U.S. Department of Health and Human Services

Office of Inspector General

More Than One-Third of Medicaid-Enrolled Children in Five States Did Not Receive Required Blood Lead Screening Tests

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October 2021, OEI-07-18-00371

U.S. Department of Health and Human Services

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Report in Brief

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More Than One-Third of Medicaid-Enrolled Children in Five States Did Not Receive Required Blood Lead Screening Tests

Medicaid's Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit covers preventive medical services—including blood lead screening tests—for enrolled children. Previous OIG work regarding EPSDT screenings and annual EPSDT participation reports have identified deficiencies with blood lead level testing. Specifically, OIG found that many enrolled children did not receive all required components of complete medical screenings, including blood lead screening tests, potentially leaving them vulnerable to the toxic effects of lead exposure.

Key Takeaway

In the 5 States we reviewed, 38 percent of 1 million Medicaid-enrolled children did not receive a blood lead screening test at 12 months or 24 months of age, as required by Medicaid's schedule.

Why OIG Did This Review

There is no safe level of lead exposure; even low-level blood lead concentrations during childhood have been associated with behavioral and physical impairments. Children exposed to lead may suffer stunted cognitive development and delayed reproductive development. In the longer term, elevated blood lead levels have been linked to increased incidence of hypertension and coronary heart disease as well as higher rates of violent crime and arrests in adulthood. Prevention is key to avoiding the permanent developmental effects of lead exposure on children. Scheduled blood lead screening tests can support early detection of elevated blood lead levels, timely followup, and improved outcomes for children.

How OIG Did This Review

We selected five States for which we reviewed Medicaid claims data and supplemental health department data for fiscal years (FYs) 2015–18. We examined the extent to which Medicaid-enrolled children received required blood lead screening tests. We also interviewed stakeholders and surveyed practitioners to identify challenges in providing blood lead screening tests, followup services, and treatment for Medicaid-enrolled children.

What OIG Found

Many Medicaid-enrolled children in five States did not receive required blood lead screening tests on schedule during FYs 2015–18. Specifically, more than one-third of the 1 million children who were required to receive a 12-month and a 24-month blood lead screening test received neither test. Additionally, of the approximately 209,000 children who had been continuously enrolled in Medicaid from birth through age 3, 1 in 5 children in the selected States had never received a blood lead screening test by 3 years of age. Finally, stakeholders we interviewed called for consistent requirements for blood lead screening tests and practitioners reported challenges with providing blood lead screening tests for Medicaid-enrolled children.

What OIG Recommends

To address challenges that contribute to low participation rates in the blood lead testing component of the EPSDT benefit, we recommend that CMS:

1. monitor national EPSDT performance data for blood lead screening tests and target efforts toward low-performing States to develop action plans for increasing the provision of blood lead screening tests, according to Medicaid's schedule;

2. ensure consistency across CMS guidance related to actionable blood lead reference values (i.e., the blood lead level at which public health actions should be initiated) and blood lead screening test definitions; and

3. coordinate with partners to develop and disseminate to State Medicaid agencies educational resources that reaffirm requirements and schedules for blood lead screening tests.

CMS concurred with all of our recommendations.

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BACKGROUND

Objectives

1. To determine the extent to which children enrolled in Medicaid received required assessments of blood lead levels (i.e., blood lead screening tests) during fiscal years (FYs) 2015–18
2. To identify challenges that practitioners faced in providing blood lead screening tests, followup services, and treatment for Medicaid-enrolled children

Medicaid's Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit provides comprehensive, preventive medical screening services for millions of children annually.[1] Under this benefit, States must provide enrolled children with services including laboratory testing and blood lead screening tests at early, regular intervals.[2] Previous OIG work on EPSDT services has identified deficiencies. Specifically, OIG found that some enrolled children did not receive all required components of complete medical screenings including blood lead screening tests, potentially leaving them vulnerable to the toxic effects of lead exposure.[3]

Lead exposure is often attributed to a child's home environment (e.g., lead-based paint and dust in old houses, or contaminated soil) or the area in which a child lives (e.g., industrial areas).[4, 5] But sources of lead exposure are widespread and not tied to specific areas of the Nation; cases have been chronicled from coast to coast.[6, 7, 8] Children can also be exposed to lead through food, water, toys, and consumer products in their homes.[9, 10, 11] Many of these exposure sources can present particular hazards for young children as they become mobile, begin to explore their environments, and engage in hand-to-mouth activity.[12] Cumulative exposures can have lasting impacts on childhood development.[13]

There is no safe level of lead exposure; even low-level blood lead concentrations during childhood have been associated with behavioral and physical impairments.[14] Children exposed to lead may suffer stunted cognitive development (e.g., reduced academic performance and increased impulsivity), and delayed reproductive development.[15] In the longer term, elevated blood lead levels (EBLLs) have been linked to increased incidence of hypertension and coronary heart disease, as well as to higher rates of violent crime and arrests in adulthood.[16, 17, 18] Prevention is key to avoiding the permanent developmental effects of lead exposure on children.[19] Scheduled blood lead screening tests can support early detection of EBLLs, timely followup, and improved outcomes for children.

Early and Periodic Screening, Diagnostic, and Treatment Services

Medicaid's EPSDT benefit provides comprehensive, preventive medical screening services for millions of children annually to avoid and reduce childhood illnesses.[20, 21] States must establish periodicity schedules that set the frequency for EPSDT services to occur in consultation with recognized medical organizations involved in pediatric health care such as the American Academy of Pediatrics (AAP).[22, 23] Components of EPSDT medical screenings include a comprehensive health and developmental history; physical exam; age-appropriate immunizations; laboratory tests (including blood lead screening tests appropriate for age and risk factors); and health education.[24]

When conditions or illnesses are identified through screenings, EPSDT covers necessary treatment, services, and other medical assistance to correct or ameliorate the issues, regardless of whether such corrective services are covered under State plans.[25]

Centers for Medicare & Medicaid Services Requirements and Activities Regarding Blood Lead Screening Tests and Diagnosis of Elevated Blood Lead Levels

The CMS State Medicaid Manual requires enrolled children to receive blood lead screening tests at 12 and 24 months of age.[26] These tests include the collection of a blood sample via a capillary blood draw (i.e., fingerstick) or venipuncture (i.e., blood collected from a vein). If a capillary draw identifies a blood lead level (BLL) equal to or greater than 10 µg/dL (micrograms per deciliter), a confirmatory test must be conducted using venipuncture to verify the child's level.

CMS issued updated guidance on blood lead screening tests via two Informational Bulletins published in 2012 and 2016. The 2012 guidance allowed States to request approval from CMS to implement a targeted blood lead screening program in lieu of universal blood lead screening test requirements for all Medicaid-enrolled children ages 12 months and 24 months.[27] To date, only Arizona has been approved for a targeted program. CMS's 2016 guidance cited the current Centers for Disease Control and Prevention (CDC) actionable blood lead reference value of 5 µg/dL, which is the level at which the CDC recommends that public health actions be taken.[28] CMS did not revise the policy in The State Medicaid Manual to reflect this change. CMS also stated in the bulletin that completion of a risk assessment questionnaire—sometimes referred to as lead screening questions—would not satisfy the Medicaid blood lead testing requirement.

CMS has engaged in additional activities with Federal partners and professional organizations related to blood lead screening test requirements. Some activities included a session at the 2016 CMS Quality Conference and a webinar as part of National Lead Poisoning Prevention Week in 2018.

Other Guidance Related to Blood Lead Screening Tests and Followup for Elevated Blood Lead Levels

CMS suggests that States reference—along with Medicaid EPSDT requirements—other practice guidelines related to lead screening and followup for EBLLs.[29] These include guidance developed by CDC as well as the AAP's *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*. See Appendix A for a table of the EPSDT requirements and CMS-suggested guidance related to blood lead screening tests and followup for EBLLs.

CDC

CDC guidance recommends that practitioners follow Medicaid guidelines for blood lead screening of Medicaid-enrolled children.[30] CDC also advises practitioners to use screening questions, outreach, and parental education to minimize a child's exposure to lead prior to testing. When testing indicates confirmed blood lead levels above 5 µg/dL in children, CDC recommends that practitioners initiate public health actions (e.g., followup testing within 3 months).[31]

AAP

AAP guidance regarding lead screening and followup for EBLLs emphasizes prevention and risk assessment as key factors in reducing childhood lead exposure. One prevention effort is AAP's anticipatory guidance, which outlines discussion points to educate parents about lead exposure, minimize risks, and develop a plan to create a lead-safe environment for children.[32] This effort also includes the use of environmental assessments and risk assessments at designated intervals of the Bright Futures/AAP periodicity schedule, and screenings for Medicaid-enrolled patients at 12 months and 24 months of age.[33, 34] When practitioners identify blood lead levels above 5 µg/dL in a child, AAP recommends followup services such as finding and removing environmental sources of lead, and observing the child's diet and nutritional status.[35]

State Reporting on Blood Lead Screening Tests and Lead Surveillance Activities

State EPSDT Reports

Each year, CMS requires States to submit EPSDT reports that track the expected and actual number of EPSDT screening services provided to Medicaid-enrolled children in different age groups.[36, 37] Form CMS-416 allows States to count instances of certain medical screening procedures, including blood lead screening tests, as proxies for reporting complete medical screenings. In 1990, the Secretary of the Department of Health and Human Services established a target goal of 80-percent EPSDT participation by 1995, but States have typically fallen short.[38, 39] Although the EPSDT

participation goal applies broadly to initial or periodic screening services and is not specific to blood lead screening tests, annual EPSDT reporting suggests that there is room for improvement in blood lead screening tests. When the number of blood lead screening tests reported nationally in 2018 on Form CMS-416 is compared to the number of eligible children, the data suggest that only about 46 percent of children between 12 months and 24 months of age received a blood lead screening test.[40, 41] This reporting methodology introduces imprecision; rates could be impacted if any child has more than one Medicaid identification number, or if any child receives multiple blood lead screening tests during a period of enrollment. Furthermore, EPSDT reporting may not capture all instances of blood lead screening tests in cases in which tests were not billed to Medicaid. Sometimes, Medicaid-enrolled children may receive testing through participation in Head Start, WIC, or other programs funded by State and local health agencies. In addition to tracking screening services, CMS requires States to count the total number of children referred for corrective services and/or treatments in cases in which screenings identified illnesses or conditions (e.g., an EBLL identified through a blood lead screening test).

State Lead Surveillance Programs

Some State and local health departments receive grant funding from CDC for activities such as establishing programs to prevent childhood lead poisoning.[42] These programs promote education, enhanced blood lead screening efforts, and referrals for medical and environmental intervention in cases of childhood lead exposure.[43] The programs often play a role in State surveillance efforts as well, including the collection and reporting of blood lead screening test data to ensure that children with EBLLs receive followup and case management.[44] For all States included in this review, practitioners and/or laboratories are required to report the results of any child's blood lead screening test, regardless of BLL, for lead surveillance purposes. CDC currently funds 35 programs in States and some large cities, and requires quarterly reporting of lead surveillance data as a condition of the grant.[45, 46] CDC applies standard definitions and classifications for terms such as "screening test" in its collection of States' lead surveillance data.[47] See Exhibit 1 on the next page for selected State activities to prevent childhood lead exposure and improve blood lead screening test rates.

Exhibit 1: Following our FYs 2015-18 review period, selected States engaged in activities to prevent childhood lead exposure and support lead surveillance efforts.

State	Activity
CA	In 2020, California enacted legislation to improve the provision of blood lead screening tests among children enrolled in Medicaid Managed Care plans.[48] The Department of Public Health collaborated with the Department of Health Care Services on a strategy to identify providers with low rates of performing blood lead screening tests for Medicaid-enrolled children and to improve screening practices among these providers.[49]
NY	In 2019, the New York State Public Health Law was amended to lower the definition of an EBLL from 10 ug/dL to 5 ug/dL.[50] New York City implemented a campaign to prevent lead poisoning, including an initiative to increase the number of children that receive blood lead screening tests.[51]
OH	During Healthy Homes Awareness Month in 2019, staff from the Ohio Department of Health visited physicians' offices and offered trainings to increase the provision of blood lead screening tests for at-risk children. The Department of Health also received $10 million from the Ohio State Medicaid agency to fund lead hazard control projects.[52]
PA	In 2019, the State implemented an initiative to increase children's access to blood lead screening tests. The Pennsylvania Department of Health also collaborated with the State Medicaid agency on a data-matching project to improve lead surveillance data and the provision of screenings for Medicaid-enrolled children.[53]
TX	In 2019, the Texas lead poisoning prevention program collaborated with the University of Texas on a data project to assess the completeness of State lead surveillance data. The collaboration also included production of a series of educational modules for providers on compliance related to blood lead screening tests, reporting, and followup.[54]

Source: OIG review of State activity documentation, 2021.

Methodology

This study includes an evaluation of Medicaid claims and blood lead testing data from State health departments, a practitioner survey, and stakeholder interviews. We did not conduct a medical record review to determine the rate of EBLLs among children who received blood lead screening tests or the efficacy of treatment; this material can be found in a future OIG companion report.

To assess the extent to which children in five selected States received required blood lead screening tests, we collected Medicaid Management Information System data for FYs 2015-18. Specifically, we collected fee-for-service claims, managed care encounter claims, and eligibility data from the States of California, New York, Ohio, Pennsylvania, and Texas. We also collected blood lead testing data from the selected States' health departments for the same time period. Together, the combined data comprised blood lead screening tests that Medicaid-enrolled children received in medical office visits, labs, and in other settings (e.g., tests administered at public health fairs) for the cumulative period of review.

We conducted several analyses of the combined Medicaid and State health department data. To account for BLL tests that occurred at the required 12- and 24-month time periods, and off-schedule tests that occurred for a subset of children, we determined the percentages of Medicaid-enrolled children who received:

1) a blood lead screening test on schedule at 12 months and at 24 months of age; and
2) a blood lead screening test at any point before 3 years of age.

For the above analyses, we identified evidence of blood lead tests within each of the time periods. From the Medicaid data, we used a blood lead test procedure code detailed in the Form CMS-416 instructions to States for annual reporting. From the State health department data, we counted dates of service for blood lead tests. The analyses also contained other criteria that precluded comparison to aggregate blood lead test data in annual EPSDT reporting. See Detailed Methodology for further details regarding our analyses.

To collect information regarding challenges in the provision of blood lead screening tests, followup services, and treatment, we surveyed practitioners and conducted stakeholder interviews. We surveyed 706 practitioners in the selected States about lead screening and diagnosis practices, and any barriers to the provision of blood lead screening tests, followup services, and treatment. We received responses from 193 practitioners, which was a simple final response rate of 27 percent (see Limitations below).[55] We interviewed stakeholders from government agencies and professional organizations regarding blood lead screening tests and outreach to practitioners, parents, and caregivers. We reviewed the survey responses and interview data to identify common themes.

Limitations. It is possible that some children in our review received blood lead screenings that were not submitted to Medicaid or reported to State health departments. Therefore, this study may underestimate the number of children who received blood lead screenings. In addition, we relied on State health departments to match the data and did not verify the accuracy of their efforts.

In the weeks and months following the deployment of the practitioner survey, the COVID-19 pandemic impacted day-to-day operations in practitioners' offices in some States and many practitioners did not respond to repeated requests to complete the survey. Because of the low survey response rate of 27 percent, results of the practitioner survey are not generalizable.

Standards

We conducted this study in accordance with the Quality Standards for Inspection and Evaluation issued by the Council of the Inspectors General on Integrity and Efficiency.

FINDINGS

More than one-third of Medicaid-enrolled children in 5 States did not receive a blood lead screening test at 12 months or 24 months of age, as required by Medicaid's schedule

More than one-third of Medicaid-enrolled children in the five selected States did not receive a required blood lead screening test on schedule. That is, 38 percent of the approximately 1 million children who should have received a 12-month test and a 24-month test received neither test (see Exhibit 5 in Detailed Methodology). Medicaid's schedule requires that enrolled children be screened for lead exposure via blood testing at 12 months and 24 months of age.

Exhibit 2: In selected States, many children did not receive blood lead screening tests at required intervals.

38% of Medicaid-enrolled children did **not** receive a 12-month or a 24-month blood lead screening test.

Source: OIG analysis of Medicaid claims data, 2021.

For more information regarding our review of Medicaid claims and blood lead testing data from State health departments, please see Detailed Methodology. See Appendix B for more information on individual State rates of blood lead screening tests.

Fifty percent of Medicaid-enrolled children in 5 States did not receive a blood lead screening test at 12 months of age, as required by the schedule

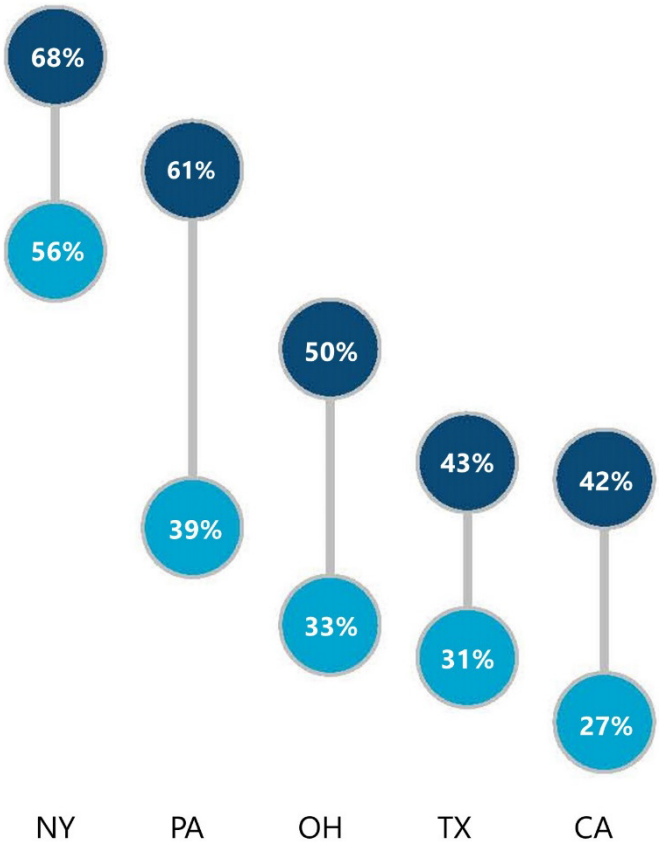
Of the 1.8 million Medicaid-enrolled children who should have received a blood lead screening test at 12 months of age in the selected States, more than 900,000 children did not receive a test. The scheduled 12-month blood lead screening test is important to identify early exposure and to establish primary prevention efforts. For children who drink formula, and may thereby ingest greater quantities of tap water, this initial required test could aid practitioners in timely detection of EBLLs in cases in which water is the source of lead exposure. Early testing also offers practitioners an opportunity to educate parents on lead exposure risks and to discuss how to create a lead-safe environment for children as they learn to crawl and walk.

For more details regarding States' rates of blood lead screening tests for children at 12 months of age, see Appendix B.

Nearly two-thirds of Medicaid-enrolled children in 5 States did not receive a blood lead screening test at 24 months of age, as required by the schedule

Of the 1.9 million Medicaid-enrolled children who should have received a blood lead screening test at 24 months of age, more than 1.2 million children did not receive a test. In all 5 States, a smaller proportion of children received this second required blood lead screening test, compared to the number of children who were tested at 12 months of age.

Exhibit 3: In all 5 States, a higher proportion of Medicaid-enrolled children received a blood lead screening test at 12 months of age than at 24 months of age.



Source: OIG analysis of Medicaid claims data, 2021.

As children age, the number of scheduled medical office visits for EPSDT screenings typically decreases. Therefore, during their second year of life, Medicaid-enrolled children may have fewer opportunities to be examined by practitioners and fewer opportunities to receive their second required blood lead screening test.

For young children who often exhibit hand-to-mouth behaviors, the scheduled 24-month blood lead screening test is critical; as children gain mobility, they face increased risks of encountering lead in dirt and dust, toys, and consumer products around the home. The second scheduled test also provides practitioners with another opportunity to educate parents and to discuss the impacts of diet and nutrition on childhood lead absorption.

For more details regarding States' rates of blood lead screening tests for children at 24 months of age, see Appendix B.

For those children who had been continuously enrolled in Medicaid from birth through age 3, 1 in 5 children in the selected States had never received a blood lead screening test by 3 years of age

Of the approximately 209,000 children with continuous Medicaid enrollment from birth to 3 years of age in the 5 States, 21 percent of the children had not received a blood lead screening test before their third birthday (see Appendix B).

Exhibit 4: In selected States, some children were never tested for elevated blood lead levels before their third birthday.

21% of children with continuous enrollment in Medicaid from birth did **not** receive a blood lead screening test by 3 years of age.

Source: OIG analysis of Medicaid claims data, 2021.

Children included in this analysis had 3 years of continuous Medicaid enrollment and therefore had more time to receive a blood lead screening test than children included in the 12- and 24-month analyses. Still, many were never tested.

Stakeholders called for consistent requirements for blood lead screening tests and practitioners reported challenges with providing tests for Medicaid-enrolled children

Through interviews with stakeholders (e.g., government agencies and professional organizations) and surveys of practitioners, we gathered insights and challenges related to providing blood lead screening tests and followup services for Medicaid-enrolled children. Although CMS does not establish clinical guidelines, stakeholders called for CMS to adopt an actionable blood lead reference value (i.e., a blood lead level at which public health actions should be initiated), as the blood lead reference values published in the CMS State Medicaid Manual and the 2016 Informational Bulletin are not consistent. Stakeholders also called for consistent definitions related to blood lead screening tests. Furthermore, surveyed practitioners reported logistical challenges and other barriers related to providing blood lead screening tests for Medicaid-enrolled children. See Appendix C for response rates to individual survey questions.

Stakeholders called for consistency across CMS guidance related to actionable blood lead reference values and blood lead screening test terminology

Stakeholders described opportunities for CMS to adopt consistent blood lead reference values and blood lead screening definitions across CMS requirements and guidance. Stakeholders reported challenges related to the lack of a consistent actionable blood lead reference value. Although the CMS State Medicaid Manual defines a BLL of 10 µg/dL as actionable, CMS' Informational Bulletin references CDC's actionable BLL of 5 µg/dL. Therefore, practitioner reimbursement for activities to identify the source of a child's lead exposure could be limited by some State Medicaid agencies to only those cases in which a child has an actionable BLL of 10 µg/dL or above. Stakeholders agreed and shared that discrepancies in what qualifies as an actionable BLL can limit a child's access to followup services and interventions. Stakeholders also noted that CMS requirements and guidance lack definitions for blood lead testing terms. For example, the CMS State Medicaid Manual does not include definitions for the terms "test," "screening test," and "confirmed elevated BLL," which are included in CDC's standard lead surveillance definitions.

Practitioners reported logistical challenges and other barriers related to providing blood lead screening tests

Surveyed practitioners reported challenges with parental followup related to scheduled lab appointments, which can limit practitioners' abilities to screen for EBLLs. Practitioners noted that children frequently miss scheduled lab appointments where they would receive initial and/or followup blood lead screening tests because these tests often require an additional office visit. If Medicaid-enrolled children do not attend lab appointments to obtain testing on schedule, practitioners may not be aware of EBLLs, leaving children vulnerable to the toxic effects of lead exposure.

Practitioners also reported that parents occasionally decline blood lead screening tests and followup tests for children. During the first few years of life, a child attends frequent medical office visits for preventive care EPSDT screenings and typically receives immunizations at each appointment. Parents may not want to subject their child to a capillary or venous blood draw on top of the multiple immunizations that may occur during an office visit. When parents decline screenings during scheduled EPSDT medical office visits, practitioners could miss screenings at later dates, causing Medicaid-enrolled children to fall behind schedule for critical BLL testing.

CONCLUSION AND RECOMMENDATIONS

During the timeframe of this work, CMS took steps to coordinate with partners in support of blood lead screening test requirements for Medicaid-enrolled children. Some activities included the development of a 2016 Informational Bulletin, a session at a CMS Quality Conference, and a webinar as part of National Lead Poisoning Prevention Week.

Despite these efforts, our review determined that CMS must continue to focus its attention on the blood lead screening test component of EPSDT. To date, only one State has been approved for a targeted lead screening program,[56] and most Medicaid-enrolled children are required to receive blood lead screening tests at 12 months and 24 months of age, per Medicaid's schedule. However, we found that many Medicaid-enrolled children did not receive required blood lead screening tests on schedule. In fact, half of the children in selected States did not receive their first required blood lead screening test at 12 months of age, and more than 60 percent of children did not receive their second required test at 24 months of age.

Via stakeholder interviews and practitioner surveys, we identified several factors that may contribute to low participation rates in the BLL testing component of EPSDT. We determined that existing CMS guidance is lacking consistency in actionable blood lead reference values and definitions to help guide the provision of blood lead screening tests, diagnosis of EBLLs, and followup services. Additionally, we determined that missed lab appointments and declined blood lead screening tests present serious challenges to timely testing for and diagnosis of EBLLs.

On the basis of these findings, we recommend that CMS implement strategies to address these challenges. Specifically, we make three recommendations to CMS:

Monitor national EPSDT performance data for blood lead screening tests and target efforts toward low-performing States to develop action plans for increasing tests, according to Medicaid's schedule

CMS should actively monitor national EPSDT performance data for blood lead screening tests to identify low-performing States. For low-performing States in the lowest quartile, CMS should request that States develop action plans to improve blood lead screening test rates. CMS should also alert States if they are at risk of entering the lowest quartile. The plans should include State-specific objectives to improve screening rates and ensure Medicaid-enrolled children receive BLL testing on schedule. The plans should also establish reasonable timelines for States to meet outlined objectives and allow CMS to track progress over time. The plans could promote the use of innovative strategies (e.g., linking Medicaid claims with State

health department data to identify testing deficiencies; launching point-of-care testing initiatives to support blood lead screening tests in medical office settings).[57, 58] Finally, the plans could encourage States to report promising strategies to improve rates of blood lead screening tests.

Ensure consistency across CMS guidance related to actionable blood lead reference values and blood lead screening test definitions

CMS should adopt consistent blood lead reference values and definitions for blood lead screening tests across CMS guidance. To accomplish this, CMS should ensure the actionable blood lead reference value across its guidance aligns with the CDC's actionable blood lead reference value. Furthermore, CMS should consider incorporating the CDC's standard lead surveillance definitions across CMS guidance.

Coordinate with partners to develop and disseminate to State Medicaid agencies educational materials that reaffirm requirements and schedules for blood lead screening tests

CMS should continue to coordinate with Federal agencies (e.g., CDC) and medical organizations (e.g., AAP) to develop educational materials to share with State Medicaid agencies. To support early identification and improved outcomes for children exposed to lead, the materials should clearly communicate Medicaid's requirements and testing schedule, and the materials should highlight the current actionable blood lead reference value. CMS could share these materials and reaffirm its support for improved blood lead screening test rates by developing an Informational Bulletin or holding a workshop for State Medicaid agencies.

AGENCY COMMENTS AND OIG RESPONSE

CMS concurred with all of our recommendations.

In response to our first recommendation—for CMS to monitor national EPSDT performance data for blood lead screening tests and target efforts toward low performing States to develop action plans for increasing tests, according to Medicaid's schedule—CMS stated that it would monitor national EPSDT performance data for blood lead screening tests in order to identify States performing in the lowest quartile. CMS will request that States performing in the lowest quartile develop an action plan, and CMS will provide technical assistance, as necessary.

In response to our second recommendation—for CMS to ensure consistency across CMS guidance related to actionable blood lead reference values and blood lead screening test definitions—CMS stated that it recognizes the need for consistent guidance, and will work to ensure that CMS guidance reflects the current blood lead reference value established by the CDC.

In response to our third recommendation—for CMS to coordinate with partners to develop and disseminate to State Medicaid agencies educational materials that reaffirm requirements and schedules for blood lead screening tests—CMS stated that it has undertaken considerable outreach efforts around Medicaid blood lead screening requirements, and remains committed to working with both Federal and State partners to ensure that all children enrolled in Medicaid and CHIP receive required blood lead screening tests. CMS will continue to engage with its partners and identify educational and outreach materials available to help states reaffirm requirements and schedules for blood lead screening tests.

OIG appreciates CMS's steps to address deficiencies in childhood blood lead screening tests for Medicaid-enrolled children, and continues to encourage CMS's efforts to engage both Federal and State partners in protecting children from toxic lead exposure.

Appendix D provides the full text of CMS's comments.

DETAILED METHODOLOGY

State Selection

For this evaluation of blood lead screening tests, and a forthcoming companion medical record review of followup services and treatment for children with elevated blood lead levels (EBLLs), we selected five States: California, New York, Ohio, Pennsylvania, and Texas. These States had among the highest number of children with confirmed EBLLs, based on National Childhood Blood Lead Surveillance Data from the Centers for Disease Control. We selected these States to ensure that we would have a large enough population of children with EBLLs to sample from for our medical record review.

Medicaid Claims and State Health Department Data Analysis

Population Selection

This study included Medicaid-enrolled children born between January 1, 2013, and December 31, 2016, from California, New York, Ohio, Pennsylvania, and Texas. We examined the population of children with at least 6 months of continuous Medicaid enrollment who were eligible to receive a blood lead screening test at 12 months of age and at 24 months of age. We also evaluated the population of children with continuous Medicaid enrollment starting at birth who received a blood lead screening test by 3 years of age.

Data Collection

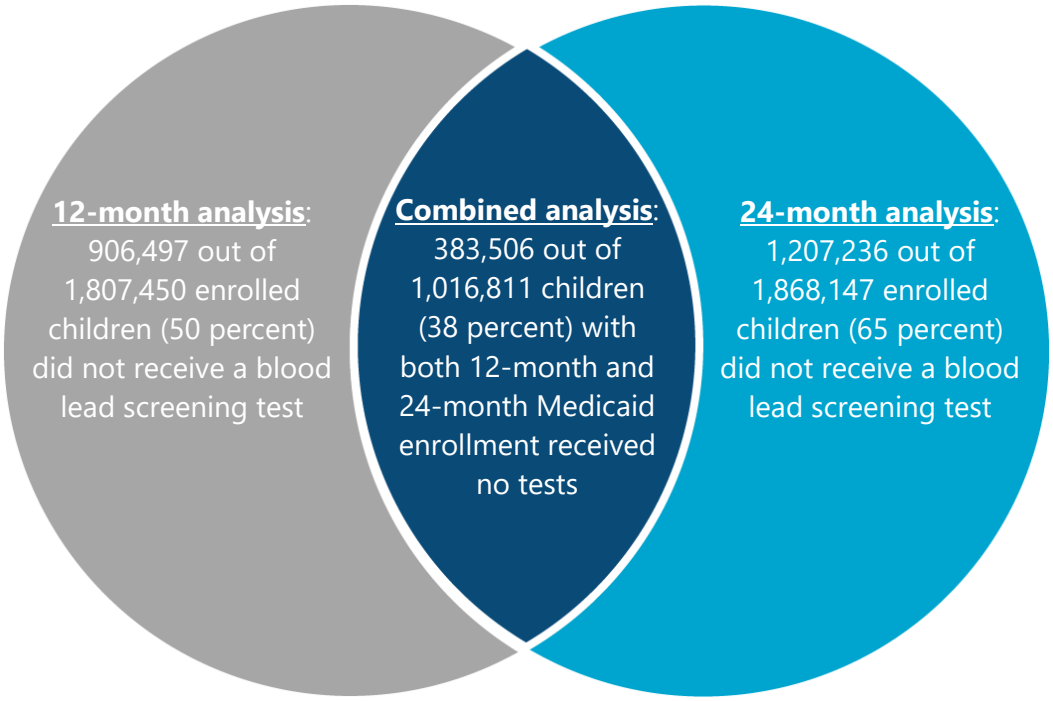
Medicaid Claims. We collected Medicaid Management Information System fee-for-service and managed care encounter claims from Fiscal Years (FYs) 2015 through 2018, as well as all of the dates of Medicaid eligibility for the defined population in the selected States. The data included eligibility information and all incurred outpatient claims (i.e., all claims that practitioners submitted) for our population of children.

State Health Department Data. Medicaid-enrolled children may receive blood lead screening tests that are not billed to Medicaid. To capture tests that were not submitted to Medicaid but were reported to State health departments, we requested blood lead testing data from each of the selected States. Specifically, unique identifiers of 2,284,414 Medicaid-enrolled children were sent to respective State health departments. The health departments matched these children to blood lead testing databases and returned relevant blood lead screening tests to OIG.

Blood Lead Screening Rate Analysis

Eligibility. From the Medicaid claims, we identified children for the 12-month and 24-month screening rate analyses who were continuously enrolled in Medicaid and eligible to receive a blood lead screening test for 3 months preceding and 3 months following their first and second birthdays, respectively. For instance, children in the 12-month analysis had to have been continuously enrolled in Medicaid from 9 months of age to 15 months of age. This approach provided a reasonable buffer for children to meet the EPSDT requirement. Children in the combined 12-month and 24-month analysis (i.e., finding 1 on page 8) had to have continuous Medicaid enrollment from 9 to 15 months of age and 21 to 27 months of age. Therefore, children included in the combined analysis were also represented in the respective 12-month and 24-month analysis populations (see Exhibit 4 below). Children included in the 3-year analysis had to have been continuously enrolled in Medicaid from birth to 3 years of age. Children with a populated date of death variable were excluded from all analyses.

Exhibit 5: Children in the combined 12-month and 24-month analysis were also represented in the respective 12-month and 24-month analysis populations of Medicaid-enrolled children.



Source: OIG analysis of Medicaid claims data, 2021.

Data Analysis. To identify blood lead screening tests for enrolled children in the cumulative Medicaid claims data, we referenced the CMS Form-416 instructions for

States. Form-416 criteria allow States to report blood lead screening tests as claims with a blood lead test medical procedure, accompanied by certain diagnoses, or by reporting data collected from the use of a measure developed by the National Committee for Quality Assurance.[59] We broadly defined a blood lead screening test as any instance of a blood lead test procedure code, regardless of diagnosis, to facilitate matching with State health department data.

For Medicaid-enrolled children who were eligible for one of the respective analyses (e.g., the 12-month analysis) but did not have a qualifying blood lead screening test claim, we looked for blood lead screening tests in State health department data. Specifically, we looked for evidence of dates of service for blood lead tests. These data were merged with Medicaid data to determine a more complete screening rate and account for tests received during medical office visits, in labs, and in other settings in which tests may not have been billed to Medicaid (e.g., tests administered at public health fairs or schools). See Appendix B for States' screening rates.

Unit of Measure. The findings in this study are expressed in terms of unique children and the number of required blood lead screening tests enrolled children received before age 3. For this reason, we do not report our analysis broken out by fiscal year as this would limit our ability to track a child over time. It is possible for a child to have multiple Medicaid identification numbers within a State. Therefore, prior to analysis, we created an arbitrary, unique identifier per child based on Social Security numbers. This approach reduces the probability of reporting the same child more than once.

Data Validation and Quality Assurance

We performed extensive data validation and quality assurance checks, including:

- null analysis of selected variables compared to Medicaid Statistical Information System threshold tolerances;[60]
- independent, peer review, and quality assurance checks of all analyses; and
- incorporation of each State's timeliness of reporting guidelines into analysis.

Through this validation process, we concluded that the data were usable for the analyses conducted for this study.

Practitioner Survey

Population Selection

For the 5 States included in this evaluation, we identified 35,116 unique National Provider Identifiers (NPIs) for Medicaid-enrolled practitioners who billed for well-child medical procedure office visits from FY 2015 through FY 2018.

Sample

From this population, we selected a simple random sample of 150 practitioners enrolled in Medicaid in each of the 5 States, as identified in the Medicaid claims analysis. Thirty-five of the selected NPIs were associated with businesses and 9 of the selected NPIs were deactivated or associated with practitioners who had retired. This resulted in a final sample size of 706 practitioners.

Survey of Practitioners

We administered a survey to the sampled practitioners regarding practices and barriers related to childhood blood lead screening tests, followup services, and treatment for Medicaid-enrolled children. We asked the practitioners about topics including: (1) when and how they typically conduct blood lead screenings for Medicaid-enrolled children; (2) any barriers they face when screening and providing services for Medicaid-enrolled children; and (3) their experiences with guidance and educational resources related to blood lead screenings. We collected the survey data from February to June 2020.

To distribute the survey, we mailed practitioners a letter and a paper copy of the survey informing them of the effort. We also sent an email with a link to a web-based survey. We made multiple attempts to contact practitioners via mail, email, phone, and facsimile.

We received responses from 193 practitioners for a final response rate of 27 percent. The weighted response rate, based on responses within each State, was 25 percent. To evaluate practices and barriers related to childhood blood lead screening tests, followup services, and treatment for Medicaid-enrolled children, we analyzed the 193 survey responses. Due to the low response rate, and item nonresponse for individual questions, results of the survey are not generalizable. See Appendix C for response rates to individual survey questions.

Stakeholder Interviews

To gather information regarding childhood lead exposure, blood lead screening tests, and outreach to practitioners, parents, and caregivers, we conducted structured interviews with stakeholders. The interview respondents included specialists from the Pediatric Environmental Health Specialty Unit Network and the Agency for Toxic Substances and Disease Registry, and officials from the American Academy of Pediatrics and the Children's Environmental Health Network.

APPENDIX A

Requirements and Guidance for Blood Lead Screening Tests and Followup for Elevated Blood Lead Levels

The following tables provide an overview of requirements and guidance from CMS, the CDC, and AAP regarding blood lead screening tests, followup services, and treatment for children.

	Risk Assessment / Screening Questions	Blood Lead Screening Tests	Additional Considerations
CMS State Medicaid Manual[I]		All children enrolled in Medicaid are required to receive a screening blood test at 12 months and at 24 months. Children between 36 months and 72 months of age must receive a screening blood lead test if they have not been screened previously. A blood lead test result equal or greater than 10 ug/dL obtained by capillary specimen (fingerstick) must be confirmed using a venous sample.	All children are considered at risk and must be tested for lead poisoning.
CMS 2016 Informational Bulletin[II]	Completion of a risk assessment questionnaire does not meet the Medicaid requirement.	All children enrolled in Medicaid are required to receive blood lead screening tests at ages 12 months and 24 months. In addition, any child between 24 months and 72 months of age with no record of a previous blood lead screening test must receive one. The Medicaid requirement is met only when the two blood lead screening tests (or a catchup) are conducted.	To align the Medicaid lead screening policy with that of the CDC, CMS expanded its lead screening policy in 2012 to allow states to request approval from CMS to implement a targeted lead screening program.
CDC[III]	Clinicians' roles should include screening questions, outreach, and education to minimize exposures prior to blood lead testing.[IV]	The CDC recommends that Medicaid-enrolled children be screened at ages 12 months and 24 months, and once between 36 months and 72 months for those without prior screening.	
AAP[V]	The Bright Futures/AAP Periodicity Schedule recommends a risk assessment at the following well-child visit intervals: 6 months, 9 months, 12 months, 18 months, 24 months, and at 3, 4, 5, and 6 years of age.	A blood lead test is only recommended if the risk assessment comes back positive or as appropriate based on universal screen requirements for patients with Medicaid or in high prevalence areas.	Universal screens or blood lead level tests are no longer recommended except for in high prevalence areas with an increased risk factor.

Sources: I) CMS, *The State Medicaid Manual*, Chapter 5: "Early and Periodic Screening, Diagnostic and Treatment Services," section 5123.2.D. Accessed at https://go.usa.gov/xU2VG on October 29, 2017.
II) CMS, *CMCS Informational Bulletin*, "Coverage of Blood Lead Testing for Children Enrolled in Medicaid and the Children's Health Insurance Program," November 30, 2016. Accessed at https://go.usa.gov/xHF8p on August 26, 2020.
III) CDC, "Recommendations for Blood Lead Screening of Medicaid-Eligible Children Aged 1-5 Years: An Updated Approach to Targeting a Group at High Risk," August 7, 2009. Accessed at https://go.usa.gov/xFx5u on August 10, 2020.
IV) CDC, "Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention," January 4, 2012. Accessed at https://go.usa.gov/xU58B on July 16, 2018.
V) AAP, "Detection of Lead Poisoning, 2016." Accessed at https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/lead-exposure/Pages/Detection-of-Lead-Poisoning.aspx on July 15, 2018.

	Blood Lead Reference Level	Recommended Followup	Recommended Treatment
CMS State Medicaid Manual[I]	10 ug/dL (see Recommended Treatment)		If a child is found to have blood lead levels equal to or greater than 10 ug/dL, providers are to use their professional judgment with reference to CDC guidelines covering patient management and treatment, including followup blood tests and initiating investigations to determine the source of lead, where indicated.
CMS 2016 Informational Bulletin[II]	The bulletin references the CDC, which recommends 5 ug/dL is the threshold level at which public health actions be taken	States should have guidance and resources available to support providers, families and other stakeholders who work to obtain appropriate services for children with EBLLs.	Under the EPSDT benefit, Medicaid provides comprehensive coverage for any service described in section 1905(a) of the Social Security Act needed that is medically necessary to correct or ameliorate defects in physical and mental illnesses or conditions identified by the screening services. States have an affirmative obligation to ensure that Medicaid-eligible children and their families are aware of the services that are a part of the EPSDT benefit and have access to required screenings and necessary treatment services. Medicaid also provides reimbursement for lead investigations in the home or primary residence of a child with an EBLL.
CDC[III]	The CDC uses a blood lead reference value of 5 ug/dL, which is based on National Health and Nutrition Examination Survey data from 2007-2008 and 2009-10.	The CDC provides a schedule for followup blood lead testing for blood lead levels ranging from ≥5-9 ug/dL to ≥45 ug/dL.[IV]	The CDC provides a summary of recommendations for followup and case management of children based on confirmed blood lead levels ranging from <5 ug/dL to ≥70 ug/dL. Services range from anticipatory guidance and environmental investigations for lower ranges to abdominal x-rays and chelation for higher ranges.[IV]
AAP[V]	The current reference value is 5 µg/dL or greater for case management.		Recommended treatment includes finding and eliminating the source of lead, instruction in personal and household hygiene measures, optimizing the child's diet and nutritional status, and close followup.

Sources: I) CMS, *The State Medicaid Manual*, Chapter 5: "Early and Periodic Screening, Diagnostic and Treatment Services," section 5123.2.D. Accessed at https://go.usa.gov/xU2VG on October 29, 2017.
II) CMS, *CMCS Informational Bulletin*, "Coverage of Blood Lead Testing for Children Enrolled in Medicaid and the Children's Health Insurance Program," November 30, 2016. Accessed at https://go.usa.gov/xHF8p on August 26, 2020.
III) CDC, *Blood Lead Levels in Children.* Accessed at https://www.cdc.gov/nceh/lead/prevention/blood-lead-levels.htm on August 28, 2020.
IV) CDC, *Summary of Recommendations for Follow-up and Case Management of Children Based on Confirmed Blood Lead Levels.* Accessed https://www.cdc.gov/nceh/lead/advisory/acclpp/actions-blls.htm on December 14, 2017.
V) AAP, *Treatment of Lead Poisoning.* Accessed at https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/lead-exposure/Pages/Treatment-of-Lead-Poisoning.aspx on August 28, 2020.

APPENDIX B

States' Blood Lead Screening Test Rates

Table B-1: Number of Medicaid-enrolled children in 5 States who did not receive a blood lead screening test* at 12 months of age

	Number of Enrolled Children	Number of Enrolled Children Who Did Not Receive a Test*	Percentage of Enrolled Children Who Did Not Receive a Test
12-Month Eligibility**			
California	713,086	414,538	58.13%
New York	334,404	105,798	31.64%
Ohio	211,951	106,007	50.01%
Pennsylvania	175,233	67,510	38.53%
Texas	372,776	212,644	57.04%
Total	1,807,450	906,497	50.15%

Table B-2: Number of Medicaid-enrolled children in 5 States who did not receive a blood lead screening test* at 24 months of age

	Number of Enrolled Children	Number of Enrolled Children Who Did Not Receive a Test*	Percentage of Enrolled Children Who Did Not Receive a Test
24-Month Eligibility**			
California	713,659	521,497	73.07%
New York	373,130	165,539	44.36%
Ohio	220,288	147,801	67.09%
Pennsylvania	174,224	106,002	60.84%
Texas	386,846	266,397	68.86%
Total	1,868,147	1,207,236	64.62%

Source: OIG analysis of Medicaid claims data, 2021.

*For these analyses, we counted blood lead test procedures within Medicaid claims data and dates of service for BLL tests identified by State health departments to determine whether Medicaid-enrolled children received required blood lead screening tests on schedule at 12 months and at 24 months of age.

**12-month and 24-month eligibility analyses included children with continuous enrollment 3 months preceding and 3 months following 12 months of age, and 3 months preceding and 3 months following 24 months of age.

Table B-3: Number of Medicaid-enrolled children in 5 States who did not receive a blood lead screening test* by 3 years of age

	Number of Enrolled Children	Number of Enrolled Children Who Did Not Receive a Test*	Percentage of Enrolled Children Who Did Not Receive a Test
3 Years of Continuous Eligibility**			
California	63,204	19,599	31.01%
New York	68,077	5,139	7.55%
Ohio	46,383	12,070	26.02%
Pennsylvania	23,671	4,315	18.23%
Texas	8,013	2,758	34.42%
Total	209,348	43,881	20.96%

Source: OIG analysis of Medicaid claims data, 2021.
*For this analysis, we counted blood lead test procedures within Medicaid claims data and dates of service for BLL tests identified by State health departments to determine whether Medicaid-enrolled children received a BLL test within 3 years of age.
**The 3-year eligibility analysis included children with continuous Medicaid eligibility from birth to age 3.

APPENDIX C

Survey Responses From Practitioners in the Sample

Table C-1: Number of Practitioners in Sample Who Reported That They Have Experienced Barriers Related to Screening Children for Lead* (n=156)

Barriers	California	New York	Ohio	Pennsylvania	Texas	Total Number of Practitioners
Missed appointments	11	16	15	22	30	94
Lapses in Medicaid coverage	6	6	4	4	21	41
Parents decline screening	7	5	4	9	9	34
Requires travel to offsite location	3	2	4	10	3	22
Informational and/or educational barriers for parents	2	2	2	1	6	13
Other	4	1	0	4	2	11
Requires additional appointments	2	0	2	1	5	10
Shortage of clinical staff and/or resources	2	0	1	2	2	7

Source: OIG analysis of survey responses from 193 practitioners, 2021.

* Practitioners could select multiple barriers and are represented in more than one category. Among respondents, 114 practitioners selected at least one barrier, including "Other."

APPENDIX D

Agency Comments

DEPARTMENT OF HEALTH & HUMAN SERVICES

Centers for Medicare & Medicaid Services

Administrator
Washington, DC 20201

DATE: September 21, 2020

TO: Christi A. Grimm
Principal Deputy Inspector General
Office of Inspector General

FROM: Chiquita Brooks-LaSure
Administrator
Centers for Medicare & Medicaid Services

SUBJECT: Office of Inspector General (OIG) Draft Report: More than One-Third of Medicaid-Enrolled Children in Five States Did Not Receive Required Blood Lead Screening Tests (OEI-07-18-00371)

The Centers for Medicare & Medicaid Services (CMS) appreciates the opportunity to review and comment on the Office of Inspector General's (OIG) draft report. CMS is committed to working with both federal and state partners to ensure that all children enrolled in Medicaid and the Children's Health Insurance Program (CHIP) receive required blood lead screening tests.

The amount of lead in blood is referred to as blood lead level, which is measured in micrograms of lead per deciliter of blood (µg/dL), and the Centers for Disease Control and Prevention (CDC) currently uses a blood lead reference value of 5 µg/dL to identify children with elevated blood lead levels (EBLLs). Lead exposure can affect nearly every system in the body and often goes undetected because, at low levels of exposure, it may display no obvious symptoms. Comprehensive screening and surveillance ensures that lead-poisoned infants and children receive the necessary medical and environmental follow-up as soon as possible, and also allows for the development of neighborhood-based efforts to prevent lead poisoning.

As young children are especially vulnerable to lead exposure, all children enrolled in Medicaid or Medicaid expansion CHIP (M-CHIP) are required to receive blood lead screening tests at 12 months and 24 months of age, or a catch-up blood lead screening test at up to 72 months of age if there is no record of a previous blood lead screening test. CMS has clarified for states that the completion of a risk assessment questionnaire does not meet the requirement, and that the Medicaid requirement is met only when the 12- and 24-month blood lead screening tests, or a catch-up blood lead screening test, are conducted. Separate CHIP programs (S-CHIP) do not have the same requirements for universal lead screening as Medicaid; however, CMS encourages states to align their CHIP and Medicaid screening policies. At this time, all S-CHIP states cover blood lead screening tests and medically necessary care for children with identified EBLLs.

As noted in the OIG's report, the Early and Periodic Screening, Diagnostic and Treatment (EPSDT) benefit covers the required blood lead screening tests as well as any medically necessary care for children with identified EBLLs. In addition, Medicaid will provide reimbursement for lead investigations in the home or primary residence of a child with an EBLL if the investigation is conducted by a credentialed health practitioner who meets the qualifications established by the state and is undertaken to identify the source of lead exposure.

States have an affirmative obligation to ensure that Medicaid enrolled children and their families are aware of the services that are a part of the EPSDT benefit and have access to required screenings and necessary treatment services.

State Medicaid agencies are required to submit EPSDT data annually to CMS using the Form CMS-416, which includes the number of blood lead screening tests for children enrolled in Medicaid, from birth to age six. According to data reported on the Form CMS-416, the number of children enrolled in Medicaid who receive blood lead screening tests varies considerably from state to state. Further, because the Form CMS-416 only captures Medicaid claims and encounter based data, it underrepresents the actual number of children who received blood lead screening tests. For example, it does not capture screenings that are not paid for by Medicaid, such as screenings performed by clinics using CDC funding or funded by state health departments. CMS encourages states to review their most recent Form CMS-416 data submission and any other available data sources, including CDC surveillance data, to better understand their state's blood lead screening rate.

In support of state efforts to improve blood lead screening rates for children, CMS issued an informational bulletin[1] in November 2016 to remind states of the screening requirements for children enrolled in Medicaid and CHIP and the current recommended blood lead reference value for taking action. The informational bulletin also included information on steps that states could take to improve lead screening efforts in order to reach children at risk of EBLLs. For example, CMS encouraged states to include lead screening requirements in their managed care contracts in order to emphasize its importance and ensure that additional monitoring occurs through the annual state report required by 42 CFR 438.66. CMS also recommended that states ensure that their provider manuals and educational materials include information on lead screening that is clearly written and consistent with Medicaid and CHIP requirements. CMS is committed to working with states to improve blood lead screening rates for children enrolled in Medicaid and CHIP, and appreciates the opportunity to comment on the OIG's report.

OIG's recommendations and CMS' responses are below.

OIG Recommendation

Monitor national EPSDT performance data for blood lead screening tests and target efforts toward low-performing states to develop action plans for increasing tests, according to Medicaid's schedule.

CMS Response

CMS concurs with this recommendation and will monitor national EPSDT performance data for blood lead screening tests in order to identify states performing in the lowest quartile. CMS will request that states performing in the lowest quartile develop an action plan, and will provide technical assistance as necessary.

OIG Recommendation

Ensure consistency across CMS guidance related to actionable blood lead reference values and blood lead screening test definitions.

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[1] https://www.medicaid.gov/federal-policy-guidance/downloads/cib113016.pdf

CMS Response

CMS concurs with this recommendation. CMS recognizes the need for consistent guidance, and will work to ensure that CMS guidance reflects the current blood lead reference value established by the CDC.

OIG Recommendation

Coordinate with partners to develop and disseminate to state Medicaid agencies educational materials that reaffirm requirements and schedules for blood lead screening tests.

CMS Response

CMS concurs with this recommendation. As noted in the OIG's report, CMS has undertaken considerable outreach efforts around Medicaid blood lead screening requirements, and remains committed to working with both federal and state partners to ensure that all children enrolled in Medicaid and CHIP receive required blood lead screening tests. CMS will continue to engage with our partners and identify educational and outreach materials available to help states reaffirm requirements and schedules for blood lead screening tests.

ACKNOWLEDGMENTS AND CONTACT

Acknowledgments

Dana Squires served as the team leader for this study. Others in the Office of Evaluation and Inspections who conducted the study include Katharine Fry, Haley Lubeck, and Anna Pechenina. Office of Evaluation and Inspections staff who provided support include Althea Hosein, Kevin Manley, and Christine Moritz.

We would also like to acknowledge the contributions of other Office of Inspector General staff including Lonie Kim and Julie Taitsman.

This report was prepared under the direction of Brian Whitley, Regional Inspector General for Evaluation and Inspections in the Kansas City regional office.

Contact

To obtain additional information concerning this report, contact the Office of Public Affairs at Public.Affairs@oig.hhs.gov. OIG reports and other information can be found on the OIG website at oig.hhs.gov.

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ABOUT THE OFFICE OF INSPECTOR GENERAL

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ENDNOTES

[1] In FY 2018, more than 42 million children were eligible to receive Medicaid's EPSDT benefit and nearly 5 million of these children were between the ages of 12 months and 24 months. CMS, *Early and Periodic Screening, Diagnosis and Treatment*, 2018 annual reporting data. Accessed at https://go.usa.gov/xUWaP on August 3, 2020.

[2] Social Security Act (The Act) § 1905(r).

[3] Previous OIG work that included a sample of 345 children in 9 States found that almost 40 percent of 197 children who received EPSDT medical screenings were missing appropriate laboratory tests. Among the children missing lab tests, almost 60 percent of children ages 1 and 2 did not receive blood lead screening tests as required by Medicaid. OIG, *Most Medicaid Children in Nine States Are Not Receiving All Required Preventative Screening Services*, OEI-05-08-00520, May 2010. Accessed at https://go.usa.gov/xU4gG on October 29, 2017.

[4] AAP Council on Environmental Health, "Prevention of Childhood Lead Toxicity," *Pediatrics*, Vol. 138, No. 1, July 2016. Accessed at https://pediatrics.aappublications.org/content/138/1/e20161493 on July 24, 2020.

[5] C.M. Aelion and H.T. Davis, "Blood lead levels in children in urban and rural areas: Using multilevel modeling to investigate impacts of gender, race, poverty, and the environment," *Science of the Total Environment*, Vol. 694, December 2019. Accessed at https://doi.org/10.1016/j.scitotenv.2019.133783 on October 20, 2020.

[6] M.B. Pell and Joshua Schneyer, *Reuters*, "Reuters finds 3,810 U.S. areas with lead poisoning double Flint's," November 14, 2017. Accessed at https://www.reuters.com/article/us-usa-lead-map/reuters-finds-3810-u-s-areas-with-lead-poisoning-double-flints-idUSKBN1DE1H2 on January 18, 2018.

[7] Luis Ferré-Sadurní, *The New York Times*, "11,168 Children Tested Positive for Lead. The City Didn't Inspect the Homes," September 26, 2019. Accessed at https://www.nytimes.com/2019/09/26/nyregion/nyc-lead-exposure.html on August 6, 2020.

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[9] Annie Gasparro and Sharon Terlep, *The Wall Street Journal*, "Toxic Heavy Metals Found in Some Baby Food, Congressional Report Says," February 4, 2021. Accessed at https://www.wsj.com/articles/toxic-heavy-metals-found-in-some-baby-food-congressional-report-says-11612451332 on February 5, 2021.

[10] AAP Council on Environmental Health, "Prevention of Childhood Lead Toxicity," *Pediatrics*, Vol. 138, No. 1, July 2016. Accessed at https://pediatrics.aappublications.org/content/138/1/e20161493 on July 24, 2020.

[11] A U.S. Government Accountability Office (GAO) review of consumer products purchased through third-party sellers on e-commerce websites identified counterfeit products such as travel mugs and cosmetics that had been found to contain hazardous substances including lead. GAO, *Intellectual Property: Agencies Can Improve Efforts to Address Risks Posed by Changing Counterfeits Market*, January 2018. Accessed at https://go.usa.gov/xGR6a on August 12, 2020.

[12] Eric M. Roberts, M.D., Ph.D., et al., "Assessing Child Lead Poisoning Case Ascertainment in the US, 1999-2010," *Pediatrics*, Vol. 139, No. 5, May 2017. Accessed at https://doi.org/10.1542/peds.2016-4266 on December 6, 2017.

[13] AAP Council on Environmental Health, "Prevention of Childhood Lead Toxicity," *Pediatrics*, Vol. 138, No. 1, July 2016. Accessed at http://pediatrics.aappublications.org/content/pediatrics/138/1/e20161493.full.pdf on August 17, 2018.

[14] Low-level exposure even at blood lead concentrations below 5 µg/dL has been associated with diminished intellectual abilities and lower birth weights in children. See AAP Council on Environmental Health, "Prevention of Childhood Lead

Toxicity," *Pediatrics*, Vol. 138, No. 1, July 2016. Accessed at http://pediatrics.aappublications.org/content/pediatrics/138/1/e20161493.full.pdf on August 17, 2018.

[15] U.S. Environmental Protection Agency, *Integrated Science Assessment for Lead*, June 2013. Accessed at https://go.usa.gov/xUgUs on October 26, 2017.

[16] Ibid.

[17] Brian B. Boutwell, et al., "Aggregate-level lead exposure, gun violence, homicide, and rape," *PLoS One,* Vol. 12, No. 11, November 2017. Accessed at https://doi.org/10.1371/journal.pone.0187953 on January 29, 2018.

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[19] AAP Council on Environmental Health, "Prevention of Childhood Lead Toxicity," *Pediatrics*, Vol. 138, No. 1, July 2016. Accessed at http://pediatrics.aappublications.org/content/pediatrics/138/1/e20161493.full.pdf on August 17, 2018.

[20] In FY 2018, more than 42 million children were eligible to receive Medicaid's EPSDT benefit and nearly 5 million of these children were between the ages of 12 months and 24 months. See CMS, *Early and Periodic Screening, Diagnosis and Treatment*, 2018 annual reporting data. Accessed at https://go.usa.gov/xUWaP on August 3, 2020.

[21] Medicaid-enrolled children under the age of 21 are eligible to receive EPSDT services.

[22] The Act § 1905(r)(1)(A)(i).

[23] The Act § 1905(r)(1)(B)(iv).

[24] The Act § 1905(r)(1)(B).

[25] The Act § 1905(r)(5).

[26] The State Medicaid Manual also states that children between the ages of 36 months and 72 months should also receive a blood lead test if they have not been previously screened for lead. See CMS, *The State Medicaid Manual*, Chapter 5: "Early and Periodic Screening, Diagnostic and Treatment Services," section 5123.2.D.1. Accessed at https://go.usa.gov/xU4hY on October 29, 2017.

[27] The policy change helped align the CMS lead screening policy with that of the CDC. See CMS, *CMCS Informational Bulletin*, "Targeted Lead Screening Plans," June 2012. Accessed at https://go.usa.gov/xF29W on June 7, 2021.

[28] The Informational Bulletin also stated that any child between ages 24 months and 72 months with no record of a previous blood lead screening test must receive one. See CMS, *CMCS Informational Bulletin,* "Coverage of Blood Lead Testing for Children Enrolled in Medicaid and the Children's Health Insurance Program," November 2016. Accessed at https://go.usa.gov/xHF8p on August 13, 2020.

[29] CMS, *The State Medicaid Manual*, Chapter 5: "Early and Periodic Screening, Diagnostic and Treatment Services," section 5123.2.D. Accessed at https://go.usa.gov/xU2VG on October 29, 2017.

[30] CDC guidance also recommends that practitioners follow local and State screening guidelines. In jurisdictions without formal State or local recommendations, CDC recommends that children receive blood lead screening tests at 12 and 24 months of age, and once between 36 months and 72 months of age for those without a prior test. CDC, *Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention*, January 2012. Accessed at https://go.usa.gov/xU58B on July 16, 2018.

[31] The CDC, *Childhood Lead Poisoning Prevention, Recommended Actions Based on Blood Lead Level.* Accessed at https://www.cdc.gov/nceh/lead/advisory/acclpp/actions-blls.htm on June 4, 2021.

[32] Joseph F. Hagan, Jr., M.D., FAAP, et al., AAP, *Bright Futures Guidelines for Health Supervision of Infants, Children, and Adolescents (Fourth Edition)*, 2017.

[33] AAP does not recommend universal blood lead testing except in high prevalence areas with increased risk factors for lead exposure. The current Bright Futures/AAP Periodicity Schedule includes a risk assessment at the following well-child visit intervals: 6 months, 9 months, 12 months, 18 months, 24 months, 36 months, 48 months, 60 months, and 72 months of age. The recommendation notes that a blood lead screening test should be conducted only if the risk assessment comes back positive. See AAP, *Detection of Lead Poisoning*, 2016. Accessed at https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/lead-exposure/Pages/Detection-of-Lead-Poisoning.aspx on July 15, 2018.

[34] Bright Futures/AAP, *Recommendations for Preventive Pediatric Care Periodicity Schedule*, March 2021. Accessed at https://downloads.aap.org/AAP/PDF/periodicity_schedule.pdf on June 4, 2021.

[35] AAP, *Treatment of Lead Poisoning*, 2016. Accessed at https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/lead-exposure/Pages/Treatment-of-Lead-Poisoning.aspx on July 15, 2018.

[36] CMS, *The State Medicaid Manual*, Chapter 5: "Early and Periodic Screening, Diagnostic and Treatment Services," section 5320.2.C. Accessed at https://go.usa.gov/xU2VG on October 29, 2017.

[37] CMS, *2700.4 Instructions for Completing Form CMS-416, Annual Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) Participation Report,* 2020. Accessed at https://go.usa.gov/xHF9x on June 4, 2021.

[38] The Act § 1905(r), 42 U.S.C. § 1396d(r).

[39] CMS, *The State Medicaid Manual*, Chapter 5: "Early and Periodic Screening, Diagnostic and Treatment Services," section 5360.B. Accessed at https://go.usa.gov/xU2VG on October 29, 2017.

[40] The 2018 national EPSDT report noted that about 2 million blood lead screening tests were provided to almost 4.5 million enrolled children between 12 months and 24 months of age. See CMS, *Early and Periodic Screening, Diagnosis and Treatment*, 2018 annual reporting data. Accessed at https://go.usa.gov/xUWaP on August 3, 2020.

[41] CMS instructs States to count the total number of blood lead screening tests provided to eligible children under the age of 6 with at least 90 continuous days of enrollment during a fiscal year, using unduplicated claims. The instructions also note that followup blood tests administered to children who have been diagnosed with or are being treated for lead poisoning should not be counted. See CMS, *2700.4 Instructions for Completing Form CMS-416, Annual Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) Participation Report*, 2020. Accessed at https://go.usa.gov/xHF9x on June 4, 2021.

[42] Lead Contamination Control Act of 1988, Pub. L. No. 100-572, § 3, 102 Stat. 2887 (1988).

[43] Adrienne S. Ettinger, et al., "CDC's Lead Poisoning Prevention Program: A Long-standing Responsibility and Commitment to Protect Children From Lead Exposure," *Journal of Public Health Management and Practice*, Vol. 25, Suppl. 1, 2019. Accessed at https://go.usa.gov/x7YAk on September 17, 2020.

[44] CDC, *Childhood Lead Poisoning Prevention: Data and Statistics*. Accessed at https://go.usa.gov/xGVTg on September 24, 2020.

[45] CDC, *Childhood Lead Poisoning Prevention*, "Learn More about CDC's Childhood Lead Poisoning Data." Accessed at https://go.usa.gov/xGVT2 on September 24, 2020.

[46] CDC, *Childhood Lead Poisoning Prevention*, "Funding Information." Accessed at https://go.usa.gov/xFx6z on June 4, 2021.

[47] CDC, *Childhood Lead Poisoning Prevention*, "Standard Surveillance Definitions and Classifications," July 2019. Accessed at https://go.usa.gov/xAugN on January 24, 2020.

[48] A.B. 2276 (Cal. 2020). Accessed at https://leginfo.legislature.ca.gov/faces/billCompareClient.xhtml?bill_id=201920200AB2276&showamends=false on July 28, 2021.

[49] California Department of Public Health, *California's Progress in Preventing and Managing Childhood Lead Exposure*, 2020. Accessed at https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/CLPPB/CDPH%20Document%20Library/CLPPBReport2020.pdf on July 28, 2021.

[50] N.Y. Comp. Codes R. & Regs. Tit 10 § 67-1.2. Accessed at https://regs.health.ny.gov/content/section-67-12-lead-screening-and-follow-children-health-care-providers on July 28, 2021.

[51] City of New York, *Lead Free NYC Initiatives*, 2020. Accessed at https://www1.nyc.gov/content/leadfree/pages/initiatives on July 28, 2021.

[52] Ohio Department of Health, *2019 Ohio Lead Advisory Council Annual Report*. Accessed at https://odh.ohio.gov/wps/portal/gov/odh/know-our-programs/childhood-lead-poisoning/media/olac-annual-report on July 28, 2021.

[53] Pennsylvania Department of Health, *2019 Childhood Lead Surveillance Annual Report*, January 2021. Accessed at https://www.health.pa.gov/topics/Documents/Environmental%20Health/2019%20Childhood%20Lead%20Surveillance%20Annual%20Report.pdf on July 28, 2021.

[54] Texas Department of State Health Services, Minutes from a meeting of the Strategic Planning Committee to Eliminate Childhood Lead Poisoning, August 2019. Accessed at https://dshs.texas.gov/lead/SPC/SPC_Minutes_08-21-19.pdf on July 28, 2021.

[55] The weighted response rate, based on responses in each State, was 25 percent.

[56] States that have sufficient data to demonstrate that universal screening is not the most effective method of identifying exposure to lead may request to implement a targeted lead screening plan for Medicaid-enrolled children, rather than continuing to universally screen all Medicaid-enrolled children at ages 1 and 2. See CMS, *CMCS Informational Bulletin*, "Targeted Lead Screening Plans," June 2012. Accessed at https://go.usa.gov/xF29W on June 7, 2021.

[57] Shelley A. Bruce, et al., "Using Medicaid Data to Improve Childhood Lead Poisoning Prevention Program Outcomes and Blood Lead Surveillance," *Journal of Public Health Management and Practice*, Vol. 25, Suppl. 1, 2019. Accessed at https://go.usa.gov/xAnX6 on January 8, 2021.

[58] Benjamin Carnahan, M.D., et al. "Point-of-Care Testing Improves Lead Screening Rates at 1- and 2-Year Well Visits," *The Journal of Pediatrics*, March 2021. Accessed at https://doi.org/10.1016/j.jpeds.2021.02.067 on April 7, 2021.

[59] The National Committee for Quality Assurance's (NCQA's) Health Effectiveness Data and Information Set measure for lead screening in children examines the percentage of children who had one or more blood lead test(s) by their second birthday. NCQA, *Lead Screening in Children*, 2021. Accessed at https://www.ncqa.org/hedis/measures/lead-screening-in-children/ on July 16, 2021.

[60] Medicaid Statistical Information System (MSIS) threshold error tolerances allow between 0.1 and 5.0 percent missing, unknown, or invalid codes for the variables used in this analysis. CMS, *MSIS File Specifications and Data Dictionary,* 2012.