

Individual Cow SCC Data to Reduce Bulk Tank SCC

A systematic approach by a dairy management team is necessary to decrease bulk tank somatic cell counts (BTSCC). Clinical mastitis, visibly abnormal milk, is easy to detect with the naked eye. Sub-clinical mastitis is impossible to diagnose without individual SCC data. Therefore, collecting and using SCC data is essential to reducing the financial loss from mastitis and maximizing the profitability from selling the highest quality milk at the highest price.

What is a Somatic Cell?

The word “somatic” means “derived from the body.” Therefore somatic cells are “body cells,” specifically body cells with a nucleus. White blood cells (WBCs), milk secreting cells and general body tissue all have a nucleus. Red blood cells do not have a nucleus, and therefore blood in milk does not contribute to an increase in SCC. The primary cells that contribute to the SCC are the white blood cells. In a non-infected quarter, WBCs account for 75-85 percent of the SCC, while milk secreting cells account for the remainder. This is why a cow has a higher SCC after freshening and in late lactation, the milk secreting cells are sloughed at a higher rate at these times. Additionally, SCCs are measured on a “per milliliter” basis, and anytime a cow’s milk production drops, there is less dilution and the somatic cell count increases.

In an infected quarter, approximately 99 percent of the SCCs are white blood cells, they are the body’s primary defense mechanism. The WBCs serve two purposes: 1) destroy the invading bacteria through a process called phagocytosis and 2) assist the body in repairing damaged milk secretory tissue.

Measuring Somatic Cells

Due to the presence of the nucleus in the cells, it is possible to count the actual cells. DHIA organizations use high-speed cell counting equipment to determine the SCC. The California Mastitis Test (CMT) uses a reagent with a detergent that reacts with the nuclear material in



the somatic cells. This causes them to stick together, forming a gel. There are other devices available for counting somatic cells and any one of these systems can provide the necessary information to attack the overall BTSCC. It's important to note that there must be individual cow SCC information to strategically implement a herd SCC reduction program.

SCC results are reported in three different systems:

- DHI equipment gives a specific number of cells counted, ranging from 0 to millions
- Most DHI organizations report the raw number count as a linear score, ranging from 0-9.
- The CMT grades the amount of gelling as 0, trace, 1, 2 or 3.

The relationship between the raw count and linear score is shown in Table 1. The relationship between CMT gelling and the raw SCC is shown in Table 2.²

Table 1 INDIVIDUAL COW SCC DATA

Linear Score	Somatic Cell count/ml	
	Midpoint	Range
0	12,500	0 to 17,000
1	25,000	18,000 to 34,000
2	50,000	35,000 to 70,000
3	100,000	71,000 to 140,000
4	200,000	141,000 to 282,000
5	400,000	283,000 to 565,000
6	800,000	566,000 to 1,130,000
7	1,600,000	1,131,000 to 2,262,000
8	3,200,000	2,263,000 to 4,525,000
9	6,400,000	Over 4,525,000

SCC Relationship to Mastitis

A linear score greater than four, SCC greater than 200,000, or a positive on the CMT is abnormally high and highly suggestive of an inflamed quarter. It is important to understand that inflammation (heat, pain, swelling, redness and a loss of function) indicates the body is

Table 2

CMT Score	SCC
0	100,000
Trace	300,000
1	900,000
2	2,700,000
3	8,100,000

responding to a problem by sending WBCs to the area. The problem may be an injury, an internal issue or an infection. A bacterial culture is needed to determine the problem.

It is best to interpret SCC data with multiple results, rather than a single point in time. The following areas can affect the SCC in a given herd:

- Infection status – highest in infected herds
- Stage of lactation – higher in early and late lactation
- Cow age – SCC generally increases with age
- Season of the year
- Herd size
- Geographic location of herd
- Level of milk production – lowest in high producing herds (dilution factor)
- Presence of other diseases in herd

Analyzing the Data

- DHIA reports commonly contain a hot sheet of cows by ID with the highest linear scores in a decreasing order.
- Dairy management software programs will often give the ability to produce a similar list of cows through the test information as loaded into the program. This can also list the percent contribution to the bulk tank and pounds of production and any data on the individual cow as desired.

An additional piece of information that must be collected before launching a BTSCC program is bulk tank cultures or string cultures. It is essential to determine the types of mastitis-causing bacteria in a herd, with a focus on contagious bacteria. Often times addressing a contagious bacteria problem will produce a dramatic decrease in BTSCC.

Steps to Reduce the BTSCC

Step 1- Evaluate the rate of new clinical mastitis cases, an achievable goal is two to five percent per month. If the new clinical cases per month is too high, review the milking operation and cow environment. Seek assistance from a veterinarian or other reputable milk quality specialist.

Step 2 – Collect and analyze the data, starting with the individual cow SCC data. Individual cow SCC information through DHIA and use of CMT information will allow for evaluation of the high SCC cows in the herd.

Step 3 – Create an action list by evaluating each high SCC cow individually.

- New or chronic?
- Bred or open?
- 1st lactation or older cow?
- Low or high production?
- Genetic merit?
- Disease history?

Step 4 – Classify each cow into an action category:

Action category 1 – *Worth attempting a treatment.*

This cow is of substantial production, young and new on the high SCC list. Use the CMT to determine infected quarter and collect a sterile milk sample. Use treatment protocol written by herd veterinarian. After treated twice, if not cured, move to category 2.

Action category 2 – *Worth milking but not treating.*

This cow has a chronic history or is unresponsive to treatment. Use of CMT will identify infected quarter(s), it may be most logical to dry quarter or use a “quarter milker” to milk infected quarter.

Action category 3 – *Dry off on time or early.* This cow is later in pregnancy and may be ready to dry off early or on schedule. Discuss with herd veterinarian best protocol for dry off.

Action category 4 – *Cull immediately.* Chronic mastitis cow, a cow that acts as a reservoir for bacteria to spread to clean cows.

It is important not to become overwhelmed by the large number of cows on high SCC lists, especially if receiving individual cow SCC information for the first time. This may be the first indication of many sub-clinical infections. Action category 1 will be limited by treatment group size, once culture results are confirmed, treatment can be spread over time. In addition to the steps suggested, it is important to work closely with the herd veterinarian in implementing a systematic team approach in a BTSCC reduction program.

References

- 1) Lowering Your Bulk Tank Somatic Cell Count, Roger S. Thomson, D.V.M., Team Management Concepts, PLC, Battle Creek, MI.
- 2) National Mastitis Council (NMC), Verona, WI.

