

## Toxic Substance-Related Illness

Agent: Multiple agents, including heavy metals (e.g., lead, cadmium, mercury, arsenic), occupational dusts or fibers (e.g., coal, silica, asbestos), gases (e.g., carbon monoxide, methane), pesticides, or radioactive materials.

Mode of Transmission: Varies depending on agent; can include absorption through skin, ingestion, or inhalation.

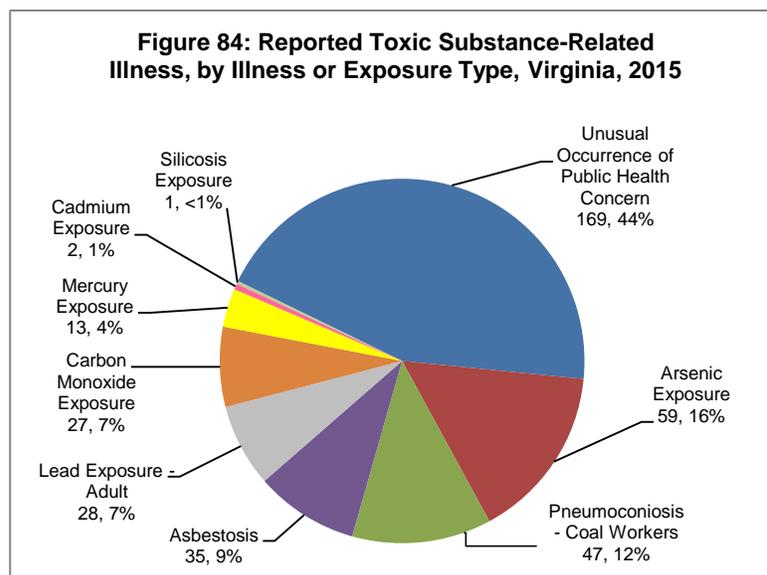
Signs/Symptoms: Varies depending on agent, route, dose and duration of exposure. Chronic occupational dust or fiber exposure may increase the risk of lung cancer, mesothelioma and nonmalignant lung disorders. Heavy metals, gases and pesticides may damage nervous, hepatic (liver), digestive, or reproductive systems.

Prevention: Eating, drinking, or smoking should not occur in contaminated work areas. Hands and face should be washed with soap and water after contact with toxic materials. After working with potential toxic substances, showering and changing clothes should occur at the worksite, if possible. Preventive measures include strict adherence to safety guidelines and requirements.

Other Important Information: Improving public and healthcare professional awareness and recognition of various toxic substance exposures can help reduce subsequent illness.

<b>Toxic Substance-related Illness: 2015 Data Summary</b>	
Number of Cases:	381
5-Year Average Number of Cases:	309.8
% Change from 5-Year Average:	23%
Incidence Rate per 100,000:	4.6

In 2015, 381 cases of toxic substance-related illness were reported in Virginia. This is a 7% increase from the 357 cases reported in 2014, and a 23% increase from the five-year average of 309.8 cases per year. A determination of illness is based upon a physician's diagnosis, a laboratory finding outside an occupational standard, or when no standard exists, outside expected normal values. Toxic substance exposures are identified by public health professionals from electronic laboratory reports, death certificates, and through claims by exposed persons to the Virginia Workers' Compensation Commission (WCC). The two most frequently reported toxic substance-related conditions in 2015 were arsenic exposure and coal workers' pneumoconiosis. These were followed by asbestosis, lead and carbon monoxide exposure (Figure 84). Other toxic substance-related exposures reported during 2015



included mercury, silicosis and cadmium exposures. Illness from exposure to rarely reported substances were also captured. While the occurrence of most types of toxic substance exposure or illness has remained very similar in recent years, more “unusual occurrences of public health concern” were captured in 2014 and 2015 compared to the previous years. These included unintentional workplace exposures to aerosol cleaners, solvents, exhaust fumes, and methane, or other illness sustained during a toxic substance or chemical release. Inhalation was the most common route of exposure, followed by dermal contact then ingestion.

Arsenic exposure has continued to be one of the most frequently reported toxic substance exposures in Virginia, due in part to the presence of arsenic in various foods, particularly fish and shellfish. Since the 2012 spike of 92 cases, arsenic trends have been declining and are showing proof of stabilization including the 66 exposures reported in 2013, 57 exposures in 2014, and the 59 exposures in 2015. The 2012 spike was due to a more thorough and comprehensive reporting approach through utilization of electronic laboratory reporting. Of the 59 arsenic exposures in 2015, 49 cases did not present with any clinical symptoms. This is common in many elevated total arsenic cases due to exposure through ingestion of seafood versus detrimental inhalation or ingestion of inorganic, carcinogenic types of arsenic. Exposure to the inorganic, carcinogenic form commonly happens through cigarette smoke or in contaminated drinking water.

Coal workers’ pneumoconiosis, also referred to as black lung disease, is an industrial disease that is the result of breathing in dust from coal, graphite, or man-made carbon over a period of years. The dust particles reside in the lungs following inhalation and build up over time. This creates chronic exposure due to the lungs not being able to excrete the dust. This continued exposure causes inflammation, fibrosis, and necrosis. Although rates of pneumoconiosis have declined since the Federal Coal Mine Health and Safety Act of 1969, new cases appear each year in Virginia. In 2015, 47 cases of coal workers’ pneumoconiosis were reported. Nearly all were associated with working in the coal mining industry, and were mostly identified through surveillance of death certificates. This nearly 500% increase in cases from the eight cases reported in 2014 is likely due to the delayed reporting of death certificate data. Some death certificates of persons who died in 2014 as a result of coal workers’ pneumoconiosis were not received until 2015. As a result, these deaths were counted as 2015 cases. This may have artificially reduced the case count for 2014, while increasing the number for 2015.

The number of reported asbestos exposures has remained relatively stable over the past decade, with only a slight increase for the current year. In 2015, 35 persons were reported with asbestos exposure in Virginia. The age of reported individuals ranged from 29-94 years, with a mean of 77 years. The majority of cases were 70 years or older which reflects current illness from exposures that occurred before regulatory standards and guidelines went into effect. Of those reporting exposure, all were male and 29 cases (83%) were white. Asbestos exposures were reported mainly by death certificates (86%), followed by reporting through the Worker’s Compensation Commission (14%).

Reports of adult lead exposures ( $\geq 25$   $\mu\text{g/dL}$  of lead in blood for persons aged 16 years or older) continue to decrease. In 2015, 28 cases of elevated blood lead levels in adults were reported compared to the 181 cases in 2006. Of the 28 reported cases, 96% were male. The majority of reported cases with elevated lead exposure did not include information on occupation or industry. Among those who did, historic preservation, lead and asbestos abatement, and radiator repairs were the most common industries listed. Greater awareness of the dangers of lead exposure, as well as enforcement of workplace lead safety standards, has contributed to the decrease in reported exposures. Lead exposures among children aged 15 years and younger are discussed in the childhood lead section of this report.

In 2015, 27 carbon monoxide exposures were reported in Virginia compared to the 93 reported exposures in 2014. This dramatic decrease was due, in part, to a large number of workers being exposed at a produce facility in 2014. The workers of the produce facility were thought to have been exposed to carbon monoxide from forklift exhaust located inside the facility. The majority of cases reported in 2015 worked in various industries including automobile, construction, and law enforcement. Twelve exposures were reported through death certificate surveillance and were the result of exposure to vehicle exhaust or carbon monoxide within the home. Ten cases were reported through the WCC. The majority of exposures were occupational, while most deaths were a result of accidental poisonings due to vehicle exhaust or carbon monoxide inside the home.

A declining trend phenomenon has been seen in the reporting of cadmium and mercury exposures over the last decade. The number of reported cases of cadmium has dropped noticeably in the last two years, and now only accounts for 1% of all reported toxic substance-related exposures. Mercury exposures have been declining as well. Only 13 reported exposures to mercury were reported in 2015. Mercury accounted for 3% of all reported toxic substance exposures in 2015.

Among all reported toxic substance exposures, the largest proportion of cases (30%) and the highest incidence rate (7.6 per 100,000) occurred in the 60 year and older age group. Incidence rates ranged from 1.0 to 6.2 per 100,000 among the remaining age groups, averaging 4.4 per 100,000. This age distribution reflects the large proportion of cases identified by public health through WCC reports and death certificates, which are likely to represent long-term exposures. Race information was not reported for 66% of toxic substance-related cases. As such, no statement can be made about the distribution of toxic substance exposures by race. Males accounted for 67% of all cases. The incidence rate among males was twice the rate of females (6.2 and 2.9 per 100,000, respectively). The southwest region had the highest incidence rate at 7.5 per 100,000. Rates in other regions ranged from 2.6 to 5.0 per 100,000.