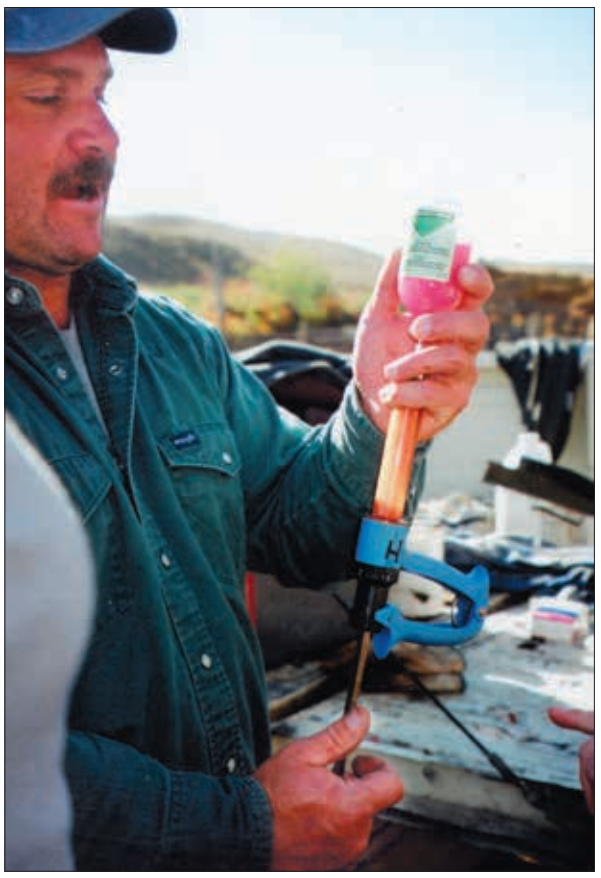
Herd HEALTH



Vaccinating Cattle Safely

Follow these best practices for safety of both crew and cattle.

by ***Heather Smith Thomas***

Most beef herds are vaccinated at least once a year, and many go through the chute twice or more annually. It is important to make sure these cattle-working tasks are accomplished smoothly and safely, for safety of the crew doing the job and optimum health of the cattle being worked.

Human safety

Veterinarian and assistant clinical professor, field service, at Kansas State University College of Veterinary Medicine Nora Schrag says the place to start is to walk through the facilities you'll be using to hold, sort and restrain the cattle.

"Walk through them with two things in mind," she explains. "Be thinking in terms of the people working around this facility and taking note of anything that might be dangerous to them. Many set-ups use pipes behind animals in the chute alleyway to keep them from backing up. Notice the way gates swing and the directions the levers go."

Schrag says to consider what kind of squeeze chute you have. "If you are standing in the wrong spot when an animal is released, or your head is in the wrong place, you may get hurt. You need to make sure that you and your crew — whoever will be working there, especially if some are people who aren't used to working around cattle, or new to your particular facility — know about the danger areas. Point out the places they need to be aware of. Walking through the facility with these things in mind is very important."

She also says to look at the facilities from the animal's point of view. "I always walk into the tub or down the chute alleyway, looking for any nails that might be sticking out or bolts, or maybe a flap of tin hanging out that an animal could get caught on, or anything they could put their foot through. There might be something that was perfectly fine the last time you worked cattle, but may not hold for today. Things change. These facilities are out in the weather, we use them, cattle bounce against things, and sometimes it's not very obvious where it broke the last time. Then an animal hits it again and it's very obvious. So pay attention to these things at the start, and the whole time you are working cattle; keep facility functionality in mind."

It also pays to try to handle the cattle in the best possible way as they flow through the process. "You might point out to the crew that a certain corner is a bit tight and they need to be careful as they go around that, or not put too many through a certain gate at once. These things make a big difference. It's a lot easier to prevent injuries than to fix them later," she says.

It's also good to do some human safety reminders when working cattle. "It depends on how many people are involved. If there's just one person pushing cattle up and one person working at the chute, it's not very complicated. But sometimes there might be several people doing things, to make it go faster, and there are some things that can make a difference in how likely you are to get poked with a needle, or have some other kind of accident," Schrag says.

"I sometimes have students helping, who are inexperienced, and I always stress that they need to be aware of every person and every animal around them. This is wise, even for people who are very experienced. Keep safety precautions in mind."

It pays to do things in a routine, safe way.

"When you are refilling or holding a syringe, always keep your elbows down at your sides. Then if someone walks past you, they're not as likely to bump your elbow and bump your hand," she explains.

"If you are refilling syringes, one of the dangers is accidentally poking yourself or someone else. Most of the vaccines aren't dangerous to humans, but blackleg can cause a serious inflammatory reaction. Avoiding accidental needle pokes should be high priority. Keep your elbows at your sides, and if you are holding a bottle to refill your syringe, stick out one finger and touch your other arm for stability and steadiness. Then if someone bumps you, there's no way that the needle will jump into your hand. You already have your hands locked together and braced. Thus when you are reaching out in front of you with both hands in the air, your elbows are tight and one hand is touching the hand holding the bottle already. Then if you are bumped, the needle has no chance of going into your hand."

Always keep safety in mind. When working cattle, you may be reaching through bars to vaccinate or apply medication. Depending on facilities, this process may be easy and safe or it may be risky — pay attention to what you are doing.

"A couple of general rules can keep you from getting hurt," Schrag says. "Always reach over rather than through, when possible. If you are reaching through, be aware of what you and the animal are doing, and be ready to pull back if the animal moves. Any time that you can open a bar instead of reaching through it is preferable."

The animal may lunge or jump and catch your hand, wrist or arm between it and the bar. "Even people who have been working around chutes for a long time sometimes get hurt. Anything you can do to minimize situations where your arm could get pinched will help," she says.

Think ahead to what might possibly happen. It's all about trying to predict those problems rather than helplessly watching them happen. And it helps if the people who are doing the vaccinating have had some experience and know the risks.

Animal safety

"From the animal's standpoint, adequate restraint is very important," Schrag explains. "I personally have filled an alleyway with cattle, and vaccinated them without catching heads, and it can work fine, in the right facility. This works, as long as we keep in mind the Beef Quality Assurance

(BQA) criteria. We need to be injecting into the neck, and if this is not possible in the alleyway, then we really need to be catching them," she says.

"Broken needles are another concern when cattle are not properly restrained and are moving around. It also helps if you are using a very short needle; a short one is less apt to bend or break. You can use a very short needle when giving subcutaneous injections, and most vaccines today are given subcutaneously. We like to use a 16-gauge 5/8 in. needle, which makes it almost impossible to get it into the muscle. It's pretty foolproof, even if you are vaccinating quickly and the animal moves. It will end up in the right place and that needle isn't likely to break, because it's big enough and short enough," she explains.

Another advantage of the short needle is that it eliminates the need for tenting the skin, and allows the person doing the vaccinating to keep his free hand out of the way of the needle, even if the cow or calf is moving around.

Depending on the vaccine you are giving, however, you may be using different needles. "With some there might be a little bit of leak-back with a needle this large. In this instance you can drop down to an 18-gauge. It all depends on the type of vaccine and the volume being given. For most purposes, however, I really like the 5/8 in. length for subcutaneous injections," Schrag says.

"Depending on the brand, some of the reproductive vaccines (like leptospirosis) are still labeled for in the muscle, and then you can go to a 1 in. needle. I like the 1 in. 16-gauge needles because they don't bend or break as easily as the longer, smaller ones," she says.

If a needle breaks off in the animal, you have a food safety issue as well as a cattle health issue. "If this happens, you need to stop that animal right where it is, mark the spot, and call a veterinarian, and see if they can get it out. If they can't get it out, that animal cannot enter the food chain," she explains.

Also pay attention to the temperature when vaccinating cattle. "If it will be a hot day, we prefer not to vaccinate if it gets above 85 degrees and 40% humidity," Schrag says.

"I won't vaccinate cattle if it gets above 95 degrees. We are already stressing those cattle, and on a hot day we see more vaccine reactions. Think about what the day will be like, and what time of day you will be doing this. If we can start early morning and be done by 9 a.m. then it's fine. But if we can't get it done that quickly and we know it might get up toward 100 degrees that day, we should choose a different day to vaccinate. If an animal has any sort of reaction at all to the vaccine, in addition to high temperatures, this can be very hard on them."

Proper restraint is important to get the vaccine in the right place. The adverse reaction rate to vaccination goes up drastically if you accidentally inject directly into a blood vessel. "The most frequent time we see this is when people are roping and dragging calves, and injecting into the neck of the roped calf. If you get a little bit too low, it may go right into the calf's jugular vein. Just having someone paying attention to this is important. The people vaccinating the calves may start out in the perfect spot and then as things get rolling along may creep down a couple inches. On a little calf, a couple inches can put it right into the jugular vein," she says.

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Check dates and labels

Follow label directions for vaccine handling and storage, dosage and administration, and check expiration dates before you use the vaccines. Make sure the vaccine purchased on sale last spring is still viable this fall. Expired vaccine may not be as effective for stimulating immunity.

Most vaccines need to be refrigerated. If it's an older refrigerator out in the barn or on the back porch, make sure the refrigerator stays at the proper temperature — keeping things cool enough but not freezing. "It pays to keep a thermometer in there and make sure the refrigerator is actually capable of maintaining the proper temperature," says Nora Schrag, DVM and assistant clinical professor, field service, at Kansas State University College of Veterinary Medicine.

"When vaccinating cattle, remember that modified live vaccine is only good for two hours after it's been mixed together. Try to use it up within an hour. My rule of thumb is to mix only what you think you'll use in an hour. That way, if a cow gets out of the headcatch or flips over in the alley, you have time to deal with the situation before your vaccine is inactive. Your vaccine will still be good up to about two hours." **HW**

1. Supplies needed: soap, cooking oil spray, distilled water and a zipper storage bag.

Cleaning syringes

The repeat dosing syringes (multi-dose syringe guns) are a little bit difficult to clean, but they always need to be cleaned. "A good rule of thumb is to clean them with regular soap and hot water on the outside, and on the inside. If you've used a vaccine that's very thick, take the syringe apart completely and clean it with soap and water, and then rinse thoroughly with clean water," says Nora Schrag, DVM and assistant clinical professor, field service, at Kansas State University College of Veterinary Medicine.

"You should use distilled water to rinse with, so it won't leave any deposits or residue from the water. Many people have hard water, and modified live virus vaccines are very sensitive to mineral deposits and disinfectants. The minerals in hard water will mix with the components of the vaccine sometimes and cause problems. You also don't want to clean a syringe with disinfectant and then use it for a MLV vaccine, or the vaccine will be deactivated," she says. The syringe should be clean. Use soap and water, and then rinse it with distilled water.

2. Wash the syringe inside and out with soap and water.

3. Lubricate rubber rings with cooking oil spray — it's sterile.

4. Draw up boiling hot distilled water into syringe and squirt it. Repeat three times.

5. Put clean syringe in zipper storage bag, but do not seal it tight until it dries out completely.

"The final step is to boil some distilled water or heat it in a microwave for two minutes to get it boiling. Put the recently cleaned syringe back together. Then suck up the boiling water and blow it out the end of the syringe, three times. After you've done that, the syringe is not perfectly sterile (not like it would be in an autoclave), but it is very clean, and safe to use to vaccinate cattle," she explains.

"After the syringes are thoroughly rinsed with boiling water, we put them in Ziploc bags to store in a cabinet so they won't get dusty," she says. "Don't tighten the Ziploc or it will seal dampness inside. Leave it open enough to dry out. Then you can come back in a day or so when it's all dry, and seal it up. Then we can put that syringe in our treatment box or wherever we will be using it next or storing it until the next use. Then when we pull it out, it's clean and ready to go." **HW**

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"This can even happen in a chute if the calf is bouncing around and turns his head. You might inject where you normally do, but his neck is now sideways. Just keep in mind that there's a jugular vein down there at the lower part of the neck and make sure you are staying away from that area."

Also keep in mind that almost all vaccines have a withdrawal time. "Some people forget this. They may remember that antibiotics have a withdrawal time — a certain number of days you have to wait before the treated animal can be slaughtered for human consumption — but might forget that this applies to vaccines, too. Many vaccines contain a preservative, and this is why they have a withdrawal time on the label. Make sure to observe this, from a food safety standpoint. Some of those withdrawal times, depending on the preservative, is quite long; a few are more than 30 days. Read the label."

It's also wise to change needles periodically when vaccinating a large group of cattle, even if the needle you are using is not yet dull or bent. Schrag says how often to change needles may depend on the operation.

"For a purebred operation that is trying to control leukosis or make sure we are not spreading any kind of blood-borne disease around, we actually recommend changing needles for every animal — using a separate, sterile needle for each one. This recommendation sometimes surprises people, but if you have high dollar animals or breeding stock, this is very cheap insurance and it's really not that hard to do. It might take another couple of seconds. It seems cumbersome if you are not used to changing needles that often, but you can become very efficient at it once you get used to doing it."

She recommends that for commercial cattle and feeder calves, you change the needle every 10 to 15 head. "This seems to work well," she says. "Sometimes it gets pushed to 30 head, but that should be the limit, for one needle, especially since it may get damaged." If you bumped something with the needle, it may have a slight burr on the tip and isn't as sharp anymore, causing more pain and tissue damage when you use it.

"Also, every once in a while you get a little blood back into that needle and this will transfer it to the next animal. It pays to change needles, and a person can just make a habit of changing needles each time you refill the multi-dose syringe gun. This is an easy way to remember. It's not that people don't want to change needles, but sometimes you just get going through the cattle and forget. So if you make a habit of changing each time you fill the syringe, this is a good way to do it," she says.

When filling a syringe from a large bottle that may not be used up that day (a killed vaccine product that will keep longer), use a sterile needle. "It might be a 50 ml bottle of blackleg or some other clostridial vaccine and you are only going to use 25 doses. Don't go back into that bottle with a needle that's been in a calf. Use a new needle, or designate a certain needle that you are using only for going into the bottle, and inject the calves with another needle," Schrag says.

Always try to vaccinate into a clean area on an animal. Sometimes when it is waiting its turn in the runway to the squeeze chute it gets manure on its head and neck from the animal in front of it.

"We want to vaccinate into the triangular area of the neck but sometimes we have to move to the other side (that's cleaner) or even something different. If the neck is dirty on both sides you may have to put an injection (subcutaneous) under the loose skin behind the shoulder," she says.

"When people rope and brand calves, this is actually an easier spot to vaccinate the calf than in the neck. Someone usually has their leg on the neck, holding the calf on the ground. It's safer for both the calf and the human to inject over the ribs." This injection site is not a meat quality issue, and the animal will be able to function just fine with the vaccine put into this location.

"It's really safe for the person administering the vaccine." Bottom line — the goal is to keep the people and the animals safe and healthy and to not impact the animal adversely. **HW**

Don't take a shot in the dark

Reduce vaccine failure by understanding cattle status, employing vaccination management techniques and using the right vaccines at the right time.

by ***John Comerford***

Fall vaccinations are a vital part of successful health programs for beef herds. These programs include preconditioning programs for feeder calf sales as well as maintaining effective health status in the cow herd. I often hear about cattle and calves that get sick anyway after vaccination, and the usual answer is "that vaccine wasn't any good." However, there is a lot more to vaccine failure than just the stuff in the bottle. Vaccination failure to prevent disease comes in three parts: the animal, the people and the vaccine.

The animal

Despite administration of a good vaccine, the cattle will get sick anyway. The causes are numerous but are usually confined to the environment for the animal, the parasite, and other health status, stress and nutrition status. Otherwise healthy cattle, primarily calves that are under some form of stress from the environment, will not respond to vaccines adequately. This stress includes extremes in hot weather, dehydration or other environmental factors. Stress from transportation, weaning, castration, comingling or simply handling can reduce the ability of the animal to develop the desired immunity to disease from the vaccine because these activities are additive sources of stress.

When you are weaning calves this fall, either vaccinate ahead of this date or wait a few days until the stress has subsided. Combine as few other management activities as possible with vaccinations. When you are receiving cattle, the 24-hour rest period before handling new cattle will allow the transportation stress to subside and the cattle to rehydrate. Cattle that are already sick will not respond to vaccines. If there is some signal the cattle are sick, use treatment for the disease to fix the problem. This feature also includes heavy parasite loads.

Cattle obviously in a malnourished state will also not respond well to vaccines. The immune status of young cattle can also be decreased from maternal antibodies for the very young calf, and for calves under 3 months of age, the immune system may not be fully developed.

The people

Vaccines also fail because people do not use them correctly. Understanding the causes of stress already outlined should be considered when handling the cattle and planning vaccinations. The protocol for the use of a vaccine is on the label of the product and should be followed to the letter. Vaccines that are not mixed correctly, usually modified live vaccines, will not work under the best of conditions.

Mix only the amount of vaccine you are going to use in a short period of time, keep a cold cooler at the chute to hold the mixed product, use transfer needles for mixing and do not shake the mixed product harshly. Never mix different vaccines in the same syringe. Storage of any vaccines in the pickup is another source of failure because they may become overheated or freeze or be exposed to sunlight. Mix, handle and store vaccines according to the label.

A good general rule is to use a new needle for each animal. Needles used on multiple animals can distribute bugs through the herd, including diseases like bovine leukosis virus, for which there is no vaccine. Sometimes the vaccine just does not get in the animal properly. The desired route of administration is always subcutaneous, but those requiring intramuscular (IM) administration can fail from leakage at the vaccination site, not getting the product deep enough in the muscle to allow vascular contact and using the wrong needle size. In most cases, an 18 gauge needle 1 inch long should be used for IM vaccinations in the neck. Needles too small or too short do not deposit the product correctly internally, and those too big cause injury and bleeding that will disrupt uptake of the vaccine. Contact your state beef council for information about becoming a Beef Quality Assurance certified producer and for information about effective drug use and injection technique.

The vaccine

The main reason the vaccine itself fails is because it is the wrong product for the disease. Most of the time, however, vaccines contain most of the major serotypes for the disease they are intended to control. If there is a disease issue in the herd, use the best vaccine for that disease by making sure you know from necropsy or other tests what disease is present. A vaccine can fail when the disease challenge is greater than the level of immunity, and this situation occurs most often when proper boosters were not given or the challenge occurs a short time after administration and the immunity has not developed. Again, the label will describe the timing and the need for boosters. Some boosters are recommended for multiple times each year. Timing of vaccination is critical in some cases. For example, pinkeye and scours vaccines must be administered at the right time ahead of a challenge. Modified live vaccines for cows should be given after calving and before breeding starts to prevent abortions. Vaccinations and boosters will be needed prior to transportation, weaning and other high-stress activities for feeder cattle.

No vaccination program will prevent 100% of disease challenges, but the odds can be improved by understanding the status of the cattle, using good vaccination management techniques and using the right vaccines at the right time. **HW**

Editor's note: *John Comerford is a professor emeritus of animal science at Penn State.*