Physician Barriers to Lead Testing of Medicaid-Enrolled Children

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Background.—The rate of blood lead testing among Medicaid-enrolled children is low.

Objective.—To determine barriers to lead testing perceived by pediatricians to develop future interventions to improve the rate of appropriate blood lead testing.

Methods.—We developed a mail survey based on findings from 6 focus groups of primary-care providers in Michigan. We then surveyed a random sample of 520 primary-care pediatricians in Michigan. Pediatricians who did not accept Medicaid were excluded from the analysis.

Results.—The overall response rate was 65% (257 of 396 potentially eligible respondents). Most (68%) reported that they routinely test 1-year-old Medicaid-enrolled children. Practices with onsite blood testing were more likely to report routine testing of 1-year-old children (79% vs 62%; $P < .01$). Most (76%) who do not routinely test were aware of the Medicaid requirements for testing. The most common reason (70%) for not testing Medicaid-enrolled children was physicians' belief that they practice in a low-risk area. However, 35% of those who do not test because they practice in a low-risk area actually have their main practice site in a high-risk area.

Conclusions.—To improve the rate of blood lead testing, the public health department should provide pediatricians with data regarding the local risk of lead poisoning. The public health department should also consider working with practices to facilitate onsite blood collection for lead testing.

KEY WORDS: lead poisoning; mass screening; Medicaid; pediatrics; physician's practice patterns

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The Centers for Disease Control and Prevention (CDC) recommend that children receive blood lead testing based on their risk of exposure (ie, targeted testing).[1,2] Regardless of other factors, Medicaid-enrolled children have a threefold increased risk of having an elevated blood lead level.[3] Federal regulations therefore mandate that all Medicaid-enrolled children receive lead testing at 1 and 2 years of age or between 3 and 5 years if not previously tested.[4] Despite these recommendations, the rate of testing among Medicaid-enrolled children has been low.[5,6] Although Michigan has a high environmental lead burden compared with other states,[7] in 2002, only 30% of 1-year-old children enrolled in Michigan Medicaid had blood lead testing.[8]

Michigan has set an ambitious goal that, by 2007, at least 80% of all 1-year-old Medicaid-enrolled children be tested.[9] The purpose of this study was to understand the barriers to blood lead testing in pediatric clinics to develop interventions to meet this target.

METHODS

Instrument

We designed a survey instrument to assess pediatricians' practice and attitudes toward lead testing and to identify those important barriers that are amenable to intervention. This instrument was based on findings from 5 focus groups held in summer 2004 with primary-care providers in Michigan that accept Medicaid. Three of these focus groups were held in communities with a high burden of environmental lead. On average, each focus group had 6 participants. Each focus group participant received a $100 honorarium. The focus groups were moderated by one author (A.R.K.) and audiotaped for later analysis.

Nearly all focus group members were aware of the requirements for blood lead testing. Two major themes related to barriers to testing were identified by both study authors:

- Pediatricians who believed they practice in a community in which lead poisoning is rare felt that the requirements for testing Medicaid-enrolled children were wasteful of resources and a burden on practice and therefore would not routinely test.
- Pediatricians felt that many parents do not want their children to have blood taken and therefore will often not take their child to the laboratory. This problem was worse for those in practices that refer children offsite for blood testing.

Questions were developed to address these themes, to characterize the usual approach to lead testing, and to identify practice demographics and characteristics. The instrument was then pilot tested with a separate group of pediatricians to ensure readability and clarity. The final instrument consisted of a 2-page, 13-question survey on lead testing and practice demographics and took less than 5 minutes to complete. Questions included multiple-choice (eg, for Medicaid-enrolled children, the ages at which the respondent

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would test routinely, test only if risk factors, or not test at all; criteria used for risk assessment; location of blood lead testing; perceived barriers to blood lead testing; description of practice characteristics, including practice size, proportion of patients enrolled in Medicaid, and the number of well-child examinations per month), Likert scales of agreement (eg, perception of the risk of lead poisoning in the respondent's practice area; perception of the benefit of early intervention or environmental cleaning; perception of the availability of lead-abatement services), and open response (eg, age of house that would place child at risk; ZIP code of main practice site).

Sampling Frame

We queried the American Medical Association Master File to obtain a random sample of pediatricians practicing in Michigan. Our query excluded physicians older than 70 years, federal and military employees, physicians with a nongeneralist board or subboard certification, and those with a major professional activity other than office-based direct patient care. The sampling strategy resulted in a file of 895 pediatricians, of which 520 were randomly selected for the survey. The first survey mailing, accompanied by a cover letter, $5 participant incentive, and business reply envelope, was sent during September 2004. Two subsequent mailings to nonresponders were sent at 3-week intervals. Because the study focused on lead testing for Medicaid-enrolled children, pediatricians who reported that they do not accept Medicaid were excluded from further analysis.

Classification of Urban/Rural Status and Local Risk of Lead Poisoning

The ZIP code of each respondent's main practice site was used to classify urban/rural status based on location in a metropolitan statistical areas (MSA), as defined by the US Census Bureau.[10] The local risk of lead poisoning was based on ZIP code classification developed by the Michigan Department of Community Health, which takes into account the incidence of lead poisoning, the stock of older houses, and the proportion of children living in poverty.[11]

Data Analysis

Initially, general frequency responses to all survey items were determined. After this, Pearson χ^2 tests of independence were used to test for association among categorical variables. Only 1 variable, the age of a house that a respondent considered would place a child at risk for lead poisoning, was continuous. To minimize bias from outliers, a nonparametric median test was used for statistical inference on this variable. All analyses were performed with Stata 8.2 software (College Station, Tex). The University of Michigan Medical School Institutional Review Board approved this project.

RESULTS

Sample

Of the 520 physicians in the sample, 124 were found to be ineligible based on survey response (101 do not conduct well-child exam or accept Medicaid, 18 moved out of state, 5 retired or died). For the remaining 396 physicians, the overall response rate was 65% (257 of 396).[12] The Table indicates respondent practice and demographic characteristics.

Demographic and Practice Characteristics of the Respondents (n = 257) and the Proportion That Reported Routinely Offering Blood Lead Testing for 1-Year-Old Medicaid-Enrolled Children

Characteristic	Distribution, % (n)	Routinely Test 1-Year-Old Medicaid-Enrolled Children, %
Number of physicians in practice		($P = .06$)
1	13 (33)	80
2–5	61 (156)	70
>5	26 (68)	57
Proportion of patients <5 years that are Medicaid enrollees		$P < .001$
<10	28 (72)	46
10–50	50 (129)	69
>50	21 (54)	93
Missing	<1 (2)	. . .
Number of well-child exams per month		($P = .3$)
<10	4 (11)	90
10–25	12 (31)	65
>25	83 (214)	67
Missing	<1 (1)	. . .
Practice setting		($P = .6$)
Rural	16 (41)	64
Urban	83 (214)	68
Missing	<1 (2)	. . .
Location of blood collection		$P = .006$
Onsite	33 (84)	79
Offsite	67 (173)	62
Local risk of lead poisoning		($P = .2$)
Low	52 (135)	64
High	48 (120)	71
Missing	<1 (2)	. . .
Number of children identified in past 5 years with level ≥10 μg/dL		$P < .001$
0	35 (90)	56
1–2	35 (89)	63
3–10	18 (46)	79
>10	12 (30)	97
Missing	<1 (2)	. . .

Lead Testing for Medicaid-Enrolled Children

Most (68%) pediatricians report routinely testing 1-year-old Medicaid-enrolled children for lead poisoning, 30% test only if there are other risk factors, and 2% do not test at all. Compared with testing of 1-year-old children, fewer pediatricians report testing 2-year-old Medicaid-enrolled children ($P < .001$): 42% test routinely, 53% if there are other risk factors, and 5% do not test at all. Half (52%) of the respondents would test 3- to 5-year-

old Medicaid-enrolled children who had not previously been tested. Fewer (18%; $P < .001$) would test such children if they had been previously tested.

The Table notes the relationship between the demographic and practice characteristics and likelihood of routinely testing 1-year-old Medicaid-enrolled children. The likelihood of testing was not associated with urban/rural practice setting or the local risk of lead poisoning. The likelihood of testing increased as the proportion of Medicaid-enrolled patients increased and as the number of children with elevated blood lead levels identified in the past 5 years increased. Although the overall trend for increased likelihood of testing with decreasing practice size did not reach statistical significance, solo practitioners were more likely to test than practices with >5 physicians (80% vs 57%; $P = .03$).

Pediatricians in practices with onsite blood collection were more likely to report routine testing of 1-year-olds for lead poisoning. Among those who use offsite blood collection, 35% reported that they have never considered offering capillary testing onsite. The most commonly cited barriers to collecting capillary blood were that it is too time consuming (36%), the practice has insufficient staff (27%), reimbursement is insufficient (29%), and capillary blood tests lack accuracy (26%).

Risk Assessment

Respondents endorsed multiple methods of risk assessment. The single most common method (78%) for determining risk for lead poisoning was the age of the child's home. Among those who used the age of the home for determining risk, the median cutoff for year of construction was 1970 (range: 1940–1975); 25% considered only homes built before 1960 to be a risk factor for lead poisoning. There was no difference in the cutoff year among those in urban or rural practices ($P = .71$) or by local risk of lead poisoning ($P = .11$). Other methods for risk assessment included use of a standardized questionnaire (44%), child's ZIP code (33%), and by asking questions about all previous addresses at which a child has lived (26%).

Barriers to Testing Among Those Who Do Not Routinely Test 1-Year-Old Medicaid Enrollees

Most (76%) of the pediatricians who do not routinely test were aware of the Medicaid requirements for testing and most (70%) reported that lead is not a problem in their practice area. However, 35% of those that did not consider lead to be a problem had their main practice site in a high-risk area. Uncertainty in the value of early detection of children with elevated blood lead levels was not a barrier; most believed that environmental cleaning is effective (67%) and that lead abatement services are available (70%).

DISCUSSION

We were interested in identifying barriers to lead testing of Medicaid-enrolled children to develop effective interventions aimed at pediatricians to increase the rate of testing. Most pediatricians, including those who do not routinely test, are already aware of the requirements. However, many pediatricians choose not to test because of the perception that the risk of lead poisoning is low, including some who practice in communities with a high risk of lead poisoning. We also found that pediatricians used a wide variety of methods to assess children for risk of lead exposure. This suggests that the public health department should include data about the local risk of lead poisoning and tools for standardized risk assessment as part of their educational outreach efforts for pediatricians.

We found that physicians in practices that collect blood onsite were more likely to routinely test Medicaid-enrolled children. Testing onsite also simplifies the effort required for parents to have their children tested and might increase the rate of testing among those children whose parents are somewhat reluctant to have their child's blood taken. Not surprisingly, increasing reimbursement may encourage some pediatricians to offer capillary testing within their practice. However, the public health department could facilitate testing within practices by providing supplies for capillary blood lead testing and training office staff on how to efficiently collect the blood in a manner that optimizes test accuracy.[13]

In our sample, more pediatricians reported routinely testing 1-year-old Medicaid-enrolled children than laboratory data collected by the state suggest. We are unable to determine how much of this increase is due to true change in practice, perhaps influenced by recent outreach from the public health department, and how much of this change reflects reporting bias. Despite this uncertainty, information on barriers to testing reported by the respondents can help in developing interventions to ensure the timely identification of children with elevated blood lead levels.

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