

LEAD EXPOSURE IN SHOOTING RANGES

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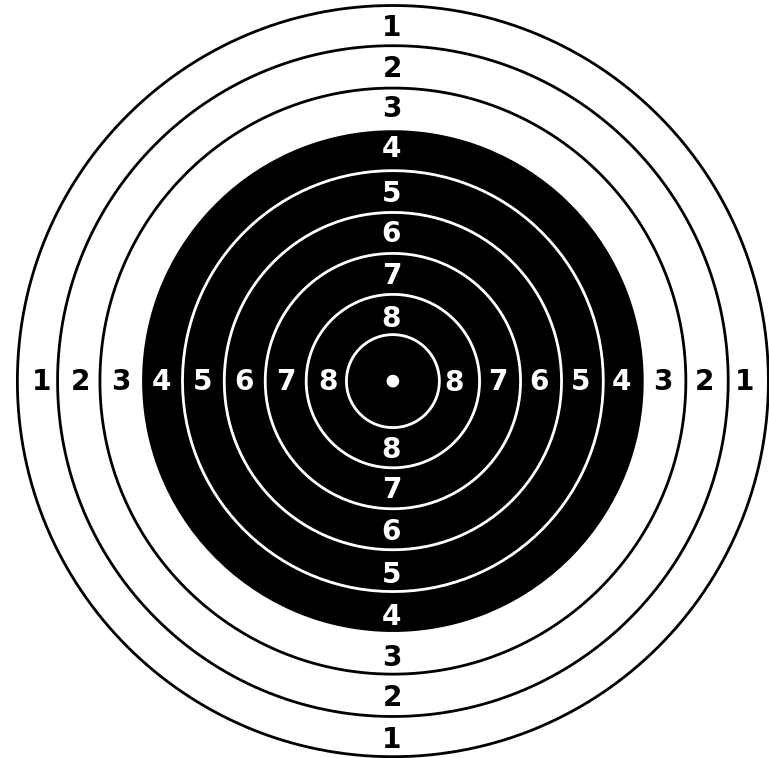
Simcoe Muskoka District Health Unit

DISCLAIMER ALERT!!!!



THIS SESSION

- Simcoe Muskoka District Health Unit (SMDHU)
- Health effects of lead – adults
- Health effects of lead – children
- Lead Exposure Sources
- Public Health Ontario research
- Case Study
- SMDHU – outreach
- Questions



WHERE IS SMDHU????



ABOUT US.....

- Independent Board of Health: 15 members
 - 4 representatives County of Simcoe
 - 2 representatives District of Muskoka
 - 2 representatives City of Barrie
 - 1 representative City of Orillia
 - 6 citizens appointed by the Lieutenant Governor in Council through the Provincial Appointments Secretariat

WHAT DO WE DO?????

PREVENT

- Disease
- Injury
- Example: Lead exposure

PROTECT

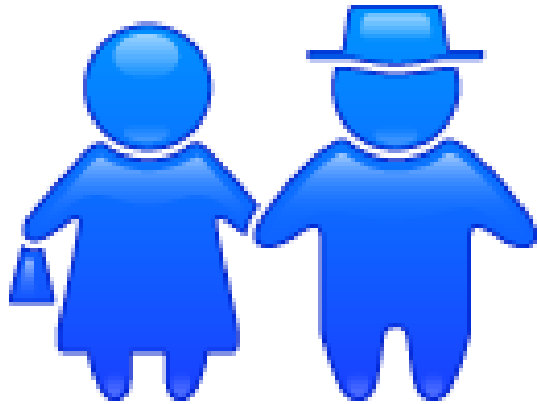
- People
- Natural Environment
- Example: Recreational shooters & families

PROMOTE

- Individual & Population Health
- Healthy Environments
- Example: Behaviours to reduce exposure

CHRONIC EXPOSURE TO LEAD

WHY THE CONCERN?



ADULTS

- Main target = nervous system
- Long-term exposure – may decrease performance in nervous system
- Weakness in fingers, wrist or ankles
- Small increases in blood pressure possible
- Anemia - possible

CHILDREN – CONCEPTION TO 18 YEARS

- No safe blood lead level in children has been determined
- Can be exposed in the womb, association between lead in umbilical cords & maternal/infant levels
- Exposure in the womb - may be born prematurely and have lower weights at birth
- Possible exposure through breastmilk if maternal blood lead levels are high

Exposure in the womb, in infancy or early childhood may also cause:

- Neurodevelopmental effects – reduction in intelligence quotient IQ
- Attention-related behaviours
- Can persist until late teen-age years
- Greater GI absorption and less renal excretion

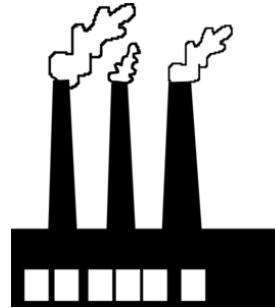


LEAD – EXPOSURE SOURCES

Primary - Ingestion and Inhalation

GOOD NEWS!!

- Air – unleaded gasoline
- Food – lead solder
- Drinking Water - regulated
- Soil
- Consumer products



CURRENT EXPOSURE SOURCES

- Food



CURRENT EXPOSURE SOURCES

Drinking Water (pre-1950s) – leaded distribution pipes



CURRENT EXPOSURE SOURCES

Soil and Dust

Lead is “sticky” and carried indoors

Created inside



CURRENT EXPOSURE SOURCES

- Hobbies (art supplies/stained glass)
- Consumer Products
- Paint (sanding, exterior)
- Smoking
- Some home remedies



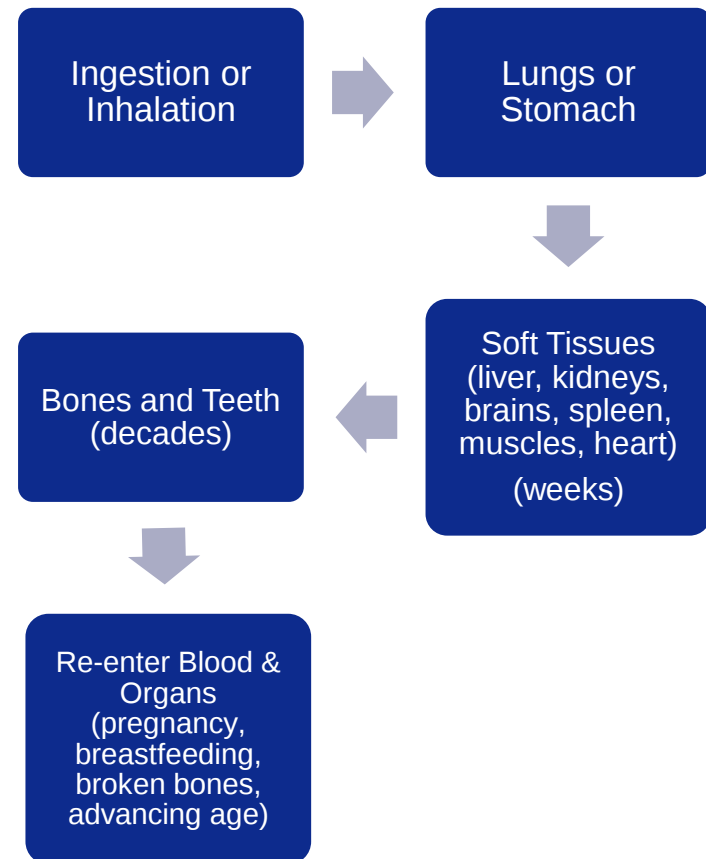
CURRENT EXPOSURE SOURCES

- Recreational shooting
- Manufacturing Ammunition



LEAD IN THE BODY

- If breathed in – quickly goes from lungs to other parts of the body through blood
- If ingested – can go into blood stream however depends on time and amount of last meal
- Children absorb about 50% of ingested lead – higher than adults
- Lead not stored in bones leaves in urine or feces
- If no continued exposure - 99% of lead taken in by adults leaves within weeks through kidneys & intestines
- Children absorb ~50% of ingested lead

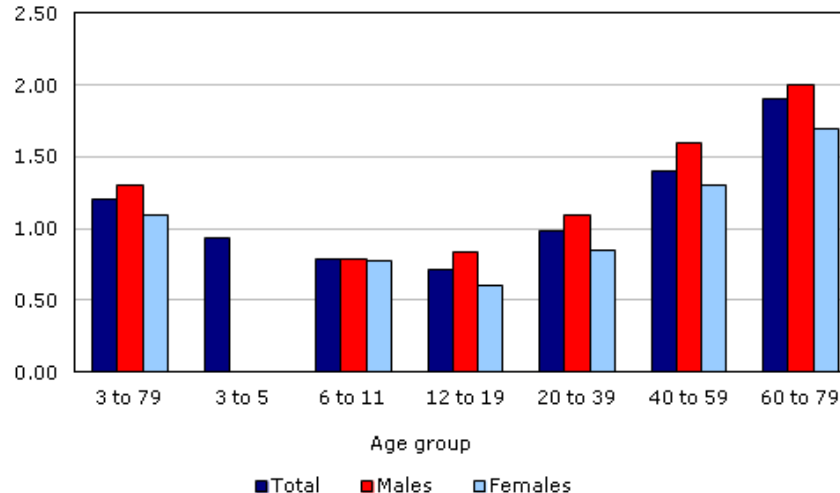


BLOOD LEAD LEVELS

CANADIAN BLOOD LEVEL INTERVENTION LEVEL = 10 UG/DL

Chart 1
Blood lead concentrations (geometric mean),
by age group and sex, household population
aged 3 to 79 years, Canada, 2009 to 2011

Blood lead concentration
(geometric mean) ($\mu\text{g/dL}$)



Note: A geometric mean is a type of average that is less influenced by extreme values than the traditional arithmetic mean. The geometric mean provides a better estimate of central tendency for highly skewed data. This type of data is common in the measurement of environmental chemicals in blood and urine. The sample size for 3 to 5 year olds produces reliable national estimates for both sexes combined only.

Source: Canadian Health Measures Survey, 2009 to 2011.

LEAD EXPOSURES AMONG RECREATIONAL SHOOTERS



- What is the evidence that recreational shooters are exposed to lead?
- What is the evidence that recreational shooters can take home lead....exposing their families?
- What preventative measures can be taken to reduce lead exposure?

Lead Exposures Among Recreational Shooters



Rapid evidence review
October 2014

1. SHOOTERS EXPOSED TO LEAD

- Lead fumes & particles generated by:
 - ignition of lead-containing primers
 - friction of bullets against gun barrel
 - fragmenting as bullets strike the trap
- Elevated BLL in occupationally exposed workers – well documented
- Can also occur at volunteer run ranges to adults and children
- Many studies found BLL > 10 ug/dL
- One study showed shooters using powder chargers containing lead had much higher BLL than shooters using air propelled bullets



2. TAKE-HOME LEAD

- No specific studies found related to recreational shooters transporting lead
- Occupational shooters – lead detected on hands, pants & shoes and was transferred into personal vehicles
- This was also found in studies of occupational workers
- Could potentially be tracked into homes and result in exposure to children & pregnant women



3. PREVENTATIVE MEASURES

- Use of lead free ammunition - jacketed lead or non-lead bullets
- Separate ventilation system for firing lanes
- Awareness of lead exposures
- Proper range maintenance
- Use of wet mopping or HEPA vacuuming
- Cleaned with all-purpose household detergent
- Proper use of personal protective equipment – cleaning/maintaining lead contaminated surfaces & areas
- Avoid use of carpets



3. PREVENTATIVE MEASURES

Proper personal hygiene:

- No eating or drinking inside the firing range
- Wash up or shower (if available) after shooting or performing housekeeping/maintenance
- Change clothes & shoes after shooting. Place in airtight bag for transport
- Store firing range clothes separately and wash separately from other household laundry
- If exposed, workers & volunteers (especially children & women of child-bearing age) ask health care provider about blood lead test

Education/awareness/signage/poster



CASE STUDY – PUBLIC HEALTH ONTARIO



- Public health unit received report of elevated blood lead levels
- Interview determined recreational shooter (2x/week) at volunteer run club
- Site visit to range
- Members – middle-aged males with years of fire arms use
- Children frequent visitors
- Other members sampled – also elevated BLL

CONTINUED.....

Club agreed to environmental sampling by Public Health Ontario – hygienists

- Samples to measured lead in personal breathing zones
- Wipes to assess surface contamination
- Vacuum sampling to assess surface contamination

Results

- 4 of 5 personal breathing zones measurements were elevated and exceed 8 hour occupational exposure limit (note: only shooting for 2 hours)
- Lead detected on all surfaces within shooting area

SIMCOE MUSKOKA ACTION



December 17, 2014

To the Gun Club Presidents throughout Simcoe and Muskoka:

The intent of this letter is to connect with your club to increase awareness related to the potential risk of lead exposure in recreational shooters. Recently, health care practitioners in our area have notified Simcoe Muskoka District Health Unit (SMDHU) of cases of elevated blood lead levels in patients who have indicated they are active members of local recreational shooting facilities.

The current Canadian blood lead intervention level set by Health Canada is $10 \mu\text{g/dL}$, a level significantly exceeded in the cases reported to us. This is the level at which public health action is recommended to reduce exposure. However, Health Canada does note that there is evidence to indicate that chronic health effects including neurodevelopmental, neurodegenerative, cardiovascular, renal, and reproductive effects do occur at levels below $10 \mu\text{g/dL}$. Children, youth and women of childbearing age are particularly vulnerable to the harmful effects of lead.

In October 2014, Public Health Ontario completed a review titled 'Lead Exposures among Recreational Shooters'. This review provides background information about lead and lead exposures associated with shooting. It also outlines preventative measures that clubs can implement to mitigate exposure. Sergeant Peter Niedermaier, Chief Firearms Officer of the Ministry of Community Safety and Correctional Services, advised us that this report has been circulated through the CFO Shooting Range Inspectors to shooting clubs in the province. This review can be accessed under the *Environmental and Occupational Health* section at Public Health Ontario's website: www.publichealthontario.ca.

We have learned recently that elevated blood lead levels in shooters have been reported in other health units. In one of these situations, Public Health Ontario completed environmental lead sampling at the club and also provided a review of the club's lead management program. This information will be used to assist the club in reducing lead exposure to club members. This type of technical support may be available to other clubs as well.

We would be interested in connecting with you to explore opportunities to increase awareness about the health impacts of lead exposure and to discuss strategies that may reduce lead exposures to you and your members at your club.

For further discussions, please feel free to connect with Marina Whelan, Health Hazards Manager at marina.whelan@smdhu.org or 705-721-7520 (ext.7345).

Sincerely,

ORIGINAL SIGNED BY

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Your Health Connection

KEY MESSAGES

- All people are vulnerable to impacts of lead exposure
- Amount of exposure and duration is important
- Women of child-bearing age and children more vulnerable
- Exposure prevention or reduction is key
- Ensure protective measures are implemented and followed



RESOURCES

Center for
Disease
Control

- <https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=22>

Health
Canada

- <http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/dhhssrl-rpecscepsh/index-eng.php#a1>

SMDHU

- <http://www.simcoemuskokahealth.org/Topics/Environment/environmentalcontaminants/Lead/lead.aspx>

Public Health
Ontario

- https://www.publichealthontario.ca/en/eRepository/LeadAmongShooters_2014.pdf



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