Attitudes and experiences with the Iowa Beef Cattle Preconditioning Program: A survey of feedlot operators

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ABSTRACT

The Iowa Preconditioning program is the oldest sponsored program of its type in North America. The objectives of this project were to determine the attitudes and experiences of feedlot operators about the Iowa preconditioning program. A survey was developed to examine these attitudes and experiences. The survey was mailed to four hundred fifty feedlot operators in Iowa. The response rate was thirteen percent. Sixty-one percent of the respondents operate feedlots with less than one thousand head one time capacity. Fifty-three percent of respondents had purchased Iowa preconditioned calves in the last year. More than fifty percent of respondents want information on what vaccinations were given to the replacement calves prior to arrival in the feedlot. Feedlot operators feel it is important to have information on vaccination history but only forty-five percent use the information to make decisions on the arrival-processing program for new replacements. Eighty-four percent of the respondents indicated respiratory disease was the health problem most often observed the first month replacements are in the feedlot, but only fifty-one percent of respondents indicated respiratory disease was a health problem the first month Iowa preconditioned calves are in the feedlot. Modified live vaccine is used by sixty-seven percent of feedlot operators in their arrival-processing program, and seventy-two percent of feedlot operators use modified live vaccine for re-vaccination. Sixty-nine percent of respondents indicated they were satisfied with the preconditioned calves they purchased. Forty-four percent of respondents who indicated they were dissatisfied with purchased preconditioned calves were dissatisfied because of illness. Thirty-six percent of feedlot

operators indicated they would like to see pasteurella vaccination required in the Iowa preconditioning program.

Feedlot operators were asked to rate the importance of the requirements in the preconditioning program using a scale of one to five, with one meaning not important and five very important. The operators rated most of the requirements as four or five except for weaning ration, castration date, and dehorning date. This survey indicates that preconditioned calves are well accepted by feedlot operators in Iowa, and that the preconditioning certificate should accompany the calves through the marketing process.

INTRODUCTION

Preconditioning is a health and management tool designed to reduce morbidity and mortality and increase profitability of weaned calves. This is achieved by vaccinating for several diseases, treating for parasites, castrating, and dehorning the calves prior to weaning. Calves are then weaned on the farm of origin and started on a diet similar to feedlot rations. The ultimate goal is to improve profitability by reducing costs, improving feed efficiency and rate of gain, especially during the early feedlot adjustment period.

The advent of large commercial feedlots in the 1960's caused veterinarians and producers to realize there was a need to reduce feedlot health problems by preconditioning calves prior to entering feedlots. John B. Herrick, Extension Veterinarian at Iowa State University, developed the first statewide preconditioning program in 1965. The requirements for the program included vaccination for common feedlot diseases, treatment for internal and external parasites and a weaning period of 30 days prior to entrance into feedlots. In the first year of the program, 500 calves were offered for sale at a special auction. The next year Iowa veterinarians preconditioned 50,000 calves. In 1969 the Iowa Veterinary Medical Association sponsored the Iowa Preconditioning Program, the first formal program of its kind in the country. More than 300,000 calves are preconditioned each year, making it the oldest and largest program of its kind. The Iowa Cattlemen's Association is now a co-sponsor of the Iowa Preconditioning Program.

Veterinarians, cow/calf producers and feedlot operators do not always agree on the specific health requirements for preconditioning programs. Veterinarians debate the relative merits of vaccines, use of various health products, and procedures that should be used during the weaning period. Cow/calf producers want the greatest return for their calves with the

least investment and at the lowest possible risk. Feedlot owners would like to see calves weaned, started on feed, and vaccinated against disease using the "best" vaccines. There is an inherent conflict between cow/calf producers who wish to receive higher compensation for preconditioned calves and feedlot operators who want to pay a minimum price and experience little or no feedlot disease. This makes it difficult to develop a preconditioning program that is acceptable to all segments of the cattle industry. The periodic advent of new vaccines, pharmaceuticals and health procedures complicates these discussions.

Previous research has shown that preconditioned calves may bring a premium price of $1.50 to $2.00 per cwt. Costs range from $6 to $15 per head for the health procedures associated with preconditioning. Feed costs can range from $25 to $30 during a 30-day weaning period. There is concern that preconditioning may not always be a profitable management procedure because of increased costs.

Normally, preconditioned calves gain more weight during the weaning period than nonpreconditioned calves, increasing their value at marketing. Feedlot owners want to purchase high quality calves that have low morbidity and mortality. Calves that do not get sick will have improved feed efficiency, lower feed costs and a greater chance of being profitable. Preconditioned calves may be the best source of such feedlot replacements.

The purpose of this study was to determine the attitudes and experiences of cattle producers relating to the Iowa Preconditioning Program. Producers were surveyed to determine attitudes and experiences with preconditioned calves in their feedyards in order to determine future direction and health recommendations for the program.

REVIEW OF LITERATURE

History

Most of Iowa's beef feedlots are relatively small, family farm enterprises. This is especially true when the state's industry is compared to the large, commercial feedlots of the high plains states. The Iowa Agriculture Statistics Service census indicates there are 12,000 feedlots in the state with less than 1000 head one-time capacity.[1] According to the January 1, 2001 USDA Cattle on Feed Report, those 12,000 feedlots contain 665 thousand head or 63.3% of the cattle on feed in Iowa.[1] These farms finish calves produced on those same farms and/or purchase additional replacements. Many of these feedlot placements are purchased at livestock auction markets. On many farms, the purchase of enough replacements to fill a pen may extend over several days. Feedlot placements may be purchased from several auction markets and thus originate from numerous cow calf operations. This method of purchasing replacements increases exposure to infectious agents and often leads to significant problems with respiratory and feedlot diseases.

In 1961, Iowa Beef Packers (IBP) opened a beef packing plant in Denison, Iowa. Prior to this time, packing plants were built near terminal stockyards. Building packing plants close to where cattle were fed soon became the norm for the industry, as it reduces transportation and other costs.

In the late 1950's, large commercial cattle feedlots with a one-time capacity of many thousands of head began to appear in the high plains from Nebraska to Texas. The ability to irrigate large tracts of land for feed grain production helped make this possible. The high plains region generally has better weather and feedlot drainage conditions. Although no

longer the case for many years, U.S. tax policy favored investor consignment of cattle to these feedlots. These investors often have no other involvement in the cattle industry. The majority of these commercial operations have well over 1,000-head one-time capacity. Several have a one-time capacity of more than 100,000 head. Cattle are fed in pens of 100 to 300 head or more. In larger feedlots, replacements are co-mingled at the beginning of the feeding period and new animals are seldom added to a pen. They usually purchase replacements on a consignment or contract basis.

During the 1960s, commercial feedlots gained an increasing market share from traditional family-farm, independent cattle feeders in the Midwest. Today, 84% of feedlot cattle in the United States are fed in feedlots with a one-time capacity of 1,000 head or more.[2]

While the average size of feedlots has grown, cow/calf herds have remained relatively constant in size. Approximately eighty percent of cowherds in the United States have less than 50 cows.[3] Eighty-five percent of calves are marketed through auction markets. The disparity between the size of cowherds and feedlots means that replacements must be purchased from multiple sources and transported relatively long distances. These changes in the cattle feeding industry have resulted in increased stress of calves and exposure to infectious agents.

Marketing

Marketing and movement of calves from cow/calf herds to feedlots is a period of high stress. At marketing time, calves are weaned and transported to auction markets prior to sale. They are sorted and sold in lots of similar weight, frame size, quality grade, breed, and other

characteristics. After the bidding process, calves are returned to a holding pen and co-mingled with other animals purchased by an individual buyer. This pen may hold calves from several different sources. The calves are then loaded onto a truck or trailer and transported to the destination feedlot, another auction market where more replacements are purchased, or an order buying facility where large groups of calves are co-mingled. Some calves may remain at these facilities for several days while enough calves can be purchased to fill an order. Calves are then transported to a feedlot, backgrounding operation, or another auction market where they may be sold again. Backgrounding operations purchase and feed the calves through the transition or feedlot adjustment period, after which they are moved to lots that feed the calves to market weight. The transition period, whether in a feedlot or backgrounding operation, is the time when the highest incidence of disease occurs.

Feedlot Morbidity and Mortality

During the adjustment period, usually defined as the first 28 days in a feedlot, morbidity can range from 25% to 54%. [4,5,6] Mortality rates in feedlots nationwide can range from 0 to 7.5%, but may exceed twenty-five percent in some high-risk groups.[6, 7] Bovine respiratory disease complex is the major cause of feedlot disease. In one study, bovine respiratory disease accounted for more than 79% of morbidity and 67% of mortality.[8] In a 1994 survey, respiratory disease accounted for 44.1% of feedlot mortality.[9] In a 1999 USDA National Animal Health Monitoring System survey, feedlot mortality averaged 1.4%. Sixty-one percent of this death loss was due to respiratory disease.[10]

Digestive disorders, including bloat and acidosis, are the second most important cause of feedlot mortality. In one survey, digestive disorders caused 25.9% of mortality, while

respiratory disease caused 48.1%. [11,9]

Bloat is the accumulation of gas in the rumen. There are two forms of bloat in feedlot animals. Free gas bloat occurs when the animal loses the ability to eructate due to a physical or functional blockage. Functional blockage can be caused by decreased rumen motility due to acidosis or damage to the vagus nerve. Physical blockage occurs when there is an obstruction of the esophagus. Frothy bloat is due to the formation of excessive and stable foam that traps gas in the rumen. Because of the stable foam, eructation is impossible. The presence of foam in the rumen results in the inability of the animal to eructate. Chronic bloat that does not result in death causes reduced performance. Feedlot bloat can be caused by several factors, including physical defects, physical form of the ration, and others.

Acidosis is caused by consumption of highly fermentable carbohydrates in a short period of time. Fermentation by rumen microorganisms results in the production of organic acids. Acidosis is classified as either acute or subacute based on clinical signs. In an episode of acute acidosis, rumen pH may decrease to 4.0-5.0, causing a significant change in microflora.[11] Lactic acid concentration in the blood increases and blood pH decreases. Acute acidosis may cause significant impairment of physiological function, diarrhea, acute anorexia, depression, and death. Cattle that recover may develop rumenitis, laminitis, or liver abscesses. Poor performance is a common result.

Subacute acidosis is more difficult to diagnose. It usually occurs when cattle are adjusting to feedlot diets. It can cause reduced efficiency of the immune system and increased susceptibility to respiratory and other infectious diseases.

Acidosis can lead to liver abscesses, polioencephalomalacia, sudden death, and bloat.

The incidence of liver abscesses in feedlot cattle varies from 12 to 32%, although it may be 100% in some groups of cattle.[11, 12]

Cow/calf Health Practices

Feeder calves are usually marketed at six to seven months of age. According to a National Animal Health Monitoring Service Beef 97 survey, forty-two percent of calves entering marketing channels have not been weaned.[13] Of the calves marketed in this manner, 30% of the males must be castrated at some time after leaving the farm of origin.[13] More than 70% had never been vaccinated against respiratory pathogenesis, or Clostridia or other diseases prior to marketing. Maternal antibody levels begin to decrease soon after the first day of life and are not protective by weaning at 5 or 6 months of age. Therefore, calves that enter the marketing system often have little or no immunity to major respiratory and other pathogens.

Stress

Stress decreases the efficiency of the immune system.[14] The detrimental effect of stress on the immune system is mediated by the release of glucocorticoids at the time stress occurs. Cortisol is a glucocorticoid hormone released by the adrenal glands. Its release is regulated by the hypothalamus. The hypothalamus secretes corticotropin-releasing hormone. Corticotropin releasing hormone (CRH) then causes the release of adrenocorticotropic hormone (ACTH) from the anterior pituitary gland.[15] ACTH stimulates the adrenal glands to release cortisol. It is part of the animal's fight or flight complex and has a significant effect on circulating cells of the immune system. In the bovine there is a reduction in the number of circulating lymphocytes, eosinophils, and basophils. There may be an increase in the

number of neutrophils. This increase is due to a decrease in the ability of the neutrophils to leave the circulatory system, reducing their ability to fight disease. Neutrophils are usually one of the first cells of the body to attack disease-causing organisms. Cortisol also down-regulates the cytotoxic and phagocytic abilities of the body's immune system.[16] Corticotropin releasing hormone may also cause a reduction in the activity of natural killer cells.[17]

There is a complex interaction between the neuroendocrine system and the immune system. This is a two-way interaction between the systems.[18, 19,20,21] Communication is both neural and hormonal. Lymphocytes and thymocytes have receptors for several hormones that affect their function.[18] The immune system may influence the functioning of the neuroendocrine system by the release of small amounts of hormone upon antigenic stimulation.[18, 22,23] These interactions between the neuroendocrine and immune systems have a direct affect on the ability of calves to develop an immune response to disease. ACTH can directly inhibit T-helper cell signals causing a reduction in antibody response and decreased production of interferon-y. Interferon-y enhances the activity of natural killer (NK) cells. Interferon-y also activates T-cells and stimulates macrophages to produce greater amounts of major histocompatiblity complex (MHC) class I. The MHC-1 is an antigen-presenting molecule required to activate the immune system when viruses or bacteria are intracellular.[16]

In times of stress, macrophages stimulate the release of the cytokine IL-1. This cytokine feeds back on the hypothalamus, causing the release of CRH. This release of CRH then stimulates the release of ACTH, which then stimulates the release of cortisol from the adrenal glands, and the cycle continues. IL-1 induces fever, suppresses appetite, and causes

the animal to become lethargic. This results in decreased activity and fatigue, thereby reducing function of the immune system.[16] IL-1 stimulates the body to metabolize nutrients and places a priority on providing energy for defense of the body instead of for growth.

The specific effects of fear, anxiety, pain, and excitement are difficult to measure in domestic animals. In the human, these are known to increase susceptibility to infectious diseases.

Weaning is perhaps the most stressful of all procedures. In traditionally marketed calves, this occurs immediately before loading, hauling, marketing, major ration change, and unloading into contaminated feedlots. It is well known by cattle producers that weaning, without any other procedures, may induce episodes of respiratory and other diseases.

Loading and unloading at auction markets and transporting long distances to the final destination increases transportation stress. Loading and unloading may be the most stressful period in transportation.[24, 25] One trial showed that actual transportation time was the most important stress.[26] The stress response of the animal often includes a reduction of lymphocyte numbers and lymphocyte blastogenesis, thereby increasing the risk of infection.[27, 28]

Arrival at the auction market or final destination may induce fear or increase stress on the calves.[29] The genetic background of calves may play a role in the stress level of calves. Highly excitable calves undergo a higher degree of stress than calves that are calmer.[30] Stress may also be increased by agitation of other animals in the environment because of an increase in the secretion of pheromones.[29]

Nutrition

Feed intake is often depressed during the first 2 weeks in the feedlot. Intakes in highly stressed calves may average 1.5% of body weight or less. This low intake level may contribute to depressed immune function.

In the cowherd, the calf diet usually consists primarily of mother's milk and pasture or hay. Some calves may have consumed creep feed. Creep feed usually has a high grain and fiber content. This ration often has vitamins and trace minerals added. It may have an anti-microbial included to help prevent diarrhea or pneumonia. Some creep feed rations consist primarily of homegrown grain such as corn or small grains. Feed is usually presented in an entirely different manner in feedlots. During the marketing process, feed and water intake is often dramatically reduced. Any feed supplied at auction markets and order buyer facilities is usually only dry hay. Water deprivation, common in the marketing and transportation process, may lead to dehydration. This further compromises the immune system.

The feedlot ration is usually dramatically different from the farm or ranch of origin, where calves can eat and drink whenever they desire. Feedlots feed once or twice per day. The ration is provided in a feedbunk and requires that calves learn to stand shoulder to shoulder with other individuals in the pen. A new social structure or "pecking order" must be established. Automatic watering systems replace streams, ponds, or water tanks. Feedlot calves are usually provided a totally mixed ration. All ingredients are processed and thoroughly mixed. This ration usually consists of grain primarily highly fermentable carbohydrates, vitamins, minerals, growth promotants, and ground hay or corn silage. The percentage of grain in the ration is gradually increased during the feeding period. Feeding

exclusively high levels of grain can increase the risk of respiratory disease by 4.9 times and the incidence of disease by 12.7 times.[31]

Reduction of feed intake, malnutrition, and dramatic changes in the ration reduce the animal's ability to mount an effective immune response against disease.[18] The complex balance and inter-relationship of micronutrients may cause health and production problems.[32, 33] As an example, serum zinc decreased and serum copper increased during episodes of transit morbidity or infectious bovine rhinotracheitis virus infection.[34] Trace mineral deficiencies affect the immune system before they affect growth.[35]

Overwhelming Pathogen Dose

During the marketing and adjustment process, calves are exposed to large numbers of pathogens carried by the new animals they encounter. They may have never been exposed to these organisms prior to this time. Calves are raised in relative isolation on many farms and ranches and are immune to only a few endemic pathogens. They must develop a primary immune response before protection develops. This may take as long as fourteen days.[16] At the same time, stress may significantly reduce the ability of a calf's immune system to respond to the "new" pathogens. Exposure may occur at any time during movement of animals from the farm of origin to the feedlot.

Increased movement, co-mingling, castration, dehorning, and processing at arrival may increase the risk of disease at the feedlot or backgrounding operation. Processing procedures upon arrival at feedlots are variable. According to NAHMS Feedlot99 data, more than 70% of feedlots vaccinate for one or more of the major respiratory viral agents.[2] More than 87% of feedlots vaccinate against IBR and BVD.[2] At least 27% of all feedlots vaccinate

for Mannheimia haemolytica (formerly Pasteurella haemolytica) and Pasteurella multocida. Haemophilus somnus vaccine was used in 33% of feedlots. Fifty six percent of feedlots vaccinate at least once for the Clostridial diseases. Bull calves are castrated and horned calves are either dehorned or the horns are "tipped." Tipping refers to the removal of the sharp end of the horn to reduce bruising of penmates. Replacements are often treated for external and internal parasites upon arrival.

Bovine Respiratory Disease

Bovine respiratory disease (BRD) may account for 80% of morbidity in newly arrived calves in the feedlot and 72% of mortality.[36] It is a complex disease with many components. Multiple pathogens may cause BRD. The etiological factors that lead to bovine respiratory disease complex are often summarized as follows:

Stress + Viruses + Bacteria = BRD

Stress reduces the efficiency of the immune system, thereby increasing susceptibility to pathogenic viruses and bacteria. Co-mingling from several herds of origin causes exposure to numerous pathogens against which individual animals have little or no immunity. Infection with viruses such as IBR, PI-3, BVD, BRSV, and others compromise natural resistance to bacterial organisms. They often damage the mucosal surface of the lung, allowing pathogenic bacteria to invade. Pathogenic bacteria are often present in the lungs of "healthy" calves, but do not cause disease until stress and concomitant viral infections overwhelm resistance.

The major viral agents in bovine respiratory disease include Infectious Bovine Rhinotracheitis (IBR) also called Bovine Herpesvirus-1 (BHV-1)), Parinfluenza-3 (PI-3), Bovine Virus Diarrhea (BVD), and Bovine Respiratory Syncytial Virus (BRSV). Other viral

agents possibly associated with BRD include adenoviruses, rhinoviruses, and bovine respiratory coronavirus. The major bacterial components of bovine respiratory disease are Mannheimia haemolytica, Haemophilus somnus, Mycoplasma sp. and Pasteurella multocida.[37] Arcanobacter pyogenes (formally Corynebacteria pyogenes) is a secondary pathogen found in the lungs of calves with chronic respiratory disease. It often causes pulmonary abscesses.

Bovine Herpes Virus-1 is a herpes virus. Infection causes necrosis of the respiratory epithelium and diminshes the action of respiratory cilia. Reduction of ciliary function allows pathogenic bacteria to colonize the respiratory tract and can lead to bronchopneumonia. BHV-1 virus infection also induces the production of cytokines. Cytokines such as interferon may have antiviral properties while others may enhance colonization of the respiratory tract with pathogenic bacteria. BHV-1 can also reduce the activity of alveolar macrophages, polymorphonuclear neutrophils, and lymphocytes. The reduced activity of the lung defenses allows further colonization of the lung with pathogenic bacteria.[38] Clinical signs of BHV-1 infection range from mild to severe. These clinical signs are generally limited to the respiratory tract and include inflammation of the nostrils, erosion of the nasal mucosa, lacrimation, and conjunctivitis. If severe, the animal may become dyspneic and exhibit open mouth breathing. Fevers of 40-42 ^{O}C (105-107 ^{O}F) are common with BHV-1 infection.[38]

Parainfluenza-3 is a paramyxovirus with worldwide distribution. Most uncomplicated PI-3 infections are inapparent or cause mild clinical disease. PI-3 virus infects respiratory epithelium, causing a reduction in the ability of the cilia to eliminate

bacterial pathogens. It also infects alveolar epithelium and alveolar macrophages, allowing colonization by pathogenic bacteria. Infection of alveolar macrophages enhances parainfluenza-3 virus replication, resulting in altered function of macrophages. Infected macrophages secrete prostaglandins that are immunosuppressive. Altered macrophage function and production of immunosuppressive prostaglandins allow pathogenic bacteria to colonize the lung, sometimes causing pneumonia. Clinical signs of PI-3 infection include rhinitis and secondary pneumonia. Fevers of 39-41 ^{O}C (104-106 ^{O}F) are observed.[38]

Bovine respiratory syncytial virus (BRSV) is a paramyxovirus. It is cytopathic, causing cells to fuse and form large multinucleated syncytia. BRSV is found worldwide. Eighty-one percent of U.S. cattle had antibodies to BRSV prior to introduction of the first vaccines. Infection with BRSV can be inapparent, mild, or severe. Initially, infected animals become lethargic and anorectic. Serous to mucoid nasal discharge and increased respiratory rate may occur. Dyspnea may become more pronounced as the disease progresses, leading to open mouth breathing. Alveoli may rupture, causing subcutaneous emphysema over the shoulder area. Severely infected animals are unable to drink and become dehydrated, further compromising the immune system. Secondary bacterial invaders may also be present in BRSV infections. Clinical signs may disappear for one to two weeks but then some form of stress may cause clinical signs to reappear.[39]

Bovine virus diarrhea (BVD) is a single stranded RNA pestivirus. There are two biotypes classified by behavior in cell culture. Cytopathic BVD causes cytoplasmic vacuolation and cell death while noncytopathic BVD causes few changes and persistent infection in cell culture. Bovine Virus Diarrhea is further divided into two genotypes, Types

I and II. Most Type II BVDV isolations have been from animals affected with acute hemorrhagic disease and from persistently infected animals.[40]

It is estimated that 70-90% of immunocompetent cattle have subclinical infections or inapparent infection, but BVD can cause several clinical syndromes. When the noncytopathic biotype of BVD infects a pregnant cow prior to 125 days of gestation, the fetus becomes persistently infected with BVD virus. The early-stage fetus fails to recognize the virus as foreign and accepts it as part of "self." Persistently infected calves shed virus for life and serve as a reservoir of infection for contact animals. In some individuals, BVD infection causes mucosal disease. Mucosal disease occurs when a persistently infected animal becomes infected with a genetically similar cytopathic virus. This combination produces the invariably fatal mucosal disease syndrome.[41] Lesions found in mucosal disease are mainly observed in the digestive tract. Oral erosions are observed on the dental pad, palate, lateral surfaces of the tongue, and the inside surfaces of the cheeks. The mucous membranes of the esophagus may contain small erosions throughout its length. The mucosa of the abomasum, omasum, and the small intestine may be diffusely reddened.[42]

There is little direct evidence that BVDV is the primary agent in respiratory disease of cattle. Tissues taken from diseased respiratory tracts commonly contain Mannheimia haemolytica and/or BHV-1 virus. It appears that BVDV infection reduces the ability of cattle to eliminate infection with bacteria or other viruses. BVDV has an affinity for cells of the immune system. Infection may cause a transient leukopenia, indicating BVDV is immunosuppressive.[40]

Bovine Respiratory Coronavirus is an RNA virus that infects both the alimentary and respiratory tracts of cattle. Respiratory disease may be observed in calves six to nine months of age. Clinical signs are nasal discharge, fever, and dyspnea. The role and importance of bovine respiratory coronavirus in BRD is unclear.

Mannheimia haemolytica is the major bacterial pathogen that causes the fibrinous pneumonia commonly associated with the bovine respiratory disease complex. It can be isolated in low numbers from the nasopharynx of many clinically normal cattle. Stress and/or infection with one or more viral agents may lead to severe respiratory disease and death. Growth and adhesion of Mannheimia haemolytica in the upper respiratory tract may be due to reduced effectiveness of mucociliary clearance. M. haemolytica produces a lipopolysaccharide that causes inflammation, edema, hemorrhage; platelet and leukocyte aggregation.[43] The initiation of inflammation by the lipopolysaccharide is the main cause of vascular damage in the lung. M. haemolytica may produce a polysaccharide capsule, allowing the organism to resist phagocytosis.

Pasteurella multocida does not colonize as rapidly as M. haemolytica and is not a major component of mortality in newly arrived feedlot calves. It is found in the upper respiratory tract of clinically normal animals and is generally associated with chronic suppurative pneumonia. It also produces a polysaccharide capsule that inhibits phagocytosis.

Haemophilus somnus is associated with bovine respiratory disease. This organism is difficult to grow in culture from tissues of calves that died of respiratory disease. H. somnus is generally associated with Mannheimia haemolytica due to its slow growth rate and relative resistance to antimicrobial drugs. Lesions associated with H. somnus include suppurative bronchopneumonia, pulmonary abscesses, fibrinous pleuritis, necrotizing bronchilitis, and

interstitial inflammation. H. somnus produces a lipoligosaccharide which causes adhesion and cell separation of the endothelium of the respiratory tract. Necrosis and tissue damage may result. H. somnus can persist in an animal for extended periods of time.[43]

Mycoplasma bovis can also cause respiratory disease. This organism causes inflammation of the bronchi and may be immunosuppressive. M. bovis frequently causes a chronic infection. It is capable of incorporating host antigens into its cytoplasmic membrane, thereby avoiding the host immune system.[43] A common sequel of M. bovis infection is microabscesses in the cranioventral lung lobes with corresponding fibrinous arthritis.[44]

Arcanobacter pyogenes is a secondary pathogen that frequently causes lung abscesses.

Preconditioning Programs

Veterinarians have long recognized the need to reduce feedlot morbidity and mortality. John B. Herrick, Extension Veterinarian at Iowa State University developed the term and concept of preconditioning feedlot replacements. Preconditioning can be defined as preparing an animal for the next stage in its life, that is, the feedlot. It is designed to increase the immunity of cattle to major pathogens prior to movement from cow calf herds to feedlots and to reduce stress associated with the marketing process. Unavoidable stresses such as weaning and ration change are spread out over time. Preconditioning also is designed to reduce or eliminate parasites and other diseases and ease the adjustment to feedlot rations

The goal of preconditioning is to reduce morbidity and mortality and improve feedlot performance. Surgical procedures such as dehorning and castration are performed prior to weaning, significantly reducing stress during the marketing process.[45 Weaning] is a major

cause of stress, and is the reason most preconditioning programs require calves to be weaned 30 days or more prior to marketing. Calves weaned 6 weeks prior to sale had higher average daily gain in the feedlot than calves weaned at sale.[45] Feedlot replacements that are more resistant to disease and have higher performance are expected to command a higher market price.

The Iowa Preconditioning program was initiated in 1965 at Ottumwa, Iowa with educational meetings for veterinarians, livestock market operators, and producers.[46] The first preconditioning sale was held in Albia, Iowa in 1965. Five hundred calves were offered for sale. In 1965 the National Feeders Association and the Infectious Disease of Cattle Committee of the United States Animal Health Association endorsed the concept of preconditioning. [46]

In 1966, a national committee was formed and met at Iowa State University to develop guidelines for preconditioning programs. That year, 50,000 feeder calves were preconditioned in Iowa. Veterinarians in southern Iowa formed their own program that year. In 1967, the concept of a national preconditioning program was discussed at Oklahoma State University. Iowans preconditioned 100,000 calves that year.

In 1968, Iowa veterinarians preconditioned 200,000 calves and held seventeen special preconditioned sales. The National Coordinating Committee held it's second meeting in Laramie, Wyoming.

In 1969 the Iowa Veterinary Medical Association formed the Bovine Practice Committee and launched the first officially sponsored preconditioning program. Prior to 1969 the preconditioning program was managed by Iowa State University Extension. The

Bovine Practice Committee of IVMA continues to serve as a coordinating and governance committee for the program, in cooperation with the Iowa Cattlemen's Association. The American Association of Bovine Practitioners (AABP) formed a preconditioning committee in 1969. There is still no nationally recognized preconditioning program sponsored by the AABP. The number of calves preconditioned in Iowa continued to grow. By 1970, 300,000 calves were preconditioned. In 1971 preconditioning was discussed with county cattlemen's associations and veterinarians in every county in Iowa.

In 1973 the Iowa Cattleman's Association Board of Directors voted to co-sponsor the preconditioning program. This sponsorship increased the number of calves to 600,000 calves and increased the number of special preconditioning sales to 72. The Iowa Cattleman's Association, the Iowa Veterinary Medical Association, and Iowa State University Extension continue to work together to manage the program and make it the largest in the country.

In 1974, a survey representing 10,000 feedlot cattle showed a morbidity of 10% and mortality of 0.3% of preconditioned calves. From 1974-1980, Dr. Herrick and other Iowa State University Extension professionals made presentations on preconditioning throughout the Midwest and the plains states. In 1980 a joint committee of the AABP and the National Cattleman's Association issued a paper on the control of bovine respiratory disease in an attempt to promote a national preconditioning program. [46]

Several states, including Illinois, Missouri, Ohio, Kentucky, Texas, South Dakota, and Indiana have developed their own preconditioning programs. Differences of opinion on what should be included in a preconditioning program has led to this lack of a standardized national program. A large number of these programs either no longer exist or are small and localized efforts.

The Iowa Preconditioning program is governed by the Bovine Practice Committee of the Iowa Veterinary Medical Association and the Marketing Committee of the Iowa Cattlemen's Association. The requirements of the program are reviewed the IVMA and ICA every three years. The Iowa Veterinary Medical Association and the Iowa Cattlemen's Association must agree before any changes are made in the program.

Veterinarians must be members of the IVMA or pay a fee to participate in the preconditioning program. Green eartags used to identify preconditioned calves and certificates are ordered from the office of the IVMA. Each certificate consists of four copies. Copies accompany the calves to market, remain with the producer, the veterinarian, and the IVMA office. The Iowa Preconditioning Program does not specify the use of either killed or modified live virus vaccines. This allows local veterinarians to decide what specific animal health products will be used in individual herds. The program requires one vaccination. Calves must be more than four months of age. Vaccination requirements are 7-way Clostridia, Haemophilus somnus, Infectious Bovine Rhinotracheitis (IBR), Bovine Virus Diarrhea (BVD), Bovine Respiratory Syncytial Virus (BRSV), and Parainfluenza-3 (PI3). Vaccinations must be given a minimum of 21 days prior to marketing. Calves must be castrated and dehorned and healed. They must be treated for external parasites (including ox warbles before November 15). They must be weaned a minimum of 30 days before marketing. Once all requirements have been met, the producer and veterinarian sign a certificate that certifies that all procedures have been performed according to the rules and requirements of the program.

MATERIALS AND METHODS

The purpose of this research project was to determine the experiences and attitudes of feedlot operators about the Iowa Preconditioning Program. Iowa feedlot operators were surveyed to determine experiences, satisfaction level, and possible changes that should be made. We also wanted to know if feedlot health and management decisions were different for preconditioned compared to traditionally marketed feeder calves.

A randomized cross-sectional design was used to survey feedlot operators in Iowa. Only Iowa feedlot operators were surveyed in order to increase the probability that operators had experience with preconditioned calves.

Survey of Feedlot Producers

The Iowa Cattleman's Association (ICA) is an organization of individuals who support and promote the beef cattle industry of the state. The feedlot survey was sent to 450 randomly selected feedlot operators from a list maintained by the ICA. This list has approximately 900 names and addresses of individuals who have fed cattle at sometime during the past year. A random sample was obtained by selecting alternate individuals from this list. Surveys were placed in envelopes, sealed and transported to the Iowa Cattleman's Association headquarters. In order to maintain confidentiality of the mailing list, surveys were addressed and mailed from ICA headquarters. A stamped, addressed business reply envelope was included. The surveys were returned to the ICA office and picked up by the investigators.

Survey Development and Design

Two members of the Department of Veterinary Diagnostic and Production Animal Medicine at Iowa State University wrote survey questions. Other faculty members reviewed

the questions and suggested changes. The survey was then presented to the Survey Laboratory at Iowa State University for review. The Survey Laboratory suggested several wording and format changes. These suggestions were reviewed and changed when appropriate. The survey was then given to several members of the Production Animal Medicine faculty for further review. After this review, final changes were made and the survey was sent to the Iowa State University Human Subjects Committee for review and approval. The Human Subjects Committee approved the survey on May 16, 2000.

Data Analysis

Survey response data was entered into a Microsoft Excel[R] spreadsheet. Preliminary statistical analysis was performed using this software. Further analysis was performed using JMP[R] statistical software. Methodologies utilized included averages, percentages, standard deviation, standard error of the mean, and Chi-square. Questions answered on a scale were averaged over all respondents using a paired t-test.

RESULTS

Response

Sixty-one (61) of four hundred and fifty (450) feedlot owners (13.5%) returned the survey.

Profile

Fifty-eight percent of respondents purchase placements for the feedyard; twenty-four percent custom feed cattle for someone else. Eighteen percent also fed calves produced in their own cowherd.

Sixty-one percent of the respondent's feedyards one time capacity was one thousand head or less; thirty percent of responding feedyards had one time capacity between one thousand and two thousand five hundred head, and eight percent had one time capacity greater than two thousand five hundred head.

Eighty-four percent of respondents had fed cattle for more than twenty years, twelve percent from eleven to twenty years, and four percent for less than five years.

Purchased Iowa Preconditioned Calves

Of the feedlot owners who responded, fifty three percent had purchased preconditioned calves in the last year. Ninety-three percent of respondents said they would be willing to pay more than traditionally marketed calves for properly preconditioned calves. Sixty-four percent of respondents indicated they reprocessed replacement calves that were Iowa preconditioned.

Historical Information on Purchased Replacements

Feedlot operators were asked to rate the importance of historical information about

replacement calves by selecting a number between one and five, with one meaning not important and five very important. Vaccination history for Clostridial diseases and respiratory viral diseases were rated the most important information with means of 3.9 to 4.2 (Table 1). Creep feeding, weaning ration, and birth date were rated lowest, indicating this information was of only moderate importance (Table 1).

Processing Replacement Calves

Forty-five percent of respondents to survey question eight (Appendix 8) indicated that having information about the management history of calves would always influence their processing decisions, sixteen percent of respondents indicated that such information would often influence their processing decisions. Twenty percent of the respondents indicated that having background information would sometimes influence processing decisions and eighteen percent indicated that background information would seldom or never influence their processing decisions.

More than eighty percent of feedlot operators indicated they utilize a vaccine containing at least one of the major respiratory viruses (Table 2). Ninety-five percent of feedlot operators also indicated they use some form of parasite control in their processing program (Table 2).

Sixty-five percent of feedlot operators indicated they utilize a modified live vaccine when processing replacements (Table 3).

Sixty-five percent of respondents indicated they were the primary individual responsible for processing replacement calves in their feedyard. Thirty-three percent of the respondents indicated the veterinarian was the primary person responsible for processing replacements. Only two percent use a professional processing crew.

Table 1. The importance of having historical information about purchased replacement calves.

	Not Important	Minor Importance	Moderate Importance	Important	Very Important	Total Number of Responses	Mean Response
Clostridial Vaccination	2(4%)*	5(10%)	8(15%)	18(35%)	19(37%)	52	3.9#
IBR Vaccination	1(2%)	2(4%)	4(8%)	17(33%)	28(54%)	52	4.3
PI3 Vaccination	2(4%)	4(8%)	8(15%)	15(29%)	23(44%)	52	4.0
BVD Vaccination	1(2%)	2(4%)	5(10%)	17(33%)	27(52%)	52	4.3
BRSV Vaccination	1(2%)	2(4%)	5(10%)	20(39%)	23(45%)	51	4.2
Haemophilus Vaccination	4(2%)	5(10%)	3(6%)	18(35%)	25(48%)	52	4.2
Pasteurella Vaccination	3(8%)	1(2%)	7(13%)	16(30%)	25(47%)	53	4.1
External Parasite Control	3(6%)	2(4)	10(20%)	13(26%)	22(44%)	50	4.0
Internal Parasite Control	3(6%)	3(6%)	10(19%)	13(25%)	24(45%)	53	4.0
Date of Weaning	3(5%)	7(13%)	14(25%)	14(25%)	17(31%)	55	3.6
Weaning Ration	6(11%)	10(19%)	19(35%)	13(24%)	6(11%)	54	3.1
Creep Feeding History	7(13%)	13(24%)	16(30%)	10(19%)	8(15%)	54	3.0
Genetic Background	2(4%)	4(8%)	13(25%)	21(40%)	13(25%)	53	3.7
Birth Date	8(15%)	13(25%)	16(30%)	12(23%)	4(8%)	53	2.8
Implant History	2(4%)	10(19%)	8(15%)	17(32%)	16(30%)	53	3.7

*Number (%)

#Scale 1=not important, 5=very important

Table 2. Products used routinely in feedlot processing programs.

	Use	Don't Use	Total Responses
Clostridial 7-way	41(77%)	13(24%)	54
Clostridial 8-way	9(17%)	45(83%)	54
Clostridial C & D	18(33%)	36(67%)	54
IBR Vaccine	51(93%)	4(7%)	55
PI3 Vaccine	44(80%)	11(20%)	55
BVD Vaccine	52(96%)	2(4%)	54
BRSV Vaccine	45(83%)	9(17%)	54
Haemophilus somnus Vaccine	45(83%)	9(17%)	54
Pasteurella Vaccine	38(69%)	17(31%)	55
External Parasite control	53(96%)	2(4%)	55
Internal Parasite Control	52(95%)	3(5%)	55
Implants	53(96%)	2(4%)	55
Antibiotic Shot	14(27%)	37(73%)	51
Vitamin Shot	14(27%)	38(73%)	52

Table 3. Type of vaccine used when processing replacement calves.

Virus	Killed	MLV	Intranasal	Total Responses
IBR	13(27%)	32(67%)	3(6%)	48
PI3	14(30%)	30(65%)	2(4%)	46
BVD	17(35%)	32(65%)	0	49
BRSV	15(32%)	32(68%)	0	47

Twenty-nine percent of producers indicated the previous vaccination program would always influence their decision on the vaccine type used at arrival. Twenty-seven percent indicated the previous vaccination program influences their decision about what type of vaccine to use on arrival. Twenty-four percent rarely or never look at the previous vaccination program to make decisions about vaccine type used on arrival, while twenty percent sometimes look at previous vaccination to decide what vaccine type to use in replacements on arrival.

The local veterinarian is the individual most frequently asked for information about processing programs for replacements (Table 4).

Re-vaccination of Replacement Calves

After initial processing, many feedlot operators routinely re-vaccinate after a variable period of time. Thirty-one percent of respondents wait fifteen to twenty-one days before re-vaccinating replacements while twenty-six percent wait eight to fourteen days.

Table 4. Who do feedlot operators ask for advice about processing programs.

	Never		Sometimes		Always	Total Responses
Local Veterinarian	1(2%)	2(4%)	23(41%)	12(21%)	18(32%)	56
Consulting Veterinarian	26(51%)	6(12%)	12(24%)	5(10%)	2(4%)	51
Nutritionist	16(31%)	12(23%)	18(35%)	3(6%)	3(6%)	52
Drug Company Representative	28(54%)	8(15%)	13(25%)	2(4%)	1(2%)	52
Local farm or Feed Store	35(69%)	5(10%)	8(16%)	3(6%)	0	51
University Extension	27(53%)	9(18%)	14(27%)	0	1(2%)	51

Twenty-four percent of feedlots wait more than thirty days before revaccination. Eight percent of producers wait twenty-two to thirty days before re-vaccination while five percent wait zero to seven days.

Thirty-four percent of feedlot operators use an IBR vaccine in their revaccination program (Table 5).

Feedlot operators use modified live vaccine for viral respiratory diseases more than seventy percent of the time when re-vaccinating (Table 6).

Sixty-four percent of feedlot operators indicated they change their re-vaccination program when feeding preconditioned replacements while thirty-six percent don't change their re-vaccination program.

Table 5. Vaccines routinely used by feedlot operators for re-vaccination.

	Never	Seldom	Sometimes	Often	Always	Total Responses
Clostridia Vaccine	23(43%)	8(15%)	9(17%)	7(13%)	6(11%)	53
IBR Vaccine	19(35%)	4(7%)	13(24%)	10(19%)	8(15%)	54
PI3 Vaccine	22(43%)	11(22%)	10(20%)	4(8%)	4(8%)	51
BVD Vaccine	18(33%)	11(20%)	11(20%)	7(13%)	7(13%)	54
BRSV Vaccine	20(39%)	10(20%)	10(20%)	6(12%)	5(6%)	51
Haemophilus Vaccine	20(39%)	8(15%)	10(19%)	8(17%)	6(12%)	52
Pasteurella Vaccine	30(58%)	9(17%)	6(12%)	4(8%)	3(6%)	52

Table 6. Type of vaccine used by feedlot operators when re-vaccinating.

Virus	Killed	MLV	Intranasal	Total Responses
IBR	9(28%)	27(73%)	1(3%)	37
PI3	8(26%)	23(75%)	0	31
BVD	11(30%)	26(70%)	0	37
BRSV	9(30%)	21(70%)	0	30

Health Problems of Newly Arrived Replacements

Eighty-four percent of feedlot operators indicated they have respiratory disease at least sometime during the first month cattle are on feed. Fifty-seven percent of feedlots indicated they have some form of digestive disorder (bloat, diarrhea, or acidosis) at least sometime during the first month of the feeding period (Table 7).

Fifty-one percent of Iowa preconditioned calves have respiratory disease sometime (Table 8) during the first month they are on feed compared to eighty-four percent of all calves (Table 7).

Seventy percent of producers responding to the survey indicated the feedlot owner was the primary individual responsible for making treatment decisions, while the feedlot veterinarian was the person responsible for treatment decisions in twenty-three percent of the responses. In eight percent of the responses the feedlot manager was responsible for treatment decisions.

Fifty-six percent of feedlot operators indicate they never have to castrate Iowa Preconditioned calves when arriving at their feedlot.

Table 7. Frequency of health problems during the first month cattle are in feedyards.

	Never	Seldom	Sometimes	Often	Always	Total Responses
Respiratory Disease	2(4%)	7(13%)	32(58%)	12(22%)	2(4%)	55
Vaccine Reaction	23(43%)	25(46%)	5(9%)	1(2%)	0	54
Bloat	18(33%)	32(59%)	4(7%)	0	0	54
Coccidiosis	7(13%)	27(51%)	16(30%)	2(4%)	1(2%)	53
Foot Rot	7(13%)	25(45%)	23(42%)	0	0	55
Toe Abscess	18(33%)	22(41%)	11(20%)	3(6%)	0	54
Other Lameness	12(23%)	27(51%)	12(23%)	2(4%)	0	53
Diarrhea	8(15%)	27(50%)	17(31%)	2(4%)	0	54
Neurological	13(24%)	31(56%)	10(18%)	1(2%)	0	55
Eye Problems	10(18%)	25(45%)	19(34%)	2(4%)	0	56
Lice	20(36%)	20(36%)	14(25%)	1(2%)	0	55
Grubs	21(38%)	27(49%)	7(13%)	0	0	55
Worms	19(35%)	24(44%)	10(18%)	2(4%)	0	55
Abscesses	11(20%)	38(70%)	5(9%)	0	0	54
Acidosis	16(30%)	30(56%)	8(15%)	0	0	54
Injuries	7(13%)	32(60%)	11(21%)	2(4%)	1(2%)	53

Products Used by Feedlots

Micotil[R] is used therapeutically by seventy percent of feedlot operators at least sometimes while sixty-nine percent of feedlots use penicillin-G sometimes in their treatment programs (Table 9).

Sixty-eight percent of feedlots use Aureomycin[R] in the feed of replacement calves during the first month on feed. Rumensin[R] is used in the feed of replacement calves seventy percent of the time during the first month on feed (Table 10).

Table 8. Frequency of health problems in Iowa preconditioned calves first month on Feed.

	Never	Seldom	Sometimes	Often	Always	Total Responses
Respiratory Disease	4(9%)	18(40%)	22(49%)	1(2%)	0	45
Vaccine Reaction	26(58%)	17(38%)	2(4%)	0	0	45
Lice	17(39%)	21(48%)	6(14%)	0	0	44
Grubs	19(43%)	21(48%)	4(9%)	0	0	44
Worms	15(33%)	25(56%)	5(11%)	0	0	45
Abscesses	15(34%)	24(55%)	5(11%)	0	0	44
Eye Problems	13(29%)	25(56%)	6(13%)	1(2%)	0	45
Required Castrating	25(56%)	18(40%)	2(4%)	0	0	45
Required Dehorning	26(58%)	16(36%)	3(7%)	0	0	45

Iowa Preconditioned Calves

Sixty-nine percent of respondents to the survey (Appendix A) were satisfied or very satisfied with the preconditioned calves they purchased; twenty-one percent were neutral and eight percent were dissatisfied or very dissatisfied with the greentag calves they purchased.

Forty-four percent of respondents indicating they were dissatisfied with the preconditioned calves they purchased. Those respondents indicating dissatisfaction, were dissatisfied due to illness while thirteen percent were dissatisfied due to poor performance. Thirty-one percent felt the preconditioned calves cost too much (Question 24, Appendix A).

Table 9. Frequency of treatment products used by feedlot operators.

	Never	Seldom	Sometimes	Often	Always	Total Responses
Long Acting Tetracycline	2(4%)	19(37%)	22(42%)	9(12%)	0	52
Micotil^{R}	7(13%)	9(17%)	19(37%)	15(29%)	2(4%)	52
Nuflor^{R}	7(14%)	12(24%)	19(38%)	10(20%)	2(4%)	40
Baytril^{R}	21(43%)	11(22%)	14(29%)	3(6%)	0	49
Penicillin-G	6(11%)	11(20%)	26(48%)	9(17%)	2(4%)	54
Adspec^{R}	35(70%)	10(20%)	4(8%)	1(2%)	0	50
Sulfa Boluses	11(22%)	22(45%)	13(27%)	1(2%)	2(4%)	49
Tylan^{R}	21(42%)	15(30%)	14(28%)	0	0	50
Erythromycin	23(48%)	11(23%)	12(25%)	2(4%)	0	48
Banamine^{R}	17(34%)	10(20%)	17(34%)	5(10%)	1(2%)	50
Ketofen^{R}	38(81%)	8(17%)	1(2%)	0	0	47
Injectable Vitamins	13(26%)	15(30%)	17(34%)	5(10%)	0	50
Steroids	22(44%)	15(30%)	10(20%)	3(6%)	0	50
Oral Electrolytes	16(32%)	20(40%)	10(20%)	3(6%)	1(2%)	50
Probiotics	11(23%)	22(46%)	15(31%)	0	0	48
Antihistamines	11(22%)	16(32%)	16(32%)	6(12%)	1(2%)	50

IBR vaccination was rated as the most important requirement of the preconditioning program with a mean of 4.5 on a scale of one to five with one not important and five very important. BVD vaccination, vaccination date, and the veterinarian's signature were rated the second most important requirement with ratings of 4.4 on the same scale (Table 11).

Thirty-six percent of feedlot owners responding to question twenty-six of this survey (Appendix A) would prefer to have Pasteurella vaccination required in the preconditioning program. Thirty-three percent would like a requirement of double vaccination for the virus diseases. Fourteen percent want a longer weaning period required. Ten percent would like to have the sire breed indicated on the certificate while seven percent want deworming required in the program.

Research Topics Important to Feedlot Operators

Feedlot operators were asked to rate the importance of research topics using a scale of one to five, with one meaning not important and five very important. BVD, IBR, nutrition, and implants were rated the most important with a mean rating of 3.8 (Table 12). Beef quality assurance programs and research on specific treatment programs were rated important as research topics by feedlot operators with mean ratings of 3.7 on the same scale.

Feedlot operators rated Johne's disease research and external parasite control programs the lowest with a mean rating of 2.7.

County meetings and extension publications were rated as the most important form of education for feedlot operators with means greater than 3.5 on a scale of one to five, with one indicating not important and five very important (Table 13).

Table 10. Feed additives used during the first month in feedlots.

	Never	Rarely	Sometimes	Often	Always	Total Responses
Aureomycin^{R}	9(17%)	8(15%)	11(20%)	18(33%)	8(15%)	54
Terramycin^{R}	22(44%)	7(14%)	9(18%)	5(10%)	7(14%)	50
Tylan^{R}	34(68%)	10(20%)	5(10%)	1(2%)	0	50
Deccox^{R}	11(22%)	10(20%)	12(24%)	7(14%)	9(18%)	49
Bovatec^{R}	25(47%)	2(4%)	11(21%)	8(15%)	7(13%)	53
Rumensin^{R}	12(22%)	4(8%)	10(19%)	10(19%)	17(32%)	53
Gainpro^{R}	44(90%)	4(8%)	1(2%)	0	0	49
Cattlyst^{R}	42(84%)	5(10%)	2(4%)	0	1(2%)	50
MGA^{R}	24(44%)	5(9%)	9(17%)	7(13%)	9(17%)	54
Probiotics	26(53%)	12(24%)	7(14%)	1(2%)	3(6%)	49
Vitamin/Mineral	5(9%)	2(4%)	6(11%)	15(28%)	25(47%)	53

Table 11. Importance of the requirements in the preconditioning program.

	Not Important				Very Important	Total Responses	Mean Response
Preconditioning Certificate	2(4%)	2(4%)	6(12%)	11(21%)	31(60%)	52	4.3*
Owner's Signature	2(4%)	1(2%)	8(15%)	12(23%)	30(57%)	53	4.3
Weaning Date	1(2%)	6(11%)	15(28%)	13(25%)	18(34%)	53	3.8
Weaning Ration	3(5%)	10(18%)	17(31%)	19(35%)	6(11%)	55	3.3
Vaccination Type	1(2%)	4(7%)	8(15%)	19(35%)	22(41%)	54	4.0
Vaccination Date	1(2%)	0	5(9%)	20(37%)	28(52%)	54	4.4
Clostridial Vaccination	1(2%)	0	7(13%)	24(45%)	21(40%)	53	4.2
Haemophilus Vaccination	1(2%)	2(4%)	5(9%)	20(37%)	26(48%)	54	4.3
IBR Vaccination	1(2%)	0	1(2%)	23(43%)	29(54%)	54	4.5
PI3 Vaccination	1(2%)	0	5(9%)	23(43%)	25(46%)	54	4.3
BVD Vaccination	1(2%)	0	1(2%)	23(43%)	28(53%)	53	4.4
BRSV Vaccination	1(2%)	0	4(7%)	23(43%)	26(48%)	54	4.3
Castration Date	4(8%)	10(19%)	12(23%)	19(36%)	8(15%)	53	3.3
Dehorning Date	5(10%)	15(28%)	12(23%)	17(32%)	4(8%)	53	3.0
External Parasite Control	1(2%)	0	5(9%)	24(44%)	24(44%)	54	4.3
Veterinarian's Signature	2(4%)	2(4%)	3(6%)	15(29%)	30(58%)	52	4.4

*Scale 1=not important, 5=very important

Table 12. Importance of research topics.

	Not Important	Minor Importance	Moderate Importance	Important	Very Important	Total Responses	Mean Response
Specific Treatment Programs	1(2%)	1(2%)	19(36%)	22(42%)	10(19%)	53	3.7*
Vaccination Protocols	0	5(10%)	19(37%)	21(40%)	7(13%)	52	3.5
Clostridial Disease	1(2%)	9(18%)	21(41%)	19(37%)	1(2%)	51	3.2
BVD	0	3(6%)	17(33%)	19(37%)	12(24%)	51	3.8
IBR	0	3(6%)	17(33%)	18(35%)	14(27%)	52	3.8
PI3	0	4(8%)	20(39%)	17(33%)	10(20%)	51	3.6
BRSV	0	3(6%)	16(31%)	22(43%)	10(20%)	51	3.7
Haemophilus somnus	0	3(6%)	19(37%)	20(39%)	9(18%)	51	3.7
Pasteurella haemolytica	1(2%)	6(11%)	20(38%)	16(30%)	10(19%)	53	3.5
Pasteurella multocida	1(2%)	6(12%)	23(44%)	13(25%)	9(17%)	52	3.4
Johnes Disease	5(10%)	19(37%)	19(37%)	7(13%)	2(4%)	52	2.7
Coccidiosis	0	13(24%)	20(37%)	19(35%)	2(4%)	54	3.2
Lice	4(8%)	19(37%)	18(35%)	10(19%)	1(2%)	52	2.7
Grubs	4(8%)	19(37%)	20(38%)	8(15%)	1(2%)	52	2.7
Neurological Disease	4(8%)	14(27%)	18(35%)	13(25%)	2(4%)	51	2.9
Nutrition	3(6%)	3(6%)	9(18%)	25(49%)	11(22%)	51	3.8
Implants	0	4(8%))	8(15%)	29(55%)	12(23%)	53	3.9
Facility Design	2(4%)	8(15%)	22(42%)	16(31%)	4(3%)	52	3.3
Bacterial Resistance	1(2%)	9(18%)	17(33%)	21(41%)	3(6%)	51	3.3
Beef Quality Assurance	1(2%)	4(8%)	12(24%)	24(47%)	10(20%)	51	3.7
Feed Additives	1(2%)	2(4%)	15(29%)	27(52%)	7(13%)	52	3.7
Bullers	2(4%)	15(28%)	18(33%)	17(31%)	2(4%)	54	3.0

*Scale 1=not important, 5=very important

Table 13. Educational programs important to feedlot operator.

	Not Important	Minor Importance	Moderate Importance	Important	Very Important	Total Responses	Mean Response
Classes over the internet	11(21%)	17(33%)	12(23%)	9(17%)	3(6%)	52	2.5*
Classes on Iowa Cable Network	11(21%)	15(28%)	15(28%)	11(21%)	1(2%)	53	2.5
County Meetings about Cattle Feeding	2(4%)	4(8%)	12(23%)	25(48%)	9(17%)	52	3.7
Extension Publications	2(4%)	8(15%)	8(15%)	29(56%)	4(8%)	52	3.5
Extension Newsletters	2(4%)	6(11%)	12(23%)	29(55%)	4(8%)	53	3.5
Field Investigations by ISU Veterinarians	4(8%)	10(19%)	15(28%)	19(36%)	5(9%)	53	3.2
Campus Meetings at ISU	10(19%)	14(27%)	18(35%)	8(15%)	2(4%)	52	2.6

*Scale 1=not important, 5=very important

DISCUSSION

The Iowa Preconditioning program is the oldest sponsored program of its type in North America. In the year 2000, more than three hundred fifty thousand feeder calves were processed according to the rules and regulations of this program.[49] These numbers indicate a high level of acceptance of the preconditioning program by cow/calf producers, feedlot operators, and veterinarians in the state of Iowa.

The objective of this project was to determine the attitudes and experiences of feedlot operators about Iowa preconditioned calves. A survey was developed to examine attitudes and experiences of feedlot operators (Appendix A). Participants were selected from the membership list of the Iowa Cattleman's Association. Nine hundred names are listed alphabetically on this list. It was determined to survey four hundred fifty individuals by selecting every other name on the list.

Response Rate

The response rate of cattle feeders (13.5%) was lower than typical mailed cross-sectional surveys.[47] This may be due to the length of the survey or the timing of the mailing. Follow-up reminder cards did not result in additional return of surveys. Some members on the list no longer feed cattle, possibly reducing the response rate. Farmers are often reluctant to return surveys that address issues relating to production practices.

Profile

Fifty-eight percent of respondents purchase replacement feeder calves through marketing channels while a small number of respondents, eighteen percent, feed calves produced in their own cow calf herds.

Respondents with feedlots of less than one thousand head one time capacity (sixty-one percent) is very close to the sixty four percent reported by the Iowa Agriculture Statistics Service.[1] This profile provides a representative sample of feedlot operators in Iowa. Eighty-four percent of respondents have been feeding cattle for more than 20 years. This group provides an historical perspective to the survey results.

Purchased Preconditioned Calves

This project examined the experiences and attitudes of feedlot operators about the Iowa Preconditioned program. Fifty-three percent of respondents had purchased preconditioned calves in the past year. Ninety-three percent indicated they would pay more for properly preconditioned calves than traditionally marketed feeder calves. A willingness to pay a premium for properly preconditioned calves by feedlot operators is beneficial for the cow-calf producer, as it increases the value of his/her product.

Historical Information on Purchased Replacements

Feedlot operators indicated it was important to have historical information about purchased replacement calves. Fifty-four percent of respondents feel IBR vaccination history is important and fifty two percent feel BVD vaccination history is important.

The historical information that feedlot operators feel is important is provided by the Iowa preconditioning certificate (Appendix B). Historical information is provided by the preconditioning certificate.

Processing Replacement Calves

Feedlot operators believe it is important to have information about the vaccination history of purchased replacements but only forty-five percent use that information to make

decisions on a processing program for feedlot replacements. Many feedlot operators want all cattle in their lots to be vaccinated with the same products.

Local veterinarians are the major source of information for feedlot operators when making processing decisions. Sixty eight percent of feedlot operators indicate that feedlot replacements are vaccinated with modified live vaccines upon arrival. Use of modified live versus killed vaccines is a major issue in the beef cattle health industry.

Re-vaccination of Replacement Calves

Sixty-three percent of feedlot operators wait a minimum of two weeks before re-vaccinating replacements. This agrees with recommendations provided by vaccine manufacturers. Seventy-two percent of feedlots use modified live vaccine when re-vaccinating calves in the feedlots. Forty-one percent of feedlots use a clostridial vaccine when re-vaccinating calves. Revaccination with clostridial vaccines in feedlot cattle is discouraged because of concern about injection site lesions.

Health Problems of Newly Arrived Replacements

According to feedlot health surveys, respiratory disease is the leading cause of sickness in feedlot calves during the first twenty eight days of the feeding period.[9] In this survey, respiratory disease was also regarded as the most important health problem in feedlot calves during the first month calves were in the feedlot (eighty-four percent). Respiratory disease is the most important health problem in preconditioned calves during the first month of the feeding period. One of the major goals of the preconditioning program is to reduce the incidence of respiratory disease in feedlots. An examination of the responses to question seven and question eight indicates a thirty-three percent reduction in the incidence of respiratory disease in preconditioned calves.

Feedlot operators indicated some Iowa preconditioned calves sometimes had not been properly castrated or dehorned prior to entry into the feedlot. Forty-three percent of respondents said castration or dehorning of preconditioned calves was seldom or sometimes needed. Proper castration and dehorning are requirements of the preconditioning program.

Products Used by Feedlots

Products used to treat sick animals (Table 9) are variable among feedlots. Only a few responses indicated an individual antibiotic is always used. Responders indicated Micotil^{R} and penicillin-G were the most frequently used antimicrobial products.

Feed additive use (Table 10) indicates a number of feedlots routinely use antibiotics in their feed.

Iowa Preconditioned Calves

Feedlot operators who responded to the survey were very satisfied with the preconditioned calves they purchased in the last year. It is interesting that thirty-one percent of respondents said they were dissatisfied with preconditioned calves because they cost too much while ninety-three percent of respondents to question 5 indicated they were willing to pay more for these calves.

Survey respondents prefer that Pasteurella vaccination and two respiratory virus vaccinations become mandatory requirements of the preconditioning program. The Bovine Practice Committee of the Iowa Veterinary Medical Association has discussed these issues several times but has not reached a consensus.

Respondents generally indicate the preconditioning certificate (Table 11) provide adequate information to feedlot operators, indicating no major revisions are needed at this time.

Research and Education

Feedlot operators were asked to rate the importance of research topics. The highest rated research topic was implants, with a mean response of 3.9 on a scale of one to five, with one not important and five very important. This selection is important to feedlots, perhaps mainly because of "grid" marketing systems. Implant selection and usage can have a major effect on how cattle "fit" various grids, and thus have important marketing implications. The export market is also affected by the use of growth promotants. The European Union has banned the import of beef from the United States because of the use of hormone implants. This may be the reason feedlot operators rated implants as the most important research topic.

Feedlot operators also rated research on the major respiratory viral pathogens as important. Even with generally good vaccines and improved understanding about how these viruses cause disease, respiratory disease is still the number one cause of feedlot morbidity.

Feedlot operators were asked to rate the importance of educational programs, using a scale of one to five, with one not important and five very important. They rated local county meetings as the most important form of education they receive and extension publications and newsletters as the next most important. Feedlot operators appear to prefer meetings where direct interaction with people is possible. They can refer to written material whenever need arises.

Recommendations

This survey indicates that preconditioned calves are well accepted by feedlot operators in Iowa. They are willing to pay a premium for preconditioned calves as long as they receive information on the vaccination status of replacements. The study points out the importance of the availability of an accurately completed preconditioned certificate.

The study demonstrates the need for continued focus on respiratory disease and production problems in feedlot calves. Respiratory disease and production problems are the major concerns of feedlot operators. Local meetings and written materials are an important method of educating cattle feeders.

APPENDIX A

FEEDLOT OPERATOR SURVEY

Feedlot survey

Iowa State University

Veterinary Diagnostic and Production Animal Medicine

For each question that follows, please circle one answer (unless otherwise specified) that best represents your experience.

The following three questions are general information questions about your feedlot.

1. Indicate which of the following best describes your feedlot? (Circle one response)

   1 = Custom Feedyard

   2 = Feed own calves

   3 = Purchase replacement

2. What is the size of your feedlot? (One time capacity)

   1 = Small (0-1000 head)

   2 = Medium (1001-2500 head)

   3 = Large (more than 2500 head)

3. How many years have you been feeding cattle?

   1 = 0-5 years

   2 = 6-10 years

   3 = 11-20 years

   4 = more than 20 years

---

4. Have you purchased Iowa Greentag Preconditioned * Calves in the last year?

   ***A preconditioned calf is a calf that has met all the requirements of the greentag program, vaccinated, weaned 30 days, castrated, dehorned, poured for grubs or lice, and certified by a veterinarian.**

   1 = Yes

   2 = No

5. Would you be willing to pay more for a properly preconditioned calf?

   1 =Yes

   2 = No

6. Do you process (vaccinate, worm, implant, pour) calves that were preconditioned under the Iowa Greentag program, when they arrive in your feedlot?

   1 = Yes

   2 = No

7. When purchasing cattle for the feedlot, how important is it to you to have background information about the following.

	Not Important	Minor Importance	Moderate Importance	Important	Very Important
a. Clostridial vaccination	1	2	3	4	5
b. IBR vaccination	1	2	3	4	5
c. PI3 vaccination	1	2	3	4	5
d. BVD vaccination	1	2	3	4	5
e. BRSV vaccination	1	2	3	4	5
f. Haemophilus vaccination	1	2	3	4	5
g. Pasteurella vaccination	1	2	3	4	5
h. External Parasite Control (Grubs & Lice)	1	2	3	4	5
i. Internal Parasite Control	1	2	3	4	5
j. Date of weaning	1	2	3	4	5
k. Weaning ration	1	2	3	4	5
l. Creep Feeding History	1	2	3	4	5
m. Genetic Background	1	2	3	4	5
n. Birth Date	1	2	3	4	5
o. Implant History	1	2	3	4	5

Other (Please Explain)_____

_____

8. Does having background information on calves influence your processing decisions?

   1 = Never

   2 = Seldom

   3 = Sometimes

   4 = Often

   5 = Always

9. What products do you routinely use in your *processing program? (Circle appropriate number under use or don't use beside the product)

   *If you use a product such as (Ivomec^{R}, Dectomax^{R}, or Cydectin^{R}) please circle both internal and external parasite.

	Use	Don't Use
a. Clostridial 7-Way	1	2
b. Clostridial 8-Way	1	2
c. Clostridial C&D	1	2
d. IBR Vaccine	1	2
e. PI3 Vaccine	1	2
f. BVD Vaccine	1	2
g. BRSV Vaccine	1	2
h. Haemophilus somnus vaccine	1	2
i. Pasteurella Vaccine	1	2
j. *External Parasite Control	1	2
k. *Internal Parasite Control	1	2
l. Implants	1	2
m. Antibiotic Shot	1	2
n. Vitamin Shot	1	2

Other (Please Explain)_____

_____

10. Which type of vaccine do you use the majority of time at processing? (Circle one for each virus)

Virus	Killed	MLV	Intranasal
a. IBR	1	2	3
b. PI3	1	2	3
c. BVD	1	2	
d. BRSV	1	2	

11. Who is the primary person who processes replacement cattle when they arrive at the feedyard? (Circle only one)

1 = Veterinarian

2 = Self

3 = Hired Help

4 = Professional Processing Crew

Other (Please Explain) _____

_____

12. Does the previous vaccination program enter into your decision about vaccine type used upon arrival? (Circle only one)

1 = Never

2 = Rarely

3 = Sometimes

4 = Often

5 = Always

13. How frequently do you ask for advice about processing from each of the following people? (Circle one for each source.)

	Never		Sometimes		Always
a. Local Veterinarian	1	2	3	4	5
b. Consulting Veterinarian	1	2	3	4	5
c. Nutritionist	1	2	3	4	5
d. Drug Company Representative	1	2	3	4	5
e. Local farm or Feed store	1	2	3	4	5
f. University Extension	1	2	3	4	5

Other (Please Explain)_____

_____

14. Indicate how often you routinely re-vaccinate cattle during the feeding period with the following vaccines? (Circle one)

	Never	Seldom	Sometimes	Often	Always
a. Clostridia vaccine	1	2	3	4	5
b. IBR vaccine	1	2	3	4	5
c. PI3 vaccine	1	2	3	4	5
d. BVD vaccine	1	2	3	4	5
e. BRSV vaccine	1	2	3	4	5
f. Haemophilus vaccine	1	2	3	4	5
g. Pasteurella Vaccine	1	2	3	4	5

Other (Please Explain)_____

_____

_____

15. If you re-vaccinate cattle, how long after the initial vaccination do you normally wait before re-vaccinating? (Circle one)

1 = 0-7 days

2 = 8-14 days

3 = 15-21 days

4 = 22-30 days

5 = more than 30 days

Other (Please Explain)_____

_____

16. When re-vaccinating cattle, what type of vaccine do you use the majority of the time? (Circle one for each virus)

Virus	Killed	MLV	Intranasal
a. IBR	1	2	3
b. PI3	1	2	3
c. BVD	1	2	
d. BRSV	1	2	

17. Do you handle your re-vaccination program differently if cattle have been Greentag Preconditioned?

    1 = Yes

    2 = No

    Other (Please Explain)_____

    _____

18. Indicate the frequency with which the following diseases or health problems occur the first month cattle are at the feedyard.

	Never	Seldom	Sometimes	Often	Always
a. Respiratory Disease (Shipping Fever)	1	2	3	4	5
b. Vaccine reaction	1	2	3	4	5
c. Bloat	1	2	3	4	5
d. Coccidiosis	1	2	3	4	5
e. Foot Rot	1	2	3	4	5
f. Toe Abscess	1	2	3	4	5
g. Other Lameness	1	2	3	4	5
h. Diarrhea	1	2	3	4	5
i. Neurological (Brainer)	1	2	3	4	5
j. Eye Problems	1	2	3	4	5
k. Lice	1	2	3	4	5
l. Grubs	1	2	3	4	5
m. Worms	1	2	3	4	5
n. Abscesses	1	2	3	4	5
o. Acidosis	1	2	3	4	5
p. Injuries	1	2	3	4	5

Other(Please Explain)_____

19. Who has primary responsibility for treatment decisions for each animal at your feedlot? (Circle only one)

    1 = Veterinarian

    2 = Feedlot Manager

    3 = Hired Help

    4 = Feedlot Owner

    Other(Please Explain)_____

20. How frequently have you seen the following problems in Iowa greentagged cattle the first month on feed?

	Never	Seldom	Sometimes	Often	Always
a. Respiratory Disease (Shipping Fever)	1	2	3	4	5
b. Vaccine reaction	1	2	3	4	5
c. Lice	1	2	3	4	5
d. Grubs	1	2	3	4	5
e. Worms	1	2	3	4	5
f. Abscesses	1	2	3	4	5
g. Eye Problems	1	2	3	4	5
h. Required castrating	1	2	3	4	5
i. Required dehorning	1	2	3	4	5

Other (Please Explain)_____

_____

21. How often do you use the following products in treating your cattle?

	Never	Seldom	Sometimes	Often	Always
a. Long Acting tetracycline (LA-200^{R})	1	2	3	4	5
b. Micotil^{R}	1	2	3	4	5
c. Nuflor^{R}	1	2	3	4	5
d. Baytril^{R}	1	2	3	4	5
e. Penicillin-G	1	2	3	4	5
f. Adspec^{R}	1	2	3	4	5
g. Sulfa Boluses	1	2	3	4	5
h. Tylan^{R}	1	2	3	4	5
i. Erythromycin	1	2	3	4	5
j. Banamine^{R}	1	2	3	4	5
k. Ketofen^{R}	1	2	3	4	5
l. Injectable Vitamins	1	2	3	4	5
m. Steroids (Azium^{R}, Predef^{R})	1	2	3	4	5
n. Oral Electrolytes	1	2	3	4	5
o. Probiotics	1	2	3	4	5
p. Antihistamines (ReCovr^{R})	1	2	3	4	5

Other (Please Explain)_____

22. Indicate how often the following additives are included in the ration during the first month cattle are on feed?

	Never	Rarely	Sometimes	Often	Always
a. Aureomycin^{R}	1	2	3	4	5
b. Terramycin^{R}	1	2	3	4	5
c. Tylan^{R}	1	2	3	4	5
d. Deccox^{R}	1	2	3	4	5
e. Bovatec^{R}	1	2	3	4	5
f. Rumensin^{R}	1	2	3	4	5
g. GainPro^{R}	1	2	3	4	5
h. Cattlyst^{R}	1	2	3	4	5
i. MGA^{R}	1	2	3	4	5
j. Probiotics	1	2	3	4	5
k. Vitamin/Mineral	1	2	3	4	5

Other (Please Explain)_____

_____

23. Indicate your level of satisfaction with the greentag calves purchased. (Circle One)

1 = Very Dissatisfied

2 = Dissatisfied

3 = Neutral

4 = Satisfied

5 = Very Satisfied

24. If you were dissatisfied with the purchased greentagged calves, indicate below the reasons for this dissatisfaction. (Circle all that apply)

1 = Illness

2 = Poor Performance

3 = Cost

Other (Please Explain)_____

_____

_____

_____

25. As a cattle feeder, rate the importance of the following requirements in the greentag program? (Circle only one for each requirement)

	Not Important				Very Important
a. Preconditioning certificate	1	2	3	4	5
b. Owner's Signature	1	2	3	4	5
c. Weaning Date	1	2	3	4	5
d. Weaning Ration	1	2	3	4	5
e. Vaccination Type (Killed vs. Modified Live)	1	2	3	4	5
f. Vaccination Date	1	2	3	4	5
g. Clostridial Vaccination	1	2	3	4	5
h. Haemophilus Vaccination	1	2	3	4	5
i. IBR Vaccination	1	2	3	4	5
j. PI3 Vaccination	1	2	3	4	5
k. BVD Vaccination	1	2	3	4	5
l. BRSV Vaccination	1	2	3	4	5
m. Castration Date	1	2	3	4	5
n. Dehorning Date	1	2	3	4	5
o. External Parasite Control	1	2	3	4	5
p. Veterinarian' Signature	1	2	3	4	5

Other (Please Explain)_____

_____

26. Indicate which of the following changes to the Iowa greentag program would be the most important to you. (Circle only one)

1 = Indicate sire breed on certificate

2 = Require Pasteurella Vaccination

3 = Require Deworming

4 = Require longer weaning period

5 = Require 2 Virus Vaccinations

Other (Please Explain)_____

_____

27. Indicate the importance of the following research topics to you as a feedlot operator in Iowa. Those topics found to be the most important to feedlot operators in Iowa will be given priority for future research at Iowa State University.

	Not Important	Minor Importance	Moderate Importance	Important	Very Important
a. Specific Treatment Programs	1	2	3	4	5
b. Vaccination Protocols	1	2	3	4	5
c. Clostridial Disease	1	2	3	4	5
d. BVD	1	2	3	4	5
e. IBR	1	2	3	4	5
f. PI3	1	2	3	4	5
g. BRSV	1	2	3	4	5
h. Haemophilus somnus	1	2	3	4	5
i. Pasteurella haemolytica	1	2	3	4	5
j. Pasteurella multocida	1	2	3	4	5
k. Johnes Disease	1	2	3	4	5
l. Coccidiosis	1	2	3	4	5
m. Lice	1	2	3	4	5
n. Grubs	1	2	3	4	5
o. Neurological Disease	1	2	3	4	5
p. Nutrition	1	2	3	4	5
q. Implants	1	2	3	4	5
r. Facility Design	1	2	3	4	5
s. Bacterial Resistance	1	2	3	4	5
t. Beef Quality Assurance	1	2	3	4	5
u. Feed Additives	1	2	3	4	5
v. Bullers	1	2	3	4	5

Other (Please Explain)_____

_____

_____

_____

_____

_____

_____

28. Indicate the importance of the following educational programs to you as a feedlot operator in Iowa. The educational programs that are the most important to you as a feedlot operator will be used for future programs at Iowa State University.

	Not Important	Minor Importance	Moderate Importance	Important	Very Important
a. Classes over the internet	1	2	3	4	5
b. Classes on Iowa Cable Network (ICN)	1	2	3	4	5
c. County Meetings about Cattle Feeding	1	2	3	4	5
d. Extension Publications	1	2	3	4	5
e. Extension Newsletters	1	2	3	4	5
f. Field Investigations by ISU Veterinarians	1	2	3	4	5
g. Campus Meetings at ISU	1	2	3	4	5

Other (Please Explain)_____

_____

_____

_____

_____

_____

_____

Remember your responses are strictly confidential. Thank you for taking the time to complete the survey. It will provide quality information to help you in your feedlot enterprise. If you have any questions please let me know.

Return:

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Iowa State University
Ames, IA 50011
Phone: 515-294-7012
E-mail: dtensly@iastate.edu
Fax 515-294-1072

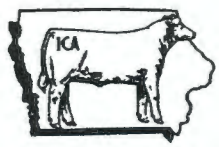
APPENDIX B

IOWA GREENTAG PRECONDITIONING CERTIFICATE

PRECONDITIONING CERTIFICATE

IOWA VETERINARY MEDICAL ASSOCIATION
IOWA CATTLEMEN'S ASSOCIATION

This certificate valid July 1, 1998 through June 30, 2001



Producer/ Owner_____ Date Issued_____

Address _____ Phone _____

Sale Location_____ Sale Date _____

IVMA PC Tag No. _____ - _____ Total No. _____ Breed _____

NOTICE: Certificate not to be signed nor provided to owner until 30 days AFTER weaning.

Home Raised ☐ yes ☐ no

Date Weaned _____ Ration during weaning period _____

Other Owner Comments _____

I certify that these cattle have been weaned 30 days and that I have owned them at least 60 days.

SELLER - PLEASE FORWARD THIS INFORMATION TO THE NEW OWNER.

_____
Owner Signature

Vaccine must be given in neck area. Vaccines must be given subcutaneously if permitted on product label. Revaccination recommended per vaccine label instructions.

First Vaccination & MANDATORY Procedures Required 3 Weeks Prior To Shipment

			Date 1st vac. (Required)	2nd vac. (Optional)	Product Name and Mfg.
Clostridial Group (7-way)					
Haemophilus somnus					
	1st vac	**2nd vac**			
IBR	mlv/k	mlv/k			
PI-3	mlv/k	mlv/k			
BVD	mlv/k	mlv/k			
BRSV	mlv/k	mlv/k			
Castrated				method used	
Dehorned				method used	
External parasite treatment				**Product**	
Grub/Lice (Aug. 1 - Nov. 15)					
Lice (after Nov. 15)					

MANDATORY Must be 4 Months of Age

OPTIONAL

	Date	Product Name and Mfg.
Internal parasite treatment		
Implant steers ☐		
heifers ☐		
Pasteurella		
Other (specify)		

To the best of my knowledge this is an accurate statement of the procedures performed on these calves.

Veterinarian Signature Address Phone

Requirements of the P.C. program are determined by a joint effort of the IVMA and ICA. The above veterinarian has agreed to the rules set by the IVMA. The IVMA and ICA are not responsible or liable for services rendered by this veterinarian. No warranty of health performance is given or implied. Revised June, 1999. All previous certificates obsolete.

THIS COPY TO ACCOMPANY CALVES

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