

## **Toxic Substance-Related Illness**

**Agent:** Multiple, 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.

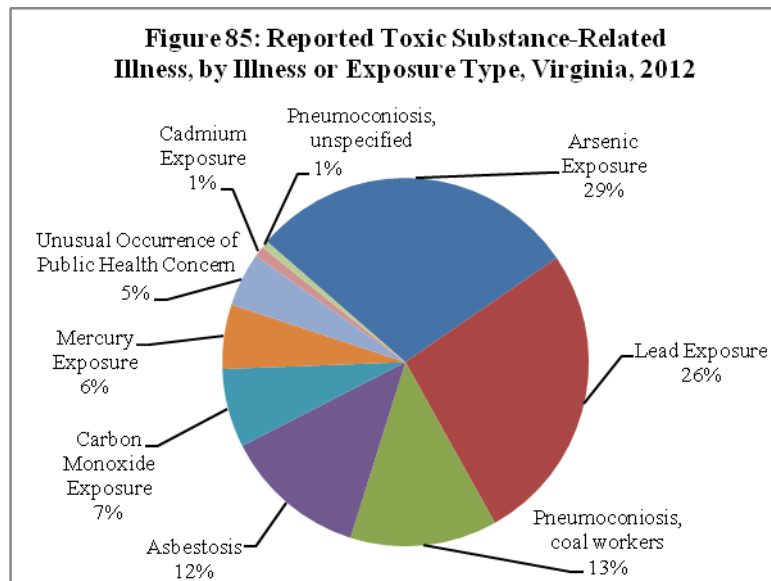
**Mode of Transmission:** Varies depending on agent; can include absorption through skin, ingestion, or inhalation.

**Signs/Symptoms:** Varies depending on agent and 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 contacting 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.

During 2012, 317 cases of toxic substance-related illness were reported in Virginia. This is 7% fewer than the five-year average of 340.6 cases per year. A determination of illness is based upon a physician's diagnosis or on a laboratory finding outside an occupational standard, or when no standard exists, outside expected normal values. The two most frequently reported toxic substance-related conditions were arsenic and lead exposure, followed by coal workers' pneumoconiosis and asbestosis (Figure 85). Additional toxic substance-related illnesses reported during 2012 included unspecified pneumoconiosis and exposures to cadmium, carbon monoxide, and mercury. While the percentages may fluctuate from year to year, these represent the same types of exposure or illness that have been reported for several years. Illness from exposure to rarely reported substances were also captured. These "unusual occurrences of public health concern" included exposures to aerosol cleaners, noxious fumes, hydrogen sulfide, methanol, ethanol, ethylene glycol, drain cleaner, and difluoroethane. All of these unusual exposures were reported through death certificates or claims from the Virginia Workers' Compensation Commission (WCC).



Arsenic has continued to be one of the most frequently reported toxic substance exposures. Since 2007, when 18 cases were reported, there has been a general increase to the 92 cases reported in 2012. This increase is primarily due to more comprehensive electronic laboratory reporting of persons with arsenic levels above normal laboratory values. Previously, these reports were rarely received from physicians or laboratory directors. The same phenomenon is seen, to a lesser extent, in reporting of mercury and cadmium exposure. However, these two conditions have seen a noticeable drop in reported cases in the last two years and together account for 7% of toxic substance-related illness in 2012. Arsenic and mercury lab reports are based on elevated urine or blood levels. Most laboratories report total arsenic or mercury without further speciation of these substances.

While lead remains one of the three most commonly reported exposures on a yearly basis, reported cases of adult lead exposure continue to show a general decrease. In 2012, 84 cases of elevated blood lead levels in adults were reported compared with 181 cases in 2006. Greater awareness of the dangers of lead exposure, as well as enforcement of workplace lead standards, has contributed to the decrease in reported exposures.

Among other frequently reported toxic substance-related illnesses, pneumoconiosis remains within the top three conditions reported. Eighty-six percent of the 43 persons reported with pneumoconiosis worked in the coal mining industry, and of these, 29 persons, or 78%, were identified from death certificates. Forty-one persons were reported with asbestosis, accounting for 13% of all toxic substance-related illness in 2012; the number of cases reported each year has remained relatively stable over the past decade. The average age of those reported with asbestosis was 80 years, which is reflective of exposures occurring before regulatory standards and guidelines came into effect. All but four of the asbestos exposures were reported through death certificates, and of these, 58% listed asbestosis as a primary cause of death. The remaining four asbestosis cases were reported by the WCC as worker exposures. The 22 persons with reported carbon monoxide exposures worked in various industries; all but four of the exposures were reported through death certificates and resulted from either accidental or deliberate exposure to fire, vehicle exhaust, charcoal grills, or generators. The remaining four carbon monoxide cases resulted from accidental exposure to fumes from generators utilized during a storm-related power failure.

Among all toxic substance exposures, the highest percentage of cases (40%) occurred in the 60 year and older age group, with an incidence rate of 8.7 per 100,000, followed by the 50-59 year age group, with a rate of 4.7 per 100,000. No cases of toxic substance exposure (excluding childhood lead) occurred in children less than one year of age. 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 43% of toxic substance-related cases. Where race information was provided, incidence in the white population was more than double the rate in the black population (2.7 and 1.0 per 100,000, respectively). Eighty percent of all cases occurred in males and the incidence was more than four times that in females (6.4 and 1.5 per 100,000, respectively). The eastern region had the highest incidence rate at 5.7 per 100,000. Incidence rates in other regions of the state ranged from 2.4 to 4.7 per 100,000.