

Minimising Lead Exposure in Shoot Club Ranges

Public health advice for operators

The following recommendations are endorsed by the National Public Health Service (NPHS) as part of best practice design and operation of indoor shooting ranges.

There is no one-size-fits-all solution as every range is different and requires its own design solutions. The design concept of “dirty” areas and “clean” areas is useful.

Please note that it is difficult to assess indoor shooting ranges for risks from lead exposure and to develop pragmatic, workable solutions. The regulatory agency for use of land and requirements related to buildings is the territorial authority for the location i.e. the local council. It is recommended that early consultation occurs with the relevant council to avoid expensive mistakes.

These recommendations also include safety advice for shooters. Shooting ranges and clubs should educate shooters about the potential harm of lead exposure and promote mitigation strategies via information pamphlets, club newsletters, email updates and website information. This document includes a reference list to many other sources of information

Recommendations

Shooting Club Committees, Range Officers and Shooters at indoor shooting ranges should take the following steps to protect themselves from risks of elevated lead exposure:

Designing or renovating a shooting range - (to minimise lead exposure):

- Ensure adequate ventilation and air filtration systems are installed in consultation with an expert third party. Ventilation changes may need Council consent. (1)
- Where possible, use bullet traps that minimise lead dust generation. Some newer traps do away with the need for regular cleaning. Repeated misting with water using a garden sprayer will help to keep the dust down.
- In the “dirty” area, facility walls, ceilings, floors and all fixed structures, partitions, chairs and tables should have washable, smooth surfaces that are easy to keep clean.
- Avoid dust traps on ceiling beams or roof trusses and promote aerial separation of the “dirty” area from “clean” areas e.g. by self-closing, draught-proof doors.

Operating a shooting range

- Discourage eating, drinking or smoking in the firing range “dirty” area. (2, 3, 4)
- Ensure that shooters have ready access to hand washing facilities, and are advised to wash their hands immediately following their shooting session.
- Consider the use of lead free ammunition for indoor ranges.
- Consider limiting the number of shooters per session.
- Advise users to wear dust masks whilst shooting, to avoid exposure to excess lead. (18, 19).

Cleaning and maintenance of “dirty” areas

- Disposable overalls, gloves and masks should be worn at all times during cleaning. (5)
- Disposable overalls, gloves and masks should be worn during indoor repair and maintenance work. (5)

- Young persons of school age (defined as 15 and under) and women of childbearing age should not participate in cleaning or maintenance of “dirty” areas.
- Laminated posters on personal hygiene (especially on hand washing and not eating, drinking or smoking in the firing range) should be displayed prominently at ranges.
- A regular monitoring programme should be established to ensure the correct operation of ventilation systems with a written record kept of checks conducted. Ventilation systems need regular maintenance and cleaning (including filter replacement if required) according to manufacturers’ advice. (7, 8, 9 , 10, 11, 12)
- Ensure fan and ventilation systems are always turned on and fully functional when the range is in use.
- Anyone participating in cleaning needs to have adequate training on ways to minimise lead dust exposure and in the use of appropriate personal protective equipment (PPE). (7, 13).
- A roster system should be created to rotate Range Officers and shooters to minimise lead exposure.
- Only use wet mopping or HEPA-filter vacuuming instead of dry sweeping when cleaning the floor in ‘dirty areas’. Never dry sweep or use cleaning techniques that raise dust. (5, 13)
- When cleaning horizontal surfaces (other than the floor) in “dirty” areas, always use wet squeegees or wipes. (5, 13)
- If bullet traps needs to be emptied, debris should be emptied into sealed plastic bags and repeatedly misted with water to avoid raising dust. • Contaminated materials (i.e. wiping cloths, filters, mop heads and contaminated back stops/soil etc.) should be safely disposed to landfill by a Department of Labour approved cleaning contractor - as hazardous material.
- If contractors are hired to clean premises or remove lead contaminated back stops/soil, then they must follow best practice guidelines i.e. Department of Labour rules and Territorial Authority rules.

Advice for shooters

- Shooters regularly attending an indoor shooting range; shooters who cast their own bullets and shooters who are involved in regular range housekeeping or maintenance activities should consider asking their GP to monitor their blood lead level. These persons may have raised levels of lead in their blood, where indoor shooting could be a contributing lead exposure risk (14, 16, 17).

Environmental management

- Shooting range management should also consider how to dispose of waste that contains lead residues to minimise the impact of lead pollution on the environment.
- Ranges and clubs should nominate a health and safety representative, often the Range Officer, who is trained to minimise lead exposure and tasked to actively raise awareness amongst shooters of ways to decrease lead exposure. For example, they could initiate the production of advice, policies, procedures, and programmes specific to indoor shooting ranges according to relevant standards and legislation.
- Shooters should use personal protective equipment (PPE) and consider regular blood tests to check their lead levels (14, 15).
- Clubs should advise shooters to consult a doctor if concerned about their health. NPHS will contact members with raised blood lead levels and discuss how lead exposures may be reduced.
- Lead exposure resulting from work activities is a matter for the Department of Labour (DoL) (16,17).

For more information about dealing with environmental exposure to lead, please contact the Northern Region National Public Health Service on 09 623 4600.

References

1. Kinsky H. A General Overview of Indoor Shooting Ranges in Germany. In: World Forum on the Future of Sport Shooting Activity, editor. Workshop on indoor shooting ranges: responsible care of range environment; Rome, Italy: World Forum on the Future of Sport Shooting Activity; 2005. p.41- 44.
2. Novotny T, Cook M, Hughes J, Lee S. Lead exposure in a firing range. *Am J Public Health* 1987; 77(9):1225.
3. Fowles J, Bates M. The Chemical Constituents in Cigarettes and Cigarette Smoke: Priorities for Harm Reduction: A Report to the New Zealand Ministry of Health. Porirua, New Zealand: Epidemiology and Toxicology Group ESR: Kenepuru Science Centre 2000.
4. Jones BL. Reducing lead contamination and exposure on military firing ranges through the practical application of ballistic containment systems (fourth edition). California: United State Marine Corps, Department of the Navy 1999.
5. National Institute for Occupational Safety and Health (NIOSH). Lead exposure and design consideration for indoor firing ranges. Washington, DC: National Institute for Occupational Safety and Health (NIOSH), US Department of Health, Education and Welfare (HEW) 1975. Report No.: Pub.No. (NIOSH): 76-130.
6. Shannon M. Lead poisoning in adolescents who are competitive marksmen. *N Eng J Med* 1999; 1999(341):852.
7. Novotny T, Cook M, Hughes J, Lee S. Lead exposure in a firing range. *Am J Public Health* 1987; 77(9):1225.
8. Fischbein A, Rice C, Sarkozi L, Kon S, Petrocci M, Selikoff I. Exposure to lead in firing ranges. *JAMA* 1979; 241(11):1141.
9. Gulson B, Palmer J, Bryce A. Changes in blood lead of a recreational shooter. *The Science of the Total Environment* 2002; 293(1-3):14350.
10. Landrigan PJ, McKinney AS, Hopkins LC, Rhodes WW, Jr, Price WA, Cox DH. Chronic Lead Absorption: Result of Poor Ventilation in an Indoor Pistol Range. *JAMA* 1975 October 27, 1975; 234(4):394-7.
11. Crouch KG, Peng T, Murdoch DJ. Ventilation control of lead in indoor firing ranges: inlet configuration and booth and fluctuating flow contributions. *Am Ind Hyg Assoc*

- J1991;52(2): 81-91.
12. Fact sheets from Mid-Central District Health Board in regards to “lead hazards and indoor shooting ranges. Published by Public Health Services, Public Health Unit, Palmerston North.
 13. Compton FS. Control of lead dust and unburnt propellant in indoor ranges. 2005.
 14. George PM, Walmsley TA, Currie D, Wells JE. Lead exposure during recreational use of smallbore rifle ranges. N Z Med J1993; 106(965) : 422-4.
 15. Anthony M Gregory. Risks of lead poisoning in firearms instructors and their students, The Aslet Journal, March/April 1990 Volume 4 Issue 2.
 16. <https://www.health.govt.nz/publication/guidelines-management-lead-based-paint>
 17. <https://www.health.govt.nz/publication/environmental-case-management-lead-exposed-persons>
 18. Bonanno J, Robson M, Buckley B, Modica M. Lead exposure at a covered outdoor firing range. Bulletin of environmental contamination and toxicology 2002;68(3):315-23.
 19. Tripathi R, Sherertz P, Llewellyn G, Armstrong C. Lead exposure in outdoor firearm instructors. Am J Public Health 1991; 81(6):753.