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Milk Quality Work in a Tight Economy & Busy Practice

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Milk Quality work offers great opportunity for dairy practitioners to become more involved with their dairies beyond reproduction and sick cow work. The NMC (formerly known as the National Mastitis Council) has given us valuable guidelines for evaluating milking systems. Equipment and maintenance issues contribute to milk quality and it is rare for me to evaluate a system for the first time without finding an area of concern with the equipment. Milking technique and cow environment are even more common limitations to milk quality than equipment. Veterinarians are uniquely positioned to identify and resolve these issues.

Milk quality training often concentrates on becoming proficient at a full NMC equipment evaluation and the types of specialized equipment used for those evaluations. I maintain that these evaluations are important, but it is difficult for veterinarians to find the time to commit to learning these skills and dairy producers are reluctant to employ veterinarians for this work until they have some confidence that the veterinarian can identify and solve issues of economic importance on their dairy. Thus, it is best to start with work that has the potential for quick success. My best opportunity to get involved with this work is on dairies that are milking cows when I am present for routine work. It is important to remember that the milking system including the cows and the operators are a system and every change in one area effects performance overall.

When there is a break in reproductive work between groups, I will slip into the parlor to observe milking routine. I will take some alcohol pads with me and swab teat ends that have been prepped for the milker unit to be applied. I will commonly lay these swabs up on the equipment for the milkers to see. Typically, I will see improvement in the cleanliness of teat ends as they observe these swabs. My next level of involvement is to do strip yields. I've see practitioners carry measuring cups for this purpose, but I'm a little bit lower tech. I use a cut off calcium bottle at the 500 cc fill line. Milker take off settings are right for the stimulation that cows receive when 20% of the cows or a little less have 500 cc's of residue milk in their four quarters. They cannot all be dry or cows are being overmilked and need to be milked wetter. These strip yields need to be done immediately after milker removal as cows continue to make milk and the strip yields will increase if the measurement is delayed. I always strip at least 20 cows before making any judgments if an adjustment in takeoff settings is needed. When adjustments are needed, I make a small change and recheck the setting until I am happy with it, then recheck every two to three months.

Changes in liners and milking routine can affect the settings being appropriate for the milking system. The most common challenge that I find is that cows are being milked too dry. This over milking leads to teat end damage.

The next level of involvement is to look at teat end scores or milking technique. Teat end scoring would be good to document any changes that you make in milking equipment settings or techniques. I use the 1 to 4 scale described by the NMC. 1 is a smooth teat end, 2 has a raised ridge, 3 has a raised ridge with a crack, and 4 exhibits hyperkeratosis. Twenty percent or less of the teat ends as 3's or 4's is the goal. We use two part carbonless forms in our practice for many uses. For teat end scoring, I quadrant the page scoring the left front in the upper left, right front in the upper right, left rear in the lower left, and right rear in the lower right. Commonly I wear a head lamp to aid in visualizing the teat ends. I score at least 25 cows per group and prefer to score at least an early lactation and late lactation group. Most herds have difficulty reaching the 20% goal of 3 and 4's. The process of moving toward this goal can take years.

Milking technique may be the most glaring deficit as you make your initial observations. It is the hardest protocol on the dairy to change and is especially difficult if there is a language barrier with the milkers. The other major obstacle is to get owners and managers to understand that good milking techniques may take a little more prep time especially at first, but within weeks we will milk faster with higher production and better quality milk. The goal of milking technique is to put every teat cup on a clean, dry, stimulated teat. The most common sequence to achieve this is to dip, strip, rub, wipe and apply. Variations on this are acceptable as long as we meet certain time constraints. Of course, all teats are dipped with an effective postdip covering the area that was had a milk film from the teat cup liner. It takes 15 to 30 seconds for predips to disinfect teats. We see better cleaning on some farms when the dip is reapplied after stripping. Spraying teats is not acceptable as it is very rare to get full coverage of all surfaces that the milker liner will contact. Stripping three squirts of milk from each teat is the maximum stimulating activity. The second best stimulating activity is rubbing the teats especially at the teat end. This coincides with better teat end cleaning. The timing from first stimulation to milker attachment is important to allow stimulation and letdown to take place. If letdown is not complete when the milker is attached, the milk will be evacuated from the teat cistern and gland cistern then there will be a milking lag until milk is expelled from the alveoli during letdown. This milking lag results in over-milking at the beginning of milking increasing teat end irritation. This type of milking lag can be observed in the claw of the milker, by using a Lacto-recorder to document it very specifically, or by recording attachment claw vacuum with a vacuum recorder. Guidelines for adjusting the milking sequence are that for twice daily milking with a lot of milking pressure, attachment should be 60 to 90 seconds after first stimulation. For three times daily milking, attachment should be 90 to 180 seconds after first stimulation.

We use these guides to determine how many cows an operator should perform the milking sequence on. The variation in operator speed is large with the range of cows that should be worked with to meet these time limits ranging from 2 to 10.

One of the biggest areas of milking technique that presents challenges is drying the teats. Cloth towels that have been washed in detergent and dried in a hot drier are preferred. These towels are used to dry teats in a circular motion with a swipe across the teat end. One towel is used on no more than one cow. I often check towels for cleanliness and dryness before they are used. Impression cultures have been done to demonstrate cleanliness or lack of it with the towels. Often the baskets, tubs, and carrying bags can present a source of contamination. This is an area that veterinarians can monitor without training or equipment.

The next level of involvement requires an equipment purchase of a digital gauge or vacuum recorder. I have both and feel that the investment in a Tri-Scan digital vacuum recorder was a right choice for my practice. We also own Digimet, which I bought gently used from a retiring veterinarian, and I started my milk quality work with a Detco recorder, which does not currently work. This level of involvement includes graphing pulsators and recording claw vacuums. Graphing pulsators requires a recorder and T pieces that are fitted to the pulsator hoses. I carry two different sizes in my recorder case. Pulsator tubes are pulled off the claw, the T piece with another pulsator tube is attached and it is determined if the units are set up; for side to side or front to back alternating pulsation. Every pulsator is graphed. Ratios alone are not adequate to determine if the movement of the pulsator follows a normal curve. I've had dealers act amazed that I graph every pulsator, but how else can you determine which ones work and which don't. More of our dealers now graph every pulsator. We mark which pulsators need rebuild attention and regraph those pulsators at our next visit. I like to graph all pulsators on large dairies every three months and on small dairies at least annually.

The other area of involvement is measuring claw vacuum. This can be done with a simple few hundred dollar vacuum gauge, but is more consistent with the digital recorder. This requires a T piece that is fitted for the claw outlet or a 3 inch 12 gauge needle that can be introduced into the milk hose. I prefer the T pieces, but they cost almost \$200 each. I measure at least 6 and more commonly 10 claw vacuums during the second minute of milking of fast milking cows before making recommendations for changes. We target average claw vacuum over a 30 second period between 11.5 and 12.5 inches of vacuum. Outside this range can lead to teat end damage from too high of vacuum or prolonged milking due to low vacuum. Usually, I will make changes in vacuum level no more than .5 inches at a time, but if the level is dramatically off, I will make big changes all at one time.

Success with milking technique and equipment evaluation will not be realized if a contagious bacteria or treatment failure issue exists. We encourage our dairies to collect a sample of abnormal milk before any treatments are started and freeze this sample until our next visit. Of course this works best with weekly visits. Our veterinary technicians have developed a high level of expertise with milk cultures because they have a constant stream of samples to work with. All results are passed through all dairy veterinarians after they are forwarded to the client. Adjustments in milk quality strategy are often based upon culture results. We do not currently have any clients performing on farm cultures, but there is some interest.

These areas of monitoring can be worked into weekly or monthly herd checks, but it leaves some gaps of system flow dynamics that should be measured at least yearly. That is when the complete training in a system evaluation should be employed. By this time the dairy should have confidence in you as a milk quality consultant and you should be able to lead them through the complete evaluation.

Milk quality work is a natural area for veterinarians to expand into and you can test that market with minimal investment or training.