# Childhood Lead Poisoning Prevention Activities Within Michigan Local Public Health Departments

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## **SYNOPSIS**

**Objective.** Local public health departments have a wide array of responsibilities, including coordinating childhood lead poisoning prevention activities. This study was conducted in an effort to understand how local public health officers prioritized lead poisoning prevention activities and the barriers to the delivery of childhood lead poisoning prevention services delivered through local health departments.

**Methods.** A telephone survey was conducted of health officers in Michigan, a state with a high burden of environmental lead. Analysis included Spearman rank correlation and Fisher's exact test.

**Results.** No association was found between the local risk of lead poisoning and the priority placed by local health departments on lead poisoning prevention activities. Similarly, there was no association between the local risk of lead poisoning and the availability of services. Only 60% of local health departments offered blood lead testing, environmental investigation, and case management. Most (74%) believed that lead poisoning is inadequately addressed within the area served by their local health department.

**Conclusion.** New strategies of providing lead poisoning prevention activities are needed to achieve the federal and state goals of eliminating childhood lead poisoning over the next decade.

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The removal of lead from paint and gasoline has resulted in a steep decline in the proportion of children with elevated blood lead levels.1 With this decrease in childhood lead poisoning, the Centers for Disease Control and Prevention (CDC) revised the recommendations for secondary prevention from near-universal blood lead testing of all young children to targeted testing of children at risk, including those living in older housing or enrolled in public assistance programs such as Medicaid or the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).2 Once detected, management of children with elevated blood lead levels involves a complex partnership of families, primary care providers, specialists, and public agencies to provide medical management and to identify and abate sources of lead.3 Public health departments play a central role in coordinating and ensuring the success of these lead poisoning prevention activities.

Compared to other states, Michigan has a high rate of childhood lead poisoning.4 However, in previous research we have found the rate of lead testing to be low among Michigan Medicaid-enrolled children, a population at high risk of lead poisoning.<sup>5</sup> We have also found that many Michigan Medicaid-enrolled children with known elevated blood lead levels do not have follow-up testing, a key component of medical management.6

The state and federal governments have set an ambitious goal of eliminating childhood lead poisoning by 2010.<sup>7,8</sup> To achieve this goal, recent legislation has required Medicaid providers to increase testing rates and laboratories to report lead levels electronically to the state, and has established a commission to coordinate future lead prevention activities.9

Although state agencies play an important role in setting policy for the prevention of childhood lead poisoning, local public health departments are responsible for the actual programmatic activities. These activities must be balanced against the resources required for other responsibilities, including environmental health, maternal and child health, health education, laboratory testing, infectious disease control, and death investigation and certificates. The responsibilities of local public health departments have also recently been expanded to include a focus on emergency preparedness. Funding for local health department activities comes primarily from block grants from the state, local tax revenue, and service fees. Some health departments also apply for grants from federal agencies and nonprofit foundations. As a result, the resources available across local health departments vary.

We were interested in understanding Michigan local public health department activities related to childhood lead poisoning, including the priority placed on these activities and the services that are offered. Our overarching goal was to identify barriers to the delivery of childhood lead poisoning prevention services at the local public health department level in order to develop strategies to improve these services.

#### **METHODS**

Michigan is divided into 45 local public health department catchment areas, ranging in size from one densely populated urban area to ten rural counties. Each local health department has a health officer, who is responsible for managing all of its activities. From November 2004 to January 2005, we conducted a semi-structured telephone survey of the health officers.

## **Survey instrument**

The survey instrument consisted of 12 questions focusing on the lead poisoning prevention services offered by the local health department, sources of funding for these services, barriers to lead poisoning prevention activities, and the overall priority of lead poisoning prevention. The survey (available upon request) was designed so that each interview would take approximately 20 minutes. The interviewer took notes during the telephone call, which were then entered into a database. Responses to open-ended questions were grouped into common themes based on consensus of the investigators.

## Local risk of lead poisoning

We categorized local health departments based on the local risk of lead poisoning within their catchment areas. The state has identified ZIP code areas with high risk for lead poisoning based on the incidence of lead poisoning, the stock of older houses, and the proportion of children living in poverty.<sup>10</sup> In 2000, 55% of the state's population lived in a high risk area. 11 Local health departments were classified as high risk if ≥75% of the population in their catchment area lived in a high risk area and at low risk if ≤25% of the population lived in a high risk area; the remaining local health departments were classified as moderate risk. Overall, 18 local health departments were high risk, 22 were moderate risk, and five were low risk.

#### Data analysis

We used Spearman rank correlation to evaluate the association between the priority of lead poisoning prevention activities and local risk of lead poisoning. We used Fisher's exact test to evaluate the association between other selected categorical variables. We considered p<0.05 to be statistically significant. Stata 8.2 was used for all analyses.<sup>12</sup>

# **RESULTS**

# Response rate

Health officers from 42 of the 45 local health departments participated in the survey (93% response rate). Two of the nonrespondents represented local health departments with a moderate risk of lead poisoning and one represented a local health department with a high risk of lead poisoning.

# Priority of childhood lead poisoning prevention activities

Within the local health departments, nine health officers (21%) identified lead poisoning prevention as a high priority, 22 (52%) as a medium priority, and 11 (26%) as a low priority. The Table presents the priority of childhood lead poisoning prevention stratified by the risk of lead poisoning within the health department catchment area. Overall, the priority of lead poisoning prevention was independent of the local risk (p=0.28).

Most health officers based priority on their perception of the local prevalence of lead poisoning (n=28; 67%). For some (n=7; 17%), priority was based on the local prevalence, availability of financial resources, and competing needs for the local population (e.g., immunization delivery). The same number (n=7; 17%) set priority based only on available resources and competing needs.

#### Childhood lead poisoning prevention activities

Blood lead testing was offered by 33 (79%) of the local health departments. For half of these local health

departments (n=17; 52%), lead testing was part of their WIC clinics. For those local health departments that offered blood lead testing, families with children who were not enrolled in a public insurance program or WIC would be charged for blood collection and analysis.

Most (n=33; 79%) local health departments offered environmental investigation for children identified in the community with elevated blood lead levels, including 26 of the 33 local health departments that offered blood lead testing and seven of the nine that did not. Those that did not offer environmental investigation reported lack of trained staff and appropriate equipment. As with environmental investigation, most (n=38; 86%) reported using comprehensive case management to track children with elevated blood lead levels to ensure appropriate care.

Overall, 25 local health departments (60%) offered blood lead testing, environmental investigation, and case management. The likelihood of offering all three services was not associated with the local risk of lead poisoning (p=0.82) or the priority placed on child-hood lead poisoning prevention (p=0.59). One local health department did not offer any of these services. Although this local health department was in a high risk area, the health officer reported that childhood lead poisoning prevention was a low priority because of the low prevalence of childhood lead poisoning and the high costs of training staff to monitor and manage children with elevated blood lead levels.

#### **Funding**

In addition to funding provided by the state, 13 local health departments (31%) received outside funding specifically for childhood lead poisoning prevention activities. Sources included federal agencies (n=4)

Table. The priority of childhood lead poisoning prevention activities and the lead prevention services offered by the local health departments overall and stratified by the risk of lead poisoning within the health department catchment areas

	Risk category				
	Overall (N=42)	Low (n=5)	Moderate (n=20)	High (n=17)	
Priority					
Low	11 (26%)	2 (40%)	5 (25%)	4 (24%)	
Medium	22 (52%)	3 (60%)	11 (55%)	8 (47%)	
High	9 (21%)	0 (0%)	4 (20%)	5 (29%)	
_ead prevention services					
Blood lead testing	33 (79%)	3 (60%)	16 (80%)	14 (82%)	
Environmental investigation	33 (79%)	5 (100%)	17 (85%)	11 (65%)	
Case management	38 (90%)	5 (100%)	18 (90%)	15 (88%)	

such as the Department of Housing and Urban Development (HUD) and the Centers for Disease Control and Prevention (CDC), local governments (n=9), and non-profit organizations (n=3). Although there was no association between local risk and the likelihood of receiving outside funding (p=0.45), higher priority was associated with increased likelihood of having outside funding (p=0.02). Local health departments with outside funding were also more likely to provide blood lead testing, environmental investigation, and case management (85% vs. 48%; p=0.04).

# Perception of adequacy

Most health officers (n=31; 74%) reported that the problem of lead poisoning is not adequately addressed within the local health department's catchment area. This did not vary by the local risk of lead poisoning (p=0.31). Regardless of their perception of adequacy, all health officers believed that lack of funding for environmental investigation and abatement limited the effectiveness of their childhood lead poisoning prevention activities. One health officer reported believing that the state did not consider lead poisoning to be a priority issue because of the lack of specific funding for childhood lead poisoning prevention activities.

## **DISCUSSION**

Local health departments have the challenge of providing numerous diverse services with limited resources. Current economic pressures and the increasing role of health departments in emergency preparedness have further increased the financial pressure on local public health departments. Health officers have the ability to prioritize activities to meet the needs of the population they serve. This strategy, similar to "new federalism," can improve the efficiency of resource utilization, but leads to the fragmentation of services when resources are constrained.<sup>13</sup>

About 2% of U.S. children have elevated blood lead levels. <sup>14</sup> Local health departments are responsible for ensuring that these children receive appropriate care and that sources of lead are identified and eliminated. Because of limited resources in Michigan, nearly half of the local health departments do not offer all of the services necessary for eliminating lead poisoning, including blood lead testing, environmental investigation, and case management. The state is not able to fund all local public health departments for these services; however, some local health departments have been successful in obtaining funding from other sources. New coordinated efforts between federal, state,

and local agencies are needed to eliminate childhood lead poisoning.

Although most health officers believed the priority of lead poisoning prevention activities is based on the local prevalence, there was no association between local risk and either priority or services provided. While assigning a higher priority to lead poisoning prevention might increase lead poisoning prevention activities, other nonrelated services might suffer. State officials can play an important role in how health officers prioritize services by ensuring that health officers have high quality data about the populations they serve. However, state officials must work with the health officers to balance the important but challenging goal of eliminating lead poisoning with the complex responsibilities of the local health departments to ensure that federal, state, and local objectives can be realized.

In Michigan, we have been focusing on efforts to increase the rate of blood lead testing among at-risk children and increasing coordination and cooperation between different local health departments, such as applying for grant funding for lead abatement and training individuals to perform environmental investigations. Systems have also been developed to provide data to the health officers regarding the rate and outcome of blood lead testing, allowing for continuous quality improvement activities. Public health officials are also considering adding blood lead test results to the statewide immunization registry. Future studies will assess the outcome of these interventions.

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