



Last quarter I discussed proper vaccine handling and this quarter I will give some information on various vaccine considerations. Vaccinating cattle is by no means a necessity to raising healthy cattle nor does it completely eliminate your risk for health problems. However, when used correctly, vaccines are a tool that can prepare your herd's immune system for issues that may arise. For this article I will restrain from listing vaccine product names, as there are numerous options and your local veterinarian would be a better source for what is available in your area. I will also try to hit the main areas of concern (most common pathogens), as touching on all the possible vaccine options would be too exhaustive for this article.

With Cattle there are 3 main areas that we target for vaccine protection: Respiratory, Digestive, and Reproductive systems. Although there is overlap, the first two areas are more of a concern with younger calves, while the third is obviously a concern for mature cattle. There are also some geographical differences to consider when formulating a vaccination protocol, especially in the digestive area. For example, Anthrax is thankfully uncommon in most of the United States, but there are pockets that have a higher incidence and therefore would benefit from vaccination. Respiratory issues, however, tend to be more of a universal problem for cattle and they become even more of an issue when cattle are confined or shipped. Pinkeye is a fairly common ailment that doesn't quite fit into these 3 categories, but can be vaccinated for.

Respiratory Pathogens:

Respiratory pathogens are broke down into either viral or bacterial pathogens. The 4 most common bovine viral pathogens are BVD (Bovine Viral Diarrhea type I & II), IBR (Infectious Bovine Rhinotracheitis), PI3 (Parainfluenza 3), and BRSV (Bovine Respiratory Syncytial Virus). Viral vaccines that contain these viruses are often called "5-way viral vaccines" as they contain both types of BVD plus the other 3 viruses. They are available as either a "killed vaccine" or a "modified-live vaccine" (MLV). In short, killed vaccines contain in-activated viral particles that don't require any mixing of the vaccine. MLV vaccines require mixing of a sterile diluent with a cake portion containing live virus that has been modified to a non-pathogenic form. Killed vaccines require a booster dose within 3-6weeks of the initial dose, while MLV vaccines do not require a booster. Annual revaccination is required to maintain immunity to your desired pathogen.

The three most common bacterial respiratory pathogens include *Mannheimia haemolytica* (formerly *Pasteurella haemolytica*), *Pasteurella multocida*, and *Histophilus somni* (formerly *Haemophilus somnus*). The first 2 bacteria listed are often in combination in a MLV version, while *H. somni* is available as a killed vaccine. Cattle respiratory disease has been called "shipping fever" for years, as traveling cattle have a higher incidence of disease due to the stress of hauling and commingling with other cattle. Vaccination of the above viruses and bacteria has proven effective in preventing shipping fever in cattle and may be a consideration when deciding to bring cattle to the show or as a prerequisite when you're considering buying new cattle.

Digestive Pathogens:

Digestive pathogens can be broke down into viral, bacterial, protozoal, and foreign objects. Rota and Corona viruses are the two main viruses that are a concern for newborn calves. They can cause severe diarrhea that is easily spreadable to other young calves, but fortunately is fairly easy to prevent with proper vaccination. They are found in combination in killed "scour" vaccines that can be given to the cows prior to calving. There is some variation in vaccination timing but all three available scour vaccines should be given their boosted dose no later than a month prior to calving. This allows the

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heifer or cow to produce the appropriate antibodies that will be provided for the calf in her colostrum. Rota & corona viruses also come in a MLV version that can be given orally to newborn calves at birth. Bovine Viral Diarrhea (BVD) virus, as its name denotes, is another viral cause of diarrhea in addition to its respiratory and reproductive ailments. There are several digestive bacteria pathogens that can be detrimental to cattle. First off, *E. coli* and *Clostridium perfringens* Type C are the two most common bacteria that show themselves in young calves and are in combination with rota & corona viruses in the scour vaccines mentioned earlier. For the older calf there are more *Clostridium* bacteria to be aware of; some digestive in origin (consumed), others infected through injury. They are often found in combination vaccines often nicknamed "7-way" or "Blackleg" vaccines, as they contain 7 types of *Clostridium* in a killed product. Blackleg is an often fatal muscle infection caused by *Clostridium chauvoei* which can be fairly common and is where the nickname for the vaccine comes from. In addition, the following 6 *Clostridium* species/types are included in a "7-way" vaccine: *Cl. Septicum* (causes malignant edema), *Cl. Novyi* (causes black disease), *Cl. Sordellii* (causes gas-gangrene), and *Cl. perfringens* Types B, C and D (causes enterotoxemia and enteritis). In addition, there are also vaccines containing *Clostridium perfringens* Type A by itself, in a killed product. In the past 15 years, Type A has been found in many scour cases in calves and has been seen in adult dairy cows as the often fatal "jejunal hemorrhage" syndrome. Tetanus is also in the *Clostridium* family (*Cl. tetani*) and comes in a killed vaccine which should be given when banding bull calves. *Salmonella* is another bacterium that can cause enteritis in young and adult cattle and has a killed vaccine. It is often carried by birds that "deposit" it in the feed bunks and mangers. Two protozoa that cause digestive issues in calves are *cryptosporidium* and *coccidia* and are in a class by themselves. They act more like a parasite than a bacterium; thus there are no preventative vaccines for protozoa. They can, however, be minimized with management and some various products for prevention/treatment (coccidiostats/ionophores) once diagnosed. The last "pathogen" mentioned above was foreign objects and by that I mean the wire, nails, and various other metal objects that cattle are prone to consume in their feed. They can cause a condition often called "hardware", when the object pokes through the stomach wall and either travels thru the gut or directly into the heart and lungs. Obviously, there is no vaccine to prevent that, but I like to recommend cattle magnets whenever discussing a vaccination plan as they can prevent the metal object from causing damage to the animal. The magnet stays in the reticulum (stomach compartment) for the remainder of the bovine's life.

Reproductive Pathogens:

Reproductive pathogens can also be broken down into viral, bacterial, and protozoal components. Bovine viruses that cause reproductive failure (abortions, failure to conceive, testicular infections, & development of persistently infected calves w/ BVD) are actually some of the same viruses that cause respiratory issues. BVD and IBR are the main viral culprits in reproductive failure. As mentioned earlier, they can be given in either a killed vaccine or a MLV vaccine. They are also found in combination with the bacterial pathogens responsible for reproductive failure. Those bacteria include *Campylobacter fetus* and various types of *Leptospira* (*L. canicola*, *L. grippityphosa*, *L. icterohaemorrhagiae*, *L. pomona*, & *L. borgpetersenii* serovar hardjo type hardjo-bovis). The bacterial portion of these vaccines is killed and therefore requires a 3-6 week booster. The last bacterial pathogen I'll mention is *Brucella abortus*, which causes abortions. It was first isolated by a Danish veterinarian by the name of Bangs and has since been nicknamed "Bangs" disease. Bangs vaccination can only be done by a licensed and accredited veterinarian who applies an official USDA metal tag and tattoo to the right ear at the time of vaccination. It is also limited to heifers between the ages of 4 & 12 months. The vaccine is a live culture of *Brucella abortus* and special care must be taken not to inject oneself with the vaccine. There are a couple protozoa (*Neospora caninum*, *Tritrichomonas foetus*) that can hamper reproductive success, but like other protozoa they must be managed. There is actually a killed vaccine available for *neospora*, however its incidence is so low that it is not widely used.

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In conclusion, there are a few limitations that must be considered as you formulate a vaccination protocol. The first would be to be aware of the number of "Gram negative" bacterial vaccines you are giving at one time. Common Gram negative vaccines would include: *Pasturella* vaccines, *Histophilus somni*, *E. coli*, *Salmonella*, Lepto 5 combos, or pinkeye vaccines. A good rule of thumb is to never give more than two injections of Gram negative vaccines on the same day. An individual injection of a combination including more than two Gram negatives is acceptable, for example, a 5-way Lepto vaccine can be given with an additional Gram neg. vaccine. In addition, if outside temperatures exceed 90°F, plan to vaccinate on another day or pick the cool of the morning/evening. Another limitation involves the use of modified-live 5-way vaccines on pregnant cows. MLV vaccines will note on their product label if they are safe for pregnant cattle or not. If they are safe, the only way you can give the vaccine to pregnant cows is if they have had 1-2 doses prior to being exposed to a bull or AI. If given to a naïve animal that is pregnant they will abort their calf. Two doses given pre-breeding is recommended to ensure their immune system has "seen" the vaccine prior to becoming pregnant. Also, when giving a MLV 5-way vaccine prior to breeding, it should be done at least a month prior to when you plan to breed. The reason for that is that the first reproductive cycle (21 days) after an initial dose of a MLV 5-way vaccine may not be as receptive to conception.

Vaccinating cattle can be confusing and frustrating, but if you have a plan in place that coincides with times you are already working or moving cattle (calving, going to grass, working calves, weaning, pregnancy checking, etc), it can prove successful in helping to maintain a healthy Dexter herd. If you are considering formulating your own vaccination plan, I would recommend you seek advice from your local veterinarian or an experienced cattleman/woman who is aware of your local health concerns. They can recommend specific products to use that have proven effective in your area.