



DCPH-A

Army Quarterly Pediatric Lead Report Calendar Year (CY) 2024 Quarter (Q3)

THIRD QUARTER HIGHLIGHT

Between 1 July and 30 September 2024,
2,324 Army child dependents received a blood lead test; 1.4% of those tests exceeded the CDC blood
lead reference value (BLRV $\geq 3.5 \mu\text{g}/\text{dL}$).

INTRODUCTION

Lead is a naturally occurring heavy metal but can present an environmental and health hazard if it contaminates water, air, soil, or dust. In the U.S., the most common ways that people are exposed to lead are the inhalation or accidental ingestion of contaminated dust and soil as a result of aging or chipping lead-based paint.^{1,2} Lead-based paint was banned from use in the U.S. in 1978, but many homes built prior to the ban still exist in communities across the country. Other potential sources of lead exposure are contaminated water, ammunition, soldering equipment, as well as some foreign-made toys, ceramics, make-up, and packaged foods.

Lead is neurotoxic and can cause cognitive and behavioral issues, as well as gastrointestinal and hematological problems.^{2,3} Children are at higher risk of lead exposure because of their more frequent hand-to-mouth behavior. They are also more susceptible to the harmful effects of lead since the brain is in a period of rapid development during childhood.

Because children are at higher risk of poor health outcomes if exposed to lead, the American Academy of Pediatrics recommends that all children aged 6 months to 6 years, inclusive, be screened for increased risk of lead exposure via a parental questionnaire administered at routine well-child visits.³ Children who screen positive for an increased exposure risk should be tested to determine if their blood lead level (BLL) exceeds the Centers for Disease Control and Prevention (CDC) blood lead reference value (BLRV).⁴ Laws regarding lead exposure screening, testing, and reporting are established at the State level, and Army regulation directs installations to comply with State law.³

In 2021, the CDC lowered the BLRV from 5 micrograms per deciliter ($\mu\text{g}/\text{dL}$) to 3.5 $\mu\text{g}/\text{dL}$.⁴ This updated reference value was derived from the 97.5th percentile of the blood lead values among U.S. children aged 1 to 5 years, resulting from the 2015–2016 and 2017–2018 National Health and Nutrition Examination Survey cycles. The CDC reference value should not be interpreted as a “safe” level, and the CDC continues to stress that there is no safe level of lead exposure.

In October 2018, pediatric lead poisoning was established as a reportable medical event (RME) for Army dependents aged 0 to 6 years, according to the Army Lead Hazard Management Control Program.⁵ Based on the Defense Health Agency’s Armed Forces Health Surveillance Division guidelines, Army dependents with a BLL that exceeds the CDC BLRV must be reported to the Disease Reporting System internet (DRSi). In November 2022, the Tri-Service Reportable Medical Event Working Group updated the case definition of the elevated blood lead RME to reflect the change in the CDC reference value.

This quarterly report tracks all available BLL laboratory test results within the Army dependent population and monitors the occurrence of BLLs that exceed the CDC BLRV.

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METHODS

Laboratory Data

The Defense Centers for Public Health – Portsmouth (DCPH-P) provided available BLL laboratory results for Army dependents from the Military Health System (MHS) GENESIS.⁶ Records are dated according to the BLL collection date, and this report covers test results collected from 1 July through 30 September 2024 (CY2024 Q3). The data include all BLL test results above and below the CDC BLRV collected within the MHS. These include test results for Army dependents who receive care at medical treatment facilities (MTFs) on Army installations and other Department of Defense facilities. Test results were excluded from the analysis when the unit of measure or the result could not be determined, or the biological sample was not blood.⁷ Zinc protoporphyrin (ZPP), point of care (POC), and capillary blood tests (n=295) were also not included as these tests are not considered in the case definition in the *Armed Forces Reportable Medical Events – Guidelines and Case Definitions*⁸, hereafter referred to as the Armed Forces RME Guidelines.

Only BLL results for Army dependents aged 0 to 6 years were analyzed for this report. According to the Armed Forces RME Guidelines, a child with a BLL higher than the CDC BLRV can be counted as a case only once per calendar year.⁸ If an individual had more than one BLL result (e.g., duplicate record or follow-up blood test) during CY2024 Q3, the highest BLL result was retained. The frequency of BLL test results is displayed by BLL range (<3.5 µg/dL, 3.5–9 µg/dL, 10–19 µg/dL, ≥20 µg/dL), Medical Readiness Command (MRC), and installation. Results ≥3.5 µg/dL exceed the CDC BLRV.

Disease Reporting System Internet Data

The DRSi is a tri-service reportable medical event system. Since 18 October 2018, pediatric lead poisoning has been reportable through the DRSi for children aged 0 to 6 years.⁵ Only Army dependent cases reported to DRSi are included in this report. Among Army dependents, DRSi cases with medical event report dates from 1 July through 30 September 2024 were counted.

DRSi Reporting Compliance

DRSi report dates can differ from the BLL test collection date. Taking this into consideration, cases with test collection dates during CY2024 Q3 were considered in the measure of compliance with the BLL reporting policy. Reporting compliance was determined using the proportion of laboratory results that exceeded the CDC BLRV within CHCS and MHS GENESIS collected during CY2024 Q3 that were also reported via a medical event report in DRSi.

Public Health Nurses Program Status Report (PHN-PSR)

Starting in April 2019, specific questions regarding childhood lead exposure were included in the PHN-PSR to assess the Environmental Health Hazard Management Control Program.⁹ As part of installation safety and housing office-led environmental investigations, the installation's Department of Public Health (Preventive Medicine Services) conducts parent/guardian interviews after a child 6 years of age or younger is confirmed to have a BLL higher than the CDC BLRV. The PHN-PSR captures the following Lead Hazard Management Control Plan metrics based on the past fiscal quarter: (1) number of pediatric BLL tests conducted and reported to the state/local authorities; (2) number of confirmed elevated pediatric BLL test results reported to the state/local authorities per the state/local reporting requirements; (3) number of elevated pediatric BLL cases managed by Public Health Nursing.

RESULTS

Laboratory Test Results

During CY2024 Q3, 2,324 Army dependents aged 0 to 6 years received a blood lead test within the MHS; 32 of those results (1.4%) indicated a BLL that exceeded the CDC BLRV (≥3.5 µg/dL), as shown in Table 1. Because of the lower reference value, ten additional children with a BLL higher than the CDC BLRV were identified. In CY2024 Q3, no child's BLL exceeded the level at which chelation therapy is typically recommended (≥45 µg/dL) or fell within the highest range (≥20 µg/dL, Table 1).

Table 1. Total Count of Pediatric (ages 0–6) Blood Lead Levels in CY2024 Q3

BLL Ranges (µg/dL)	CY2024 Q3 n (%)
<3.5	2,292 (98.6%)
3.5–9	27 (1.2%)
10–19	5 (0.2%)
≥20	0
Total	2,324 (100%)

In CY2024 Q3, 27 out of 32 blood lead test results that exceeded the CDC BLRV are new cases. Five Army dependents had a result greater than 3.5 µg/dL reported previously in CY2024. In the first three quarters of CY2024, there were a total of 53 Army dependents with a BLL exceeding the CDC BLRV (Figure 1).

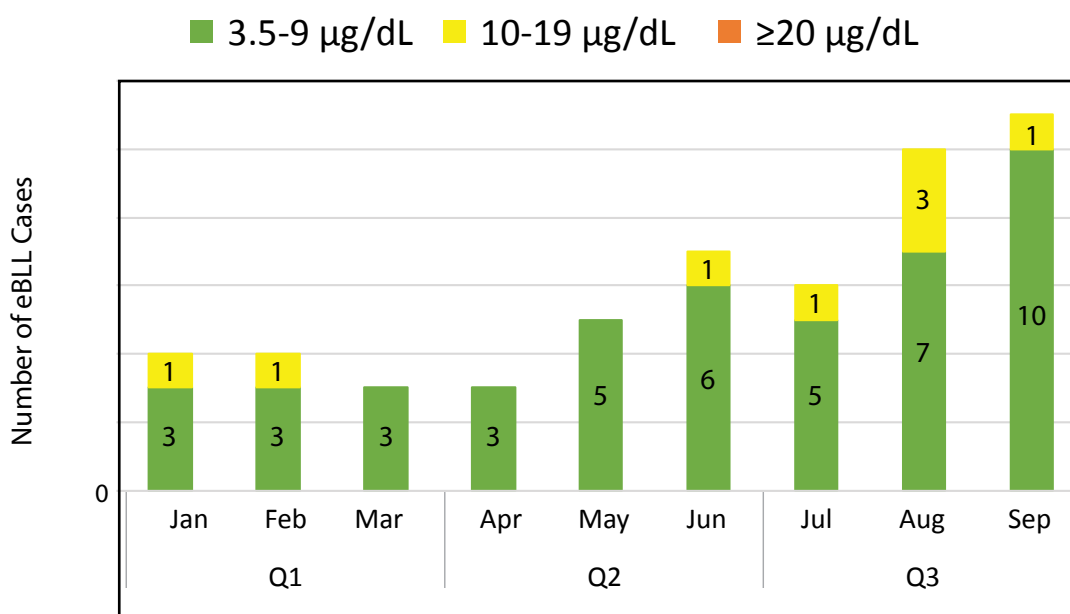


Figure 1. Number of Cases Exceeding the CDC Blood Lead Reference Value (≥3.5 µg/dL) by Month in CY2024
Data source: CHCS HL7 and MHS GENESIS

The highest BLL test results from CY2024 Q3 were retained for each child dependent; Table 2 summarizes these BLLs by MRC and installation. The results that exceeded the CDC BLRV were from Fort (Ft.) Bliss (3), Ft. Campbell (1), Ft. Carson (2), Ft. Drum (5), Ft. Eisenhower (1), Ft. Irwin (1), Ft. Leonard Wood (1), Ft. Liberty (5), Ft. Moore (1), Ft. Riley (3), Ft. Sill (3), JB Elmendorf-Richardson (1), JB Lewis-McChord (1), Little Rock Air Force Base (1), Naval Air Station (NAS) Oceana (1), and Schofield Barracks (2). Appendix A shows a complete list of U.S. Air Force (USAF), Space Force, Marine Corps, and Navy locations where Army dependents received BLL testing during CY2024 Q3.

Table 2. Pediatric (ages 0–6) Blood Lead Levels (BLL), by Medical Readiness Command and Installation, CY2024 Q3

MRC	BLL Ranges				Total
	<3.5 µg/dL	3.5–9 µg/dL	10–19 µg/dL	≥20 µg/dL	
EAST					
Aberdeen Proving Ground	42	0	0	0	42
Ft. Belvoir	51	0	0	0	51
Ft. Campbell*	67	1	0	0	68
Ft. Detrick	14	0	0	0	14
Ft. Drum*	131	4	1	0	136

Table 2 (continued). Pediatric (ages 0–6) Blood Lead Levels (BLL), by Medical Readiness Command and Installation, CY2024 Q3

MRC	BLL Ranges				Total
	<3.5 µg/dL	3.5–9 µg/dL	10–19 µg/dL	≥20 µg/dL	
EAST (continued)					
Ft. Eisenhower*	5	1	0	0	6
Ft. Gregg-Adams	20	0	0	0	20
Ft. Jackson	2	0	0	0	2
Ft. Knox	34	0	0	0	34
Ft. Liberty*	209	4	1	0	214
Ft. Meade	44	0	0	0	44
Ft. Moore*	79	1	0	0	80
Ft. Novosel	30	0	0	0	30
Ft. Stewart	98	0	0	0	98
Walter Reed NMMC	9	0	0	0	9
West Point	7	0	0	0	7
WEST					
Ft. Bliss*	204	3	0	0	207
Ft. Carson*	107	2	0	0	109
Ft. Cavazos	187	0	0	0	187
Ft. Huachuca	3	0	0	0	3
Ft. Irwin*	4	0	1	0	5
Ft. Johnson	79	0	0	0	79
Ft. Leavenworth	12	0	0	0	12
Ft. Leonard Wood*	47	1	0	0	48
Ft. Riley*	106	3	0	0	109
Ft. Sill*	36	2	1	0	39
PACIFIC					
Ft. Shafter	22	0	0	0	22
Ft. Wainwright	23	0	0	0	23
Schofield Barracks*	230	2	0	0	232
EUROPE					
Baumholder	2	0	0	0	2
Grafenwoehr	18	0	0	0	18
Hohenfels	4	0	0	0	4
Kaiserslautern	1	0	0	0	1
Landstuhl	33	0	0	0	33
Patch Barracks	3	0	0	0	3
Vicenza	6	0	0	0	6
Vilseck	14	0	0	0	14
Wiesbaden	3	0	0	0	3
JOINT BASES					
JB Elmendorf-Richardson*	13	1	0	0	14
JB Langley-Eustis	30	0	0	0	30
JB Lewis-McChord*	75	0	1	0	76
JEB Little Creek-Ft Story	1	0	0	0	1
JB McGuire-Dix-Lakehurst	5	0	0	0	5
JB Meyer-Henderson Hall	7	0	0	0	7
JB San Antonio	113	0	0	0	113
USAF MTF**					
	77	1	0	0	78
NAVAL/MARINE CORPS MTF**					
	30	1	0	0	31

*Installation where a blood lead level exceeds the CDC blood lead reference value (BLRV ≥3.5 µg/dL)

** See Appendix A for the list of USAF, Space Force, Navy, and Marine Corps locations where Army dependents received BLL tests in CY2024 Q3.

DRSi Reporting Results

Among Army dependents, 23 cases with a BLL higher than the CDC BLRV were reported in DRSi during CY2024 Q3 (Table 3). Due to the differences in the report date compared to the test collection date in the DRSi system, two children had BLL test results from CY2024 Q2 reported and the remaining 21 had test results from CY2024 Q3 reported.

Table 3. DRSi Report Location for Cases Exceeding the CDC Blood Lead Reference Value*

Installation	CY2024 Q3
Ft. Bliss	3
Ft. Campbell	1
Ft. Cavazos	2
Ft. Drum	4
Ft. Eisenhower	1
Ft. Irwin	1
Ft. Liberty	3
Ft. Riley	2
Ft. Sill	3
JB Elmendorf-Richardson	1
JB Lewis-McChord	1
Tripler Army Medical Center	1
Total	23

*Blood lead reference value (BLRV) ≥ 3.5 $\mu\text{g}/\text{dL}$

Note: Case counts are based on DRSi reporting date and may not reflect the counts in Table 1.

DRSi Reporting Compliance

Twenty-three of the 27 new cases exceeding the CDC BLRV identified in the laboratory data in CY2024 Q3 were reported to DRSi, an 85% reporting compliance. Ft. Carson, Ft. Moore, NAS Oceana, and Schofield Barracks each had one BLL result above 3.5 $\mu\text{g}/\text{dL}$ that was unreported during CY2024 Q3.

Public Health Nurses Program Status Report (PHN-PSR)

The results of the PHN-PSR indicated that a total of 1,244 BLL test results were reported to state and/or local authorities during CY2024 Q3 (Table 4). The PHN-PSR question related to pediatric lead is relevant for installations located in state and local jurisdictions that require reporting of all BLL test results, including those below 3.5 $\mu\text{g}/\text{dL}$ (e.g., Louisiana, New York, North Carolina). MRC-West reported the most BLL test results to state and local authorities (n=807), followed by MRC-East (n=372), MRC-Pacific (n=62), and MRC-Europe (n=3). Twenty-five (2.0%) of those results (n=1,244) indicated BLLs higher than the CDC BLRV, and Public Health Nursing managed 13 cases.

Table 4. Blood Lead Levels (BLL) Reported through the PHN-PSR by Medical Readiness Command and Installation, CY2024 Q3

MRC	Number of BLL tests reported to the State/local authorities	Number of eBLL tests reported to the State/local authorities	Number of eBLL cases managed by Public Health Nursing
EAST			
Carlisle Barracks	4	0	0
Ft. Belvoir	121	0	0
Ft. Campbell	1	1	0
Ft. Drum	151	4	1
Ft. Eisenhower	1	1	0
Ft. Liberty	0	3	0
Ft. Novosel	35	0	0
JB Langley-Eustis	59	0	0
WEST			
Ft. Bliss	228	3	1
Ft. Carson	123	1	1
Ft. Cavazos	173	0	0

Ft. Irwin	1	1	0
Ft. Johnson	87	0	0
Ft. Leavenworth	19	0	0
Ft. Leonard Wood	1	1	1
Ft. Sill	44	4	4
JB San Antonio	131	2	0
PACIFIC			
Ft. Wainwright	60	0	0
Tripler AMC/Schofield Barracks	2	2	2
EUROPE			
Stuttgart (USAG Bavaria)	1	0	0
USAG Vicenza	2	2	3

Note: Installations that are not listed did not report BLL tests or eBLL (≥ 3.5 $\mu\text{g}/\text{dL}$) tests.

DISCUSSION

Approximately 1% of the results of BLL tests performed in CY2024 Q3 (1 July – 30 September 2024) exceeded the CDC BLRV. Because of the lower reference value, ten additional children with a higher BLL were identified. The number of Army dependents tested during CY2024 Q3 (n=2,324 BLL tests) was 98% higher than the number of test results in CY2023 Q3 (n=1,169 BLL tests). This increase is likely due to a more complete capture of MHS GENESIS laboratory test results.

Since there is no safe level of lead in the blood, the Army will continue its Lead Hazard Management Control Program to both prevent childhood lead exposure and monitor children with a BLL higher than 3.5 $\mu\text{g}/\text{dL}$ to ensure each case receives proper treatment and management. Reporting cases of pediatric lead poisoning to DRSi is an important aspect of that control and prevention program. This quarter, reporting compliance was higher, with MTFs reaching 85% reporting compliance. For comparison, the reporting compliance during the previous two quarters ranged from 67 - 82%. Reporting cases higher than the CDC BLRV is critical to reliably identifying installations where children may be at increased risk of lead exposure. Children with a BLL that exceeds the CDC BLRV are reportable to DRSi once per calendar year. Contact the Disease Epidemiology Branch (dha.apg.pub-health-a.mbx.disease-epidemiologyprogram13@health.mil) for any questions regarding DRSi reporting of eBLLs.

LIMITATIONS

This report may not include all Army dependent BLL test results. The DCPH-P extracted the blood lead laboratory results from MHS GENESIS one month after the end of Q3 to minimize the chance of missing any results collected during that quarter. However, it is still possible that some of the results were not certified by the laboratory and entered into MHS GENESIS at the time the DCPH-P performed the data extraction. In addition, only BLLs collected within the MHS are available through MHS GENESIS, meaning blood samples collected and tested outside the MHS are not represented in this report.

REFERENCES

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Appendix A

Table A-1. U.S. Air Force, Space Force, Navy, and Marine Corps locations where Army Dependents Received a Blood Lead Test, CY2024 Q3

USAF/Space Force Bases	Naval/Marine Corps Stations
Barksdale AFB	Chesapeake
Beale AFB	Dahlgren
Davis-Monthan AFB	Groton
Dover AFB	Guantanamo Bay
Eglin AFB	Indian Head
F.E. Warren AFB	JB Pearl Harbor-Hickam
Goodfellow AFB	Joint Region Marianas
Hanscom AFB	New England
Hill AFB	North Chicago
Holloman AFB	Okinawa
JB Anacostia-Bolling	Patuxent River
JB Andrews	Quantico
Keesler AFB	Suffolk
Little Rock AFB	Virginia Beach
Luke AFB	
MacDill AFB	
Malmstrom AFB	
Nellis AFB	
Offutt AFB	
Osan AB	
Patrick SFB	
Peterson SFB	
Robins AFB	
Scott AFB	
Shaw AFB	
Sheppard AFB	
Tinker AFB	
USAF Academy	
Vandenberg SFB	