Exposure to Lead in Great Britain 2015

Medical Surveillance of Blood-Lead Levels in British Workers 2013/14

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Summary

This document describes the latest statistics for blood-lead measurements taken under statutory medical surveillance for work with lead.

The document can be found at [www.hse.gov.uk/statistics/causdis/lead/](http://www.hse.gov.uk/statistics/causdis/lead/)

There has been an overall reduction in the number of British workers under medical surveillance for work with lead over the past decade. Women have consistently accounted for a small proportion of the total under surveillance, and the number of young people (under 18 years) under surveillance remains very low. The number and proportion of workers with higher levels of blood-lead concentrations have decreased substantially over the past decade.

It has recently become apparent that previously published statistics for 2012/13 were subject to undercounting. These statistics have therefore been temporarily withdrawn. The issue is being investigated with the intention of producing a revised figure as soon as possible.

The most recent medical surveillance data show:

- There were 6,751 workers under medical surveillance in 2013/14, of which 96% were males.
- The number of workers under surveillance in 2013/14 is slightly lower than the average for the four years prior to 2012/13.
- The industry sector with the highest number of males under surveillance was the smelting, refining, alloying and casting sector.
- In 2013/14, 12 males had blood-lead levels at, or above, the suspension level of 60µg/100ml compared with 139 in 2003/04.
- The industry sector with the highest number of females under surveillance was the glass making industry.
- In 2013/14, 1 female had blood-lead levels at, or above, the suspension level of 30µg/100ml compared with 21 in 2003/04.
- There were 15 individuals (all males) suspended due to excess blood-lead levels in workers under surveillance in 2013/14 compared with 93 (83 males and 10 females) in 2003/04.

![Figure 1](image_url) The total number of British lead workers under medical surveillance since 2003/04
Introduction

Exposure to lead can result in a range of serious medical problems, which is why a regime of surveillance of workers in lead industries is undertaken in Great Britain.

Under the Control of Lead at Work (CLAW) Regulations all workers with significant exposure to lead are required to undergo medical surveillance which includes measurement of blood-lead concentrations. However the decision to put workers under surveillance rests with the employer. The regulations specify blood-lead concentration levels (µg/100ml) at which an appointed doctor is to decide if a worker should no longer be exposed to lead (known as the 'suspension level'). In 1998, updated regulations introduced a lower ‘action level’ at which employers must take additional steps to help ensure worker's blood lead levels are reduced.

Since 1998/99, separate information has been collected on young people (aged under 18 years) under medical surveillance.

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

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

Information from HSE Appointed Doctors (who are the main group of Doctors carrying out statutory medical surveillance of lead-exposed workers in GB) would indicate that in the main individuals with blood lead levels at or above the suspension limit and who are suspended from working with lead may not have symptoms or signs that would normally be described as “lead poisoning”, though on further, more detailed testing, for example of renal function, may show features of early damage of certain target organs. For the purposes of prevention, such workers are therefore removed from further exposure to lead to reduce the likelihood of them developing such symptoms and signs.

The coverage of these 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#lead for more information.
Workforce under medical surveillance

The number of workers under surveillance provides an indication of the extent of potential occupational lead exposure in the British population. Figure 2 shows the number of male and female workers under medical surveillance each year since 1996.

![Graph showing the number of workers under medical surveillance from 1996/97 to 2013/14 by sex.](image)

**Figure 2** The total number of British lead workers under medical surveillance since 1996/97 by sex

It has recently become apparent that previously published statistics for 2012/13 were subject to undercounting. These statistics have therefore been temporarily withdrawn. The issue is being investigated with the intention of producing a revised figure as soon as possible. Investigation into the 2013/14 figures suggests that these figures are not affected.

There were 6,751 workers (6,451 males and 300 females) under medical surveillance in 2013/14 (Table 2). This is slightly lower than the average number of workers under surveillance each year during the four years prior to 2012/13.

There has been a long-term downward trend in the numbers under surveillance over the last two decades. Similar reductions have been seen among both men and women. Women have accounted for only a small proportion of the total under surveillance over this period (4% of all workers under medical surveillance in 2013/14).

The number of young people (under 18 years) under medical surveillance continues to remain low with 1 young male and no young females in 2013/14.

**Table 2** Breakdown of workers under medical surveillance

<table>
<thead>
<tr>
<th>Year</th>
<th>Males</th>
<th>% Males</th>
<th>Females</th>
<th>% Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003/04</td>
<td>11011</td>
<td>96%</td>
<td>467</td>
<td>4%</td>
<td>11478</td>
</tr>
<tr>
<td>2004/05</td>
<td>9267</td>
<td>96%</td>
<td>418</td>
<td>4%</td>
<td>9685</td>
</tr>
<tr>
<td>2005/06</td>
<td>8278</td>
<td>96%</td>
<td>340</td>
<td>4%</td>
<td>8618</td>
</tr>
<tr>
<td>2006/07</td>
<td>8376</td>
<td>96%</td>
<td>321</td>
<td>4%</td>
<td>8697</td>
</tr>
<tr>
<td>2007/08</td>
<td>7752</td>
<td>96%</td>
<td>317</td>
<td>4%</td>
<td>8069</td>
</tr>
<tr>
<td>2008/09</td>
<td>6563</td>
<td>96%</td>
<td>268</td>
<td>4%</td>
<td>6831</td>
</tr>
<tr>
<td>2009/10</td>
<td>6916</td>
<td>97%</td>
<td>246</td>
<td>3%</td>
<td>7162</td>
</tr>
<tr>
<td>2010/11</td>
<td>7214</td>
<td>97%</td>
<td>258</td>
<td>3%</td>
<td>7472</td>
</tr>
<tr>
<td>2011/12</td>
<td>7689</td>
<td>97%</td>
<td>260</td>
<td>3%</td>
<td>7949</td>
</tr>
<tr>
<td>2012/13*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013/14</td>
<td>6451</td>
<td>96%</td>
<td>300</td>
<td>4%</td>
<td>6751</td>
</tr>
</tbody>
</table>

* Previously published figures for 2012/13 were subject to undercounting and have been temporarily withdrawn.
Lead based industry distribution

Statistics since 2010/11 incorporate revised industry sector categories to better reflect current working practices and conditions. Lead battery and glass recycling are now identified separately from battery and glass manufacture, and a category for the paint removal sector has also been added. The ‘other processes’ sector remains to include smaller industries that are not covered by the broader categories.

The statistics for 2010/11 onwards in this report have also been revised with respect to the numbers of workers within each of the industry sectors. The total number of workers under surveillance in these years has not been revised. These revisions followed a recent review of the companies previously assigned to the “other processes” category and subsequent reassignment of a number of such companies to more specific sectors.

Males under surveillance

The sector with the highest number of males under surveillance in 2013/14 was the smelting, refining, alloying and casting sector (21% of all male workers under medical surveillance). The next three sectors with the highest number of workers under surveillance in 2013/14 were work involving metallic lead and lead containing alloys (12% of all male workers under medical surveillance), the scrap industry (11% of all male workers under medical surveillance) and the lead battery manufacture sector (11% of male workers under medical surveillance). One noteworthy change was that the lead battery manufacture sector had around 1,000 males under surveillance in 2010/11 and 2011/12, but this fell to below 700 in 2013/14.

![Figure 3](https://example.com/figure3.png)

**Figure 3** The breakdown of male lead workers under medical surveillance in 2013/14 by industrial sector

A summary of the distribution of blood-lead levels of all male workers under medical surveillance by industry sector and year can be found at [www.hse.gov.uk/statistics/tables/claw1.xls](http://www.hse.gov.uk/statistics/tables/claw1.xls).
Females under surveillance

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

The three industry sectors with the highest number of females under surveillance in 2013/14 were the glass making sector (24% of all female workers under surveillance), the smelting, refining, alloying and casting sector (20% of all female workers under medical surveillance), and the potteries, glazes and transfers sector (17% of all female workers under medical surveillance).

Figure 4 The breakdown of female lead workers under medical surveillance in 2013/14 by industrial sector

A summary of the distribution of blood-lead levels of all female workers under medical surveillance by industry sector and year can be found at www.hse.gov.uk/statistics/tables/claw2.xls.
**Blood-lead levels in British workers**

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. The figures shown here are for males with greater than 50µg/100ml and females with greater than 25µg/100ml recorded blood-lead level. 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. Without further information being available it is assumed that all female employees less than 18 years of age are of reproductive capacity, thus the lower action and suspension levels are used for the statistics presented.

**Male blood-lead levels**

Numbers of males under surveillance by recorded blood-lead level are shown in Figure 5. 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).

The number of males in the highest two blood-lead categories (60-70µg/100ml and >70µg/100ml) has decreased substantially over the past decade, both in absolute terms, and also as a proportion of the total number under surveillance. In 2013/14 the number of males with blood-lead levels at or above 60µg/100ml was 12 (0.2% of all male workers under medical surveillance) down from 139 males in 2003/04 (1.3% of all male workers under medical surveillance). These figures have reduced from 322 males in 1998/99 (the first year of the lower suspension levels), and 576 males in 1996/97.

**Figure 5** The breakdown of male lead workers under medical surveillance since 2003/04 with elevated blood-lead levels (>50µg/100ml)

In 2013/14, there were 69 males (1.1% of all male workers under medical surveillance) with blood-lead levels at or above 50µg/100ml. The three industry sectors with the majority of the highest blood-lead level readings were: the smelting, refining, alloying and casting sector, accounting for 14 males, the paint removal sector, with 11 males and industries involving work with metallic lead and lead containing alloys with 10 males.

No young males were recorded with a blood-lead level above the action limit of 40µg/100ml in 2013/14.
**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).

As with males, the number of females in the highest two blood-lead categories (30-40µg/100ml and >40µg/100ml) has decreased substantially over the past decade, both in absolute terms, and also as a proportion of the total number under surveillance. There was 1 female (0.3% of all female workers under medical surveillance) in 2013/14 with a blood-lead level at or above 30µg/100ml, down from 21 females in 2003/04 (4.5% of all female workers under medical surveillance). These figures have reduced from 50 females in 1998/99 (the first year of the lower suspension levels), and 64 females in 1996/97.

![Figure 6](image-url)

*Previously published figures for 2012/13 were subject to undercounting and have been temporarily withdrawn*

**Figure 6** The breakdown of female lead workers under medical surveillance since 2003/04 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 2003/04.

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.

![Graph showing number of male and female lead workers under medical surveillance suspended from working with lead since 2003/04](image)

*Previously published figures for 2012/13 were subject to undercounting and have been temporarily withdrawn

**Male suspensions**

In 2013/14, 15 males (0.2% of all male workers under medical surveillance) were suspended from work due to excess blood-lead levels. This number was similar to the 13 males suspended in 2011/12.

**Female suspensions**

No females were suspended due to an excess of blood-lead in 2013/14.
National Statistics

National Statistics are produced to high professional standards set out in the National Statistics Code of Practice. They undergo regular quality assurance reviews to ensure that they meet customer needs. They are produced free from any political interference.

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/

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