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, ≥5 µg/dL) at any time prior to December 31, 2016.[1,2] These data are for children eligible to enter kindergarten in the fall of 2018 (i.e., children born between September 1, 2012 and August 31, 2013).

SIGNIFICANCE

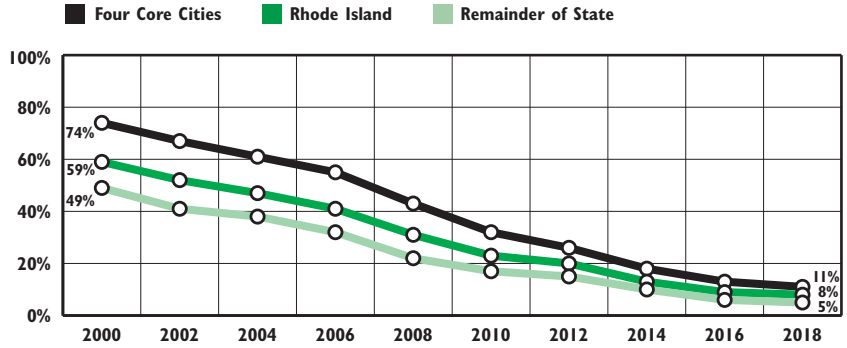
Lead poisoning is a preventable childhood disease. Infants, toddlers, and preschool-age children are most susceptible to the toxic effects of lead because they absorb lead more readily than adults and have inherent vulnerability due to developing central nervous systems.[3] Lead exposure, even at very 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.[4,5] 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.[6,7,8]

The Centers for Disease Control and Prevention (CDC) is focused 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 µg/dL to 5 µg/dL. This new lower reference value allows parents and health officials to take corrective actions sooner.[9,10]

Although the percentage of children with elevated blood lead levels is declining nationally and locally, low-income and minority children remain the most likely to be lead poisoned.[11,12,13] 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.[14]

In 2016, 1,201 (4.9%) of the 24,738 Rhode Island children under age six who were screened had confirmed elevated blood lead levels of ≥5 µg/dL. Children living in the four core cities (7.0%) were more than twice as likely as children in the remainder of the states (3.2%) to have confirmed elevated blood lead levels ≥5 µg/dL.[15]

Children Entering Kindergarten with History of Elevated* Blood Lead Level Screening (≥5 µg/dL), Rhode Island, Four Core Cities, and Remainder of State, 2000-2018



Source: Rhode Island Department of Health, Healthy Homes and Childhood Lead Poisoning Prevention Program, Children entering kindergarten between 2000 and 2018. *Elevated blood lead level of ≥5 µg/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.[16]**

Lead Exposure and Academic Performance

◆ **Exposure to lead has been shown to negatively impact academic performance in early childhood.[17] 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 lead levels and those living in the four core cities. Children with lead exposure are also at increased risked for absenteeism, grade repetition, and special education services.[18,19]**

◆ **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.[20,21]**

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 ≥15 µg/dL. The number of children under age six who were significantly lead poisoned has decreased by 78% over the past 12 years, from 349 in 2005 to 76 in 2016.[22]

◆ Starting in 2015, an environmental inspection of a child's home is offered when a single venous test is ≥15 µg/dL (versus ≥20 µg/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 2016, 67 environmental inspections were offered, of which 42 were performed, 12 were refused, seven were pending, and six the child moved.[23]

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 screening through age six. Lead screening is a mandated covered health insurance benefit in Rhode Island. In 2016, 76% of Rhode Island three-year-olds with an active status in KIDSNET received a blood lead test, 56% received two blood tests, and 24% were never tested.[24,25,26]

Table 23. **Lead Poisoning in Children Entering Kindergarten in the Fall of 2018, Rhode Island**

CITY/TOWN	NUMBER TESTED FOR LEAD POISONING	CONFIRMED WITH BLOOD LEAD LEVEL ≥5 µg/dL	
		NUMBER	PERCENT
Barrington	146	10	6.8%
Bristol	163	9	5.5%
Burrillville	132	9	6.8%
Central Falls	342	35	10.2%
Charlestown	40	3	7.5%
Coventry	277	8	2.9%
Cranston	770	45	5.8%
Cumberland	315	7	2.2%
East Greenwich	154	6	3.9%
East Providence	479	52	10.9%
Exeter	43	0	0.0%
Foster	29	2	6.9%
Glocester	63	1	1.6%
Hopkinton	67	4	6.0%
Jamestown	33	1	3.0%
Johnston	255	11	4.3%
Lincoln	185	5	2.7%
Little Compton	15	2	13.3%
Middletown	196	1	0.5%
Narragansett	58	2	3.4%
New Shoreham	13	6	46.2%
Newport	282	17	6.0%
North Kingstown	215	4	1.9%
North Providence	276	15	5.4%
North Smithfield	84	2	2.4%
Pawtucket	916	82	9.0%
Portsmouth	133	4	3.0%
Providence	2,627	348	13.2%
Richmond	35	1	2.9%
Scituate	67	3	4.5%
Smithfield	124	1	0.8%
South Kingstown	206	11	5.3%
Tiverton	118	5	4.2%
Warren	87	2	2.3%
Warwick	723	24	3.3%
West Greenwich	38	0	0.0%
West Warwick	336	14	4.2%
Westerly	160	12	7.5%
Woonsocket	565	44	7.8%
Unknown Residence	*2*	*NA*	*NA*
Four Core Cities	*4,450*	*509*	*11.4%*
Remainder of State	*6,317*	*299*	*4.7%*
Rhode Island	*10,769*	*808*	*7.5%*

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 2018 reflect the number of Rhode Island children eligible to enter school in the fall of 2018 (i.e., born between 9/1/12 and 8/31/13).

Children confirmed positive for lead poisoning (blood lead level ≥5 µg/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 2016. The Rhode Island Healthy Homes and Childhood Lead Poisoning Prevention Program recommends that children under age six with a capillary blood lead level of ≥5 µg/dL receive a confirmatory venous test.

The denominator for percent confirmed is the number of children entering kindergarten in the fall of 2018 who were tested for lead poisoning. Data include both venous and confirmed capillary tests.

Of the 820 children entering kindergarten in 2018 who had an initial blood lead screen of ≥5 µg/dL, two did not receive a confirmatory second test. Their lead poisoning status is unknown.

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

Unknown: Children were Rhode Island residents, but specific city/town information was unavailable.

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

See Methodology Section for more information.

References

[1,10] Centers for Disease Control and Prevention. (n.d.). *Blood lead levels in children.* Retrieved February 20, 2017, from www.cdc.gov

[2,24] Rhode Island Department of Health. (2016). *Childhood lead poisoning prevention program referral intervention process.* Retrieved February 20, 2017, from www.health.ri.gov

(continued on page 180)