Michigan's Expanded Medicaid-funded Nurse Case Management Program for Children with Elevated Blood Lead Levels: Results from Fiscal Year 2019

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Executive Summary

In-home nurse case management for children with elevated blood lead levels historically has been provided by nursing staff at Local Health Departments (LHDs) when resources allowed. In January 2017, a redesigned Elevated Blood Lead-Nurse Case Management (EBL-NCM) program was put in place by the Michigan Department of Health and Human Services (MDHHS) that increased Medicaid's reimbursement rate for EBL-NCM for Medicaid-enrolled children, simplified the billing system for LHDs, and increased training and technical support provided by the MDHHS Childhood Lead Poisoning Prevention Program.

This report describes the redesigned program and the results from Fiscal Year 2019 (FY'19), the second full fiscal year of the redesigned program. Results were compiled from MDHHS blood lead surveillance data, quarterly activity reports submitted by LHDs, and the FY'19 annual program evaluation reports submitted by LHDs. Highlights are as follows:

Data on children served by EBL-NCM nurse case management

- 43 (95.5%) of Michigan's 45 LHDs signed contracts with MDHHS for the program for FY'19.
- 34 (79.1%) of the 43 LHDs did at least one home visit, with a range of one to 433 home visits per LHD.
- 782 children with elevated blood lead levels received a total of 1,113 home visits.
    - 723 (92.5%) of the 782 children were Medicaid-enrolled.
    - The 723 Medicaid-enrolled children received a total of 1,049 home visits.
- By comparison, in the calendar year prior to this program (2016), LHDs billed Medicaid for EBL-NCM for 94 home visits for 77 children statewide.
- The 723 Medicaid-enrolled children who received a home visit comprised 37.8% of the 1,912 Medicaid-enrolled children with venous confirmed elevated blood lead levels who were reported to the MDHHS surveillance system in FY'19.

FY'19 annual evaluation survey results

- All 43 participating LHDs reported completing at least one intervention with families of children with elevated blood lead levels.
    - 41 (95.3%) made 2,622 attempted phone contacts and 2,951 successful phone contacts.
    - 38 (88.4%) reported mailing information to 1,338 to families.
    - 37 (86.0%) reported making 1,687 calls to providers' offices.
- 42 (97.7%) of the 43 LHDs identified at least one success of the EBL-NCM program.
    - The four most frequently cited successes were: Seeing that the blood lead levels of children were declining (85.7%); family compliance with EBL-NCM recommendations (66.7%); fostering collaborations with other agencies (57.1%); getting applications submitted so families could receive assistance in lead home abatement (47.6%).
- 41 (95.4%) of the 43 LHDs identified at least one challenge directly related to the completion of the home visit.

    - The four leading challenges to completing home visits were: Difficulty contacting the families (85.4%); getting family consent for the EBL-NCM home visit (78%); getting a confirmatory venous test after an elevated blood lead level from a capillary test (70.7%); and the child's primary care provider not being knowledgeable on lead poisoning prevention recommendations (61.0%).
- 34 (79.1%) of the 43 LHDs identified at least one administrative challenge to program success, including 52.9% that noted the need for additional resources to cover LHD-related expenses for home visits.
- 31 (72.1%) of the 43 LHDs offered at least one recommendation for program improvement. The two most frequently cited recommendations were: improving data management systems and tools (51.1%) and increasing funding to support the program (30.2%).
- Limitations to this report, which will be addressed in the FY'20 summary report, include:
    - Incomplete data on EBL-NCM provided to children not enrolled in Medicaid.
    - No follow-up blood lead data on the children who received NCM.
    - No data on home inspections for lead or lead abatement of the homes of the children who received EBL-NCM.

Introduction

Under Michigan's Public Health Code (MCL 333.5474 and 333.20531) and associated rules (R 325.9081-9087), clinical laboratories are required to report all blood lead test results to the Michigan Department of Health and Human Services (MDHHS), and the data are to be used to take public health actions to prevent lead exposure and lead poisoning. One of the key strategies for the mitigation of adverse health effects of lead exposure is the provision of in-home nurse case management for children with elevated blood lead levels.[1] Starting in early 2000, Local Health Departments (LHDs) were permitted to bill the Michigan Medicaid program $75 for each nurse home visit, for up to two visits, for any child enrolled in Medicaid who had an elevated blood lead level (EBLL). LHD nurses were expected to follow a guide for in-home nurse case management provided by the Childhood Lead Poisoning Prevention Program (CLPPP) in MDHHS. This guide was based on guidance from the Centers for Disease Control and Prevention.[1]

Few LHDs took advantage of this funding source. This may have been because the reimbursement rate was lower than their actual costs, the billing mechanism was time consuming and complicated, or there was a lack of funds to staff a child lead poisoning prevention program. In January 2017, a redesigned Elevated Blood Lead Nurse Case Management (EBL-NCM) program was put in place that increased the reimbursement rate and simplified the billing system for LHDs, supported by increased CLPPP training and technical support.

This report describes the redesigned program, a summary of activities and interventions completed by LHDs in the second fiscal year that this program was in operation (October 2018 – September 2019, FY'19), and a summary of responses to a program evaluation survey that participants in the redesigned program were required to complete at the end of FY'19.

Background: Lead hazards, blood lead testing, and public health response

➢ Lead Hazards

Lead is a highly toxic metal that acts on the nervous system. There is no known safe level of lead in the body. Even at very low levels, lead has been associated with developmental delays, learning difficulties, lowered IQ, and behavioral issues. Very high levels of lead can lead to coma and death. Children under 6 years old are the greatest risk of harmful health effects from lead exposure.[2] This is because their brains and nervous systems are still forming and because they are most likely to have contact with lead when they lick, swallow, or breathe in dust from old lead paint. Most homes built before the 1978 ban on leaded paint have old lead paint. If paint peels, cracks, or is worn down, the chips and dust from the old lead paint can spread onto floors, windowsills, and all around the home. Lead can also leach into drinking water from lead pipes and plumbing fixtures, as demonstrated by data collected for the Flint water crisis.[3]

➢ Blood Lead Testing

A blood lead test measures the concentration of lead in blood, in micrograms of lead per deciliter of blood (µg/dL). This test is ordered by a child's health care provider or it can be done in a public health clinic. The Centers for Disease Control and Prevention (CDC) uses a lead reference value of 5 µg/dL to identify children with elevated blood lead levels, i.e., that are higher than most children.[4] MDHHS policy defines an elevated blood lead level (EBLL) as 5 µg/dL (including levels of 4.5-4.9 µg/dL, which are rounded to 5) or higher.[5] MDHHS has the public health obligation [6] to work with families of children

with EBLLs to ensure they receive education and interventions to find lead sources and mitigate lead exposures in their homes. For children with very high blood lead levels (e.g., 45 µg/dL or greater), and based on their clinical exam, clinicians may determine that hospitalization and/or chelation are necessary.

There are two main methods for collecting blood samples: an initial screening test in which blood is collected from a finger stick (capillary test); and a confirmatory test in which blood is drawn from a vein in the child's arm (venous test). The capillary test is quicker and easier, but it is not as accurate as the venous test because it can pick up any lead dust on a fingertip, in addition to lead in the blood, leading to false positive results.[7] For this reason, when a capillary test is ≥4.5µg/dL, a venous test is needed to confirm whether the blood lead level is actually high.

Laboratories that test blood for lead are required by law to report the results to the MDHHS's CLPPP. Since 1998 CLPPP has maintained a database of laboratory reports, called "MICLPS" ("Michigan Childhood Lead Poisoning Surveillance"). Each year, CLPPP publishes an annual report summarizing the data in MICLPS; the 2006-2018 annual reports are available on the MDHHS website, www.michigan.gov/lead. In 2018, the most recent full year of blood lead data, blood lead test results were reported to CLPPP on 142,356 children under six years old in Michigan, of whom 4,124 (2.9%) had an elevated level.[8] CLPPP provides LHDs with blood lead test results of all children in their jurisdictions.

- Public Health Response: The elevated blood lead nurse case management program

LHD nurses offer in-home NCM to children with venous-confirmed EBLLs. With family consent, the nurse attempts to visit the home at least twice to assess the child's growth and development, look for potential lead hazards, and refer the family to any needed social and medical services. Because there is limited evidence that parent education alone can lower children's blood lead levels[9] and the recognition that the most effective action is to eliminate the sources of lead in the child's environment,[10] the program emphasizes the importance of collaboration with the Lead Safe Home Program (LSHP) at MDHHS. The LSHP provides resources and expertise to eligible families for lead home inspections and, if needed, safe removal of lead paint hazards through abatement, replacement of leaded plumbing fixtures, and other remodeling.[11] The LHDs document EBL-NCM activities in a database called the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS) which is maintained by MDHHS.

> The MDHHS Lead Safe Home Program (LSHP) helps qualifying families remove lead hazards from their homes by supporting an in-depth environmental investigation of the home and appropriate renovations. The LSHP oversees the renovations and verifies that the house is "lead safe" when finished.

Components of the redesigned EBL-NCM program

Four components of the revised EBL-NCM program were put in place in the four months prior to its inauguration in January 2017. They were developed collaboratively between the Michigan Medicaid program (hereafter referred to as Medicaid) and CLPPP, and in consultation with health officers from the LHDs. The components included: an agreement between Medicaid and CLPPP on the reimbursement rate and procedures for administering the program; a billing mechanism utilizing MDHHS's electronic contracts management system with LHDs; a revised EBL-NCM guide and supporting tools for the conduct of EBL-NCM; and training and technical support for LHDs.

A summary comparison of the major differences between the old and redesigned EBL-NCM program is in Table 1, and a description of the redesigned program follows.

Table 1: Comparison of Old to Redesigned EBL-NCM Program

EBL-NCM before 2017	EBL-NCM starting January 2017
Home visit reimbursable $75 per visit	Home visit reimbursable $201.58 per visit
Maximum of 2 home visits	Maximum of 6 visits, with additional allowed if approved by CLPPP
Each home visit billed directly to Medicaid at time of service	Billed quarterly through MDHHS's Electronic Grants Administration & Management System (EGrAMS)
No documentation of home visit required separate from general requirements of Medicaid for billing.	Required documentation: updates to child's record in lead case management electronic data system (Mi-HHLPSS), a spreadsheet listing names of children and dates of home visits submitted with quarterly invoice, and an annual report.
Audits and reimbursement approvals performed by Medicaid	Audits and reimbursement approvals performed by CLPPP.
In previous 5 years, about 12 trainings provided to individual LHDs; no statewide training done.	In early 2017, webinar training provided to all LHDs and posted online; all nurses performing home visits required to complete. Additional regional trainings continued, and an all-day in-person training provided in September 2018.

- Reimbursement rate and administrative procedures
    - The reimbursement rate per nurse home visit was set at $201.58. Up to six home visits could be reimbursed per child with EBLL, and additional visits would be allowed if justification was provided to and approved by CLPPP. The visits were required to be conducted by a registered nurse who had participated in training provided by CLPPP. Children eligible for reimbursable EBL-NCM had to be under 6 years old, have a venous BLL of 5 µg/dL or greater, and be enrolled in Medicaid at the time of the home visit.
    - CLPPP, not Medicaid, was the program administrator and was responsible for: Verifying quarterly invoices submitted by LHDs for services provided; maintaining records and electronic data on the program; and providing tools, training, and technical assistance to LHDs participating in the program. MDHHS financial services would reimburse LHDs whose invoices had been approved by CLPPP, using Medicaid funds.
- Contracts with LHDs
    - A contract was set up in MDHHS's Electronic Grants Administration and Management System (EGrAMS) for the EBL-NCM project, which described the obligations of the LHDs in order to invoice for NCM visits each quarter. LHDs receive funds from MDHHS for many different projects and most of these projects are managed in EGrAMS, thus the format for each contract and procedures for invoicing and transfer of funds from MDHHS to LHDs are standardized and well established.
    - In the fall of 2016, LHDs were invited to sign up for the program by completing the contract for their jurisdiction for the remainder of fiscal year 2017 (January- September 2017). The agreement specified the programmatic requirements (e.g., eligibility and staff requirements listed above) and documentation requirements, including submission of quarterly invoices, spreadsheets listing the children for whom services were provided,

and an annual summary report to CLPPP. Forty-three of the 45 LHDs completed contracts for this project. (One elected not to participate and one was not eligible because funding for EBL-NCM was already being provided through another mechanism.) Contracts were renewed for FY'18 and FY'19.

- The EBL-NCM guide
    - The guide for EBL-NCM was revised in the fall of 2016 based on programmatic changes in CLPPP and the MDHHS Lead Safe Home Program, and experiences with EBLL- NCM in Flint, Michigan following the declaration of the Flint water emergency.
    - The guide is designed to foster the goals of EBL-NCM, which are to bring each child's blood lead level below 5 µg/dL and prevent future EBLLs by promoting activities to reduce or eliminate sources of lead in the child's environment. It reflects the best practices described by the CDC in 2002.[1] The guide and a set of health education documents for families, the public, and providers are maintained on a website accessible by all LHDs (www.miclppp.org). A summary of the components of EBL-NCM is in Appendix 1.
- Training and Technical Support
    - A two-hour training webinar was provided twice in December 2016 and once in January 2017. It was open to all LHDs. LHDs were informed that the nurses were required to take the training before they began EBL-NCM home visits. The training covered the elements of the EBL-NCM guide, documentation requirements, and billing procedures. The webinar was recorded and made available on a website where the guide and related documents are housed (miclppp.org).
    - The primary contact for the program at each LHD was required to provide the names of their staff who completed the training on an on-going basis, especially as new nursing staff were brought onboard.
    - Starting in February 2017, conference calls with the LHDs were conducted every other month. These were used to answer questions, provide updates, and provide additional training. Time was set aside to encourage participants to share challenges and successes and learn from one another.
    - An in-person training was provided in an all-day conference in Lansing in September 2018 covering surveillance data, medical treatment, working with Child Protective Services, and other topics.
    - The CLPPP nurse consultant provided ongoing in-person, one-on-one trainings at LHDs throughout the state. These were conducted when new nurses started at the LHD and/or as requested.
    - Three types of technical support were provided to the LHDs on an ongoing basis: response by the CLPPP nurse consultant to questions about the management of individual children and the use of the EBLL-NCM guide; use of the electronic surveillance database (MI-HHLPSS) for documentation of EBL-NCM activities; and billing procedures.
    - All written materials, including the EBL-NCM guide, educational materials, and other materials for lead programs in LHDs were made available on a website (miclppp.org) and updated as needed.

Methods for Data Collection and Analysis

Information for describing the results of the of the FY'19 EBL-NCM program was obtained from (1) quarterly activity reports submitted by LHDs listing children who received EBL-NCM that the 43 participating LHDs were required to submit, (2) data from MICLPS (the MDHHS electronic database of blood lead test results), (3) data from Medicaid on the numbers of EBL-NCM visits reimbursed by Medicaid prior to 2017, and (4) results of a survey that the 43 LHDs were required to complete at the close of FY'19 providing information on program activities, successes, challenges, and recommendations for the program.

➢ Data on Home Visits

Data on children who received a home visit were obtained from the quarterly spreadsheets LHDs submitted listing names of each child who had received a home visit, their HHLPSS ID numbers, and the dates of home visits for which they were requesting Medicaid reimbursement. They were asked to include information about home visits for non-Medicaid children with EBLLs in the first three quarter reports and were required to do so starting in quarter 4 of FY'19, even though these home visits were not reimbursable. Quarterly reports were reviewed by CLPPP staff to ensure accuracy of information as part of the process of approving claims for reimbursement by Medicaid.

The total number of home visits was compiled by counting the number of home visits conducted by each LHD in each of the four quarters of FY'19 and summed. The number of Medicaid and non-Medicaid children who received home visits was compiled by merging the HHLPSS ID numbers for all four quarters and then deduplicating by HHLPSS ID.

In addition, the LHDs were asked to include the numbers of home visits by Medicaid status of the children in their annual evaluation reports.

The number of children with venous-confirmed EBLLs, Medicaid and non-Medicaid was compiled from the CLPPP blood lead surveillance data for FY'19.

Data on children with EBL-NCM home visits before the expanded program went into effect in 2017 was provided by Medicaid on a spreadsheet with an extract from their claims database of the children under 6 years old, where the LHD was reimbursed for a home visit (ICD-10-CM procedure code T1028) and where the diagnosis was related to lead (ICD-9-CM codes 984.0-9, V15.86, E861.5, or E866.0 for January 2010 through September 2015; ICD-10-CM codes Z77.11, R78.71 or T56.0X1-0X4 for October 2015 – December 2017). The spreadsheet included a child identification number and the date(s) the child received the services. The number of children who received at least one home visit and the number of EBL-NCM home visits in 2016 were compared to the FY'19 numbers compiled from the quarterly reports.

➢ Annual Evaluation Report Information

LHDs were asked to complete a web-based survey at the close of FY'19. As noted above, it requested data on numbers of home visits by Medicaid status of the children. It also requested numbers of related activities done outside of the home visit, for example, telephone calls to the family, in-person consultations outside of the home. It then instructed the respondent to select all that applied to their LHD from lists of program successes (e.g., "seeing blood lead levels go down"), contributions by the MDHHS CLPPP program (e.g., "training"), challenges to completing home visits (e.g., "getting families to return calls"), and administrative challenges; (e.g., "staff turnover"). Each checklist category also had an open-ended "other" option. Finally, the respondents were asked to provide recommendations for

improvements in each of five categories (data management, EBL-NCM case management protocol, technical assistance and training from CLPPP, policy and funding, and other) as open-ended responses. The survey questions were developed based on a review of narrative evaluation reports the 43 LHDs submitted at the close of FY'18. The list of questions is in Appendix 2.

Responses about successes and challenges were summarized by the numbers of LHDs checking each item on the lists. The narrative responses to the "other" options were listed without additional analysis, with minor edits to preserve confidentiality. The open-ended responses in each recommendation category were grouped for analysis. Data analysis was conducted in Excel.

Results

➢ EBL-NCM Home Visits

Thirty-four (79.1%) of the 43 participating LHDs submitted documentation on 782 children who had received at least one EBL-NCM home visit. Thirteen (38.2%) of the 34 LHDs included documentation on 59 children who were not enrolled in Medicaid and for which they were not claiming Medicaid reimbursement, leaving 723 Medicaid children who received at least one home visit (Table 2).

The 34 LHDs completed 1,113 home visits for these 782 children. Ninety-three percent of the 782 children were enrolled in Medicaid (Table 2). One LHD completed 432 home visits and the other 33 completed between 1 and 125 home visits each (data not shown).

Table 2: Number and percent of EBL-NCM children with home visits and number of home visits, by Medicaid status of children

Medicaid status	**Children**		**Home visits**	
	N	%	N	%
Medicaid-enrolled	723	92.5	1,049	94.2
Not Medicaid-enrolled	59	7.5	64	5.8
Total	782	100	1,113	100

Numbers of home visits provided in the annual evaluation report were similar to the data on the quarterly spreadsheets for Medicaid children (1,065 compared to 1,049), but LHDs reported more than three times the number of home visits for non-Medicaid children in the survey than they included on their quarterly spreadsheets (219 compared to 64).

The 723 Medicaid-enrolled children who received a home visit in FY'19 comprised 37.8% of the 1,912 Medicaid-enrolled children with venous-confirmed EBLLs who were reported to the MDHHS surveillance system in FY'19.

By comparison, in 2016, the calendar year prior to this program, LHDs billed Medicaid for 94 EBL-NCM home visits for 77 children statewide. This constituted 3.2% of the 2,432 children enrolled in Medicaid with venous confirmed EBLLs.[12]

➢ Annual Evaluation Report Summary

All 43 LHDs submitted responses to the survey.

- EBL-NCM Non-home visit activities

The LHDs were asked to identify the types non-home visit interventions from a checklist of 10 types and an open-ended "other" option. They were then asked for the number of interventions in each category checked. All 43 LHDs indicated that they had completed at least one non-home intervention. More than 50% of the LHDs indicated they had conducted at least one of the listed interventions, with the exception of attempted drive-by visits (39.4%). The largest number of interventions by category were attempted and completed phone calls, at 2,622 and 2,951 calls, respectively (Table 3). None of the interventions listed are reimbursable by Medicaid. The responses by eight LHDs in the "other" category are listed in Appendix 3.

Table 3: Number and percent of LHDs completing non-home interventions, the number completed, and range by LHD

Non-home intervention type	**Number of LHDs**	**% of LHDs**	**Number of interventions**	**Range of number of interventions per LHD**
Phone calls to families attempted but not completed	41	95.3	2,622	1 - 400
Completed phone calls to families	41	95.3	2,951	1 - 467
Mailed educational materials	38	88.4	1,338	2 - 157
Made phone calls to providers' offices	37	86.0	1,687	1 - 465
Made referrals to other resources (e.g., WIC, Head Start, Early-On)	35	81.4	509	1 - 98
Provided telephone consultation during completed phone call	34	79.1	954	1 - 387
Made referral to LSHP	27	62.8	329	1 - 100
Made phone calls to other entity (e.g., social service agency)	26	60.5	450	1 - 98
Had in-person consultation in setting outside of home	24	55.8	127	1 - 21
Attempted drive-by visit but home visit not completed	15	34.9	258	1-66
Other	8	18.6	-	-

- Program outcome successes

Forty-two (97.7%) of the 43 LHDs identified at least one success of the EBL-NCM program and the one that did not check any of the success options responded in the "other" option that they hadn't completed any home visits. The four most frequently cited successes were: seeing BLLs declining (83.7%); observing family compliance with EBL-NCM recommendations (65.1%); experiencing improved collaborations with other agencies like WIC, HeadStart, and Medicaid Health Plans (55.8%); and getting

Lead Safe Home Program applications submitted (46.5%) (Table 4). "Other" program successes are listed in Appendix 3.

Table 4: EBL-NCM program successes identified by LHDs

Success Indicator	Number of LHDs	% of LHDs
Seeing BLLs go down.	36	85.7
Family compliance with NCM recommendations	28	66.7
Fostering collaborations (e.g., WIC, HeadStart, Immunization programs, clinics, Medicaid Health Plans)	24	57.1
Getting LSHP applications submitted	20	47.6
Contacts with and training for providers	15	35.7
Leveraging resources so we could provide EBLL services for non-Medicaid children with EBLLs	14	28.6
Leveraging other resources to support our lead poisoning prevention program	12	33.3
Increased numbers of screening programs	12	28.6
Getting LIRAs done	8	19.0
Other	4	9.5

- CLPPP's contributions to successes

Forty-two (97.7%) of the 43 LHDs identified at least one type of CLPPP support, and the one that did not check any of the options responded in the "other" option that they had not completed any home visits. The MDHHS lead website and training provided by CLPPP were the two leading types of support checked (83.7% and 65.1% respectively) (Table 5). The narrative responses by seven LHDs to the "other" option are in Appendix 3.

Table 5: Types of support from MDHSS CLPPP that contributed to program successes (n=43 LHDs)

CLPPP Support Types	Number of LHDs	% of LHDs
MDHHS lead website	36	85.7
Training	28	66.7
Technical assistance	26	61.9
EBL-NCM Manual	24	57.1
Other	7	16.7

- Challenges directly related to completion of the home visit

Forty-one (95.3%) of the 43 LHDs identified at least one challenge and the two others wrote "N/A" and "Did not complete any home visits" in the "Other" option. The three leading challenges included "getting families to return calls" (85.4%), "getting families to agree to a home visit" (78.0%), and "getting

the child to have a confirmatory venous test after an elevated capillary test" (70.7%) (Table 6). The challenges listed by 10 LHDs under "other" are provided in Appendix 3.

Table 6: EBL-NCM challenges directly related to completion of EBL-NCM home visits identified by 41 LHDs

Challenge Type	Number of LHDs	% of LHDs
Getting families to return calls	35	85.4
Getting families to agree to home visit	32	78.0
Getting confirmatory venous tests after elevated capillary test	29	70.7
Child's primary care provider (PCP) saying BLL not a concern; PCPs lack of knowledge on lead recommendations	25	61.0
Getting a current phone number and/or address	23	56.1
Lead abatement issues (e.g., long wait time, information not available on status of application, some families not eligible for LSHP assistance)	22	53.7
Getting families to agree to a second home visit	20	48.8
Parent misconceptions about lead	19	46.3
Limited resources & trained staff to cover needs of all eligible children with EBLLs	13	31.7
Parent confusion when multiple agencies involved with child	12	29.3
Having family at home when nurse comes for home visit	11	26.8
Language barriers	7	17.1
Other	10	24.4

- Administrative challenges to the EBL-NCM program

Thirty-four LHDs (79.1%) checked at least one option. Of the nine (20.9%) that did not indicate challenges, six left all options blank, and three wrote "none" or "did not make home visits" in the "other" option. Over half (52.9%) identified the need for additional resources so that non-Medicaid children could have home visits and expenses for non-home visit interventions could be covered (Table 7). Administrative challenges listed in the "other" option are presented in Appendix 3.

Table 7: Administrative challenges related to completion of EBL-NCM home visits identified by 34 LHDs

Administrative Challenge Type	Number of LHDs	% of LHDs
Additional resources needed for conducting home visits for non-Medicaid children and covering expenses for non-home visit interventions	18	52.9
Difficult for nurses to keep proficient when very few cases	14	41.2
Lag time between EBLL test and information to LHD about that EBLL	14	41.2
Staff turnover; getting staff trained	13	38.2
HHLPSS missing information on child or information incorrect for child	9	26.5
Other	9	26.5

- Recommendations

Thirty-one (72.1 %) of the 43 LHDs provided at least one recommendation. Appendix 4 includes the verbatim recommendations in five categories: data management, nurse case management protocol, technical assistance and training, policy and funding, and other. Summaries of the narrative recommendations for data management, nurse case management protocol, technical assistance and training, and policy and funding follow:

Data management: Twenty-one (48.8%) of the 43 LHDs made 30 recommendations addressing data management. The majority (63.3%) of the recommendations addressed issues related to the functionality of HHLPSS, the case management tracking database, and almost all the rest were related to other HHLPSS issues (e.g., training, data linkage) (Table 8.a).

EBL-NCM procedures and forms: Twelve (27.9%) of the 43 LHDs offered 15 recommendations for EBL-NCM procedures and forms. Many of the recommendations were directly related to the protocol (26.7%) and forms (40.0%) (Table 8.b).

Training and technical assistance from CLPPP: Fourteen (32.6%) of the 43 LHDs made 16 recommendations for training and technical assistance. Over three-quarters (81.3%) of the recommendations related to training (Table 8.c).

Policy and funding: Eighteen (41.9%) of the 43 LHDs made 23 recommendations related to policy and funding, including 5 (21.7%) for more funding for the Medicaid EBL-NCM program and 9 (39.1%) for funding for EBL-NCM for non-Medicaid children. There was a wide variety of recommendations among the 8 “other” policy and funding recommendations (Table 8.d).

Table 8: Number and percent of program improvement recommendations by category of recommendation

Recommendation	N*	%*
8.a: Data Management (21 LHDs*)		
Improve functionality of HHLPSS	19	63.3
Clarify data needed to document administration of the EBL-NCM program	3	10.0
Provide more useful data analyses	3	10.0
Add data linkage functionality - HHLPSS to other systems	4	13.3
Provide training for HHLPSS	1	3.3
Total	30	100.0
8.b: EBL-NCM Procedures (12 LHDs*)		
Improve EBL-NCM forms	6	40.0
Change/update EBL-NCM protocol	4	26.7
Provide more training and staffing	3	20.0
Provide better electronic tools and forms	2	13.3
Total	15	100.0
8.c: Technical Assistance/training by CLPPP (14 LHDs*)		
Provide more training and networking	13	81.3
Facilitate co-training with other programs	1	6.3
Improve training materials	2	12.5
Total	16	100.0
8.d: Policy and funding (18 LHDs*)		
Provide more funding for current EBL-NCM program	5	21.7
Provide funding for non-Medicaid EBLL- NCM	9	39.1
Provide more support staff	1	4.3
Other policy/funding recommendations (e.g., there should be RFP process for funding LHDs for lead activities; see Appendix 4 for list)	8	34.8
Total	23	100.0

*Some LHDs provided more than one recommendation. The percent is based on the total number of recommendations, not number of LHDs who identified at least one recommendation in each category.

Discussion

In January 2016, the MDHHS launched a redesigned program to support in-home nurse case management provided by LHDs to children with elevated blood lead levels. The essential components of the redesigned program included expanded training and technical assistance provided by MDHHS CLPPP for LHD nurses, more than doubling of the reimbursement rate by Medicaid to the LHD for each home visit for eligible children, and a streamlined system to request reimbursement from MDHHS for home visits. Forty-three of Michigan's 45 LHDs enrolled in this program through the MDHHS electronic contracts management system. (One LHD declined participation and the other was not eligible because EBL-NCM was being funded through another mechanism.)

Data from the second full fiscal year of data following program implementation indicates that there was almost a 10-fold increase, from 77 to 723, in the number of Medicaid children who received at least one nurse home visit compared to the number of Medicaid children for which EBL-NCM reimbursement was requested in 2016, the year prior to program implementation. The number of Medicaid-enrolled children with EBLLs who received a home visit in FY'19 was similar to the number (732) served in the first full fiscal year of the program (FY'18).[*] The 723 Medicaid-enrolled children who received a home visit in FY'19 comprised 37.8% of the 1,912 Medicaid-enrolled children with venous confirmed EBLLs who were reported to the MDHHS surveillance system in FY'19. Although the number of children receiving EBL-NCM in FY'19 was markedly greater than the number in the year prior to program implementation, there were still many eligible children who did not receive this service.

Each LHD completed a survey that asked for some metrics related to program implementation and the identification of successes, challenges, and recommendations at the end of FY'19. Notable strengths identified by LHDs included seeing the successes of their interventions in lowering blood lead levels, conducting the EBL-NCM home visits, and facilitating the process for abatement of lead in children's homes. Many LHDs also indicated ancillary benefits including having increased contacts with health care providers and collaborations with service organizations like Head Start and WIC.

Not surprisingly, two of the greatest challenges in administering the EBL-NCM program were in reaching parents and getting parents to agree to a home visit. These challenges have no easy solutions, because they are likely related to the socio-economic status of this group of children, all of whom must be enrolled in Medicaid for the LHD to be reimbursed for EBL-NCM. Medicaid families are poor, transient, and not consistently engaged with their health care providers, making them difficult to contact. Some families may have been unwilling to agree to home visits because of mistrust in government. [13,14]

Program funding was also identified as a major challenge, with LHDs noting that this program's "fee-for-service" model does not cover all the costs involved, including phone calls, mailings of educational materials, families not being home for scheduled home visits, and provision of services for EBLL children who are not enrolled in Medicaid.

CLPPP determined that some of the recommended improvements were feasible. Unfortunately, many of the changes recommended to the HHLPSS case management database cannot be made because CDC is the "owner" of the application, not MDHHS. CLPPP has proposed replacing HHLPSS by building a new case management data system that will be part of the MDHHS Michigan Comprehensive Lead Exposure and Abatement Registry (MICLEAR). CLPPP also recognizes that this funding model does not cover all the

[*] CLPPP: Unpublished data

costs of the EBL-NCM program. CLPPP led a legislatively mandated workgroup charged with developing a cost estimate for LHDs to "establish lead elimination and response," and the report with a cost estimate which covers all aspects of EBL-NCM was submitted to the legislature in October 2020.[15]

There are several limitations to this report. First, we do not know if EBL-NCM was provided by LHDs to children with EBLLs who were not Medicaid-enrolled other than information from the limited number LHDs that voluntarily included names of 58 non-Medicaid children in their quarterly spreadsheets. It is possible that some LHDs were using other funds to provide EBL-NCM to non-Medicaid children. All participating LHDs are required to include names of non-Medicaid children who receive EBL-NCM in FY'20, so that more complete data will be available in subsequent reports. Second, data on BLLs of the children who received EBL-NCM have not yet been analyzed to determine if BLLs declined after the intervention. Nevertheless, it should be noted that 86% of the LHDs identified declining BLLs as one of the successes of the program. Third, the number of children who received EBL-NCM in FY'19 is not a simple subset of the children who had EBLLs in FY'19; some children who had EBL NCM in FY'19 could have had their EBLL in FY'18, and some children with an EBLL in FY'19 may not have had NCM until FY'20. Fourth, data are not yet available on how many homes of these children were inspected for lead and abated of lead hazards. This information will be easily retrievable when the nurse case management information now included in the HHLPSS database is incorporated into MICLEAR, the lead abatement database.

Appendix 1: Components of the EBL-NCM guide

- The LHD provides lead education by phone to the parent/guardian, encourages venous confirmation of all capillary EBLLs, and offers in-home nurse case management services for children who had a venous EBLL.
- With consent of the parent/guardian, the LHD nurse conducts an initial in-home nursing assessment and creates a plan of care for the child.
- The initial home visit includes evaluation of the child's health and nutritional history, physical appearance, social and behavioral status (e.g., child's cognitive development), and the child's home environment for lead hazards including peeling paint.
- Based on this assessment, the nurse develops a plan of care that includes goals related to nutrition, completion of the LSHP application, and interim measures to reduce contact with lead hazards (e.g., rigorous cleaning, keeping away from peeling paint). Referrals are also made to any needed social or medical services (e.g., "Early On", WIC, transportation services, food, and clothing assistance).
- At least one follow-up nurse case management home visit is done to assess the family's progress in completing the plan of care and make any needed changes.
- If the LSHP application is approved by MDHHS and an environmental investigation of the home is completed, the LHD assists the family in interpreting the completed investigation report and its recommendations for lead remediation in the home. The investigation includes a detailed visual inspection of the home and property plus collection of dust, paint, soil, and water samples which are tested for lead in a laboratory.
- If possible, after completion of home visits the LHD continues to work with the family as needed to accomplish the goals in the plan of care and encourage the family to have the child's blood lead tested again to make sure the interventions are working.
- The case is closed when the child's blood lead is below 5 μg/dL and/or all interventions are completed as much as possible.
- The LHD is expected to update the child's electronic record in the CLPPP-maintained electronic case management database of all blood lead reports, called HLPPSS, with information about the contacts with the family and outcomes and uploading the completed EBL-NCM form and plan of care.

Appendix 2: LHD annual evaluation survey questions.

Section 1: Data Report

Please respond with a number for each of the following questions regarding EBL interventions and education provided.

* 3. Did you complete home visits for children with Medicaid?

- ◯ Yes
- ◯ No

4. If Yes, how many?

_____

* 5. Did you complete home visits for children without Medicaid

- ◯ Yes
- ◯ No

6. If Yes, how many?

_____

* 7. If you provided non-home visit interventions during FY 19, please check all that apply.

- ☐ Attempted drive-by visit
- ☐ Attempted phone calls to families
- ☐ Completed phone calls to families
- ☐ In-person consultation in setting outside of home
- ☐ Made referral to LSHP
- ☐ Made referrals to other resources (e.g. WIC, Head Start, Early-On)
- ☐ Mailed educational materials
- ☐ Phone calls to other (e.g. social service agency)
- ☐ Phone calls to providers' offices
- ☐ Provided telephone consultation
- ☐ I did NOT provide non-home visit interventions during FY 19

8. Please indicate how many times you provided these non-home visit interventions? If not applicable put 0.

Attempted drive-by visit	
Attempted phone calls to families	
Completed phone calls to families	
In-person consultation in setting outside of home	
Made referral to LSHP	
Made referrals to other resources (e.g. WIC, Head Start, Early-On)	
Mailed educational materials	
Phone calls to other (e.g. social service agency)	
Phone calls to providers' offices	
Provided telephone consultation	

Section 2: Challenges and Successes

Please answer the following regarding challenges and successes you have had this fiscal year. Select all that apply.

9. What challenges directly related to the success of home visits?

- [ ] Getting confirmatory venous tests after elevated capillary test.
- [ ] Getting families to return calls.
- [ ] Getting a current phone number and/or address.
- [ ] Getting families to agree to HV.
- [ ] Getting families to agree to a second HV.
- [ ] Having family at home when nurse comes for HV.
- [ ] Child's PCP saying BLL not a concern; PCPs lack of knowledge on lead recommendations.
- [ ] Language barriers.
- [ ] Parent confusion when multiple agencies involved with child.
- [ ] Lead abatement issues: (long wait time, info not available on status of application, some families not eligible for LSHP assistance.)
- [ ] Limited resources and trained staff to cover needs of all eligible EBLs.
- [ ] Parent misconceptions about lead.
- [ ] Other (please specify)

10. What challenges indirectly related to completion of home visits?

- [ ] Staff turnover; getting staff trained.
- [ ] Hard for nurses to keep proficient when very few cases.
- [ ] Lag time between EBL test and information to LHD about that EBL.
- [ ] Additional resources needed for conducting home visits for non-Medicaid children and covering expenses for non-home visit interventions.
- [ ] HHLPSS missing or wrong info about child.
- [ ] Other (please specify)

11. Which of the following were indicators of success of the program? (check all that apply)

- [ ] Seeing BLLs go down.
- [ ] Family compliance with NCM recommendations.
- [ ] Getting LIRAs done.
- [ ] Getting LSHP applications submitted.
- [ ] Leveraging other resources to support our lead poisoning prevention program.
- [ ] Fostering collaborations (e.g. WIC, Headstart, Imms clinic, Medicaid Health Plans).
- [ ] Contacts with and training for providers.
- [ ] Increased numbers of screening programs.
- [ ] Leveraging resources so we could provide EBL services for non-Medicaid EBL children.
- [ ] Other (please specify)

12. Which of the following contributed to the success of the program (check all that apply)

- [ ] Training provided by CLPPP
- [ ] Technical assistance from CLPPP
- [ ] EBL NCM Manual
- [ ] MDHHS lead website
- [ ] Other (please specify)

Section 3: Recommendations for Program Improvements

Please provide recommendations to CLPPP for program improvement in the following categories.

13. Data management

14.Nurse case management protocol, including forms

15. Technical assistance and training from CLPPP

16.Policy and funding

17. Other:

Appendix 3: "Other" comments from LHDs

Non-home interventions (question 7)
Care coordination with other jurisdictions sharing zip codes and Medicaid Managed Health Plan coordination and follow up
Case review and coordination with LHD Environmental Health staff
Checking HHLPSS and MCIR for lead results
Facilitated temporary and permanent relocation, referred rental properties to building and safety department in addition to referred properties to enforcement
Letters to clients, calls to other health departments, refer to MDHHS for a 3200, information provided at health fairs
Mailed Letters for follow-up testing: 62
Phone calls from families
Provided verbal info & educ materials to clients in clinics - I don't have an exact # on these
Program Successes (Question 11)
Distribution of approx 15 buckets of cleaning supplies & test kits, Lead grant for pregnant woman
Lab open at our LHD; continued partnering with city's Lead Safe program and more direct involvement with WIC, LHD Clinics and VFC medical provider offices
Relocation of hospital cases, partner collaboration with case management efforts
LSHP apps. in previous years
CLPPP Support that contributed to Successes
Conference calls, 105 letters sent out by Health Education to families with high test results
Access to data and printable educational material
In-person preferred and conference call to share updates, best practices and challenges
Collaboration between counties during meetings, and phone conference.
All staff is so very helpful.
All of the items listed have been used, but I am not sure they were contributing factors of the program success. The above is only beneficial if families agree to see the RN for NCM
Michigan Lead Safe Prevention Program User Manual very helpful.
Challenges directly related to completion of Home Visits (Question 9)
Case information not updated in HHLPSS. HHLPSS is not user friendly for nursing documentation.
Allotted time for case management and parents' availability with times.
Clinic was not reporting lead levels.
Constraints with city lead grant, no program with income above parameters, finding housing newer than 1978 if chelation.
Family work schedules

Parents thinking that I am a part of Child Protective Services, or will invoke penalties for either not maintaining their home, or allowing their child to be exposed to lead.
PCP not understanding recommendations and follow up.
Staff need to know that they can do up to 6 visits as needed for elevated results even if coming down. Our families need ongoing support and reminders at home visits.
Staffing challenges, delays in case designation for timely follow up/event creation and document upload, educating providers on new rounding delays confirmatory testing.
Unreliable electronic data collection spreadsheet, program sustainability, case complexity, lack of database for affordable, lead safe housing.
Administrative challenges to the EBL-NCM Program (Question 10)
Families following through with getting a confirmatory venous lead test
Finding qualified Nurse case manager candidates
helps being cumbersome to use and recommendations for blood draws out of date.
Inability run NCM reports, merging duplicates causes issues with accuracy of letter creation, risks loss of documentation of deleted records and jurisdictional access issues when zip codes are shared between counties
Need funding for non-Medicaid kids and need more guidance regarding testing of pregnant women
Not having correct info on child
Working other in other areas in the health agency and limited time. Turnover with applications submitted.
Wrong jurisdiction to the address given when arrived for EBL- NCM.

Appendix 4: Verbatim Recommendations.

Data Management Recommendations (21 LHDs) (Question 13)
•HHLPSS could be much more user friendly. Hard to navigate.
•Too much double documentation with narrative and adding events
•Pulling reports
•Since switching HHLPS over to milogin third party, I have not been able to access HHLPSS. When I was able to use HHLPSS, I like the online system to record notes, contacts, and information.
•Very confusing to have multiple updates to the spread sheets (Appendix N) throughout the year.
•Training with HHLPSS staff.
• It would have been helpful to know that we should track the numbers/counts asked in the report, at the beginning of calendar year.
• How to accurately gather the requested information regarding the breakdown for non-home visit interventions.
• Improved access to the report function in HHLPSS.
•Difficulty pulling reports from HHLPPs.
•Decrease the lag time from screening into HHLPSS on the download. •Report building and management in HHLPSS. • Coordinate with the major EHR systems in the State, on the public and private side, e.g. Patagonia on the public, EPIC on the private.
• Records must be entered manually into HHLPSS. • Can't pull data from our EMR resulting in staff having to enter data twice • Unable to pull data from scanned reports in HHLPSS • Ability to identify source of lead exposure by zip codes in HHLPSS
•Data needs to be easy to enter, •HHLPSS is time consuming and cumbersome, and does not provide workflow assistance. •Conversely, I need easily accessible data that shows outcomes, such as capillary to venous screening rate, overall screening rate (Medicaid and non-Medicaid), abatement history of addresses.
•increase the turnaround time for data requests, takes too long.
•Request dual jurisdictional access for counties that share zip codes. • Access to reports on HHLPSS
•Faster input
•There is still a month lapse from when we upload our results and the results show up in MCIR. •Reporting in Excel is going well, but it would be great if we could get the information electronically out of our EHR.
•Need only 1 vehicle for entering data-not both notes and information screens
•Not using HHLPSS ID as identifier makes it difficult to match data at the local level. •The ability to pull data from nurse case management and follow up case management forms would provide additional program outcomes rather than only productivity measures. • The ability to assist local departments in linking housing and child data or sending a quarterly report linking the two would assist with targeting prevention and intervention efforts.

•Flagging children on the weekly report who this is not their first capillary or venous lead test would be helpful when tracking multiple elevated blood lead levels and trying to keep track of all children who need follow up.
Nurse Case Management (12 LHDs) (Question 14)
•Consolidate some forms
•A half to full day training in Lead paperwork, case management, billing Medicaid, reporting, etc would be extremely helpful. More training on how to fill out the forms, what forms are required, and training on the case management spreadsheets would be helpful.
•More training (frequent) or • possibly a regional person to handle case management for those of us who rarely see elevated cases.
•Redundancy in paperwork, always adding demographic information on all forms verses having a system that will auto-populate this information on the forms.
• Simplify assessment forms
• Plan of care too cumbersome and lacks individuality. Somewhat redundant.
• Streamline the forms, remove redundancies and shorten in general.
• Coordinating NCM services between 2 counties. Children may move to another county while their home is being remediated. This is typically a short-term arrangement. In order to provide continuity of services the new county and the county of their permanent residence should be allowed to provide coordinated NCM services.
• Protocol updated more frequently with dates, • fillable electronic forms for ease in completion and upload to HHLPSS
• [Forms] need to be online to be electronically fillable. • The forms need to interface with our EHR (Patagonia) training of nurses regarding the importance of home visits.
• Need improvement detailed tracking tool for calls, attempted visits etc.
• EBLL Guide needs to be updated to include the change in chelation recommendations as well as provide support in hospital protocols/procedures.
Technical Assistance and Training from MDHHS CLPPP ((14 LHDs) (Question 15)
• More opportunities for training, especially for new staff, as well as refresher and opportunities to network and learn from those with more experience and larger caseloads.
• Would appreciate a training in the UP at our local health department to train other nurses on how to navigate the system. Staff is always helpful when I call the state for assistance.
• Have training offered more often, esp. when new nursing staff hired, or offer training expanding upon what already offered previously.
• Training with the Healthy Homes Section staff. • Training on the beginning to the end process of home abatement and who is responsible for each step.
• Continue with conference calls.
• Would be nice to have more training than a few hours in one day… lead nurse change was frequent at our local HD.
• Any updates or sharing of information is appreciated.
• Continue the statewide trainings and networking opportunities.
• I would appreciate an in-depth explanation of all of the abatement grants (Lead Safe Home, Healthy Homes, Medicaid CHIP, etc.) I don't really understand what all is available and how they work together.

• Maybe a yearly in-person program update/training for Lead NCM and educators
• Update SharePoint site (announcements link reflects 2018 call); "Contact Us" document list staff members by who to call for what, rather than just by title
• Webinars for nurse case managers at least 2 times a year. The staff forget how important this is to make the visits.
• Standardized EBLL modules for student nurses, providers and other community members. • The annual meeting has been helpful the last two years to learn about what other CLPPPs are doing.
• In person training opportunities and/or webinar trainings for any/all updates and to keep apprised of the newest guidelines would be beneficial.
Policy and Funding (18 Local health Departments) (Question 16)
• Including base funding to support the program, in addition to the billing for providing case management
• Additional funding would be [*?*], but • having adequate staff to work in the program would be helpful. At times, a full day could be spent on the "indirect" tasks of following up on elevated lead levels, coordinating appointments for the family, education, and follow up, and there really isn't funding for that if a home visit isn't taking place.
• Funding for non-Medicaid recipients would be helpful. These children are also found to have EBLL sometimes too.
• Clarification on the different funding sources available for home abatement regarding the city, county and state.
• Some of the most interested parents in NCM and HV were those whose children were not Medicaid eligible
• There should be an RFP process for all funding opportunities instead of continuation funding as happens with the Lead Education & Outreach grant.
• Provide funding for phone calls, mailings, and drive bys
• Would be nice to have funding to cover the staffs time spent contacting families/PCP to get venous conf. As the only reimbursement LHD get is when a NCM home visit is done. This is seldom for our LHD and many staff hours are spend contacting these families, PCP, MHP as the lead program wants but this time is hard to justify when our LHD are strapped for money to cover staffs time and there is no billing code for this program. Thus, I feel this hinders the staff's level of engagement as they focus more on the programs they have 'quotes' in and can bill their services for.
• Some reimbursement for non-Medicaid enrolled clients; or only receiving the names of children for which the LHD will be reimbursed. We feel as if it's our duty to see all children with EBLLs, and in a lot of cases, the number of non-Medicaid children meets or exceeds the number of Medicaid enrolled children.
• Funding to provide lead services. Very difficult to provide services when we have a small county. Our local HDC has been great to work with.
• Simplify the "funding" or "billing" of non-Medicaid services for EBLLs • Move from "Prevention" to "Intervention" grant.
• More funding for non-Medicaid clients and • all the non-home visit activities/time
• Additional funding for non-Medicaid children for education and outreach. • Home lead assessment services for children who are not on Medicaid or living in target areas
• As a program, we need to be moving towards primary prevention.
• Update policy and funding to allow expanding screening and NCM follow up to non-Medicaid families
• More funding in prevention and home visits for non-Medicaid clients

• We need more funding for testing the non-Medicaid kids. We need more funding to do case management for non-Medicaid families. This affects a lot of people in our communities.
• Needs funding for transportation assistance and HEPA Vacuums.
• Lead funding received through [LHD] should be included in the CLPPP allocations rather that in [LHD]. This would make it easier to plan for program activities and manage budget as well as reporting measures.
• The amount of time spent tracking families down and multiple attempts at contacts are challenging for the minimal amount of time that is allotted to this program related to limited funding. Changing policy to include additional funding for telephone consultations and guidance to families would be helpful as many families refuse NCM in home because they do not want home visitors.
Other Recommendations (6 LHDs) (Question 17)
• Hard to be proficient when LHD has very few cases. Have to relearn the process every time we have a new case.
• Sometimes child's name or DOB is incorrect on weekly line list. • Why does the Medicaid list come so late?
• HHLPSS database was unavailable multiple times this last FY 19. Public Health Nurses "wear many hats" and the time and effort put forth for data entry is overwhelming at times when the system is slow or not operating correctly.
• Lack of coordination of services with foster placement agency. This leads to children being transferred to another foster care home and our LHD doesn't have any information regarding location of child.
• More resources to provide to families who opt to not accept NCM services (simple self check environmental check list) and • more resources in multiple languages.
• Please simplify the events in the HHLPSS to make entry easier. • Access to medical report for chelation kids.

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