

DAIRY VETERINARY NEWSLETTER

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New Information from the National Mastitis Council - Milking Machine and Procedures Specifics, Robotic Milking Issues

At the recent National Mastitis Council (NMC) Regional Meeting in Boise, Idaho, there were many interesting and informative presentations and excellent short courses. Two of the presentations included some information that I will summarize and highlight here. [NMC members can log in to the members only section and find all proceedings online.](#)

Milking Machine and Procedural Details Affecting Milk Quality

Veterinarian Dr. Juan Rodrigo Pedraza presented, "Efficient Parlor Throughput with Milk Quality in Mind". Some of the key points he made regarding milking machine settings and performance, and milking procedures are below. Quotes are from the written proceedings. Other points come from his oral presentation and there are some comments from my experience as well.

- "[Make sure you train your people correctly so they understand the cow's language and keep cow flow without any interruptions.](#)" One thing he pointed out was that if a cow, e.g. the fifth cow entering a parlor, is hesitant or stops, many milkers walk along behind her to keep her moving. After she gets going, they still keep walking with her even if not needed. When a person is doing that, the cows behind are all slowed down. Once the cow gets moving, try to stay still or not look intently at any one cow.
- [Parlor flooring.](#) "[Rubber mats](#) will speed up the process, cows like to get on them and they feel safe so therefore move faster."
- [Good parlor lighting.](#) This and flooring have been identified for many years as important for cow throughput and milkers' comfort and efficiency. I certainly agree from my time in parlors sampling cows.
- "[Once parlors get bigger than double 35 they start losing efficiency because of the walking distances.](#)" I remember that in the first double 50 parlor we had in New York State one of my colleagues calculated that it took long enough to load and exit the parlor three times that there was no way to effectively prep or teat dip cows and get more than 3 turns per hour. The management was continually firing milkers and hiring new ones trying to get at least 3 turns per hour. They valued speed, and the SCC was high.
- "[The D phase \[of pulsation\] is the resting phase and it should be around 200 mS.](#)" He also stated that it should be *at least* 200 mS (0.2 seconds) for adequate teat massage. It is also important that the C and D phase combined should be at least 300 mS (0.3 seconds). There are many systems today with at least 70:30 pulsation ratio and at least 60 cycles/min. Any pulsation ratio or speed higher than that combination of numbers does not allow adequate massage of the teats.

- Teat end vacuum level. “Nothing good happens to a teat end above 12.5” Hg (42 kPa [kilopascals]).” I do not like to see teat end vacuum greater than 12” Hg.
- “Vacuum fluctuations at the teat end will not cause a direct effect on mastitis incidence but will certainly increase the risk of liner slips which can be a really important factor in terms of mastitis transmission.” Teat end vacuum should not fluctuate more than 0.1” Hg.
- Automatic take offs (ATO). “Probably one of the most important settings that can help on reducing unit on time and therefore reducing excessive exposure to vacuum.” He said that the vast majority of ATO settings in milking systems overmilk cows substantially. I agree.
- “Flow-rate thresholds [to begin the automatic takeoff removal of the unit] should be adjusted to be around to 2 lbs/min (900 cc/min). - - The truth of the matter is that peak flows are not as important as low flows when it comes to unit on time. Avoid overmilking cows at all cost. Do not allow cows to see low flows, here is when automatic take off settings really need to be adjusted.”
- Milk flow by gravity, not lifting milk in slugs. He used the example of drinking through a typical drinking straw compared to one 5 feet long. “We should apply enough vacuum to the teat in order to extract milk, once this happens this milk should flow to the milk line by gravity and not pulled by vacuum. Long milk hoses will create a loop and then the milk will not flow by gravity to the line but instead vacuum has to pull slugs of milk that will increase teat end vacuum fluctuations.” He showed several photos where hoses had been replaced and had excessive loops below the lowline milk line so milk did indeed have to be lifted, affecting vacuum back up to the claw.
- Prep time and forestripping. “It should be 10-20 seconds long with firm movements and pulling 3 to 4 strings of milk per quarter. - - In my opinion stripping cows is a must.” In my experience, this is one of the most resisted practices as dairy herds have become larger. Many producers say that their milkers will all have sore hands, they can’t ask the milkers to forestrip, etc. However, the best managed dairy farms with high milk production and good milk quality always forestrip at every milking. This clears streak canal infections and soiling right at the teat orifice, as well as helping to identify clinical mastitis.
- Unit alignment. “[This] plays a very important role in terms of even and efficient milking. - - Arms, chains, ropes, silicone blocks can all be useful if they are used correctly. The goal is to use a system that does not need any extra effort to make corrections and that it does not get in the way of the employees, either making a complicated procedure or creating a risk for injuries. Bad unit alignment will truly and consistently affect parlor throughput.” With the increased adoption of parallel or rotary parlors milking cows from the rear, this has become a major issue. Unit removal without units pulled of under vacuum or hitting the floor is also, when milking from behind the cow. From my experience, some kind of fork that easily adjusts up and down to position milk hoses works best. If they become bent or loose, they need to be repaired or replaced.
- Milking routine and walking distances for milkers. “Always take into consideration walking distances for the milkers. When they are doing long shifts this amount of walking will go against the quality of the job. - - In my opinion the best milking routine is territorial where each milker has a defined zone where he/she will be responsible for all parts of the process.” Dr. Pedraza made an interesting observation. “I am Latino. You North Americans have your comfort zone (at least a couple of feet), your personal space. We Latinos do not have that. If we have a milking routine where we move together, but should be spaced well apart, pretty soon we are all marching along right together gregariously down the parlor.” He said timing between milking procedure steps on each cow, and reduced walking distance, are helped by territorial milking. (The assertion that many milkers are Latino/Hispanic was made by the speaker. This is reality in the dairy industry and not intended to be discriminatory or stereotypical.)

Notice that many of the above items can be seen by veterinarians if they stop by the parlor to talk with someone about some aspect of cow health, or have a chance to see from behind the cows in the holding area what is taking place. Even if not doing a formal observation of milking or testing the milking system, many of these issues can be seen in a brief time looking at the milking parlor and procedures.

Robotic Milking Including Milk Quality Issues

Veterinarian Dr. Marcia Endres presented, “Milking Dairy Cows with Robots”. She had knowledge of 6 brands of robotic milkers, most of which are rare in the U.S. This presentation was timely considering that in Utah and other neighboring states we are seeing more robotic milkers installed, even though robots are still uncommon here. Interest in robots is growing among producers in the Intermountain West. USU’s Caine Dairy is currently installing Lely robotic milkers.

She mentioned several dairy farms that are installing between 19 and 64 robotic milkers. There are many YouTube videos of robotic milking, including at Homestead Dairy in Indiana.

Dr. Endres talked primarily about issues of robotic milking related to milk quality and udder health, but not entirely.

- “84% of the producers surveyed mentioned having a more flexible work schedule as a reason for making the decision to install Robotic milking systems (RMS).”
- 60-70 cows can be milked per robot, usually closer to 60 (this has been a pretty consistent finding on most farms)
- Adjustment to RMS. “3 days of hell, 3 weeks or purgatory, then it gets better”, one producer said.
- “Decreased cost of hired labor was reported by 70% of farms.” (I thought it was interesting that 30% did not report this.) She commented that many producers with robots wanted to reduce issues of employee unreliability or disciplinary actions.
- Mastitis detection. Electrical conductivity is the main, usually only, way that RMS detects clinical mastitis. Sensitivity is poor, 5 to 18% in one study. “Measurement of SCC by the RMS will become available as an option in the US in the very near future.”
- Teat prep. “(In a recent review) 8% of teat cleanings per cow failed due to machine problems and 4% because of cow-related problems, including kick-offs. - - only 67% of the cleanings were technically successful [on a whole cow basis], i.e., all 4 teats were brushed.” Some farms have the brush clean teats, rinsed with a hose, then go back and clean teats again. This must be maintained of course.
- “Treating cows is also more difficult since they no longer go to a parlor to be milked. Contagious organisms can be a real challenge.” I have often wondered what it must be like to have to blitz treat *Strep ag* mastitis repeatedly in a robotic milked herd. This pathogen is not completely eradicated from the U.S. or the West.
- Contagious mastitis and SCC. “(Producers) might miss clinical and subclinical mastitis cows and contagious mastitis can more easily spread. In addition, infected cows generally cannot be grouped separately. Typically SCC will go up for the first year after transitioning to RMS then might drop.”
- “We suggest that producers culture bulk tank milk regularly. If contagious organisms are present in the herd there can be some special add-on equipment (e.g., steam cleaners) that may help.”
- Environmental sanitation. “Keeping the barn and stalls clean is very critical; the RMS cannot distinguish between dirty and clean udders”. This, as one might expect, was emphasized as very important.

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- “Getting (all) cows to regularly visit the RMS milking station is important.” The goal is to have all cows self-milk at least twice per day, with many milking at least 3X, but a small percentage of cows don’t choose to be milked even 2X and must be brought to the robot.
- Milking cows using multiple methods. Some farms maintain a conventional parlor, but most cows do not do well going between different milking systems. The scenario where first lactation cows learn in a parlor, then go to RMS, or cows of any age have to adjust to RMS mid-lactation, is the worst case, Dr. Endres said. If pre-fresh heifers learn to eat in a grain box like the RMS milking space, this makes things a lot easier after they calve.

If you are not currently a member of NMC, I suggest that you would find it beneficial to join. Again, all of the proceedings are online for members only at the NMC website.

Please let us know your comments and also suggestions for future topics. I can be reached at (435) 760-3731 (Cell), (435) 797-1899 M-Tues, (435) 797-7120 W-F or David.Wilson@usu.edu.



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