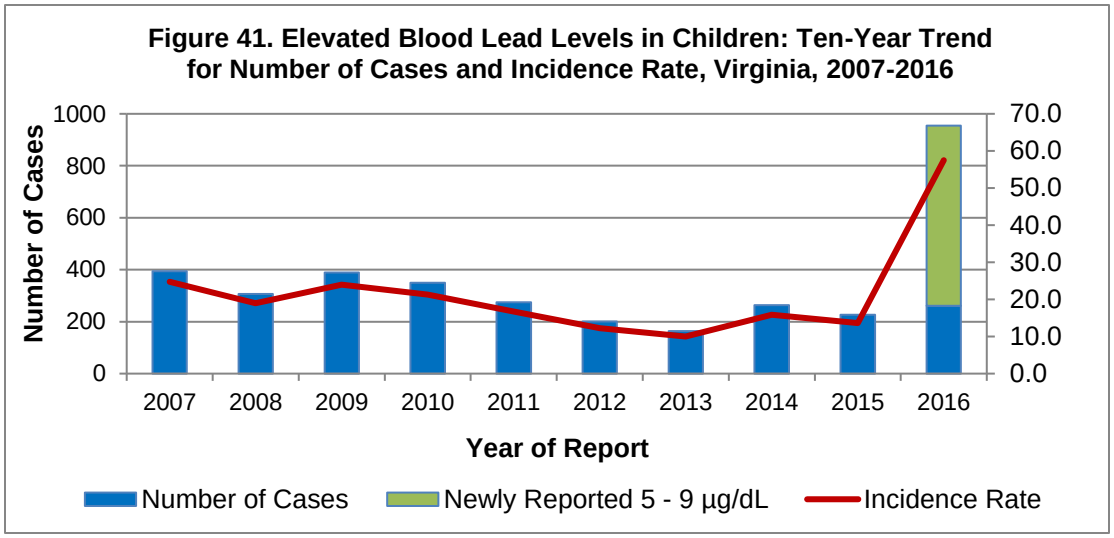
Lead - Elevated Blood Levels in Children

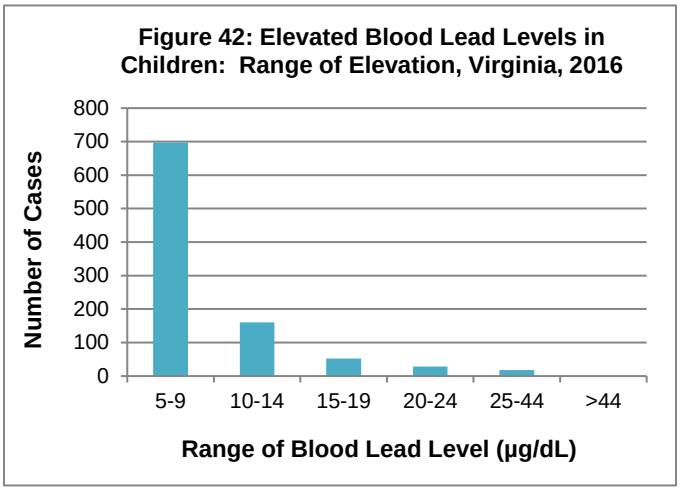
Agent: Lead (soft, dense metal, with a past use in paint and gasoline)
Mode of Transmission: The primary source of lead poisoning in children is ingesting lead-contaminated paint found in buildings built before 1978. Lead exposure can also happen through chewing objects painted with lead paint; ingesting lead contaminated soil, food, or water; inhaling lead contaminated air or dust; or using glassware, healthcare products or folk remedies containing lead.
Signs/Symptoms: Low levels of blood lead in children have been associated with reduced Intelligence Quotient (IQ), hyperactivity, reduced stature, reduced hearing, and headaches. Nervous system damage, learning disabilities (e.g., attention deficit hyperactivity disorder), behavior problems (withdrawn behavior, issues with sociability), muscle weakness, decreased growth, delayed puberty, and anemia can also be attributed to exposure to lead. Children who ingest large amounts of lead can develop kidney and brain damage. Furthermore, children can appear healthy despite having elevated levels of lead in their blood.
Prevention: Ingestion of lead-contaminated materials and use of lead-containing materials should be avoided. Educating healthcare professionals and parents is important in detecting and reducing lead exposure. Recommendations for parents who live in older homes should include testing the home and water for lead, precautionary lead testing in young children, and washing children's hands, faces and toys often in order to eliminate exposure to lead in dust and soil. Parents who have an occupation or hobby that might involve lead should wear personal protective equipment, not wear work clothes or shoes home, shower after working with lead, and avoid bringing other lead-contaminated materials from work into the home. Children should be kept away from any home renovations involving the sanding or scraping of paint.
Other Important Information: In 2016, the Virginia Department of Health changed the elevated blood lead level for surveillance from $\geq$10 µg/dL to $\geq$5 µg/dL in children age 15 years and younger. This new level is based on the 97.5th percentile of blood lead levels of children aged 1-5 years who were included in a national survey. The change was also in response to CDC's 2012 updates to its recommendations which indicate no safe blood lead level in children has been identified and established 5 µg/dL as the reference level at which ongoing monitoring and response is recommended. On October 20, 2016, the Virginia Department of Health modified its disease reporting requirements to read: "Lead, reportable levels" means any detectable blood lead level in children 15 years of age and younger and levels greater than or equal to 5 µg/dL in persons older than 15 years of age. For surveillance purposes, only levels $\geq$5 µg/dL are included in this report.

Lead – Elevated Levels in Children: 2016 Data Summary	
Number of Cases:	955
5-Year Average Number of Cases:	225.8
% Change from 5-Year Average:	+323%
Incidence Rate per 100,000:	57.5



In 2016, 955 new cases of elevated blood lead levels in children were reported in Virginia. This represents a 323% increase from the 226 cases reported in 2015, and a 323% increase from the five-year average of 225.8 cases per year (Figure 41). This increase is attributed to the change in blood lead levels used for surveillance purposes, as described above. Of these newly reported cases in 2016, the majority represent blood lead levels in the range of 5-9 µg/dL, which were not captured in previous years.

Among the 955 children reported with elevated blood lead levels in 2016, 694 (73%) had confirmed blood lead levels in the 5-9 µg/dL range, 160 (17%) had levels in the 10-14 µg/dL range, 52 (5%) had levels in the 15-19 µg/dL range, 28 (3%) had levels in the 20-24 µg/dL range, 18 (2%) had levels in the 25-44 µg/dL range, and 3 (<1%) had a level above 44 µg/dL (Figure 42).



Public health follow-up care is based on the confirmed blood lead level. For blood lead levels in the 5-9 µg/dL range, children and families are provided educational materials and blood lead levels are monitored by primary care providers. Blood lead levels of ≥10 µg/dL in children require public health action. Blood lead levels in the 10-14 µg/dL require a nursing assessment, lead awareness education, and follow-up monitoring. Blood lead levels in the 15-19 µg/dL range require nutritional and environmental education, as well as additional testing to ascertain if the blood lead level is increasing or persistently elevated. Blood lead levels equal to or greater than 20 µg/dL require greater degrees of case management. For instance, these cases require the initiation of an environmental investigation to identify and eliminate lead hazards and may require medical intervention.

Incidence rates for children with elevated blood lead levels are based on population figures for children age 0-15 years. By age group, the majority (89%) of elevated blood lead levels and the highest incidence rate occurred in those aged 1-9 years (848 cases, 91.1 per 100,000), followed by infants (53 cases, 51.5 per 100,000). Rates were lowest among those 10-15 years of age (54 cases, 8.6 per 100,000). Race information was not reported for 55% of cases. Among cases with a known race, incidence among the "other" race population was the highest (76.6 per 100,000), followed by the black population (38.4 per 100,000). The white population had the lowest incidence rate (15.3 per 100,000). Incidence rates among males and females were similar (57.8 and 56.9 per 100,000, respectively). Geographically, incidence rates ranged from 81.4 per 100,000 in the central region to 39.7 per 100,000 in the eastern region, resulting in a statewide incidence rate of 57.5 per 100,000 in children less than 16 years of age. Incidence rates by locality can be seen in the map below.

Blood lead results on approximately 77,000 children were received by VDH in 2016. Continued improvement in reporting of specimen type (e.g., capillary or venous) by physicians and laboratories has enhanced interpretation of test findings, reduced ambiguity, and yielded more accurate information on the number of children with confirmed elevated blood lead levels.

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Incidence Rate by Locality, Virginia, 2016