Childhood Lead Screening in Oregon
A 2004 Survey of Healthcare Providers

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ABSTRACT

Objectives: This survey was conducted prior to the implementation of a childhood lead screening plan in the State of Oregon to determine current practices, knowledge, and perceptions about childhood lead poisoning and screening among different types of pediatric healthcare providers.

Design/Setting/Participants: A statewide cross-sectional self-administered survey of 1,560 randomly selected healthcare providers who routinely see children in their practices in professions of medical doctors, osteopathic doctors, naturopathic doctors, nurse practitioners, and physician assistants.

Results: Usable responses were obtained from 850 providers (55.9%). The analysis was restricted to the 503 providers who provide well child care to at least 10 children a year who are under 6 years of age. Approximately half of the providers reported routinely assessing lead exposure risk in their pediatric patients. By specialty, 72.3% of those specializing in pediatrics and 43.3% of those specializing in family medicine reported routinely assessing risk. The most frequently reported reason for not assessing risk was not having a clinic system that supports the risk assessment. Having not received training about lead during residency was significantly associated with not routinely assessing risk in current practice. About 60% of providers reported not providing information about lead poisoning to parents. Less than 5% of providers obtain blood lead tests on children enrolled in Medicaid. Over 70% of providers would like to learn more about lead poisoning.

Conclusions: There is a lack of routine lead exposure risk assessment in children among all professions represented in this survey. Providers who specialize in family medicine are significantly less likely to routinely assess risk compared with those who specialize in pediatrics.
Factors that may help increase the routine use of lead exposure risk assessment include training during residency, a clinic system that facilitates the assessment, and increased awareness about populations at risk for lead poisoning.

BACKGROUND:

Childhood lead poisoning, defined as a venous blood lead ≥10µg/dl in children under the age of 6 years, is known to cause developmental and behavioral problems, including aggression, hyperactivity, attention deficit, school problems, learning disabilities, as well as growth, speech and language delays and hearing loss.[1] There does not appear to be a threshold for harm, and recent evidence indicates that children with lead levels below 10µg/dl, which is the current level of concern set by the Centers for Disease Control and Prevention (CDC), can have deficits such as lowered IQs.[2]

One of the great public health triumphs of the last 30 years has been the dramatic decline in children's blood lead levels, however, childhood lead poisoning remains the number one environmental health problem of young children in this country. One of the national goals of *Healthy People 2010* is the elimination of elevated blood lead levels in children by the year 2010.[3] Over the years, the CDC has developed various childhood lead poisoning screening guidelines. The current recommendations are for states to develop childhood lead screening plans and childhood lead poisoning elimination plans that are state specific. Over the past few years, the Oregon Childhood Lead Poisoning Prevention Program (OCLPPP) has been designing a childhood lead screening plan for the State of Oregon. The estimated prevalence of childhood lead poisoning in Oregon is 1-2% and it was decided that this prevalence was not high enough to warrant universal blood lead testing. Instead, OCLPPP, is advising that a lead exposure risk assessment be administered to children to determine who is at risk for lead exposure and thus should receive a blood lead test.

Pediatric healthcare providers can play an important role in both primary and secondary prevention of childhood lead poisoning, but screening practices can vary. A national survey of pediatricians indicated that approximately half of US pediatricians report screening all patients younger than 6 years with a blood lead test.[4] A New Jersey survey of pediatricians and family physicians indicated that less than half reported assessing lead exposure risk in the majority of their patients.[5] Traditionally, the healthcare providers that have been targeted for surveys and outreach on childhood lead poisoning

have been pediatricians and family physicians. However, there are many other healthcare providers that often see young children in their practices, including Nurse Practitioners (NPs), Naturopathic Doctors (NDs), Osteopathic Doctors (DOs), and Physician Assistants (PAs). In order to gain a better understanding of current lead screening practices, barriers to lead screening, and perceptions and knowledge about childhood lead poisoning, OCLPPP surveyed a sample of each of these groups of providers in the State of Oregon.

METHODS:

Study Design and Sample

A cross-sectional survey of a statewide representative random sample of pediatric healthcare providers was conducted. The pediatric healthcare providers included were Medical Doctors (pediatricians and family physicians), Osteopathic Doctors (pediatric and family medicine), Nurse Practitioners (pediatric and family medicine), Physician Assistants (pediatric and family medicine), and Naturopathic Doctors.

A four-page self-administered survey was developed by project administrators of OCLPPP and was reviewed by a panel of researchers, pediatricians, family physicians, and naturopathic doctors. Some questions used in the survey were obtained from similar surveys conducted nationwide and in other states.[4-7] Mailing lists were obtained from the Oregon Board of Medical Examiners, Oregon State Board of Nursing, and Oregon Board of Naturopathic Examiners. After revisions, the survey was mailed to 1,560 healthcare providers [556 MDs (296 family physicians, 260 pediatricians), 180 DOs (167 family medicine, 13 pediatrics), 399 NPs (260 family medicine, 139 pediatrics), 165 PAs (149 family medicine, 16 pediatrics), 260 NDs]. For a ten percent bound on the error of measurement, the desired number for each group was 130 respondents. Assuming a fifty percent response rate, this number was doubled where possible. Some of the professions did not have high numbers, so the survey was sent to the entire group; otherwise a random sample was obtained. An initial mailing and one follow-up mailing to non-respondents were conducted during February and March, 2004.

Survey Design

The survey was made up of five sections: 1) healthcare provider demographic and practice characteristics; 2) screening practices, barriers to screening, and educational practices; 3) the use of chelation therapy; 4) general knowledge and perceptions about lead poisoning; and 5) education and training on childhood lead poisoning (See Table 1).

Screening was divided into two types: 1) the use of a lead exposure risk assessment (questionnaire, specific questions, zip codes etc.) to determine who is at risk for lead exposure; and 2) the use of a lab test.

Table 1. Sections in Questionnaire

Healthcare provider demographics and practice characteristics
- Profession & specialty
- Years providing well-child-care (WCC)
- Percentage of practice comprised of pediatric patients
- Hours per week in direct patient care
- Zip code of primary practice

Screening, barriers to screening, and educational practices
- Routinely assess risk for lead exposure (all pediatric patients & children receiving Medicaid)
- How risk is assessed
- Who performs the risk assessment & age of child at risk assessment
- Systematic way to identify children for risk assessment
- Difficulty level of assessing risk
- Barriers to assessing risk
- Provide education to parents about lead poisoning (all parents or particular groups)
- What prompts the use of a lab test to screen for lead
- What is the primary lab test used & at what ages
- Reasons for not obtaining a blood lead test in children at risk for lead exposure

The use of chelation therapy
- Ever used chelation therapy
- The type of lab used to direct the use of chelation therapy
- The blood lead level at which chelation therapy would be considered

General knowledge and perceptions about lead poisoning
- Is lead exposure a problem for children in Oregon? In your patient population?
- Does local health department provide case management/follow-up for children with lead poisoning?
- Level at which venous blood lead level has been shown to result in lowered IQ
- Level at which a capillary blood lead test should be confirmed with a venous blood lead test
- Relative contribution of various factors to lead poisoning among children in Oregon

Education and training on childhood lead poisoning
- Received education/training on lead exposure risk assessment, diagnosis/treatment of lead poisoning in medical education, residency
- Would like to learn more about lead poisoning
- Preferred method for learning about lead poisoning

ANALYSIS

Data entry was performed with Microsoft Access and analysis was performed with SPSS (11.5). Chi Square was used for tests of statistical significance.

RESULTS

Response Rate and Demographics

Among the 1,560 healthcare providers surveyed, correct addresses for 38 (2.4%) could not be obtained. Usable responses were obtained from 850 of the providers, which is an overall response rate of 55.9%. The response rate by provider type was 68.5% for naturopathic doctors, 57.3% for physician assistants, 55.5% for nurse practitioners, 55.3% for medical doctors and 39.6% for osteopathic doctors. The analysis was restricted to the 503 respondents who provide well-child care (WCC) for at least 10 children a year who are under six years of age. The descriptive characteristics of the participants are presented in Table 2

Table 2. Characteristics of Responding Primary-Care Pediatric Healthcare Providers (N=503)

	All respondents [number (%)]	Pediatricians [number (%)]	Family physicians [number (%)]	Osteopathic doctors [number (%)]	Naturopathic doctors [number (%)]	Nurse practitioners [number (%)]	Physician assistants [number (%)]	P value
Total	503	117 (23)	106 (21)	50 (10)	61 (12)	110 (22)	59 (12)	
Number of years providing WCC:								
In training	28 (5.6)	0	23 (21.7)	0	5 (8.2)	0	0	<.001
0-4 years	107 (21.3)	13 (11)	22 (20.8)	12 (24)	23 (37.7)	20 (18.2)	17 (28.8)	
5-9 years	109 (21.7)	29 (25)	16 (15.1)	10 (20)	7 (11.5)	31 (28.2)	16 (27.1)	
10-19 years	129 (25.6)	29 (25)	24 (22.6)	11 (22)	18 (29.5)	35 (31.8)	12 (20.3)	
≥20 years	129 (25.6)	46 (39)	21 (19.8)	17 (34)	8 (13.1)	24 (21.8)	13 (22)	
No response	1 (.2)						1 (1.7)	
Percent of practice comprised of pediatric patients:								
<25%	262 (52)	5 (4.3)	91 (85.8)	37 (74)	46 (75.4)	44 (40)	39 (66.1)	<.001
25-49%	120 (23.9)	43 (36.7)	10 (9.4)	8 (16)	12 (19.7)	33 (30)	14 (23.7)	
50-75%	93 (18.5)	55 (47)	4 (3.8)	5 (10)	2 (3.3)	22 (20)	5 (8.5)	
>75%	26 (5.2)	14 (12)	1 (.94)	0	0	11 (10)	0	
No response	2 (0.4)				1 (1.6)		1 (1.7)	
Hours per week in direct patient care:								
0-10	23 (4.6)	2 (1.7)	1 (0.9)	0	7 (11.5)	9 (8.2)	4 (6.8)	<.001
10-20	47 (9.3)	7 (6)	3 (2.8)	1 (2)	12 (19.7)	22 (20)	2 (3.4)	
20-30	107 (21.3)	28 (23.9)	15 (14.2)	2 (4)	27 (44.3)	26 (23.6)	9 (15.2)	
30-40	199 (39.6)	46 (39.3)	41 (38.7)	23 (46)	12 (19.7)	39 (35.5)	38 (64.4)	
>40	126 (25)	34 (29.1)	46 (43.4)	24 (48)	3 (4.9)	13 (11.8)	6 (10.2)	
No response	1 (0.2)					1 (0.9)		

Screening Practices, Barriers to Screening, and Educational Practices

Screening Practices

The use of a lead exposure risk assessment was defined as the use of a questionnaire, specific questions, zip codes or other means of assessing risk. Of the respondents who provide WCC, 265 (52.7%) reported they routinely assess their pediatric patients, less than six years of age, for lead exposure risk (more details on methods of risk exposure is provided below). By profession, those who reported routinely assessing lead exposure risk were 87 (74.3%) of the pediatricians, 48 (45.3%) of family physicians, 17 (34%) of the osteopathic doctors, 22 (36%) of the naturopathic doctors, 26 (44.1%) of the physician assistants, and 65 (59%) of the nurse practitioners. By specialty of pediatrics or family medicine, 128 (72.3%) of those specializing in pediatrics reported routinely assessing risk compared with 115 (43.3%) of those specializing in family medicine (naturopathic doctors were not included in this analysis because they do not have a clear distinction between these specialties). See table 3.

Table 3. Distribution of Lead Exposure Risk Assessment by Profession & Specialty

	Routinely assess risk [number (%)]	Do not routinely assess risk [number (%)]	P Value
	265 (52.7)	238 (47.3)	
Profession			
Pediatrician	87 (74.3)	30 (25.6)	<.001
Family Physician	48 (45.3)	58 (54.7)	
Osteopathic Doctor	17 (34)	33 (66)	
Naturopathic Doctor	22 (36)	39 (63.9)	
Nurse Practitioner	65 (59)	45 (40.9)	
Physician Assistant	26 (44.1)	33 (55.9)	
Specialty*			
Pediatrics	128 (72.3)	49 (27.7)	<.001
Family medicine	115 (43.4)	150 (56.6)	
*excluding naturopathic doctors			

Medicaid

Of all providers, 85.5% reported seeing children enrolled in Medicaid. By profession, NDs were significantly less likely to report seeing children enrolled in Medicaid (Chi-Square p<.001) (NDs 45%, MDs 91.5%, NPs 89%, DOs 90%, Pas 95%). Many of the NDs reported that they previously saw children

enrolled in Medicaid, but their services are no longer covered. Of all the providers who reported seeing children enrolled in Medicaid, 92.3% reported being able to identify these children at the time of the visit (not significantly different between professions). Of the providers who see children enrolled in Medicaid and are able to identify these children at the time of the visit (n=397) 58% reported routinely assessing lead exposure risk in these children. This was not significantly different between professions (MDs 62%, NPs 60%, DOs 44%, PAs 53%, NDs 61%). Five percent of these providers reported obtaining a lab test for lead on all children receiving Medicaid (not significantly different between providers). The providers who do not routinely assess risk in children receiving Medicaid also do not routinely use a lab test to screen for lead in these children (100%).

Practices of Providers Who Routinely Assess Risk

Of the 265 providers who reported routinely assessing risk in all children, the primary method used to assess risk was reported by 43%. Of these, the most commonly reported method of risk assessment was the use of the questionnaire from the CDC (42%), followed by the questionnaire from the state health department (38%), zip codes (10%), and the questionnaire from Medicaid (9.6%).

Overall, the majority of providers (64%) reported that the risk assessment was performed by themselves. NDs were significantly more likely to perform the risk assessment themselves (Chi-Square p=.007) (MDs 62%, NPs 57%, DOs 88%, PAs 54%, NDs 91%). Thirty percent reported that the risk assessment was filled out by parents (not significantly different between professions), 13% reported it was administered by nursing staff (MDs and NDs significantly less likely to have nursing staff administer the questionnaire p=.002), and 3% reported it was administered by office staff (not significantly different between professions).

The most frequently reported age at which children are assessed for lead exposure risk is between 12-18 months (73%), followed by less than 12 months (49%), 19-24 months (45%), 25-36 months (29%), and over 36 months (19%). These percentages exceed 100 because most providers assess risk at several ages.

Approximately half of the providers who routinely assess risk reported that their practice has a systematic way to identify children who should be assessed for lead exposure risk. The most commonly reported system was a chart prompt (49%), consisting of a paper or electronic standardized well child visit form.

Barriers to Screening

Of the 265 providers who reported routinely assessing lead exposure risk, 1.1% reported it to be very difficult, 20.8% reported it to be somewhat difficult, 26.8 % reported it to be only a little difficult, and 41.9 % reported it to be not at all difficult (9.4% did not answer the question). Providers who reported having a clinic system that facilitates risk assessment were more likely to report that the assessment was not at all difficult, whereas the providers who did not have a clinic system were more likely to report the assessment as somewhat to very difficult. Likewise, when providers reported the risk assessment being performed by nursing staff, office staff, parents, or providers the assessment was reported as not at all difficult by 61%, 57%, 61%, and 39% respectively. When providers performed the risk assessment themselves they were more likely to report it being somewhat to very difficult.

The most frequently reported difficulty among those who routinely assess risk was time limitations (38.5%), followed by having other issues to discuss with parents (22.3%), difficult to remember (17.4%), the belief that lead is not a problem for their patient population (16.6%), not having a clinic system in place to facilitate the assessment (16.6%), language barriers (10.9%), and not being familiar with lead exposure assessment methods (8.3%).

Among the providers who do not routinely assess risk (n=238), the most frequently reported reason was not having a clinic system to facilitate the assessment (50.8%), followed by the belief that lead is not a problem in their patient population (43.3%), not being familiar with lead exposure risk assessment methods (39.1%), having other issues to discuss with parents (33.2%), difficult to remember (28.6%), time limitations (27.3%), and language barriers (4.6%).

Providers reported that they serve patients who speak different languages including: Spanish, Mizteco and other dialects from Mexico, Russian, Somalian, Hmong, Vietnamese, Mandarin, and Romanian. These languages were reported to be a difficulty for those who routinely assess risk (10.9%) and a reason for not assessing risk (4.6%).

Educational Practices

Of all the providers, 105 (20.9%) reported routinely giving parents information about lead poisoning. Of these, 57.1% give information to all parents with children under 6 years of age, 31.4% only give information when the risk assessment shows the child is at risk, and 15.2% only give information if the child has an elevated blood lead level. The providers who routinely give information to parents are also more likely to routinely assess risk compared with those who do not routinely assess risk (Chi-Square $p<.001$).

Prenatal Care

One hundred twenty five providers reported providing prenatal care. Of these, 22.4 % reported routinely assessing lead exposure risk in pregnant women and 4.8% reported routinely giving information about lead poisoning to pregnant women.

Lab Tests

Providers were asked to indicate what prompts them to obtain a lab test to screen for lead poisoning. Nine percent reported that they don't use a lab test to screen for lead and 9% reported that they obtain a lab test on all children.

Of the providers who routinely assess risk, 78% said they obtain a lab test if the lead exposure risk assessment showed the child to be at risk. The main reasons reported for not obtaining a blood lead test on children who are at risk for lead exposure were: parents refuse the test (22%), children uncooperative with the test (12.5%), reimbursement is a problem (6%), lack of staff to perform the test (3.8%), lack of testing supplies (3.4%), the belief that blood lead levels do not reflect the body burden of lead (2.3%), the belief that the interventions available for lead poisoned children are ineffective (0.8%), and not having a lab for

analyzing the sample (0.8%). Providers who do not routinely provide parents with information about lead poisoning were more likely to report that parents would refuse a test even if their child was at risk (Chi-Square p=.021).

Twenty four percent of providers reported only obtaining a lab test for lead if the child had symptoms of lead poisoning. The majority of these providers (77%) also reported not routinely assessing risk. One provider stated they obtain labs for lead on all internationally adopted children.

Providers were asked to identify the lab test that they primarily use to screen for lead in children. Fifty three percent reported using a venous blood lead test and 14% reported using a capillary blood lead test. The use of hair samples was reported by 2.6% and urine samples by 2%. The providers who reported using hair or urine samples were naturopathic doctors (21), a family medicine nurse practitioner (1), and a family medicine physician assistant (1).

Of the providers who obtain labs to screen for lead, the most frequently reported age of the child when the lab is performed is 12-18 months (32%), followed by less than 12 months (13.5%), 19-24 months (13.3%), 25-36 months (7.4%), and over 36 months (8.3%). Many providers did not specify the age at which they obtain lab tests and stated they would obtain a lab at any age if the child has risk factors, symptoms, or if parental request.

Lead Poisoning Treatment Practices

Providers were asked if they had ever used chelation therapy for elevated lead levels in children. Ten percent said yes, 78% said no, and 12% said they refer children with elevated lead levels to other providers. The most frequently reported lab type used to direct the use of chelation or referral for chelation was a venous blood lead test (59%), followed by a urine sample (3%), hair sample (1.2%), and capillary blood lead test (0.6%). Approximately 32% did not know what lab test should be used to direct the use of chelation therapy. Providers were asked to indicate the blood lead level that they would they consider using or referring for chelation therapy. Fifty seven percent did not know the answer. The most

frequently reported level was >45 µg/dl (17%), followed by >25 µg/dl (14%), >10 µg/dl (10%), >75 µg/dl (1.3%), <10 µg/dl (0.65%), and >100 µg/dl (0.2%).

Perceptions and General Knowledge About Childhood Lead Poisoning

Forty five percent of the providers agreed with the statement "lead exposure is a problem for many children in Oregon", whereas only 13% agreed with the statement "lead exposure is a problem for many of my pediatric patients".

Thirty-two percent of providers agreed with the statement, "venous blood lead levels ≤ 10 µg/dl have been shown to lower IQs in children". Twenty four percent did not agree with this statement and 44% did not know.

Fifty percent of the providers did not know at what level a capillary blood lead test needs confirmation with a venous blood lead test. This deceased to 20% when the analysis was restricted to the providers who reported using a capillary blood lead test as the primary test to screen for lead poisoning.

Fifty percent of providers did not know if their local health department provides case management and follow-up for children with lead poisoning.

Providers were asked to indicate the extent to which different factors contribute to lead poisoning among children in Oregon. The factors could be ranked as no contribution to low, moderate or high contribution. Lead dust from deteriorating paint, lead dust from remodeling and lead paint chips were all ranked as moderate to high contribution to lead poisoning among children in Oregon. Other factors, such as drinking water, pottery with lead glaze, home remedies, hobbies or occupations of parents were generally ranked as low to moderate contribution.

Education and Training on Childhood Lead Poisoning

Of all providers, 56% reported that they received training on lead exposure risk assessment and diagnosis and treatment of lead poisoning during their medical education. Of all providers, 316 participated in a residency program, and of these, 37% reported receiving training on lead exposure risk

assessment and diagnosis and treatment of lead poisoning. Current practice of not routinely assessing lead exposure risk was significantly associated with having not received training during residency (Chi-Square $p<.001$), but was not significantly associated with having not received training during medical education.

Seventy six percent of providers said they would like to learn more about lead poisoning. The most preferred method for learning about lead poisoning was printed materials (65% ranked as medium to high preference), followed by a web-based teaching module (42% ranked as medium to high preference). Lectures, grand rounds, or seminars were the least preferred methods ranked as medium to high preference by 33%.

DISCUSSION

In this statewide survey of 503 healthcare providers who were routinely seeing children in their practice, a lack of routine lead exposure risk assessment was evident. Overall, only about half of the providers routinely assess risk. Healthcare providers with specialties in family medicine are significantly less likely to assess risk than those with specialties in pediatrics. Those who are not assessing risk are also not screening with a lab test, so they have no routine means for identifying lead poisoning in children. The results of this survey are similar to a survey of New Jersey pediatricians and family physicians, which found that more than half reported not assessing lead exposure risk in the majority of their patients.[5]

Federal law requires that all children enrolled in Medicaid receive a blood lead test at ages 12 and 24 months or at 36 to 72 months if they have not previously been screened. The results of this survey indicate that only about 5% of providers are in compliance with this law. This finding is consistent with childhood lead poisoning surveillance data collected by OCLPPP. Several providers indicated that they previously obtained blood lead tests on children enrolled in Medicaid, but they never found an elevated level, so they discontinued the practice. The majority of providers appear to be treating children on Medicaid the same as all other children in their practice, with 57 and 53% routinely assessing risk, respectively.

The factors that were significantly associated with not routinely performing a lead exposure risk assessment were; specializing in family medicine compared with specializing in pediatrics, having not received training on lead exposure risk assessment, diagnosis, or treatment during residency, not being familiar with lead exposure risk assessment methods, the belief that lead exposure is not a problem in their patient population, and not having a clinic system that supports risk assessment. The clinic systems that appear to make the risk assessment easier are the use of a standardized paper or electronic well child visit form and having the risk assessment performed by office staff, nursing staff, or parents.

While almost half of the providers believe that lead exposure is a problem for many children in Oregon, only 13% believe that it is a problem for many of their pediatric patients. This discrepancy could either be based on facts, such as having never found an elevated blood lead test after years of testing, or based on perceptions that may or may not be true. In recent years, within the State of Oregon, there has been a significant movement of middle and upper class families into older neighborhoods, resulting in increased risk of lead exposure from major remodeling. Healthcare providers should be aware of this demographic shift, which adds to the populations at risk for lead exposure.

Only one in five providers routinely give information to parents about prevention of lead poisoning. The potential sources of lead exposure are numerous, ranging from lead based paint to various home remedies and particular hobbies and occupations, so the authors believe that all pediatric primary care providers should routinely provide this information to parents as a means of primary prevention of childhood lead poisoning.

In utero exposure to lead can be particularly problematic because the developing nervous system is very vulnerable to environmental insults. During pregnancy women may be at increased risk of lead exposure through remodeling, repainting, or refurbishing old furniture. Only one in five providers who provide prenatal care reported assessing lead exposure risk in their pregnant patients and only 5% routinely give information about prevention of lead poisoning during pregnancy. The authors are unaware

of any other studies that have assessed lead exposure risk assessment or educational practices among other obstetrical healthcare providers.

It is concerning that a large proportion of providers are not assessing lead exposure risk in children and are only obtaining a lab test for lead if the child has symptoms of lead poisoning. The symptoms of lead poisoning can mimic other conditions, from gastroenteritis to attention deficit disorder, and if lead poisoning is not included in the differential diagnosis, it may never be diagnosed.

This survey relied on self-report and it has not been validated, although several of the questions were similar to questions used on validated surveys. It is possible that there was some social response bias, however, this would likely have caused an underestimate of the true number of those who do not routinely assess risk. It is also possible that non-responder bias was present, however, it seems unlikely that the non-responders are all routine screeners. It is more likely that the non-responders screen the same or less than the responders, which would mean that our results provide either a close estimate or an underestimate of providers who do not routinely screen for lead.

In summary, there is a lack of routine lead exposure risk assessment in children among all professions represented in this survey. Providers who specialize in family medicine are significantly less likely to routinely assess risk compared with those who specialize in pediatrics.

Factors that may help increase the routine use of lead exposure risk assessment include training during residency, a clinic system that facilitates the assessment, and increased awareness about populations at risk for lead poisoning.

Pediatric healthcare providers are integral to the implementation of a statewide childhood lead screening plan that focuses on risk assessment. Elimination of childhood lead poisoning requires both primary and secondary prevention and healthcare providers play an important role in both. It is our hope that the results of this survey will be used to raise awareness about childhood lead poisoning and increase lead exposure risk assessment among healthcare providers that serve the pediatric population.

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