

## Analysis of Blood Lead Screening Data (2008–2011) for Refugee Children in Rhode Island

*Edwina Williams, Robert Vanderslice, PhD, and Carrie Bridges Feliz, MPH*

**MANY REFUGEE CHILDREN ARRIVE TO THE UNITED STATES WITH elevated blood lead levels (BLLs) compared to U.S. born children.** Immigrant and refugee children are at high risk for lead poisoning due to previous lead exposure in their country of origin, malnutrition and iron deficiency. Upon arrival to Rhode Island most refugees are initially placed in housing units in the Providence area located near essential services at Rhode Island Hospital, the International Institute of RI, and the Diocese of Providence. However, housing units in these Providence neighborhoods are at high risk for lead hazards, thereby putting refugees at high risk for lead poisoning.

A study from New Hampshire published in 2004, found that of the 242 refugee children who were resettled in that state during October 1, 2003 – September 30, 2004, 92 received two blood lead level tests, one upon arriving to the United States and the second, 3–6 months after the initial screening. While most children had BLLs below ten micrograms per deciliter ( $<10 \mu\text{g}/\text{dL}$ ) at the initial screening, 37 (40%) of the 92 children who had two screenings had BLLs  $>10 \mu\text{g}/\text{dL}$  at the second screening, suggesting that the children experienced lead exposures in the US. Further investigation revealed environmental exposures to lead as well as a lack of awareness among refugee families on the sources and hazards of lead exposure.<sup>1</sup>

Based on the results of the New Hampshire study and subsequent recommendations from the Centers for Disease Control and Prevention (CDC), the Rhode Island Department of Health (HEALTH) issued lead screening guidelines specific to the pediatric refugee population in 2006. The HEALTH guidelines require that refugee children up to the age of 16 years receive a health screening within 30 days of their arrival that includes a BLL test. Children whose initial lead screening results in a BLL  $<10 \mu\text{g}/\text{dL}$  should have a repeat test 3–6 months later. Children with a BLL of  $10 \mu\text{g}/\text{dL}$  or greater at any testing point are classified as having elevated BLLs. Children whose initial lead screening results in a BLL between  $10 - 19 \mu\text{g}/\text{dL}$  should have a repeat test within three months (90 days) and receive lead education and/or non-medical case management by a lead center as recommended. Children who have an initial BLL test of  $20 \mu\text{g}/\text{dL}$  or greater are considered “significantly lead poisoned” and should receive additional medical evaluation and treatment immediately.<sup>2</sup>

A previous analysis of blood lead screening data performed by Sunil Hebbbar found that between 2004 and 2008, refugees experienced more lead exposures compared to other Providence children. For this period, annual prevalence rates ranged from 14 to 40% for refugee children; prevalence rates for Providence for the same period ranged from four to nine percent.<sup>3</sup>

Since the initial analysis was performed, many changes have occurred which have impacted the lead exposures of the refugee

population. For example, the housing and foreclosure crisis has reduced the availability of safe and healthy housing; increased the cost to maintain rental units, and increased attention on the placement of newly arrived refugees.

This report provides an updated analysis of the prevalence of lead poisoning among refugee children in Rhode Island from 2008 to 2011, addresses concerns about lead-safe housing placements for refugee children, and offers a recommendation to lower the lead level of concern from  $10 \mu\text{g}/\text{dL}$  to  $5 \mu\text{g}/\text{dL}$ .

### METHODS

The HEALTH Lab analyzed blood lead screening samples for 257 refugee children from 2008 to 2011. To address the concerns of refugees being placed in housing units with lead hazards that are contributing to their exposure, screening histories were examined in detail for 20 of the 257 children for whom an increase in BLLs of at least  $2 \mu\text{g}/\text{dL}$  was observed between two screening tests.

### RESULTS

The following results were obtained for the 257 refugee children who had blood lead screenings from 2008 to 2011: Blood lead levels ranged from zero to  $28 \mu\text{g}/\text{dL}$ , with an average of all samples of  $5 \mu\text{g}/\text{dL}$ . 23 children (9%) had at least one sample at or above  $10 \mu\text{g}/\text{dL}$ ; and 5 children (2%) had a sample of  $15 \mu\text{g}/\text{dL}$  or greater.

Of the 23 refugee children whose BLLs were above  $10 \mu\text{g}/\text{dL}$ , 12% were children under the age of six years as compared to 3.4% of all Providence children under the age of six years who had elevated BLL during the same time period.<sup>4</sup> Four of the 23 children experienced an increase in BLLs after their initial screening. Two children experienced this increase after moving from

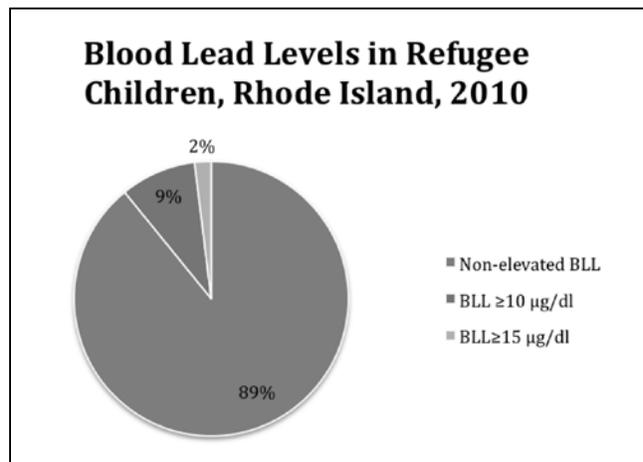


Figure 1.

## Increase in Blood Lead Level in Refugee Children at Initial Placement, Rhode Island, 2010

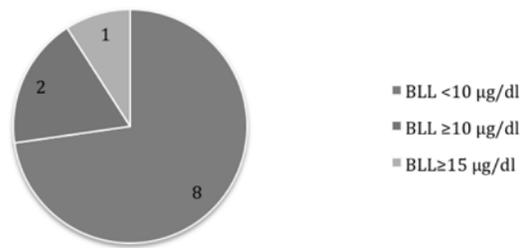


Figure 2.

their initial housing placement to a second location; whereas the remaining two children experienced BLL increases from nine to 12 µg/dL and four to 11 µg/dL, respectively, while remaining at their initial housing placement. The remaining 19 children with elevated BLLs of 10 µg/dL or greater did not experience an increase in their BLL after their initial screening.

After examining the screening histories for the 22 children who experienced a 2 µg/dL or more increase in BLLs between two screens, 11 of these children had relocated to a secondary housing placement since their initial screening test. The blood lead level increase was likely associated with exposures at the second address and not at the address of the initial placement. However, the remaining 11 children experienced an increase in their BLLs while remaining at their initial housing placement. Three children experienced a BLL increase above 10 µg/dL; one from 20 to 25 µg/dL, and the other two results were previously reported. The remaining eight children experienced an increase in BLLs but the results of the screening test remained below 10 µg/dL.

### DISCUSSION

The 2008-2011 screening data do not provide evidence that current housing placements in Rhode Island are contributing to a widespread lead poisoning problem in the refugee community. Most refugee children arrive in the U.S. with blood lead levels below 10 µg/dL and maintain low blood lead levels during childhood. Children with initial screening results that were elevated all experienced declines in blood lead levels over time. For children who experienced an increase in blood lead levels while remaining at their initial housing placements, these increases may be due to the normal fluctuation and accuracy of the laboratory test. The lack of evidence of a widespread problem is not equivalent to an endorsement of the most recent housing placements, however. Most families with children were placed in housing without a Certificate of Conformance for lead. It is likely that placing families in housing with fewer hazards would result in lower blood lead levels than those observed to date.

The need to improve housing placements for refugees is demonstrated by the most recent recommendation of the CDC Advisory Committee on Childhood Lead Poisoning Prevention. The Committee recommended that the lead level of concern be lowered from 10 to 5 µg/dL. Notably, almost 40% of refugee

children (100 of 257 screened from 2008 to 2011) fall into the 5 to 9 µg/dL range of concern.

Addressing the health of housing for refugee children will require the following:

- Quarterly notification by refugee resettlement agencies to HEALTH of housing placements for recently resettled refugees.
- A commitment to placing refugees in safe housing, which includes ensuring that no family with children under the age of six is placed in a unit with lead hazards, as determined by: a valid certificate of conformance or lead safe certificate for the housing placement; placement in a unit built after 1978; or visual confirmation by the resettlement agency that the paint is intact, that the soil adjacent to the house is covered, that the landlord has been informed of the requirements to comply with the lead standards, and that a dust sample test result has been obtained that is within standards for obtaining a Certificate of Conformance.
- Maintaining open and transparent communication between refugee resettlement agencies, the R.I. Department of Health, the State Coordinator for Refugee Resettlement, and the U.S. Department of State, which contracts directly with resettlement agencies for reception and placement.

### REFERENCES

1. Kellenberg J, DePentima R, et al. Elevated blood lead levels in refugee children— New Hampshire, 2003-2004. *MMWR*. 2005;54:42-6.
2. Rhode Island Department of Health Lead Screening and Referral Guidelines for Refugees. Childhood Lead Poisoning Prevention Program. Rhode Island Department of Health. January 2006. <http://www.health.ri.gov/publications/brochures/provider/LeadScreeningAndReferralGuidelinesForRefugees.pdf>.
3. Hebbbar S, Vanderslice R, Simon PR, Vallejo ML. Blood Levels in Refugee Children in Rhode Island. *MH/RI*. 2010;93:254-5
4. Childhood Lead Poisoning Prevention Program. Providence, RI: Rhode Island Department of Health.

*Edwina Williams is a Masters student at the Warren Alpert Medical School, Program in Public Health, Brown University.*

*Robert Vanderslice, PhD, is the Team Lead for Healthy Homes and Environment, Division of Community Family Health and Equity, Rhode Island Department of Health.*

*Carrie Bridges Feliz, MPH, is the Team Lead for Health Disparities and Access to Care, Division of Community, Family Health and Equity, Rhode Island Department of Health.*

### Disclosure of Financial Interests

The authors and/or their spouses/significant others have no financial interests to disclose.

### CORRESPONDENCE

Edwina Williams  
Brown University  
Box G-S121, 2nd Flr.  
Providence, RI 02912  
e-mail: edwina\_williams@brown.edu