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Testing for Lead among Children in New Mexico, 2010-2014

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One of the ten great recent public health achievements in the U.S. has been noted to be childhood lead poisoning prevention and control[1], mostly due to the removal of lead from paint and fuel. While children from all geographic, social and economic levels can be affected, children living in poverty and in older, poorly maintained homes have higher exposure to lead. Child blood lead levels have declined significantly over the past 30 years. In 2012, the CDC's Advisory Committee for Childhood Poisoning Prevention (ACCLPP) recommended lowering the threshold for lead poisoning from 10 ug/dL to 5 µg/dL based on studies showing that chronic blood lead levels under 10 µg/dL are associated with IQ deficits, attention-related behaviors, and poor academic achievement[2,3,4,5]. The CDC set the reference level for lead to be the 97.5th percentile of the NHANES's blood lead distribution in children, currently at 5 µg/dL. At the beginning of 2016, New Mexico implemented CDC's new reference level and reduced the threshold for initiating case management from 10 ug/dL to 5 µg/dL.

This changing landscape has resulted in a shift in the CDC guidelines from universal screening of all Medicaid-eligible children to targeted screening of children confirmed to be at highest risk, when sufficient data are available[6]. CDC recommends that state and local public health officials: 1) update blood lead screening policies for Medicaid-eligible children, 2) improve rates of blood lead screening among Medicaid-eligible children determined to be at increased risk for lead exposure, and 3) design and implement updated surveillance and evaluation strategies. The current report presents data from the NM DOH and how it relates to the updated CDC blood lead reference level of 5 µg/dL. These results are presented in the context of the NM DOH's strategy around screening of children for blood lead levels.

Methods

In NM, childhood lead poisoning measures developed for the CDC Environmental Public Health Tracking Program's Nationally Consistent Data and Measures (NCDMs) were used to identify geographic regions of the state that are a priority for improving lead screening of children and promotion of lead poisoning prevention interventions. Data have been provided for these measures for the five-year period from 2010 to 2014. The county-level measures (NCDMs) include: *1) Annual Screening*: % of children in the population under 6 years (yrs) old tested, *2) Annual Elevated*: % of children under 6 yrs old tested and confirmed elevated blood lead levels (EBLL), *3) Cohort Screening*: Ratio of children born in the same year and tested before age 3 yrs divided by the number of births in that birth year. This ratio measure was developed to correspond with the Medicaid law requiring lead screening of all enrolled children at 12 and 24 months of age, *4) Cohort Elevated*: % of children born in the same year tested before age 3 yrs with confirmed EBLLs (by birth year cohort), *5) Housing Age*: % of housing units built before 1950 (2000 census), *6) Children in Poverty*: % of children under 5 yrs old living in poverty (2000 census).

Population estimates were obtained from the NM Indicator-Based Information System (NM-IBIS) for the years 2010-2014. Annual numbers of births for the cohort measures were obtained from the NM Bureau of Vital Records and Health Statistics. Data were summarized both for the current definition of EBLL of >=5 µg/dL and for the range of BLL from 5 ug/dL to <10 µg/dL, since the action level was 10 µg/dL for this time period. Additionally, a comparison was made between the prioritized areas to increase lead screening

based on risk factors including age of housing, poverty, brownfield sites, and the areas with EBLLs.

Results

From 2010 to 2014, 75,144 children under 6 years of age residing in NM had at least one blood sample screened for lead. The mean blood lead level was 4.0 µg/dL (range <1.1 ug/dL to 38.0 µg/dL).

Annual Screening. The annual lead screening rate has remained approximately the same over time from 9.6% of children under 6 years of age in 2010 to 8.5% in 2011, 9.0% in 2012, 8.7% in 2013, and 8.4% of children in 2014. However, results cannot be generalized to the population when screening rates are under 10%. In the period from 2010-2014, screening rates varied considerably between counties, with less than or equal to 5% of children under the age of 6 years screened in Bernalillo, Catron, Curry, Harding, Lea, Sandoval, Taos and Union counties. Counties with greater than 15% of children screened included Chaves, De Baca, Eddy, Grant, Hidalgo, McKinley and Quay. The Table shows how many potential cases the NM DOH Childhood Lead Poisoning Prevention Program (CLPPP) would have managed if the action level had been 5 µg/dL from 2010-2014, with screening rates by county, indicating that overall our screening rates ranged from 22.0% (Chaves County) to 2.5% (Union County).

Annual Elevated Test Results. From 2010 to 2014, 168 children under the age of 6 years were found to have confirmed EBLLs (≥10 µg/dL) either by a venous test or by capillary test with a second test conducted within 12 weeks. The statewide EBLL rate for the five-year period was 10.9 per 1,000 children screened. Annual rates are as follows (per 1,000): 10.0 in 2010, 11.5 in 2011, 9.2 in 2012, 11.2 in 2013, and 12.9 in 2014. The highest county-level rates of EBLLs for 2010-2014 included (per 1,000): Quay County (50.2), followed by Sierra County (36.5), San Juan County (34.5), De Baca County (32.3), and Hidalgo County (25.6). Although Hidalgo, De Baca and Quay counties did have screening rates higher than 10%, they had a total of 685 children among the three counties.

Cohort Screening. Overall, in NM, the lead testing ratio (per 100 births) for children under 36 months of age was 28.9%. There were 83,919 births to residents in 2011-2014, and the NM CLPPP received lead screening reports on 24,279 children less than 36 months of age who were born in 2011-2014. Ten counties had testing ratios under 15%, seven counties had testing ratios from 15% to 24%, Ten counties had higher testing ratios ranging from 25%-49%, and 6 counties had testing ratios above 50%. As was found for annual screening among children under the age of 6, the counties with the best screening performance were in the Northwest [McKinley (68.2%), San Juan (46.3%)] and in the South [Chaves (71.2%), Eddy (69.5%) and Hidalgo (54.9%)]. Los Alamos County (51.2%) and Grant County (63.3%) also had higher screening ratios among children under the age of 3 years.

Cohort Elevated Test Results. The state rate for confirmed elevated blood lead levels among children under 36 months of age born in 2009-2011 was 1.9 per 1000, or 46 confirmed EBLLs (10 µg/dL). The five counties with the highest rates actually had very few children with a confirmed EBLL. For example, the highest rate (13 per 1,000 children) in Quay County was based on one child with an EBLL; Hidalgo, Lincoln and Lea counties had rates per 1,000 of 10.4, 7.1, and 4.5 respectively and are based on one or two children with EBLLs. Low rates were found in Santa Fe County (0.7, one EBLL), McKinley County (1.1, 3 EBLLs), Bernalillo County (1.3, 6 EBLLs), Rio Arriba County (1.4, one EBLL), Chaves County (1.4, 3 EBLLs), and Dona Ana County (1.6, 3 EBLLs). The rate in Chaves County was the same as the state overall at 1.1 EBLL per 1,000 children tested (2 EBLLs).

Housing Age. In the 2000 Census, 22% of US homes were built before 1950, compared to 9.4% of NM homes. However, the counties in the Northeast and Southeast regions of the state had a higher proportion of housing built before 1950, including Harding (53.3%), Guadalupe (34.1%), Union (36.5%), Mora (21.2%), Colfax (17.6%), De Baca (32.3%), Quay (19.9%), and San Miguel (21.6%).

Children in Poverty. In the 2000 Census, 30 of 33 NM counties had a higher percentage of children under the age of 5 years living in poverty than the national percentage of 18.2%. Among those 30 counties with high rates of poverty, the percentage ranged from 21% in urban Bernalillo County to 53% in Luna County, on the border with México. The highest concentration of child poverty is found in the counties of the Southwest region: Luna (53%), Socorro (53%), Hidalgo (41%), Dona Ana (38%), Catron (37%), Sierra (34%), and

Grant (33%) counties. There was also high childhood poverty in the Northwest counties of McKinley (43%) and Cibola (35%), as well as in Chavez County (34%) and in Union County (37%).

Discussion

During 2010-2014 the case management for blood lead started at 10 µg/dL, thus no follow-ups occurred for EBLLs between 5 - 9.9 µg/dL. If the case management level had been at 5 µg/dL, the number of cases would have at a minimum quadrupled. These data are a good indicator of the expected number of new cases that will be seen in 2016, since the lowering of the action level to 5 µg/dL.

Based on the results at the county level, the areas with the higher BLLs (>= 5 µg/dL) are also very consistent with areas identified through our prioritization matrix which includes risk factors such as housing built before 1980, brownfield sites, and areas with children under six years of age in poverty in NM. The top ten higher risk counties as predicted from our lead prioritization matrix include Bernalillo, Dona Ana, Santa Fe, Otero, Chaves, San Juan, McKinley, Sandoval, Valencia and Curry counties.

Quay County was found to have a higher rate of EBLL among children under the age of 6 and among children under the age of three years. However, just a little more than 10% of children residing there have been screened. Based on the literature, a screening level of 10% would show a margin of error of 1% for a population greater than 100,000 and this would be a representative sample for lead exposure in a community. Similarly, counties located in the Northeast region of the state, where there is a higher proportion of high-risk older housing, also had limited lead screening among children. McKinley County had a 21.4% child testing rate (8.7 EBLL per 1,000) and San Juan County had a 7.4% testing rate (34.5 EBLL per 1,000). Many counties had population screening rates under 10%, like Bernalillo County (5.0%) and Taos County (4.4%) and therefore the results cannot be generalized to the population in these counties.

The patterns that emerged in the data indicate that the percentage of children screened for lead needs to improve in San Juan County, Southwest and Northeast region counties, as well as Bernalillo County. The Indian Health Service and Tribal Head Start programs appear to be implementing screening guidelines more effectively than many of our other providers within the state. An effort is underway to learn from what these programs are doing with respect to their lead testing successes and apply them statewide.

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Table. Elevated Blood Lead Levels (EBLL) among Children by County at 5 and 10 µg/dL Thresholds, NM, 2010-2014

County	Population	# Tested	% screened	% EBLL above 5	% EBLL above 10
Bernalillo	266,138	13,261	5.0%	0.6%	0.4%
Catron	833	24	2.9%	0.0%	0.0%
Chaves	30,740	6,768	22.0%	0.7%	0.4%
Cibola	10,993	1,518	13.8%	0.8%	0.4%
Colfax	4,082	407	10.0%	0.0%	0.0%
Curry	25,278	1192	4.7%	1.3%	0.8%
De Baca	664	105	15.8%	2.9%	1.9%
Dona Ana	92,101	5,848	6.3%	1.3%	0.7%
Eddy	22,608	5,040	22.3%	1.1%	0.6%
Grant	10,090	2,040	20.2%	1.4%	0.8%
Guadalupe	1,477	151	10.2%	0.0%	0.0%
Harding	147	7	4.8%	0.0%	0.0%
Hidalgo	1,796	285	15.9%	2.5%	1.1%
Lea	35,016	1,478	4.2%	1.3%	0.8%
Lincoln	5,737	791	13.8%	0.6%	0.5%
Los Alamos	5,782	646	11.2%	0.0%	0.0%
Luna	10,535	1389	13.2%	1.4%	0.9%
McKinley	36,651	8,320	22.7%	0.8%	0.4%
Mora	1,495	136	9.1%	0.0%	0.0%
Otero	27,937	1,877	6.7%	1.2%	0.6%
Quay	2,947	929	31.5%	1.7%	0.9%
Rio Arriba	15,730	2,291	14.6%	0.5%	0.3%
Roosevelt	9,085	871	9.6%	0.5%	0.2%
Sandoval	55,092	2,733	5.0%	0.8%	0.4%
San Juan	62,313	6,408	10.3%	2.5%	1.3%
San Miguel	9,264	951	10.3%	0.4%	0.2%
Santa Fe	48,413	3,501	7.2%	0.6%	0.3%
Sierra	3,098	229	7.4%	3.5%	1.7%
Socorro	7,041	709	10.1%	2.3%	1.3%
Taos	10,676	467	4.4%	0.6%	0.2%
Torrance	5,420	337	6.2%	1.5%	0.9%
Union	1,464	36	2.5%	0.0%	0.0%
Valencia	30,939	2,551	8.2%	0.9%	0.6%

Population data from NM IBIS and lead data from NM CLPPP

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