



Vol 1. #7

Good Morning. It is August 27. This week's articles focus on Part II of preconditioning programs while the second article provides a background on **Trichomoniasis** ("Trich"). Have a great week!! John Paterson, Extension Beef Specialist

**Preconditioning Programs: Vaccination, Nutrition, and Management (Part II)**

**Dr. Charlie Stoltenow, NDSU Extension Veterinarian**

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**Bacterial and Viral Agents Which Cause Bovine Respiratory Disease**

The agents responsible for producing respiratory disease in beef cattle are both viral and bacterial. Viruses rely on the animal's own cells to produce more virus whereas bacteria have all the cellular functions necessary to reproduce without the aid of an animal's cell. Antibiotics can be used for fighting bacterial infections but are ineffective at fighting viral infections. The viral and bacterial agents most commonly associated with BRD are shown in the chart below.

**Viral Agents**

- Infectious bovine rhinotracheitis (IBR)
- Bovine viral diarrhea (BVD)
- Bovine respiratory syncytial virus (BRSV)
- Bovine parainfluenza 3 virus (PI<sub>3</sub>)
- Bovine adenovirus
- Bovine rhinovirus
- Bovine reovirus
- Bovine enterovirus
- Bovine coronavirus

**Bacterial Agents**

- Pasteurella hemolytica
- Pasteurella multocida
- Hemophilus somnus
- Mycoplasmaspp
- Chlamydiaspp

Of all the viral agents, IBR, BVD, BRSV, and PI<sub>3</sub> are the only viruses which cause acute respiratory disease by themselves. All the other viruses require significant interaction with other pathogens. Of the bacterial pathogens, neither Mycoplasmaspp. nor Chlamydiaspp. are considered primary pathogens in weaned or yearling cattle.

A pathogen causes disease. Rarely is only one pathogen responsible for BRD. Two or more pathogens work in concert with each other to bring about morbidity and mortality. Respiratory viruses compromise the animal's respiratory defense mechanisms to allow bacterial pathogens access to the lower respiratory tract. This is what causes the pneumonia commonly associated with BRD.

Prevention

**Three keys to a successful vaccination program are effective vaccines, animal response, and proper timing of the vaccination.**

**Vaccines**

A vaccine is a suspension of attenuated or killed microorganisms, or the antigenic proteins derived from them. Two key components are required for successful vaccination. They are an efficacious vaccine and a functioning immune system

within the animal. Furthermore, for a vaccine to work, the immune response that it elicits must occur prior to the challenge of the infectious agent. In other words, the vaccine must be administered before the animal becomes exposed to the disease to be truly effective. If a vaccine is used in any fashion other than prior to exposure, vaccine efficacy will be suboptimal or negligible.

**Vaccines are not always 100% effective.** There can be many reasons for vaccine failure which include:

The animal may have been incubating the disease when it was vaccinated.

Something may have happened to the vaccine to make it ineffective, such as mishandling (ie exposure to sunlight, heat, adverse climatic conditions).

**The immune status of the animal may make it unresponsive to the vaccine.** The immune system of the calf may not be fully functional, antibodies derived from the colostrum of the cow may still be present and inactivate the vaccine, or the nutritional program may be inadequate and not allow an immune response to occur.

The animal may be exposed to an overwhelming dose of the infectious agent.

The duration of immunity after vaccination was not adequate.

A booster may be required for proper vaccine response. Be sure to read and follow the label.

Important antigenic differences exist between the vaccine and field strains.

There are two categories of vaccines, killed and modified-live. A killed vaccine is just that, killed. No self-replicating microorganisms are present in the suspension. The advantages of a killed vaccine are:

- More stable in storage.
- Unlikely to cause disease due to residual virulence or reversion to virulence.

Modified-live vaccines contain microorganisms which have been made attenuated through culturing and laboratory procedures. The advantages of a modified-live vaccine are:

- Stronger immune response achieved with fewer doses.
- Possible stimulation of interferon production.

Microorganism contained in the vaccine resembles the pathogenic form of microorganism more closely.

An important point must be made regarding modified-live vaccines. Some modified-live vaccines are capable of inducing disease in the immunosuppressed animal. They are not recommended for use in animals with compromised immune systems (very young animals, animals already battling an infectious disease, or pregnant animals).

#### **What to Vaccinate for in a Preconditioning Program**

Backgrounding yards and feedlots are in the best position to determine if preconditioning vaccination programs are effective in decreasing the morbidity and mortality of BRD. Table 1 lists the vaccines requested by stocker and feedlot operators.

**Table 1. Preconditioning vaccination preferences of stocker cattle and feedlot industry.**

<b>Antigen</b>	<b>Stocker</b>	<b>Feedlot</b>
IBR	69%	70%
BVD	60%	58%
PI <sub>3</sub>	63%	56%
BRSV	57%	48%
Clostridials	64%	46%
H. somnus	42%	34%
Pasturella	9%	16%

Adapted from NCA/IRM Calf Information Task Force Calf History Information Survey. 1995.

According to Table 1, IBR, BVD, and PI<sub>3</sub> were the most important viral pathogens to be included in a vaccination program. However, the use of the bacterial vaccines was not as universally accepted. This is true in part because no one vaccine program or preconditioning program will meet the needs of all backgrounding or feedlot operations.

Table 2 shows examples of vaccination and preconditioning programs which producers can use. Producers should work with their local veterinarian for programs specific to each farm or ranch.

**Table 2. Calf health programs for preconditioning calves.**

<b>Health Program</b>	<b>Required Management Procedures</b>	<b>Timing of Administration</b>
<i>Vac 24</i>	<p><i>Vaccinated Against:</i></p> <p>IBR (chemically altered modified live)            PI<sub>3</sub> (chemically altered modified live)            BVD (killed)            BRSV (modified live or killed)            7-way Blackleg            Pasteurella haemolytica (with leukotoxoid component)</p>	2 to 4 months of age
<i>Vac 34</i>	<p><i>Vaccinated Against:</i></p> <p>7-way Blackleg            IBR (chemically altered modified live)            PI<sub>3</sub> (chemically altered modified live)            BVD (killed)            BRSV (modified live or killed)            Pasteurella haemolytica (with leukotoxoid component)</p>	<p>At branding or turnout.</p> <p>At least 3-4 weeks prior to weaning.</p>
<i>Vac 45 Pre-weaning Option</i>	<p><i>Vaccinated Against:</i></p> <p>IBR (chemically altered modified live)            PI<sub>3</sub> (chemically altered modified live)            BVD (killed)            BRSV (modified live or killed)            7-way Blackleg            Pasteurella haemolytica (with leukotoxoid component)</p> <p><i>Revaccinated Against:</i></p> <p>IBR (modified live or chemically altered modified live)            PI<sub>3</sub> (modified live or chemically altered modified live)            BVD (modified live or killed)            BRSV (modified live or killed)            Pasteurella haemolytica with leukotoxoid component)</p>	<p>At 2 to 4 months of age or at least 3 to 4 weeks prior to weaning.</p> <p>At weaning.</p>
<i>Vac 45 Weaning Option</i>	<p>Weaned at least 45 days prior to shipment.</p> <p><i>Vaccinated Against:</i></p> <p>7-way Blackleg            IBR (modified live or chemically altered modified live)            PI<sub>3</sub> (modified live or chemically altered modified live)            BVD (modified live or killed)            BRSV (modified live or killed)            Pasteurella haemolytica (with leukotoxoid component)</p>	<p>Beginning at weaning.</p> <p>At branding.</p> <p>At weaning and revaccinated 14 to 21 days later.</p>
	<p>Weaned at least 45 days prior to shipment.</p>	<p>Beginning at weaning.</p>

<i>Vac Pre Con</i> <sup>1</sup>	<i>Vaccinated Against:</i> 7-way Blackleg IBR (modified live or chemically altered modified live) PI <sub>3</sub> (modified live or chemically altered modified live) BVD (modified live or killed) BRSV (modified live or killed) Pasteurella haemolytica (with leukotoxoid component) Backgrounded for at least 60 days.	Upon arrival.    Upon arrival and revaccinated 14 to 21 days later.   Beginning at purchase.
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<sup>1</sup> The Vac Pre Con program was designed for producers who purchase weaned calves and background them in drylot or on pasture.

Adapted from King (1998).

## Summary

Development of an effective vaccination, nutrition, and parasite control program during the preconditioning period should result in lower incidence of morbidity and mortality when calves are placed in a backgrounding yard or a feedlot. Vaccinations needed may vary from herd to herd. An effective nutrition program will enhance calf performance and get cattle adjusted to a drylot quickly. Consult your veterinarian for help in developing a specific preconditioning vaccination and parasite control program tailored to your operation.

### Trichomoniasis in the Southwest John Wenzel, DVM Extension Animal and Natural Resources Department New Mexico State University

#### **Introduction**

Trichomoniasis is a sexually transmitted disease of cattle caused by the protozoa *Tritrichomonas foetus*. The disease is characterized by an increase in open cows detected at preg checking time and/or an increase in dry cows at spring branding. Trichomoniasis can result in an extended calving season. These characteristics can result in a severe financial loss to cow-calf enterprises.

#### **The Disease in Cows**

Trichomoniasis is strictly a venereal disease that does not make cows or bulls outwardly sick. Cows develop the disease after being bred by an infected bull. The infection develops in the cow's reproductive tract and usually causes early embryonic death. The cow will usually cycle again after the loss of pregnancy, which results in her passing the infection to any bull that breeds her before she mounts an immune response and clears the infection. It takes about 3-5 months for a cow to clear the infective protozoa. The cow will clear the infection about 97% of the time. The remaining 3% of cows can become carriers and remain infected through calving. These carrier cows can keep the infection in the herd from year to year. Untested positive bulls will also carry the infection from year to year. Immunity from the disease only lasts about 12 to 15 months so a cow can become reinfected if bred by an infected bull the next year. A few infected cows develop scarring in the uterus that makes them infertile. There is no medication available that is effective in treating the disease.

#### **The Disease in Bulls**

The bull is a mechanical spreader of the disease. The *T. foetus* organism lives on the surface of the penis and prepuce in small folds called crypts. The older the bull, the deeper and more numerous the crypts thus, it is easier for bulls over three years of age to become chronically infected. Younger bulls (as young as yearlings) can develop the infection but may not become chronically infected. The bull contracts the disease by breeding an infected cow and picking up the *T. foetus* organism on the surface of the penis. There is no response by the bulls' immune system, so he does not develop any resistance to the organism. Additionally, there is no treatment for this disease.

#### **Diagnosis**

The disease is very difficult to diagnose in the cow because it requires successive, negative tests.. The test is performed on cervical mucus samples. Because of the logistical challenges of testing cows, most testing is done on bulls.

#### **Control**

Control measures established in New Mexico in 2005 are designed to help limit exposure and spread of the disease but are only part of a complete program to prevent or eradicate the disease. Contact your local veterinarian for recommendations regarding prevention and eradication of Trichomoniasis on your ranch.

#### **Trichomoniasis Control Tips**

- ✓ test all bulls 2-3 weeks after the end of breeding season and cull any bulls positive for *T. foetus*
- ✓ cull all open cows at preg check and any dry cows at spring branding
- ✓ test all incoming bulls that are added to the bull battery
- ✓ do not share or lease bulls unless a Trichomoniasis prevention program is in place
- ✓ do not add cattle from unknown herds or with unknown calving histories
- ✓ keep fences in good repair to prevent exposure to neighboring cattle
- ✓ consider using only virgin bulls

### **Prevention**

To prevent the disease from entering a clean herd, only add bulls with a negative test or certified virgin bulls. Also, only add cows or heifers from known negative herds. Annual testing of the bull battery is recommended to catch the disease early if exposure does occur. An effective vaccine is available to immunize females against the disease; however, the vaccine stimulates immunity that is protective for a short period of time and must be used according to label directions. Vaccinating cows against *T. foetus* can be a valuable part of a total prevention or eradication program. The vaccine is not effective in preventing the disease in bulls.

### **Economics**

Trichomoniasis is a disease that can be economically devastating in a short period of time. A susceptible cow that is bred by an infected bull will become infected and usually abort, cycle again, shed the organism, and then settle, infecting all bulls that breed her while she is infected. Infected bulls can only be sold for slaughter. A cow that rebreeds will usually calve 4 to 6 months later than normal so her calf is much lighter at weaning. Many cows will not rebreed and will have to be culled as open cows. Other cows that were pregnant at preg check may abort. Although less common, abortion can occur as late as 240 days of gestation. The loss in calf crop can reach as high as 50% the first year, depending on the number of infected bulls in the herd with susceptible cows. A herd that has one positive test is quarantined and can only sell breeding age females for slaughter (unless more than 120 days pregnant) until the quarantine is lifted. The quarantine does not affect the sale of weaned calves. Preventing introduction of the disease into a herd is the key to avoiding economic loss.

***For more information about Trichomoniasis prevention and control programs, contact your local Veterinarian.***

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