



# Control and Prevention of Diseases of Feedlot Cattle

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## Take Home Message

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- ✓ Successful and economical control of diseases of feedlot cattle depends on many factors:
  - purchasing healthy animals, a transportation system that minimizes stress;
  - a good feedlot pen environment;
  - an adequate feeding system;
  - a good surveillance system;
  - the judicious use of vaccines, growth promotants, and antimicrobial agents when necessary.

## Cattle Purchase and Introduction to a Feedlot

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The purchase of cattle and their introduction to a feedlot has been a controversial issue in beef production ever since the development of commercial feedlots. Commercial feedlots attempt to purchase the most inexpensive cattle that will perform the best and provide maximum economic returns. However, feedlot cattle are subjected to a variety of stressors when they are shipped to the feedlot and after they arrive in the feedlot.

Several factors cause stress, which contributes to the occurrence of the acute respiratory disease complex in feedlot cattle. The routine process of weaning beef calves at six to eight months of age in North America is often followed by respiratory disease. Any factor that causes stress at weaning time can result in an increased incidence of disease.

Transportation over long distances without adequate rest and feeding periods may be followed by an epidemic or 'wreck' associated with acute respiratory disease. Rapid changes in weather and unexpected snowstorms at the time of shipping may result in outbreaks of shipping fever.

The placement of recently weaned beef calves, at six to eight months of age, into the feedlot is associated with much higher morbidity and mortality rates than older yearling cattle. Presumably, this is due to the higher level of acquired immunity in the older cattle. Mixing weaned beef calves from many different origins at the time of entry into the feedlot is considered to be a major factor in acute fibrinous pneumonia.

Cattle are often vaccinated, dehorned, castrated, branded, implanted, and injected with vitamins and antibiotics within a few days after their arrival in the feedlot. The acute respiratory disease complex may remain a major source of economic loss in the feedlot industry if it continues the common practice of introducing stressed cattle from different sources, with different immunological backgrounds, into populations of cattle in which disease is endemic.

The major objective is to get the cattle onto a high-energy diet which will result in rapid growth as soon as possible, usually within 21 days. At the same time the manager must minimize the morbidity and mortality associated with acute respiratory disease, some other common infections such as hemophilus septicemia, and digestive diseases associated with adjustments to high-energy diets. A major consideration is to achieve all of these objectives most economically.

## Origin and Purchase of Cattle

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This is a very important phase of feedlot operations. The type of cattle fed will be influenced by the cost and availability of feeder cattle and feed, the expected performance of the animals and the net financial returns. Calves and yearling cattle are most commonly fed in North America.

The decision on what kind of cattle to buy and where to buy them is largely a matter of risk aversion. How much risk is the feedlot operator willing to take? It is possible to buy groups of uniform feeder calves or yearling cattle that come from one source and in which the disease incidence will be very low. However, these cattle cost more, and the gross margin is smaller than for cattle originating from several sources and accumulated and sold through public auction sales yards.

The incidence of disease is much higher in weaned beef calves than in yearling cattle. Steer calves are preferred to heifer calves because of their availability, superior growth rate, higher selling price, and the absence of problems associated with

estrus and pregnancy in heifers. Lighter weight calves (less than 500 lbs.) may be preferred to medium weight calves (500 to 750 lbs.) because they cost less per head and have a greater potential for low cost gains.

Yearlings are preferred in some feedlots because more groups can be fed per year and the morbidity and mortality from respiratory disease is much lower than in calves. The disadvantages include higher purchase price, higher feed costs per unit of gain and uncertain availability. Yearling cattle may also originate from a backgrounding operation in which calves were placed on pasture or a growing ration for several months. They have adequate body size and gain well in the feedlot.

The principles for consideration when purchasing cattle and introducing them to a highly intensive, heavy feeding environment are as follows:

- Purchase healthy cattle;
- Obtain cattle directly from the farm of origin if possible;
- The disease incidence is lower in yearling cattle than in feeder calves;
- Adopt the all-in-all-out principle. The cattle are purchased as a group, fed as the same group, and sold as a group. This would tend to break the chain of infection from one group to another. An important related principle is to avoid the mixing of recently arrived cattle with cattle already resident in the feedlot. Because of fluctuations in the supply of cattle that may occur, feedlots will often continue to assemble and make up groups of cattle over a period of several days or a few weeks. As recently arrived cattle are added to existing groups, new outbreaks of disease occur, which may be perpetuated for several weeks;
- Purchase preconditioned cattle if possible and if economical;
- Transport the cattle to the feedlot in the shortest time that is economically feasible;
- Develop a reporting system that regularly informs the cattle buyer of the condition of the cattle received and their subsequent performance. This will assist the buyer in the purchase of healthy cattle, avoiding unhealthy cattle and ensuring that they are transported by the most economical and least stressful method of transportation. If the cattle are not preconditioned, the feedlot should attempt to determine what vaccines the animals have received before they were shipped to the lot.

In the simplest system, a cow/calf producer weans the calves at six to eight months of age and places them in the home farm feedlot. The calves are gradually brought onto a growing and then a finishing diet and marketed at 14-16 months of age. Alternatively, the calves may be kept on a maintenance and growth diet until they become yearlings, at which time they are placed in the farm feedlot or sold to a commercial feedlot. These calves would usually be vaccinated for the clostridial diseases and infectious bovine rhinotracheitis and other common infectious agents associated with respiratory disease. If these cattle are kept in their original groups until market, the morbidity and mortality may be low.

## Preimmunization and Preconditioning

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There are often large economic losses associated with the high morbidity and mortality due to acute respiratory disease in weaned beef calves. These calves may be shipped from the ranch, within a few days after weaning, to sales yards and finally to feedlots. The risk of these losses led to the development of the concept of preconditioning. Preconditioning is based in part on immunological and nutritional principles.

The first principle is that effective immunity against infectious diseases of the respiratory tract can be achieved only if animals are vaccinated in sufficient time before natural exposure occurs after arrival in the feedlot. Preimmunization or vaccination of calves two to three weeks before shipment from the ranch to the feedlot, against the common infectious agents associated with acute respiratory disease was the beginning of the practice of preconditioning. In addition to vaccination, efforts were directed to feeding and management procedures on the ranch that would assist the calf in making an easier transition to the feedlot.

Preconditioning of beef calves includes the following:

- Be at least four months of age prior to being vaccinated;
- Owned by the operator 45 days prior to sale or shipment;
- Weaned for a minimum of 45 days;
- Castrated and dehorned at least three weeks prior to sale or shipment;
- Given IBR, PI-3, multi-clostridial (7 or 8-way), and *Haemophilus somnus* vaccines three weeks prior to sale or shipment;
- Treated for warbles at least three weeks prior to sale or shipment;
- Tagged with an official eartag applied under the supervision of a licensed veterinarian;

- Accompanied by an official health certificate completed and signed by both the veterinarian and the producer.

When these preconditioned calves are placed in a feedlot, they usually begin to eat and drink on arrival, and if not subjected to unusual stressors, the incidence of disease will be minimal. Surveillance on a daily basis is still necessary to identify cases of illness.

The proper preconditioning of calves involves cost to the primary producer. The rancher must gather and handle the calves early to vaccinate them, and after weaning he must provide an adequate diet until shipment. The loss of weight following weaning must be made up before the sale. If the producer is to engage in these practices, he must be adequately compensated.

Reports in the literature indicate that preconditioned calves are healthier when they arrive in the feedlot and that the incidence of respiratory disease is lower than in non-preconditioned calves. However, other field studies indicate that, in general, because of the costs of preconditioning incurred by the cow-calf producer, the feedlot operator could not economically justify paying a premium for preconditioned calves.

The primary producer has shown considerable interest in delivering a quality calf to the feedlot but is understandably reluctant to add extra expense unless the returns are greater than the costs. The future of preconditioning will depend in large part on whether the livestock industry becomes convinced of its value.

A major deterrent to the acceptance of preconditioning has been the lack of uniform procedures and certification by an impartial third party. Some Canadian provinces and American states have sponsored and encourage preconditioning programs but most have been abandoned because of the inability of the feedlot operator and the cow-calf producer to agree on the value of a preconditioned calf. In most situations, a premium price would be necessary to compensate the cow-calf producer for the costs of preconditioning.

Early weaning of calves has beneficial effect on cow winter maintenance requirements which must be incorporated into the calculation of the economics of preconditioning. This suggests that there is a need for an examination of the economics of the entire system of producing calves for beef production from the cow-calf producer to the feedlot operator.

Currently, the availability of relatively inexpensive antimicrobials and the development of relatively effective postarrival management protocols continue to encourage the shipment of recently weaned calves to feedlot.

## Backgrounding

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Backgrounding is a variation of preconditioning in which recently weaned calves are grown to yearling feeder cattle weight usually in a smaller feedlot. The principal objective is to prepare yearling cattle to adjust to a high-energy finishing ration in a feedlot with minimal problems. This is achieved by feeding the calves a growing diet that yields rapid, efficient body weight gains without fattening. Maximum use is made of roughage type rations. The spectrum of diseases that occur in backgrounding operations during the first 45 days after arrival of the calves will depend on whether the calves were preimmunized, preconditioned, or obtained from several different sources with no preconditioning.

The infectious diseases of the respiratory tract (pneumonic pasteurellosis) and of the digestive tract (coccidiosis) may account for most of the losses. Cattle that have been through a backgrounding program usually go onto a high-energy finishing diet in a different feedlot with a minimum of problems. The ideal situation is to maintain the groups as they were formed in the backgrounding feedlot.