

Letter Health Consultation

LEAD IN VENISON IN MICHIGAN

**Prepared by the
Michigan Department of Community Health**

MARCH 18, 2010

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LETTER HEALTH CONSULTATION

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Agency for Toxic Substances and Disease Registry



STATE OF MICHIGAN

DEPARTMENT OF COMMUNITY HEALTH
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

JANET OLSZEWSKI
DIRECTOR

January 22, 2009

Stephen M. Schmitt, D.V.M.
Michigan Department of Natural Resources
4125 Beaumont Road, Room 250
Lansing, MI 48910-8106

Dr. Schmitt,

At your request, I have reviewed the Michigan Department of Natural Resources (MDNR) analytical data for lead concentrations in venison (deer meat) harvested during the 2008 firearm season. My comments and recommendations follow.

Background - The Michigan Sportsmen Against Hunger (MSAH) program was developed as a mechanism to allow hunters to donate venison, which is typically processed into one pound packages of ground meat and distributed to food pantries around the state. Small lead fragments are often found in venison from deer shot with lead bullets and people may ingest lead when they eat the meat. Venison donated to charity food pantries is a particular concern because people using food pantries may also be exposed to lead from other sources such as lead paint.

Discussion - In 2008, the MDNR collected 89 one pound packages of venison from game meat processors who had received deer from the MSAH: 87 packages of ground venison and two packages of butterfly loins. Each package was screened for the presence of lead fragments using a fluoroscope. Twenty-seven of the 89 packages showed fragments that appeared to be lead. These were x-rayed, then analyzed for lead along with 30 packages that did not show lead fragments. Lead was found only in ground venison samples. No lead was detected in the venison loin packages. Table 1 provides the results of the lead analysis.¹

Table 1. Summary of lead content analysis in Michigan hunter-killed deer.

Sample group	Number of samples ^a	Range of lead concentration (ug/gm) ^b	Mean ±SD ^c in lead-positive samples (ug/gm)	Prevalence of lead-positive samples
Lead fragments	27	ND ^d to 235	19.7 ± 45.1	96 %
No lead fragments	30	ND to 0.66	0.22 ± 0.18	3.3 %
All samples analyzed	57	ND to 235	9.1 ± 32.2	60 %

^aEach sample represents a one pound package.

^bmicrograms per gram or parts per million (ppm)

^cSD = Standard Deviation

^dND = Non-detect

¹ MDNR (Michigan Department of Natural Resources) 2009. Unpublished Data.

Lead is a cumulative toxin that increases in concentration in the body with frequent or prolonged exposure. People may be exposed to lead in drinking water, in the air they breathe, and in food. Children may ingest lead in worn or peeling lead-based paint in their home, daycare, or school. Exposure to lead can cause neurological and developmental problems, especially in children and the fetus before birth. The Centers for Disease Control and Prevention (CDC) has identified a blood lead concentrations at or above 10 micrograms per deciliter of blood (ug/dl) as a level of concern for children. Blood lead concentrations greater than this level have been associated with developmental delays in learning and cognition.²

The Wisconsin Department of Health and Family Services (WDHFS) used the United States Environmental Protection Agency's Integrated Exposure Uptake Biokinetic (IEUBK) model to predict the blood-lead level that might result from frequent consumption of lead-contaminated venison.³ The model was run using default inputs and assumptions for all exposure parameters except dietary consumption of lead-contaminated game meats as a percentage of total meat consumption. The model predicted that 58% of children who ate two meals of venison containing 16.7 ug/g of lead per month would have a blood-lead level greater than 10 ug/dl. If the venison contained 6.2 ug/g lead, 38% of children who ate this meat twice per month were predicted have a blood-lead level greater than 10 ug/dl.

In response to reports of lead fragments in wild game meat, the Centers for Disease Control and Prevention (CDC) collected blood samples from wild game consumers in North Dakota. CDC also administered a questionnaire designed to provide demographic information and wild game consumption habits. CDC found that eating wild game was associated with a small (0.30 ug/dl) but significant rise in blood lead levels. The increase was highest in people who ate all three types of game meat included in the study (venison, birds, and other game), but no linear trend was detected with an increase in the number of game types eaten. In addition, people who reported having eaten game meat within the month prior to blood testing had significantly higher blood lead levels compared to people who had not.⁴

Conclusions - MDCH cannot currently conclude whether eating lead-contaminated venison in Michigan could harm people's health because it is difficult to predict the impact of eating lead-contaminated venison on a child's blood-lead level without knowing what other lead exposures a child may have. Modeling conducted by the WDHFS suggests that, at the average lead concentration of 9.1 ug/g shown in Table 1, between 38 and 58 percent of Michigan children eating this meat twice per month could have unacceptable blood-lead levels as a result. However the CDC study in North Dakota found only a slight elevation in blood lead levels associated with eating game meat. These findings could be concerning for children in families frequenting the food pantries who may have additional exposures from lead sources in their homes that contribute to an elevated blood lead level.

Recommendations - The best course of action would be to stop using lead bullets to harvest venison. However, there are no immediate plans to change state of Michigan law that permits

² ATSDR (Agency for Toxic Substances and Disease Registry). 2007. Toxicological Profile for Lead. Atlanta: US Department of Health and Human Services; 2007 Aug.

³ ATSDR (Agency for Toxic Substances and Disease Registry). 2008. Health Consultation: The Potential For Ingestion Exposure To Lead Fragments In Venison In Wisconsin. Prepared by: the Wisconsin Department of Health and Family Services.

⁴ Iqbal, S., et al. Hunting with lead: Association between blood lead levels and wild game consumption. Environ. Res. (2009), doi:10.1016/j.envres.2009.08.007.

hunters to use this ammunition. Alternatively, MDCH makes the following recommendations to inform the affected groups of people so that they can make choices to protect themselves and their families:

- Hunters should be encouraged to select ammunition that does not contain lead and should be provided with information to help them reduce the potential for lead contamination in game meat.
- Consumers of game meat, particularly those who use food pantries, should be made aware of the potential hazards of eating lead-shot meat for children and women of childbearing age.
- Meat processors should be provided with guidelines for processing lead-shot venison that will reduce the lead contamination in the finished meat.

Public Health Action Plan – MDCH was pleased to work with you and Dr. Daniel O’Brien as well as several other stakeholders to develop three public information brochures to address these recommendations:

“What every hunting family should know about lead bullets and venison”

“Protect your child from lead in venison”

“Food service providers: What you need to know about lead in venison”

Attached are the final drafts of each of these brochures, which will be distributed both in print and on the internet. In addition, at your recommendation the Michigan Department of Agriculture (MDA) has provided meat processors with information to minimize lead contamination in ground game meat.

Please contact me by phone at 517- 335-8566 or by e-mail at dykema@michigan.gov if I can be of further assistance in this matter.

Sincerely,



Linda D. Dykema, Ph.D., Manager
Toxicology and Response Section

cc: Dr. Daniel O’Brien, MDNR
Dr. David R. Wade, MDCH
Mr. Kory Groetsch, MDCH

**If you use high-velocity lead bullets,
here are some ways to remove or reduce
lead fragments:**

- Place your shots carefully. Shots that go through large bones, like the hindquarters of a deer, elk, or bear, will cause more fragmentation.
- Fragments are often found farther from the wound channel than expected. This makes it impossible to recommend a safe distance for trimming. However, liberally trimming around the wound channel should remove some fragments.
- Do not rinse the carcass. Rinsing the meat will not necessarily remove lead fragments. It may spread lead fragments to other parts of the animal, causing more of the meat to have lead.
- Ground venison has been found to have more lead fragments. Venison steaks and chops usually contain less lead.
- Some commercial processors combine several deer. Venison that contains lead fragments could be mixed into venison that you receive. Ask the processor not to combine meat from other deer with yours.
- Acids make it easier for the human body to absorb lead. Avoid using acidic substances (like vinegar or wine) when cooking venison.

For more information about lead:
Call 1-800-MI-TOXIC (1-800-648-6942)
Or visit www.michigan.gov/leadsafe



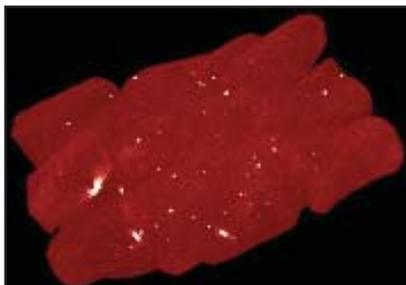
Lead Bullets and Venison

Deer, Elk & Bear



**What Every
Hunting Family
Should Know**

New studies show that lead fragments are often found in venison shot with lead bullets.



These pieces of lead are too small to be seen or felt while chewing. Ground venison has the most lead fragments (see photo).

Using a medical imaging device, lead fragments (bright spots) are shown scattered within the ground venison shot with lead bullets.*

Choose ammunition that will not leave lead fragments in the meat

Worst

- Rapidly expanding bullet
 - Ballistic tip
 - Soft point

These bullets leave the most lead fragments in the meat. The lead can be found throughout the meat, not just along the wound channel.

Better

- Shotgun slug
- Muzzleloader bullet
- Non-exposed lead core bullet

These fragment much less due to slower velocity, higher mass, or a metal completely covering the lead. However, there is still some risk of lead fragments.

Best

- Copper bullet
- Lead-free bullet

Copper and lead-free bullets leave no lead in the meat.

Who is most at risk of health problems from lead?

- Women who are pregnant or can become pregnant
- Children ages 6 and under



In pregnant women, lead can cause low birth-weight babies, premature births, miscarriages, and stillbirths.

In young children, lead can cause learning disabilities, lower IQs, and stunted growth. Even the smallest amount of lead can harm children and babies.

Public Health Advice

If you harvest deer, elk, or bear with high-velocity lead bullets, women of childbearing age and children ages 6 and under should avoid eating that venison.

Older children and adults should use caution when eating ground venison shot with lead bullets.

Bow hunting does not leave lead in venison.

More good choices on the back.



*Photo (top left): Cornatzer et al. 2008 Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans. The Peregrine Fund, Boise, Idaho, USA.

More About Lead:

You may find lead in other places. Homes built before 1978 likely contain lead-based paint. Lead dust falls to the floor and gets on children's hands and toys. It can enter their bodies when they put their hands or toys into their mouths.

Lead plumbing, solder or fixtures can put lead into drinking water.

A child with lead poisoning may seem healthy or have any of these signs:

- Upset stomach
- Tiredness
- Loss of appetite
- Hearing Problems
- Weight loss
- Hyperactivity
- Irritability
- Difficulty sleeping

If you are concerned about lead poisoning in you or your child, talk to your physician about getting a blood lead test.

For more information about lead:

Call 1-800-MI-TOXIC (1-800-648-6942)
or visit www.michigan.gov/leadsafe

*Michigan Department
of Community Health*



Jennifer M. Granholm, Governor
Janet Olszewski, Director

Protect your Child from Lead in Venison



Lead in Venison

Venison (deer meat) can be a healthy source of food for you and your family. But new facts show that lead bullets can leave small pieces of lead in the venison. These small lead pieces cannot be seen in the meat or felt in your mouth while chewing. When you swallow this lead, it absorbs into your body.



Ground venison usually has more lead fragments.

Steaks and chops usually have fewer lead fragments.



- Even the best attempts to remove the lead fragments before processing can still leave lead in the meat. Most lead fragments are too small to be seen or felt while chewing.

What are the dangers of lead?

- Lead affects the nervous system, and can cause problems with brain function.
- In children, lead can cause developmental problems like lowered IQ and learning disabilities.
- Lead is unhealthy for adults too, but women beyond childbearing age and adult men are at less risk of health problems from small amounts of lead.

Who is at greatest risk from lead in wild game?



Lead, even in the smallest amounts, is a serious health risk for:

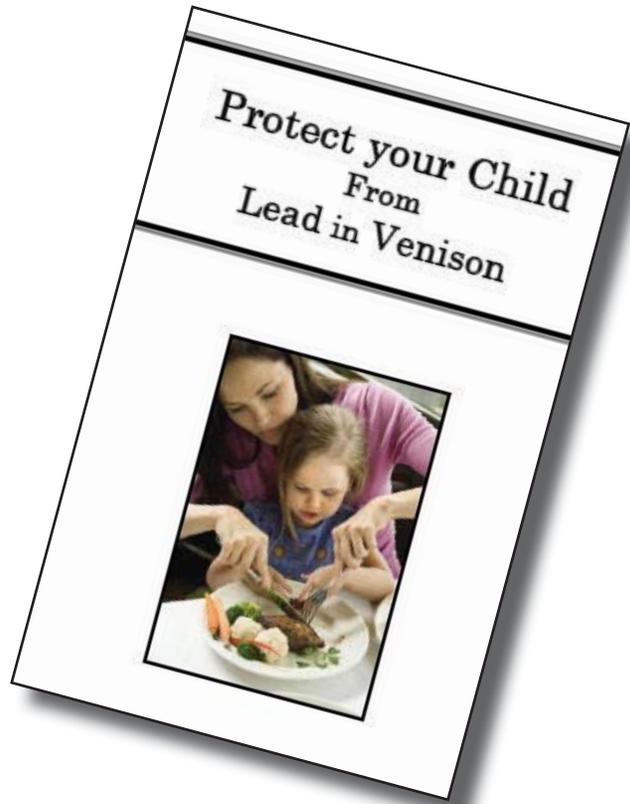
- Children ages 6 and under
- Pregnant women and unborn babies
- Women of childbearing age and children ages 6 years old and under should avoid eating venison that has been shot with lead bullets.
- Ask if venison (deer meat), is used in the meals served to you. You can request that store-bought meat be served to you and your children. Store-bought meat does not contain lead.

What about children over 6 and adults?

- Older children and adults also can have health problems caused by lead, but it takes much more lead to cause problems in these people. Eating a few meals of lead-shot ground venison will not harm older children and adults. However, if they eat lead-shot ground venison every week, that may be harmful.
- Older children and adults should use caution when eating ground venison that was shot with lead bullets.



Give the brochure
“*Protect your Child from Lead in Venison*”
to your clients.



Please call the
Michigan Department of Community Health
1-800-648-6942
for more information.

*Michigan Department
of Community Health*



Jennifer M. Granholm, Governor
Janet Olszewski, Director

What you need to know about **Lead in Venison**



for
**Food Service
Providers**

What do I need to know before serving venison?

- Deer shot with lead bullets can have small lead fragments in the meat.
- Some of the venison donated to your organization may have lead in it.
- Venison steaks and chops tend to have less lead than ground venison.



Ground venison usually has more lead fragments.

Steaks and chops usually have fewer lead fragments.



- Even the best attempts to remove the lead fragments before processing can still leave lead in the meat. Most lead fragments are too small to be seen or felt while chewing.

Who is at greatest risk from lead in wild game?

Lead, even in the smallest amounts, is a serious health risk for:

- Children ages 6 and under
- Pregnant women and unborn babies



What are the dangers of lead?

- Lead affects the nervous system, and can cause problems with brain function.
- In children, lead can cause developmental problems like lowered IQ and learning disabilities.
- Lead is unhealthy for adults too, but women beyond childbearing age and adult men are at less risk of health problems from small amounts of lead.

As a food service provider, you can help reduce the chance of lead exposure in your clients.

- Do not serve any venison to children ages 6 and under or to pregnant women. Serve these clients store-bought meat or a type of meat that was not shot with lead bullets.
- For clients of all ages, serve ground venison no more than once a week.
- Try to use whole cuts (like steaks and chops) of venison rather than ground meat. Ground venison tends to have more lead fragments.
- Serve venison in soups, stews, or casseroles rather than in burgers and meatloaves. This will reduce the amount of venison eaten by each person, which will reduce the chance of lead exposure.
- Acids (like vinegar or wine) make it easier for a person's body to absorb lead. Avoid using acidic substances like vinegar when cooking venison.

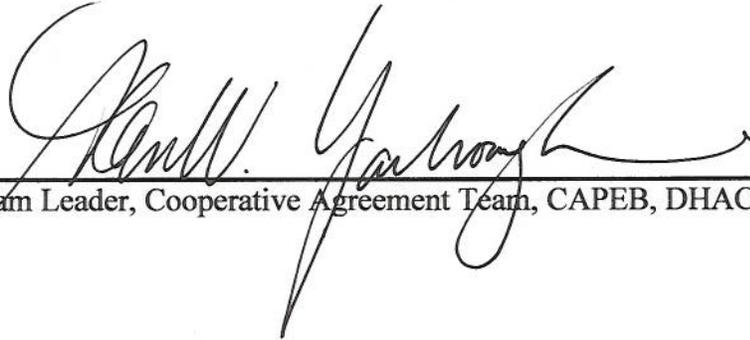
Certification

The Michigan Department of Community Health prepared this Letter Health Consultation, Lead in Venison, under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). At the time this Health Consultation was written, it was in accordance with the approved methodologies and procedures. Editorial review was completed by the Cooperative Agreement partner.



Technical Project Officer, Cooperative Agreement Team, CAPEB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.



Team Leader, Cooperative Agreement Team, CAPEB, DHAC, ATSDR