

# *Developing a Plan for Treating Mastitis*

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Mastitis is both the most common and costly disease of dairy cows. The costs associated with clinical mastitis result from the milk that is discarded because it is either abnormal or withheld from sale due to antibiotic residue; lost future production of the cow; the cost of treatment/labor; and culling or death of affected cows. The incidence of clinical mastitis varies greatly between herds with some dry lot dairies having an incidence in excess of 100 cases per 100 cows per lactation. It is obvious that the preferred strategy for dealing with mastitis is to prevent the occurrence of mastitis in the first place. However, even with the best efforts in place for the prevention of mastitis, there is still a need to deal with cases of clinical mastitis. From the dairyman's perspective, the first objective of treatment of clinical mastitis would be to return the cow to having saleable milk. To accomplish this, milk needs to be normal in appearance and free from antibiotic residue.

As dairies become larger in size and hired labor becomes responsible for treating clinical cases of mastitis, it becomes more important for management to develop standardized treatment protocols. There are five things that a dairy producer should consider in developing treatment protocols for clinical mastitis.

1) Identify causative bacteria. In the ideal situation, the dairy producer would know what bacteria are causing the case of clinical mastitis before treatment is initiated. Since, we aren't able to identify the organisms causing the clinical mastitis until sometime after the onset of the case, the next best thing is to know what bacteria typically are responsible for causing clinical mastitis in a given herd.

2) Grade the severity of mastitis. A simple system of grading the severity of mastitis into three categories of mild, moderate and severe will help to further refine treatment protocols.

3) Develop cost effective treatment protocols. A cost-effective treatment protocol needs to consider not only the cost of the drugs in the treatment protocol, but the amount of milk discarded, and the success in achieving bacteriological cures, reducing somatic cell counts, and preventing future relapses.

4) Establish treatment objective. The objective of treatment is to not only establish a clinical cure but a bacteriological cure as well.

5) Develop a record system. If the dairy producer is going to truly manage mastitis, the outcomes of cases following treatment must be monitored.

Figure 1 shows the distribution of bacterial isolates from 4414 cases of clinical mastitis reported from three trials, one in California, one in Canada, and one in the U.K. Twenty eight percent of the samples had no bacterial growth. Yet, at the time the milk sample was taken from these cows for culture, the cows had a case of clinical mastitis. So what happened? These are cases in which the cows most likely had a clinical coliform mastitis but by the time sample was collected, the cow's white blood cells had been enlisted to fight the mastitis-causing organism and had actually succeeded in eliminating the infection. The sooner a sample of milk is taken following the recognition of the clinical mastitis, the more likely that a coliform organism will be isolated. With a delay in time between the onset of mastitis and sample collection, more of these cows will have eliminated the bacteria and the samples will have no growth. Hence, in the majority of cases where there was no growth, the mastitis was initially a clinical case of coliform mastitis but the cow has succeeded in eliminating the coliform organism. Therefore, the proportion of clinical cases of coliform mastitis is really the sum of cases from which coliform organisms were isolated and cases from which there was no growth. This means that across large populations of cows, approximately 50% of the cases of clinical mastitis are caused by the combination of coliform organisms and gram-negative bacteria.

From a practical standpoint, there aren't any commercial intra-mammary antibiotic tubes that are truly effective for the treatment of coliform mastitis. Hence, we are primarily dependent upon the cow's immune system for elimination of coliform organism from the mammary gland and resolution of the mastitis. From a management perspective, we can reduce the severity of coliform mastitis through the use of gram-negative core antigen vaccines.

Approximately 25% of the cases of clinical mastitis are caused by environmental streptococci. Thus, about 75% of the cases of clinical mastitis are caused by the combination of environmental bacteria, the streps and coliform bacteria. Approximately 15% of the clinical cases of mastitis are caused by the combination of *Staphylococcus aureus* and coagulation negative staph (CNS) in most herds. The staphs and streps are gram-positive bacteria and are potentially susceptible to the antibiotics in commercial intra-mammary antibiotic tubes. Although *Staphylococcus aureus* may be susceptible to the antibiotics in commercial tubes, *Staphylococcus aureus* mastitis cases are frequently refractory to intra-mammary treatment because of the nature of the infection. Hence the infections that are most likely to benefit from the use of commercial intra-mammary antibiotic tubes are cases caused by environmental strep and the CNS bacteria and represent about one third of the cases of clinical mastitis.

There are several important lessons in this data set and they all emphasize the importance of identifying the causes of clinical mastitis for each dairy.

- 1) Although we know the proportions of bacteria that are responsible for clinical mastitis in large populations of cows, it is important to culture samples from every clinical case of mastitis to develop a profile of the mastitis causing-organisms for your dairy. If we are going to pass judgment of the effectiveness of mastitis treatments, we must know which cases of mastitis are treatable with intra-mammary therapy.
- 2) From large surveys of clinical mastitis, only one third of the cases of clinical mastitis would likely benefit from intra-mammary therapy.
- 3) Culturing clinical cases of mastitis is also a valuable tool for the early identification of mycoplasma mastitis infections in a herd.
- 4) Profiling the cause of clinical mastitis cases provides information on where the appropriate measures should be implemented for the prevention of mastitis.
- 5) Samples from clinical cases should be collected aseptically when the cow is first pulled from the milking string and the sample identified and frozen. These samples can be submitted to a laboratory for culture on a weekly, bi-weekly or monthly bases.