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## Health of the Herd Bull

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### INTRODUCTION

The importance of the herd bull to the reproductive performance and profitability of cow herds that utilize natural service cannot be underestimated. Health problems in a bull may result either in decreased fertility in that bull or, in the worst case, in an infectious disease that could spread to the rest of the breeding herd, with disastrous results for herd fertility. For these reasons, the health of incoming and existing herd bulls is of utmost importance.

### HERD BULL DISEASES OF IMPORTANCE

Conditions that can affect bulls may be divided into two categories: 1) infectious diseases that may affect the herd beyond the bull's own fertility and 2) conditions that affect the bull himself and his ability to successfully breed cows.

#### A. Herd Conditions

1. *Bovine Viral Diarrhea (BVD)*. BVD is a viral disease that has the potential to cause profound detrimental effects on herd fertility. BVD infections in pregnant cows may result in a wide range of clinical signs, including formation of persistently infected (BVDV-PI) calves, abortions, or birth defects. BVDV is also an immunosuppressive agent, and animals infected with BVDV are more susceptible to secondary infections.

Bulls can be infected with BVDV either transiently or persistently and serve as a source of infection for cows. BVDV-persistently infected bulls are relatively rare, but they represent a tremendous source of BVDV exposure for cows and other cattle present on pastures. BVDV can be shed in the semen of persistently and transiently infected bulls.

2. *Trichomoniasis*. Bulls are the primary reservoir for trichomoniasis, a protozoal disease that is transmitted venereally. *Trichomonas* infections cause inflammation within the female reproductive tract, resulting in a failure to conceive, early embryonic death, or less commonly, abortions. Infected bulls, especially older bulls, persistently

harbor the organism in the skin of their penis and sheath. Cows are infected during the act of breeding and serve as a source of infection for uninfected bulls that breed them on the subsequent inseminations.

3. *Leptospirosis*. Several different strains of *Leptospira*, a bacteria, can cause late-term abortions and conception failure. One of these strains, *Leptospira interrogans* serovar *hardjo-bovis*, is "host-adapted," meaning it tends to persistently colonize organs such as the kidneys and reproductive tracts. While leptospirosis is not a venereal disease, bulls can harbor infections and serve as sources of infection (via urine) for the rest of the herd. Nonhost-adapted strains can also cause illness (and in cows, abortions), but these strains are not carried long term by the affected animal.

4. *Vibriosis*. The causative agent of vibriosis is the bacteria *Campylobacter fetus* subsp. *venerealis*. The clinical and infectious aspects of vibriosis are very similar to those of trichomoniasis: the organism causes inflammation in the female reproductive tract, resulting in failure of conception or early embryonic death. Infected bulls are both long-term carriers and a reservoir for infection in the breeding herd.

5. *IBR-Infectious Bovine Rhinotracheitis*. IBR (or "red nose") is a viral disease often associated with respiratory diseases in younger cattle. It also is a cause of conception failure and abortions in cows. IBR is another illness that may be passed from bulls to cows (and vice versa), although not via breeding.

#### B. Conditions primarily affecting the individual bull

1. *Johne's disease*. A chronic and progressive bacterial disease, *Johne's* is significant in bulls because of their potential role in bringing this disease into a previously noninfected herd. Animals affected with *Johne's* usually only show clinical signs (wasting and chronic diarrhea) after animals are several years old. In spite of this, young

calves are most susceptible to infection and may be exposed to Johne's on pasture by bulls or cows shedding the organism (usually by animals with clinical signs).

2. *Lameness due to injury or infection.* Musculoskeletal injuries resulting in lameness, often as a result of fighting, are common in multiple-bull pastures. In addition, foot rot, or interdigital dermatitis, can affect bulls frequenting areas such as stock dams or waterways. Besides the obvious detrimental effect on a bull's locomotion, pain and stress associated with these ailments decreases sperm production through the effect of excess cortisol on testosterone production.

3. *Pinkeye.* Bulls are visual breeders (they depend on vision to follow the herd and identify cows in heat). Infectious bovine keratoconjunctivitis (IBK, or "pinkeye") not only will affect a bull's vision but also is a source of pain and stress for the animal.

4. *Vesiculitis.* The seminal vesicles, glands located within the bull's pelvis, contribute seminal fluid to the ejaculate. Inflammation of these glands, which is termed "seminal vesiculitis," may be detected in bulls—especially younger bulls—presented for breeding soundness examinations. This inflammation usually stems from a bacterial infection entering the gland from the bloodstream (as a consequence of rumen acidosis, liver abscesses, or infection elsewhere in the body). The presence of pus in the ejaculate means these bulls are not fit for breeding. Young bulls with vesiculitis often respond to antibiotics or a period of sexual activity, but in older bulls this condition is usually chronic and unresponsive to treatment.

5. *Other conditions.* Any illness resulting in fever for a prolonged period of time may depress semen quality. In addition, infections due to Gram-negative bacteria anywhere in the body may depress sperm formation due to release of endotoxins into the bloodstream.

Substances such as gossypol (a common component of cottonseed meal) and zearalenone (a toxin produced by certain molds in certain feeds) may have detrimental effects on sperm production. Although data is very limited, there is no evidence to suggest routine antibiotics, non-steroidal anti-inflammatories, or parasiticides have effects on semen quality.

## **BIOSECURITY CONCERNS FOR PRODUCERS BUYING BULLS**

Biosecurity may simply be defined as "practices employed to ensure new diseases (or strains of disease causing agents) do not enter the existing herd." A biose-

curity program for cow-calf operations may be divided into pre- and postpurchase considerations.

### **A. Prepurchase information**

Just as a bull's EPD or genetic makeup is important to the future calf crop, a bull's health history or herd of origin is important to the future health of the herd. The health aspects that are important depend on what level of herd health the buyer seeks. For example, a buyer who has a Johne's testing program in place on his/her operation will by necessity be concerned with the Johne's status of the animal he/she is purchasing. Other factors, such as BVD-PI animals, are important to keep out of the herd no matter the circumstance.

In some cases concerning infectious disease, the test status of the herd is more important than the test status of the individual animal. Certain diagnostic tests, such as the current blood tests for Johne's disease, have low sensitivity in detecting individually infected animals. However, when that test is applied to many individuals in the herd, the chances are greater that at least one infected animal will be detected (and the herd therefore identified as Johne's-positive). An individual animal originating from a Johne's infected herd, even an animal that tests negative after its herd has been diagnosed as Johne's-positive, is at risk for clinical illness later in life. For other diseases, such as BVD-PI status, individual testing is quite sensitive and should be applied to individuals entering the herd.

### **QUESTIONS TO ASK PREPURCHASE**

1. *What herd testing is being done in the herd on a regular basis?* Examples of testing to look for include herd status in the voluntary Johne's Control Program, ear-notch testing for BVD-PI, or trichomonas testing of bulls.

2. *What testing has been performed on the individuals for sale?* Examples include ear-notch BVD-PI testing, trichomonas testing (required for non-virgin bulls before sale), or Johne's disease (with consideration of testing limitations as explained above).

3. *What is the vaccination program for herd animals?* Proper vaccination programs for bull calves start before they are weaned and continue on an annual basis. For reproductive diseases, pre-breeding vaccination provides better protection than vaccination during gestation.

4. *Has a Breeding Soundness Examination (BSE) been performed?* A BSE that meets the minimum qualifications outlined by the Society for Theriogenology is the best evidence of the semen quality and soundness of the purchased bull. However, a high percentage of yearling bulls

may not have reached adequate maturity to pass a BSE. As a result, depending on the age of the bull purchased, a BSE may not have been performed yet.

## **B. Postpurchase procedures that ensure bull health**

1. *Isolation.* Incoming bulls should not be exposed to the resident herd immediately. Rather, incoming bulls should be placed in isolation. Considerations about both the facility used and the isolation time period should be given:

a) *Facility considerations.* Any appropriate-sized pen or building could be used as an isolation facility, provided there is no possibility of nose-to-nose contact with existing herd animals, including shared water or feed sources. Generally, longer distances are better than shorter distances, although most important cattle diseases do not travel long distances through the air. Some conditions are transmitted via the fecal-oral route, so isolation facilities should not drain into spaces that the existing herd has access to, or vice versa. Equipment such as tractors and skid loaders should not travel between isolated animals and the existing herd without being thoroughly sanitized.

b) *Time period considerations.* In general, an isolation period of 30 to 60 days is adequate for an incoming bull to recover from any transient (temporary) shedding of disease agents, for testing procedures to be completed, and for vaccinations to become effective. Stress of transportation may allow once dormant infections, such as IBR virus, to be re-activated. It's important to realize that for some persistent conditions, such as BVD-PI or infection with *Lepto-hardjo-bovis*, any amount of isolation time will not be long enough—these conditions need to be addressed through diagnostic testing or treatments.

2. *Disease testing.* During the isolation period, samples for diagnostic testing should be taken and animals not allowed to enter the herd until negative test results are received. Testing new bulls for disease conditions needs to be planned and considered carefully. If a bull tests positive for Johne's disease, for example, and the purchaser elects to keep the animal to enter the breeding herd anyway, testing is a wasteful exercise. Examples of tests that could be employed during isolation are similar to those discussed in pre-purchase testing above.

3. *Vaccination.* The vaccination status of new bulls should match as closely as possible that of the herd they will enter. Vaccinations such as pre-breeding shots or intranasal IBR-PI3 may be considered, depending on the time of year and current herd practices. Knowledge of the bull's prior vaccinations and consultation from your veterinarian will help guide this practice.

4. *Treatments.* The carrier state of *Lepto hardjo-bovis* may be cleared by administration of a dose of long-acting tetracycline. New bulls should be treated with parasiticide products appropriate to the time of year before they are mixed with the breeding herd.

5. *Breeding Soundness Exam.* All bulls should be submitted to a BSE prior to the breeding season. New bulls should be evaluated if they were not tested prior to purchase, if it has been an extended period of time since the last BSE, or if the bull has been injured since the last BSE.

## **HERD BULL "MAINTENANCE"**

Maintaining bull health from year to year depends a great deal on 1) supporting the bull nutritionally, 2) maintaining immunity, and 3) managing parasite loads.

1. *Vaccinations.* Herd bulls are members of the breeding herd, too, and they potentially play a role in disease transmission. Therefore, bull vaccinations are just as or more important than the vaccination of the cow herd. Ideally, vaccines should be administered 2 to 4 weeks before turnout to the breeding pasture.

a) *Viruses.* Common viral vaccine combinations include BVDV, IBR, PI-3, and BRSV. Killed or modified live vaccines (MLV) are available. In general, MLV vaccines stimulate a broader immune response and are usually effective after a single dose, as compared to killed virus vaccines. To date, there is no evidence to suggest that the administration of MLV vaccines to bulls has any detrimental effect on semen quality.

b) *Leptospirosis\**. Five-way leptospirosis bacterins are common and important components of many pre-breeding vaccines (as bulls can become infected on pasture and assist the transmission of leptospirosis). Newer vaccines that include *Lepto hardjo-bovis* should be strongly considered as well.

c) *Vibriosis\**. Vaccines against vibriosis are considered effective in preventing, and possibly also in clearing, infections from bulls. Vibriosis is also commonly included in pre-breeding vaccine combinations.

d) *Trichomoniasis\**. Unlike vibrio vaccines, vaccines against trichomoniasis are not effective in prevention of infection. Their role is limited to use in already-infected herds as a means to improve pregnancy rates.

e) *Pinkeye\**. Because of the severe potential effect of pinkeye infection in a herd bull, vaccination should be considered. Protection from pinkeye infections is very strain-dependent, and vaccine failures are not uncommon.

mon. For this reason, fly control measures such as insecticide tags, rubbers, or pour-ons are also important.

f) *Foot rot*\*. For bulls in some pastures, foot rot vaccine (against *Fusobacterium necrophorum*) may be considered. Foot rot, like pinkeye, is a multi-factorial disease, and other control measures, such as attention to muddy conditions, should be employed.

\* Leptospirosis, vibriosis, *Moraxella* (pinkeye), and *Fusobacterium* (foot rot) are Gram-negative bacteria. Vaccinating an animal with more than two vaccines containing these antigens at the same time has the potential to result in excessive levels of endotoxin delivered to the animal—a condition that could result in impaired semen quality or illness in bulls.

2. *Parasiticides*. Treating bulls for internal parasites prior to entry onto the breeding pasture will reduce the bull's parasite load and decrease the amount of worm eggs deposited onto the pasture. Bulls and cows should be treated at the same time. In the fall or winter, a product that treats for external parasites should also be given.

Bulls are of great importance to the reproductive productivity of the cow-calf enterprise, and need to be in optimal health for their best performance. Also, bulls most likely represent the most frequently added animal from other herds, therefore representing a potential source of new disease agents for a herd. Paying attention to health decisions before and after a bull is purchased—and close consultation with a veterinarian—will help ensure that bulls do not become liabilities to the herd.