

Indicator #13: Elevated Blood Lead Levels (BLL) Among Adults

Background and Public Health Significance

Since November 2015, the surveillance case definition for an elevated blood lead level (BLL) used by the Centers for Disease Control and Prevention (CDC) and National Institute of Occupational Safety and Health (NIOSH) includes workers age 16 and older, with blood lead concentrations of greater than or equal to 5 µg/dL of whole blood, in a venous blood sample. This case definition is used by the ABLES (Adult Blood Lead Epidemiology and Surveillance) program, which is the data that is used when generating this indicator's statistics. Unfortunately, Virginia does not participate in the ABLES program and therefore only collects data for adults with an elevated blood lead level of 25 µg/dL or greater.

The national prevalence of BLLs ≥25 µg/dL declined from 14.0 adults per 100,000 employed in 1994 to 5.7 in 2012. Historically, in the United States, most adult lead cases have been related to occupational exposures. Of the states who participated in the ABLES program from 2002-2012, 94.7% of the BLLs ≥25 µg/dL were from occupational exposures.

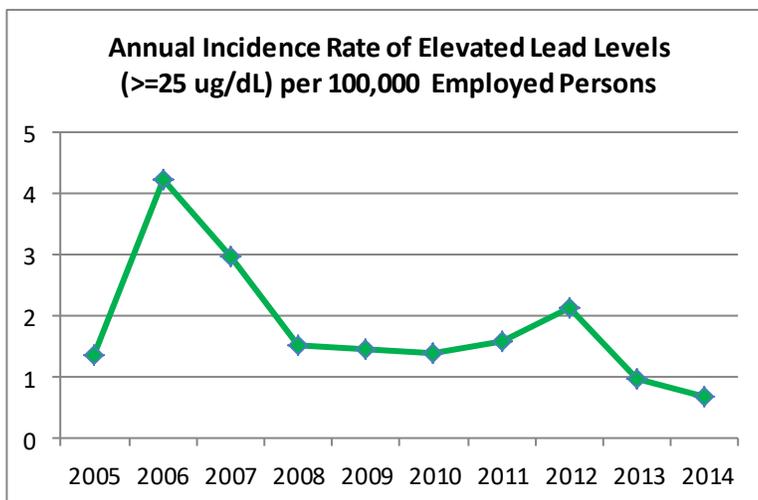
Many adults in the US continue to have BLLs above levels known to be associated with acute and chronic adverse effects in multiple organ systems ranging from subclinical changes in function to symptomatic intoxication. The risks for adverse chronic health effects are even higher if the exposure is maintained for many years.

Data source: Reports of elevated BLLs from laboratories in VA (BLL: ≥25µg/dL) & BLS Current Population Survey Data

Rationale:

Among adults, lead poisoning is a persistent, mainly occupational, health issue that continues to be an important public health problem. The most widely available test for exposure is the BLL. The Federal Occupational Safety and Health Administration (OSHA) lead standards to protect workers from lead-associated health effects include requirements for monitoring BLLs among employees who meet certain exposure criteria. The standards are based on medical information that is now more than 30 years old and are not protective against the adverse health effects of lead. Lower medical removal recommendations have been proposed to protect workers against the adverse health effects of both acute and chronic lead exposures. It is important to note that the average BLL for the general population is less than 1.5 µg/dL.

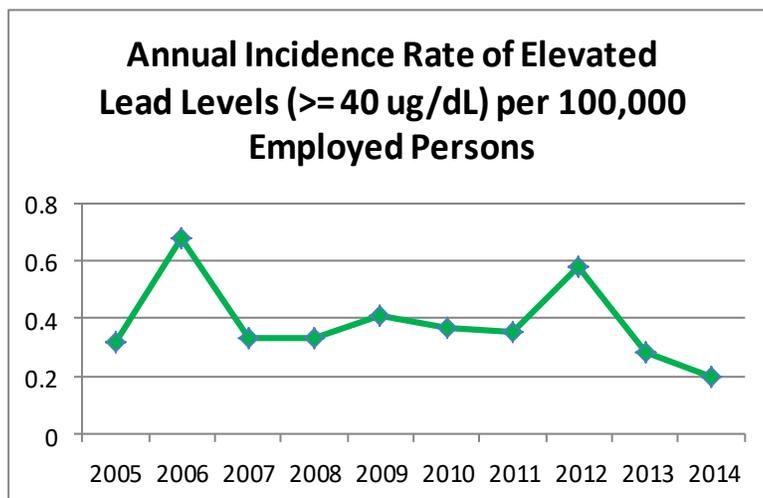
	13.1 Annual Number of Adult Incident Cases for Elevated Lead (≥ 25 µg/dL)	13.2 Annual Incidence Rate per 100,000 Employed Persons (≥ 25 µg/dL)
2005	52	1.37
2006	163	4.24
2007	116	2.97
2008	60	1.51
2009	56	1.45
2010	53	1.39
2011	63	1.59
2012	84	2.13
2013	39	0.98
2014	28	0.69



NOTE: 2013 & 2014 rates may change when the updated 2015 Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants is released due to changes in high risk industries and occupations. Also, Virginia is incorporating new reporting regulations for BLLs in 2016. No US Rate available because not all states participate in the ABLES program and states don't use a universal system to capture elevated lead cases.

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	13.3 Annual Number of Adult Incident Cases for Elevated Lead (≥ 40 ug/dL)	13.4 Annual Incidence Rate per 100,000 Employed Persons (≥ 40 ug/dL)
2005	12	0.32
2006	26	0.68
2007	13	0.33
2008	13	0.33
2009	16	0.41
2010	14	0.37
2011	14	0.35
2012	23	0.58
2013	11	0.28
2014	8	0.20



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Limitations

Resource Limitations:

Some states do not require laboratories to report all BLLs, or have no BLL reporting requirement in place. Even with a reporting requirement, data from laboratories are frequently incomplete. Many workers with significant occupational lead exposure are not appropriately tested. An individual's lead exposure and BLL testing may be done in the same or in different states (which may not be the individual's state of residence). Approximately 10-15% of elevated BLLs among adults can be caused by non-occupational exposures. Not all states may be able to distinguish occupationally exposed individuals from non-occupationally exposed individuals. Not all states may be able to determine both state of employment/exposure and state of residence of their reported cases.

Indicator Limitations:

BLLs reflect the contributions of acute external exposure to lead as well as the release of internal bone lead stores into the blood. For persons without significant lead body burden, a BLL is a good indicator of recent (preceding 3-5 weeks) external lead exposure. For persons with significant body burden, a single BLL may not be an accurate indicator of recent external exposure, as lead is also being released into the blood from bone stores.

VA Lead Reference Levels

As of December 2015:

Children (ages ≤ 15 years): ≥ 10 $\mu\text{g/dL}$

Adults (ages 16+ years): ≥ 25 $\mu\text{g/dL}$

Starting March 2016:

Children (ages ≤ 15 years): ≥ 5 $\mu\text{g/dL}$

Adults (ages 16+ years): ≥ 5 $\mu\text{g/dL}$