

*~ Metal Fever ~*  
*Beyond Lead Poisoning*

by  
**Jim Schatz**

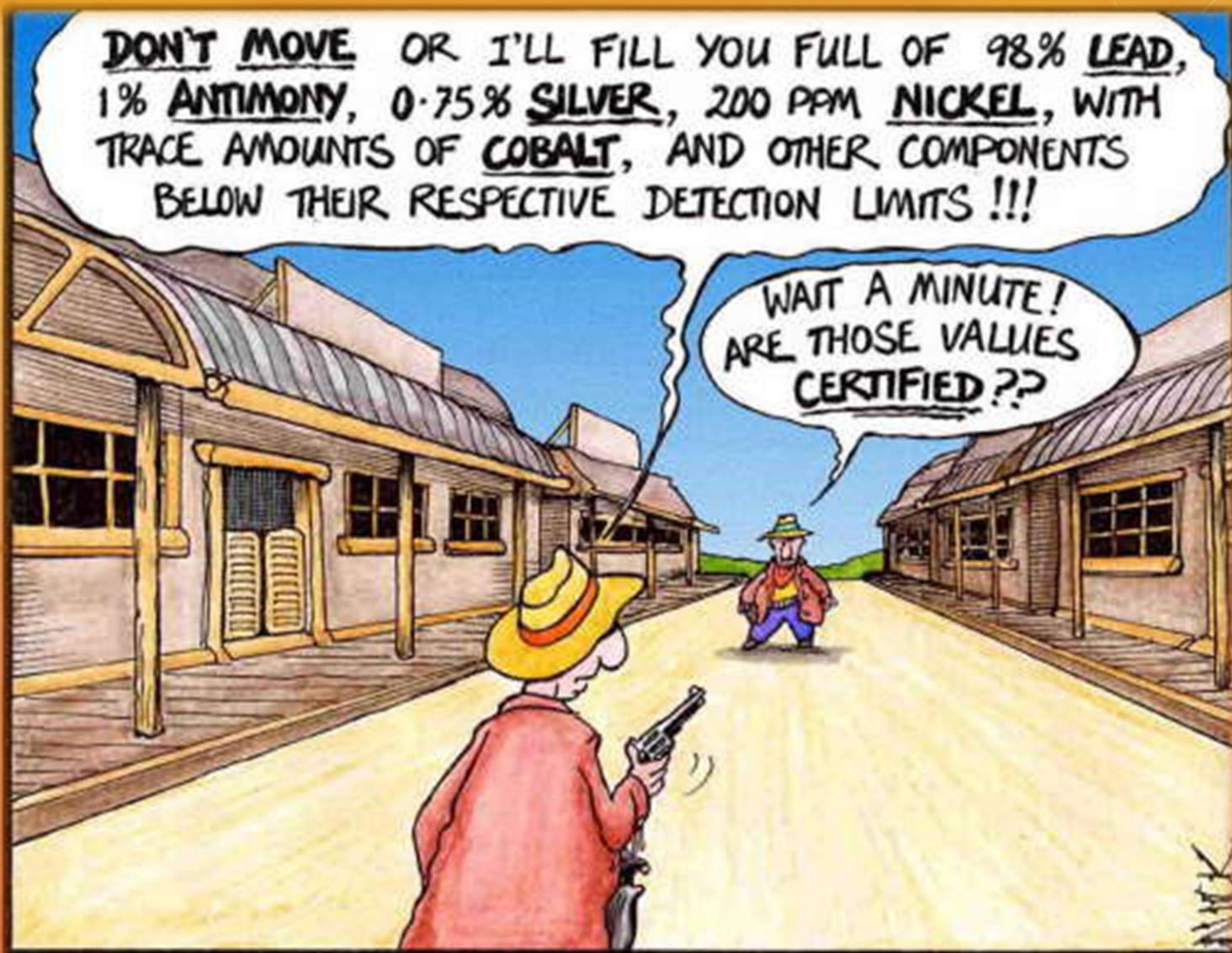
Presented at the  
**2014 NDIA Joint Armaments Forum**  
**Phoenix, Arizona**

**May 2014**

(050814)

**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 firefights 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.**

Hazardous Material (partial listing only)	Source(s)
•Aluminum (Al)	Cartridge Case, Primer
•Ammonia (NH)	Propellant
Antimony (Sb)	Projectile
•Arsenic (As) (Deadly)	Propellant Gases
Barium (Ba) (Barium Nitrate)	Primer
Bismuth (Bi)	Projectile, Shot
Brass (Zinc {Zu} + Copper {Cu})	Cartridge Case, Projectile, Primer
•Cadmium (Cd) (Deadly)	Projectile Jacket, Cartridge Case, Bore
•Copper (Cu)	Projectile Jacket
Chromium (Cr)	Bore Chrome Plating, Steel Barrels
•Hydrogen Cyanide (HCN)	Propellant
Iron (Fe)	
•Lead (Pb) (Deadly)	Projectile
- Lead Dioxide	Tracer or Incendiary projectile
- Lead Styphnate	Primer
•Mercury (Hg) (Deadly)	Primer, "Silver" amalgam tooth filings
•Nickel (Ni)	Cartridge Case, Projectile Jacket
Tin (Sn)	Projectile Core
Tungsten (W)	Projectile Core
Zinc (Zn)	Projectile Jacket, Primer, Coatings

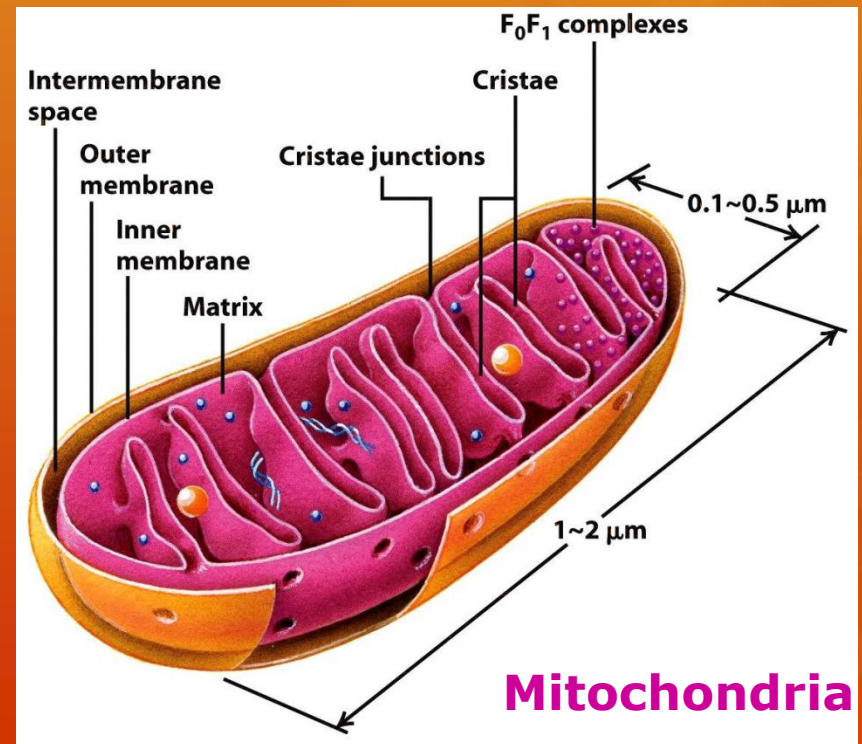
# Those at Risk

- **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).



# **III 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

### Chronic

- **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**
- **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**
- **Irritability. Mood swings. Depression.**
- **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**

- Handling: Weapons. Ammo. Magazines.

- **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.**



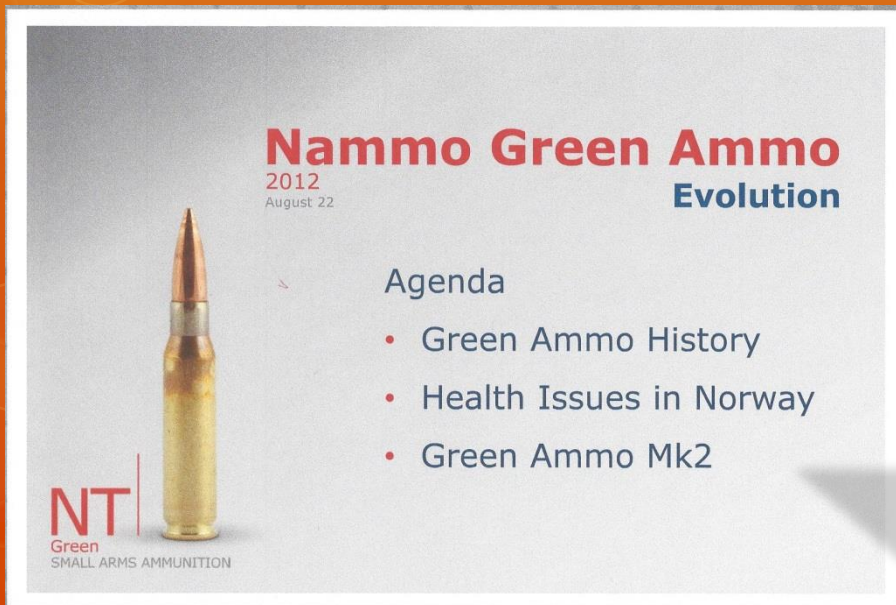
# Dip Tanks and Air Circulation

[http://www.minimaxcleaner.com/movie\\_updates/1seal-3-shorty.wmv](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



**Nammo Green Ammo**  
2012  
August 22  
**Evolution**

Agenda

- Green Ammo History
- Health Issues in Norway
- Green Ammo Mk2

**NT**  
Green  
SMALL ARMS AMMUNITION

The slide features a single green-tipped bullet on the left side. The background is a light gray gradient.



# Lesson Learned – Norway (cont.)

Mk1

## Health Issues in Norway

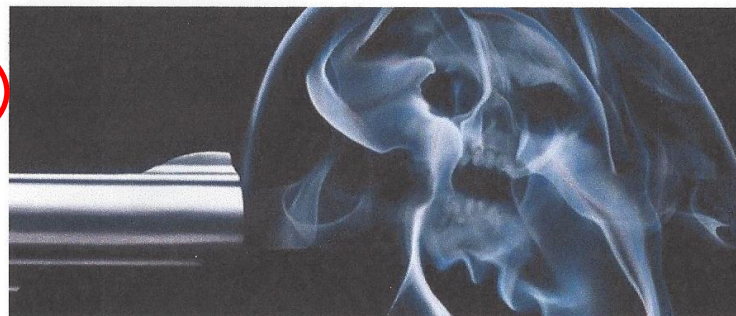
- Reports of health issues in 2009.
- **Carbine in indoor shooting ranges.**
- Health issues
  - Irritated airways
  - Coughing
  - Fever
  - Cold sweats
  - Headache
  - Nausea
  - Body pain.
- 5.56 mm Ball Non Toxic
- Norwegian investigation showed increased levels of copper and zinc when using lead free ammunition compared to traditional "lead ammunition".
- 15 + 100 million rounds fired in other weapon systems without any problems

**Cooper and Zinc Source(s)?**

## Cause Analysis

Studies from FFI Norway, FOI Sweden and Nammo

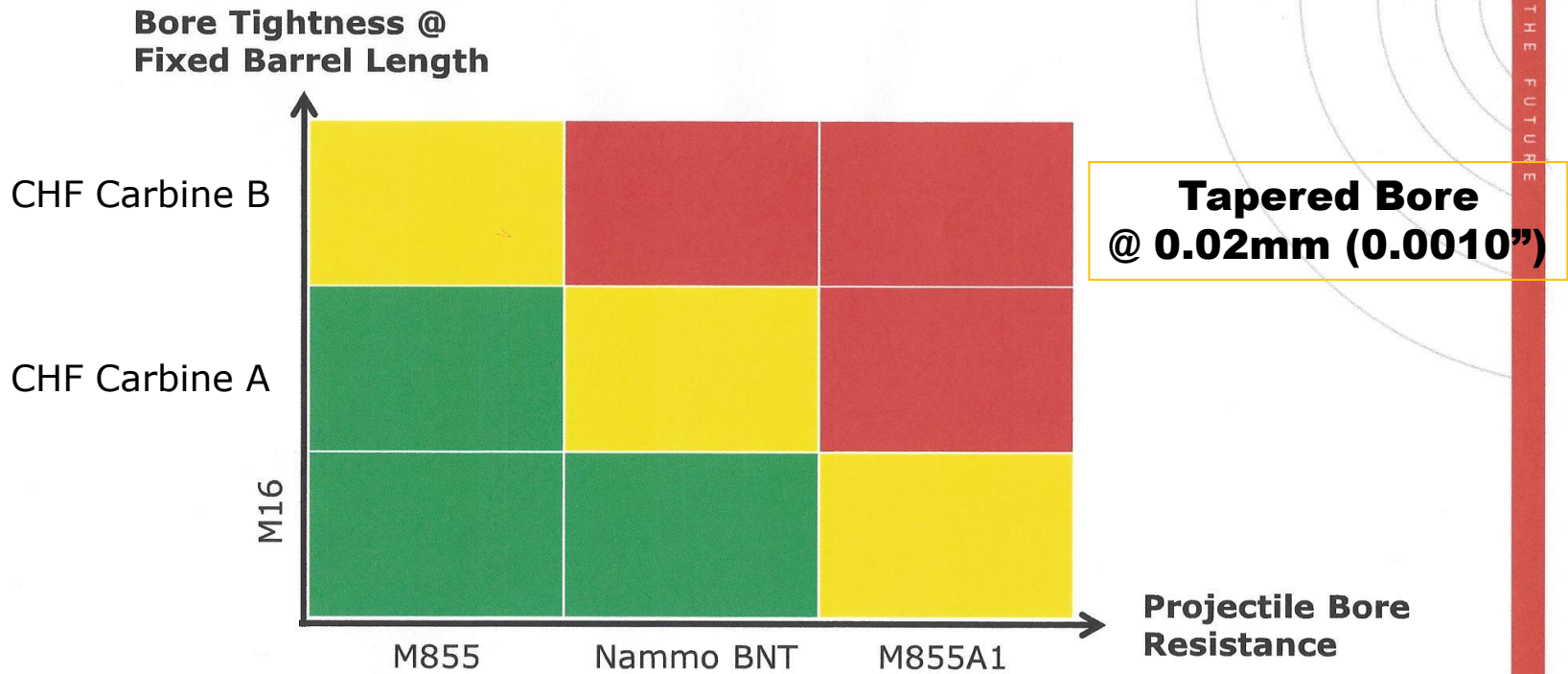
- Metal particles, primary copper and zinc
- Carbon Monoxide, CO
- Ammonia, NH<sub>3</sub>
- Hydrogen Cyanide, HCN



# Lesson Learned – Norway (cont.)

Mk1

## Cause Analysis – Weapon/Ammo System



SECURING THE FUTURE

# Lesson Learned – Norway (cont.)

Mk2

## Improved Performance 5.56 mm Ball NT 4 HP **Mk2**

**Fulfill all aspects in relevant STANAG and MOPI**

### Improved accuracy

- $\leq 2$  MOA (Extreme spread  $\leq 6$  cm @ 100 m) shot from shoulder

### Barrel erosion

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

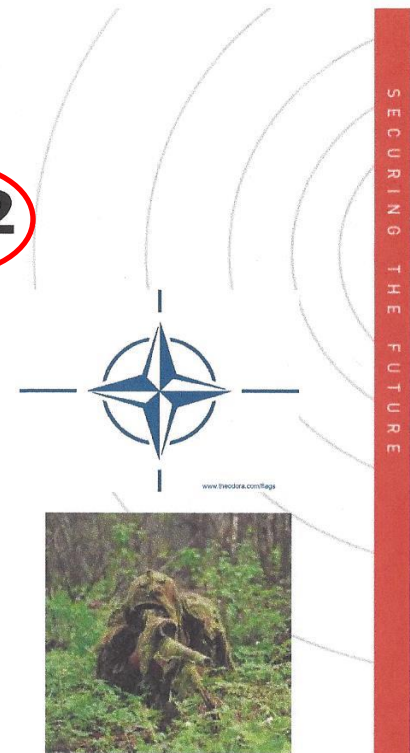
### Enhanced penetration capability

- Penetrates NATO 3.5 mm steel plate @  $> 700$  m

### Plus:

- **50% less Ammonia and Zinc**      - **40% less Copper**

- **75% less Hydrogen Cyanide**



**Nammo**

# 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

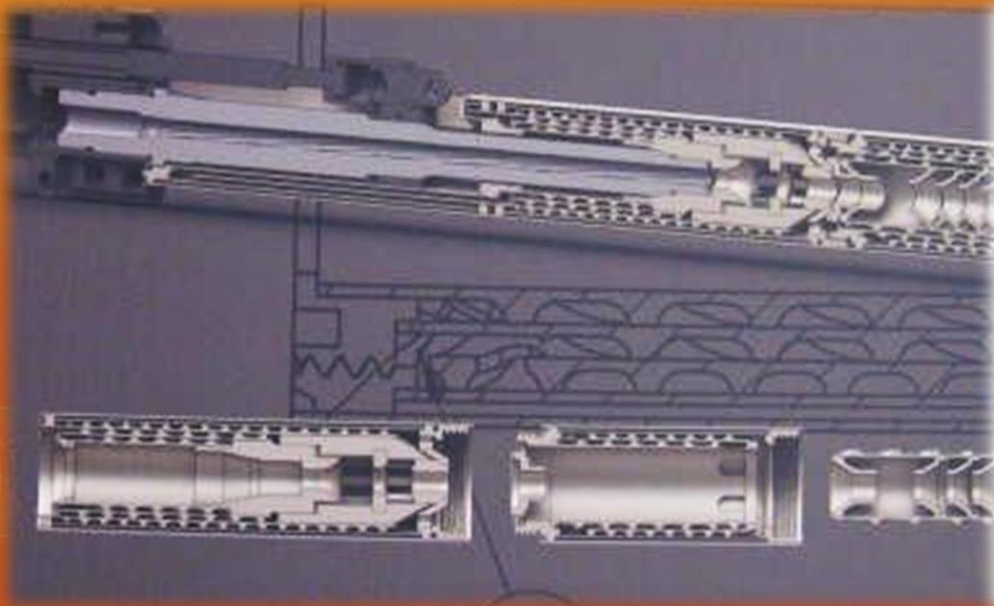
# Cartridge Case Solution?

- 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**





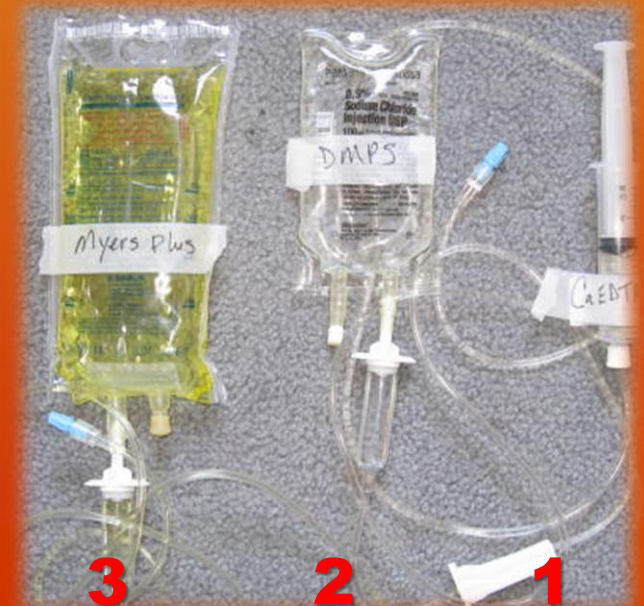
# Treatment - Chelation

- 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



# Pre-Chelation Levels

**Doctor's Data, Inc. Test.**  
**(4) DMSA pills, IV med precursor.**  
**6 hour Urine Elements Collection.**

		TOXIC METALS				
		RESULT µg/g creat	REFERENCE INTERVAL	WITHIN REFERENCE	OUTSIDE REFERENCE	
Aluminum	(Al)	130	< 25			
Antimony	(Sb)	< dl	< 0.3			
Arsenic	(As)	23	< 108			
Barium	(Ba)	3.8	< 7			
Beryllium	(Be)	< dl	< 1			
Bismuth	(Bi)	0.9	< 10			
Cadmium	(Cd)	1.7	< 0.8			
Cesium	(Cs)	4.3	< 9			
Gadolinium	(Gd)	1.5	< 0.3			
Lead	(Pb)	39	< 2			
Mercury	(Hg)	18	< 3			
Nickel	(Ni)	14	< 10			
Palladium	(Pd)	< dl	< 0.3			
Platinum	(Pt)	< dl	< 1			
Tellurium	(Te)	< dl	< 0.8			
Thallium	(Tl)	0.2	< 0.5			
Thorium	(Th)	0.06	< 0.03			
Tin	(Sn)	1.3	< 9			
Tungsten	(W)	< dl	< 0.4			
Uranium	(U)	0.2	< 0.03			

URINE CREATININE							
	RESULT mg/dL	REFERENCE INTERVAL	-2SD	-1SD	MEAN	+1SD	+2SD
Creatinine	48.9	45- 225					

**Subject: 52 year old male. Life-long shooter, instructor.**

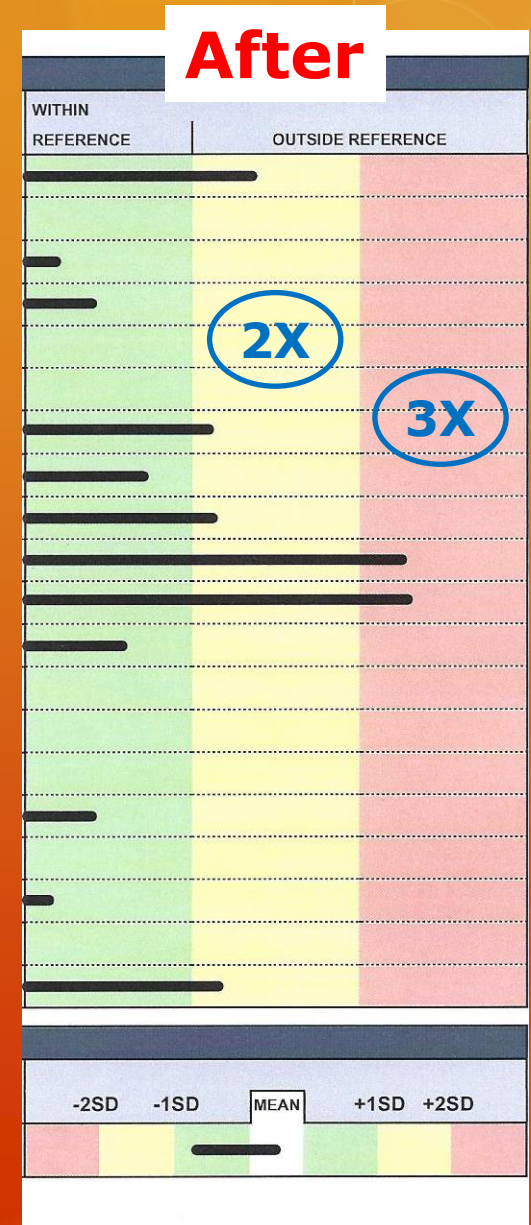
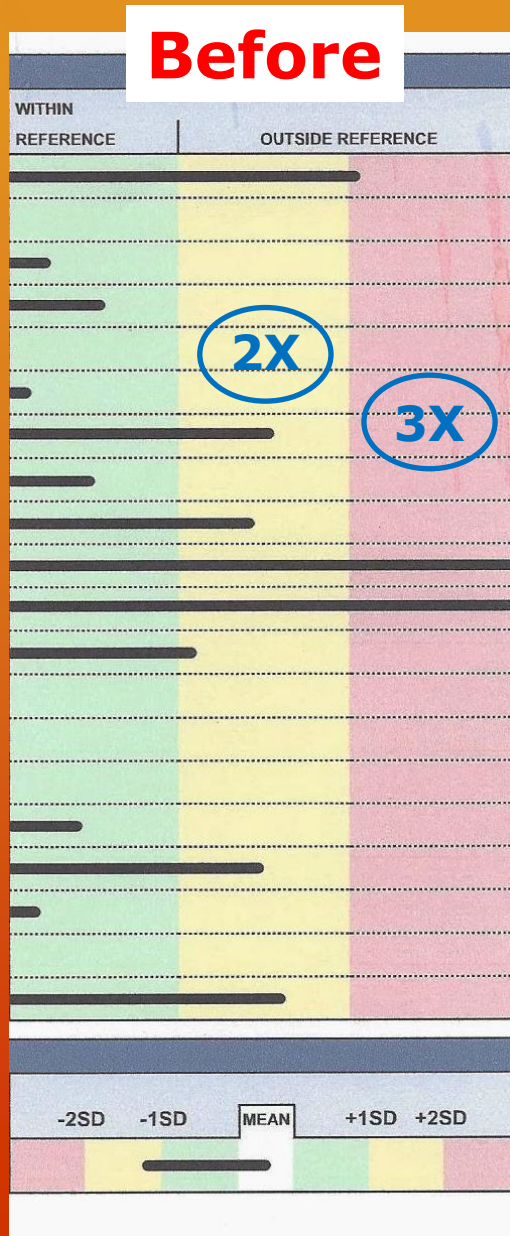
# Levels After 12 Treatments

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

URINE CREATININE						
	RESULT mg/dL	REFERENCE INTERVAL	-2SD	-1SD	MEAN	+1SD +2SD
Creatinine	75.9	45 - 225				

# Levels Before & After 12 Treatments

Aluminum	(Al)
Antimony	(Sb)
Arsenic	(As)
Barium	(Ba)
Beryllium	(Be)
Bismuth	(Bi)
Cadmium	(Cd)
Cesium	(Cs)
Gadolinium	(Gd)
Lead	(Pb)
Mercury	(Hg)
Nickel	(Ni)
Palladium	(Pd)
Platinum	(Pt)
Tellurium	(Te)
Thallium	(Tl)
Thorium	(Th)
Tin	(Sn)
Tungsten	(W)
Uranium	(U)
Creatinine	



# 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](http://www.doctorsdata.com)**

**Find a local “Functional Medicine  
Practitioner” for toxic metals testing  
and/or Chelation at:**

- **[www.functionalmedicine.org](http://www.functionalmedicine.org)**
- **[acam.org](http://acam.org)**
- **[aaemonline.org](http://aaemonline.org)**



# Useful References

- **Tuberoose.com**  
“Heavy Metal Toxicity” information  
[www.tuberoose.com/Heavy\\_Metal\\_Toxicity.html](http://www.tuberoose.com/Heavy_Metal_Toxicity.html)
- **US Dept of Labor – OSHA –**  
“Toxic Metals”  
[www.osha.gov/SLTC/metalsheavy/](http://www.osha.gov/SLTC/metalsheavy/)
- **Agency for Toxic Substances & Disease Registry (ATSDR)**  
“ATSDR Toxic Substances Portal”  
<http://www.atsdr.cdc.gov/substances/index.asp>
- **Agency for Toxic Substances & Disease Registry (ATSDR)**  
“ToxGuides” (quick reference)  
<http://www.atsdr.cdc.gov/toxguides/index.asp>

***Thank you for  
your attention!***

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

***Theodore Roethke***



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