



# COOPERATIVE EXTENSION SERVICE

DEPARTMENT OF VETERINARY SCIENCE  
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## Recommended Practices for the Control of Bovine Respiratory Disease in the Cow-Calf Herd

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### BACKGROUND

This management guideline is a joint effort between the National Cattlemen's Association (NCA) and the American Association of Bovine Practitioners (AABP). Cattlemen and veterinarians must continually contend with shipping fever and the respiratory disease complex. It is good economic practice for their management systems to rely upon the most effective and proven disease prevention techniques.

The NCA and AABP formed a technical working group on herd health and bovine respiratory disease to establish good management practices for the industry. The group plans to revise and expand this management guide as needed in the future.

### INTRODUCTION

This management outline attempts to present the ideal immunization program. There are regional and area differences in disease incidence and the general health of cow herds.

Your management needs may vary. You may need more or fewer treatments. **CONSULT WITH YOUR VETERINARIAN BEFORE CHANGING YOUR CURRENT PROGRAM. AT ALL TIMES, FOLLOW THE LABEL DIRECTIONS ON ANY PRODUCT USED.**

### GENERAL

Respiratory diseases continue to be the major cause of disease loss in beef cattle. The costs to cattlemen for treatment, weight loss, death loss and culling in weaner calves are estimated to be about a third of a billion dollars annually.

Approximately 80 percent of U.S. feeder cattle originate in herds of 50 cows or less. Because of the closed-herd status and scale of operation, it is sometimes difficult for these producers to appreciate the care and processing these calves should receive to be properly immunized. In addition, the concept of "preconditioning" has been poorly interpreted or badly abused by producer, buyer and veterinarian alike. Furthermore, some feeders want to buy replacement cattle at the cheapest price and in as thin a condition as possible. They frequently overlook the immediate health status and prior immunization of animals they are purchasing, hoping to compensate for losses that might occur through compensatory gains. Success rates vary considerably.

Preconditioning is the preparation of the calf to better withstand the stress of movement from its production site into and through marketing channels. If a preconditioning program is followed, sickness and death rate will be reduced and weight gains improved. Preconditioning involves castration

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and dehorning, proper immunization against costly diseases, control of parasites, weaning and water trough and feed bunk adjustment at the calf's production site.

Preconditioning is a complete health management program. "Pre" means before some event. "Condition" means to process, to prepare. Preconditioning feeder calves means "to prepare them so they can best withstand the stress and adjustment they undergo when they leave their point of origin in route to the feedlot."

In simple terms, preconditioning is a management tool--it is an insurance program--which involves the use of best known practices to produce and market healthy feeder calves. Basically, preconditioning is common sense and sound husbandry.

### **"HIDDEN" ECONOMIC LOSSES**

Cattlemen often fail to recognize all costs associated with sick cattle. The average sick animal will shrink 10-20 percent. Considerable additional labor is required per sick animal. Medicine, treatment regimens and death losses are expensive. One study revealed an average three-day medication cost for a 400-lb. calf is \$7.08. A 5 percent death loss increases the cost of each calf \$10-\$20, or 5-8 percent. One time through a chute is considered equivalent to a seven-day feeding period; therefore, it is cheaper to prevent disease than to treat it.

### **BOVINE RESPIRATORY DISEASE (BRD)**

Bovine respiratory disease is difficult to control, highly complex and not completely understood. BRD usually involves more than one respiratory disease organism; the role of a single disease organism in the respiratory disease complex is difficult to assess.

### **DISEASE COMPLEX AND STRESS**

Many facets of BRD are influenced by geography, season, transportation, herd management, marketing system, nutrition, vaccination and the management attitudes of the cow/calf producer and the feeder. Numerous studies have shown that BRD results from the combination of stress plus viral, bacterial and other infectious agents.

### **STRESS FACTORS**

Stress factors include fatigue, hunger, thirst, dust, anxiety, ammonia build-up, adverse weather, weaning, castration, dehorning, shipping, mixing with other cattle and unnecessary and/or abusive handling.

### **BACTERIAL ORGANISMS (PATHOGENS)**

Bacterial organisms which have been implicated in BRD are *Pasteurella*, *Pseudomonas*, *Haemophilus* and other bacteria. *Pasteurella multocida* and *Pasteurella hemolytica* are the bacterial organisms most frequently isolated from lung lesions of cattle dying from BRD. *Haemophilus somnus* appears to be a significant cause of respiratory disease. Other pathogens may be added to this list upon further study.

### **VIRAL ORGANISMS (PATHOGENS)**

Viral organisms which have been shown to be involved in BRD are Infectious Bovine Rhinotracheitis (IBR), Parainfluenza-3 (P1<sub>3</sub>), Bovine Virus Diarrhea (BVD), reoviruses, syncytial virus, rhinoviruses, adenoviruses and as yet unclassified herpes viruses.

### **OTHER ORGANISMS**

Other microorganisms involved in BRD are chlamydia, mycoplasma and rickettsia. Their role in BRD is not fully understood.

### **ROUTES OF INFECTION FOR BRD**

Bovine respiratory disease is seldom the result of a single factor. BRD usually is caused by a combination of stress, virus infection and invasion of the lungs by pathogenic bacteria such as *Pasteurella* and *Haemophilus*. Stress undermines the natural defenses built in the lining of the trachea and bronchi, and respiratory viruses (such as IBR, P1<sub>3</sub>, BVD, etc.) further damage these natural defenses. Ultimately, pathogenic bacteria find a wide open road into the lungs where they localize, multiply and cause the severe damage we call BRD, or pneumonia, or shipping fever.

### **VACCINATION - TO PROTECT AGAINST RESPIRATORY DISEASE**

**NOTE: Follow the label directions on any products used.**

**Viral infections:** Immunity against IBR, BVD and P1<sub>3</sub> can be achieved by the administration of virus vaccines to cattle. Modified live and inactivated virus vaccines are available in single or combination forms. The routes of administration of these vaccines are intramuscular (IBR, P1<sub>3</sub>, BVD) or intranasal (IBR and P1<sub>3</sub> only). Both intramuscular and intranasal vaccines provide adequate immunity.

**Bacterial infections:** Bacterial infections can be controlled with bacterins (vaccines) which are composed of killed organisms. Two injections 14 or more days apart are needed for adequate protection whenever bacterins are used.

**Other organisms:** Currently, there are no immunizing agents available for chlamydia, mycoplasma and rickettsia associated with BRD.

## RECOMMENDED IMMUNIZATION AND MANAGEMENT PROGRAMS FOR A BEEF COW-CALF HERD

### CALVES

Because of differences in climate, geography, production systems and individual management, it is not possible to make a single recommendation for all areas. Several different management options are presented for each individual cattleman's consideration.

#### PROGRAM "A"

##### For Young Calves (1-3 months of age)

1. Respiratory diseases
  - a. *IBR-P1*, (use killed vaccine intramuscularly or modified live vaccine intranasally)
  - b. *Pasteurella*
  - c. *Hemophilus somnus*
2. Other diseases
  - a. *Leptospirosis* (single or multiple strains available)
  - b. *Clostridial diseases* (includes *cl. chauvei*, *cl. septicum*, *cl. novyi*, *cl. sordellii*, *cl. perfringens C and D*, and *cl. haemolyticum*)
3. Other procedures which should be done at this time:
  - a. Implant with approved growth stimulants (except animals to be kept for breeding)
  - b. Castrate and dehorn
  - c. External and internal parasite control. (Some products are not recommended to be used in very young calves)

#### PROGRAM "B"

##### For Older Calves (3-4 weeks prior to weaning)

1. Respiratory disease
  - a. *IBR-P1*: If killed vaccine was administered at 1-3 months of age, it should be readministered as a booster, or a modified live vaccine intranasally

or intramuscularly may be used instead of the killed product. However, if this is the initial vaccination and not a booster, use the modified live vaccine intranasally or intramuscularly.

b. *BVD*: BVD vaccine is available singly or in combination with modified live IBR virus, and/or P1, virus, and/or *pasteurella*. Since calves are not apt to be heavily stressed when vaccinated 3 to 4 weeks before weaning, a "combination" BVD vaccine could be used at this time.

Some cattlemen and veterinarians prefer not to administer BVD simultaneously with IBR-P1, modified live vaccine intramuscularly because of the added stress on the animal. This is true in very young or heavily stressed animals which can be vaccinated against BVD 2-3 weeks later; in this case, at weaning time. It must be emphasized that calves stressed in any form (e.g.: castrated, dehorned, branded, shipped, etc.) should not be vaccinated against BVD, otherwise adverse reactions could occur.

c. *Pasteurella and Hemophilus somnus*: Two injections, 2 to 4 weeks apart, are needed whenever *Pasteurella* and *Hemophilus bacterins* are used. If the first injection is given at this time, follow with the booster injection at weaning time.

2. Other diseases (not generally part of BRD complex) which may be considered at this time:

a. *Clostridial diseases booster*

b. *Leptospirosis*

c. *Vibriosis* (Heifer and bull calves kept for breeding)

d. *Brucellosis* (for heifer calves): Requirements vary among different States. Consult with your veterinarian regarding specific regulations in your State. It is a one-time vaccination and generally must be administered by a licensed veterinarian, or other designated animal health official. All brucellosis vaccinations must be officially reported to the appropriate State agency.

3. Other procedures

a. Vitamin A (injectable preferred)

b. Implant with approved growth stimulants (except animals to be kept for breeding).

c. Treat for internal and external parasites.

NOTE: If your immunization program is begun early enough, both initial and booster shots may be administered prior to weaning. This will reduce stress at weaning and reduce shrink and amount of time required to regain weaning

weight. This regime is subject to local practices, individual herd health needs and various combinations of vaccines. The above recommendations, early immunization, processing of cattle and other management practices are designed to reduce stress at weaning.

#### Calves - Weaning Time

1. If original and booster shots have both been given, no additional immunization is needed at this time. Treat for internal and external parasites, if not done 3-4 weeks prior to weaning.
2. If the first vaccination series as listed in Program "A" (Young Calves, 1-3 months of age), above, has been given, give boosters as listed under Program "B" (3-4 weeks prior to weaning) and treat for internal and external parasites.
3. For calves that have not previously been vaccinated, several alternatives are feasible, depending upon type of confinement, feed, equipment, availability of labor and final disposition or destination of the calves. **Calves must be handled twice for optimum results; two programs ("C" and "D") are outlined for your selection:**

#### PROGRAM "C"

##### At Weaning

1. Respiratory disease
  - a. *IBR-P1*, intranasally or I.M. (killed vaccine).
  - b. *Pasteurella* bacterin
  - c. *Hemophilus* bacterin
1. Other diseases
  - a. *Clostridial* bacterin
3. Other procedures
  - a. Internal parasites
  - b. Implant
  - c. Vitamin A

##### 14-21 Days Later

(Providing calves are consuming 2-3 percent of body weight of feed, or are on pasture and eating well)

1. Respiratory disease
  - a. *IBR-P1*, booster if killed vaccine was used at weaning
  - b. *BVD* vaccine
  - c. *Pasteurella* booster
  - d. *Hemophilus* booster
2. Other diseases (not generally considered part of BRD) which may be prevented at this time.
  - a. *Clostridial* booster
  - b. *Leptospirosis* bacterin
  - c. *Vibriosis* bacterin
  - d. *Brucellosis* (heifers)
3. Other procedures
  - a. Treat for external parasites

#### PROGRAM "D"

##### At Weaning

1. Respiratory disease
  - a. *Pasteurella* bacterin
  - b. *Hemophilus* bacterin
  - c. *BVD* vaccine
2. Other diseases
  - a. *Clostridial* bacterin
3. Other procedures
  - a. Treat for internal parasites
  - b. Implant
  - c. Vitamin A

##### 14-21 Days Later

(Providing calves are consuming 2-3 percent of body weight of feed, or are on pasture and eating well)

1. Respiratory disease
  - a. *IBR-P1*, intranasally or I.M.
  - b. *Pasteurella* booster
  - c. *Hemophilus* booster

2. Other diseases (not generally associated with BRD) which may be considered at this time.

- a. *Clostridial* booster
- b. *Leptospirosis* bacterin
- c. *Vibrio* vaccine (heifers and bulls)
- d. *Brucellosis* (heifers)

### ADDITIONAL MANAGEMENT TIPS

High levels of antibiotics may be fed during the weaning period on the advice of your veterinarian. Do not attempt to feed antibiotics unless calves are consuming 2-3 percent of their body weight of feed. The need and the level of antibiotics should be determined by your veterinarian. Prior to working cattle, consult with your veterinarian concerning the use of epinephrine to treat shock or sensitivity reactions in cattle. It is a **potent** drug. You should know the clinical signs of shock and sensitivity, indications for epinephrine and its dosage. Always take time out to observe cattle that have been treated.

### MANAGEMENT OF CALVES AT WEANING

1. Calves should be eating some dry feed 2-4 weeks prior to weaning.
2. Vaccination procedures should be reviewed and changed as necessary, depending upon health conditions of specific lots of cattle, environmental conditions and prevalence of various diseases in the immediate area.
3. An adequate fresh water supply is essential, preferably from a source which cattle can see or hear running.
4. Vitamin A prior to or at weaning is generally recommended.
5. Check feed and water consumption--both should increase during the weaning period.
6. Provide good high quality hay. Calves should be consuming 2-3 percent of body weight of feed before either the feed or water is medicated.
7. Check calves 2 or 3 times daily.
8. Seek professional help from your veterinarian when needed and before a major problem arises.

### MARKETING AND TRANSPORTATION

A. Minimize stress factors as follows:

1. It is crucial to get calves moving through marketing channels quickly.
2. Avoid crowding and bruising.
3. Avoid conditions of extreme temperature variations, dust or wetness.
4. Feed and water calves before shipping.

B. Other factors to improve health:

1. Upon arrival at the feedlot, cattle should first be fed hay prior to having access to water. Be sure to have adequate water facilities available. Begin a limited feeding of grain and protein supplement.
2. Segregate sick animals.
3. Tractor exhaust stacks must be tall enough for gases to clear trailer well.
4. Avoid ammonia build-up in trucks, yards, barns or sheds from excess urine, manure, moisture. Ammonia contributes to respiratory disease.
5. Start adequate treatment promptly. Identify sick cattle and treat as recommended by your veterinarian.

### COW HERD, REPLACEMENT HEIFERS AND BULLS

It must be emphasized that vaccination and adequate handling of calves are part of, but not a substitute for, a total herd health management program. It is essential that an adequate breeding herd vaccination program be implemented if maximum benefits are expected from vaccinating and/or preconditioning calves.

The following recommendations are intended to insure immunization of the breeding herd against diseases of recognized significance.

A. **Replacement Heifers and Bulls** (generally 10-15 months of age)

The immunization outlined below should be boosted annually, no later than 30 days prior to breeding.

1. Replacement Cattle with Unknown History Status - Heifers **not** pregnant.
  - a. **First Working**
    1. Immunization: (a) IBR-P1, (b) *Vibriosis*, (c) *Leptospirosis* (d) *Clostridial* diseases. (e) *Haemophilus*. (f) *Pasteurella*.
    2. Other treatment: (a) Treat for internal parasites. (b) Vitamin A.

**b. Second Working (14-30 days later)**

1. Immunization: (a) BVD. (b) Leptospirosis booster. (c) Vibriosis booster. (d) Clostridial booster. (e) Haemophilus booster. (f) Pasteurella booster.
2. Other treatments: (a) Treat for external parasites, depending upon grub development and season. (b) If heifers are of **eligible** age, vaccinate for brucellosis. If heifers are older than of eligible vaccination age, they should be tested, possibly twice, for brucellosis.

**2. Replacement Cattle Sufficiently Immunized by Calfhood and Weaning Programs**

This is recommended as optimum management, starting after calves are weaned and assuming they have had at least the minimal recommendations suggested for calves.

- a. Booster vaccinations: (1) IBR. (2) BVD. (3) Leptospirosis. (4) Vibriosis. (5) Clostridial.
- b. Other treatments: (1) Internal and external parasites. (2) Vitamin A.

**B. Mature Cows and Bulls**

Assuming that the breeding herd of Mature Cows and Bulls has been previously immunized either as calves or as herd replacements the following booster immunizations are recommended:

<b>Booster Immunizations</b>	<b>Not less than 20 days prior to breeding</b>		<b>Last trimester of pregnancy</b>
IBR	X	or	X-Killed or intranasal vaccine
BVD	X		*?
Clostridial	X	or	X
Leptospirosis	X		
Vibriosis	X		

Frequently veterinarians recommend that IBR, \*BVD and Clostridial immunizations be administered during the last trimester of pregnancy because it conveys a greater passive immunity to the calf. One should be cautioned, however, that if IBR is administered during the last trimester of pregnancy that it be a killed product, or an intranasal vaccine.

\*BVD vaccines are modified live virus vaccines and ordinarily should not be administered to pregnant animals. However, there are experimental studies and reports of practitioners having administered BVD vaccines during the last trimester of pregnancy to increase passive immunity in the calf without adverse effects. We are cautioned again, however, that all biological products should be administered in accordance with recommendations of the manufacturers.

Annual boosters are frequently recommended. However, it is important that cattlemen consult with their veterinarian as to the appropriate schedule of immunization for their herd.

**C. SPECIAL NOTICE: Brucellosis Status**

Cow-Calf producers should pay special attention to brucellosis since the infection still exists in many herds in some states. Further regulations regarding vaccination and testing are due to change. If new cattle are to be brought into a herd, they should originate from a negative herd, be isolated from other animals in the herd of destination and be retested before being co-mingled with the new herd. Vaccination should be used as recommended by your veterinarian. **VACCINATE ALL ELIGIBLE HEIFERS FOR BRUCELLOSIS. PURCHASE ONLY VACCINATED HEIFERS.**

**A SUMMARY OF PRACTICES  
RECOMMENDED FOR THE CONTROL OF  
RESPIRATORY DISEASE IN A BEEF COW-CALF HERD**

PROGRAM "A"	CALVES AGE	IMMUNIZATIONS AGAINST BRD	OTHER IMMUNIZATIONS WHICH MAY BE CONSIDERED	ADDITIONAL PROCEDURES
	YOUNG CALVES 1 to 3 mo. old	<p><b>IBR/P1:</b> killed vaccine intra-muscularly or intranasal modified live vaccine</p> <p><b>Pasteurella</b></p> <p><b>Hemophilus somnus</b></p>	<p><b>Leptospirosis</b></p> <p><b>Clostridial diseases:</b> the "7-way" bacterin is preferred</p>	<p><b>Castrate and dehorn</b></p> <p><b>Implant</b> (except animals to be kept for breeding) with approved product</p>
PROGRAM "B"	OLDER CALVES 3 or 4 wk. before weaning	<p><b>IBR/P1:</b> booster vaccination given at 1-3 mo. of age (may use killed vaccine, or intranasal vaccine, or live intramuscular vaccine) -Use only modified live vaccine if this is the first vaccination</p> <p><b>BVD:</b> Do not give to stressed or very young calves. Not always recommended in conjunction with live IBR/P1, vaccine. Often given at weaning time.</p> <p><b>Pasteurella and Hemophilus somnus:</b> booster shots if given earlier (1-3 mo. old) -if given now for the first time, booster is needed 3-4 wk. later</p>	<p><b>Leptospirosis</b></p> <p><b>Clostridial diseases:</b> a booster is recommended at this time</p> <p><b>Vibriosis:</b> for heifers and bull calves kept for breeding</p> <p><b>Brucellosis:</b> -only heifers</p> <p>-State regulations vary; consult with your veterinarian.</p>	<p><b>Vitamin A:</b> injectable vitamin is preferred</p> <p><b>Implant:</b> -use approved product -do not implant animals to be kept for breeding</p> <p><b>Parasite control:</b> -internal -external</p>

**AT WEANING TIME**

-If initial and booster shots had been administered as outlined in PROGRAMS "A" and "B", no additional immunizations are needed at this time.

-If the first vaccination series as listed in Program "A" was given but was not followed by Program "B" (3-4 wk. before weaning) give boosters listed in Program "B" at weaning time.

-If calves have not been vaccinated at all before weaning, the following programs ("C" and "D") are offered. It must be emphasized that PROGRAMS "C" and "D" are not always an adequate substitute for PROGRAMS "A" and "B"; there may be a degree of risk when calves receive various vaccinations for the first time at weaning, or worse, after weaning.

<b>PROGRAM "C"</b>	WEANING TIME	<p><b>IBR/P1:</b> - give intranasal vaccine or -killed vaccine (in muscle)</p> <p><b>Pasteurella and Hemophilus somnus:</b> give first shot</p>	<p><b>Clostridial bacterin:</b> the "7 way" is recommended</p>	<p><b>Parasites:</b> treat for internal parasites</p> <p><b>Vitamin A:</b> the injectable form is preferred</p>
	14-21 DAYS AFTER WEANING	<p><b>IBR/P1:</b> if killed vaccine was given at weaning, a 2nd shot of killed vaccine is needed now.</p> <p><b>BVD vaccine</b></p> <p><b>Pasteurella and Hemophilus:</b> give booster</p>	<p><b>Clostridial diseases:</b> a booster is needed now</p> <p><b>Leptospirosis bacterin</b></p> <p><b>Vibriosis:</b> for replacements and bull calves</p>	<p>Treat for <b>external parasites</b></p>
<b>PROGRAM "D"</b>	AT WEANING	<p><b>Pasteurella and Hemophilus:</b> first shot</p> <p><b>BVD vaccine</b></p>	<p><b>Clostridial bacterin:</b> 1st shot</p>	<p><b>Parasites:</b> treat for internal parasites</p> <p><b>Vitamin A:</b> injectable</p>
	14-21 DAYS AFTER WEANING	<p><b>IBR/P1:</b> use modified live vaccine, either intranasal or intramuscular</p> <p><b>Pasteurella and Hemophilus:</b> booster</p>	<p><b>Clostridial diseases:</b> booster</p> <p><b>Leptospirosis bacterin</b></p> <p><b>Vibriosis bacterin</b></p> <p><b>Brucellosis:</b> heifers only</p>	<p><b>Parasites:</b> treat for external parasites</p>