

Fall Followup: AN EVOLVING PERSPECTIVE ON LEAD IN VENISON



*Story and Photos
by Craig Bihrlé*

Prospects for North Dakota's 2008 deer season are much the same as in the recent past: High populations and abundant licenses for both whitetail and mule deer have created expectations for another excellent year.

And yet, something is different this year.

On March 20, 2008, three North Dakota state agencies collectively made a decision that quickly became a mainstream national news story, and may change the way deer hunters approach processing their animals.

The decision by the departments of Health, Agriculture and Game and Fish was to recommend to North Dakota food pantries to not distribute any more venison donated in 2007 to clients because of evidence that some of the meat contained lead fragments, likely from ammunition used by hunters to kill the deer.

The recommendation was based on a small but valid investigation that identified lead particles in more than 50 percent of packages of ground venison destined for distribution to food pantries. This cost the Sportsmen Against Hunger venison donation program, administered by the North Dakota Community Action Partnership, more than 4,000 pounds of what was remaining from about 17,000 pounds donated by hunters during the 2007 hunting season.

While the donated venison was an immediate concern, the issue brought other, more long-term concerns to the forefront. Hunters want to know whether their venison – processed at home or commercially – also might have similar contamination.

And if it does, is it a health risk?

And if it is, what can be done to minimize or eliminate the incidence of lead particles remaining in venison, whether it's processed commercially or cut up at home.

Since North Dakota's action in March, much has taken place. Other states initiated research to see how their donated venison compared to North Dakota's statistics. The North Dakota Department of Health asked the U.S. Centers for Disease Control and Prevention to assist the department with a study in North Dakota to see if inadvertent lead ingestion is a health risk. Minnesota recently completed a study of bullet fragmentation that may provide valuable information on just how much lead fragments do penetrate into muscle tissue away from the primary bullet path.

Many states, for the first time, are including in their hunting regulations cautions about the potential presence of lead in deer meat.

Newspaper columnists and magazine writers have taken polar opposite stands on North Dakota's and other states' actions. Some were critical that any action was taken, others suggested a grand conspiracy by anti-hunters, and still others looked at the evidence and determined they would only use bullets that did not contain lead for future deer hunting.

So here it is late August. The first firearms elk season starts within a couple of weeks, followed by a special September antlerless white-tailed deer gun season in units 2C and 2D in about a month.

Will this year be any different for North Dakota big game hunters? Some of that might depend on the results of the CDC study, which are not expected until sometime after this issue of *North Dakota OUTDOORS* is published.

Regardless of what that study reveals, North Dakota's venison donation program and many meat processors are reevaluating their guidelines and operating procedures to minimize or eliminate the risk of lead particles winding up in deer meat. Lead is, after all, a toxic substance.

"It's important to remember it's not a good thing to eat," Dan Symonik, lead compliance program supervisor for the Minnesota Department of Health, told agency officials from seven states at a gathering in early June related to the lead-venison issue.

More About Lead

Lead is a soft, heavy metal that occurs naturally in the Earth's crust. It is mined in many countries and its most prevalent use in the United States today is in vehicle and other storage batteries. Ammunition comes in second.

Use of lead overall is much lower today than it was 20 or more years ago. Lead was widely used in household paint until 1978, as a gasoline additive until the 1980s, and in household and municipal plumbing (water) systems until the 1980s. The lead used in these and other practices still exists in the environment, however, and people can be exposed in a variety of ways, especially during remodeling work that disturbs materials containing lead paint, and in work places where lead is used or manufactured.

One of the main sources of lead exposure for children is living

in older homes where paint containing lead was used. Children are susceptible to breathing dust carrying lead particles or even eating lead-laden paint chips. Many studies over the past 50 years have documented reductions in brain functions or development in young children from relatively minor exposures to lead.

The amount of lead in the human body is most often measured as micrograms of lead per deciliter of blood. One microgram of lead per deciliter of blood ($\mu\text{g}/\text{dl}$) is equal to 10 parts per billion.

Because lead exists naturally in the environment, the average human with no outside exposure typically has a blood-lead level of 0-2 $\mu\text{g}/\text{dl}$. The U.S. Centers for Disease Control and Prevention at present considers 10 $\mu\text{g}/\text{dl}$ an elevated lead level in children. When testing identifies a child with a level of 10 or higher, the local public health nurse gets involved. The North Dakota Department of Health's Lead Prevention Program conducts a site visit for blood-lead levels of 20 $\mu\text{g}/\text{dl}$ or higher, according to Sandi Washek, program coordinator.

For adults, CDC considers a blood-lead level of 25 $\mu\text{g}/\text{dl}$ as a health concern, and adults might start feeling ill from lead poisoning at levels of 30-40 $\mu\text{g}/\text{dl}$. The U.S. Occupational Safety and Health Administration becomes involved at 40 $\mu\text{g}/\text{dl}$, and medical intervention is suggested at 45 $\mu\text{g}/\text{dl}$. Levels of more than 60 $\mu\text{g}/\text{dl}$ are considered a medical emergency for adults. However, even blood lead levels below 10 $\mu\text{g}/\text{dl}$ may be associated with subtle health effects such as elevated blood pressure and reduced kidney function, Washek said.

When someone gets lead in their bloodstream, it has a half-life of approximately 30 days. For instance, if you swallowed a particle of lead that caused your blood-lead level to go up to 10, in about 30 days without any further lead exposure it would be back



down to 5, then down to about normal 30 days after that.

On the other hand, lead in the blood is cumulative. If you ingested the same-sized lead particle under the same circumstances for five days in a row, your blood-lead reading would continue to increase.

The primary concern is this: in an adult, a high exposure may not have any long-lasting health effects after the lead has eventually passed from the system. For children, especially those under age 7 when their neurological system is still developing, even a one-time, short-term high exposure can slow or impair mental and physical growth. The longer or higher the exposure, the more potential for permanent damage.

Similarly, elevated blood-lead levels in pregnant women, even a one-time, short-term exposure, can also inhibit development of an unborn child.

Children are also likely to absorb more from a particle of ingested lead than an adult, but in both children and adults, the amount of lead absorbed into the body can vary greatly, depending on what else had been eaten.

One experiment referenced by the U.S. Agency for Toxic Substances and Disease Registry, a branch of the U.S. Department of Health and Human Services, indicated that adult volunteers who ingested small amounts of lead after eating a meal absorbed only about 6 percent of the lead into their blood. The absorption rate was 60-80 percent when the same amount of lead was ingested after a day with no food.

These studies and statistics have a direct bearing on decisions made by states on how to proceed with their venison donation programs, and in providing information to hunters and venison processors.

Given the potential risk that even a small amount of ingested lead could raise a child's blood-lead reading to a level of concern, North Dakota and Minnesota moved last spring to discard all venison that remained for distribution by food pantries. In Wisconsin, food pantries were cautioned to withhold distribution of donated venison unless it had been verified by x-ray that it contained no lead particles. Iowa and South Dakota continued to distribute venison through donation programs, accompanied by consumption cautions for pregnant women and young children.

CDC Study

During the last part of May, the U.S. Centers for Disease Control and Prevention, in conjunction with the North Dakota Department of Health, conducted a study in North Dakota to try to determine whether blood-lead levels were associated with wild game consumption. More than 700 state citizens, including those who eat venison and those who don't, had their blood tested for lead levels.

As of press time, no preliminary information was available from the study.

Sportsmen Against Hunger Plans

As of early August, the North Dakota Community Action Partnership, which administers the Sportsmen Against Hunger venison donation program, is planning to run this important program again this year.

In July, NDCAP sent out a survey to gauge continuing interest from businesses that process deer. "I was a little bit nervous, not knowing if people were even going to want to be a part of it," said NDCAP executive director Ann Pollert. "But the lead-venison issue really hasn't impacted the interest in the program. Most of the processors from last year are more than willing to be a part of the program this year, and it looks like we may even add some new ones."

While interest remains high, Pollert said there may be some new guidelines for processors that would help reduce the incidence of lead in donated venison. For instance, one of the likely recommendations is that processors would not accept donations of deer that are shot anywhere in either hind quarter, because so much meat would have to be discarded to ensure a clean batch, that it wouldn't be worth the processing cost. At the same time, if a deer was shot through the front shoulders, one or both full quarters would not be used.

Department of Agriculture Meat Inspection Program

The level of quality control for donated venison is necessarily higher than most hunters might use in their own processing. In making the decision to recommend withdrawal of donated meat in March, the Health, Agriculture and Game and Fish departments all considered the venison donated to food pantries should have the same level of product quality as retail consumer meat. In fact, the mission of the Department of Agriculture's Meat Inspection Program is to "... ensure that the meat products consumers buy are safe to eat and free of contamination."

Certainly, it's reasonable for people to have the same expectations for food distributed by food pantries.



The Meat Inspection Program licenses commercial meat processing facilities in the state. All facilities have the same requirements for construction, lighting, equipment, sanitation and other specifics. Businesses that sell meat products either wholesale or retail within or outside the state are visited by either state or federal inspectors on a regular basis whenever animals are slaughtered and processed.

Any licensed business can process deer, but that activity is not inspected because it does not involve animals that are eventually sold at retail. All venison brought in by hunters is processed and returned to the hunter.

This category is called “custom exempt.” Dr. Andrea Grondahl, DVM, Meat Inspection Program director, says the state does not have any regulatory authority over the actual meat product that comes from deer processing. As such, individual processors develop their own guidelines for cutting up deer, both for individuals and those animals donated and destined for food pantries.

In early August, the Agriculture Department sent a letter to all licensed meat processors to explain the potential for lead in venison and offer suggestions for reducing the likelihood that lead particles would remain in processed meat.

“Most of the plants, if not all, already realize that lead remains in a carcass,” Grondahl said. “We want to make sure that they are also aware of the potential health risks ... and that we need to take precautions to minimize those risks.”

Some information and precautions outlined in the letter to processors include:

- There is currently no evidence linking venison consumption to lead poisoning in humans. However, the amount of lead found in some venison samples suggests that lead poisoning could occur in people who regularly eat venison shot with lead ammunition. Meat processors play an important public health role in venison processing and the Sportsmen Against Hunger donation program.
- Trim a generous distance away from the bullet wound channel and discard any meat that is bruised, discolored or contains hair, dirt, bone fragments or grass. Studies conducted to date have found lead in venison even though most processors usually trim away visibly damaged tissue.

- Periodically check grinders for lead fragments. The grinding process will create additional risks no matter what type of meat or other product is involved. USDA has determined ground beef to be a riskier meat product because if bacteria is present on the surface of one or more pieces of meat, it will be distributed throughout the batch when ground. Because lead is a soft metal, it can be ground along with venison, spreading lead contamination through an entire batch. If there is evidence of large amounts of lead contamination on the grinder plate, you may need to discard the venison that was ground since the previous time the grinder plate was cleaned. To minimize the amount of product that could be potentially discarded, check the grinder at least once per hour, or between each batch.
- Avoid or minimize batching of multiple deer to avoid cross-contamination. While it may not be possible to process single deer, using smaller batch sizes will also limit potential lead cross contamination.
- Develop standard operating procedures for all employees to follow.

Guidelines for Hunters

Hunters enjoy eating wild game. Venison, when taken care of properly, is a high-quality, low-fat, naturally produced source of protein.

Every North Dakota hunter develops a routine for getting a deer or other big game animal from the field to the dinner table. Some bring their deer into commercial processors, some cut up and package their entire animal at home, and some debone the meat at home and take some or all of it to a commercial processor for grinding into burger or sausage.

Part of that routine, whether it's processing at home or commercially, involves trimming and discarding meat that appears damaged from the bullet. Just how much meat is trimmed from around the bullet path is an individual choice based, at least up until now, partly on each person's perception of how much that “damaged” meat might affect the flavor of the remaining meat, and most likely not on eliminating lead particles.

Meat that is bloody, bruised or has embedded bone fragments or hair is almost always trimmed away.

The recent research findings provide solid evidence to suggest that even if these guidelines are followed, big game meat may still contain lead fragments beyond the muscle that is visibly damaged.

Hunters or processors who want to reduce the potential for lead particles possibly remaining in the meat should consider removing an additional portion surrounding the bullet pathway.

There is no definitive answer as to how much additional meat you need to discard to ensure that no random lead particles remain. Lead bullet fragmentation varies depending on several factors, including shot placement, distance and angle of shot, rifle caliber and bullet make-up.



One recent peer-reviewed scientific study in Europe indicated that 10 red deer and 10 wild boars taken by hunters all had elevated lead levels in meat measured from 10 to 15 centimeters – about 4-6 inches – from the bullet path. In meat from 6-10 inches from the wound channel, about half the animals still had a detectable elevated lead level.

No hunter wants to waste game meat. At the same time, no one wants to swallow a small particle of lead, either. It's important for hunters to know that the more meat that is trimmed away from the wound channel, the likelihood of lead fragments remaining is reduced.

Grinding vs. Whole Cuts

All of the venison tested for lead in North Dakota had been ground into burger. One Minnesota study also looked at whole cuts, which had a much lower incidence of presence of lead – 2 percent vs. about 30 percent for ground samples. This might suggest a couple of things: 1) that perhaps some of the outer trimmings from around the wound channel, those which are more likely to look OK but still have a likelihood of containing lead fragments, are separated for later grinding. Good meat that remains is cut up into steaks or roasts; 2) that grinding could tend to distribute lead throughout a batch of ground meat, if any of the meat had any lead fragments in it.

Wrapping it Up

Here's what we know so far:

- Lead is a harmful substance.
- Most firearm ammunition used for taking deer contains lead.

- Recent studies have confirmed that venison processed by hunters and commercial meat processors can contain lead particles.
- To date, no incidence of human lead poisoning from eating venison has been documented in North Dakota, or any other state.
- Hunters can eliminate the risk of lead in their game meat by using bullets that do not contain lead, such as those made from copper. They are considered an effective alternative, but are slightly more expensive than the highest quality bullets that contain lead.
- Hunters can maximize the amount of clean meat by carefully selecting shot placement. Since a good share of the meat on a big game animal is in the hind quarters, it's important to take shots that will not impact this area.
- Hunters who use lead bullets can reduce the potential presence of lead in their venison by significantly expanding the area they trim around the bullet channel. This would mean a significant reduction of meat if the animal was hit in the front or hind quarter.

These are all things known last year at this time, except for the documentation that venison, whether processed at home or commercially, may contain more lead fragments or particles than anyone previously thought possible. It is now up to hunters to decide how to apply that information to their own situation, while agencies work out the details that will sustain the growing and valuable venison donation program that helps thousands of low-income families around the state.

CRAIG BIHRLE is the Game and Fish Department's communications supervisor.



Many North Dakota hunters prefer to home-process their deer and pronghorn. After research in North Dakota and Minnesota last spring confirmed the presence of lead in some commercially processed venison, Minnesota Department of Natural Resources employees gathered 123 samples of venison they cut and ground up at home. About 18 percent of those home-processed samples had some lead contamination.

ADDITIONAL INFORMATION:

North Dakota Department of Health

Phone: (701) 328-2372

Website: <http://www.ndhealth.gov/lead/venison/>

ND Department of Health Recommendations

Most pieces of lead bullets should be removed during the dressing process, but even if properly processed, there is still a chance some pieces will remain in the meat. Because of the seriousness of lead poisoning, the North Dakota Department of Health advises that anyone who is concerned about how their wild game was cleaned and processed should not serve it to children or pregnant women, and may decide whether to eat it themselves.

North Dakota Game and Fish Department

Phone: (701) 328-6300

Website: <http://gf.nd.gov/>

North Dakota Department of Agriculture

Phone: (701) 328-2231

Website: <http://www.agdepartment.com/>

North Dakota State University

Phone: (701) 231-8975

Website: <http://www.ag.ndsu.edu/pubs/yf/foods/hunting/wildgame.htm>



Minnesota Study Verifying Lead Bullet Fragmentation

Minnesota Department of Natural Resources researchers were awaiting final analysis of a lead bullet fragmentation study as this issue of *North Dakota OUTDOORS* went to press, but some preliminary observations indicate considerable differences in fragmentation, depending on bullet type.

To conduct the study, DNR staff shot bullets into dead sheep that had been previously killed in farm culling operations. The sheep were then X-rayed to determine the bullet pathway and how much, if any, the bullet fragmented and distributed particles away from the wound channel.

Lou Cornicelli, DNR big game program coordinator, said it appears that most bullets do what they are designed to do. Soft point and ballistic tip bullets tend to fragment

much more than lead-core jacketed or copper bullets. The degree of fragmentation, Cornicelli said, was somewhat of a surprise, as in a few cases lead particles were discovered out to 12 inches away from a bullet entry wound.

Marrett Grund, DNR deer project leader in charge of the study, told Minnesota Outdoor News that he thought he did a good job of trimming meat from around the wound channel of deer he's harvested, but that X-rays from the study were showing that lead fragments go well beyond that. "It never dawned on me that it might be an issue," he said.

Game and Fish will provide final details on the Minnesota study when it is completed.