Maine Childhood Lead Poisoning Prevention Program

Childhood Lead Poisoning in Maine

2010 Update **February, 2011**

2010 Surveillance Report

Prepared by

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A. Introduction

The goal of the State of Maine to eradicate childhood lead poisoning by the year 2010 was not met (22 MRSA §1314-A). Yet, much progress has been made. In 1997, over 400 children were newly identified as having an elevated blood lead level (by convention, defined as 10 micrograms lead per deciliter of blood or higher, or 10 µg/dL). In 2009, just over 100 Maine children were identified as having an elevated blood lead level.

FIGURE 1. Number of newly identified children under 6 years of age with an elevated blood lead level, by year for the period 2003- 2009.

There is no safe amount of lead exposure for children. Changes in cognitive function related to even low-level lead exposure have been shown to affect school performance, educational attainment, IQ scores. In particular, the association between lead exposure and IQ and future income earnings is well established in the scientific literature.[1] Davis (2010) estimated that at current levels of lead exposure, each new cohort of babies annually born in

[1] Landrigan, Phillip J., Clyde B. Schechter, Jeffrey M. Lipton, Marianne C. Fahs and Joel Schwartz. 2002. "Environmental Pollutants and Disease in American Children: Estimates of Morbidity, Mortality, and Costs for Lead Poisoning, Asthma, Cancer, and Developmental Disabilities." Environmental Health Perspectives 110(7): 721–728. http://www.ehponline.org/members/2002/110p721-728landrigan/landrigan-full.html

Maine will suffer on average a one-point loss in IQ score and as a result can expect to earn as an aggregate $270 million less over their lifetimes.[2]

This report provides a brief update on recent surveillance activities to track childhood lead poisoning in Maine, and identify high risk areas for more effective targeting of resources.

B. Identifying High Risk Areas for Lead Poisoning

The ME-CDC's Environmental Occupational Health Program (EOHP)[3] completed a major two-year effort to compile, perform data quality checks, and geocode childhood blood lead surveillance data for the years 2003 through 2007. These data were analyzed and mapped to identify areas of the state that have "high-counts" of cases of newly identified children with an elevated blood lead level. Counts of children with elevated blood lead level (i.e., a confirmed blood lead level equal to or above 10 micrograms lead per deciliter blood, or 10 ug/dL) for the years 2003 - 2007 were mapped to the town level (see Figure 1). This mapping identified five (5) areas of the state that collectively represented forty (40%) of all identified cases of children with an elevated blood lead level (eBLL). These five areas are: Bangor, Biddeford-Saco, Lewiston/Auburn, Portland, Portland/Westbrook, and Sanford. Using local property tax information, ME-CDC further determined that roughly 80% of the cases of children with an eBLL were living in rental housing.

Higher counts of children with eBLLs are to be expected for towns with higher populations. To determine whether the five communities represent areas of "high risk" for children with eBLLs, we have computed a measure of the rate of lead poisoning, specifically, the percent of children with an eBLL relative to the total number of children screened for blood lead.

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[2] Davis, Mary E. 2010. "Economic Assessment of Children's Health and the Environment in Maine." Maine Policy Review 19(1): 34-45. http://mcspolicycenter.umaine.edu/files/pdf_mpr/V19N1_DavisFIN.pdf

[3] The Environmental and Occupational Health Program (EOHP) is a program within the Maine Center for Disease Control and Prevention (ME-CDC) Division of Environmental Health. The EOHP includes the four program areas: the Maine Childhood Lead Poisoning Prevention Program, the Environmental Public Health Tracking Program, the Occupational Disease Reporting System Program, and the Environmental Toxicology Program. These four programs are grouped into a single administrative unit to promote efficient use and sharing of resources in recognition of their overlapping missions. See 22 MRSA c. 252, c. 259-A, c. 271.

Using this "rate" measure, we determined that the rates for these five communities are significantly above the statewide rate.

Table 1 below shows the percent of screened children newly identified children with an eBLL for the years 2003-2007 for each of the five high density areas as compared to the statewide average percent. Each high density area was determined to have a higher percent of children with an eBLL than the state average, and in some cases with rates twice the state average (e.g., 2.9 versus 1.3 percent).

Table 1. Percent of newly identified children under 6 years of age with an elevated blood lead level for identified "high-risk" communities for the period of 2003-2007.

Selected Area	Number Screened	Number eBLL[(a)]	Percent	95% CI
Bangor	2,096	41	2.0	(1.4 – 2.6)
Biddeford/Saco	2,229	44	2.0	(1.4 – 2.6)
Lewiston/Auburn	4,162	119	2.9	(2.4 – 3.4)
Portland/Westbrook	5,146	110	2.1	(1.7 – 2.5)
Sanford	1,660	34	2.0	(1.3 – 2.7)
Statewide*	54,422	565	1.0	(1.0 – 1.1)

[(a)] eBLL = elevated blood lead level;
* Excluding high risk areas

We have recently updated this analysis with the most recent 5-years of combined data (2005-2009), and these results are summarized in Table 2. The rates for children with eBLLs in the communities of Bangor, Portland/Westbrook, and Sanford have dropped from the 2003-2007 combined years, though remain above the rate for remainder of the state (which has also

Table 2. Percent of newly identified children under 6 years of age with an elevated blood lead level for identified "high-risk" communities for the period of 2005-2009.

Selected Area	Number Screened	Number EBLL	Percent	95% CI
Bangor	1,998	30	1.5	(1.0 – 2.0)
Biddeford/Saco	2,172	41	1.9	(1.3 – 2.5)
Lewiston/Auburn	4,134	116	2.8	(2.3 – 3.3)
Portland/Westbrook	4,973	65	1.3	(1.0 – 1.6)
Sanford	1,576	24	1.5	(0.9 – 2.1)
Statewide*	53,286	464	0.9	(0.9 – 1.0)

* excluding high risk areas

dropped). Rates for both Biddeford/Saco and Lewiston/Auburn remain relatively unchanged compared to prior years and are twice the rate for the remainder of state.

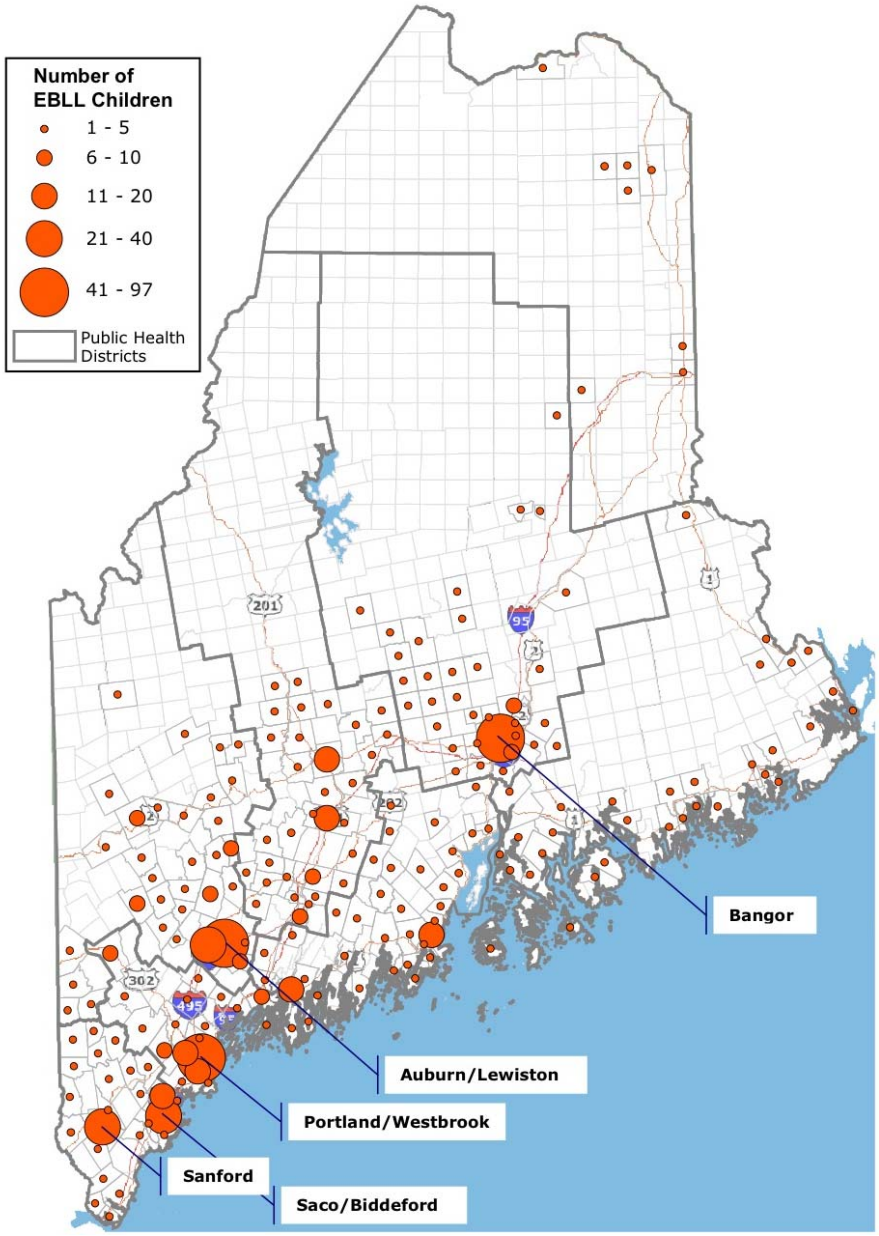

FIGURE 2. Number of newly identified children under 6 years of age with an elevated blood lead level, by town for the years 2003- 2007.

ME-CDC has also perform GIS mapping of eBLLs down to the census block level for each of the five high risk areas. These geospatial data were then presented jointly with base layers of either pre-1950 housing (Figure 3a) or number of children living in poverty (Figure 3b).

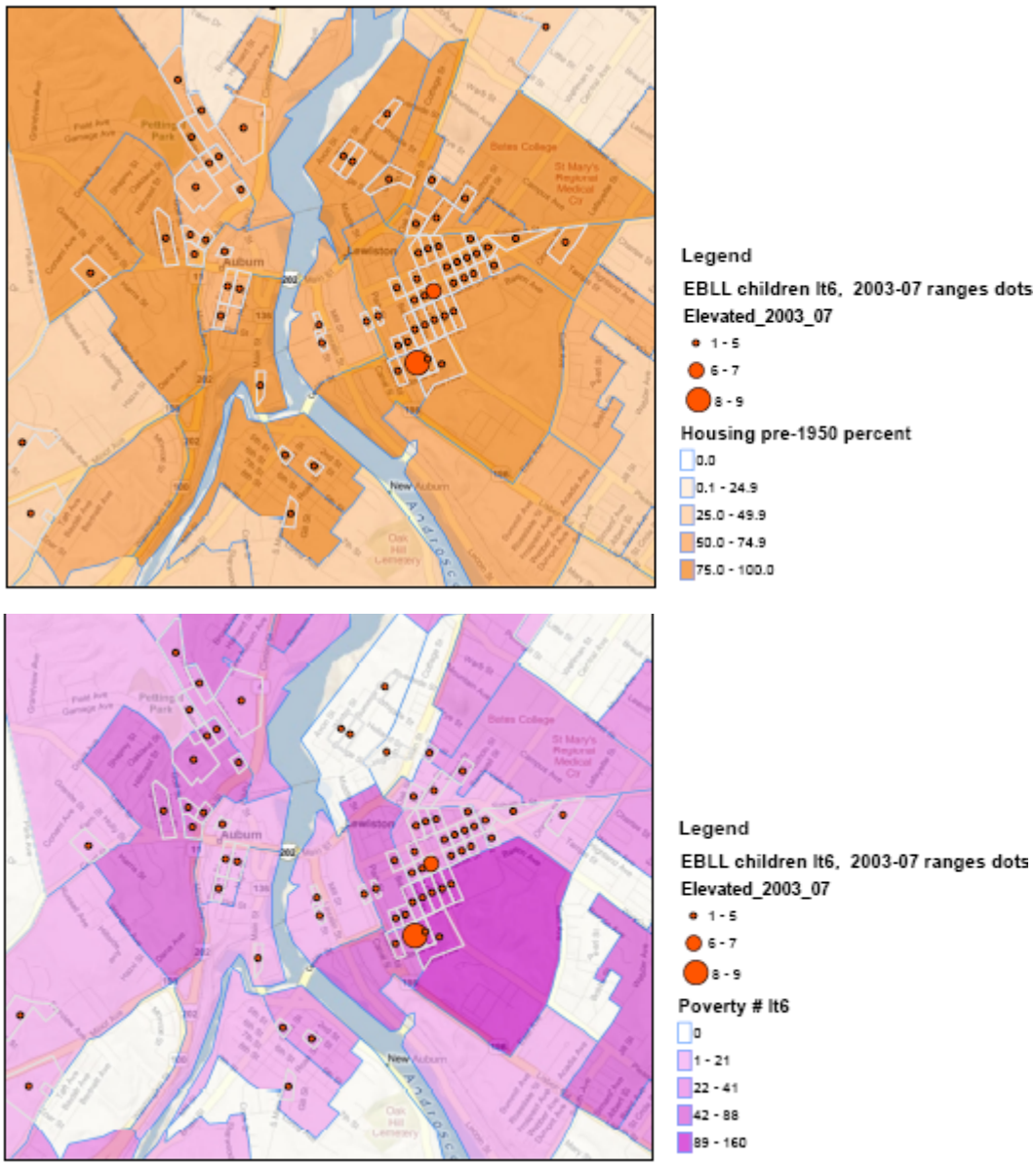

Figure 3a and 3b. Joint occurrence of children with a confirmed elevated blood lead level (eBLL) and pre-1950 housing (3a) or with number of children living in poverty (3b) for Lewiston/Auburn. eBLL data were aggregated to census block level. Pre-1950 housing and poverty data, available from the U.S. Census files, was aggregated to the census block group level.

These spatial analyses using data on blood lead levels, pre-1950 housing, and poverty shows their joint concurrence at the census block group level and affirms the strong concordance between these known risk factors and childhood lead poisoning. More importantly, these maps have provided state and local partners with information to target primary prevention efforts. Similar figures have been prepared for each of the high risk areas.

C. Blood Lead Screening

Screening rates for one and two-year old children have generally remained relatively stable since 2003 within each high risk area. Figure 1 below illustrates the trend in screening rates for two of the high risk areas (Portland/Westbrook and Lewiston/Auburn).[4]

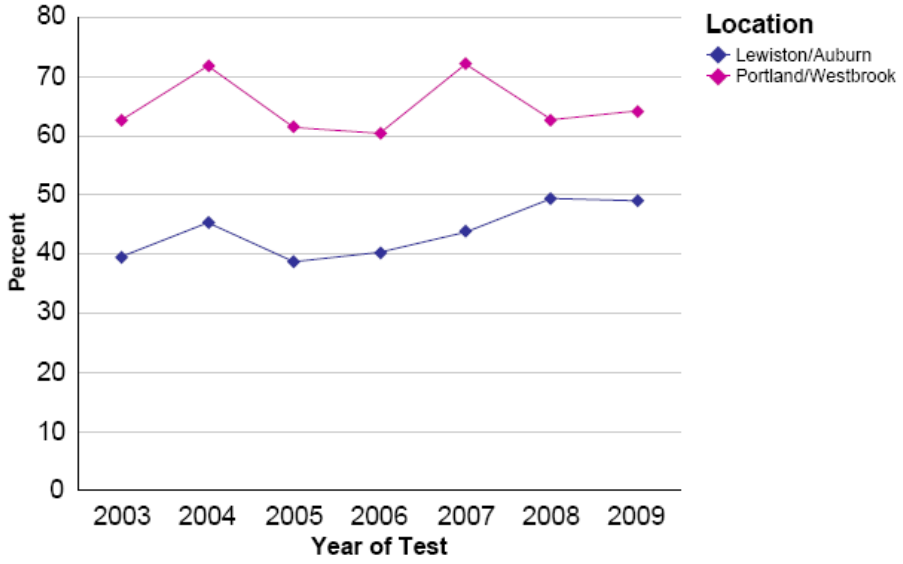

Figure 4. Blood lead screening rates for 1-year olds in the communities of Portland/Westbrook and Lewiston/Auburn for the years 2003 – 2009.

Screening rates in the five high risk areas range from 43.6 to 71.7 percent for one-year olds, and 26.4 – 33.8 percent for two-year olds. Table 3 below summarizes recent data on

[4] To view trends in blood screening rates, visit the Maine Tracking Network to access surveillance data on lead poisoning (https://tracking.publichealth.maine.gov/).

screening rates for each of the five high risk areas and for the two age groups required by law.[5] These screening rates – averaged over a five-year period – provide a baseline to use in assessing progress toward increasing screening rates in future years. The difference in screening rates between 1 and 2 year olds suggests most providers appear focused on making sure that a child has a least one blood lead test by 36 months of age. Looked at this way, current surveillance data indicate between 62% to 77% of children in living in the five high risk areas have had at least one blood lead test by age 36 months.

Table 3. Percent of one-year old and two-year old children screened for blood lead prior to initiation of efforts to increase screening (2003 – 2007) and post initiation of new efforts (2008-2009).

High Risk Areas	Age Group (months)	Population	Number Screened	Percent Screened
Bangor	12 – 23	1,764	1,068	60.5%
	24 – 36	1,844	525	28.5%
Biddeford/Saco	12 – 23	2,229	1,225	55.0%
	24 – 36	2,234	589	26.4%
Lewiston/Auburn	12 – 23	3,580	1,561	43.6%
	24 – 36	3,438	1,024	29.8%
Portland/Westbrook	12 – 23	4,013	2,549	63.5%
	24 – 36	3,975	1,090	27.4%
Sanford	12 – 23	1,209	867	71.7%
	24 – 36	1,138	385	33.8%
Statewide Average	12 – 23	70,159	33,517	47.8%
	24 – 36	70,360	16,324	23.2%

One notable challenge to increasing screening rates in some of our high risk areas is the recent increase in immigrant populations. This is especially a challenge for the Lewiston/Auburn community where the secondary immigrant Somalis represent an increasing proportion of identified cases of lead poisoned children. Children of African descent now

[5] 22 MRSA S1317-D - As required by Section 1905(r)(5) of the Social Security Act and the federal Omnibus Budget Reconciliation Act of 1989, the state lead testing program must require the testing of blood lead levels of all children covered by the MaineCare program at one year of age and two years of age. The program must require the testing of blood lead levels of all children not covered by the MaineCare program at one year of age and two years of age unless, in the professional judgment of the provider of primary health care, in conjunction with the use of the lead poisoning risk assessment tool, the child's level of risk does not warrant a blood lead level test.

represent sixty (60) percent of cases of lead poisoned children in Lewiston/Auburn. In 2005, children of African descent represented forty (40) percent of cases; there were no cases of lead poisoned children of African descent during the 2003 – 2004 period.

Barriers to screening within this ethnic community are many, and some examples include:

- Awareness of lead poisoning. Use of lead paint in Somalia was rare – many immigrants have not heard of lead paint and the two Somali languages do not have a direct translation of the word "lead".
- Cultural barriers to blood testing. Some Somalis have been resistant to the idea of removing blood from their children. Traditionally, seeking health care services was for acute, severe disease. The concept of preventive health care is a new one for this population.
- Physical barriers to screening. Often a blood lead test would be ordered at a physician's office, but the actual blood draw would occur at a hospital laboratory. In these cases the Somali family often needs to get transportation from the physician's office to the hospital lab for both themselves as well as an interpreter.
- Language barriers. It is often difficult to communicate the need for blood lead testing to parents who may not be literate in their own language.
- Magnitude of the problem: There is no accurate data on the number of Somali children in these locales. Additionally, recording of ethnicity from the lead results is often incomplete or misleading (black vs. African vs. Somali). For that reason it is not possible to calculate screening rates within this community to identify the magnitude of the problem or to evaluate efforts to improve screening.

Attempts to address these barriers have begun, as noted in discussion above on new initiatives launched in Lewiston/Auburn. The use of a LeadCare II analyzer in ME-CDC hosted clinics in the Lewiston/Auburn area may be especially helpful in increasing screening rates in this community.

The LeadCare II analyzer may also be a useful device for health care providers to perform in-office blood lead determination. This could potentially address the physical barriers to blood lead screening for practices that must otherwise send patients to an off-site laboratory to obtain a blood lead sample. It also will allow provider offices to inform patients of the results rather than have to attempt contact with the parent 1-2 weeks later. However, allowing health care providers to perform in-office blood lead analysis would require a change to state law. Maine's Lead Poisoning Control Act requires that a blood sample taken from a child by a health care provider or laboratory to test for blood lead level must be sent to the State Health and Environmental Testing Laboratory for analysis (22 MRSA §1319-A). A major advantage of this provision of state law has been timely and comprehensive reporting of blood lead data to the State's Childhood Lead Poisoning Prevention Program – the program responsible for providing services on all cases of childhood blood lead poisoning.[6] This reporting has become completely electronic and largely automated such that, unlike many other states, Maine does not require a staff person to perform data entry of reports submitted from multiple laboratories or provider offices, and data quality checks have become largely automated. As noted above, states that have allowed the use of LeadCare II for in-office blood lead analyses have experienced problems with maintaining good reporting of blood lead test data to state surveillance programs.

It may be feasible to expand the State's existing IMMPACT II system to enable any providers who chose to use the LeadCare II device to electronically transmit blood lead data directly to the State's Childhood Lead Poisoning Prevention Program. If feasible, this would address concerns about potential data entry burdens and possible reduced reporting. ImmPact2, which is managed and maintained by the ME-CDC Immunization Program, is a secure, confidential, Internet-based informatics system that enables authorized users – such as health care providers - to both enter and access information related to a person's immunization status and/or well child visits. It is in widespread use by health care providers in Maine. ImmPact2 is

[6] Services include arranging for a home visit by a public health nurse to instruct the family on how to control lead hazards in the home, counseling the family about lead poisoning, arranging for inspection of rental properties by a licensed inspector trained to identify lead hazards in the home, assisting with relocation of the family in necessary to protect the child, issuing an order to abate lead hazards if necessary, and ensuring that lead hazards are successfully abated before a rental unit can be re-occupied.

able to perform a variety of functions for authorized users, including: a) recording immunizations, contraindications, and reactions; b) validating immunization history and providing immunization recommendations; c) producing recall and reminder notices, vaccine usage and client reports, and Clinic Assessment Software Application (CASA) extracts; and, d) managing vaccine inventory. A web-based interface is used to allow providers to both enter shot records and view immunization history.

We believe it is feasible to build similar functionality to manage blood lead data in IMMPACT II, and it also appears feasible to provide views of State's existing blood lead data using IMMPACT II. Thus, providers would be able to both enter blood test results from using LeadCare II, and would be able to retrieve any confirmatory blood lead test as well as testing history. If Leadcare II use is coupled with use of IMMPACT II for electronic reporting of test data, the use of this new device could occur with minimal additional data processing burden on the State, and thus minimal fiscal impact. And because medical providers would have access to whether a child has not had a previous blood lead test, may increase blood lead screening. The challenge of maintaining good reporting of blood lead test data could be insured by making use of LeadCare II conditional on maintaining good reporting.