Stopping Disease Before It Takes Hold

FRANKLYN GARRY—Integrated Livestock Management, Colorado State University
Department of Clinical Sciences, Fort Collins, CO 80523-1620
Tel: (970) 491-0371 Fax: (970) 491-1275 fgarry@lamar.colostate.edu

The Spectrum of Dairy Cattle Health Problems

Over the last several decades, changes in management, nutrition and genetics of our dairy cow population have led to a shift in the type of diseases perceived to be important. We increasingly recognize the importance of suboptimal performance that occurs without overt disease signs, the occurrence of metabolic and production related diseases and a variety of management problems that limit performance but are not directly related to specifically diagnosed diseases. Examples of these types of problems include rumen acidosis, ketosis and fatty liver disease, laminitis, hypocalcemia/milk fever, displaced abomasums, and reproductive inefficiency.

Enough emphasis has been placed on this variety of problems that it is easy to perceive that infectious disease is proportionally less of a problem now than it was in times gone by. Recent information from the National Animal Health Monitoring System Dairy '96 Study demonstrates, however, that infectious diseases still represent a tremendous area of concern. This study estimates that clinical mastitis occurs in 13.4% of all dairy cows, respiratory problems in 2.5%, lameness in 10.5%, and diarrhea in 3.4%. In dairy calves, scours, diarrhea and respiratory problems are responsible for 85% of all calf deaths.

These estimates of average disease incidence provide only one side of the infectious disease picture. Infectious disease remains an extremely important concern in any livestock operation. Even more troublesome than ongoing disease losses can be the development of explosive new infectious problems. Despite the lower profile infectious diseases may have assumed in some discussions of herd health and productivity, infectious agents are still as important as ever and perhaps even more problematic as animal density and herd size increase.

Clearly, the spectrum of dairy cattle health issues is very broad, both in terms of the types of disease problems, and the management required to deal with these problems. These issues range from non-infectious to infectious diseases, from nutritional management to vaccination strategies, from antibiotic residue concerns to food safety issues. It is evident to anyone involved in dairy production that health problems are central to many of the management decisions that need to be made on a daily basis.

How Do We Deal With Dairy Cattle Health?

Ongoing scientific advancements influence our perception of disease and our methods of dealing with these problems. For some, increased knowledge about the impacts of nutrition and animal management as primary determinants of livestock health has led them to ignore many infectious disease issues. It has been easy to assume that vaccine improvements make infections ever more preventable, and antibiotic improvements make these diseases ever more treatable. With advances in computer technology and animal monitoring techniques, we have increased our ability to evaluate indices of herd performance and productivity. Thus we look at reproductive performance, milk production, sick pen days, milk somatic cell count, etc. to evaluate the herd.

Sooner or later, however, almost every dairy faces a real crisis in animal health. This might occur as a sudden increase in an infectious disease, a rapidly fatal disease of unknown cause, or recognition that a certain problem has been increasing over a prolonged time and is now rampant in the herd. When this occurs, several truisms become apparent:

1. Even with the best possible management, disease is a fact of life.
2. We can manage animals as a herd, but disease ultimately manifests in individual animals.
3. In a complex system, something goes wrong eventually.

While there are many ways we could respond to these observations, I believe the best approach is the one least frequently employed. Keeping in mind the many different disease challenges we need to consider, plus the many different factors that can promote disease, plus the many different methods we might use to manage disease problems, there is no set of management practices that could fit all situations. Clearly there is need to fit management to each individual dairy. This requires a balance between generic best management practices and monitoring for the circumstances and disease problems of the dairy. Specifically this requires attention to prompt and thorough diagnosis on a routine and systematic basis.

Disease Management

The following discussion will focus on infectious disease management. As noted above, this is only one group of diseases that would concern dairy operations,

more →

and similar management issues could be addressed for diseases that relate to nutritional factors, toxicities, or housing and facilities. Many disease problems are influenced by combinations of these factors, but the purpose of this discussion is to demonstrate the importance of balancing management and monitoring, rather than outline the causation of multiple diseases.

There are numerous infectious diseases of concern to dairy operations that do not respond well to management focused primarily on vaccination plus treatment. For example, we recognize viral diseases that can circumvent vaccine protection, diseases that respond poorly to treatment, and endemic or chronic diseases with carrier animals that perpetuate the disease in a herd. These include brucellosis, tuberculosis, Johne's disease, salmonellosis, bovine leukosis, mastitis due to Streptococcus, Staphylococcus and Mycoplasma, anaplasmosis, hairy heel warts, ringworm, Pasteurella pneumonia, Haemophilus, BVD, IBR, PI^3 and BRSV.

Infectious disease control is one area where veterinary consultation and management input are virtually indispensable. A look at the findings from the NAHMS Dairy '96 Study puts in perspective the opportunities for improvement in this disease control area. Depending on herd size, between 45% to 80% of dairies brought cattle onto their operation within the year preceding the study. Of the new additions, fewer than 25% were quarantined and even fewer were adequately tested for infectious diseases. These statistics alone emphasize the high risk of infectious disease introduction in most dairies. Between 20% to 50% of dairies fail to require common vaccinations before introducing new cattle into their herd. Thirty to eighty percent of dairies fail to require milk somatic cell counts and 60% to 90% of dairies request no milk culture before introducing new herd replacements.

A biosecurity program must be individually tailored to the herd and its specific concerns and goals. An important first step in the development of a biosecurity program is identification of those diseases that concern a specific dairy operation. Quarantine can help to limit the introduction of infectious agents that induce acute disease, but quarantine alone is an insufficient measure for the prevention of entry of most of the important infectious diseases. Other biosecurity measures will vary with the mode of disease transmission, the duration of infectious agent shedding, the presence of asymptomatic carriers, and the reliability of screening tests for the disease. Quarantine will not work to prevent the introduction of diseases with chronic asymptomatic carrier states such as Johne's disease, BVD, IBR, salmonellosis, BLV and contagious mastitis.

For some diseases, the best method of protection is testing prior to purchase. Screening tests can be very useful for avoiding brucellosis, tuberculosis, contagious mastitis, BVD and BLV. For Johne's disease, screening tests alone are inadequate and knowledge of the Johne's disease status of the herd of origin is probably more important.

Screening tests for Salmonella can be useful but most Salmonella infections are caused by feed, environmental contamination or spread by other species. Risk of disease transmission from other species has been generally considered low but should not be forgotten when considering herd management strategies. Tuberculosis and brucellosis can be spread by deer or other cervids; sarcosporidiosis, hydatid disease and rabies can be spread from dogs; and toxoplasmosis and rabies are commonly spread by cats. The Dairy '96 Study shows that 90% of operations have contact between cattle and cats, 78% of operations have contact with dogs, approximately 50% have contact with deer or other cervids, and 20% or less have contact with beef cattle, horses or poultry. The study also demonstrated that 60% or fewer of dairies prevented access to grain or concentrate storage units by dogs, cats, birds and rodents.

Infectious problems can be spread by contact with infected body fluids. More than 50% of operations that dehorned heifers with spoons, gouges, saws or other surgical methods neither washed nor disinfected between animals; 65% to 75% of operations did not change needles or disinfect needles between animals when administering vaccines by injection. Approximately 75% of operations used the same rectal sleeve for more than one cow when performing rectal palpation. Only 18% of operations separated sick cows to prevent nose to nose contact with other cows and heifers.

Some infectious diseases are spread from dams to newborns and the time of separation of the calf from the cow can have an impact on the transmission of these diseases. Only 13% of operations separated newborn calves from the dams within one hour of birth. Twenty-five percent of operations separated the calves beyond 12 hours after birth. Fifteen percent of operations allowed calves to stay with their dams more than 24 hours. Thirty percent of operations failed to wash teats and udders before colostrum was collected for administration to the calves. Approximately 55% of operations used the calving area as a hospital area for sick cows. Fecal contamination is a common means for spread of many enteric infections. Approximately 33% of operations used equipment for manure handling that was also used to handle feed for heifers less than 12 months of age.

A well designed biosecurity program can have a very significant impact in reducing the risk of infectious spread. The program should be designed for the needs of each individual operation. Consideration should be given to entry of new animals, quarantine of new animals, prepurchase vaccination and testing or screening for disease, knowledge of the herd of origin for new purchases, minimization of feed and environmental contamination, disinfection of instruments, minimized contact between sick and healthy cattle or dams and calves, minimized fecal contamination, fly and other insect control programs, and minimized contact with other species.

Monitoring Disease — The Importance of Accurate Diagnosis

So how do we determine the diseases of importance on an operation? While there are certain management practices that generically help reduce the risk of spread of multiple disease problems, others are very focused on specific diseases. Virtually all of the management items discussed above require that good diagnostic tools are used, or at least that the diagnostic tools used are well understood and employed properly, even when they are not particularly accurate. Additionally, there are unexpected disease problems that occur even when management against disease is well implemented. Unfortunately, it is often the unexpected problems that can cause the greatest losses, exactly because they are unanticipated and therefore unmanaged until they are well advanced.

The most important tool for adapting management to a changing set of disease concerns is prompt and accurate diagnosis. The best opportunities for disease monitoring are typically overlooked. It seems that many producers and veterinarians assume that they have a good feel for the diseases that occur on a specific operation. Alternatively, they assume they can use a good guess on the nature of a disease and manage around the problem. Perhaps they feel that the set of likely problems is limited enough that they don't really need to know the cause of a specific disease. Or perhaps it seems reasonable to apply some 'shotgun' treatment and prevention practices with the assumption that a broad enough approach is likely to be successful regardless of the specific problem at hand.

There is a saying that "You can't manage what you don't measure". While this is not completely true, it is certainly true that the more closely you can identify and measure a problem, the better equipped you are to manage it.

For whatever reason, very few producers or veterinarians take advantage of the array of diagnostic techniques available. When diagnostic methods are employed, they are often used sparingly in bits and pieces, and rarely with a well thought out approach. In other words, it is common that we deal with dairy disease issues without thorough information about the nature and extent of disease problems. Often a dairy will have good information about overall herd production parameters, but fail to get routine disease information about individual sick animals. Some of this information is easily acquired and often quite reasonably priced, especially when compared with the value of the information for making herd decisions.

A dead animal is usually viewed as a waste product, one that brings the burden of disposal. The value of the dead animal is routinely overlooked. It is true that dead animals are a loss to the operation, but they also provide an invaluable opportunity to evaluate an aspect of the herd. Post mortem examination (necropsy examination) is one of the most underutilized tools in dairy herd monitoring and management. It is important to investigate death losses systematically and to record trends observed over time.

The signs of many cattle diseases are remarkably similar and physical examination of sick animals can often fail to provide an accurate diagnosis. For many treatment scenarios this is not a major problem, because some diseases respond to similar treatments, and because treatment regimens can be modified to improve recovery, in many cases without a final definitive diagnosis. On the other hand, the most effective and cost beneficial strategies both for prevention and treatment will be devised on the basis of accurate diagnosis and disease identification. Therefore, routine examination of dead animals on an operation provides one of the best opportunities to evaluate treatment and prevention.

Necropsy examination on a routine and systematic basis, preferably on every dead animal, provides a tremendous advantage in the face of an emerging disease outbreak. Many of the procedures performed on samples submitted to a diagnostic laboratory require time. Waiting to conduct necropsies and submit samples until it has become really clear that a major disease problem is underway is a very poor plan. Typically, by the time you are obliged to submit necropsy samples, substantial losses have already occurred, and more will continue to occur before a reasonable answer is available. These losses are compounded by the waste of poorly directed treatment measures and other costly interventions.

A typical example follows to emphasize these points. A lactating dairy cow dies within 24 hours of getting sick with apparent respiratory disease. Because of the sudden onset and rapid death, and because only one cow was

more →

affected, the operator shrugs it off. Several years ago respiratory syncitial virus infection had occurred in some animals. Consulting with the veterinarian, the owner becomes convinced this cow was likely an aberrant case of the same infection. Two days later another cow dies, followed by several more cows over the succeeding week and a half. Several different treatments are tried, but none with good success, leading the owner and veterinarian to believe more strongly in the original diagnosis, because they don't expect antibiotics to affect the outcome of this viral disease. Unfortunately the disease problem appears to be escalating, and when six cows are dead, and several others surviving but left as respiratory cripples, three new cases appear on the same day. One of these dies, and the other two are euthanized. Necropsy of all three reveals severe bacterial pneumonia, and culture and sensitivity of the organism reveals the best antibiotic to use. However, three more cows are lost while these results are pending. After changing the treatment approach to treat at the first signs of respiratory illness with the right drugs, no further losses occur, and all affected cows respond well to the treatment.

Not all disease problems are as quickly resolved as this case. The point of this illustration was to stimulate the following questions. How many sick animals and how much money would have been saved if the first dead cow had been subjected to necropsy? How many cows do you have to lose before you initiate a good diagnostic workup? How long do you wait before realizing that a problem may be different from what you first expected? How much more money would have been lost if the owner above had instituted a radical change in vaccination programs with an assumed diagnosis that was wrong?

The best diagnostic necropsy is one performed on a recently dead animal. Sometimes it is important to euthanize an animal for necropsy because the diagnostic value exceeds the likelihood that the animal will respond favorably to treatment. In such cases, it is important to carefully select an animal that has the same disease signs, is recently affected by the disease, and thus closely fits the disease scenario you are trying to combat.

Summary

Cattle health problems are very important concerns for dairy producers, playing a central role in many aspects of dairy management. Dairy cattle diseases have many different causes and manifestations. Depending on the circumstances of each dairy operation the problems that face producers will have some similarities, but usually differ greatly from farm to farm. The best approach to managing ongoing disease problems, and heading off new disease threats before they become major problems, is a combination of (1) management practices targeted to control the diseases of importance on the operation, plus (2) ongoing diagnosis and monitoring of disease problems, necessary for modifying the management program. Necropsy and diagnostic sample submission are key elements of a disease monitoring program.