

# A Pilot Assessment Of Lead Contamination In Qatari Shooting Ranges

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## Abstract

Qataris are increasingly becoming interested in sport shooting at indoor and outdoor areas where lead (Pb) contamination can become an environmental health hazard, especially since high salinity and low organic matter content in the desert environment limit natural Pb weathering. Up to date, no information is available as to the impacts of Pb pellets on the environment in Qatar. Therefore, there is a need to determine Pb contamination levels at shooting ranges in Qatar. In this study, the concentrations of Pb in soils and dust collected from indoor, semi-outdoor, and outdoor ranges were assessed. Lead was extracted from soil and dust samples using the open acid digestion method, then its concentrations were determined by an ICP-MS. A baseline data on the health status of shooters was carried out using a 12-questions survey questionnaire. Results showed that indoor ranges were the most contaminated, having the highest Pb levels (619,309 ppb) at 25 m indoor firing ranges. The Pb levels in outdoor shooting ranges were also found to be relatively high, especially at 76 m site (148,557 ppb). Overall, the concentrations of Pb were determined to be significantly ( $p < 0.05$ ) higher in indoor ranges than those of outdoor and semi-outdoor ranges. The results of the survey data indicated that 25% and 15% of participants suffer from anemia and reduction in their mental capacity, respectively, based on self-report. This might be associated with their recreational exposure to Pb; however, the cause and effect can only be established through controlled clinical studies. Overall, these results indicate that there is a clear need for improving the situation in especially indoor shooting ranges by using lead-free ammunition, wearing personal protective equipment or installing better ventilation in indoor facilities.