Lead in Lead Ammunition

Consumer and Animal Protection
A critical Revue
Lead in Lead Ammunition

• What do we know from human medicine
• Heavy metal
• Paracelsus „dosis fecit“
• no boundary values
• Toxicology: Blood Lead Levels (BLL)

• normal 0.01 – 0.02 BLL
• medical events above 0.1 ppm BLL

• Guide values
• WHO 0.1 ppm BLL
• above elevated, 0.5 ppm intervention
• CDC 0.05 children BLL (Lanphear et al.)
Lead in Lead Ammunition

• What do we know Lead in veterinary medizin esp. Birds

• History
• Belrose 1959

• Ways
## Lead in Lead Ammunition

### Clinical Symptoms and Lead

- **Franson 1996**

<table>
<thead>
<tr>
<th></th>
<th>Blood</th>
<th>Liver</th>
<th>Kidney</th>
<th>Blood</th>
<th>Liver</th>
<th>Kidney</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subclinical</strong></td>
<td>0.2-1.5</td>
<td>2-4</td>
<td>2-5</td>
<td>0.2-0.3</td>
<td>2-6</td>
<td>2-20</td>
</tr>
<tr>
<td><strong>Toxic</strong></td>
<td>&gt; 1</td>
<td>&gt; 3</td>
<td>&gt; 3</td>
<td>&gt; 5</td>
<td>&gt; 6</td>
<td>&gt; 15</td>
</tr>
<tr>
<td><strong>Comp Death</strong></td>
<td>&gt; 5</td>
<td>&gt; 5</td>
<td>&gt; 5</td>
<td>&gt; 10</td>
<td>&gt; 15</td>
<td>&gt; 50</td>
</tr>
</tbody>
</table>

- ppm ww

- **Franson 1996** Interpretation of tissue lead residues in birds other than waterfowl in W.N. Beyer Environm. Cont. In Wildlife
Lead in Lead Ammunition
Birds of Prey, Germany

Abb.: N. Kenntner 2005
• 2010

• American Association Veterinarians

• Only blood lead level (BLL)
Lead in Lead Ammunition

• Petterson et al.
  • Blood-Lead Concentrations in California Condors released at Pinnacles National Monument, California In Lead From Spent Ammunition; Implications for Wildlife and Humans

• 35 (55 %) under 0,02 ppm BLL
• 24 (38,1 % ) 0,02 -0,58 ppm BLL
• 2 (3,2 % ) 0,6 -0,99 ppm BLL
• 2 (3,2 %) > 1 ppm BLL
MOLLY E. CHUCH et al. (2006): Ammunition is the Principal Source of Lead Accumulation by California Condors Re-Introduced to the Wild, Environmental Science & Technology/ Vol. 40, Nr. 19, P. 6143-6150
• Newth et al.
  Poisoning from lead gunshot still a threat to wild waterbirds in Britain

  Eur J Wildl Res; DOI 10.1007/s 10344
Lead in Lead Ammunition
Feeding pigs with lead hunted deer

doi:10.1371/journal.pone.0005330
Lead in Lead Ammunition

Consumer studies

- What do we know from Consumer protection
  - Studies
  - North Dakota
  - IOWA
  - Switzerland (Haldiman)
  - Norway
• Federal Institute of Risk Assessment (BfR) tried to bring together exposition data (EFSA) with consumer behaviour

• used the wrong data

• ug/kg body weight and day to ug/kg and day
Expositionsschätzung Blei (Kinder, 3 Jahre)

Kritischer Aufnahmewert
Neurotoxicität (IQ): 0,5 µg/kg pro Tag
• Resume

• Lead in Lead Ammunition is not relevant for consumer protection nor animal protection