UT PARLOR

A publication for Tennessee's dairy producers and supporting industries

Spring 2020

COVID-19 Updates

Since COVID-19 hit the US, a lot has changed. Business as usual is now working from home, wearing a mask to go to the grocery store, and meeting online. All the changes that come along with shelter-in-place and social distancing have had major impacts on the agriculture industry and the dairy industry. We will continue to update the UT Dairy website with resources and share information through our email lists. We have added a COVID-19 page to our website with links to our resources and resources from other universities and industry representatives.

Emergency Dump Milk

Disruptions along every inch of our supply chains have led to some farmers being told to dump their milk. With the shift away from food service and toward retail sales, processing plants are trying to respond. Milk that usually feeds into food service plants is now moving toward retail processing plants to meet changes in demand. Retail plants at capacity cannot accept any more raw product, and the perishable nature of milk means it cannot be stored outside the plant and wait for processing. This milk must be dumped, and some farmers have been asked to dump their milk on the farm so it is not hauled to a plant that must refuse it (because of no space to put it) and send it back. We have created a publication providing some options for emergency dump milk and a webinar reviewing alternatives, including:

- Feeding dump milk to calves.
- Feeding dump milk as part of the total mixed ration (NOT for dry or transition cows).
- Selling dump milk as a commercial feed.
- Land applying dump milk as fertilizer.
- Sending dump milk to a waste treatment facility (expensive and potentially cost-prohibitive).

CARES Act

President Trump signed the Coronavirus Aid, Relief and Economic Security Act (CARES Act) into law to aid small businesses. This act allocated $349 billion to small businesses to cover things like employee wages, rent, mortgage payments, and utility payments. Aid is in the form of loans that may be partially or completely forgiven. Farms are included as small businesses (less than 500 employees). Sole proprietors and self-employed individuals can also apply for the Paycheck Protection Program. The application is only two pages long and can be completed in roughly an hour. Some quick takeaways from a Penn State webinar:

- This is a first come, first serve program—so don't wait!
- Third-party contractors (veterinarians, hoof trimmers, etc.) cannot be covered.
- Cash-only payments or receipts cannot be covered by PPP UNLESS you have valid paperwork like a W-2, bill, etc.
- Land payments should fall under the "rent" category as long as there is a valid paper trail (i.e., not cash paid on a verbal agreement with a neighbor).
- Anyone FDIC approved can process these loans, so reach out to your local lender or Farm Credit agent.
- You do not have to be previously turned down or need collateral or a personal guarantee.

Employee Resources

Employees across the supply chains are on the front lines and are at risk for COVID-19. Taking steps to protect your employees and slow the spread is very important during this time. Employees should avoid contact with people who are sick; avoid touching their eyes, noses, and faces; routinely wash their hands with soap or use hand sanitizer; shower and wash work clothes soon after getting home; and maintain social distancing. We can help keep employees safe by making sure bathrooms on the farm are stocked with soap and/or hand sanitizer, providing gloves, and cleaning or providing supplies to clean bathrooms/common areas often. Employees who show symptoms or are sick should stay home. If employees come to work, they risk infecting other employees, managers, and owners of the farm. Alltech has created a publication in English and Spanish providing this and other information.

Mental Health Resources

We recognize these are unprecedented times. None of us expected a global pandemic, especially after the last five years of milk prices. If you or someone you know needs assistance, please use any of the following resources.

- Tennessee Suicide Prevention Network created a website including warning signs, resources, and people to talk with at tspn.org/farmers-and-suicide-prevention.
- If you need someone to talk to, the following lines are open and free to use:
  - Text "TN" to 741 741—Suicide Prevention TEXT LINE OR crisistextline.org
  - 1-800-273-8255—National Suicide Prevention call line
  - 1-855-274-7471—Tennessee crisis line

Be safe and be well during these difficult times. If you need more information, please reach out to me at 337-718-9764 or eeckelka@utk.edu, Shawn Hawkins at 865-207-7156 or shawkins@utk.edu, or the MANAGE team (financial resources).

Thank you for all you do to feed our nation. You are *vital* to our country, and we appreciate you.

—Liz Eckelkamp, *UTIA Assistant Professor and Dairy Extension Specialist*

National Mastitis Council Update

The National Mastitis Council (NMC) is a global organization devoted to reducing mastitis and enhancing milk quality. NMC promotes research and provides information to the dairy industry on udder health, milking management, milk quality, and milk safety. The NMC annual meeting was held in Orlando, Florida, from January 28-31, 2020. Master's students working with associate professor Gina Pighetti provided an overview for the meeting. Each section will be highlighted below.

Dairy Updates from around the World

One of the first sessions presented at the National Mastitis Council Meeting in Orlando, Florida, was "Dairy Updates from Around the World." Six industry professionals presented a brief overview of the dairy industry in the country they represent. Size of the industry, production, bulk tank somatic cell count, and regulations were a few of the subjects that were compared amongst the countries.

US Dairy Industry: *Jason Lombard, Veterinarian, US Department of Agriculture and NMC president*

During 2019, in the United States there were 37,000 herds housing a total of 9.4 million dairy cattle. The average herd size was 251 cows. Cows were producing approximately 23,149 lbs. of milk per year, with a total of 218 billion lbs. of milk produced in 2019. Since 2009, milk production has increased by 14 percent, herd sizes have increased by 50 percent, and operational dairy herd numbers have decreased by 80 percent. The average bulk tank somatic cell count (BTSCC) in 2019 was approximately 172,000 cells/mL. This count has decreased 42 percent since 1997, when the average BTSCC was 295,000 cells/mL. Lombard stated that US farmers have become better at detecting mastitis. According to USDA's National Animal Health Monitoring System, the percentage of cows reported to be affected by mastitis in 1996 was 13 percent, compared to 25 percent of cows reported in 2014. He also reported that 75 percent of operations are dry treating all cows, and blanket therapy remains the standard in the US at dry off.

Switzerland Dairy Industry: *Hans Graber, Agroscope*

Much like the US, only 1.8 percent of the population is involved in agriculture in Switzerland. There were 21,884 dairy farms and approximately 564,190 dairy cows reported in 2019. The major breeds include Simmental, red Holstein, brown Swiss, and Holsteins. Cows produced about 15,432 lbs. per year, with a total of 6.8 billion lbs. of milk produced in 2019. Like the US, Switzerland had increases in somatic cell count (SCC) during the summer months, averaging 135,000 cells/mL in July, compared to 90,000 cells/mL in February. By law, delivered milk is checked twice a month for SCC < 350,000 cells/mL, bacteria counts < 80,000 cells/mL, and to ensure no growth inhibitors are present. Cows > 150,000 cells/mL need to be checked by the California mastitis test. If a cow scores a 3 or 4 (SCC > 100,000 cells/mL) on the test, their milk cannot be delivered. When treating cows, antibiotics must be prescribed by veterinarians. There must be a signed agreement between the farmer and veterinarian regarding the use of antibiotics, similar to the US VCPR (Veterinary Client Patient Relationship). At dry off, antibiotics are only to be used if the cow has an intramammary infection, similar to selective dry cow therapy in the US.

Canadian Dairy Industry: *Herman Barkema, University of Calgary*

There are approximately 10,371 farms and 968,700 milking cows in Canada. Fifty percent of the dairy farms are located in the province of Quebec. Quebec had an average SCC of 194,354 cells/mL in 2019. Housing type varies depending on the province, with Quebec housing 92.2 percent of their

cows in tiestalls. There is a large push from consumers to move away from tiestalls and toward freestalls and pasture access. Twelve percent of dairy operations in 2019 had robots. This number has doubled in the last three years, and Barkema stated robotic facilities will be the standard soon. In 2001, dairy producer associations developed the Canadian Bovine Mastitis Research Network, which focuses on training, adoption of best management practices, selective antibiotic therapy, and knowledge of mastitis on farm. Through this program, mastitis incidence has decreased, financial losses have decreased, and the country has been able to maintain high milk quality.

Australian Dairy Industry: *Peter Mansell, University of Melbourne*

There are 5,700 herds and approximately 1.5 million cows in Australia. The number of herds has drastically dropped since 1980, when there were 21,994 operational herds. The average herd size is about 260 cows/herd, with cows producing about 12,787 lbs. of milk per cow per year. The majority of the herds are pasture based. Approximately 37 percent of the milk produced is exported. Most dairies in Australia do not use pre-dip or stimulate the udder before milking. Intramammary antibiotics or dry cow therapy must be prescribed by veterinarians. Australia has a very small organic industry, with the majority of the dairies being conventional.

Chilean Dairy Industry: *Marcos Munoz, Universidad de Concepcion*

Chile has 450,000 milking cows, with all of the dairies found in the central, central-south, and southern zones of the country. In 2019, Chile produced 5.7 billion lbs. of milk. In the last fifteen years, milk received by processors has grown by 55 percent. In the same period, exports have grown by 135 percent. Imports of dairy products have exceeded exports during the last four years. The average BTSCC in 2018 was 230,000 cells/mL. Marcos stated that improved dairy herd sanitation along with efficient boarder control has provided a stable primary dairy sector. The high-quality dairy products and comprehensive improvements in animal welfare have become an opportunity for ethical involvement in the industry and for an improved perception of the dairy industry in Chile.

China Dairy Industry: *Wenxue Wu, China Agricultural University*

There were approximately 10.4 million dairy cattle recorded in 2019; 85 percent of these cows were Holstein. This number has decreased from 12.3 million recorded in 2008. The average cow produces 14,770 lbs. of milk. Approximately 38.6 percent of farms in China have < 100 cows, whereas 37 percent of farms have > 500 cows. In 2019, average SCC was 221,000 cells/ml with an average bacterium count of 72,000 colony-forming units per mL. The average milk components in 2019 were 3.2 percent protein and 3.9 percent fat.

Take-home message: The dairy industry around the world has one common focus: producing high-quality milk. Each country has their own set of standards and regulations to ensure the best product is produced. Just as each farm has its own individuality, each country provides its own uniqueness to the dairy industry.

—Emily Luc, *UTIA, MS student in Mastitis and Immunology*

Mastitis Pathogens: How Do They Get into Our Herds, and How Can We Prevent Them?

Mastitis is caused by many different bacteria, with the frequency of infection varying by country and production type. All mastitis pathogens can be divided into one of two categories: environmental transmission or contagious transmission. Researchers at the National Mastitis Council Annual Meeting discussed the differences in four major pathogen types—*Mycoplasma*, *Escherichia coli*, *Staphylococcus aureus*, and *Streptococcus uberis*—and different prevention options for environmental and contagious pathogens.

Contagious Mastitis

Contagious mastitis pathogens are spread directly from cow to cow. One of the most common times when contagious mastitis can be spread is during milking. Two common contagious mastitis pathogens are *Mycoplasma* and *Staphylococcus aureus*. Recently, non-aureus *Staphyloccus* (NAS) have been characterized as contagious pathogens.

Mycoplasma will cause a rapidly spreading outbreak of mastitis and will stay present in the animals long after symptoms subside. The outbreak is typically short lived and relatively limited in spread, assuming the proper control measures are taken. The three main factors that can contribute to a *Mycoplasma* outbreak are:

1. Bringing in new animals without a quarantine period.
2. Using semen from subclinically infected bulls (artificial insemination or live cover).
3. Using a group calving pen.

A group calving pen can increase the possibility of a calf becoming infected and transmitting *Mycoplasma*. If a calf nurses from a *Mycoplasma*-infected cow, that calf can then transmit the disease to other calves through mouth-to-mouth contact, or to other cows when nursing them. Providing an individual calving pen and cleaning in between calvings can effectively limit transmission to calves and

cows. Quarantining new cows before housing them with the herd can help eliminate cow-to-cow contact. Milking new cows last will also help to limit spread. Use of on-farm culture will allow farmers to identify a *Mycoplasma* infection and quarantine infected cows quickly to help limit the spread of infection.

Staphylococcus aureus and NAS are contagious pathogens that frequently lead to subclinical, chronic mastitis. Mastitis caused by *Staph.* species tends to be resistant to antibiotic treatment, so prevention is the most effective way to limit financial losses from these infections. Identifying the pathogen through on-farm culture can help farmers make more informed decisions on how to isolate and either treat or cull animals with a *Staph.* species infection.

With all contagious mastitis, one easy way to help prevent the spread of infection throughout the herd is to move infected and high somatic cell count cows to the end of milking, wear gloves during milking, and change the gloves between infected cows and noninfected cows. Quarantining new or infected animals can help limit spread as well as using single-cow calving pens. Accurate identification of pathogens through on-farm culture is another tool that can help farmers decide treatment and culling decisions.

Take-home message: When combatting contagious mastitis infections in dairy herds, the use of diagnostic strategies to identify pathogens and adequate biosecurity are essential to limit the spread. When bringing purchased animals into a herd, quarantining and testing those animals for infection will help prevent spread.

Environmental Mastitis

Environmental mastitis pathogens can persist in bedding, grass, or in milking tools and can be spread from cow to cow. The two most common environmental pathogens are *E. coli* and *Streptococcus uberis*.

E. coli is a relatively common pathogen. *E. coli* frequently causes severe clinical cases that can reduce milk yield over a lactation by up to 11 percent. Due to its prevalence and lack of effective treatment, antibiotic-resistant *E. coli* is a big financial problem for dairies. One effective way of reducing *E. coli* mastitis incidence is through dry cow treatment. Testing high SCC cows before dry off to identify potential pathogens can help farmers and veterinarians determine what type of dry treatment will be most effective. Using teat sealant and intramammary antibiotics can help reduce the frequency of severe clinical cases after calving. Negative energy balance after calving can exacerbate infections, increasing the severity of the symptoms and milk loss. Effective dry cow treatment and nutritional supplementation in fresh cows can help reduce the incidence and severity of *E. coli* infections after calving.

Streptococcus uberis can cause both clinical and subclinical infections, and is generally seen in early lactation. On-farm culture before dry off and dry cow treatment will help reduce growth of *Strep. uberis* in the udder during the dry period and can reduce infections after calving. *Strep. uberis* is generally resistant to antibiotic therapy, so prevention is more effective than treatment.

Environmental pathogens can be controlled through cleaning and management. Overcrowding animals, infrequently cleaning or changing bedding, and dirty calving pens are all situations where environmental pathogens can thrive and cause infection. If a farm has high environmental mastitis incidence, the first line of defense should be improving cleaning of the housing facilities. Ensuring that the udder and teats are clean during milking is another way to reduce environmental pathogens. Other ways to reduce mastitis rates from environmental pathogens are to ensure that milking machines are functioning properly to reduce teat end stress, proper vaccination, and adequate nutrition.

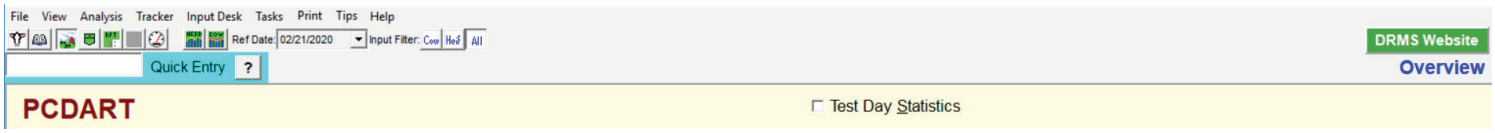
Take-home message: Many factors can influence the prevalence of environmental pathogens on farm, including climate, bedding quality and type, dry cow treatment, and milking techniques. Analyzing these possible sources of infection on individual farms and coming up with farm-specific control methods is the most effective way to combat mastitis and reduce SCC.

—Hannah Malcomson, *UTIA, MS student in Mastitis and Immunology*

Using PCDART to Develop Udder Health Management Strategies

During the NMC annual meeting, Kas Ingawa from Dairy Records Management Systems (DRMS) and Richard Wallace from Zoetis presented a short course on using PCDART to develop udder health management strategies and control mastitis. Although PCDART can be used for many aspects of dairy management, this short course specifically focused on using the program to manage milk quality. They provided a brief overview of what PCDART is, the features it provides, and how it can be used to manage mastitis on farm.

Figure 1: *The task manager to take you to all the resources discussed.*

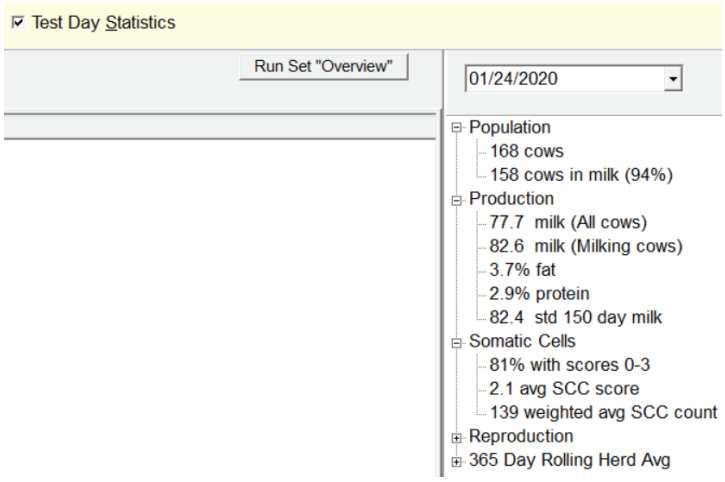


Credit: Emily Luc

Step 1—Test Day Statistics

One of the first features to monitor a farm's milk quality are the test day statistics. Test day statistics can be found on your home page (click on the third icon from the left in Figure 1). Just click the box "Test Day Statistics," and a condensed list of herd information from each test day will appear. An example of data the test day statistics provide is listed below (Figure 2). Test day statistics provide information on the number of cows in the herd and production data such as fat and protein content. They also provide the percentage of cows in a herd that have a somatic cell score (SCS) in the 0-3 range (0-100,000 somatic cells/mL) and the average somatic cell count (SCC) on that test day. Weighted average somatic cell count is also provided, which takes into consideration milk production of each cow. By glancing at the test day statistics, a great deal of information can be observed about the farm's milk quality.

Figure 2: *The test day statistics as it would appear in PCDART and how it can be used to observe milk quality information.*



Credit: Emily Luc

Step 2—Individual Cow and Herd Reports

Reports can be generated to observe milk quality more closely. Reports are found on the task manger (fifth icon from the left [RPT] in Figure 1). Both standard reports and user reports can be generated. Standard reports are found on all PCDART programs and cannot be changed. A standard report to monitor milk quality would be the 121 report (Figure 3). If a new protocol or treatment is developed for mastitis, report 121 can be used to determine how well that protocol or treatment is working. The date the protocol was started and the protocol goals can be entered through the individual cow page and monitored.

Figure 3: *Where to find the 121 Standard Repot and the various options this report provides.*

Credit: Emily Luc

Figure 4: *The 121 report based on reaching thirty days in milk in the current lactation. Index Number = Cow ID, DIM cur = Current days in milk, Base Date = Date the change was implemented, DIM on base date = days in milk on the day the change occurred, DIM on resp = days in milk on the test day.*

121 Response to 30 Days in Milk in Current Lactation

Test Date: 01/24/2020
Base-chg-1; Resp-chg+1 Lact: 0 - 1
Left: Y Inc$ from: 01/24/2020

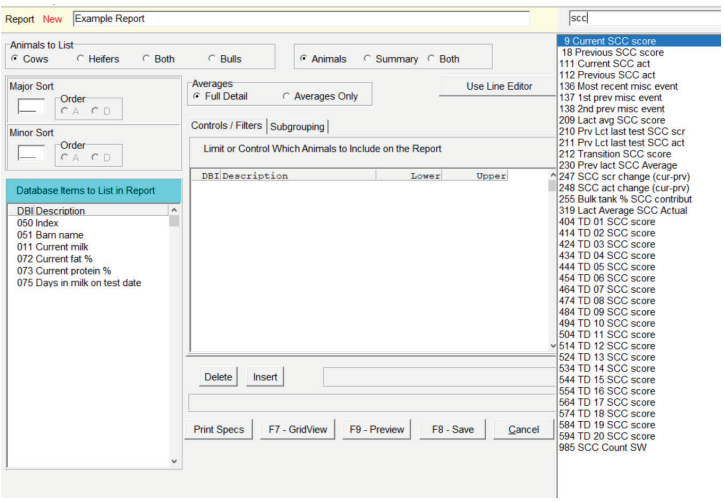
Index Number	Fresh Date	Lac	DIM Cur	Base Date	DIM on Base	DIM on Resp	Base 150d milk	Resp 150d milk	Diff 150d milk	Daily Change IOvFC$	Base 305d milk	Resp 305d milk	Diff 305d milk	Daily Diff 305d
1160	5/3/2017	1	545	5/9/2017	7	64	42	74	+32	+5.40	17084	18060	+976	+4
1155	5/3/2017	1	611	5/9/2017	7	64	48	85	+37	+6.20	17731	20006	+2275	+8
** Sub-avg (2)		1	578	5/9/2017	7	64	45	80	+35	+5.80	17408	19033	+1626	+6
4667	10/21/201	1	440	11/9/2017	20	83	85	102	+17	+2.80	21127	24022	+2895	+11
4658	10/27/201	1	496	11/9/2017	14	77	74	92	+18	+3.00	19694	21948	+2254	+8
4689	10/26/201	1	435	11/9/2017	15	78	66	88	+22	+3.70	18642	21399	+2757	+10
4659	10/30/201	1	431	11/9/2017	11	74	72	98	+26	+4.30	19544	23102	+3558	+13
4709	11/2/2017	1	370	11/9/2017	8	71	52	87	+35	+5.90	17066	21017	+3951	+14
4660	10/31/201	1	281	11/9/2017	10	73	85	127	+42	+7.00	21260	28471	+7211	+26
** Sub-avg (6)		1	409	11/9/2017	13	76	72	99	+27	+4.45	19556	23327	+3771	+14
4713	11/18/201	1	412	12/6/2017	19	82	71	76	+5	+0.80	19257	19752	+495	+2
** Sub-avg (1)		1	412	12/6/2017	19	82	71	76	+5	+0.80	19257	19752	+495	+2
4669	2/15/2018	1	461	3/7/2018	21	84	76	78	+2	+0.30	20556	20185	-371	-1
1133	2/14/2018	1	176	3/7/2018	22	85	101	104	+3	+0.50	24118	25050	+932	+3
4664	2/17/2018	1	615	3/7/2018	19	82	82	104	+22	+3.70	21527	24245	+2718	+10
4628	2/17/2018	1	321	3/7/2018	19	82	62	109	+47	+7.90	18818	24807	+5989	+22
** Sub-avg (4)		1	393	3/7/2018	20	83	80	99	+19	+3.10	21255	23572	+2317	+8
2106	6/8/2018	1	504	7/2/2018	25	96	64	67	+3	+0.50	18211	18265	+54	
2107	6/9/2018	1	151	7/2/2018	24	95	55	58	+3	+0.50	16906	16587	-319	-1
2105	6/8/2018	1	495	7/2/2018	25	96	70	80	+10	+1.70	19037	20579	+1542	+6
** Sub-avg (3)		1	383	7/2/2018	25	96	63	68	+5	+0.90	18051	18477	+426	+2
2118	7/13/2018	1	460	8/3/2018	22	111	75	85	+10	+1.70	19069	21320	+2251	+8
** Sub-avg (1)		1	460	8/3/2018	22	111	75	85	+10	+1.70	19069	21320	+2251	+8

Credit: Emily Luc

User reports can be created and developed for personal use. When developing a new user report, an extensive list of database items such as cow ID, lactation number, current SCC, milk weights, etc., can be added based on whatever your interest is. An example of developing a new user report and the milk quality database items can be found in Figure 5. When creating a report and observing SCC data, make

sure to always use "days in milk on test day," since that is when the sample was taken. User reports can control which animals are included on the report, such as cows with a SCS > 3. Subgrouping is also available in these reports to separate by groups, such as lactation or days in milk.

Figure 5: *An example of how new user reports are created and the database items that can be used to monitor SCC.*

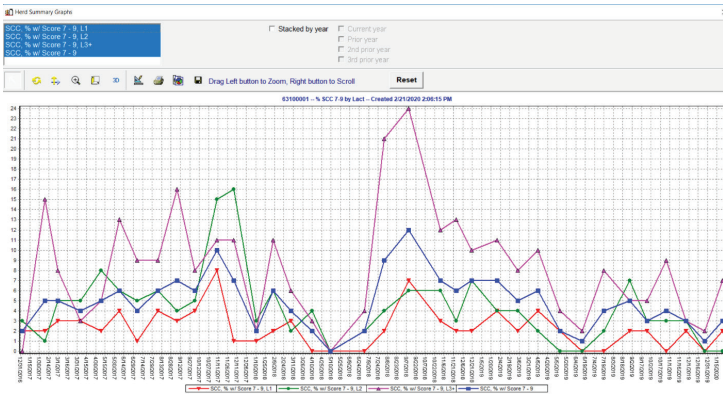


Credit: Emily Luc

Step 3—Individual Cow and Herd Performance Graphs

PCDART also produces several graphs that can be used to determine changes in the herd and when they might have happened. There are both herd graphs (eighth icon from the left [Herd] in Figure 1) and individual cow graphs (ninth icon from the left [Cow] in Figure 1) that can be generated. The herd graphs have an udder health section that can provide information on the percent of cows with an SCS of 0-3 (0-100,000 SCC) by lactation, percent of cows with an SCS of 7-9 (SCC > 1.6 million) by lactation (Figure 6), average SCC score by lactation, SCC score by days in milk (DIM) for lactation 1, and SCC score by DIM for lactation 2. These graphs are helpful to determine if a producer should be concerned about their whole herd having milk quality issues or if they need to focus on a specific group.

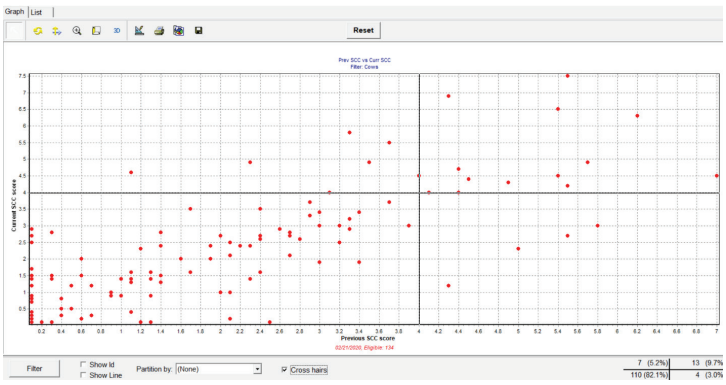
Figure 6: *The percentage (x axis) of cows with a somatic cell score of 7 – 9 (SCC > 1.6 million) by lactation on test date.*



Credit: Emily Luc

Individual cow graphs can provide information on days in milk (DIM) vs. SCC score, previous SCC vs. current SCC for each individual cow (Figure 7), DIM vs. lactation average SCC, and previous lactation SCC vs. first SCC in current lactation. Each dot on the graph is an individual cow. Clicking on the dot will bring up her individual cow page. When observing these graphs, it is helpful to set cross-hairs to create four quadrants. Place the cross-hairs at an SCS of 4 (SCC = 200,000) to get an accurate representation of infected cows. We want most cows in the bottom left quadrant, which are cows that are free from infection. The top left quadrant is cows with a new infection and the top right quadrant is cows with chronic infections. Cows that have cured their infection are found in the bottom right quadrant.

Figure 7: *Individual cow graph for Previous SCC vs. Current SCC. Ensure the cross-hairs box is checked and line it up with SCS of 4.*



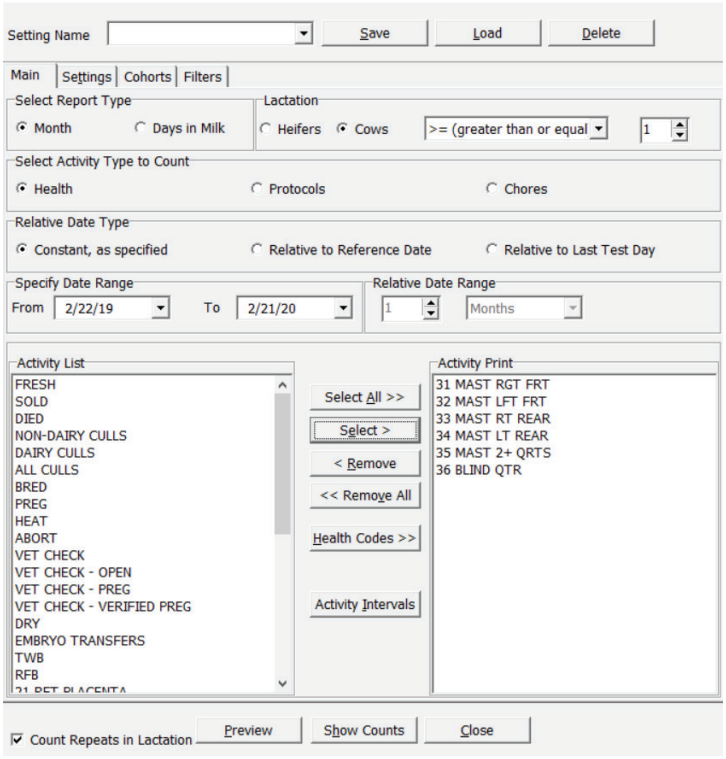
Credit: Emily Luc

Step 4—Activity Tracker

The activity tracker (Figure 8) can show when cows get infected with mastitis, which quarter has been infected, and what treatment was used. Once this data has accumulated,

the number of cows infected and with what bacteria can be determined. It can even go as far as determining how many left rear quarter cases a herd has had. The activity tracker is also important when determining how to treat the infection. It can record treatments that worked and should be used for future infections. One restriction with this tool is that it is limited to observing only twelve months at a time.

Figure 8: *Activity tracker page and the mastitis-related activities that can be monitored on each cow.*



Credit: Emily Luc

Take-home message: Mastitis continues to be a challenge on all dairy farms. PCDART is an excellent tool to manage mastitis and improve milk quality. The program allows producers to see what and where exactly the problem is, while continuously monitoring their herd.

—Emily Luc, *UTIA, MS student in Mastitis and Immunology*

Farm-Specific Cost-Effective Mastitis Control: A Model

The economics of mastitis impact every part of the dairy industry, but have the strongest impact on the producer directly. Profit loss from reduced milk production of infected cows, longer calving intervals, dumping milk from treated cows, and culling can have an enormous impact on a producer's finances. The factors that contribute to the costs of mastitis can be calculated on an individual farm basis. This calculation has been available in various online formats, but generally only includes six to ten factors. In reality, there are dozens of variables at play. Researchers are working towards creating programs that can be used in cooperation with farmers and veterinarians to accurately calculate yearly mastitis costs by farm.

Beyond just calculating the costs of mastitis, the program is being designed to show potential changes in costs by adding in control or prevention protocols. These include change in teat dips, changes in milking order, use of gloves during milking, or treating all clinical cases as soon as they are identified. This tool allows farmers to see the potential financial returns of certain veterinary-recommended changes in their standard operating procedures.

Calculation Setup

Calculating the cost of mastitis by farm means that there must be certain measurements that are taken at all farms in question. This course focused on the following general and clinical information points for each farm calculation:

Figure 1: *Farm-specific information to calculate mastitis costs.*

General and clinical information
Number of cows
Milk yield (cwt/lactation)
Prevalence mastitis in year (subclinical + clinical) (%)
Lactation length (in days)
Average duration SCM case (in days)
Value labour ($/hour)
Milk price ($/cwt)
Marginal feed costs ($/cwt)
Probability that subclinical case turns clinical (%)
Number of visits of veterinarian (# in year)
Veterinarian costs ($/visit)

Credit: Hannah Malcomson

These numbers will vary from farm to farm and will be the base on which the farm calculation is based. After these numbers are calculated, information regarding clinical mastitis, subclinical mastitis, and culling are calculated. These measurements are listed below.

Figure 2: *Farm-specific information to calculate mastitis costs (cont.).*

Information effects clincial mastitis
Proportion clinical cases treated with antibiotics (%)
Production decrease by clinical cases (% of production remaining lactation)
Treatment time by farmer (minutes/clinical case)
Medicine costs ($/clinical case)
Waiting time (treatment and withdrawal period) (in days)
Cull probability clinical mastitis (%)
Information effects subclincial mastitis
Proportion subclinical cases treated with antibiotics (%)
Production decrease by subclinical cases (% of production during duration subclinical mastitis episode)
Treatment time by farmer (minutes/case)
Medicine costs ($/case)
Waiting time (treatment and withdrawal period) (days)
Cull probabillity subclinical mastitis (%)
Culling
Culling costs ($/culled case)

Credit: Hannah Malcomson

These inputs will allow the program to calculate the approximate cost per year to the farm due to mastitis and associated costs. However, this information, while useful, will not allow farmers to make meaningful changes to their operations. This is where the mastitis control measure comes into play.

After the initial calculation is made, users can choose a control measure that they may be interested in implementing on farm to control mastitis. Some of the options are listed below.

Figure 3: *Potential mastitis control measures.*

Mastitis Control Measure
Premilking Teat Disinfection
Postmilking Teat Disinfection
Prestripping
Use of milker's gloves
Milk cows with clinical mastitis are milked last
Milk cows with subclinical mastitis are milked last
Application of blanket dry cow therapy
Wash dirty udders during preparation of the udder
Feed additional dry cow minerals
Keep cows standing after milking

Credit: Hannah Malcomson

The program can then indicate the change in mastitis-related costs due to implementation of the chosen control measure. The cost of the measure is also calculated, which allows users to see the net change in profit over one year. This allows farmers to choose a control measure for their farm that will reduce the cost of mastitis without being too expensive to implement.

By using this type of program, farmers can weigh the costs and benefits of specific mastitis control measures to make an informed decision that will provide maximum profit for the farm.

Example Calculation

This sample calculation shows the yearly differences in mastitis costs between two farms. The only difference between these two farms is that Situation 2 is using premilking teat disinfection.

Figure 4: *Scenario comparing a herd with and without using a premilking teat disinfectant.*

General information	Situation 1	Situation 2
Number of cows	1000	1000
Milk yield (cwt/lactation)	187	187
Prevalence mastitis in year (subclinical + clinical) (%)	15.0%	11.3%
Lactation length (in days)	350	350
Average duration SCM case (in days)	60	60
Value labour ($/hour)	$ 16.00	$ 16.00
Milk price ($/cwt)	$ 21.00	$ 21.00
Marginal feed costs ($/cwt)	$ 9.00	$ 9.00
Probability that subclinical case turns clinical (%)	40.0%	40.0%
Number of visits of veterinarian (# in year)	0	0
Veterinarian costs ($/visit)	$ 98.00	$ 98.00
Information effects clincial mastitis		
Proportion clinical cases treated with antibiotics (%)	100.0%	100.0%
Production decrease by clinical cases (% of production remaining lactation)	5.0%	5.0%
Treatment time by farmer (minutes/clinical case)	63	63
Medicine costs ($/clinical case)	$ 20.00	$ 20.00
Waiting time (treatment and withdrawal period) (in days)	7	7
Cull probability clinical mastitis (%)	5.0%	5.0%
Information effects subclincial mastitis		
Proportion subclinical cases treated with antibiotics (%)	0%	0%
Production decrease by subclinical cases (% of production during duration subclinical mastitis episode)	3%	3%
Treatment time by farmer (minutes/case)	63	63
Medicine costs ($/case)	$ 20.00	$ 20.00
Waiting time (treatment and withdrawal period) (days)	7	7
Cull probabillity subclinical mastitis (%)	1%	1%
Culling		
Culling costs ($/culled case)	$ 2,000.00	$ 2,000.00
Intermediate calculations		
Number of clinical cases per year	350	263
Number of subclinical cases per year	525	394
Animals culled because of subclinical and clinical mastitis (number cows/year)	23	17

	Situation 1	Situation 2
Production losses clinical ($/year)	$ 19,635.00	$ 14,726.25
Production losses subclinical ($/year)	$ 6,058.80	$ 4,544.10
Discarded milk ($/year)	$ 27,489.00	$ 20,616.75
Veterinarian ($/year)	$ -	$ -
Medicines ($/year)	$ 7,000.00	$ 5,250.00
Labor ($/year)	$ 5,880.00	$ 4,410.00
Culling ($/year)	$ 45,500.00	$ 34,125.00
Total failure costs mastitis/year	**$ 111,562.80**	**$ 83,672.10**
Additional preventive costs/year		$ 77,430.00
Net change in total mastitis costs/year		**$ 49,539.30**

Mastitis Control Measure		
	Your value	
Measure type	Premilking Teat Disinfection	
Measure specifics		
Fixed investment costs ($US per farm/year)	$	300.00
Consumables ($US per farm/year)	$	62,530.00
Labour costs ($US per farm/year)	$	14,600.00
Reduction in prevalence (%)		25.00%

Credit: Hannah Malcomson

All changes in the costs between farms is due to the addition of the premilking teat disinfection. The costs of the teat disinfectant were calculated by combining the fixed investment costs, consumables, and labor costs. The fixed investment cost was calculated to be $300 per year and includes dip cups and excess cleaning rags. The consumables were calculated at $62,530 per year, which includes all the actual disinfectant and cleaning materials for the dip cups. The labor costs per year were calculated at $14,600, and include extra time per milking for disinfecting, as well as time for cleaning and replacing the dip and dip cups. The reduction in prevalence of 25 percent was taken from peer-reviewed literature.

In this particular case, using premilking teat disinfection ended up costing this particular farm almost $50,000 per year, even though mastitis costs were lower. This is an excellent example of the power of this tool—farmers can see how much money can be saved in treatment costs of mastitis, but will also be able to see how much it will cost their operation overall.

Take-home message: Use of data to create new programs balancing the financial impacts of mastitis as well as the cost-benefit analysis of potential treatments will help producers and veterinarians make better decisions for mastitis control.

—Hannah Malcomson, *UTIA, MS student in Mastitis and Immunology*

Vet Check

Using Motivational Interviewing to Promote Change—Guest Writer

One of the sessions presented at the National Mastitis Council meeting was "Motivational Interviewing." Kristen Reyher, a veterinary epidemiologist, Lynne Johnston, a clinical psychologist from Halley Johnston Associates, and Rachel Hayton, a clinical veterinarian and research director from Synergy Farm Health, presented information on the importance of motivational interviewing, how it works, and how it can be used in practice. Research has shown that more than 75 percent of individuals do not change their behavior. Motivational interviewing can be useful when trying to break through to difficult clients, initiating mastitis investigations, and implementing mastitis control measures.

What is Motivational Interviewing?

Reyher defined motivational interviewing as a person-centered, goal-oriented method for stimulating and strengthening essential motivation for a positive change. Most people understand what they should do to make changes, but actually implementing the change is the difficult part. Others might be resisting the change because they feel that their control is being taken away, they are misjudging the importance of the change, and/or they are not confident or ready to make the change.

When practicing motivational interviewing, it is important to not try to persuade or fix anything. Emphasizing that the client controls decisions and changes and affirming their strengths and abilities is an important aspect of this style of interviewing. It is important for the client to know the idea is theirs and the idea is fully supported. When offering information about the change, ask for permission and provide information without bias. The following questions provide a great outline of the types of questions to ask when using motivational interviewing:

1. Why would you want to make that change?

2. What are the three best reasons for you to make the change from your point of view?

3. How important would you say it is for you to make this change, on a scale from 0 to 10, where 0 is not important and 10 is extremely important?

a. Follow up with: And why are you at ___ rather than a lower number?

4. If you did decide to make this change, how might you go about it in order to succeed?

Listen carefully to the answers the client provides in order to give appropriate feedback. When Johnston did a mock motivational interview with someone in the audience, the audience member said the interview style made them feel more involved in the change, they were more open to discussing the proposed change, and it allowed them to thoroughly talk through the importance of the change.

When discussing change with someone and asking the above questions, make sure to have an equal amount of change talk and sustain talk. Change talk consists of statements from the client that argue for the change position and lead to the commitment to change. In contrast, sustain talk includes statements from the client that argue for the non-change position and lead to commitment to the status quo. With this balance, the client will observe the importance of the change and provide more effort to implement those changes. During the interview, avoid disagreeing with the client and trying to persuade the client through compelling arguments or facts. When motivational interviewing was used in practice by veterinarians, there was a statistically significant increase in farmer change talk. This style of interviewing enhanced relationships between the farmer and veterinarian. Veterinarians were also more aware of and able to act on "change" talk.

Photo credit: Emily Luc

Take-home message: Farmers who have a positive outlook on controlling mastitis on their herds are able to control their bulk tank somatic cell count more efficiently.

—Emily Luc, *UTIA, MS student in Mastitis and Immunology*

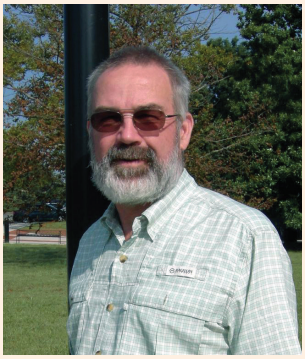


Photo credit: Lew Strickland

For any veterinary questions, please reach out to Lew Strickland.

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