Introducing milk quality services to your practice

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Abstract

Milk quality services are an excellent and often-overlooked opportunity for veterinarians to improve the profitability of their clients' dairies and their practice. There are a number of simple procedures and services you can perform without substantial investment in equipment. These include milk culture services at your clinic, utilization of DHI test data in your herd health appointments, on-farm audits of environment, procedures, and cow outcomes, DairyComp data analysis, and employee training.

Key words: milk quality, mastitis, consulting

Lab Services

Basic milk quality laboratory services are a great way to help your clients while adding a new revenue stream to your business. Milk culture is relatively simple, has low start-up costs, and can be handed off to tech staff once your workflow is up and running. Cultures can be run to inform treatment decisions on a 24-hour turnaround basis, or they can be run simply to collect data about pathogen prevalence in the herd to inform future management decisions. A mastitis culture lab needs the ability to detect the full range of mastitis organisms, although some labs will send out mycoplasma cultures due to the additional expense and complexity of running a CO2 incubator or candle jars. Mastitis-causing organisms will all grow in 24 to 48 hours with the exception of mycoplasma, which takes a week.

I recommend ordering a copy of the *NMC Laboratory Handbook on Bovine Mastitis*, which has excellent protocols for lab techniques and pathogen identification. Beyond that, you'll need a basic incubator, blood agar and MacConkey plates, sterile swabs, a microscope and a Gram's stain kit. You should also keep coagulase on hand for confirming *Staph aureus* cases. You may want to have prototheca and mycoplasma agars on hand as well, especially if you plan to perform bulk tank cultures or if you'll be handling those 2 pathogens in-house.

For bulk tank cultures, a pipettor or other calibrated measuring device will be necessary to plate a consistent volume of milk for quantitative culture. Bulk tanks are used to survey the pathogens present in the herd and their levels. They can give you a good idea of how prevalent subclinical or chronic mastitis is in the milking group, and they are imperative for early identification and removal of contagious pathogens.

If you have clients using washable towels, you may wish to add towel culture to your toolkit. It is common to find heavy bacterial loads on "clean" towels when the washer or dryer has been overloaded or is otherwise not functioning well. Basically you just take a few towels at random, snip out a specified area, soak in sterile water and then plate the water for quantitative culture.

Offering in-house lab services will help you open conversations about milk quality with your clients, steer your other efforts based on the pathogen profile of the herd and add a new revenue stream to your practice.

Utilizing DHI Data

Many dairy farms are enrolled in monthly DHI testing but the vast majority, in my experience, are not actively engaged with their milk quality data every month. In particular, I try to emphasize the new infection list and the chronic cows list.

You can access DHI results and reports online, or you can ask your client to include you in the distribution of paper copies by mail. I would recommend you bring useful information like this to your herd checks to discuss while you do your fertility exams. Including the milk quality component is an important part of making a "Herd Health" program rather than a "Preg Check" program.

Suspected new infections are those cows that had a previous test <200k somatic cell count (SCC) and current test is >200k SCC. These cows should be investigated with a California Mastitis Test (CMT) paddle, with hot quarters submitted for culture and/or treatment. New infections have a good chance of cleaning up with appropriate treatments.

Chronic infections, or those cows with multiple successive test days >200k, should have their history evaluated and perhaps a culture submitted. If the affected quarter is deemed beyond repair, options include quarter-kill treatments or culling. It's important to note that while addressing chronic cows can have a big impact on the bulk tank culture and cell count, you can't cull or "three-quarter" your way out of milk quality challenges. Make sure to address the new infection pressure at the same time you clean up yesterday's challenges.

Basic Milk Quality Audits

There are a number of simple audits you can do either while you are on the farm for a routine visit or as part of a dedicated milk quality visit. Keep your head on a swivel and take notes. I find it best to verbalize observations and recommendations directly to the key decision maker on the farm, but I also try to always put my work into writing. The written form provides a basis for future follow up and it

provides clear evidence of the work you did. As veterinarians we often struggle to charge adequately for less tangible services. A report gives you something deliverable that you should feel proud to bill for.

Stall design and condition are important components of milk quality. Take note of the stalls while you work in the pens, especially with respect to how the cows index in the stalls. Do the majority of the cows lie comfortably in the stall in a position that manure and urine land in the scrape lanes? If not, look at the position of the brisket rails if present, and the neck rail. It is very common to see neck rails pushed forward over time. Cows positioned too far forward or on a diagonal in their stall will result in extreme contamination of the bedding and an uptick in environmental mastitis organisms.

Bedding upkeep is a constant job on a dairy. Take note of how employees clean the curbs and contaminated beds. Is adequate bedding added in to all of the stalls? Is the new bedding clean and dry? In deep-bedded stalls, you can use a soil core tool or a shovel to evaluate the cleanliness of the sand below the surface as well. There is often a black line of sand, which harbors bacteria and moisture. If this is present, the back ⅓ of the stalls need to be dug out and refilled with clean, dry sand. Any type of cow bedding can be submitted for quantitative cultures -- this may be a worthwhile tool to help clients stay on top of their bedding practices.

Manure accumulation in cow traffic lanes is a serious problem on many dairies. Splatter onto the legs and udder on the way to or from the parlor can be a major source of mastitis. Look for poorly drained areas or spots where manure is not adequately removed and take pictures. Sometimes a picture or a video will explain the problem far better than words. Leg and udder hygiene scores also help point out the significance.

Proper use of the crowd gate and calm movement of cows to and from the holding area and especially into the parlor has a big impact on milk letdown, and therefore all other parlor metrics. Cows that are frightened will have poor milk flows and suffer excess vacuum as a result, damaging their teat ends and creating a vicious cycle of unpleasant experience for the cow. Many times in your work around the farm you will see behaviors that need to be corrected. Be sure to never tacitly endorse these behaviors by not saying anything. However, it is imperative that you be on the same page as ownership before taking any bold action to correct the behavior. Play your cards carefully when working with farm employees. You want them to trust you and respect you. It can be very difficult to critique their work without scalding those relationships.

Water hoses in the parlor are directly related to calm loading. Cows that are scared as they enter are more likely to defecate on the deck, and you will frequently see employees reach for a hose to spray the manure away. Any use of hoses to wash down the deck while cows are in the parlor is not recommended. It will increase the amount of manure splatter on the teats and udder.

You can assess teat end condition before or after milking. Use the National Mastitis Council (NMC) scoring system for grading the teat ends and monitor changes over time. If a high percentage of the herd has everted teat ends, there likely are issues with machine function or poor letdown. It helps to carry a flashlight when you score teat ends, unless the parlor is exceptionally well lit. Another check I like to perform is whether the end of the teats have been cleaned well prior to milking. During the gap between dry wipe and attachment, take an alcohol-soaked 4x4 gauze square and wipe the end of the teat. The pads should come away still white. Take a photo of the wipe and if there are multiple milkers, make note of which ones have clean or dirty wipes. Usually they will be much cleaner on the next side of cows once the milkers realize what you are looking at.

Post-milking strip yields can give you an idea of whether machine detachment is happening at the correct time. Immediately after detach, hand strip each quarter into a measuring cup for up to 15 seconds. You should be able to recover 40 to 100 mL of milk from each quarter. Greater than 500 mL (composite) indicates a problem with milk out. Conversely, if you cannot recover any milk there may be overmilking (check the teat end condition). Pay attention to whether the parlor is equipped with automatic take-offs, and whether some or all of the milkers are using manual mode to override the ATOs.

Learn the milking routine for your herds. If it is not already posted on a wall near the parlor, consider making a laminated description and post it. Watch the milkers and see if they carry the routine out consistently. If you're at the farm late at night for a dystocia, peek in the parlor and see if the night shift follows the routine. It is far more common to have lapses in protocol on the night shift.

Grab a stopwatch and check the prep-lag time. The timer starts when the teats are stimulated. Forestripping is considered the best stimulation, but dry wiping with a towel is also acceptable. Ideally there should be 10 seconds of stimulation. Given that letdown is a neuroendocrine reflex, it does not matter if the stimulation is of 1 teat or all 4. However, forestripping (with observation of the strippings from all 4 quarters) is another important component of milk quality. The timer stops when units are attached. The goal is 60 to 120 seconds; on the longer side for herds milked 3x and shorter for herds milked 2x. Check the first and last cow of a prep sequence, as there is sometimes a substantial difference between them if each step of the sequence does not require the same amount of time.

One of the easiest overarching audits to perform in the parlor is to observe cow comfort. If cows are standing calmly in the parlor chewing their cuds, this is a sign that the machines and procedures are going well. If cows are dancing, kicking, or looking apprehensive, there are problems you need to identify. Never get so focused on the technical minutiae that you forget to listen to what the cows are telling you.

DairyComp Analysis

Some of your herds will have DairyComp305 or another herd records software. There are many reports and monitors in these programs that you can use to troubleshoot milk quality issues. I work primarily in DairyComp.

Econ\s is a list that shows you cell count and milk yield data from the most recent test day. The report factors pounds of milk and SCC to estimate bulk tank contribution from each cow. The report will show you the percent of overall herd SCC the cow is estimated to contribute, and the herd SCC if she was removed from the herd. It also shows you how many test days >200k SCC the cow has had in this lactation. I never recommend culling directly off this list. Rather, take the CMT paddle and confirm the test day information. You may be able to make a big impact via treatment, culling or quarter-kill recommendations.

The Drylog table is a tool for monitoring change in SCC from the test day prior to dry-off to the test day after freshening. It breaks the herd down into a 2x2 table so you can look at the percent that dry off clean and freshen clean, the percent that dry off clean and become subclinically infected, the percent that dry-off subclinically infected and are cured and the percent that remain chronically infected. Remember that this is not simply a scorecard for whatever dry-cow therapy the farm is using. Rather it encompasses up to a month ahead of dry-off, the act of dry-off including tubes and employee procedures, the environment during the dry period, maternity pen and up to a month of the fresh period, cow immunity factors and milking procedure performance.

You can set up items in DairyComp to log data at the time of events. One example is to capture the most recent test day SCC at the time of a mastitis event. This allows you to see if the cow had a high cell count prior to the mastitis event (likely a chronic infection) vs a new infection in a cow with a history of low cell count. Another item can be used to capture the post-mastitis event SCC. Then you can build reports that show you the pre- and post-mastitis event SCC, allowing you to analyze the impact of different culture results or treatment protocols.

I also like to monitor the outcomes of different pathogens and protocols by monitoring treatment extensions and relapses. I consider treatment extensions to be additional protocols assigned 1 to 14 days after a first protocol. Relapses are additional protocols assigned 2 weeks to 2 months after the first event. I use both of these monitors to assess the efficacy of different protocols on different pathogens.

Parlor performance metrics are a great tool for those farms that have daily milk weights downloading to their farm computer. You can get a very good idea how different employees, milking stations or protocols are performing by monitoring these parameters. DairyComp has a number of built-in reports that will capture this information. When possible, set goals and utilize the reports to call out good performance or to seek opportunities to train for better performance. Examples of metrics to watch are milk/cow/hour, cows/stall/hour, milk in the first 2 minutes, peak flow rate, average flow rate in the first 15 seconds, second 15 seconds from 30 to 60 seconds (look for these to be increasing), seconds in low flow, and average pounds of milk per minute and average duration.

Employee Training

It may be helpful to hold meetings with farm employees explaining the basic biology behind milk letdown, machine milking and udder health. If you are unable to communicate in the language spoken by the milkers, ask the farm to bring in a translator to help.

Hands-on training in the parlor is critical for proper administration procedures of intramammary products. The most common mistakes involve dry-tubes and orbeseal, with contaminants pushed up the streak canal or teal sealant shot up into the gland rather than held down in the teat. You'll be surprised what you see if you take the time to work with the milkers on these basic, yet critical procedures.

Some farms may wish to implement an on-farm culture system. This is a great opportunity to add some milk quality time to your herd health appointment or other visits. Check in regularly with the person running the cultures, make sure their results are accurate and that they understand the significance of different results. Encourage them to log the results into DairyComp so they can be used for retrospective analysis and day-to-day decision making on the farm.