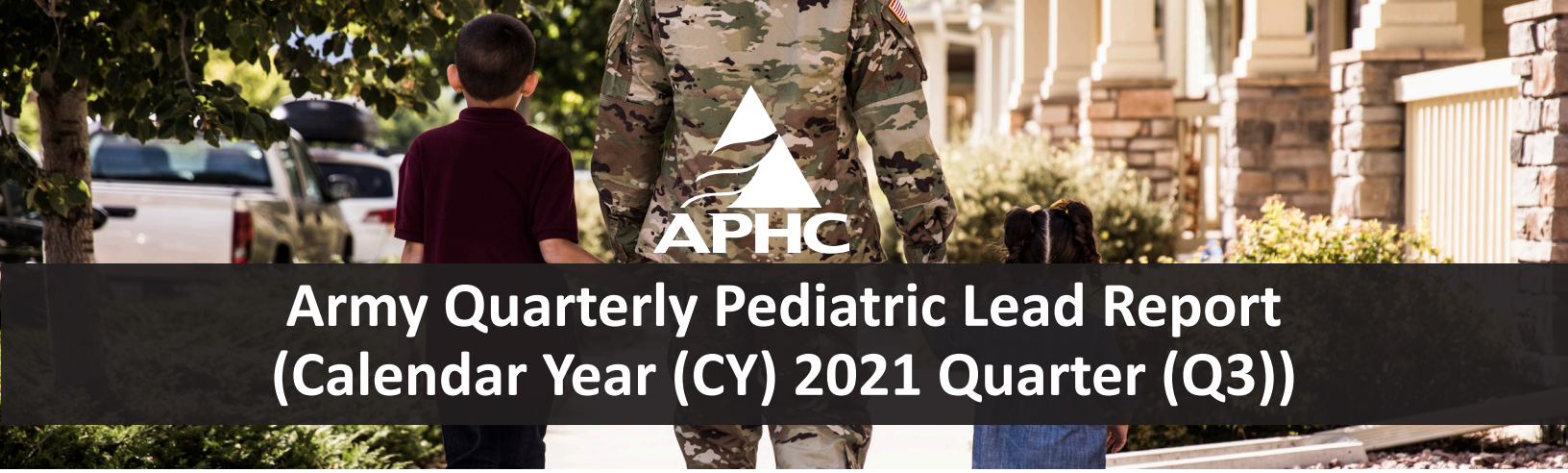

Army Quarterly Pediatric Lead Report (Calendar Year (CY) 2021 Quarter (Q3))

QUARTERLY HIGHLIGHT

2,343 Army Dependents

received a blood lead test between 1 July and 30 September 2021; 0.4% of those tests indicated an elevated blood lead level.

INTRODUCTION

Lead is a naturally occurring heavy metal, but can present an environmental and health hazard if it contaminates water, air, soil, or dust. 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 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 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 if exposed to lead, the American Academy of Pediatrics (AAP) recommends that all children ages 6 months to 6 years old, inclusive, be screened via a parental questionnaire for increased risk of lead exposure at all 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.

In 2012, the Centers for Disease Control and Prevention (CDC) lowered the reference value for an eBLL from 10 to 5 micrograms per deciliter (µg/dL); however, the CDC continues to stress that there is no safe level of lead exposure.[4] In October 2018, eBLLs became a reportable medical event (RME) for Army dependents 0 to 6 years old according to the Army Lead Hazard Management Control Program.[5] Army dependents with eBLLs should be reported to the Disease Reporting System internet (DRSi) according to Armed Forces Health Surveillance Division (AFHSD) guidelines. This report tracks all available blood lead level (BLL) test results within the Army-Dependent population and monitors the occurrence of eBLLs.

METHODS

Laboratory Data

The Navy and Marine Corps Public Health Center (NMCPHC) 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 July through 30 September 2021 (CY2021 Q3). The data includes all BLL test results, above and below the eBLL cutoff, collected within the MHS, and captures test results for Army dependents who receive care at Army military medical treatment facilities (MTFs) and other Department of Defense (DOD) 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 were also not included as these tests are not considered in the case definition in the Armed Forces RME Guidelines and Case Definitions.[7]

Only BLL results for Army dependents ages 0 through 6 years old were analyzed for this report. According to the Armed Forces RME Guidelines and Case Definitions, a child can only be counted as an eBLL case once per calendar year.[7] If an individual had more than one BLL result (e.g., duplicate record or follow-up blood test) during CY2021 3rd Quarter (Q3), the highest BLL result was retained. The frequency of BLL test results are displayed by BLL range (<5 µg/dL, 5-9 µg/dL, 10-19 µg/dL, ≥20 µg/dL), Public Health Command (PHC), and installation. Results ≥5 µg/dL are considered elevated. All CY2021 Q3 eBLL test results are reported.

Disease Reporting System, internet Data

Since 18 October 2018, eBLLs (≥5 µg/dL) have been reportable through the DRSi for children 0 to 6 years of age.[5] DRSi is a Tri-Service reportable medical event system. Only Army dependent cases reported to DRSi are included in this report. Among Army dependents, DRSi cases with medical event report dates from 1 April through 30 June 2021 were counted.

Reporting Compliance

DRSi report dates can differ from the BLL test collection date. Taking this into consideration, cases with test collection dates during CY2021 Q3 were considered in the measure of compliance with the eBLL reporting policy. Reporting compliance was determined using the proportion of all eBLL laboratory results within CHCS and MHS Genesis collected during CY2021 Q3 that were also reported via a medical event report in DRSi.

Army Public Health Nurses Program Status Report (APHN-PSR)

Starting in April 2019, specific questions regarding Childhood Lead Exposure were included in the APHN-PSR to assess the Environmental Health Hazard Management Control Program. As part of installation safety and housing office-led environmental investigations, Installation Department of Public Health (Preventive Medicine Services) conduct parent/guardian interviews in conjunction with installation services after a child six years of age or younger is confirmed to have an eBLL. The APHN-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 CY2021 Q3, there were 2,343 Army dependents between 0 and 6 years old that received a blood lead test within the MHS, and ten of those results (0.4%) were elevated (BLL ≥5 µg/dL). In CY2021 Q3, no children exceeded the BLL at which chelation therapy is typically recommended (≥45 µg/dl). The number of Army dependents tested during CY2021 Q3 compared to the same time last year decreased by 23%.

Table 1. Total Count of Pediatric (ages 0-6) Blood Lead Levels in Q3, CY2020-CY2021

BLL Ranges	CY2020 Q3	CY2021 Q3
<5 µg/dL	3044	2333
5-9 µg/dL	14	6
10-19 µg/dL	2	3
≥20 µg/dL	0	1
Total	**3060**	**2343**

Eight of the elevated results in CY2021 Q3 are new eBLL cases. Two Army dependents with an elevated result in CY2021 Q3 had an elevated result reported previously in CY2021. In the first three quarters of CY2021, there were a total of 23 Army dependents with an eBLL (Figure 1).

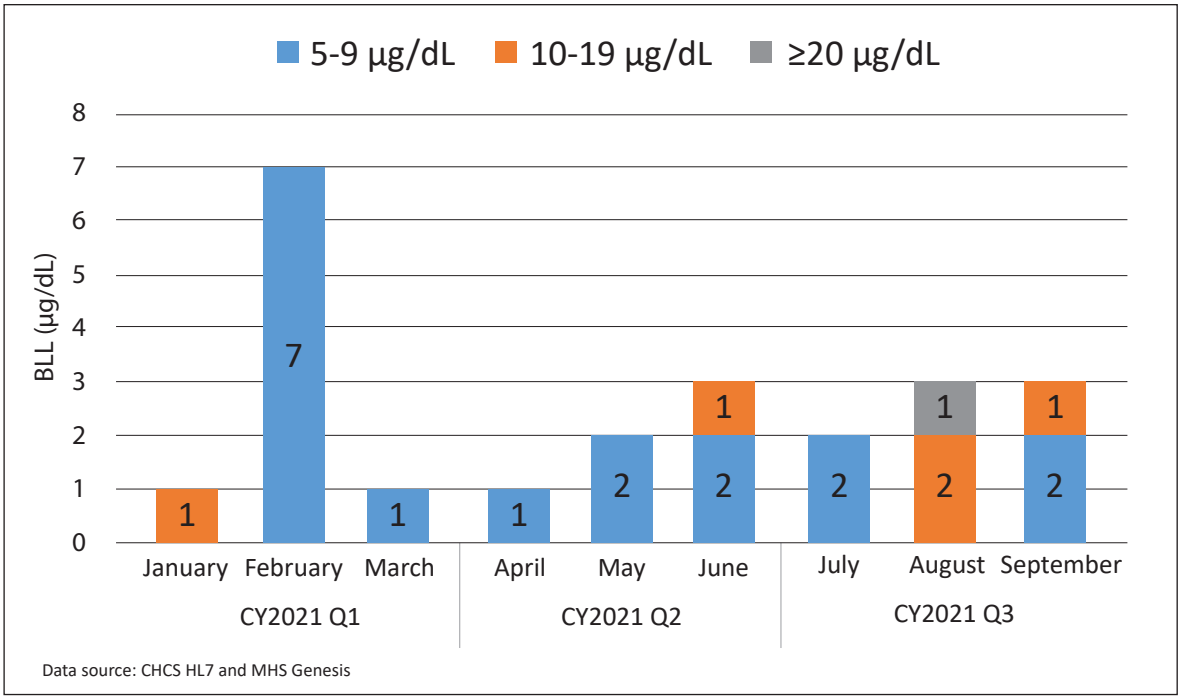

Figure 1. Number of Elevated Blood Lead Cases (≥5 µg/dL) by Month and Quarter in CY2021 Q3

With the highest test result from the third quarter of CY2021 retained for each dependent, Table 2 summarizes the BLLs by PHC and installation. Elevated BLL results came from Fort (Ft) Bliss (3), Ft Bragg (2), Ft Campbell (1), Ft Drum (1), Ft Hood (1), Ft Rucker (1), and Ft Stewart (1). Appendix A shows a list of U.S. Air Force (USAF), Marine Corps, and Navy locations where Army dependents received BLL testing during CY2021 Q3.

Table 2. Pediatric (ages 0-6) Blood Lead Levels (BLL), by Region and Installation, CY2021 Q3

	BLL Ranges				
REGION	**<5 µg/dL**	**5-9 µg/dL**	**10-19 µg/dL**	**≥20 µg/dL**	**Total**
ATLANTIC					
Aberdeen Proving Ground	26	0	0	0	26
Carlisle Barracks	7	0	0	0	7
Ft Belvoir	78	0	0	0	78
Ft Benning	106	0	0	0	106
Ft Bragg*	335	1	1	0	337
Ft Campbell*	45	1	0	0	46
Ft Detrick	9	0	0	0	9
Ft Drum*	117	0	1	0	118
Ft Gordon	3	0	0	0	3
Ft Jackson	1	0	0	0	1
Ft Knox	48	0	0	0	48
Ft Lee	39	0	0	0	39
Ft Meade	58	0	0	0	58
Ft Rucker*	42	0	0	1	43
Ft Stewart*	89	1	0	0	90
Redstone Arsenal	5	0	0	0	5
Walter Reed NMMC	18	0	0	0	18
West Point	26	0	0	0	26
CENTRAL					
Ft Bliss*	294	3	0	0	297
Ft Carson	16	0	0	0	16
Ft Hood*	258	0	1	0	259

Table 2 (continued). Pediatric (ages 0-6) Blood Lead Levels, by Region and Installation, CY2021 Q3

	BLL Ranges				
REGION	**<5 µg/dL**	**5-9 µg/dL**	**10-19 µg/dL**	**≥20 µg/dL**	**Total**
Ft Huachuca	1	0	0	0	1
Ft Irwin	3	0	0	0	3
Ft Leavenworth	9	0	0	0	9
Ft Leonard Wood	5	0	0	0	5
Ft Polk	64	0	0	0	64
Ft Riley	33	0	0	0	33
Ft Sill	39	0	0	0	39
PACIFIC					
Camp Humphreys	3	0	0	0	3
Camp Zama	1	0	0	0	1
Ft Shafter	53	0	0	0	53
Ft Wainwright	6	0	0	0	6
Schofield Barracks	123	0	0	0	123
EUROPE					
Grafenwoehr	4	0	0	0	4
Hohenfels/Amberg	4	0	0	0	4
Landstuhl	23	0	0	0	23
Vicenza	1	0	0	0	1
Vilseck	6	0	0	0	6
Wiesbaden	3	0	0	0	3
JOINT BASES					
Joint Base Elmendorf-Richardson	3	0	0	0	3
Joint Base Langley-Eustis	45	0	0	0	45
Joint Base Lewis-McChord	3	0	0	0	3
Joint Base McGuire-Dix-Lakehurst	7	0	0	0	7
Joint Base Meyer-Henderson Hall	6	0	0	0	6
Joint Base San Antonio	124	0	0	0	124
USAF MTF*±					
	83	0	0	0	83
NAVAL/MARINE CORPS MTF*±					
	37	0	0	0	37

*elevated blood lead level (eBLL ≥5 µg/dL) result in CY2021 Q3
** list of USAF, Naval, and Marine Corps locations in Appendix A

DRSi Reporting Results

In DRSi, seven eBLL cases among Army dependents have CY2021 Q3 report dates. Due to differences in the report date compared to the test collection date in the DRSi system, two children had a BLL test in CY2021 Q2 and five children had BLL tests in CY2021 Q3. Table 3 summarizes the locations of the cases.

Table 3. Locations Where Elevated Blood Lead Levels (eBLL) Were Reported through DRSi, CY2021 Q3

Installation	Number of eBLL* reports
Ft Bliss	1
Ft Bragg	2
Ft Drum	1
Ft Hood	1
Ft Leonard Wood	1
Ft Rucker	1
Total	**7**

*eBLL ≥5 µg/dL
Note: Case counts are based on DRSi reporting date and may not reflect the counts in Table 1.

Reporting Compliance

Seven out of the eight new eBLL cases identified in the CHCS and MHS Genesis laboratory data system were reported to DRSi; an 88% reporting compliance for CY2021 Q3. Four of the cases were reported during CY2021 Q3. Three cases were reported after the end of the third quarter (30 September 2021) but are being counted towards the reporting compliance measure because the test collection dates fell within CY2021 Q3. Ft Stewart had one unreported eBLL case from CY2021 Q3.

Army Public Health Nurses Program Status Report (APHN-PSR)

The results of the APHN-PSR indicated that a total of 1,066 BLL test results were reported to State and/or local authorities during CY2021 Q3 (Table 4). This question from the APHN-PSR is relevant for installations located in State and local jurisdictions that require reporting of all BLL tests, including test results below 5 µg/dL (e.g., Louisiana, New York, North Carolina). PHC-Central reported the most BLL test results to State and local authorities (n=807) followed by PHC-Atlantic (n=259). Seven (0.7%) of those results were elevated.

Table 4. Blood Lead Levels (BLL) Reported through the APHN-PSR, by Region and Installation, CY2021 Q3

REGION	Number of BLL tests reported to the State/local authorities	Number of eBLL tests reported to the State/local authorities
ATLANTIC		
Ft Belvoir	154	0
Ft Bragg	3	3
Ft Gordon	5	0
JB Langley-Eustis	89	0
Redstone Arsenal	8	0
CENTRAL		
Ft Bliss	293	2
Ft Carson	0	1
Ft Hood	298	1
Ft Huachuca	3	0
Ft Riley	104	0
Joint Base San Antonio	109	0

Note: Installations that are not listed did not report BLL tests or elevated BLL (≥5 µg/dL) tests

DISCUSSION

Approximately 0.4% of the BLL tests performed in CY2021 Q3 (1 July – 30 September 2021) were elevated. A similar proportion of elevated results was seen in the second quarter of CY2021. Among Army dependents tested within the MHS, the annual rate of eBLL in CY2020 was 5.1 per 1,000 child dependents. Since there is no safe level of lead in the blood, the Army will continue its Lead Hazard Management Control Program to 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, and military MTFs reached 88% reporting compliance this quarter. Children with an eBLL are reportable to DRSi once per calendar year. We are in a new reporting year, and a new medical event report should be submitted for any cases reported in CY2020 with an elevated result on a repeat test in CY2021.

LIMITATIONS

This report may not include all Army Dependent BLL test results. NMPHC extracted the BLL results from CHCS 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 time of the data pull. The inclusion of MHS Genesis laboratory data in this report is still new. The MHS Genesis data provided by the NMCPHC was included in this report to provide some visibility on the installations that have switched over to that system (e.g., Ft Carson, Ft Irwin, Ft Leavenworth, Ft Leonard Wood, Ft Riley, Ft Shafter, Ft Wainwright, JB Lewis-McChord, JB Elmendorf-Richardson, Presidio of Monterey, and Schofield Barracks); however, the quality and completeness of this data is still being examined by the NMCPHC. 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. As the MHS reforms, some military MTFs may transition to providing care for Active Duty personnel only, which could further limit the availability of laboratory data for child dependents.

To improve BLL surveillance, the Army established a RME for eBLLs in children 0-6 years old. At this point in time, only the Army and the Air Force are reporting eBLLs through DRSi. The Navy is not reporting elevated lead exposure through DRSi, so it is possible that these cases will not be immediately visible to APHC. However, the data shows that there were no eBLLs among the Army dependents who received BLL tests at Navy/Marine Corps MTFs.

REFERENCES

1. "Protect Your Family from Exposures to Lead," United States Environmental Protection Agency (EPA). https://www.epa.gov/lead/protect-your-family-exposures-lead#sl-home
2. EPA. 2018. *Federal Action Plan to Reduce Childhood Lead Exposure and Associated Health Impacts.* President's Task Force on Environmental Health Risks and Safety Risks to Children. https://www.epa.gov/sites/production/files/2018-12/documents/fedactionplan_lead_final.pdf
3. Council on Environmental Health. 2016. Prevention of Childhood Lead Toxicity. *Pediatrics.* 138(1):e20161493. doi: 10.1542/peds.2016-1493
4. Schnur, J and RM John. 2014. Childhood lead poisoning and the new Centers for Disease Control and Prevention guidelines for lead exposure. *J Am Assoc Nurse Pract.* 26(5):238-247. doi: 10.1002/2327-6924.12112
5. Memorandum, Department of the Army, October 17, 2018; OTSG/MEDCOM Policy Memo 18-064. Subject: *Preventing Childhood Lead Exposure – Lead Hazard Management.*
6. Navy and Marine Corps Public Health Center EpiData Center Department. 2019. *NMCPHC-EDC-TR-061-2019, DOD Quarterly Pediatric Lead Report, CY 2018 Q4.*
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

Appendix A

Table A-1. U.S. Air Force, Navy, and Marine Corps locations where Army dependents Received a Blood Lead Test, CY2021 Q3

USAF Bases
Aviano AB
Barksdale AFB
Dover AFB
Eglin AFB
Goodfellow AFB
Hanscom AFB
JB Anacostia-Bolling
JB Andrews
Kadena AB
Keesler AFB
Little Rock AFB
Los Angeles AFB
Luke AFB
MacDill AFB
Maxwell AFB
McConnell AFB
Patrick AFB
Peterson AFB
RAF Alconbury
Ramstein AB
Robins AFB
Scott AFB
Seymour Johnson AFB
Sheppard AFB
Spangdalhem AB
Travis AFB
Wright-Patterson AFB

Naval/Marine Corps Stations
Annapolis
Camp Lejeune
Cherry Point
Chesapeake
Indian Head
JB Charleston
JB Marianas Guam-Andersen
JB Pearl Harbor-Hickam
Milton
Norfolk
North Chicago
Okinawa
Portsmouth
Quantico
Suffolk
Virginia Beach