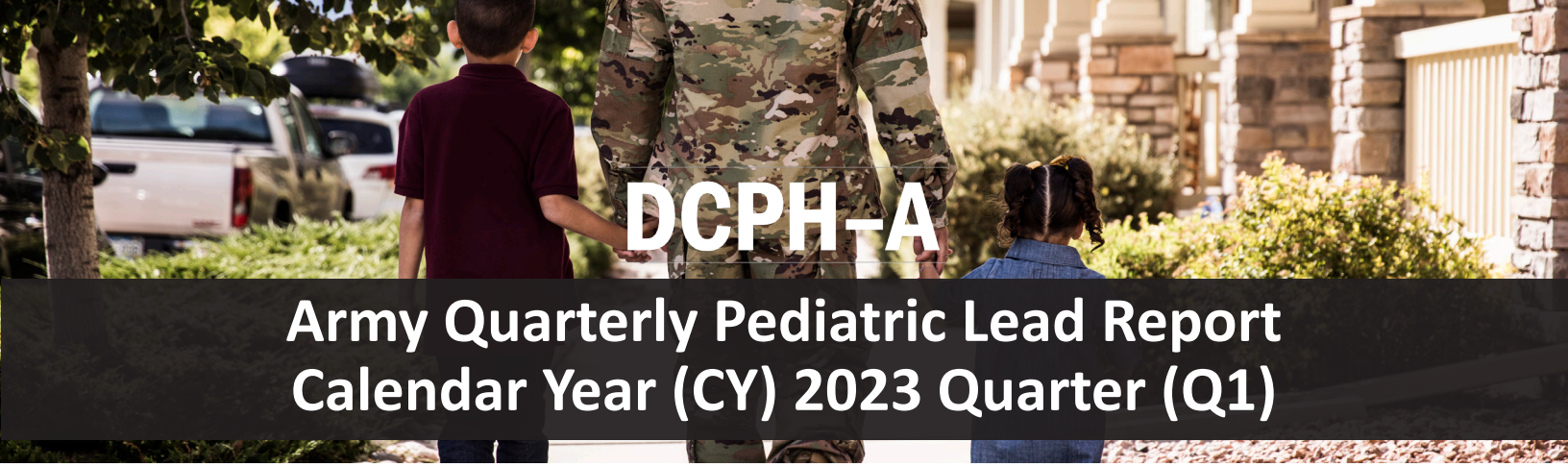

DCPH-A

Army Quarterly Pediatric Lead Report
Calendar Year (CY) 2023 Quarter (Q1)

FIRST QUARTER HIGHLIGHT

1,539 Army Child Dependents
received a blood lead test between 1 January and 31 March 2023;
0.2% of those tests indicated an elevated blood lead level (eBLL ≥3.5 µg/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 for an elevated blood lead level (eBLL). 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 Centers for Disease Control and Prevention (CDC) lowered the eBLL reference value from 5 micrograms per deciliter (µg/dL) to 3.5 µg/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, eBLLs were 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 eBLLs 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 eBLLs.

METHODS

Laboratory Data

The Defense Centers for Public Health – Portsmouth (DCPH-P) provided available BLL laboratory results for Army dependents from the Composite Health Care System (CHCS) Health Level 7 (HL7) chemistry data system and Military

Health System (MHS) GENESIS. Records are dated according to the BLL collection date, and this report covers test results collected from 1 January through 31 March 2023 (CY2023 Q1). The data include all BLL test results above and below the eBLL cutoff 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.[6] Zinc photoporphyrin (ZPP), point of care (POC), and capillary blood tests (n=113) 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[7], 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 can be counted as an eBLL case only once per calendar year.[7] If an individual had more than one BLL result (e.g., duplicate record or follow-up blood test) during CY2023 Q1, 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), Regional Health Command (RHC), and installation. Results ≥3.5 µg/dL are considered elevated. All CY2023 Q1 eBLL test results are reported.

Disease Reporting System Internet Data

The DRSi is a tri-service reportable medical event system. Since 18 October 2018, eBLLs have 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 January through 31 March 2023 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 CY2023 Q1 were considered in the measure of compliance with the eBLL reporting policy. Reporting compliance was determined using the proportion of eBLL laboratory results within CHCS and MHS GENESIS collected during CY2023 Q1 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.[8] 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 an eBLL. The PHN-PSR captures the following Lead Hazard Management Control Plan metrics: (1) number of pediatric BLL tests conducted in the past fiscal quarter reported to the State/local authorities; (2) number of confirmed elevated pediatric BLL test results in the past fiscal quarter reported to the State/local authorities per the State/local reporting requirements.

RESULTS

Laboratory Test Results

During CY2023 Q1, 1,539 Army dependents aged 0 to 6 years received a blood lead test within the MHS; three of those results (0.2%) indicated an elevated BLL (≥3.5 µg/dL), as shown in Table 1 and Figure 1. Because of the lower reference value for eBLL, one additional child with an eBLL was identified. In CY2023 Q1, 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 CY2023 Q1

BLL Ranges (µg/dL)	CY2023 Q1 n (%)
<3.5	1,536 (99.7%)
3.5–9	3 (0.2%)
10–19	0
≥20	0
Total	**1,539 (100%)**

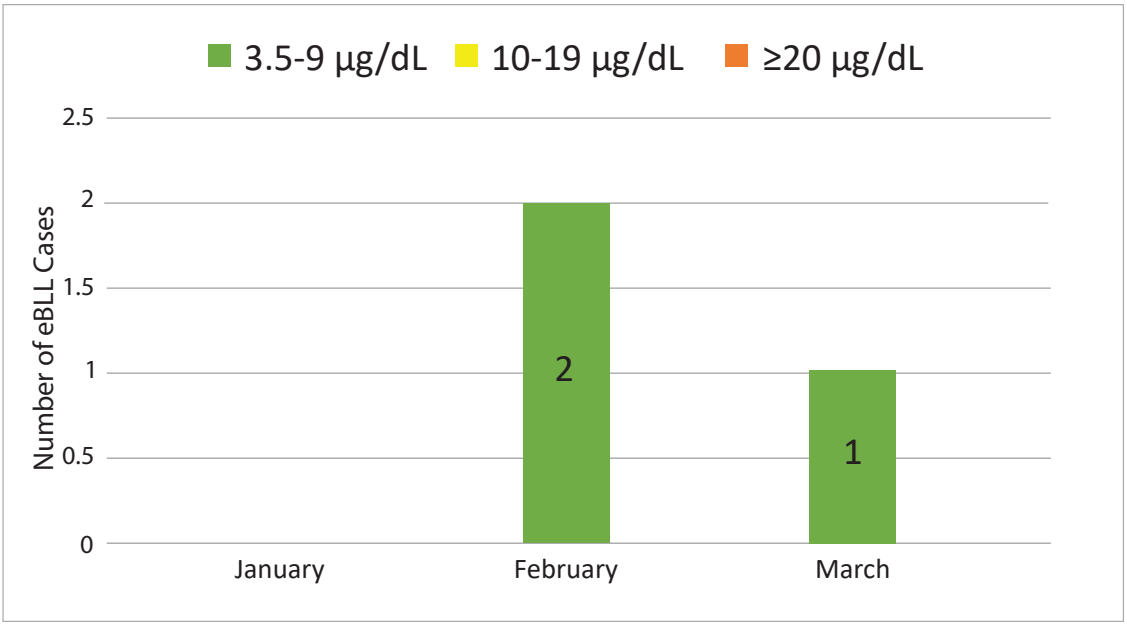

Figure 1. Number of Elevated Blood Lead Cases (≥3.5 µg/dL) by Month in CY2023
Data source: CHCS HL7 and MHS GENESIS

The highest BLL test results from CY2023 Q1 were retained for each child dependent; Table 2 summarizes these BLLs by RHC and installation. The elevated BLL results were from Fort (Ft.) Bliss (1), Ft. Wainwright (1), and Schofield Barracks (1). Appendix A shows a list of U.S. Air Force (USAF), Space Force, Marine Corps, and Navy locations where Army dependents received BLL testing during CY2023 Q1.

Table 2. Pediatric (ages 0–6) Blood Lead Levels (BLL), by Region and Installation, CY2023 Q1

	BLL Ranges				
REGION	**<3.5 µg/dL**	**3.5–9 µg/dL**	**10–19 µg/dL**	**≥20 µg/dL**	**Total**
ATLANTIC					
Aberdeen Proving Ground	14	0	0	0	14
Ft. Belvoir	48	0	0	0	48
Ft. Campbell	36	0	0	0	36
Ft. Detrick	4	0	0	0	4
Ft. Drum	61	0	0	0	61
Ft. Gordon	1	0	0	0	1
Ft. Gregg-Adams (formerly Ft. Lee)	12	0	0	0	12
Ft. Jackson	1	0	0	0	1
Ft. Knox	22	0	0	0	22
Ft. Liberty (formerly Ft. Bragg)	102	0	0	0	102
Ft. Meade	20	0	0	0	20
Ft. Moore (formerly Ft. Benning)	49	0	0	0	49
Ft. Novosel (formerly Ft. Rucker)	30	0	0	0	30
Ft. Stewart	62	0	0	0	62
Redstone Arsenal	4	0	0	0	4
Walter Reed NMMC	10	0	0	0	10
West Point	14	0	0	0	14
CENTRAL					
Ft. Bliss*	135	1	0	0	136
Ft. Carson	66	0	0	0	66
Ft. Cavazos (formerly Ft. Hood)	180	0	0	0	180
Ft. Huachuca	15	0	0	0	15
Ft. Johnson (formerly Ft. Polk)	38	0	0	0	38

Table 2 (continued). Pediatric (ages 0–6) Blood Lead Levels (BLL), by Region and Installation, CY2023 Q1

	BLL Ranges				
REGION	**<3.5 µg/dL**	**3.5–9 µg/dL**	**10–19 µg/dL**	**≥20 µg/dL**	**Total**
Ft. Leavenworth	22	0	0	0	22
Ft. Leonard Wood	37	0	0	0	37
Ft. Riley	92	0	0	0	92
Ft. Sill	57	0	0	0	57
PACIFIC					
Camp Zama	3	0	0	0	3
Ft. Shafter	29	0	0	0	29
Ft. Wainwright*	26	1	0	0	27
Schofield Barracks*	82	1	0	0	83
USAG Humphreys	2	0	0	0	2
EUROPE					
Grafenwoehr	4	0	0	0	4
Hohenfels	1	0	0	0	1
Kaiserslautern	1	0	0	0	1
Landstuhl	28	0	0	0	28
Vicenza	12	0	0	0	12
Vilseck	13	0	0	0	13
JOINT BASES					
JB Elmendorf-Richardson	10	0	0	0	10
JB Langley-Eustis	17	0	0	0	17
JB Lewis-McChord	3	0	0	0	0
JB Little Creek-Ft. Story	2	0	0	0	2
JB McGuire-Dix-Lakehurst	3	0	0	0	3
JB San Antonio	66	0	0	0	66
USAF MTF*+					
	89	0	0	0	89
NAVAL/MARINE CORPS MTF*+					
	13	0	0	0	13

*elevated blood lead level (eBLL ≥3.5 µg/dL) result in CY2023 Q1

*+ See Appendix A for the list of USAF, Space Force, Navy, and Marine Corps locations where Army dependents received BLL tests in CY2023 Q1.

DRSi Reporting Results

Twelve eBLL cases among Army dependents were reported in DRSi during CY2023 Q1. Ft. Bliss reported three eBLL cases, Ft. Liberty reported eight, and JB San Antonio reported one eBLL case. Due to differences in the report date compared to the test collection date in the DRSi system, all twelve children had test results from CY2022 Q4 reported.

DRSi Reporting Compliance

None of the eBLL cases identified in the laboratory data in CY2023 Q1 were reported to DRSi, a zero percent reporting compliance. Ft. Bliss, Ft. Wainwright, and Schofield Barracks each had one unreported eBLL during CY2023 Q1.

Public Health Nurses Program Status Report (PHN-PSR)

The results of the PHN-PSR indicated that a total of 1,028 BLL test results were reported to State and/or local authorities during CY2023 Q1 (Table 3). 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 µg/dL (e.g., Louisiana, New York, North Carolina). RHC-Central reported the most BLL test results to State and local authorities (n=610), followed by RHC-Pacific (n=241) and RHC-Atlantic (n=177). Seven (0.6%) of those results (n=1,028) indicated elevated BLLs.

Table 3. Blood Lead Levels (BLL) Reported through the PHN-PSR by Region and Installation, CY2023 Q1

REGION	Number of BLL tests reported to the State/local authorities	Number of eBLL tests reported to the State/local authorities
ATLANTIC		
Ft. Belvoir	112	1
Ft. Novosel	35	0
JB Langley-Eustis	27	0
Redstone Arsenal	3	0
CENTRAL		
Ft. Cavazos	287	0
Ft. Huachuca	27	0
Ft. Johnson	65	0
Ft. Riley	126	0
Ft. Sill	1	1
JB San Antonio	104	3
PACIFIC		
JB Lewis-McChord	11	1
Tripler AMC/Schofield Barracks	230	1

Note: Installations that are not listed did not report BLL tests or eBLL (≥3.5 µg/dL) tests.

DISCUSSION

Approximately 0.2% of the results of BLL tests performed in CY2023 Q1 (1 January – 31 March 2023) indicated eBLLs. Because of the lower reference value for eBLL, one additional child with an eBLL was identified. The number of Army dependents tested during CY2023 Q1 (n=1,539 BLL tests) was very similar to CY2022 Q1 (n=1,533 BLL tests).

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 an eBLL to ensure each case receives proper treatment and management. Reporting eBLLs to DRSi is an important aspect of that control and prevention program. This quarter, reporting compliance was low, with Army MTFs reaching 0% reporting compliance. This rate is much lower compared to the reporting compliance in CY2022 Q4 (80%). eBLL case reporting is critical to reliably identifying installations where children may be at increased risk of lead exposure. Children with an eBLL are reportable to DRSi once per calendar year. The CY2022 reporting year has ended, and a new medical event report should be submitted to DRSi for any eBLL cases reported in CY2022 with a repeat elevated test result in CY2023. 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 CHCS one month after the end of Q1 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 CHCS or MHS GENESIS at the time the DCPH-P performed the data extraction. In addition, only BLLs collected within the MHS are available through either CHCS or MHS GENESIS, meaning blood samples collected and tested outside the MHS are not represented in this report.

The MHS GENESIS data provided by the DCPH-P were included in this report to provide some visibility on the installations that have converted to that electronic medical record system. However, the DCPH-P has communicated concerns about the quality and completeness of these data. At the time of this publication, installations that transitioned to MHS GENESIS include: Ft. Belvoir, Ft. Bliss, Ft. Carson, Ft. Cavazos, Ft. Detrick, Ft. Drum, Ft. Gordon, Ft. Huachuca, Ft. Irwin, Ft. Jackson, Ft. Johnson, Ft. Leavenworth, Ft. Leonard Wood, Ft. Liberty, Ft. Meade, Ft. Moore, Ft. Novosel, Ft. Riley, Ft. Shafter, Ft. Sill, Ft. Stewart, Ft. Wainwright, JB Elmendorf-Richardson, JB Langley-Eustis, JB Lewis-McChord, JB San Antonio, Presidio of Monterey, Redstone Arsenal, Schofield Barracks, Walter Reed NMMC, and West Point.

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7. Defense Health Agency. 2020. *Armed Forces Reportable Medical Events – Guidelines and Case Definitions*. https://health.mil/Military-Health-Topics/Combat-Support/Armed-Forces-Health-Surveillance-Branch/Reports-and-Publications
8. Headquarters, U.S. Army Medical Command, January 7, 2021; USAMEDCOM Operations Order 21-17. *Environmental Health Hazard Management Control Plan*. Falls Church, VA.

Appendix A

Table A-1. U.S. Air Force, Space Force, Navy, and Marine Corps locations where Army Dependents Received a Blood Lead Test, CY2023 Q1

USAF/Space Force Bases
Altus AFB
Aviano AB
Buckley SFB
Davis-Monthan AFB
Edwards AFB
Eglin AFB
Eielson AFB
FE Warren AFB
Fairchild AFB
Goodfellow AFB
Hill AFB
JB Anacostia-Bolling
JB Andrews
JB Charleston
Kadena AB
Keesler AFB
Laughlin AFB
MacDill AFB
Malmstrom AFB
Maxwell AFB
McConnell AFB
Nellis AFB
Offutt AFB
Osan AB
Patrick SFB
Scott AFB
Seymour Johnson AFB
Tinker AFB
Travis AFB
USAF Academy
Wright-Patterson AFB

Naval/Marine Corps Stations
Camp Lejeune
Cherry Point
Chesapeake
JB Marianas Guam-Andersen
JB Pearl Harbor-Hickam
Kaneohe
Okinawa
Portsmouth VA
Quantico