~ Metal Fever ~
Beyond Lead Poisoning

by
Jim Schatz

Presented at the
2014 NDIA Joint Armaments Forum
Phoenix, Arizona

May 2014
DON'T MOVE OR I'LL FILL YOU FULL OF 98% LEAD, 1% ANTIMONY, 0.75% SILVER, 200 PPM NICKEL, WITH TRACE AMOUNTS OF COBALT, AND OTHER COMPONENTS BELOW THEIR RESPECTIVE DETECTION LIMITS!!!

WAIT A MINUTE! ARE THOSE VALUES CERTIFIED??

Analytical Chemists in the Wild West
Briefing Purpose and Goals

- Provide details on cause, effect and treatment of “toxic metal” poisoning.

Plagues more than just those exposed in indoor firing ranges and apparatus.

Goes well beyond just “simple” lead poisoning.

Has serious, life-threatening, long-term health repercussions.

- Energize the users, community and developers on ways to mitigate exposure.
At What Cost?

● How many troops, DoD, LEO, support personnel are affected/afflicted?

● What are the unknown costs to care for those afflicted?

● Who is responsible for taking action?

Combat Troops are Losing Hearing

Associated Press | March 08, 2008

SAN DIEGO - Soldiers and Marines caught in roadside bombings and firefight in Iraq and Afghanistan are coming home in epidemic numbers with permanent hearing loss and ringing in their ears, prompting the military to redouble its efforts to protect the troops from noise.

Hearing damage is the No. 1 disability in the war on terror, according to the Department of Veterans Affairs, and some experts say the true toll could take decades to become clear. Nearly 70,000 of the more than 1.3 million troops who have served in the two war zones are collecting disability for tinnitus, a potentially debilitating ringing in the ears, and more than 58,000 are on disability for hearing loss, the VA said.
A Hidden Epidemic?

- Issue and treatment not well known.
- Few statistics collected on those exposed.
- Simple “lead test” is woefully inadequate.
- Acute symptoms parrot other health conditions (i.e. aging, mono, Lyme’s, “Lo T”)
- High-concentration exposure unnecessary.
- Typical treatments may provide temporary relief while the long-term damage and risk continues.
Toxic Metals – What Are They?

- Metals that form toxic soluble compounds.
- “Heavy” - > 5 times the weight of water - 20 “Heavies”. 12 Poisonous, 4 Deadly “Light” metals also have toxicity.
- “Bio accumulate” in the body until harmful. Few can be reduced by natural means (i.e. barium, aluminum – via the kidneys)
- Toxic Metal “elements” cannot be destroyed. Must be removed through natural means or clinical Chelation.
<table>
<thead>
<tr>
<th>Hazardous Material (partial listing only)</th>
<th>Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Aluminum (Al)</td>
<td>Cartridge Case, Primer</td>
</tr>
<tr>
<td>• Ammonia (NH)</td>
<td>Propellant</td>
</tr>
<tr>
<td>Antimony (Sb)</td>
<td>Projectile</td>
</tr>
<tr>
<td>• Arsenic (As) (Deadly)</td>
<td>Propellant Gases</td>
</tr>
<tr>
<td>Barium (Ba) (Barium Nitrate)</td>
<td>Primer</td>
</tr>
<tr>
<td>Bismuth (Bi)</td>
<td>Projectile, Shot</td>
</tr>
<tr>
<td>Brass (Zinc {Zu} + Copper {Cu})</td>
<td>Cartridge Case, Projectile, Primer</td>
</tr>
<tr>
<td>• Cadmium (Cd) (Deadly)</td>
<td>Projectile Jacket, Cartridge Case, Bore</td>
</tr>
<tr>
<td>• Copper (Cu)</td>
<td>Projectile Jacket</td>
</tr>
<tr>
<td>Chromium (Cr)</td>
<td>Bore Chrome Plating, Steel Barrels</td>
</tr>
<tr>
<td>• Hydrogen Cyanide (HCN)</td>
<td>Propellant</td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>Projectile</td>
</tr>
<tr>
<td>• Lead (Pb) (Deadly)</td>
<td>Tracer or Incendiary projectile</td>
</tr>
<tr>
<td>- Lead Dioxide</td>
<td>Primer</td>
</tr>
<tr>
<td>- Lead Styphnate</td>
<td>Primer</td>
</tr>
<tr>
<td>• Mercury (Hg) (Deadly)</td>
<td>Primer, “Silver” amalgam tooth filings</td>
</tr>
<tr>
<td>• Nickel (Ni)</td>
<td>Cartridge Case, Projectile Jacket</td>
</tr>
<tr>
<td>Tin (Sn)</td>
<td>Projectile Core</td>
</tr>
<tr>
<td>Tungsten (W)</td>
<td>Projectile Core</td>
</tr>
<tr>
<td>Zinc (Zn)</td>
<td>Projectile Jacket, Primer, Coatings</td>
</tr>
</tbody>
</table>
Those at Risk

- Goes well beyond the classic “shooter/instructor in the indoor range”

- Anyone exposed to firing and firing residue from:
  - Weapons, magazines, suppressors
  - Ammo, ammo waste handling
  - Weapons Cleaning
  - Range/apparatus cleaning, maintenance
  - Target and food handling
  - Bystanders (at demonstrations)
  - Explosive breaching also
Effects of Toxic Metals

- Direct damage the mitochondria – our “cellular powerhouses” and waste removers.
- Mitochondria combine fuel with oxygen (98%) to produce energy and process waste.
- “Free radical” (2% $O_2$) byproduct attacks DNA and cells direct.
- Blocks the body’s natural ability to heal and fight off invaders to include cancer.
- Cellular “incapacitation” can prevent treatment effectiveness for other conditions (i.e. Lyme’s).
Ill Effects of Toxic Metals

- Impaired Neurological Function
- Immune System Dysfunction
- pH Imbalance and Acidity
- Coronary Artery Disease
- Energy Depletion
- Endocrine and Reproductive System Dysfunction
- Detoxification System Damage
  (colon, liver, kidneys, skin)

*Varies from element to element and by “host” health.
Toxic Metal Poisoning

~ Symptoms, Manifestations ~

**Acute**
- Fatigue, Poor Recovery
- Weight Loss/Gain
- Joint Pain and Swelling
- Cramps, Spasms
- Diarrhea, Nausea
- Lethargy, “Brain Fog”
- Poor Endurance
- Irritability, Excitability
- Headaches, Sweats
- Sleep Disorders
- Fever, Skin Color Change
- Respiratory irritation

**Chronic**
- Hypertension
- Poor Growth
- Loss of IQ
- Hearing Loss
- Autoimmune
- Anorexia
- Organ Damage
- Lung Fibrosis, Emphysema
- Cell Die Off
- Cancer
- Chronic Pain
- Death
Daily Health Indicators

The body and brain adapts to perceived “normal”.

- Constantly tired
- Diminished strength and recovery
- Inability to remember, recall common info
- Joint pain and swelling
- Confusion – “brain fog”
- Changes in skin color (especially lead)
- Shakes
- Interrupted sleep, sleep patterns

*Varies from element to element and by “host” health.*
~ Weapons Cleaning ~
Fun for All Ages
Methods of Ingestion

- **Touch**

- **Inhalation**
  - Firing exposure (all environments)
  - ”Second hand” smoke, gases
  - Sound Suppressor “blowback”
  - Fireworks - 5X elevation in air – copper, zinc, chromium, radioactive barium (green sparkles). 90 tons in 1-2 hour display.

- **Absorption**
  Passage through Skin, Hair, Mouth, Eyes
  - Handling (solvents, ionized particles)
  - Cleaning Tanks, Compressed Air “Toxic Aerosol”
Ionization

- The formation, separation and/or release of ions (atoms, molecules) by heat, electrical discharge, radiation or chemical reaction.

- Ionization Mechanisms
  - Cartridge component ignition
  - Melting of materials
    * Lead melts @ 625 degrees F/100-150 rds.
  - Projectile passage through the bore
    * Cu and Zn release worse with hard core {steel, copper} projectiles and/or cores

- Occurs even with “Non-Toxic” Ammunition
  - Projectile/bore contact (compression, friction) releases ionized copper and zinc
  - Bore restriction/taper increases effect
Gas Blowback ~
The Enemy Within

- Exposure increased with:
  - Threat Ammo
  - Suppressors
  - Confined Spaces
  - Tapered Bores

Typical shooter response to noxious gases.
Dip Tanks and Air Circulation

http://www.minimaxcleaner.com/movie_updates/1seal-3-shorty.wmv
Lessons Learned - Norway

- 1996 - Non-Tox Requirement established (Swedish)
- 2001 - Nammo 5.56mm ball NT4HP (MK1) adopted by Norwegian military
- 2004 - NATO Qualified
- 2009 - Issues reported in Norwegian Army. “Non-tox” ammo, Carbine on indoor ranges
- Norwegian/Nammo investigation begins

Credit: Henrik Johansson, R&D Engineer, Nammo Vanäsverken Sweden henrik.johansson@nammo.com
Health Issues in Norway

- Reports of health issues in 2009.
- Carbine in indoor shooting ranges.

Health issues
- Irritated airways
- Coughing
- Fever
- Cold sweats
- Headache
- Nausea
- Body pain.

- 5.56 mm Ball Non Toxic
- Norwegian investigation showed increased levels of copper and zinc when using lead free ammunition compared to traditional “lead ammunition”.
- 15 + 100 million rounds fired in other weapon systems without any problems

Cooper and Zinc Source(s)?
Lesson Learned – Norway (cont.)

Cause Analysis – Weapon/Ammo System

Bore Tightness @ Fixed Barrel Length

<table>
<thead>
<tr>
<th>CHF Carbine B</th>
<th>CHF Carbine A</th>
</tr>
</thead>
<tbody>
<tr>
<td>M855</td>
<td>Nammo BNT</td>
</tr>
<tr>
<td>Nammo BNT</td>
<td>M855A1</td>
</tr>
</tbody>
</table>

Tapered Bore @ 0.02mm (0.0010”)

Projectile Bore Resistance

Nammo Proprietary Information
Improved Performance
5.56 mm Ball NT 4 HP Mk2

Fulfill all aspects in relevant STANAG and MOPI

Improved accuracy
- ≤ 2 MOA (Extreme spread ≤ 6 cm @ 100 m) shot from shoulder

Barrel erosion
- Fulfills NATO MOPI requirement
- Passed extended test in HK416 where 20,000 rounds were fired

Enhanced penetration capability
- Penetrates NATO 3.5 mm steel plate @ > 700 m

Plus:
- 50% less Ammonia and Zinc
- 75% less Hydrogen Cyanide
- 40% less Copper
Sources – Known and “New”

**Known**
- Ammunition “Energetics” (known major sources)
  - Primer (Al, Barium, Copper, Lead, Mercury, Zinc)
  - Propellant (Ammonia, Arsenic, HCN)

**“New”** (previously not considered as major sources)
- Cartridge Case
  - Ionized Brass (Cadmium, Copper, Zinc)
  - Alternate Case Materials (Aluminum, Nickel)
- Projectile (Antimony, Bismuth, Cadmium, Copper, Lead, Nickel, Tin, Tungsten, Zinc)
- Enablers
  - Barrel/Bore
  - Signature Suppressors
Cartridge Case Solution?

- Current “MK323” USMC PM Ammo Program with MAC, LLC.
- Surface Area Reduction/Elimination of Brass (cartridge cases)
- Reduction of major potential source for ionized cadmium, copper, zinc
- What about the projectile?
Next Gen Suppressor Solution?

- 5-7% back pressure (claimed), and resultant reduction in gas blowback through forward gas flow redirection

OSS (Operators Suppressor Systems) Signature Suppressor Technology
Treatment - Chelation

- Oral. Rectal. Transdermal. IV most effective.

- Chelating Agents “bind” to toxic metals which are then excreted from the body.

- @ $300/IV treatment. Not covered by US health insurance (even “Obama Care”). 10 ($3K) to 100 ($30K) treatments required + tests.

- Side-effects include removal of “good” metals/minerals, headache, fatigue, joint pain, weight loss, kidney damage (lead, nickel, mercury, aluminum, cadmium - kidney “bad actors” during infusion)
Chelation “Happy Hour”

- @ 1-1.5 hours/IV treatment (outpatient)

- Three step process
  1. Calcium EDTA - Chelating Agent (misc. metals)
  2. DMPS - Chelating Agent (for mercury)
  3. “Myers Cocktail” – Mineral Replenishment

- Treatment for Lyme Disease also

- First used by the British in WWII for lead poisoning
Subject: 52 year old male. Life-long shooter, instructor.

Doctor’s Data, Inc. Test.
(4) DMSA pills, IV med precursor. 6 hour Urine Elements Collection.
### Levels After 12 Treatments

#### Toxic Metals

<table>
<thead>
<tr>
<th>TOXIC METALS</th>
<th>RESULT µg/g creat</th>
<th>REFERENCE INTERVAL</th>
<th>WITHIN REFERENCE</th>
<th>OUTSIDE REFERENCE</th>
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</thead>
<tbody>
<tr>
<td>Aluminum (Al)</td>
<td>62</td>
<td>&lt; 25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antimony (Sb)</td>
<td>&lt; dl</td>
<td>&lt; 0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arsenic (As)</td>
<td>19</td>
<td>&lt; 108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barium (Ba)</td>
<td>2.8</td>
<td>&lt; 7</td>
<td></td>
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</tr>
<tr>
<td>Beryllium (Be)</td>
<td>&lt; dl</td>
<td>&lt; 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bismuth (Bi)</td>
<td>&lt; dl</td>
<td>&lt; 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cadmium (Cd)</td>
<td>1</td>
<td>&lt; 0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cesium (Cs)</td>
<td>6.5</td>
<td>&lt; 9</td>
<td></td>
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</tr>
<tr>
<td>Gadolinium (Gd)</td>
<td>0.7</td>
<td>&lt; 0.3</td>
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<tr>
<td>Lead (Pb)</td>
<td>13</td>
<td>&lt; 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>12</td>
<td>&lt; 3</td>
<td></td>
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<tr>
<td>Nickel (Ni)</td>
<td>5.9</td>
<td>&lt; 10</td>
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<tr>
<td>Palladium (Pd)</td>
<td>&lt; dl</td>
<td>&lt; 0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platinum (Pt)</td>
<td>&lt; dl</td>
<td>&lt; 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tellurium (Te)</td>
<td>&lt; dl</td>
<td>&lt; 0.8</td>
<td></td>
<td></td>
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<tr>
<td>Thallium (Tl)</td>
<td>0.2</td>
<td>&lt; 0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thorium (Th)</td>
<td>&lt; dl</td>
<td>&lt; 0.03</td>
<td></td>
<td></td>
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<tr>
<td>Tin (Sn)</td>
<td>1.2</td>
<td>&lt; 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tungsten (W)</td>
<td>&lt; dl</td>
<td>&lt; 0.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uranium (U)</td>
<td>0.08</td>
<td>&lt; 0.03</td>
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</table>

#### Urine Creatinine

<table>
<thead>
<tr>
<th>CREATION</th>
<th>RESULT mg/dL</th>
<th>REFERENCE INTERVAL</th>
<th>-2SD</th>
<th>-1SD</th>
<th>MEAN</th>
<th>+1SD</th>
<th>+2SD</th>
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</thead>
<tbody>
<tr>
<td>Creatinine</td>
<td>75.9</td>
<td>45 - 225</td>
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### Levels Before & After 12 Treatments

<table>
<thead>
<tr>
<th>Element</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum (Al)</td>
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<td></td>
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<tr>
<td>Antimony (Sb)</td>
<td></td>
<td></td>
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<td>Palladium (Pd)</td>
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<tr>
<td>Platinum (Pt)</td>
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<tr>
<td>Tungsten (W)</td>
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<td></td>
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<tr>
<td>Uranium (U)</td>
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</tbody>
</table>

**Within Reference**

-2SD  -1SD  MEAN  +1SD  +2SD

**Outside Reference**

-2SD  -1SD  MEAN  +1SD  +2SD

-2X  2X

-3X  3X

**Before**

**After**
Path Forward

- A comprehensive investigation should be initiated to determine the full extent of the issue. **-Those at risk MUST be tested!**

- The comprehensive “Toxic Metals Test” must be instituted into regular health screenings for those at risk.

- Treatment must include comprehensive measures to proactively remove toxic metals.

- Govt and Industry developers must consider mechanisms and methods to reduce toxic metal transfer and generation **FROM ALL SOURCES.**
Summary

● The extent of population illness is unknown.

● Toxic metal poisoning has severe, life-threatening implications for those exposed.

● The condition is not well recognized or understood. It may be a “Sleeping giant”.

● Not all non-toxic rounds are non-toxic.

● Toxicity comes from other sources beyond “known” sources & confined spaces exposure.

● Toxicity is also weapon, enabler generated.

● IV Chelation is expensive and not covered by conventional health insurance.
Sources for Metal Toxicity Testing & Treatment

Doctor’s Data Inc.
3755 Illinois Avenue
St. Charles, IL 60174-2420 USA
(800) 323-2784
Website: www.doctorsdata.com

Find a local “Functional Medicine Practitioner” for toxic metals testing and/or Chelation at:
- www.functionalmedicine.org
- acam.org
- aaemonline.org
Useful References

- **Tuberose.com**
  “Heavy Metal Toxicity” information
  www.tuberose.com/Heavy_Metal_Toxicity.html

- **US Dept of Labor – OSHA –**
  “Toxic Metals”
  www.osha.gov/SLTC/metalsheavy/

- **Agency for Toxic Substances & Disease Registry (ATSDR)**
  “ATSDR Toxic Substances Portal”

- **Agency for Toxic Substances & Disease Registry (ATSDR)**
  “ToxGuides” (quick reference)
Thank you for your attention!

“Over every mountain there is a path, although it may not be seen from the valley.”

Theodore Roethke