The Costs of Childhood Blood Lead Poisoning

Disease burden in Minnesota

Lead poisoning is a medical condition that occurs when lead builds up in the body. Elevated blood lead levels (EBLLs) in young children are associated with adverse health effects, including learning impairment, behavioral problems, and even death at very high levels.

The proportion of children with lead poisoning has declined over time in Minnesota, from about 2% of children born in 2000 to less than 1% of children born in 2009, among children tested before 3 years of age.

THRESHOLD LOWERED

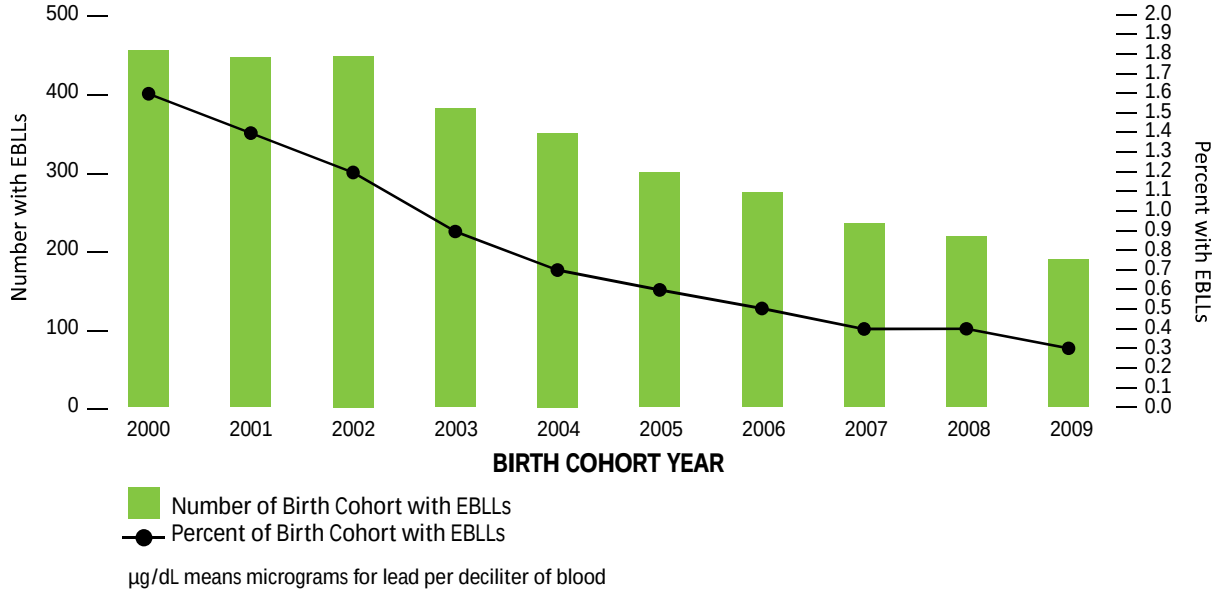
There is no safe level of exposure to lead. The threshold for an "elevated blood lead level" in Minnesota was recently lowered from 10 to 5 µg/dL (Minnesota Department of Health, 2014a). The CDC also recently lowered the threshold to 5 µg/dL, and future reductions are likely. This threshold is used to trigger actions for investigation and remediation of sources of lead in the home.

BLOOD LEAD LEVELS ARE DECLINING IN MINNESOTA

Testing for lead poisoning is important as it often occurs with no identifiable symptoms. The percentage of tested children with elevated blood lead, levels previously defined by the state of Minnesota as a level of 10 µg/dL or higher, has been decreasing.

Blood lead testing in Minnesota is targeted and not universal, meaning not every child is tested. That means this measure is not generalizable and cannot be used to interpret the prevalence or incidence for all children living in Minnesota.

CHILDREN WITH CONFIRMED ELEVATED BLOOD LEAD LEVELS (EBLLs) IN MN



µg/dL means micrograms for lead per deciliter of blood

DISPARITIES OBSERVED

Children in poverty are at greater risk for lead poisoning. About 15% of all children (<18 years) and about 17% of all children under age 5 in Minnesota live in poverty. The majority of counties in northern Minnesota have a higher percentage of children living in poverty, compared to the state average of 15%, as do Hennepin and Ramsey Counties.

RISK FACTORS

Children less than 6 years old living in homes built before 1978 are most at risk for lead poisoning. Younger children are more at risk because their bodies absorb lead more easily and their brains are still developing. Lead-based paint is a common cause of lead poisoning. People can be exposed to lead by ingesting dust from deteriorated lead paint, consuming other materials contaminated with lead, or breathing aerosolized lead paint dust. Young children frequently put their hands or other objects, which may be contaminated with lead, into their mouths. The U.S. EPA estimates that more than 80% of all homes built in the U.S. before 1978 contain lead-based paint.

EAF for childhood lead poisoning

EAF: 100% (no range)

A panel of experts (Landrigan et al., 2002) determined that all cases of lead poisoning are assumed to be of environmental origin. Therefore, the EAF is 100%, and no range was calculated.

Economic Burden

About 54,000 Minnesota children born in 2004 were tested before the age of 6, or about 76% of the 2004 birth cohort. The average peak blood lead level (BLL) was 2.5 micrograms of lead per deciliter of blood (µg/dL) – among children born in 2004 and tested up to age 6. This BLL was converted into lost IQ points, then into lost lifetime earnings for boys and girls, separately. **The total economic burden of childhood lead poisoning in Minnesota on lifetime earnings is $1.9 billion (in 2014$).**

TABLE 2: CALCULATION OF PERCENT LIFETIME EARNINGS LOST DUE TO CHILDHOOD LEAD POISONING AMONG THE 2004 BIRTH COHORT IN MINNESOTA.

Mean peak BLL	IQ points lost due to lead poisoning	Total IQ points lost due to lead poisoning	Lifetime earnings lost due to IQ points lost	Total lifetime earnings lost
2.5 µg/dL	0.47 IQ points per 1 µg/dL	1.19 IQ points	2.39% per IQ point lost	2.85%

TABLE 3: COST OF CHILDHOOD LEAD POISONING ATTRIBUTABLE TO THE ENVIRONMENT FOR THE 2004 BIRTH COHORT IN MINNESOTA.

Lifetime earnings lost due to lead poisoning		Lifetime earnings per child (2007$)	Lifetime earnings lost per child	Number of children	Lifetime earnings lost	Final economic burden (2014$)
2.85%	Boys	$1,055,542	$30,117	35,988	$1,083,833,838	$1.9 billion
	Girls	$622,653	$17,765	34,626	$615,145,548	