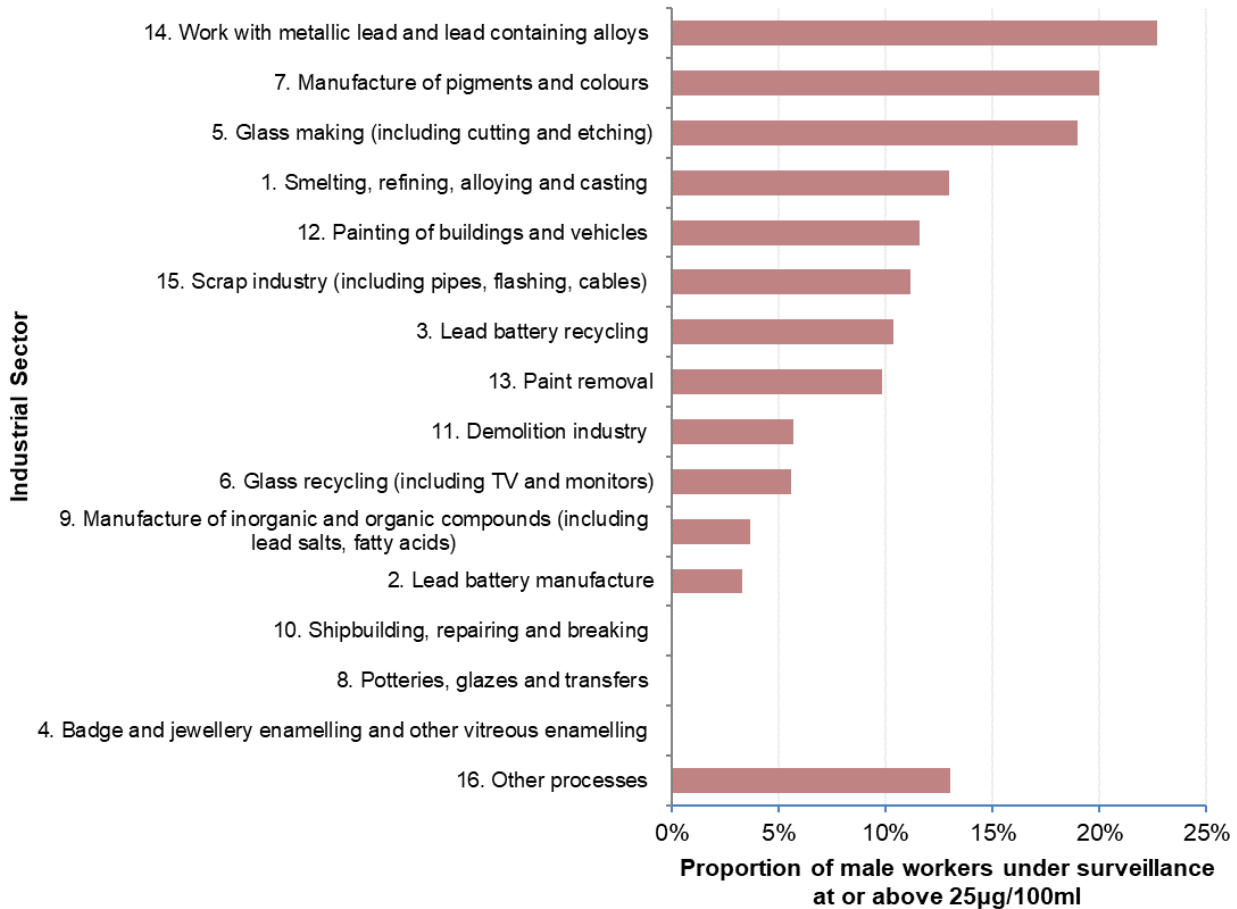


Figure 5: The proportion of male lead workers under medical surveillance with blood-lead levels at or above 25µg/100ml by industrial sector, three-year average 2021/22 – 2023/24

Female blood-lead levels

The number of women with the highest 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 five females in 2023/24 with a blood-lead level at or above 25µg/100ml.

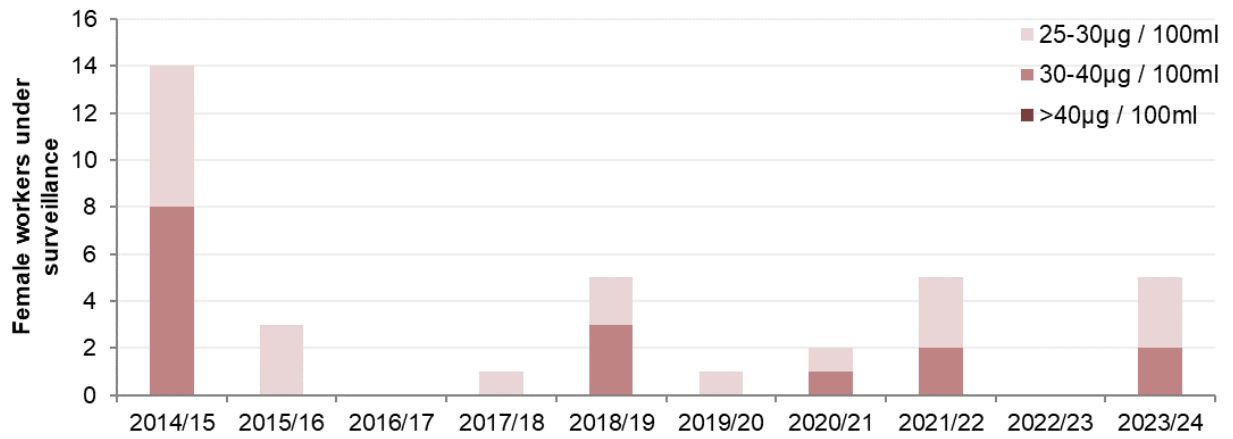


Figure 6: The breakdown of female lead workers under medical surveillance since 2014/15 with elevated blood-lead levels (>25µg/100ml)

Suspensions

Figure 7 shows the number of workers suspended from work due to excess blood-lead levels each year from 2014/15.

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.

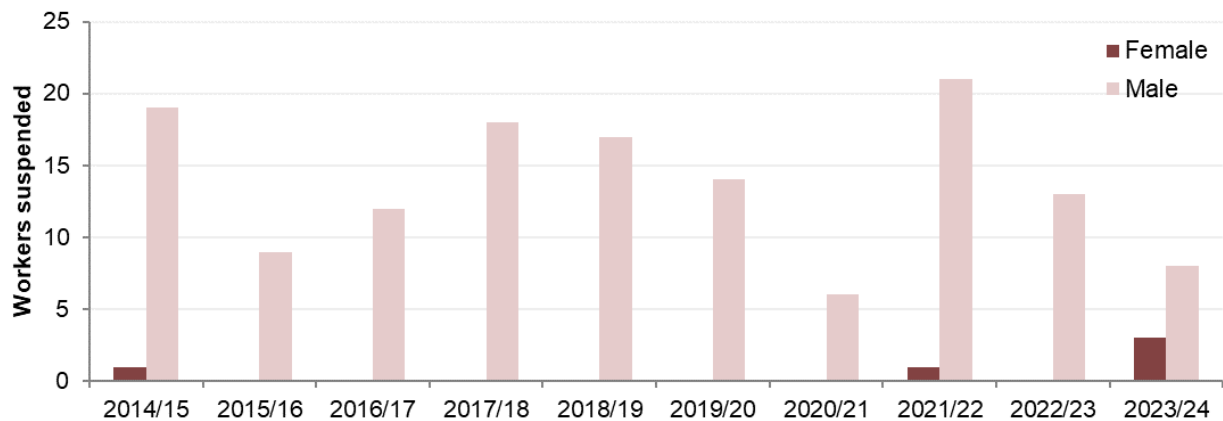


Figure 7: Number of male and female lead workers under medical surveillance suspended from working with lead since 2014/15

In 2023/24, eight males (0.2% of all male workers under surveillance) and three females (1% of all female workers under surveillance) were suspended from work due to excess blood-lead levels.

Appendix

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.

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