GIG CYMRU NHS WALES | Iechyd Cyhoeddus Cymru Public Health Wales

Retrospective analysis of elevated blood lead notifications to the Environmental Public Health Team in Public Health Wales

2021-2024

Environmental Public Health, Health Protection

Contents

Executive summary

Following bans on lead in paint and petrol, lead persists in our environment and continues to harm health event at low levels of exposure.

This report summarises the findings of a retrospective analysis of all elevated blood lead (EBL) results notified to the Environmental Public Health Team (EPHT) between 1 January 2021 to 31 December 2024.

Main Findings

The main findings of the study are as follows:

- A general increase in EBL notifications to PHW, year-on-year, between 2021 and 2024. This trend is observed for children but not for adults.
- Male children, particularly 2- to 5-year-olds, had a higher proportion of EBL notifications.
- Children in most deprived areas (WIMD quintile 1) had the highest number of EBL notifications compared with all other WIMD quintiles.
- Over 80% of all children with EBL notified to PHW had been diagnosed with, or were undergoing diagnosis for, one or more neurodevelopmental condition(s), with half of the children with or awaiting diagnosis for pica.
- Over half of the children (51%) lived in houses built before 1970; this is higher than the national proportion of homes this age, in Wales. For adults, this was 12%.
- The most common likely source of lead exposure for children was outdoor materials (i.e. soil, moss, sand, grass). For adults, this was their occupation.

Recommendations

The following are recommended for partners in lead exposure reduction in Wales; *all require multi-agency working*

For Public Health Wales

Improved information sharing, data collection and surveillance

- With partners, develop specific information and communication pathways for children who are being considered for neurodevelopmental conditions to move from reactive to proactive messaging i.e. parents to receive information about lead at first appointments with clinician.
- Consider targeted interventions for most deprived families e.g. flying start programme participants.
- Develop specific information for schools to support clinician and family conversations about lead.
- Continue to monitor trends in notifications and sources using this report, and the Annual Reports, to guide action.
    - Explore additional data to support this, e.g. demographic details of all blood lead tests, including with low blood lead results.
- Improve data collection methods for analysing Environmental Exposures Questionnaire (EEQ) data to inform action e.g. Tarian Data Extension (TDE).

For testing laboratories

- Develop a protocol to notify PHW of cases that meet the NPIS “concern” level to provide clinicians with proactive advice and information for parents/patients to reduce exposure.

For clinical services

- Standardise blood lead testing of children referred for investigation of a possible neurodevelopmental condition in Wales, seeking to conduct tests at the point of referral.
- Consider the impacts of gender disparities in testing and diagnosis of neurodevelopmental conditions in the context of lead.
- Review clinical pathways, specifically testing regimes – time between repeat blood lead tests as there appears to be inconsistency. A standardised approach will support follow-up and support improvements to PH interventions.
- Provide advice and guidance to parents and carers on ways to reduce lead exposure of children displaying pica behaviours.

For local authorities

- Explore opportunities to work with partners for housing improvements to support families that reduce children’s exposure to lead e.g. garden landscaping to reduce soil exposure, painting over/removing old paint.

Statement of inequalities assessment

We have analysed data for both children and adults and have considered how this work will affect inequalities, both in terms of describing and addressing them.

Lead exposure is particularly harmful to children and may need public health intervention and clinical management. Interventions and awareness raising around the dangers of lead should be for children and their parents or carers. In line with the Well-being of Future Generations (Wales) Act 2015 (WFGA) we need to keep in mind not just current exposure of children but the potential for other children to be exposed in the future.

It has been established that exposure to lead is more likely to occur in poorly maintained properties. People living in poorly maintained properties are more likely to be from more deprived areas. As part of our analysis, we have assessed cases by Welsh Index of Multiple Deprivation (WIMD) overall quintile.

We have also assessed the data by sex to ensure there are no disparities between males and females. Unfortunately, due to lack of data, we have been unable to assess cases by ethnicity. This is something we hope to include in future reporting.

In addition, engagement and preventative work should focus on children with pica, autism spectrum disorder (ASD) and other learning difficulties and behavioural challenges. Collecting “population” data on testing and cases of elevated blood lead or children with pica, autism and other additional needs would be invaluable but is not currently supported by the data that we have available to us.

Background

Lead (Pb) is a naturally occurring metal found globally which is harmful to health when ingested or inhaled. It poses significant public health risks, even at low levels of exposure (WHO, 2024). Historically, lead was used in a wide range of products, including paints, plumbing, and petrol and its persistence in the environment continues to pose a risk.

Health burden

The harmful health impacts of lead exposure are well documented in both adults and children. In 2021, lead exposure was linked to over 1.5 million deaths worldwide, primarily due to its effects on the cardiovascular system (WHO, 2024). Furthermore, it was estimated to contribute to more than 33 million disability-adjusted life years (DALYs) lost globally in the same year (Institute for Health Metrics and Evaluation, 2024).

Children are particularly vulnerable to the effects of lead exposure as they may absorb 4-5 times as much ingested lead compared to adults. Children are more susceptible to its harmful effects due to their rapid development and hand-to-mouth behaviours (WHO, 2024). At high levels of exposure, lead affects the brain and central nervous system, which can result in coma, convulsions and even death. Low levels of lead exposure were previously considered safe but further research and evidence shows lead to have no safe level. This is reflected in the impacts of lead exposure on neurological development such as reduced cognitive function, behavioural problems, and learning disabilities in children (UKHSA, 2024b; WHO, 2024).

Exposure to lead

In the United Kingdom (UK), despite the ban on lead in petrol in 1999 and the restriction of lead-based paints since the 1970's, residual lead sources persist, including its historical use in homes, presenting ongoing challenges for public health (UKHSA, 2024a).

Lead or lead containing products can produce fumes, dusts or vapour through processing, use or disposal. These fumes, dusts or vapour can enter the body via two main pathways:

- **Inhalation:** primarily of dusts and vapours. Or,
- **Ingestion:** of dusts when eating, drinking (lead in water), biting nails, poor hand hygiene, consuming non-food items such as outside materials or furniture coated in lead-based paints etc.

With ingestion being a route of exposure to lead, there have been links with behavioural conditions and eating disorders, e.g. pica, an eating disorder characterised by the persistent consumption of non-food items that do not have a nutritional value. Pica can affect individuals of any age and gender but is most common in children (Northamptonshire Healthcare NHS Foundation Trust, 2024). It can co-occur with other behavioural and neurodevelopment conditions such as autism spectrum disorder (ASD) and global developmental delay (GDD). It is important to therefore understand that children with pica and other neurodevelopment conditions may be more vulnerable and susceptible to the effects of lead.

Detection and intervention in Wales

Lead exposure is determined by a blood test to measure blood lead concentration. In Wales, PHW has a Standard Operating Procedure (SOP) when laboratories notify PHW of blood lead tests that are at or above the result threshold for public health action) exists (figure 1).

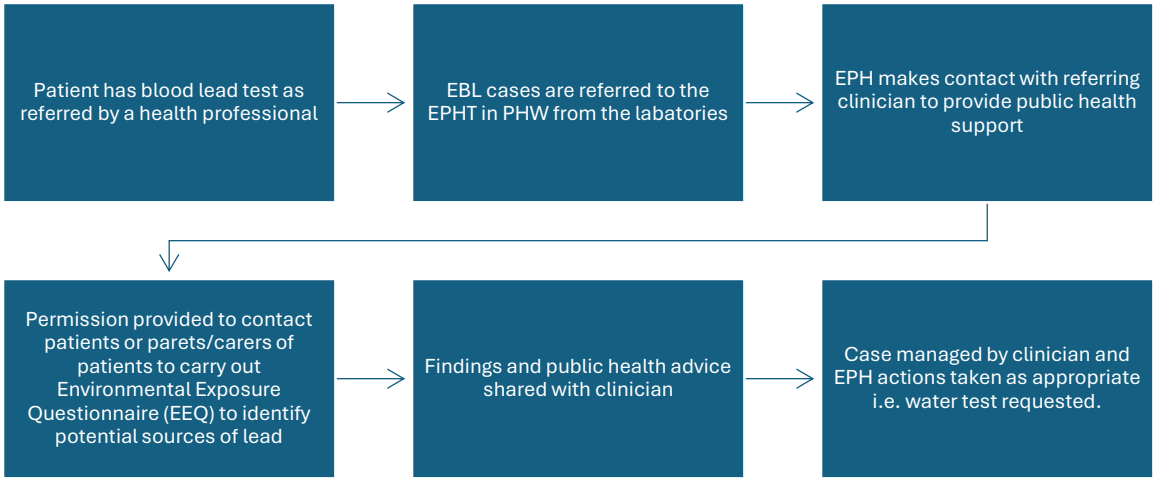

Figure 1 - Process map of EBL notifications in Wales

PHW has established annual surveillance to analyse all NHS blood lead tests in Wales (Public Health Wales, 2023). Since lead exposure symptoms are non-specific (abdominal pain, loss of appetite, vomiting, fatigue, developmental delay and learning difficulties) (NHS Inform, 2023), the surveillance of clinically reported cases is likely to underestimate the burden of lead exposure on the population of Wales. There is no routine population-level surveillance of blood lead levels of healthy people in Wales. The latest UK National Screening Committee (NSC) review concluded that screening the population is **not recommended** as the number of children affected is not known, the test is not reliable enough, and treatments in children with mild symptoms of lead exposure have not been proven and may be harmful (UK NSC, 2018). There are therefore knowledge gaps in the true burden on health in Wales.

Study aims and objectives

Aim: This review aimed to investigate cases of EBL and identify any patterns in potential sources of exposure to inform public health policy and practice.

Objectives:

- Review EBL cases from 2021 to 2024 by demographic characteristics.
- Identify any potential common sources of exposure.
- Explore inequalities in social, economic or behavioural factors which may be associated with exposure to lead.

Methods

Setting

This study is of blood lead results reported in Wales, UK (~3.1M population). Wales has an ageing and growing population. Since around 2011, improvements in life expectancy have plateaued and there are marked disparities in healthy life expectancy between most and least deprived communities (Welsh Government, 2023).

Data Collection

The data for this study has been extracted manually from the EPHT incident management database from 1 January 2021 to 31 December 2024. EBL test results were provided by laboratories across Wales (figure 1). Outside of the SOP, clinicians occasionally seek public health support from the EPHT for management of cases where blood tests have detected the presence of lead and potential for exposure, but are below the public health action level. These are considered on a case-by-case basis.

Demographic data (name, date of birth and NHS number) is provided in the initial laboratory notification. Further data such as address, postcode, sex, behavioural and developmental conditions and information on potential sources were collected as part of the environmental exposures questionnaire (EEQ) carried out with patients or parents/carers of patients.

Case definitions and abbreviations

Any case or cases of elevated blood lead (EBL)

Children

- **Public health action level:** A confirmed EBL case was an individual aged 0 to 17 with a blood lead concentration ≥ 0.24µmol/L (or 5µg/dL), as detected in a laboratory. The case must also be a resident of Wales. Described as EBL-PH.
- **National Poisons Information Service (NPIS) concern level:** A confirmed case was an individual aged 0 to 17 with a blood lead concentration ≥ 0.10µmol/L (or 2µg/dL), as detected in a laboratory. The case must also be a resident of Wales. Described as EBL-T.

Adults

- **Public health action level:** A confirmed EBL case was an individual aged 18 or over with a blood lead concentration ≥ 0.48µmol/L (or 10µg/dL), as detected in a laboratory. The case must also be a resident of Wales. Described as EBL-PH.

Data analysis

After data collection and extraction, data were cleaned to remove any duplicates, correct any inaccuracies such as formatting, and input further fields of data from EEQ's and emails. Data were manually extracted and inputted into MS Excel.

The following data points were analysed in MS Excel and R to inform the study aim and objectives:

- Age
- Sex
- Address (to inform housing age)
- Postcode (to inform overall WIMD quintile as a marker of deprivation)
- Initial test concentration
- Behavioural or neurodevelopmental conditions
- Water test results (to inform source)
- Potential sources of lead – grouped based on similarity of source i.e. soil, moss, sand, stones, plants were categorised as 'Outside materials' (appendix).

All data collected from EEQ's is self-reported by patients or parents/carers of patients and incomplete records were analysed.

However, there were three individuals of unknown age and therefore were excluded from subsequent analyses.

Findings

Total number of blood lead notifications to PHW

Between 2021 and 2024, 109 people had an EBL that was notified to PHW. 2024 saw the most notifications (n=42) and there has been a year-on-year increase (figure 2).

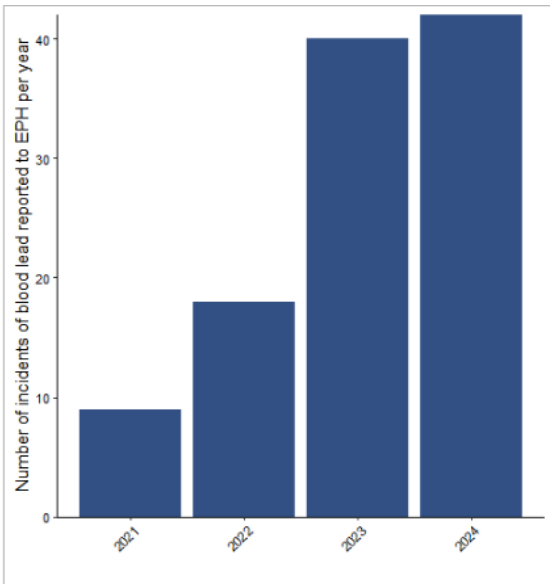

Figure 2 - Total number of blood lead notifications to PHW per year, 2021-2024, adults and children.

Children

Number of blood lead notifications

Over the four-year study period, 80 children were notified to PHW with a blood lead test result, at any level (range of initial test results: 0.08 – 1.64umol/L). Of those notified, 85% (n=68) of results met the public health action level. Year-on-year, numbers are increasing, with the highest number of notifications in 2024 (n=31; table. 1).

	Number of children notified to PHW with EBL-PH (0.24umol/L)
2021	6
2022	9
2023	22
2024	31
Total	**68**

Table 1 - Number of public health action level child blood lead notifications per year, 2021-2024

Age and Sex

Most children notified to PHW with an EBL were male and in the 2 – 5 age group (figure. 3), as were most children with an EBL-PH. The sex of two children is unknown.

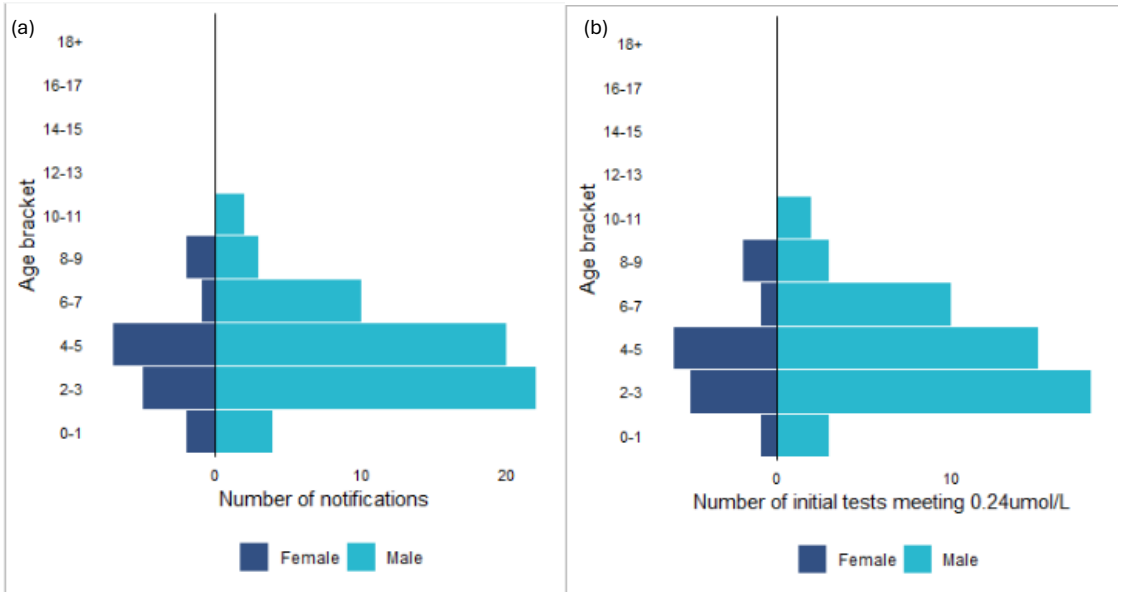

Figure 3 – (a) Age sex pyramid for children notified to PHW and (b) Age sex pyramid for children with a BL concentration meeting (or above) the public health action level.

Deprivation

Of the children notified to PHW with an EBL-PH (n=68), 52 had a known WIMD quintile (based on postcode). The 16 children without a postcode, either due to missing data or not completing the EEQ, were excluded from deprivation analysis. Across all four study years, a higher number of children were residing in most deprived areas (WIMD quintile 1) (n=23), compared with other WIMD quintiles (figure 4). Least deprived areas (WIMD quintile 5) had the lowest number of children notified to PHW (n=5).

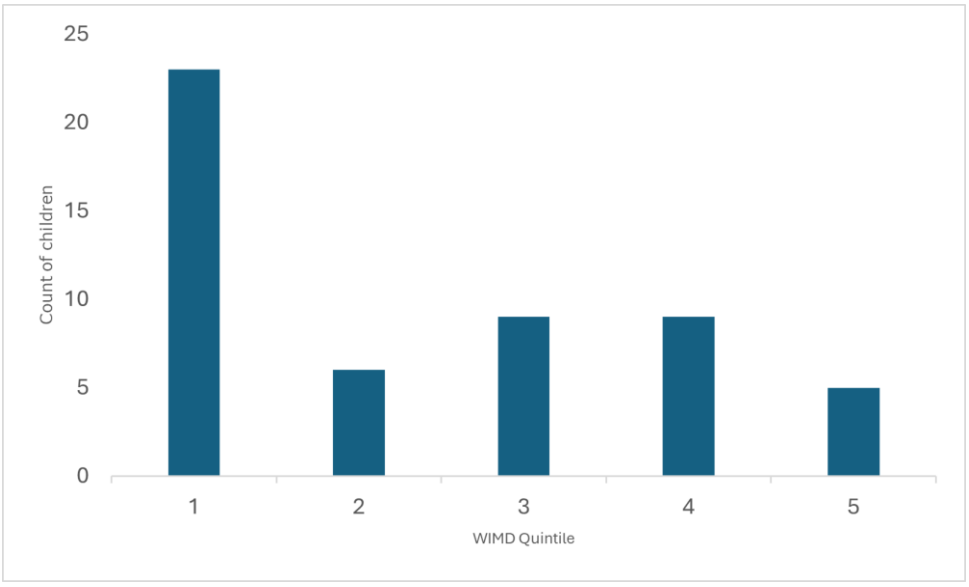

Figure 4 - Count of children within each WIMD quintile with 1 being most deprived, 5 being least deprived.

Health board

Across all seven HBs, Betsi Cadwaladr (BCUHB) reported the most children at any EBL (n=22; table 2), and consequently the greatest number of children with an EBL-PH (n=18).

	Number of children notified to PHW with EBL-PH (0.24umol/L)
Aneurin Bevan	14
Betsi Cadwaladr	18
Cardiff and Vale	11
Cwm Taf Morganwg	9
Hywel Dda	5
Powys	<5
Swansea Bay	6
Unknown	<5

Table 2 - Total number of child blood lead notifications and cases of elevated blood lead per year per Health Board, 2021-2024

Behavioural, neurodevelopmental conditions, and pica

Of all the children notified to PHW (n=80), 81.2% had been diagnosed with or were undergoing diagnosis for one or more neurodevelopmental conditions (table 3). More than half of the children notified to PHW (n=80), 57.5% had a diagnosis of, or were undergoing diagnosis for pica. It should be noted that since all neurodevelopmental conditions are self-reported by parents and not taken from clinical notes, some children, who are not among this 50%, were reported to eat non-food items but did not have a confirmed diagnosis of pica or a planned pica assessment. Therefore, pica data under-represents the role of eating non-food items in contributing to EBL in children in Wales. Less than 5 children had a diagnosis of, or were undergoing diagnosis for, attention deficit hyperactivity disorder (ADHD).

	Children with any EBL	Children with EBL-PH (0.24umol/L)
Notifications	80	68
Neurodevelopmental diagnosis	65 (81.2%)	
Autistic spectrum disorder	38 (47.5%)	32
Global developmental delay	35	33
Pica	46 (57.5%)	40

Table 3 - Total number of child blood lead notifications and cases of elevated blood lead per year in children with developmental disorders, 2021-2024

Housing age of main residence

Of the 68 children with and EBL-PH, 51% lived in a property built before 1970 and 19% lived in a property built after this time. The property age of 29% of cases was unknown.

Likely sources of lead

Of the children meeting our EBL-PH (n=68), the likely sources of lead were identified (figure 5). Consumption of outdoor materials was a suspected source of lead exposure among 51.5% of children. In 26.5% of child cases no suspected source was identified. This was either due to the EEQ not being completed or the results being inconclusive. No children had household items, cleaning products, fabrics, paper or toys identified as a likely source of lead. Of the children

notified to PHW with an EBL and diagnosed with or undergoing diagnosis for pica (n=46), 71.7% have a likely source of lead being outside materials.

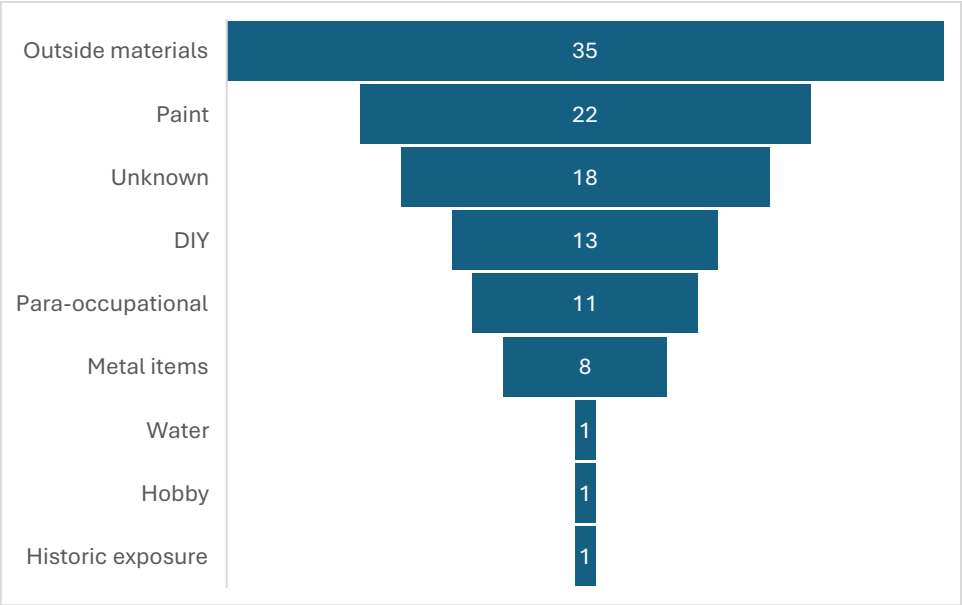

Figure 5 – Likely sources of lead for children at or above the public health action level (n=68 cases).

N.b. Each child may have more than one source of lead, therefore the total number of exposure sources are not equal to the total number of children at the public health action level. For example, a child may have a likely source from outside materials **and** paint.

Of the children notified to PHW with EBL-T (n=12), the likely sources of lead were also identified (figure 6). The results demonstrate similar findings to EBL-PH. No children had household items, cleaning products, toys, fabrics, paper or historic exposure identified as a likely source of lead.

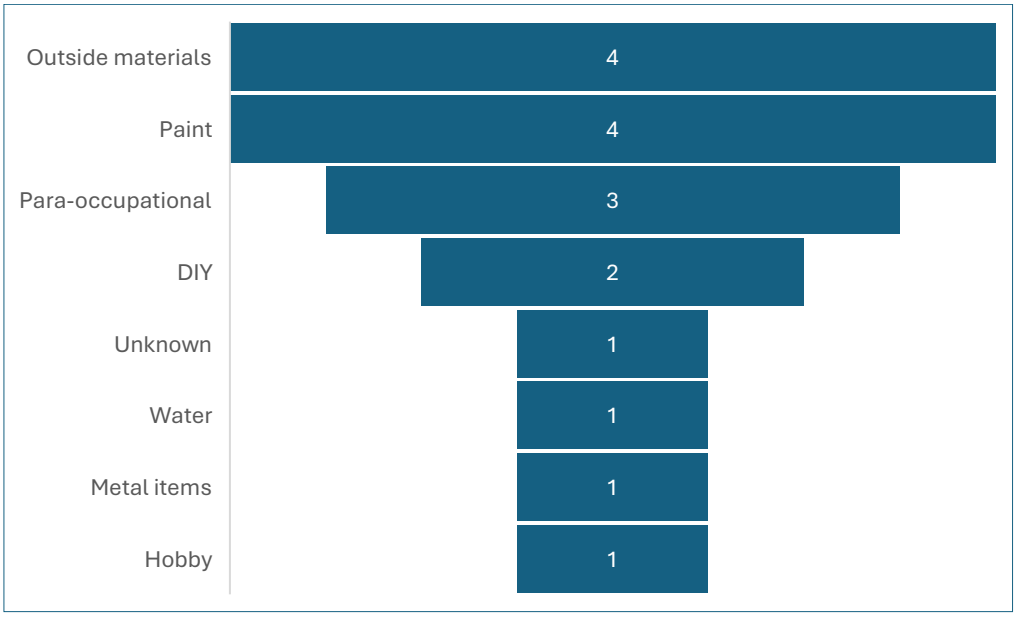

Figure 6 - Likely sources of lead for children below the public health action level (n=10).

Adults

Number of blood lead notifications

Over the four-year study period, 26 adults were notified to PHW with a blood lead test at any level (range of initial test results: 0.46 – 4.98umol/L). Of those notified, 96.2% (n=25) of the results were at or above the public health action level (≥0.48µmol/L or 10µg/dL). No obvious trend can be observed across the years (see Table 4).

	Total number of adult EBL notifications to PHW (at any level)	Number of adults notified to EPH with EBL-PH (0.48umol/L)
2021	<5	<5
2022	8	8
2023	9	9
2024	6	6
Total	**26**	**25**

Table 4 - Total number of adult blood lead notifications per year, 2021-2024

Age and Sex

Most adults who were notified to PHW with an EBL were male and between the ages 28 and 27 (figure 7). Subsequently, most adults with an EBL-PH were males also in this age category.

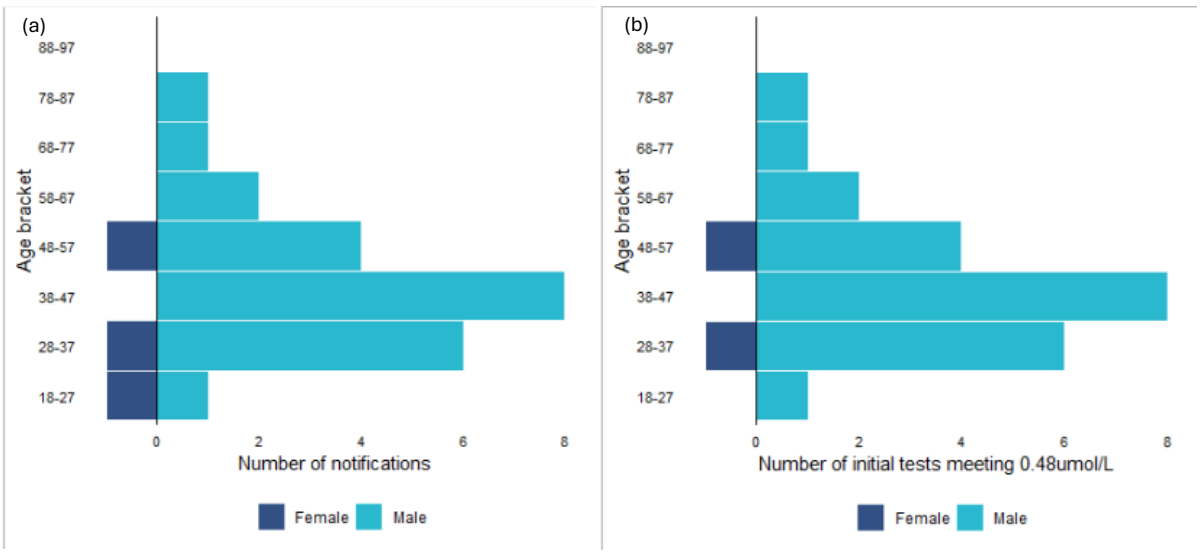

Figure 7 – (a) Age sex pyramid for adults notified to PHW and (b) Age sex pyramid for adults with a BL concentration meeting (or above) the public health action level.

Deprivation

Of the adults that were notified to PHW with an EBL-PH only 4 had a known WIMD quintile, based on postcode. Therefore, deprivation analysis for adults was not carried out.

Health Board

Of the adults notified to PHW (n=26), 96% had a known HB. Across all seven health boards, Aneurin Bevan reported the greatest number of adults with an EBL (n=11), and consequently the greatest number of adults with an EBL-PH (n=11; table 5).

	Number of adults notified to PHW with EBL-PH (0.48umol/L)
Aneurin Bevan	11
Betsi Cadwaladr	<5
Cardiff and Vale	6
Cwm Taf Morganwg	<5
Hywel Dda	0
Powys	0
Swansea Bay	<5
Unknown	<5
Total	**25**

Table 5 - Total number of adult blood lead notifications and cases of elevated blood lead per year per Local Health Board, 2021-2024

Local Authority

Of the adults notified to PHW with an EBL-PH (n=25), 92% had a known local authority.

Behavioural and neurodevelopmental conditions

Behavioural and developmental conditions were not explored for adults.

Housing age of main residence

Of the 25 adult notifications with EBL-PH, 12% live in a property built before 1970. The property age of the remaining cases is unknown.

Likely sources of lead

Of the adults with an EBL-PH (n=25), the likely sources of lead were identified (figure 8). 60.0% of adults had a suspected source of lead exposure associated with their occupation. 20.0% of adults had a source related to DIY. 16.0% of adults had an unknown source. This was either due to the EEQ not being completed or the results being inconclusive. No adults had outside materials, household items, cleaning products, metal items, fabrics, para-occupational, paper, paint or toys identified as a likely source of lead.

In the same way as for children, it should be noted that each adult may have more than one source of exposure to lead, therefore the total number of exposure sources are not equal to the total number of notifications at the public health action level. For example, an adult may have a likely source from water **and** DIY renovations.

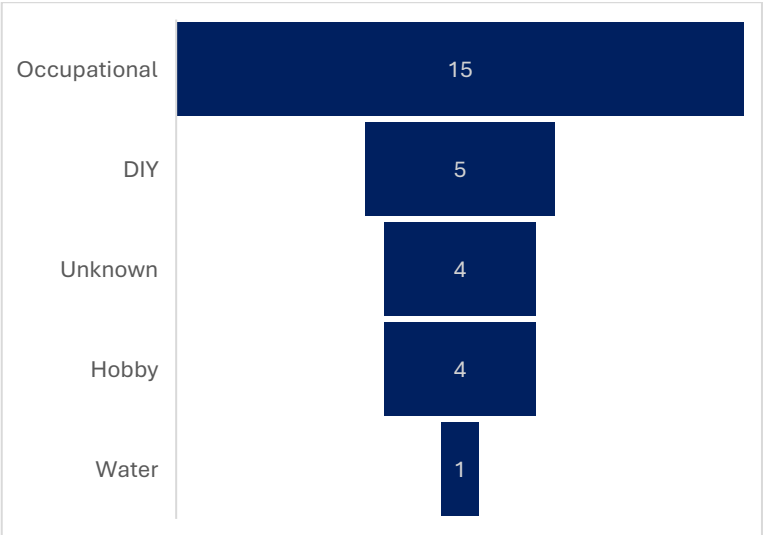

Figure 8 - Likely sources of lead for adults at or above the public health action level (n=25).

Discussion

This study has identified several important findings. It found a general increase in blood lead notifications to PHW, year-on-year, between 2021 and 2024. This is consistent with higher rates of blood lead tests undertaken annually, as outlined in the 2023 Annual Elevated Lead Report (Public Health Wales, 2023). Whilst this may reflect improved detection of cases, the increasing rates of tests and notifications to PHW highlights the persistence of lead exposure, further demonstrating the health burden, in Wales.

As for age-related vulnerabilities for children, males in the 2-5 age bracket have a larger proportion of notifications to PHW compared to females. These findings closely align with test rates observed in Wales and England (Public Health Wales, 2023 and UK Health Security Agency, 2023). This highlights an area with potential inequalities and raises the question as to whether females are receiving appropriate detection and intervention as a result. A potential explanation for this discrepancy is that a large proportion of children being tested for lead, are being done so as part of their neurodevelopmental assessment, where many of these children are diagnosed with autism. Autism diagnoses are made more frequently and earlier in development in males than females, with approximately three males being diagnosed for every one female (Loomes *et al*. 2017). As for adults, males in the 28-47 age bracket have a larger proportion of notifications to PHW compared to females. This may be explained by many of these notifications being due to occupational exposure, whereby the occupations where there is exposure risk, such as decorating, building and mechanics are male dominated industries.

There is an evident link between higher deprivation and the number of notifications of children with elevated blood lead results who also have possible or diagnosed neurodevelopmental conditions.

There is limited evidence regarding the association between deprivation and neurodevelopmental conditions in Wales. However, wider UK evidence would suggest that the overrepresentation of children in the most deprived quintile found in this study exceeds differences in the likely underlying prevalence of autistic spectrum disorders (ASD). Studies in local authority areas in England have not found an association between ASD and deprivation quintile (Baird *et al*. 2006., Kelly *et al*. 2019., Sun *et al*. 2014). A mother's level of education has sometimes been found to be more predictive of a diagnosis, with a higher level of education linked to higher rates of ASD in children (Baird, 2006, Kelly, 2019).

However, a large UK study of the association between ASD and deprivation drew on the Annual school census of the national pupil database (Roman-Urrestaratzu *et al*. 2021), which includes all English children, adolescents and young adults aged 2-21 years in state-funded education. This study found ASD was more likely in pupils who had ever been eligible for the free school meal programme (adjusted prevalence ratio 1.61 [95% CI, 1.59-1.63]), suggesting there is greater prevalence in low-income households. Evidence of underlying differences in rates of neurodevelopmental conditions is therefore inconclusive and limited, and more research is needed to understand the relationship between deprivation, lead exposure and neurodevelopmental conditions in children in Wales. Nevertheless, the findings of this study corroborate findings of the 2023 Annual Elevated Lead Report (Public Health Wales, 2023) that the majority of elevated blood lead cases are children residing in WIMD quintile one and support

the need for targeted interventions for more vulnerable populations, to reduce health inequalities.

Half of children notified to PHW with an EBL result had pica, with nearly all these children meeting the public health action level for intervention. This highlights a particularly vulnerable sub-population. Pica can significantly increase the risk of lead ingestion, especially in environments with contaminated outside materials. This finding suggests that specific, targeted and early intervention for this subgroup could result in substantial public health gains.

When looking at the sources of exposure for children, outside materials such as soil, were the most likely source of lead. Soil is the primary reservoir for lead deposited from historic use, of which leaded fuel, and lead-based paints remain the main sources (Mielke *et al*. 2011). Research suggests that the concentration of lead in soil tends to be highest near city centres and decreases with increasing distance away from the city centre (Filippellli *et al*. 2018). Over half of all adult notifications reported the most common source of exposure was occupational, suggesting that workplace exposure remains a major contributor to adult lead exposure in Wales. Although only 10% of child cases had potential source of exposure from para-occupational, it is important to understand that occupational exposure for adults could result in para-occupational exposure for children. This could be such as dusts carried home on work clothes.

Housing age can be seen as a risk factor for exposure to lead, especially for children. Houses built before 1970 may contain lead in the form of lead water pipes and lead-based paints on internal surfaces. In Wales, 39% of homes were built between 1930 and 1982 (Office for National Statistics, 2022). Over 50% of child cases notified to PHW were living in a home built before 1970, which is higher than the national proportion of homes this age, in Wales. It is important to consider that the most likely source of exposure to lead in these older properties would be paint through ingestion (pica behaviours). And therefore, highlights the importance of breaking the source-pathway-receptor link.

Limitations

Findings of this study should be interpreted with caution for the following reasons:

Testing blood lead levels in children is not universal in Wales and nor is it standardised across Wales in clinical pathways for children awaiting a diagnosis for neurodevelopmental conditions. Therefore, the sample is skewed towards patients of clinicians and services that have included blood lead testing in their diagnostic pathways and is not a random or representative sample of all children or of all children being investigated for neurodevelopmental conditions.

Data extraction was manual as there is no current system in place to extract EEQ data from the EPHT incident management database. The data extraction is therefore subject to human error.

All data collected within the EEQ are self-reported therefore caution should be exercised when interpreting results. For example, children may be diagnosed with a neurodevelopmental condition such as pica which could highlight exposure pathway behaviours. But equally, children without a diagnosis of pica may also be ingesting non-food items, since children often develop through sensory processing. This should be considered when interpreting the results.

We used the aggregate WIMD deprivation scores to create fifths and then compared outcomes between these fifths. WIMD does also include a health indicator, risking circularity between "explainer" and outcome.

Previous studies in the UK have established that children from Asian and ethnic backgrounds have higher blood lead concentrations than children with European ethnicity (Kolev *et al*. 1996). The dataset does not contain any ethnicity data and therefore it is not possible to make any conclusions regarding ethnicity.

Conclusions and recommendations

This study highlights the ongoing public health challenge posed by lead exposure in Wales, evidenced by the year-on-year increase in blood lead notifications to PHW between 2021 and 2024. As outlined in the previous Annual Elevated Lead Report (Public Health Wales, 2023), that improved testing and awareness may partly explain this trend, the persistence of cases highlights a continued environmental public health risk. Further, the findings reveal clear age and gender disparities, with young males more frequently detected and notified to PHW, likely due to neurodevelopmental testing practices. It should be considered that young females may subsequently be disproportionately affected for this reason, however, further research into this is needed.

The strong association between deprivation and lead exposure reinforces the role of social determinants in environmental public health, pointing to systemic inequalities and the need for targeted interventions.

Children with pica represent a particularly vulnerable subgroup, warranting early and focused public health action, which would be prudent in most deprived areas. Environmental sources such as contaminated soil and older housing stock remain significant contributors to exposure, especially among children, while occupational settings dominate adult cases.

Overall, this study highlights the importance of continued surveillance, targeted public health strategies, and cross-sector collaboration to mitigate lead exposure risks, address inequalities, and protect vulnerable populations across Wales.

From this, the following recommendations are made:

For Public Health Wales

Improved information sharing, data collection and surveillance

- With partners, develop specific information and communication pathways for children who are being considered for neurodevelopmental conditions to move from reactive to proactive messaging i.e. parents to receive information about lead at first appointments with clinician.
- Consider targeted interventions for most deprived families e.g. flying start programme participants.
- Develop specific information for schools to support clinician and family conversations about lead.
- Continue to monitor trends in notifications and sources using this report, and the Annual Reports, to guide action.

    - Explore additional data to support this, e.g. demographic details of all blood lead tests, including with low blood lead results.
- Improve data collection methods for analysing Environmental Exposures Questionnaire (EEQ) data to inform action e.g. Tarian Data Extension (TDE).

For testing laboratories

- Develop a protocol to notify PHW of cases that meet the NPIS "concern" level to provide clinicians with proactive advice and information for parents/patients to reduce exposure.

For clinical services

- Standardise blood lead testing of children referred for investigation of a possible neurodevelopmental condition in Wales, seeking to conduct tests at the point of referral.
- Consider the impacts of gender disparities in testing and diagnosis of neurodevelopmental conditions in the context of lead.
- Review clinical pathways, specifically testing regimes – time between repeat blood lead tests as there appears to be inconsistency. A standardised approach will support follow-up and support improvements to PH interventions.
- Provide advice and guidance to parents and carers on ways to reduce lead exposure of children displaying pica behaviours.

For local authorities

- Explore opportunities to work with partners for housing improvements to support families that reduce children's exposure to lead e.g. garden landscaping to reduce soil exposure, painting over/removing old paint.

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Appendix

Any mention of (or similar)	Category
Soil, rocks, sand, moss, grass, plants, gravel, outside materials, mud, stones, leaves	Outside materials
Water, tap water, lead pipes, ice	Water
Eating/picking at p**aint**	Paint
House renovations, DIY, decorating, re-**plaster**ing**, plumbing works, sanding**, re-painting	DIY
Candles, wax melts, kitchen items	Household items
Cleaning products, bleach	Cleaning products
Toys, plastic toys, rubber, sensory items	Toys
Coins, keys	Metal items
Para-occupational, parents work	Para-occupational
Relevant w**ork, occupational**	Occupational
Cloth, clothing, string, blankets	Fabrics
Magazines, newspaper, toilet roll	Paper
Mechanic, fishing, hobby, jewellery making	Hobby
Previous exposure, historic exposure	Historic exposure