

# Children with Lead Poisoning

## DEFINITION

*Children with lead poisoning* is the percentage of three-year-old children with a confirmed elevated blood lead level (EBLL,  $\geq 5$   $\mu\text{g}/\text{dL}$ ) at any time prior to December 31, 2015.<sup>1,2</sup> These data are for children eligible to enter kindergarten in the fall of 2017 (i.e., children born between September 1, 2011 and August 31, 2012).

## SIGNIFICANCE

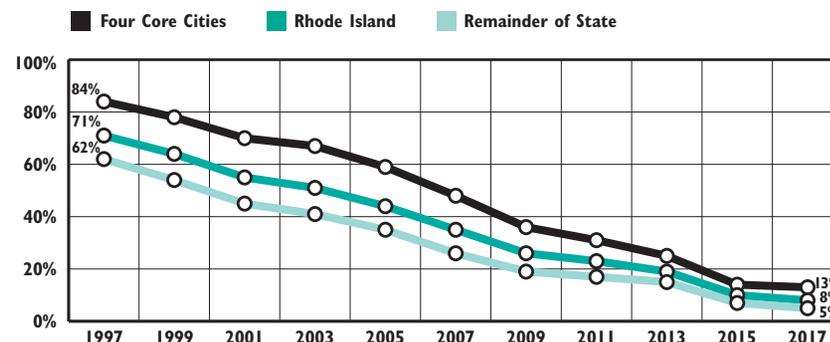
Lead poisoning is a preventable childhood disease. Infants, toddlers, and preschool-age children are most susceptible to the toxic effects of lead because they absorb lead more readily than adults and have inherent vulnerability due to developing central nervous systems.<sup>3</sup> Lead exposure, even at very low levels, can cause irreversible damage including reduced fetal and postnatal growth, decreased hearing, delayed puberty, kidney damage, increased risk for behavioral problems, decreased cognitive abilities, and lower academic performance. Though rare, severe poisoning can result in seizures, comas, and even death.<sup>4,5</sup> The societal costs of childhood lead poisoning include the loss of future earnings due to decreased cognition, and increased medical, special education, and juvenile justice costs.<sup>6,7,8</sup>

The Centers for Disease Control and Prevention (CDC) has renewed its focus on primary prevention of lead exposure in response to research findings indicating there is no safe blood lead level in children. In an effort to better alert health officials and family members to the dangers of any lead exposure in children, in 2012 the CDC lowered the threshold for which a child is deemed to have an elevated blood lead level from 10  $\mu\text{g}/\text{dL}$  to 5  $\mu\text{g}/\text{dL}$ . This new lower reference value will result in more children being identified as having elevated blood lead levels, which will allow parents and health officials to take corrective actions sooner.<sup>9,10</sup>

Although the percentage of children with elevated blood lead levels are declining nationally and locally, low-income and minority children remain the most likely to be lead poisoned.<sup>11,12,13</sup> In Rhode Island, children living in the four core cities (where most poor and minority children reside) are at increased risk for lead exposure because the housing stock tends to be older.<sup>14</sup>

In 2015, 1,342 (5.3%) of the 25,399 Rhode Island children under age six who were screened had confirmed elevated blood lead levels of  $\geq 5$   $\mu\text{g}/\text{dL}$ . Children living in the four core cities (7.7%) were more than twice as likely as children in the remainder of the states (3.3%) to have confirmed EBLLs  $\geq 5$   $\mu\text{g}/\text{dL}$ .<sup>15</sup>

**Children Entering Kindergarten with History of Elevated\* Blood Lead Level Screening ( $\geq 5$   $\mu\text{g}/\text{dL}$ ), Rhode Island, Four Core Cities, and Remainder of State, 1997-2017**



Source: Rhode Island Department of Health, Healthy Homes and Childhood Lead Poisoning Prevention Program, Children entering kindergarten between 1997 and 2017. \*Elevated blood lead level of  $\geq 5$   $\mu\text{g}/\text{dL}$ .

◆ The number of children with elevated blood lead levels has been steadily declining in all areas of Rhode Island over the past two decades. Compared to the remainder of the state, children living in the four core cities are at an increased risk for lead exposure.<sup>16</sup>

## Lead Exposure and Academic Performance

◆ Exposure to lead has been shown to negatively impact academic performance in early childhood.<sup>17</sup> Rhode Island children with a history of lead exposure, even at low levels, have been shown to have decreased reading readiness at kindergarten entry and diminished reading and math proficiency in the third grade. The most significant declines in academic performance occurred among children with the highest blood level levels and those living in the four core cities. Children with lead exposure are also at increased risk for absenteeism, grade repetition, and special education services.<sup>18,19</sup>

◆ In an effort to better inform school administrators about the prevalence of lead exposure, the Rhode Island Department of Health and the Rhode Island Department of Education provide detailed reports to superintendents and heads of private schools on rates of lead exposure and immunization among students within their respective districts. Information regarding screenings, regulations, associated risks, and parent communication are also included.<sup>20,21</sup>

Table 23. Lead Poisoning in Children Entering Kindergarten in the Fall of 2017, Rhode Island

CITY/TOWN	NUMBER TESTED FOR LEAD POISONING	CONFIRMED WITH BLOOD LEAD LEVEL $\geq 5$ $\mu\text{g}/\text{dL}$	
		NUMBER	PERCENT
Barrington	121	6	5.0%
Bristol	177	10	5.6%
Burrillville	108	10	9.3%
Central Falls	317	51	16.1%
Charlestown	56	6	10.7%
Coventry	288	18	6.3%
Cranston	743	35	4.7%
Cumberland	334	8	2.4%
East Greenwich	139	2	1.4%
East Providence	474	45	9.5%
Exeter	50	4	8.0%
Foster	33	0	0.0%
Glocester	51	1	2.0%
Hopkinton	60	1	1.7%
Jamestown	32	4	12.5%
Johnston	230	4	1.7%
Lincoln	156	12	7.7%
Little Compton	18	2	11.1%
Middletown	201	9	4.5%
Narragansett	63	3	4.8%
New Shoreham	12	1	8.3%
Newport	292	24	8.2%
North Kingstown	182	6	3.3%
North Providence	245	13	5.3%
North Smithfield	91	2	2.2%
Pawtucket	938	115	12.3%
Portsmouth	136	6	4.4%
Providence	2,706	366	13.5%
Richmond	48	4	8.3%
Scituate	86	2	2.3%
Smithfield	127	1	0.8%
South Kingstown	203	15	7.4%
Tiverton	137	9	6.6%
Warren	80	15	18.8%
Warwick	736	26	3.5%
West Greenwich	48	2	4.2%
West Warwick	314	13	4.1%
Westerly	176	7	4.0%
Woonsocket	597	36	6.0%
Four Core Cities	4,558	568	12.5%
Remainder of State	6,247	326	5.2%
Rhode Island	10,805	894	8.3%

## Significantly Lead Poisoned Children Under Age Six

◆ Starting in 2015, a child is considered to be "significantly lead poisoned" if she or he has a single venous blood test result of  $\geq 15$   $\mu\text{g}/\text{dL}$ . The number of children under age six who were significantly lead poisoned has decreased by 76% over the past ten years, from 349 in 2005 to 84 in 2015, but is up from 2014 (70).<sup>22</sup>

◆ Starting in 2015, an environmental inspection of a child's home is offered when a single venous test result is  $\geq 15$   $\mu\text{g}/\text{dL}$  (versus  $\geq 20$   $\mu\text{g}/\text{dL}$  previously). The Rhode Island Department of Health sends certified lead inspectors to determine whether lead hazards are present and works with owners to make the property lead-safe. In 2015, 68 inspections were offered, of which 41 were performed, 14 were refused, 11 the child moved, and two were pending.<sup>23</sup>

## Lead Poisoning Screening for Children Age Three

◆ All Rhode Island children must have at least two blood lead screening tests by age three and annual screenings through age six. Lead screening is a mandated covered health insurance benefit in Rhode Island. In 2015, 84% of Rhode Island three-year-olds received a blood lead test.<sup>24,25,26</sup>

### Source of Data for Table/Methodology

Rhode Island Department of Health, Healthy Homes and Childhood Lead Poisoning Prevention Program.

Data reported in this year's Factbook is not comparable to editions prior to 2012, due to a change in definition and data improvements within the Healthy Homes and Childhood Lead Poisoning Prevention Program.

Data for children entering kindergarten in the fall of 2017 reflect the number of Rhode Island children eligible to enter school in the fall of 2017 (i.e., born between 9/1/11 and 8/31/12).

Children confirmed positive for lead poisoning (blood lead level  $\geq 5$   $\mu\text{g}/\text{dL}$ ) are counted if they screened positive with a venous test and/or had a confirmed capillary test at any time in their lives prior to the end of December 2015. The Rhode Island Healthy Homes and Childhood Lead Poisoning Prevention Program recommends that children under age six with a capillary blood lead level of  $\geq 5$   $\mu\text{g}/\text{dL}$  receive a confirmatory venous test.

The denominator for percent confirmed is the number of children entering kindergarten in the fall of 2017 who were tested for lead poisoning. Data include both venous and confirmed capillary tests.

Of the 912 children entering kindergarten in 2017 who had an initial blood lead screen of  $\geq 5$   $\mu\text{g}/\text{dL}$ , one did not receive a confirmatory second test. Their lead poisoning status is unknown.

Caution should be used with small numbers in numerators and denominators.

Core cities are Central Falls, Pawtucket, Providence, and Woonsocket.

See Methodology Section for more information.

### References

<sup>19</sup> Centers for Disease Control and Prevention. (n.d.). *Blood lead levels in children*. Retrieved February 22, 2016, from [www.cdc.gov](http://www.cdc.gov)

<sup>224</sup> Rhode Island Department of Health. (2012). *Lead screening and referral guidelines: Universal blood lead screening*. Retrieved February 22, 2016, from [www.health.ri.gov](http://www.health.ri.gov)

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