

## Exposure to Lead in the Shooting Sports

Exposure to lead in the shooting sports is a controllable risk. Essential to controlling exposure is an understanding of the sources of exposure as well as the precautions and preventative measures to be taken. This article provides an overview of this topic based on information extracted from the references cited below. Separate readings of the resource materials may suggest a different emphasis.

### The Risk

Lead is a heavy metal and a known toxin which can accumulate in humans and may affect the blood, heart and immune systems if the amount of uptake into the body exceeds the ability to expel it. Persons with nervous disorders, gastrointestinal disorders, anemia or chronic bronchitis may be at significant risk from excessive lead exposure. Research has shown that young children are at higher risk for long term detrimental affects from lead poisoning.

Shooters are exposed to lead from lead compounds used in primers as well as the lead used to make bullets. The risk of excessive lead exposure is much greater in an indoor range environment than when shooting outdoors.

### Modalities of Lead Intake

Shooters are exposed to lead from lead compounds used in primers as well as the lead used to make bullets. The primary means of lead entering the body are through ingestion and inhalation. Intake through ingestion is far higher than through inhalation.

The current upper limits of exposure as defined by the Centers for Disease Control (CDC) are 10 µg/dL (micrograms per deciliter) for children and 25 µg/dL for adults. Levels above these for extended periods of time should be treated as significant health risks.

The risk of elevated blood lead level for shooters who shoot exclusively at outdoor ranges is very low. Lead based fumes and lead-laden dusts dissipate rapidly when not confined.

### Inhalation

The principal exposures to shooters via inhalation are through fumes containing respirable lead compounds originating from the lead styphnate in cartridge primers and vaporized lead compounds resulting from exposure of the lead projectile to the high temperatures produced from the ignition of smokeless powder used in firearm cartridges.

The visible smoke resulting from firing a gun is of little consequence for lead poisoning through inhalation because the particulate is of a size too large to enter the blood stream through the lungs. The lead fumes which are respirable are virtually invisible to the eye.

Shooters who frequent indoor ranges should look at the effectiveness of the ventilation system to gage their exposure risk. Ranges with once through ventilation systems which introduce fresh air near the firing line and exhaust contaminated air near the backstop have much lower risk exposure than ranges with any type of recirculating ventilation system, regardless of the degree of filtration. Lead based fumes are of a particulate size which can pass through almost all air filters except HEPA (high efficiency particulate arrester) filters.

### Ingestion

The potential for lead intake via ingestion is significantly higher than through inhalation. Ingestion can occur when lead compounds are inadvertently consumed due to contamination of foodstuffs and beverages, from the environment or from direct oral contact with the hands after handling metallic lead or touching items coated with metallic lead and/or lead compounds.

### Preventive Measures

The potential for significant intake through ingestion is much higher than through inhalation. Proper hygiene, shooting practices and attention to your health will go a long way in controlling your risk of lead poisoning.

- Wash your hands thoroughly with soap and water after exposure inside the range, or after handling spent brass cases, bullets and after reloading firearm cartridges.
- Avoid stirring up lead-laced dust on the range floor, walls and other surfaces.
- **Do not** take food or beverages into the range.
- Avoid using bullets with exposed lead in indoor ranges.
- Leave your shooting footwear in the garage, mud room, etc. so you won't bring lead laden dust onto your carpets.
- Wash your shooting clothes separately, especially if you have small children.
- Have your blood lead level (BLL) checked at least twice a year.
- Expectant mothers should avoid indoor shooting facilities for the duration of their pregnancy and afterward while breast feeding their infants.

Contrary to popular opinion, lead poisoning of those who use indoor ranges is not widespread, nor does it exist in epidemic proportions. Range workers are more at risk than the casual shooter who frequents an indoor range once a week. Where lead poisoning of range workers has been reported, the reasons have almost always been attributable to the lack of a proper health monitoring program and administrative controls.

## Statistics

In 1987 the Centers for Disease Control and Prevention (CDC) through the National Institute for Occupational Safety and Health (NIOSH) began tracking blood lead levels in adults with the goal of identifying and preventing elevated blood lead levels. The ABLES (Adult Blood Lead Epidemiology and Surveillance) program, originally including four states, has expanded to include thirty-seven states in 2004. The program goal is to reduce to zero, the number of adults with BLLs exceeding 25 µg/dL by 2010. In 2002 the study began tracking individual case data from 35 states totaling 6803 cases. The overwhelming majority of cases where BLL exceeded 25 µg/dL, some 6540, were occupation related as opposed to 263 non-occupation related.

Further non-occupation related cases, involving persons exposed from shooting firearms, totaled just 78 or 1.15%. Below is the complete statistical breakdown:

### Occupation Related Cases

Manufacturing	55.43 %
Construction	21.43 %
Mining	7.70 %
Wholesale & Retail Trades	6.61 %
Services Industries	3.07 %
Transportation/Public Utilities	1.88 %

### Non Occupation Related Cases

Shooting Firearms	1.15 %
Remodeling & Renovating	0.96 %
Hobbies	0.66 %
Gunshot wounds & retained lead	0.54 %
Other, non-specific	<u>0.57 %</u>

Total 100.00 %

## Testing and Treatment

People who regularly shoot indoors should have their blood lead level (BLL) checked at least twice a year. You will generally need to notify your doctor ahead of your visit so he can have the right vacuum vial available. It takes a different vial for accurate lead testing than for ordinary CBC and other normal blood testing.

Also contrary to some opinions, elevated blood lead levels can be treated with little or no side effects by simple reduction or elimination of lead exposure and instilling proper dietary habits and nutrition. A balanced diet rich in vitamins and minerals, especially iron, calcium, zinc and vitamin C has been shown to reduce the risk of lead poisoning.

The most recognized form of active treatment, chelation (pronounced *ke-lay-shun*) is a chemical treatment where a synthetic solution of ethylenediaminetetraacetic acid (EDTA) is intravenously injected into the body to remove heavy metals such as lead. The chelation solution binds with the lead allowing it to be expelled through the urinary tract. There can be unwanted side effects because chelation can also remove desirable metals and minerals.

Any active treatment such as chelation should only be undertaken under the direct supervision of a physician or qualified medical professional.

There is no credible evidence to support the notion that lead is a carcinogen for humans.

**Note:** Information for this article was taken from publications of:

The Centers for Disease Control and Prevention (CDC) [www.cdc.gov](http://www.cdc.gov)  
The National Institute for Occupational Safety and Health (NIOSH) [www.cdc.gov/niosh](http://www.cdc.gov/niosh)  
The National Rifle Association (NRA) [www.nrahq.org](http://www.nrahq.org)