

Shooting Range Lead Safety Precautions

There are 152 private firing ranges, shooting clubs, and training centers in Massachusetts, as well as numerous law enforcement ranges. Each year several shooters, instructors, and maintenance staff become sick from lead poisoning they received at their range.¹ This bulletin was developed to assist recreational and occupational shooters avoid lead poisoning.



The target is not the only thing affected by lead in the shooting range.

What are the health dangers?

- Examples of poisoning:
 - In one review of school-sponsored rifle teams, a coach was found to have a Blood Lead Level (BLL) of 44 mcg/dL, and one of the students to have a BLL of 31 mcg/dL.² This is significant since BLLs as low as 5 mcg/dL have been shown to have negative health effects in adults and children.
 - In Massachusetts, several range officers at a local police firing range were confirmed to have BLLs of 20 to 35 mcg/dl. The Massachusetts Occupational Lead Poisoning Registry worked cooperatively with the municipality to inspect the range and its operating procedures. Sampling revealed significant lead dust in the facility. The Massachusetts Workplace Safety and Health Program recommended the range remain closed until cleaned, and improved safety and health methods were implemented.
- Both indoor and outdoor shooting ranges can be contaminated with high levels of lead.
- Lead poisoning is 100% avoidable.
- Range employees have the highest risk of lead exposure when compared to recreational shooters.
- Casting your own lead bullets can result in high exposure to lead.
- Take-home lead can poison your family, especially children.

How does lead enter the body?

At firing ranges, shooters and instructors are exposed to lead fumes in the “gun smoke” that is released during firing. Ammunition that contains lead-based primer or lead bullets will create smoke that contains lead. This lead can be inhaled or can settle on the floor, counters, doorknobs, and other surfaces in the range. Shooters and instructors can ingest lead if they touch contaminated surfaces and then eat, drink, or smoke without washing their hands. Range operators are at higher risk of lead exposure than recreational shooters – while periodic cleaning of the range is recommended, this activity can stir up settled dust and persons conducting the cleaning can be overexposed if they are not protected.

- Lead dust and fumes can be generated by ammunition or primer
- Bullets/projectiles hitting the bullet trap, walls, floors, or ceiling of the range create lead dust.
- Ventilation and a dedicated area away from food preparation is recommended for casting bullets.



How can lead affect my health?

Lead has been shown to cause health problems, even at low levels. Poisoning may occur over a prolonged time or due to a single exposure. Find your lead level to see possible health effects of lead poisoning:

Lead Level	Possible Health Effects ³		
5 to 39 mcg/dl	Decreased chance of becoming pregnant Miscarriage/Stillbirth Reduced ability to have an erection	High blood pressure Birth defects	Kidney damage Reduced sexual drive
40+ mcg/dl	ALL OF THE ABOVE PLUS: Headache Irritability/Nervousness Constipation	Fatigue Poor appetite Sperm damage	Difficulty sleeping Upset stomach Joint and muscle aches

Precautions on the Range to Reduce Lead Exposure⁴

Shooting

- Use lead-free ammunition and primers when possible. In addition, copper or nylon-clad ammunition can significantly reduce the amount of airborne lead discharged in firing.
- Don't eat, drink, or smoke inside the range. Coffee pots, coffee mugs, and water bottles should not be allowed inside the range. **Wash hands and face** before eating, drinking, or smoking. **Wash hands and face immediately after shooting**, cleaning firearms, picking up spent casings/pellets/bullets, or reloading ammunition. Wipe hands and face with a moist towellette if running water is not available.



Re-Loading Ammunition

- Cast bullets in a designated area with good ventilation. A dedicated area with a direct ventilation duct is recommended.
- Do not cast bullets or reload ammunition in areas where food is prepared or consumed.
- Wash hands before eating, drinking or smoking. This is particularly important for children.
- Keep the ammunition re-loading area clean by using a disposable dropcloth or by wet-wiping using detergent and a disposable cloth. Be cautious to prevent dust contamination, particularly if children or pets could access the area.



Management and Design

- Train shooters, instructors, and maintenance staff about the risks of lead exposure and how to avoid poisoning.
- Control the amount of lead dust that shooters breathe by providing ventilation. Air flow should move downrange so that dust travels away from the shooter's face toward the target area.
- Prevent contamination of adjacent areas. It is very important that the ventilation system that serves the range area be completely separate from any ventilation systems for the rest of the building. The exhaust air from the firing range should not feed into air supplies for offices, meeting rooms, or other businesses. Air from the range should never be re-circulated unless it is HEPA-filtered.
- To further protect range instructors who are stationed within a range for extended periods, a separate booth with its own ventilation is recommended.
- Shooting ranges should not be carpeted, since lead dust cannot be adequately removed from carpet.

Cleaning

- Cleaning and maintenance of the range should be performed on a periodic schedule by individuals trained in lead exposure control.
- Children and teens should never be asked to dry sweep, vacuum, or rake indoor or outdoor ranges since these activities can stir up settled dust that contains lead.
- Cleaning should be done with a wet mop or an industrial HEPA vacuum. Dry sweeping or dusting will stir up lead dust and potentially increase the risk of exposure.
- Provide a tight-fitting cartridge respirator for workers who clean the range. Persons who clean the range are advised to keep a separate set of clothes and shoes for cleaning the range. Leave them in a locker at the range if possible, or keep in a plastic bag. If they are washed at home do so separately from other laundry.
- Provide a supplied air respirator and hazmat coveralls, gloves and booties for workers who clean the bullet trap. Due to the extensive worker safety and disposal requirements for trap cleaning, many range operators consider hiring a specialty contractor for this activity.

To clean the range, use a tight-fitting cartridge respirator with P100 filters, gloves, and an industrial HEPA vacuum.

If you are concerned about lead exposure, get a blood test.

For further assistance or information please call or write:

Massachusetts Department of Labor Standards
Occupational Lead Poisoning Registry Program
Wall Experiment Station
37 Shattuck Street
Lawrence, MA 01843
617-626-6502
www.mass.gov/dols
Email: MKissel@MassMail.State.MA.US



References

- 1 CDC: "Indoor Firing Ranges and Elevated Blood Lead Levels – United States 2002-2013." MMWR April 25, 2014/ 63 (16); 347-351. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6316a3.htm>
- 2 CDC: "Lead Exposure from Indoor Firing Ranges Among Students on Shooting Teams." MMWR June 17, 2005 /54(23); 577-579. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5423a1.htm>
- 3 California Department of Public Health: "Medical Guidelines for the Lead-Exposed Worker." April 2009. <http://www.cdph.ca.gov/programs/olppp/Documents/medgdln.pdf>
- 4 National Shooting Sports Foundation: "Lead Management and OSHA Compliance for Indoor Shooting Ranges." 2011. www.nssf.org