Determining Cause and Incidence Rate of Clinical Mastitis in Dairy Cattle

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Mastitis is one of the more expensive infections on a dairy operation. The average case of mastitis cost farmers $325 this includes vet costs, treatment, labor, discarded milk, decreased milk production, culling, extended days open, and death (Liang and Others, 2016). The difference between clinical and subclinical mastitis is that with clinical mastitis the cow shows signs of an infection. The following discussion will focus on determining the cause and incidence of clinical mastitis. Since subclinical cases can't be detected easily and are still costing you money without you even knowing it the key to controlling both types of mastitis in your herd is prevention.

What causes clinical mastitis? The most effective way to determine what organism causes clinical mastitis in a herd is to culture milk samples. To culture a milk sample means to place the milk sample in a sterile dish with a growth medium in a lab and provide an environment for whatever bacteria is present in the milk to grow. Then, once the bacteria have grown for a certain amount of time, a lab technician or researcher can evaluate the sample and determine the causative pathogen. Research using bacteria cultures shows that the majority of clinical mastitis cases are caused by five main bacteria. They are: *E. coli* (and other coliforms), *Streptococcus* spp., *Bacillus* spp., and *Staph. aureus.* Although considered a minor pathogen, coagulase-negative staphylococci are also frequently isolated from clinical samples.

How do you determine which bacteria is causing clinical mastitis in your herd? Bacterial cultures of milk samples from infected cows in your herd are needed to determine which bacteria is/are causing your problem. Milk samples need to be collected aseptically following strict procedures BEFORE THE COW IS TREATED. To collect samples for culturing:

1. Obtain sterile vials from either a diagnostic lab or milk cooperative such as DFA.
2. Wear gloves when collecting the samples.
3. Begin by preparing the cow or cows to be sampled just as you would prepare them for milking. Fore strip, pre-dip, then wipe clean with a dry towel or cloth. Next take a cotton ball moistened with rubbing alcohol, but not dripping wet, and for 15 to 20 seconds scrub the teat end. Continue doing this with new cotton balls until the cotton ball is still white after cleaning the teat end.
4. Do not open the collection vial until you are ready to take the sample. Hold the vial at a 45-degree angle and do not touch the inside of the lid. Also do not lay the lid on the ground, hold it facing down to minimize the risk of contamination.
5. Do not let the teat touch the collection vial, but aim for direct streams of milk into the vial. Do this as rapidly as you can, but be careful to avoid contamination. Do not fill the vial completely full as the sample will need to be frozen until it can be taken to the lab and if the vial is too full when it is frozen it will bust and your sample will be lost.

Avoiding contamination is a huge concern because contamination causes a greater chance of skewed results including other bacteria than those causing the mastitis as well as overgrown cultures that cannot be analyzed correctly. Knowing the specific pathogen causing the mastitis in your herd will allow you to treat infected cows more effectively. An important thing to note however, is that 40 to 50% of bacteria cultures come back as no growth. Reasons for this can be that the cow may have already been treated with antibiotics, that the cow's body has already dealt with the infection on her own or bacterial numbers are too low to detect. For the other 50-60% of cultures, with the exception of overgrowths, the results can lead you to the best course of treatment and management practices for the specific pathogen causing problems in your herd.

How much is too much clinical mastitis? To answer this question, you must determine the incidence rate for clinical mastitis in your herd. Simply put incidence rate for clinical mastitis is the percentage of cows in your herd with a case of clinical mastitis during their current lactation. So to determine your incidence rate you would take the number of cows with a case of clinical mastitis this lactation and divide it by your total number of cows and multiply that number by 100 to get a percentage. According to a research study done at the University of Wisconsin School of Veterinary Medicine, conducted by Nigel Cook and Rebecca Mentink, the average incidence rate of mastitis on a conventional dairy operation is 32%; this means 32 out of 100 cows on average have a case of clinical mastitis in this lactation. In a perfect world even one case of clinical mastitis is too much, but achieving that low of an incidence rate is virtually impossible for many reasons. With that being said it is not uncommon in some of the top herds for the incidence rate of clinical mastitis to be below 10 to 15%. So practically speaking, how much is too much? This answer can be different for every herd depending on the standards you are trying to maintain. In general, the higher the incidence rate the more money lost. Therefore, the lower the incidence rate the better.

Prevention is key. Preventing mastitis is by far the best, most cost effective option there is. There are several things you can do to prevent mastitis in your herd. The simplest thing is to make sure all employees are trained and that proper milking and sanitation procedures are followed. Determine problem areas on your farm where the cows most often are exposed to the pathogen causing your mastitis and correct the problem or keep the cows out of that area as much as possible. To reduce the spread of mastitis from cow to cow in your herd use an effective pre and post dip as well as clean, well-maintained milking equipment. Using dry cow treatment at dry off as well as an internal teat sealant, such as Orbaseal, and a coliform vaccine can also help prevent mastitis during the dry period and in the next lactation.