

Title: Blood Lead Screening Rates for a Cohort of California Children Served by Medi-Cal: A Joint Report from the California Department of Public Health-Department of Health Care Services

Abstract

Federal guidelines require that children served by Medicaid be screened for lead poisoning with a blood lead level (BLL) test at ages 12 and 24 months, and up to age 6 years if not previously tested. The California Department of Public Health (CDPH) and the Department of Health Care Services (DHCS) undertook a collaboration to assess BLL screening rates in the group (cohort) of children served by California's Medicaid program, Medi-Cal, who turned 3 years old in Federal Fiscal Year (FFY) 2016.

Data relevant to assessing BLL screening rates among children on Medi-Cal are available in data repositories managed by CDPH and DHCS. The data repositories are intended for different purposes, and analyses of data contained in each separate system offer an incomplete picture of screening rates. A more accurate picture of screening rates is obtained by combining data from the two systems and identifying clients found in both data sets (deterministic matching). In this approach, the analysis searches for children who are found in both data sets, indicating that a specific child has been reported both to CDPH as having received a blood lead test, and to DHCS as having been served by Medi-Cal. Using this approach, we found that of 309,574 children who turned 3 in FFY 2016 (October 1, 2015, to September 30, 2016) and had been enrolled in Medi-Cal at any time (including both children enrolled continuously and enrolled intermittently) before their third birthday, 201,263 (65.0 percent) had at least one blood lead test at some point between the ages of 6 and 35 months. When the analysis was restricted to the subset of 197,847 children who turned 3 in FFY 2016 and had been enrolled in Medi-Cal since they were 6 months old (i.e., continuously), the percentage of children screened increased to 72.6 percent (143,714). This number likely still underestimates the number of Medi-Cal children who received a blood lead test during the time period studied because limitations of the matching approach preclude identifying every child who is truly in both data sets.

Introduction

Pediatric lead exposure at very low levels can adversely affect the normal development of children and may have lifelong impacts.¹ State and federal laws support careful monitoring of pediatric lead exposures and intensive response to positive screening results. CDPH and DHCS administer programs responsible for monitoring the

¹ AAP COUNCIL ON ENVIRONMENTAL HEALTH. Prevention of Childhood Lead Toxicity. Pediatrics. 2016; 138(1):e20161493.
CDC's BLL in Children fact sheet can be found at: <https://www.cdc.gov/nceh/lead/about/program.htm>.

population for childhood lead exposure, investigating suspected cases of lead poisoning, treating children for elevated BLLs, publicly reporting screening rates, and performing other associated activities. In 2018, CDPH and DHCS undertook a cohort analysis to better understand BLL screening rates and data quality considerations.

Background

All blood lead tests drawn in California are to be reported to CDPH² and are recorded in the CDPH Response and Surveillance System for Childhood Lead Exposures (RASSCLE) system. California children who are beneficiaries of Medi-Cal, California's Medicaid program, are to be screened for lead poisoning with a blood test at ages 12 and 24 months and up to age 6 years if not previously tested.³ Medi-Cal beneficiaries receive their health care services either through Medi-Cal Fee-For-Service (FFS) or through a Medi-Cal managed care plan (MCP). FFS Medi-Cal providers are required to submit their claims to DHCS for services paid for by Medi-Cal. MCPs are required to submit their encounter data to DHCS for services provided to Medi-Cal beneficiaries. Public reporting of children receiving BLL screening has been based on data reported to CDPH or claims and encounter data reported to DHCS. In 2018, the CDPH Childhood Lead Poisoning Prevention Branch and DHCS partnered to demonstrate the benefit of combining data from CDPH and DHCS to obtain a more accurate estimate of BLL screening rates among children under the age of 6 receiving Medi-Cal services.

An initial analysis combining data from CDPH and DHCS was performed and shared with the Legislature in June 2018 (Appendix A). Information shared at that time was the result of a "point in time" analysis, and would have missed some children who had actually received lead screening. The analysis examined the number of children ages 12 through 35 months who were enrolled 12 months continuously in Medi-Cal who had a blood lead test during FFY 2015. That initial analysis demonstrated that there are gaps in data completeness in both the CDPH and DHCS data sets. Additionally, BLL data collected by DHCS and CDPH are very different. Medi-Cal data is based on the submittal of a claim or encounter that includes specific procedure and diagnosis codes indicating that a BLL screening has been performed. DHCS receives administrative data in the forms of claims (for FFS beneficiaries) or encounter data (for MCP beneficiaries). DHCS' data does not indicate the completion of a BLL test if a primary care provider performed the test but only documented an office visit. In contrast, CDPH receives data on BLL tests performed by laboratories, including those in a physician's office. CDPH has limited data to indicate whether or not a child is a Medi-Cal beneficiary.

Given these differences in collection processes, the most accurate estimate of the number of Medi-Cal beneficiaries who received a BLL test can only be obtained by combining data from CDPH and DHCS data repositories and matching client-level information. Client-level data, i.e., data which includes personally identifiable information

² California Health and Safety Code Section 124130

³ Title 17, California Code of Regulations Section 37100 (b)(2)

such as a Social Security number, name, date of birth, etc., is needed because there is no unique identifier that is shared between all children in both data repositories (e.g., Medi-Cal numbers and Social Security numbers are rarely included with laboratory results).

This study was undertaken to determine an improved estimate of the number of young Medi-Cal beneficiaries who had received at least a single blood lead test before their third birthday. A similar measure is the Lead Screening in Children (LSC) Healthcare Effectiveness Data and Information Set (HEDIS) measure which assesses the percentage of children two years of age who had one or more capillary or venous blood lead tests for lead poisoning by their second birthday.⁴ Medicaid Health Management Organizations reporting to the National Committee for Quality Assurance (NCQA) have reported that approximately 65 percent of children two years of age had one or more capillary or venous blood lead tests for lead poisoning by their second birthday.

Methodology

This report describes a cohort analysis, in contrast to the point-in-time analysis previously reported. CDPH reports,⁵ by calendar year, the number of individual children screened for lead, by highest level, by age group, and by local health jurisdiction. DHCS reports annually to the Centers for Medicare and Medicaid Services (CMS) on the CMS-416: Annual Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) Participation Report.⁶ Each of these reports reflects a point-in-time analysis based on the number of tests performed in a given year and the age of the child receiving the test in that year.

Point-in-time analyses can be limited based on the way measurement criteria are set. In contrast, cohort analyses follow a group of individuals over time, and can provide a better picture of the true experience of individuals in the group. The cohort analysis in this report was undertaken in order to have a better understanding of prevalence of BLL screening for young children enrolled in Medi-Cal. The time period of interest for BLL screening for these children is 12 and 24 months of age. Health care providers may order the mandated screening at visits that occur exactly on the child's 12 month and 24 month birthdays. However, they may also order the mandated test on a visit that occurs somewhat before or after those dates. To get a complete picture of screening rates, this analysis reviewed the cohort of Medi-Cal-enrolled children who turned 3 in FFY 2016 (October 1, 2015, to September 30, 2016) and who had a BLL screening test that occurred from 6 through 35 months of age.

The most complete and accurate estimate of the proportion of Medi-Cal beneficiaries who have received a BLL test can only be obtained by combining and matching

⁴ <https://www.ncqa.org/hedis/measures/lead-screening-in-children/>

⁵ <https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/CLPPB/Pages/data.aspx>

⁶ <https://www.medicaid.gov/medicaid/benefits/epsdt/index.html>

individual children from CDPH and DHCS data repositories. To identify children appearing in both data repositories, a deterministic match was performed using several variables or combinations of variables since there is no unique identifier that is shared between all children in both data repositories. Matching variables included Social Security number, Medi-Cal number (although a small proportion of the blood lead records contained neither of these data elements), a combination of first name, last name, date of birth, and zip code, or a combination of first name, last name, and seven-digit phone number.

Children with gaps in Medi-Cal enrollment may have different rates of BLL screening from children with continuous enrollment. Therefore, analyses were initially performed to determine BLL screening rates among children who were enrolled at any time prior to their third birthday. Then the analysis was repeated on the subset of these children who had been continuously enrolled prior to age 3. Children were counted as having received a BLL test if there was at least one Medi-Cal claim (fee-for-service) or encounter (managed care) for a blood lead test (CPT code 83655) or a report of a BLL test in the CDPH RASSCLE data system.

Claims that were denied were not included in this analysis. Claims may be denied due to incorrect codes, lack of eligibility of patients, lack of eligibility of providers, and other reasons. MCPs are required to submit encounter data to DHCS as part of their contractual requirements; however, submission of an individual encounter record does not equate with a provider reimbursement. Encounter data indicates that the service was provided.

Findings

Table 1 illustrates the cohort analysis including all Medi-Cal beneficiaries who turned age 3 in FFY 2016 and were enrolled in Medi-Cal at any point during the previous three years. Of the 309,574 children who turned 3 in FFY 2016, 169,234 had a BLL test between 6 and 35 months of age based on data from DHCS (Table 1). After examining the data from the CDPH RASSCLE data system, an additional 32,029 children were found to have received a BLL test. When BLL tests from both CDPH and DHCS data repositories were included, 65.0 percent of Medi-Cal beneficiaries (defined as having been enrolled in Medi-Cal at any point before their third birthday) were found to have been screened at least once for lead poisoning based on these matches.

Table 1. BLL screening rates among children who turned 3 in FFY 2016 and were enrolled in Medi-Cal at any point before they turned 3

Cohort Characteristics	Medi-Cal Beneficiaries Screened	Total Number of Medi-Cal Beneficiaries	Percentage of Medi-Cal Beneficiaries Screened
Turned 3 in FFY 2016: Enrolled any time during 3 years with screening at 6 through 35 months of age (DHCS data only)	169,234	309,574	54.7%
Additional Children Found in CDPH Data	32,029		
Total with Additional Children Found in CDPH Data	201,263	309,574	65.0%

Children who are not enrolled continuously in Medi-Cal may receive services outside of Medi-Cal. Table 2 illustrates the results of analysis of children who turned 3 in FFY 2016 and were continuously enrolled in Medi-Cal. Of the 197,847 children who turned 3 in FFY 2016 and were continuously enrolled in Medi-Cal, 126,045 had a blood lead test based on data from DHCS alone. After examining the data from CDPH, an additional 17,669 children were found to have been tested for lead. Among children continuously enrolled in Medi-Cal, 72.6 percent were found to have been screened at least once for lead poisoning based on these matches.

Table 2. BLL screening rates among children who turned 3 in FFY 2016 and were continuously enrolled in Medi-Cal before they turned 3

Cohort Characteristics	Medi-Cal Beneficiaries Screened	Total Number of Medi-Cal Beneficiaries	Percentage of Medi-Cal Beneficiaries Screened
Turned 3 in FFY 2016: Enrolled continuously during 3 years with screening at 6 through 35 months of age	126,045	197,847	63.7%
Additional Children Found in CDPH Data	17,669		
Total with Additional Children Found in CDPH Data	143,714	197,847	72.6%

Assessment of completeness of matching

This analysis may have failed to identify some Medi-Cal children who received BLL tests, due to limitations in the matching process resulting from missing data or inconsistent information across the two datasets. To determine whether additional children had actually received BLL testing, a random sample of 100 Medi-Cal children who had not matched with CDPH data were identified. Individual searches were then performed to try to locate a BLL test reported to CDPH. Among the 100 children, 14 children were found to have had a test reported to CDPH RASSCLE sometime between the ages of 6 and 35 months. An additional 23 children had a reported test outside that age range (all occurred when the child was age 3 or 4 years). For the remaining 63 children, no BLL test was found in RASSCLE. This indicates that the true rates of BLL screening among children enrolled in Medi-Cal are likely even higher than the estimates shown in Table 2.

Discussion

Depending on whether we included in our analysis all children enrolled at any point in Medi-Cal, or restricted our analysis to only those enrolled continuously, we found that 65 percent to 72.6 percent of Medi-Cal beneficiaries who turned 3 in FFY 2016 had received a BLL test at least once between 6 and 35 months of age. This analysis likely underestimates the true rate of BLL testing in the population, due to limitations inherent in the matching methodology. Because there is no common unique identifier in the CDPH and DHCS data repositories, data matching was performed using a combination of other data elements, including names, dates of birth, ZIP codes, and telephone numbers, when Social Security or Medi-Cal numbers were not available. This likely underestimates the number of Medi-Cal children with a blood lead test in the CDPH data. Furthermore, there are a fair number of laboratory reports that do not contain address, phone number, or any other linking variables (e.g., Medi-Cal number, social security number) beyond name and birth date. This further reduces the likelihood of a match, even if the individual child was truly present in both data repositories. The initial match did not include provider information on the claim and encounter data. Provider information could be included in future analyses to help improve matching.

This cohort analysis included two definitions of Medi-Cal participation: eligibility at any point during the three-year time period and continuous eligibility throughout the three-year period. Using these two definitions, this analysis found estimates of the percentage of Medi-Cal children who received at least one BLL screening test by the age of 3 to be either 54.7 percent among children eligible at any point or 63.7 percent among children continuously enrolled, based on DHCS data alone, and either 65.0 percent or 72.6 percent respectively based on CDPH and DHCS combined data. In contrast, the data reported to CMS on the CMS-416 report requires three months of continuous eligibility but is a point-in-time analysis. Using the data reported to CMS⁷ for

⁷ <https://www.medicaid.gov/medicaid/benefits/epsdt/index.html>

FFY 2017, of the 792,663 children under the age of 3 with three months continuous eligibility in the previous year, 211,836 or 26.7 percent had a BLL screening test in that year, based on DHCS data alone. This demonstrates the substantial difference in estimates of BLL testing rates provided by a cohort analysis as compared to a point-in-time analysis.

There are a number of reasons a BLL screening test may not be found in either the CDPH or DHCS data. Previous testing may be documented in the patient's medical record, as testing may have occurred when the child lived in another state. In this case, the provider may be compliant with federal and state laws, but the data in the CDPH or DHCS systems would not reflect this.

Providers may evaluate a patient for risk of lead exposure through an assessment of environmental hazards and decide that the risk of screening is a greater risk to the child's health than the risk of lead poisoning. The Bright Futures Periodicity Schedule includes in the footnote for Lead Screening to "Perform risk assessments or screenings as appropriate, based on universal screening requirements for patients with Medicaid or in high prevalence areas."⁸ It may not be clear that the requirements for Medicaid included BLL screening (testing) in addition to screening performed through interview or questionnaire techniques. Providers who subcontract with managed care service plans who serve both commercial populations and Medi-Cal populations may not be aware during an office visit that a patient they are seeing is on Medi-Cal and that universal BLL screening (testing) is required for Medi-Cal patients.

Providers work with patients and parents or guardians to develop care plans for the children they care for. Providers may have ordered a BLL test but parents may not have taken the child to a laboratory or draw station to receive the test. This may have been due to time constraints, transportation challenges, misunderstanding, or other reasons. If a test was performed but the specimen was inadequate for laboratory analysis, and the child was not retested, then a BLL screening would not be documented in the CDPH or DHCS data. Lastly, parents may have opted not to have their child tested with a BLL for lead.

While this study determined that the actual number of young Medi-Cal beneficiaries receiving blood lead screening was higher than suggested by previous reports, important questions remain. Future analyses may include:

- Assessing the degree to which Medi-Cal beneficiaries receive appropriate follow up testing when their blood tests indicated that they have elevated BLLs; and,
- Assessing how many Medi-Cal beneficiaries receive two screenings (at 12 and 24 months), as state and federal regulations require.

⁸ https://www.aap.org/en-us/Documents/periodicity_schedule.pdf

CDPH and DHCS are planning future collaborations to answer these questions and ensure that young Medi-Cal beneficiaries receive appropriate services to prevent and address lead exposure.

Reference Materials

Title 17, California Code of Regulations (CCR) Section 37100 (b) (2) requires screening evaluations to be performed as follows:

- When the child is 12 months of age.
- When the child is 24 months of age.
- Whenever the health care provider performing a Periodic Health Assessment (PHA) becomes aware that the child is 12 months to 24 months of age and a BLL test or risk evaluation was not taken at 12 months of age or thereafter.
- Whenever the health care provider performing a PHA becomes aware that the child is 24 months to 72 months of age and a BLL test or risk evaluation was not taken when the child was 24 months of age or thereafter
- Whenever the health care provider who performs a PHA of a child 12 to 72 months of age becomes aware that, in the professional judgment of the health care provider, a change in circumstance has put the child at risk of lead poisoning.

Appendix A: Analysis provided to Legislative Committee June 2018

Children 12-23 months old enrolled 12 months continuously in Medi-Cal with a blood lead test during Federal Fiscal Year 2015						
Type of service	Number of children with DHCS claims data for a blood lead test (CPT code 83655)	Additional blood lead tests in CDPH database ¹	Revised number of children with a blood lead test (DHCS data + CDPH data)	Number of children 12-23 months old enrolled 12 months continuously in Medi-Cal (DHCS)	Percentage of children 12-23 months old enrolled 12 months continuously in Medi-Cal with a blood lead test based on DHCS data only	Percentage of children 12-23 months old enrolled 12 months continuously in Medi-Cal with a blood lead test based on DHCS and CDPH data
Managed Care	59,132	13,289	72,421	132,143	44.7%	54.8%
Fee-for-Service	42,099	9,941	52,040	122,693	34.3%	42.4%
Total	101,231	23,230	124,461	254,836	39.7%	48.8%

Children 24-35 months old enrolled 12 months continuously in Medi-Cal with a blood lead test during Federal Fiscal Year 2015						
Type of service	Number of children with DHCS claims data for a blood lead test (CPT code 83655)	Additional blood lead tests in CDPH database ¹	Revised number of children with a blood lead test (DHCS data + CDPH data)	Number of children 24-35 months old enrolled 12 months continuously in Medi-Cal (DHCS)	Percentage of children 24-35 months old enrolled 12 months continuously in Medi-Cal with a blood lead test based on DHCS data only	Percentage of children 24-35 months old enrolled 12 months continuously in Medi-Cal with a blood lead test based on DHCS and CDPH data
Managed Care	66,394	14,329	80,723	190,949	34.8%	42.3%
Fee-for-Service	16,880	4,597	21,477	61,189	27.6%	35.1%
Total	83,274	18,926	102,200	252,138	33.0%	40.5%

(1) Children identified as tested in the CDPH lead surveillance database but not identified as tested in DHCS Medi-Cal claims data. There is no unique identifier that is shared between all children in both data repositories. Relatively few of the blood lead reports contained Social Security or Medi-Cal numbers. Instead, matches were performed using combinations of variables including names, dates of birth, ZIP codes, and telephone numbers when Social Security or Medi-Cal numbers were not available. Completeness of matching, and therefore, the number of children identified as having had a lead test, was limited by missing or inconsistent information across the two datasets.