# Using Surveillance Data to Develop and Disseminate Local Childhood Lead Poisoning Screening Recommendations: Miami–Dade County's Experience

| Mary Jo Trepka, MD, MSPH

Before 1999, few children in Florida's Miami–Dade County were being screened for lead poisoning. To improve screening rates, the county's department of health developed screening recommendations and a screening tool using surveillance and census data and disseminated these materials to primary care providers. Each year, recommendations have been reviewed to assess their sensitivity, and revised recommendations have been disseminated to health care providers.

The percentage of children 6 years or younger screened in Florida who reside in Miami–Dade County increased from 4.1% in 1998 to 20.3% in 2002. Analysis and dissemination of blood lead surveillance data not only guide development of screening recommendations but also educate health care providers regarding the importance of childhood screening. (*Am J Public Health*. 2005;95:556–558. doi:10.2105/AJPH.2004.039602)

**CHILDHOOD LEAD POISONING** adversely affects cognitive and behavioral development,[1] even at low blood lead levels.[2–5] An estimated 434 000 US children aged 1 to 5 years have blood lead levels of 10 μg/dL or higher (the surveillance case level used in defining lead poisoning),[6] and children living in older housing are disproportionately affected, as are children of low socioeconomic status.[6] Although industrial activities, parental occupations and hobbies, folk remedies, water, and ceramics have been identified as sources of lead exposure, the most common sources among US children are dust and soil contaminated by deteriorated lead-based paint and, to a lesser extent, leaded gasoline exhaust.[7] Identification of children with lead poisoning can lead to treatment as well as interventions designed to reduce blood lead levels or prevent future exposures.[8–11]

In 1997, the Centers for Disease Control and Prevention (CDC) recommended that screening be conducted among 1- and 2-year-old children who (1) lived in zip code areas in which 27% or more of dwellings were built before 1950, (2) received public assistance, (3) resided or frequently spent time in housing built before 1950 or in housing built before 1978 that had undergone recent or continuing renovation, or (4) had a sibling or playmate who had contracted lead poisoning. The CDC also recommended that 36- to 72-month-old children who had not previously been screened undergo screening. Universal screening was recommended in areas with lead poisoning prevalence rates of 12% or more. The CDC further advised that state and local public health authorities modify their recommendations on the basis of reviews of local data and community input.[12]

In 2000, 147 016 children aged 1 to 5 years resided in Miami–Dade County (MDC).[13] The total number of children at risk of lead poisoning is unknown, but today more than 32 000 reside in areas with a high percentage of older housing,[13] and approximately 20 000 live in poverty outside these areas.[14] Even though 15.4% of all Florida children 6 years or younger live in MDC,[13] the county accounted for only 4.1% (1554 of 38 039) of screening tests among this age group reported during 1998 (T. Thompson, Florida Department of Health, written communication, April 2003). In addition, only 21% of 1- and 2-year-old children enrolled in Medicaid were screened during fiscal year 1999–2000.[15]

Before 1999, the MDC Health Department had not disseminated lead poisoning surveillance data or screening recommendations to local health care providers in a comprehensive manner. In July 1999, the department was awarded a grant from the CDC's Childhood Lead Poisoning Prevention Program (CLPPP). Because of the county's low screening rates, one of the program priorities was to develop and disseminate local screening recommendations.

In October 1999, the Health Department's CLPPP staff convened a screening guidelines committee, composed of pediatricians, a Medicaid representative, epidemiologists, and department staff, whose purpose was to adapt the CDC's targeted screening guidelines to MDC. The committee considered CDC,[12] state (in draft form),[16] and other[17,18] recommendations and reviewed surveillance data and geographic in-

formation system maps depicting the following zip code–specific characteristics: housing ages; lead poisoning rates; rates of enrollment in the Special Supplemental Nutrition Program for Women, Infants, and Children; and income levels. Because no prevalence data were available, the 12% prevalence cutoff criterion for universal screening could not be considered. The committee determined the zip code areas that warranted universal screening on the basis of prevalence rates of pre-1950 housing. In other zip code areas, screening was recommended if children met any other CDC targeted screening criterion.

After development of the local screening recommendations, CLPPP staff developed a tool designed to communicate these recommendations to clinicians. The tool included a geographic information system in which lead poisoning cases were superimposed on a map of target zip code areas (i.e., areas where universal screening was recommended) (Figure 1).

Guidelines were first disseminated by mail in June 2000 to pediatric primary care providers. Included in this mailing were 2 laminated copies of the screening tool (a coat-pocket-sized copy and a paper-sized copy), background information about lead poisoning and local sources of lead exposure, a resource list, a reporting form, and a Rolodex card with CLPPP contact information.

Surveillance data were reviewed annually to ensure that more than 95% of reported lead poisoning cases met at least one criterion. During fiscal year 1999–2000, the sensitivity of the screening recommendations was 98%, and this value remained above 95% through fiscal year 2002–2003. In 2001, the criterion of recent immigration was added to the recommendations because some of the highest blood lead levels and prevalence rates were observed among recent immigrants; 12% of children screened at the Health Department's Refugee Health Assessment Center between October 1999 and September 2001 had blood lead levels of 10 μg/dL or higher.[19]

## DISCUSSION AND EVALUATION

The percentage of MDC children 6 years or younger who underwent screening tests increased from 4.1% of the state's total number of reported tests among this age group (1554 of 38 039) in 1998 to 20.3% (15 221 of 74 982) in 2003 (T. Thompson, Florida Department of Health, written communication, April 2003). However, given that 32 617 children reside in areas with older housing and that many additional children are at risk, screening remains suboptimum. On the other hand, the increase in screening suggests that primary care providers did respond to the information they received about the local childhood lead poisoning problem, and a screening increase was also noted in Minnesota after development and distribution of screening guidelines.[20]

Between 1998 and 2002, the number of lead poisoning cases identified in MDC among children aged 1 to 5 years declined by 19% from 346 to 279, despite an increase in the number of screening tests conducted. Nationally, lead poisoning prevalence among tested children declined 54% between 1998 and 2001 (from 6.7% to 3.1%).[6]

A surveillance system should include not only data collection and analysis but effective communication of data to those involved in prevention and control.[21] In the present case, 4 months after the first mailing, 55% of a random sample of 371 surveyed pediatric providers (response rate: 58%) reported recalling the recommendations made. (However, during the Health Department's staff visits, some clinicians reported surprise at the number of lead poisoning cases in MDC, given that they and their colleagues encountered only a few cases, or no cases, each year.) Also, in the case of MDC, surveillance data were useful in assessing the sensitivity of local screening criteria and in identifying recent immigration as a risk factor.

## NEXT STEPS

Health Department CLPPP staff continue to periodically analyze surveillance data to ensure that more than 95% of reported lead poisoning cases are captured by at least one criterion of the current recommendations. If the epidemiology of childhood lead poisoning in MDC changes, screening recommendations may need to be revised. Epidemiological information about local lead poisoning risk factors is and should continue to be communicated regularly to clinicians to help guide their decisions and elicit their partnership in screening, reporting, and case management. ■

**About the Author**

*At the time of the development of the screening guidelines described here, Mary Jo Trepka was with the Office of Epidemiology and Disease Control, Miami–Dade County Health Department, Miami, Fla.*

*Requests for reprints should be sent to Mary Jo Trepka, MD, MSPH, Robert R. Stempel School of Public Health, Florida International University, 11200 SW 8th*

## KEY FINDINGS

- Surveillance data can help direct development of recommendations.
- Surveillance data should be continually disseminated to health care providers to guide their decisionmaking.
- Geographic information system maps are effective in communicating surveillance data to clinicians.
- Tailoring national recommendations using local data not only is necessary but builds support among health care providers for screening efforts.

# Childhood Lead Poisoning* Screening Map for Miami-Dade County

To report lead poisoning* cases, call (305) 623-3565

## Screening Guidelines:

Screen Children at ages 12 and 24 months (at 36-72 months if child has not been screened previously) who meet any of the following criteria:

- ✓ Are enrolled in Medicaid or receive health care in a publicly funded clinic
- ✓ Receive any type of public assistance
- ✓ Live in or regularly visit a house that was build before 1950
- ✓ Live in or regularly visit a house built before 1978 that is being remodeled
- ✓ Recently arrived to the U.S. within one year
- ✓ Have a sibling or playmate with lead poisoning
- ✓ Live in or attend day care in any of the following zip code areas (corresonding to the grey shaded areas on the map)

### List of Target Zip Code Areas

33125 33126 33127 33128 33129 33130 33131
33132 33133 33134 33135 33136 33137 33138
33139 33140 33141 33142 33144 33145 33147
33150

* Lead Poisoning ia a blood lead level greater than or equal to 10 ug/dL of whole blood. 10/06/2002

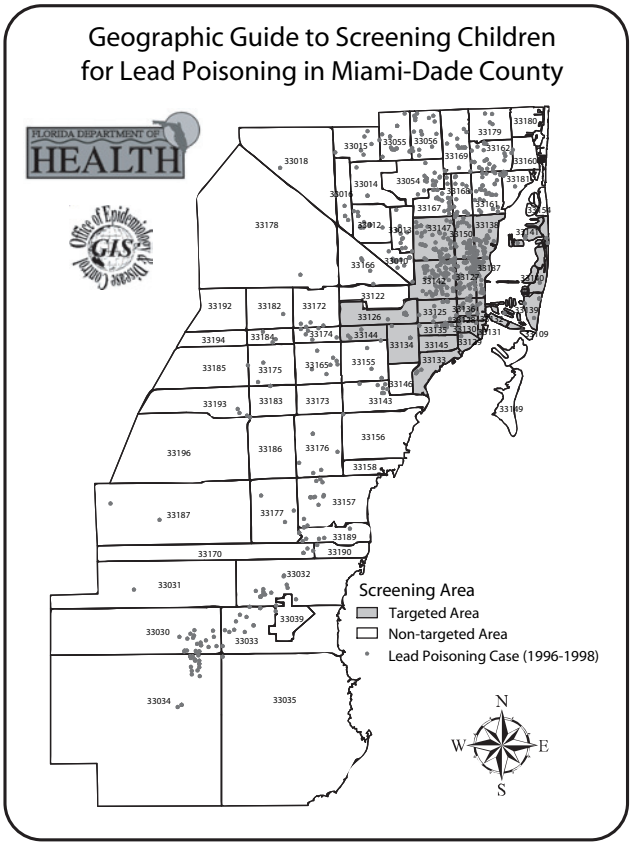


**FIGURE 1—Miami–Dade County's screening recommendations tool for health care providers.**

*St, HLS II, Room 595, Miami, FL 33199 (e-mail: trepkam@fiu.edu).*

*This article was accepted July 14, 2004.*

## Acknowledgments

Development and dissemination of the screening recommendations were supported by the Centers for Disease Control and Prevention (grant number H64/CCH416785-03-01).

I would like to thank the following people who assisted in the development and dissemination of the screening recommendations: Michel Dodard, Nancy Fawcett, Dolly Katz, Ann Avazian, Eleni D. Sfakianaki, Tally Hustace, Michelle Edouard, Virginia Gilbert, Joanna Weisbord, Guoyan Zhang, Lydia Sandoval, Trina Thompson, and Vukosava Pekovic.

## References

1. Lidsky TI, Schneider JS. Lead neurotoxicity in children: basic mechanisms and clinical correlates. *Brain.* 2003;126:5–19.

2. Bellinger DC, Needleman HL. Intellectual impairment and blood lead levels. *N Engl J Med.* 2003;349:500.

3. Canfield RL, Henderson CR, Cory-Slechta DA, Cox C, Jusko TA, Lanphear BP. Intellectual impairment in children with blood lead concentrations below 10 μg per deciliter. *N Engl J Med.* 2003; 348:1517–1526.

4. Lanphear BP, Dietrich K, Auinger P, Cox C. Cognitive deficits associated with blood lead concentrations <10 μg/dL in US children and adolescents. *Public Health Rep.* 2000;115:521–529.

5. Schwartz J. Low-level lead exposure and children's IQ: a meta-analysis and search for a threshold. *Environ Res.* 1994;65:42–55.

6. Meyer PA, Pivetz T, Dignam TA, Homa DM, Schoonover J, Brody D. Surveillance for elevated blood lead levels among children—United States, 1997–2001. *MMWR CDC Surveill Summ.* 2003;52(SS-10):1–21.

7. *Toxicological Profile for Lead.* Atlanta, Ga: Public Health Service; 1999.

8. Lane WG, Kemper AR. American College of Preventive Medicine practice policy statement: screening for elevated blood lead levels in children. *Am J Prev Med.* 2001;20:78–82.

9. Charney E, Kessler B, Farfel M, Jackson D. Childhood lead poisoning: a controlled trial of the effect of dust-control measures on blood lead levels. *N Engl J Med.* 1983;309:1089–1093.

10. Rhoads CG, Ettinger AS, Weisel CP, et al. The effect of dust lead control on blood lead in toddlers: a randomized trial. *Pediatrics.* 1999;103:551–555.

11. Schultz B, Pawel D, Murphy A. A retrospective examination of in-home educational visits to reduce childhood lead levels. *Environ Res.* 1999;80: 364–368.

12. *Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials.* Atlanta, Ga: Centers for Disease Control and Prevention; 1997.

13. US Bureau of the Census. 2000 census summary file 1: sex by age (total population). Available at: http://factfinder.census.gov. Accessed June 6, 2004.

14. US Bureau of the Census. 2000 census summary file 3: poverty status in 1999 by age. Available at: http://factfinder.census.gov. Accessed June 6, 2004.

15. Pekovic V, Trepka MJ. Childhood lead poisoning: Medicaid clients not being screened in our community. *Miami Med.* December 2003:14–15.

16. Florida Department of Health, Bureau of Environmental Epidemiology. Childhood lead poisoning screening guidelines, December 2000. Available at: http://www.doh.state.fl.us/environment/hsee/Lead/LeadWebPages/LSGuide4–01.pdf

17. American Academy of Pediatrics, Committee on Environmental Health. Screening for elevated blood lead levels. *Pediatrics.* 1998;101:1072–1078.

18. US Preventive Services Task Force. Screening for elevated lead levels in childhood and pregnancy. In: *Guide to Clinical Preventive Services.* 2nd ed. Alexandria, Va: International Medical Publishing; 1996:247–267.

19. Trepka MJ, Pekovic V, Santana JC, Zhang G. Risk factors for lead poisoning among Cuban refugee children. *Public Health Rep.* 2005;120:179–185.

20. Symonik D, Bernauer B, Falken M. Minnesota childhood blood lead guidelines. *Minn Med.* 2002;85:44–49.

21. Thacker SB, Berkelman RL. Public health surveillance in the United States. *Epidemiol Rev.* 1988;10:164–190.