

Using Your Mastitis Knowledge – Why the Difference Between Subclinical and Clinical Mastitis Matters

Dr. Ann Godkin

Farm A has a bulk tank SCC that has been increasing over the last few months but treats almost no cows for mastitis. Farm B also has an increasing bulk tank SCC but has cows that need treating for mastitis almost every week. Both are losing money and are frustrated. Both farms have a mastitis issue, but the issue is different. Where would you start investigating to decide how to prevent each herd's problem?

We have classified udder infections (mastitis) in different ways....by pathogen or bacterial type, by stage of lactation, by severity of illness, or by the signs we see in the udder or cow. To fine tune our efforts to improve milk quality we need to use a broader mastitis classification system to initially and accurately direct our decisions about prevention and treatment.

Mastitis is a bacterial infection in the udder that triggers a reaction in the cow's immune system. Depending on the bacterial pathogen the resulting inflammation can range from changes in the milk (flakes and colour change) to no visible change at all. Changes we see are "clinical" mastitis. When no visible changes occur, it is "subclinical". Both kinds of infections – clinical and subclinical – have negative impacts on cow welfare and productivity. But we need to detect and monitor each type separately so we can tailor our mastitis investigations to suit each herd's situation.

Impact on milk loss.

Both subclinical and clinical mastitis impact negatively on milk and component production but the reasons for the economic losses differ. With **clinical mastitis**, milk is abnormal, and a direct loss occurs because this milk can't be added to the bulk tank. Generally, clinical mastitis is present in only one quarter of the cow at a time (although this can vary) and milk of the whole cow is discarded until the milk returns to normal. If the affected quarter is treated with antibiotic, then milk loss is exacerbated during the ensuing treatment and withhold times. Beyond this loss, permanent damage to the affected quarter will result in lower production for the life of the cow.

Subclinical mastitis is invisible. We can't tell how long the infection has been present. How quickly we find subclinical mastitis depends on how often we test the cows to see if they have it. Formulas have been developed over the years to try to estimate milk loss from subclinical mastitis based on SCCs. These equations generally assume that the SCC has persisted at an elevated level for some time. Subclinical mastitis will often be present in more than one quarter of the cow at a time because the bacteria that cause predominantly subclinical infections are contagious. While milk from a subclinical mastitis case can be added to the bulk tank (as long as the bulk tank SCC is acceptable), economic loss is caused by reduced milk production from multiple quarters for a longer period of time than with a clinical case.

Detecting clinical and subclinical mastitis

To fully define a herd's mastitis picture there needs to be a detection system for both clinical and subclinical mastitis in every herd.

We need to rapidly identify a new case of clinical mastitis so abnormal milk can be diverted from the bulk tank. Clinical mastitis is detected at milking time by visible examination of foremilk during

pre-stripping by the milking personnel. Automatic milking systems (AMS) don't have this detection system and so must substitute some other form of testing. AMS use a variety of tests to identify a change in a milk component or something produced by the local immune system. Many of these tests work well for clinical mastitis because there is an abrupt and dramatic change in the characteristics of the milk.

Subclinical mastitis results in a more gradual change over time. Neither milking people nor AMS detection systems can find this kind of mastitis reliably. Subclinical mastitis, by definition, is only detected when an increase in SCCs is measured. Testing needs to be done routinely at a set time interval, as there is no signal from the cow to indicate testing is needed.

Monitoring subclinical and clinical mastitis

Subclinical mastitis is identified by individual cow SCCs. Test repetition at an interval of 30 to 40 days is critical. We have 40 years of research and experience on which we can reliably base our interpretation of this testing system. If testing were done more, apparent mastitis infection rates would go up. Research shows we would detect too many unimportant and self-limiting cases. If testing were done less frequently, subclinical mastitis rates would be underestimated. Important messaging about trends and risks, especially in fresh cows and cows due-to-dry, would be lost.

Monthly SCC testing does not adequately detect clinical mastitis. Many damaging clinical mastitis cases last only a few days to weeks and would be missed on monthly SCC testing. Abnormal milk needs to be discarded as soon as it is found. Clinical mastitis can only be detected cow-side at milking time in both conventional and AMS systems.

Clinical mastitis trend monitoring relies on farm records. The utility of the system depends on vigilance at milking time and the diligence of the recorder. Often great variability exists in how dependable clinical mastitis records can be.

Impact on treatment decisions

Treating a clinical case may speed up recovery by reducing bacterial numbers although many mild cases improve without treatment. Visible mastitis strongly motivates many producers to want to use an antibiotic treatment. This may be a good economic decision, but the necessity varies between herds and with the pathogen involved. Developing a decision-making algorithm for the treatment of clinical mastitis for every herd should be a priority.

On the other hand, research has shown that routine antibiotic treatment for subclinical mastitis during lactation is not economically justified. Generally, this is because many of the bacteria that cause subclinical mastitis have a poor response to therapy (for example *Staph aureus*) or cause relatively minor udder damage (the minor *Staph* species). Recall too, with subclinical mastitis, milk can still be added to the bulk tank – no milk discard occurs unless the cow is treated. Ultimately cows with persistent subclinical mastitis should be detected and treated at dry-off time to have a better chance of success and no costly milk discard.

Treatment decisions are aided by knowing the type of bacteria causing a mastitis case. Sampling strategies depend on whether clinical or subclinical mastitis is being investigated. For clinical mastitis, collecting milk samples as early as possible after finding abnormal milk is helpful. For clinical mastitis, sampling based on monthly SCC reports rarely helps as many negative results

occur. When subclinical mastitis dominates strategic sampling based on the pattern of SCCs can be helpful.

Making decisions about mastitis prevention

Recommendations for prevention depend on whether clinical or subclinical mastitis is to be targeted. For clinical mastitis, prevention focusses on changes to bedding management, ventilation, and fresh cow transition issues. If subclinical mastitis is the major concern, a review of milking procedures and hygiene would be warranted initially.

Most herds at some time face challenges from both clinical and subclinical mastitis. To keep tract of mastitis, there needs to be a separate on-going detection and monitoring systems for each kind. Being able to recognize when a change in the level of each type occurs will lead to the most direct and cost-effective corrective action.

So, back to Herd A and B at the beginning, and their problems. To start with, an examination of each herd's cow SCC results showed that Herd A had a gradual increase in the proportion of the herd with persistently high SCCs monthly over the last 6 months, suggesting a rise in subclinical mastitis. Herd B frequently had cows out of the tank because of clinical mastitis. Each month different cows were high on the herd SCC test. Both herd owners needed to do further investigation to identify specific herd problems but correctly categorizing their problems got them started in the right direction. Ultimately, while both had rising BTSCCs, the recommendations to remedy the situation were different, but rightly so.