STATE OF NEW HAMPSHIRE
ADULT BLOOD LEAD REPORT: 2013-2020

April 2023

New Hampshire Department of Health and Human Services
Division of Public Health Services

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Introduction

This report is a summary of adult lead exposure in New Hampshire from 2013-2020. It was produced as a collaboration between the State of New Hampshire Department of Health and Human Services, Division of Public Health Services, Environmental Public Health Tracking Program (EPHT) and Healthy Homes and Lead Poisoning Prevention Program (HHLPPP). Data cleaning, analysis, and report preparation were performed by EPHT, and the data were collected and managed by the HHLPPP. The HHLPPP submits data on behalf of the New Hampshire Occupational Health Surveillance Program to the National Institute for Occupational Safety and Health (NIOSH) for their Adult Blood Lead Epidemiology and Surveillance program (ABLES); therefore, ABLES standards are referenced in this document.

Findings

Blood lead levels over time

Blood lead level results for New Hampshire residents, 16 years and older, are shown in four ranges below in Table 1. The case classification used by the ABLES program to indicate elevated blood lead is 5 micrograms per deciliter (µg/dL). At 5 µg/dL or higher, pregnant women are considered at risk for harm to their fetus.[1,2] Additionally, at levels below 10 µg/dL, research suggests potential increases in hypertension and essential tremor, a disorder that causes hands, head, legs, or voice to shake involuntarily.[1] A blood lead level of 25 µg/dL is the action level of the United States Department of Labor, Occupational Safety and Health Administration (OSHA). Under a 2017 Memorandum of Understanding between the HHLPPP and New Hampshire's OSHA office, a referral is made to OSHA when an employee has a blood lead level test of 25 µg/dL or higher. This allows OSHA to conduct a worksite investigation to identify what is contributing to that employee's elevated blood lead.

Table 1: Blood lead levels over time, New Hampshire residents 16 years and older (2013-2020)

Blood Lead Level	2013	2014	2015	2016	2017	2018	2019	2020
<5 µg/dL	1,400	1,603	1,993	2,294	2,469	2,365	2,567	1,976
5-9 µg/dL	202	223	208	239	245	234	166	137
10-24 µg/dL	156	108	140	140	173	136	121	83
25+ µg/dL	23	14	15	38	25	31	17	7

Note - The results in this and following tables are limited to the single highest blood lead value per person per year.

Levels by age and sex

The age distribution appears relatively consistent across all blood lead levels, including those results that were low or not detected (Table 2). Adults aged 50-59 years old have the highest percentage of elevated blood lead results over 25 µg/dL. This finding indicates that all workers must be reached for intervention, even those who might be assumed to have more work experience and/or authority to protect themselves due to age.

Table 2: Blood lead levels by age group, New Hampshire residents 16 years and older (2013-2020)

Age Group	<5 µg/dL	5-9 µg/dL	10-24 µg/dL	25+ µg/dL	All tests
16-19	2.8%	1.1%	1.6%	2.4%	2.6%
20-29	18.4%	18.5%	19.6%	21.8%	18.5%
30-39	20.1%	22.4%	19.8%	12.9%	20.2%
40-49	18.0%	18.2%	17.1%	14.1%	17.9%
50-59	19.1%	21.0%	22.8%	28.2%	19.6%
60-69	13.3%	12.1%	14.2%	16.5%	13.3%
70+	8.2%	6.7%	4.9%	4.1%	7.9%

Table 3, below, shows that individuals with elevated blood lead levels are predominantly men by a large margin.

Table 3: Blood lead levels by sex, New Hampshire residents 16 years and older (2013-2020)

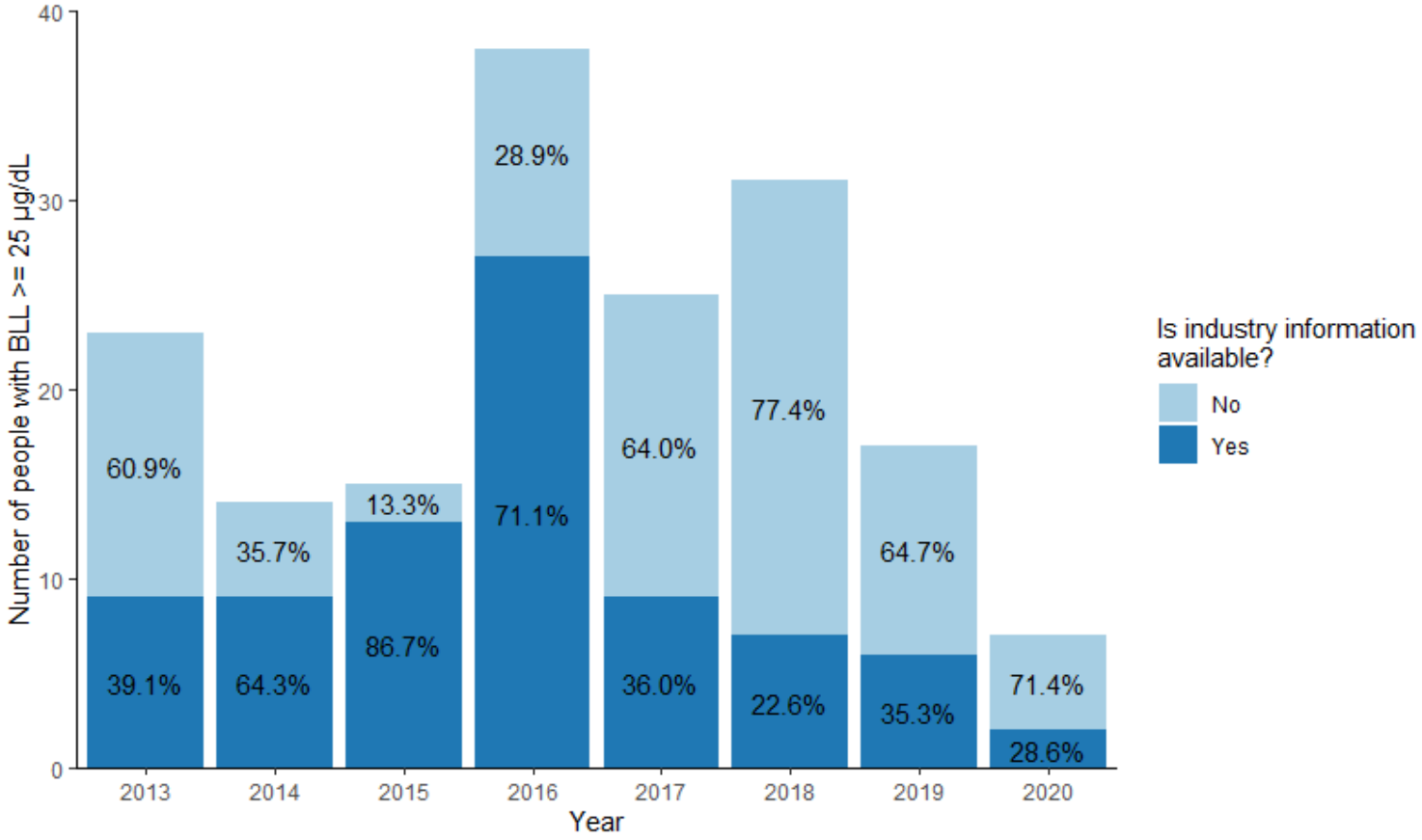
Sex	<5 µg/dL	5-9 µg/dL	10-24 µg/dL	25+ µg/dL	All tests
Male	68.1%	91.1%	95.1%	97.6%	71.7%
Female	31.9%	8.9%	4.9%	2.4%	28.3%

Elevated levels by Industry

Most elevated blood lead in adults is related to work. Various national analyses have found that 90% or more of the cases of elevated blood lead levels above 10 µg/dL or 25 µg/dL in adults with known exposure were work related.[3, 4, 5] Therefore, in order to reduce this health hazard in adults, and reduce the risk of take-home lead exposure for family members and children[6,7,8], it is important to collect information on industry and occupation. The HHLPPP currently follows up on adult cases with elevated blood leads 25 µg/dL or higher, and cases with a suspected work connection are referred to OSHA. Among data from 2013-2020, information on the industry of employment was available for 48% (82) of

the cases with blood lead levels (BLLs) 25 µg/dL or higher. The distribution of this information over time is shown below in Figure 1. Varying rates of occupational information over time reflect a variety of factors including changes in documentation procedures within the HHLPPP and their staffing levels. In the years with the highest percentage of complete data, the HHLPPP had interns who worked specifically on this task, including reaching out to providers to fill in missing data. Any use of the work-associated findings in this report should include a disclaimer about limitations due to these temporally patterned completion rates.

Figure 1: Distribution of industry information over time (2013-2020), BLL 25 µg/dL or higher



Click here to view the data from Figure 1 in table form.

Of the cases reporting BLLs 25 µg/dL or higher that had occupational information (48%), these cases were associated with a variety of industry sectors (Table 4, next page). Based on the North American Industry Classification System (NAICS), construction (34%) and manufacturing (32%) were the most common industry sectors.

Table 4: Industry sector for cases 25 µg/dL or higher with occupational information (n=82)

Sector	Description	Count	Percent
22	Utilities	<5	<5%
23	Construction	28	34%
31-33	Manufacturing	26	32%
42	Wholesale Trade	<5	<5%
56	Administrative and Support and Waste Management and Remediation Services	13	16%
71	Arts, Entertainment, and Recreation	6	7%
81	Other Services (except Public Administration)	<5	<5%
92	Public Administration	<5	<5%

Detailed NAICS codes specify more precise industries within these sectors. This allows for a clearer picture of specific industries at elevated risk for lead exposure in New Hampshire. Noteworthy industries identified among the known codes were:

- Remediation services (NAICS 562910) – 16% (13 cases)
- Painting and wall covering contractors (NAICS 238320) – 15% (12 cases)
- Residential building construction/residential remodelers (NAICS 23611/236118) – 13% (11 cases)
- Industrial valve manufacturing (NAICS 332911) – 10% (8 cases)
- Small arms and ordnance manufacturing (NAICS 332994) – 9% (7 cases)

Within the broad sector of Arts, Entertainment, and Recreation, all six cases were in *All Other Amusement and Recreation Industries*. This subsector includes establishments such as shooting ranges, which are known to be a potential occupational source of lead exposure.[9]

References

[1] National Institute for Occupational Safety and Health. (2021, February 23). Understanding Blood Lead Levels. Retrieved February 17, 2023, from https://www.cdc.gov/niosh/topics/lead/ReferenceBloodLevelsforAdults.html

[2] Lead screening during pregnancy and lactation (Committee Opinion Number 533). American College of Obstetricians and Gynecologists. (2012, August). Retrieved February 17, 2023, from https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2012/08/lead-screening-during-pregnancy-and-lactation

[3] National Institute for Occupational Safety and Health. (2021, February 23). Understanding Blood Lead Levels. Retrieved September 1, 2022, from https://www.cdc.gov/niosh/topics/ables/data.html

[4] Centers for Disease Control and Prevention. (2011, July 1). Adult Blood Lead Epidemiology and Surveillance—United States, 2008—2009. Morbidity and mortality weekly report: MMWR. 60(25);841-845

[5] Alarcon, W. A., State Adult Blood Lead Epidemiology and Surveillance (ABLES) Program Investigators. (2015, October 23). Elevated Blood Lead Levels Among Employed Adults — United States, 1994–2012. Morbidity and mortality weekly report: MMWR. 62(54);52-75

[6] Rinsky, J. L., Higgins, S., Angelon-Gaetz, K., Hogan, D., Lauffer, P., Davies, M., Fleischauer, A., Musolin, K., Gibbins, J., MacFarquhar, J., & Moore, Z. (2018). *Occupational and take-home lead exposure among lead oxide manufacturing employees, North Carolina, 2016*. Public health reports (Washington, D.C.). Retrieved February 17, 2023, from https://pubmed.ncbi.nlm.nih.gov/30231234/

[7] Kalweit, A., Herrick, R. F., Flynn, M. A., Spengler, J. D., Berko, J. K., Levy, J. I., & Ceballos, D. M. (2020, January 29). *Eliminating take-home exposures: Recognizing the role of occupational health and Safety in Broader Community Health*. OUP Academic. Retrieved February 17, 2023, from https://academic.oup.com/annweh/article/64/3/236/5716892

[8] Egan, K. B., Tsai, R. J., & Chuke, S. O. (2019). *Integrating childhood and adult blood lead surveillance to improve identification and intervention efforts*. Journal of public health management and practice: JPHMP. Retrieved February 17, 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6388394/

[9] Occupational Safety and Health Administration. (2018, August). *Protecting workers from lead hazards at Indoor Firing Ranges*. Retrieved February 17, 2023, from https://www.osha.gov/sites/default/files/publications/OSHA3772.pdf

Authors

This survey project is a collaboration between the State of New Hampshire Department of Health and Human Services, Division of Public Health Services, Environmental Public Health Tracking Program (EPHT) and Healthy Homes and Lead Poisoning Prevention Program (HHLPPP).

The following individuals contributed to the collection, review, and analysis of data and other content provided in this report:

Nicole D. Karlsson, MS, ScD, Environmental Health Data Analyst, Environmental Public Health Tracking Program

Kathleen F. Bush, PhD, Administrator, Environmental Public Health Tracking Program

Robert G. Funa, MPH, Epidemiologist, Healthy Homes & Lead Poisoning Prevention Program

Beverly Baer Drouin, Administrator, Healthy Homes & Environment Section

Nicholas K. Shonka, MS, Environmental Health Data Analyst, Environmental Public Health Tracking Program

Ryan L. Mallory, RN, BSN, Public Health Nurse Manager, Healthy Homes and Lead Poisoning Prevention Program

Contact Information

For questions about this document, please contact:
Environmental Public Health Tracking Program
Bureau of Public Health Protection
Division of Public Health Services
NH Department of Health and Human Services
29 Hazen Drive, Concord, NH 03301-6504
E-mail: EPHTInformation@dhhs.nh.gov
Website: https://www.nh.gov/epht/