



Shooting lead exposure may affect verbal memory

Comments by Elizabeth O'Brien, Lead Scientist and Lead Advisor, The LEAD Group Inc (charity), Australia

The following study from Finland was referred to in an email sent to The LEAD Group: *Memory Functions in Recreational Pistol Sport Shooters: Does Lead Matter?* by Sanna Asa-Mäkitaipale, Mervi Jehkonen, Jukka Uitti and Juhani Vilkki, Environmental Health Insights 2009;3 13–18

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2872573/pdf/ehi-2009-013.pdf>

The conclusion is anyway interesting: «Low lead exposure in recreational shooting conditions may impair verbal memory. Therefore it is important to ensure that lead exposure is prevented among those shooting for sport.»

Best regards

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Email forwarded to The LEAD Group by Professor Mark Pokras, Tufts University USA on 27th January 2020.

Two further quotes of interest and two of the references cited in the Asa-Makitaipale et al 2009 study were:

Lead may affect memory, executive functions, reasoning, visual and motor functions.^{12–20,21}

...The mean blood lead level of the sport shooters was 0.52 umol/L (corresponding to 10.76 ug/dl), which is higher than the normal level 0.3 umol/L (corresponding to 6.21 ug/dl) of non-exposed people.... The shooters' mean blood lead level was lower than that found in earlier studies concerning shooting with lead bullets^{2,6,7} but still higher than that found among Swedish police officers.³ In spite of the low average blood lead level in this study, a significant correlation was found between the numbers of bullets fired during the last month or year and the blood lead levels of the sport shooters. This may indicate that the amount [of organic] lead fumes inhaled in the proximity of the gun in firing ranges mainly increases the PbB level....

One limitation of this study is that it was not possible to conduct the blood lead level analysis for the control group, although it is highly likely that the lead exposure of the controls did not exceed the normal level....

Two of the references:

7. Gulson BL, Palmer JM, Bryce A. Changes in blood lead of recreational shooter. *Sci Total Environ.* 2002;293:143–150.

12. Schwartz BS, Bolla KI, Stewart W, et al. Decrements in neurobehavioral performance associated with mixed exposure to organic and inorganic lead. *Am J Epidemiol.* 1993;137:1006–21.



Editor's comment on the folly of using the outdated terms “normal” or “non-exposed people” in relation to blood lead (PbB) levels, when the more accurate terms would be average or “mean PbB” and “people with non-detectable PbB” (as some exposure to lead is unavoidable in this world and the best anyone can hope for is a PbB result that is below the limit of detection).

And because the mean PbB will vary widely over time and in different places, the period and place where a PbB mean was determined should always be stated - as well as stating the gender and age range of those tested.

For instance, in the USA, the NHANES study conducted between 1999 and 2002 in a series of large-scale national blood lead surveys found a geometric mean blood lead level for women aged between 20 and 59 of 1.7 micrograms per decilitre and for men in the same age range, the mean was 2.9 ug/dL. [Reference: Table 2 in "Blood Lead Levels --- United States, 1999--2002 [NHANES IV] at

www.cdc.gov/mmwr/preview/mmwrhtml/mm5420a5.htm].

In the NHANES results for the round conducted in 2009-2010, US adults 20 years and older had a mean blood lead level of 1.23 ug/dL, males (all ages) had a mean of 1.31 ug/dL and the mean for females (all ages) was 0.966 ug/dL. [Ref: Blood Lead Table, page 147/314 “Fourth National Report on Human Exposure to Environmental Chemicals: Updated Tables, September 2012 - [NHANES]” at

http://www.cdc.gov/exposurereport/pdf/FourthReport_UpdatedTables_Sep2012.pdf]

The “normal” PbB of 6.21 ug/dl quoted in the Asa-Makitaipale et al Finnish study far exceeds mean PbB for US adults before and after the 2009 study from Finland was published.