

Health risks with lead in game in Sweden - risk assessment and risk management



National Food Agency

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Lead in game – why is this a matter of concern for NFA, Sweden?

- 300 000 licensed hunters in Sweden
- Approximately 600 000 - 900 000 persons (7-10 % of the Swedish population) as potential high consumers of game meat
- Annual “production” of game meat in Sweden correspond to approximately 12 % of the production of beef
- EFSA's opinion on lead 2010, “no safe level”



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Questions to answer

1) Is there a risk for human health?

➡ Risk assessment

2) Decide IF and HOW to manage the risk

➡ Acceptable risk?



Risk management options

- * Consumer advice?
- * Dialogue with companies?
- * Legislation?
- * Control?

Efsa risk assessment 2010 – lead

- Documented adverse health effects from lead are neurotoxicological, renal and cardiovascular
- No safe level could be established, but a reference point (RP) was established to a blood lead level at 12 µg/L (effects on IQ)
- Efsa concludes that in infants, children and pregnant women, there is a potential concern that *current levels* of exposure to lead have negative effects on neurodevelopment
- A margin of exposure (MOE) of 10 or greater should be sufficient to ensure that there is no appreciable risk of a clinically significant effect on IQ
- A work should continue to reduce exposure to lead, from both dietary and non-dietary sources
- Other toxicological evaluations of lead (JECFA, 2011, NTP 2012), are in accordance with EFSA, 2010. Withdrawal of TWI, and concluding no “safe level” for lead

JECFA Evaluation of certain food additives and contaminants (2011). Seventy-third report of the Joint FAO/WHO Expert Committee on Food Additives. WHO Technical Report Series 960

National Toxicology Program (NTP), U.S. Department of Health and Human Services, Monograph on health effects of low-level lead, June 2012.



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Is lead in game meat a problem?

- A complex picture

- Bio accessibility?

- Calcium status?

- Bio availability?

- **Blood lead level**
“A shortcut”

- Recipes?

- Consumption?

- Portion size?

- Iron status?

- Analytical uncertainty?

- Fasting vs. full stomach?



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Does game meat significantly contribute to blood lead levels?

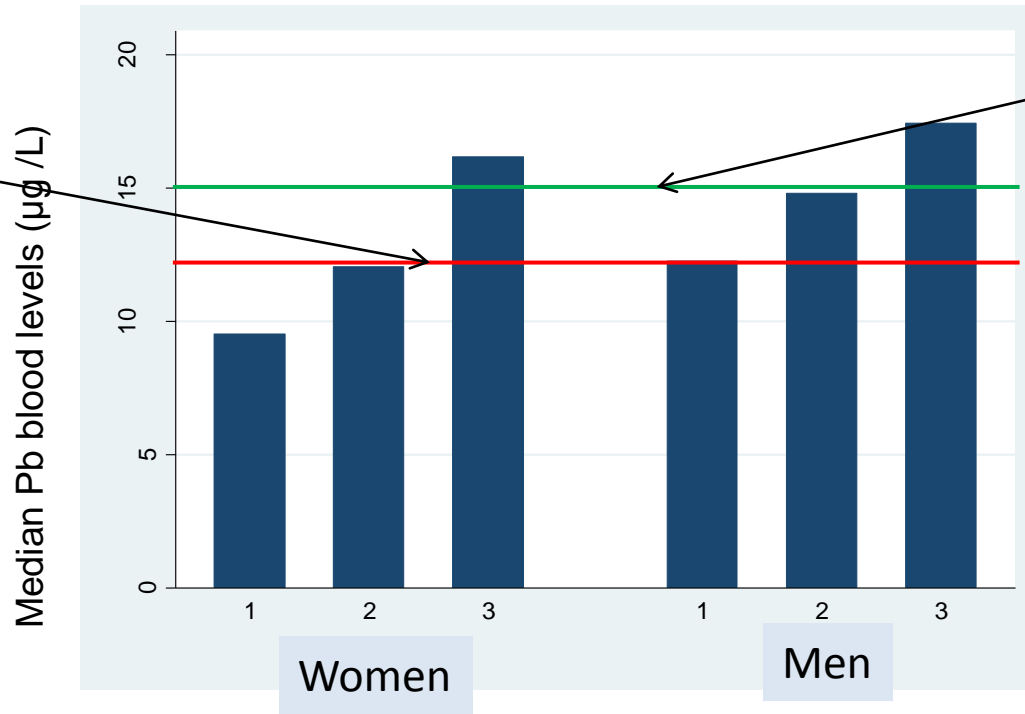


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Blood lead levels in Sweden

Efsa RP for fetus/child effects on IQ, 12 µg Pb/L blood



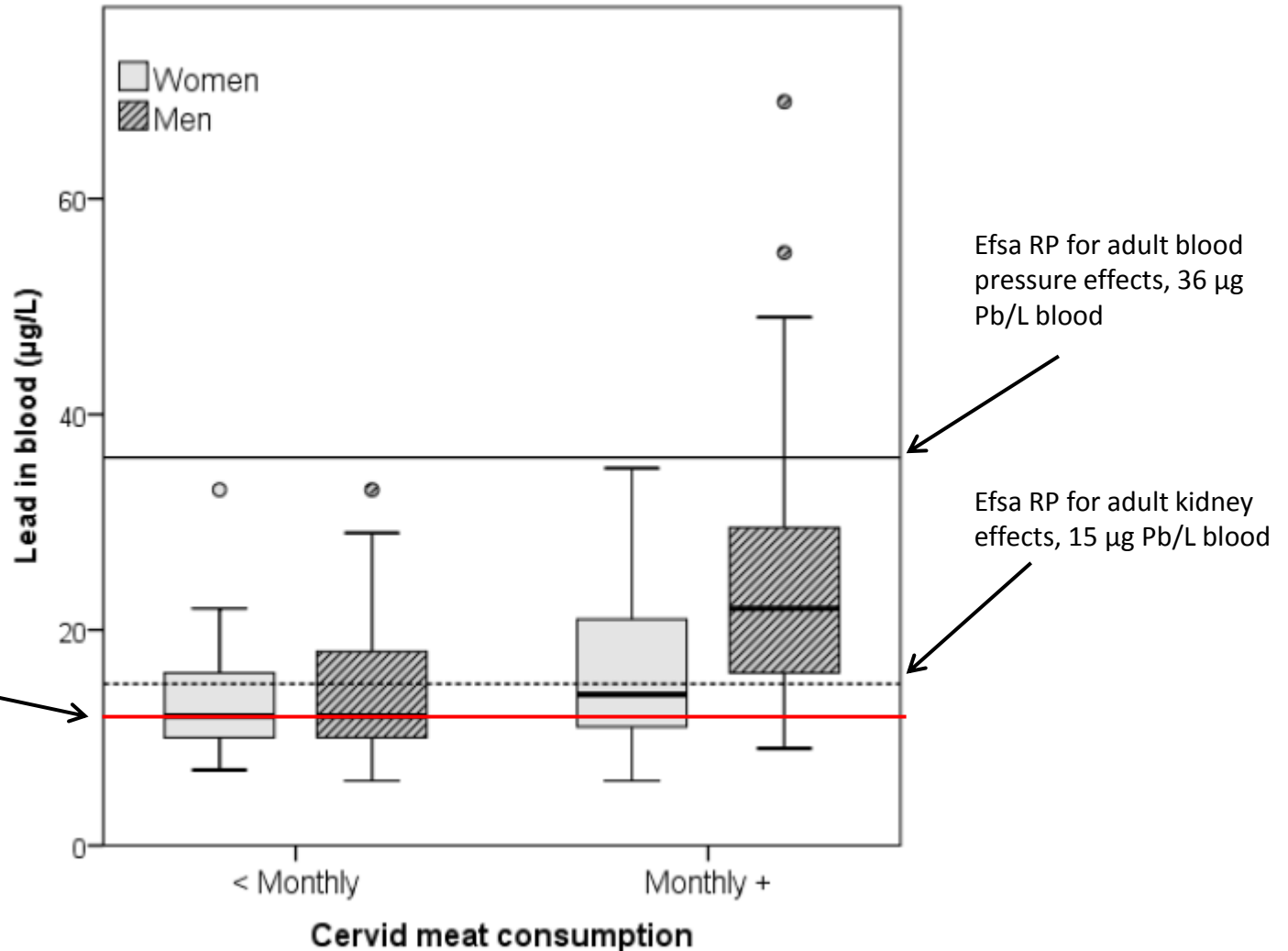
Efsa RP for adult kidney effects, 15 µg Pb/L blood

Bjerme et al., 2013 (Food and Chemical Toxicology)

| Game consumption | Women | | Men | |
|--------------------|--------------------|-------------|--------------------|-------------|
| | Number (n) | Percent (%) | Number (n) | Percent (%) |
| Never (1) | 34 | 24 | 24 | 19 |
| < 1 time/month (2) | 80 | 57 | 72 | 58 |
| > 1 time/month (3) | 26 | 19 | 28 | 23 |
| Total | 140 | | 124 | |
| P (Anova) | 0.0008 (0.0041) | | 0.0217 (0.0676) | |

()= adjusted for age and education

Blood lead levels in Norway



Efsa RP for fetus/child effects on IQ, 12 µg Pb/L blood

Efsa RP for adult blood pressure effects, 36 µg Pb/L blood

Efsa RP for adult kidney effects, 15 µg Pb/L blood

Rationale for risk management

Risk assessment to consider

- There are approximately **600 000 - 900 000 potential consumers** of game in Sweden (*a new survey indicates 1.9 million consumers eating game more than once a month*).
- Consumers of game meat, e.g. hunters and their families, are at risk for **elevated exposure** to lead due to game consumption
- Consumers of game meat, e.g. hunters and their families, are at risk for **elevated blood lead** due to game consumption
- In these consumer groups, the exposure to lead from game meat can contribute to **exceed the health based reference points** for lead

The food commodity "game meat" by it self could contribute with an unacceptable part of the health based reference point

Other legitimate factors to consider

- No **maximum limit** for lead in game meat
- Very specific and **known source** of the "contaminant"
- Possible to significantly **risk reduce** (e.g. improved cutting routines or choose lead free ammunition)
- Game meat is in a **nutritional** perspective a relatively "lean" meat with high content of minerals
- Hunting in Sweden has a long **tradition** and is an important **recreational** activity as well as meat "source"



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Risk management decision

”NFA decide that this route of lead exposure should be communicated and that consumer advice should be formulated to limit the lead exposure via game meat”



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Risk management – NFA

Dietary advice

1. For pregnant women, women who plan children in the near future and children < 7 years –

Avoid consumption of meat from areas close to the wound channel, from game shot with lead ammunition.

2. For hunters, their families and other high consumers

Limit consumption to once a week, of meat from areas close to the wound channel, from game shot with lead ammunition.

The advice published June 25, 2012



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Ongoing activities

Prospective blood lead level study directed to high consumers of game meat (e.g. hunters families)

Status – ongoing, results in 2014

Study solubility of metallic lead fragments

Status – ongoing, results 2014

Lead from rifle ammunition in other game species than moose

Status: Ongoing, results 2014

Lead from shot gun ammunition in game

Status: Ongoing, results 2014

”Cutting study” of game meat

Status – Ongoing (but very difficult to perform systematically), results 2014



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The studies are done in collaboration with the National Veterinary Institute and the Swedish Association for Hunting and Wildlife Management

Thank
you for
your
attention!



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