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The North Dakota Game and Fish Department is not recommending major changes for hunters this year. Rather, hunters should learn as much as they can about the lead-venison issue, so they can make informed decisions about bullet choices and processing their venison.

LEAD AND VENISON UPDATE

Studies Provide Insight for Deer Hunters

By Craig Bihrlle

As deer season approaches, North Dakota state agencies were still awaiting a preliminary report on a study that might help clarify just how much deer hunters should have to worry about the possibility of lead fragments in their venison.

The U.S. Centers for Disease Control and Prevention report is designed to determine if there is a correlation between venison consumption and blood-lead levels. Combined with results from a Minnesota study that documented a considerable and perhaps underestimated amount of lead fragmentation in deer taken with some types of bullets, hunters should have the information they need to make decisions on whether to change the way they harvest and process their deer and other big game animals.

While the CDC report was not available when this issue of *North Dakota OUTDOORS* went to press, it

was scheduled for release the week of November 3. The Game and Fish Department will post follow-up information on its website at gf.nd.gov as soon as it is available.

Both of these studies were initiated as a response to the discovery of lead particles in ground venison donated to food pantries in each state. The first discovery came from a small but valid investigation in North Dakota, which identified lead particles – likely from ammunition used by hunters to kill the deer – in more than 50 percent of packages of ground venison destined for distribution to food pantries.

Following this discovery, the North Dakota departments of Health, Agriculture and Game and Fish recommended to North Dakota food pantries to not distribute any more donated venison to clients. 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.

Minnesota then initiated its own investigation of donated venison, and found lead particles in approximately 20 percent of packages. That prompted a recall of donated venison in Minnesota as well. In addition, some Minnesota Department of Natural Resources employees later looked at their own home-processed venison, and found similar results.

That led to the Minnesota DNR's investigation of fragmentation and lead particle distribution among different types of bullets typically used for deer hunting, to determine just how much certain types of bullets fragment, so hunters and commercial processors have a better idea of what they're dealing with.

The CDC study came about because North Dakota Department of Health officials wanted to find out if inadvertent consumption of lead particles by people who eat venison might be an undetected public health issue.

More on the CDC Study

More than 700 state citizens, including those who eat venison and those who don't, participated in the study and had their blood tested for lead levels.

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. A lead level of zero is preferred for health reasons, according to Dr. Stephen Pickard, an epidemiologist with the North Dakota Department of Health, but it is not unusual to see lead levels of up to 2.0 in people across the United States.

While a preliminary report was not available as this is written, CDC did notify participants on individual results in early September. No one who participated in the North Dakota study had a blood-lead level of more than 10 $\mu\text{g}/\text{dl}$, the level that CDC considers as elevated. Only a few study participants had a blood-lead level of zero.

According to Pickard, there is no safe level of lead in the blood. Even levels below 10 can still cause health problems, including high blood pressure and reduced kidney function among adults and permanent brain injury among infants and preschool children. For children ages 6 and younger, any exposure to lead is considered too much.

After CDC notified individuals of their results, the Game and Fish Department tallied the levels of participating staff. Of 21 Game and Fish employees who provided their test results, many of whom frequently eat venison, the highest blood-lead level was 3.31 $\mu\text{g}/\text{dl}$, the lowest was 0.3 $\mu\text{g}/\text{dl}$, and the average was 1.34.

Still, lead is a toxic substance that no one would want to ingest on purpose. Many studies over the past 50 years have documented reductions in brain functions or development

in young children from relatively minor exposures to lead. 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.

The primary concern is this: in an adult, a one-time high exposure may not have any long-lasting health effects after the lead has eventually passed from the system. For children, especially those age 6 and younger when their neurological system is still developing, even a one-time, short-term exposure can slow or impair mental and physical growth. The longer or higher the exposure, the more potential for permanent damage.

How Does Lead Get in Venison?

The results of a bullet fragmentation study by the Minnesota Department of Natural Resources indicate that certain types of bullets may produce a lot more tiny lead fragments than most hunters, or commercial processors, would allow for in butchering an animal.

To conduct the study, Minnesota DNR staff used a .308-caliber centerfire rifle, muzzleloader and shotgun slugs, firing into previously euthanized sheep. Sheep have a body cavity similar to deer and were much more readily available in mid-summer. Five different bullet designs were used for the .308 – two rapid expansion and two controlled expansion bullets containing lead, and one all-copper bullet.

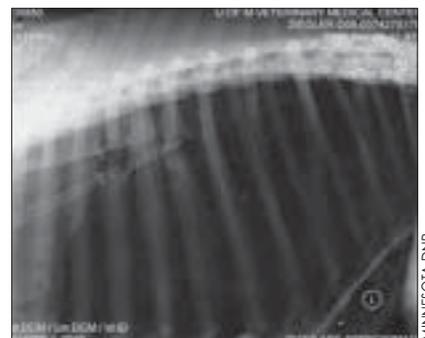
The sheep were shot through the chest cavity and later X-rayed and CT scanned to determine bullet path and extent of fragmentation. In addition, tissue samples at two, 10 and 18 inches from the exit wound were also analyzed for presence of lead.

Some of the Minnesota study findings include:

- The ballistic tip bullet (rapid expansion) had the highest fragmentation rate, with an average of 141 fragments per carcass and an average maximum distance of 11 inches from the wound channel.



X-rays from the Minnesota Department of Natural Resources bullet fragmentation show, above, many fragments from an animal shot with a soft point bullet, while below, no fragments from an all-copper bullet. A full report on the study is available on the DNR website at www.dnr.state.mn.us.





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One of the recommendations for reducing the likelihood of lead particles remaining in venison is for hunters to pass on shots like this, that might have a higher risk of hitting the hind quarter, where much of the meat on a deer is located.

Most of these fragments are too small to see or feel.

- The soft point bullets (rapid expansion) left an average of 86 fragments at an average maximum distance of 11 inches from the wound channel.
- Bullets with a nonexposed lead core and a surrounding copper case averaged nine copper fragments (no lead) at an average maximum distance of seven inches from the wound channel.
- Pure copper bullets fragmented the least, and those few fragments remained closest to the wound channel.
- While only about 7 percent of tissue samples taken at 10 inches from the bullet exit hole tested positive for lead, the

farthest fragments from rapid expansion bullets were 18 inches from the exit wound.

- Shotgun slugs left an average of 28 fragments at an average maximum distance of five inches from the wound channel, while 245-grain and 300-grain muzzleloader bullets averaged three and 34 fragments, respectively, at average maximum distances of one and six inches.
- The study also showed that a shot to the hindquarters of a deer, where heavy bones are found, will result in even more fragmentation from some bullet types. Fragmentation was so pronounced that a hunter would likely not want to utilize this meat as there would be no way to remove all the fragments.

The DNR indicated that a key message from the study is that given fragments were found so far from the exit wound, routine trimming will not remove all of the fragments and the DNR cannot make a recommendation as to how far out trimming should occur.

“These fragments really go a long way,” Lou Cornicelli, the Minnesota DNR’s big game program coordinator and study co-author told the Associated Press. “The take-home is if you shoot lead bullets, there’s going to be lead in the venison and there’s not much you can do about it.”

Game and Fish Recommendations

In an article in the August-September 2008 issue of *North Dakota OUTDOORS*, Game and Fish provided the following:

- Lead is a harmful substance.
- Most firearm ammunition used for taking deer in North Dakota 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 same recommendation is valid for commercial deer processors.) This would mean a significant reduction of meat if the animal was hit in the front or hind quarter.

In addition to these recommendations, the Department of Health recommends that hunters should follow North Dakota

Department of Agriculture processing recommendations. These were published in the August-September issue of this magazine, available online at the Game and Fish website, and at the Health Department's website, www.ndhealth.gov.

Now that the CDC and bullet studies are complete, the Health, Game and Fish and Agriculture departments plan to conduct further testing of venison to evaluate and further refine the cleaning and processing guidelines.

"We're leaving it to the hunters to decide for themselves if they'll do anything differently than in the past," says Game and Fish Director Terry Steinwand, "but the whole deer hunting experience shouldn't change. For the most part, I think it will be business as usual."

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

Venison Donation Program Accepting Bow-kills Only

North Dakota's Sportsmen Against Hunger program will accept only bow-killed deer for the remainder of the 2008 hunting season.

Sportsmen Against Hunger is a statewide venison donation program designed to help low-income individuals meet their basic food needs. It is administered by the North Dakota Community Action Partnership, which raises funds to help pay for processing of donated deer, and also arranges distribution of the low-fat, high-protein meat to food pantries and other emergency food outlets.

SAH is reaching out to bowhunters this year because of the possibility that venison donated by gun hunters could contain lead particles from bullets that are not removed during processing. Because of the discovery of lead particles in donated venison last spring, about 4,000 pounds of meat had to be discarded.

While SAH was planning to change its guidelines for accepting and processing deer taken with rifles, NDCAP executive director Ann Pollert said results of recent studies indicate that even with new guidelines, the risk of lead particles showing up in donated venison was still too high.

North Dakota will likely issue more than 15,000 bow licenses this fall, with thousands of additional gun season licenses also available for use by bowhunters during bow season. "Meat is a valuable staple for our food pantries," Pollert said, "and we encourage bowhunters who harvest an animal they don't need to donate it to this program."

Sportsmen Against Hunger is supported not only by donations of deer, but also monetary donations that help pay for processing. Pollert said wildlife, conservation and service clubs, and even nonhunters can support the program through financial donations.

"This program is a win-win for everyone, but funding for processing the meat is the bottleneck," Pollert said. "Emergency food providers



For the Sportsmen Against Hunger program to succeed this year, it will need many donations of deer from bowhunters.

could accept over 71,000 pounds of venison - that's about 1,400 animals. We process as many animals as we have funds to cover."

A list of processors participating in the Sportsmen Against Hunger program this year are listed on the Game and Fish Department website at gf.nd.gov. Each processor can only take a certain number of deer, so hunters are encouraged to call ahead to make sure the processor can take in more deer.

The list is also available at the NDCAP website at capnd.org. More information on the program is available by calling Pollert at (701) 232-2452.

