# QM²
## QUALITY MANAGEMENT • QUALITY MILK •

# Step up your SCC management: Think in terms of infections

*By Jack Van Almelo*

**The important point is to think in terms of reducing the number of infected animals by managing the cows and their environment.**

One day you wake up feeling tired; little things make you feel angry. Your eyes are tired, and it's pleasant to close them. You work through the day, emphatically telling everyone you **are not** angry. Then you go to bed and wake up feeling normal again.

Somewhere in your environment you became infected, and your body's immune system fought off the infection, just as it should.

These infection-immune system battles occur much the same way in cows. Infections occur one at a time, and a cow, supported by its immune function, either beats the infection, remains subclinically infected, or becomes clinically infected.

We manage our animals' environment to minimize their risk of infection and maximize their health and comfort so their immune systems can fight off mastitis infections that occur. Consequently, only a small portion of infections become clinical.

Under the wrong conditions, a large number of infections can become subclinical as animals and infections vie for the upper hand. Then the best case scenario is for the animal's health and environment to defeat infections, which show up as a blip on their Somatic Cell Count (SCC).

It's impossible to know how to reduce mastitis issues by looking at your bulk tank SCC or even the number of clinical cases in the last week. The herd average Linear Score (LS) is a much better measure but still not enough to help you make a plan to manage the environment.

### LS vs. SCC

As a way to manage mastitis, looking at the portion of a herd that's infected is far superior to looking at average LS. Your DHI herd summary is the most accessible tool to help you think about your herd's mastitis in terms of the portion of infected animals.

To show how the herd summary can help you, we summarized 1,140 Northeast Holstein herds with more than 100 cows. They were tested in September 2007 and averaged more than 60 pounds of milk on DHI test day.

We used the Dairy Metrics web application provided by DRMS Raleigh to assemble the information. Find your herd's level of infection on the bottom of the Raleigh Herd Summary "Stage of Lactation Profile" in the SCC Score>3.9 section. We assumed that animals with a SCC LS greater than 3.9 are likely to be infected.

The average herd we selected for our benchmarks milked 289 cows and gave 72 pounds of milk per cow at 188 days in milk. It had a weighted average SCC of 296,000 and a 2.9 LS. One standard deviation of LS was .5, which we used to divide the herds into four groups based on their average LS:

- < 2.5 = the best
- 2.5 to 2.9 = next best
- 3.0 to 3.4 = opportunity to improve
- > 3.4 = the most opportunity to improve.

When managing milk quality in a bulk tank, you must use bulk tank SCC. But when you're managing groups of cows, it's best to look at the Somatic Cell LS. There are two reasons why straight averages of SCC in cow groups can't be interpreted: Bulk tank SCC is weighted by how much milk a cow gave, and there's a much greater range in SCC than in LS. (Table 1) In other words, a single high SCC measurement has a great impact on the average; this is not the case when averaging LS. (Table 2)

| Table 1. LS vs. Raw SCC | |
|---|---|
| **LS** | **SCC (cells per milliliter)** |
| 2 | 50,000 |
| 3 | 100,000 |
| 4 | 200,000* |
| 5 | 400,000 |
| 6 | 800,000 |
| 7 | 1,600,000 |
| 8 | 3,200,000 |

*\* Generally accepted as the point where animals are likely infected.*
*Note: When LS changes by one, SCC either doubles or halves.*

Table 2 illustrates the LS to SCC relationship by looking at 10 test days for one cow.

### Table 2. SCC – LS relationship

| Test | LS | SCC |
|------|-----|-----------|
| 1 | 2 | 50,000 |
| 2 | 2 | 50,000 |
| 3 | 2 | 50,000 |
| 4 | 9 | 6,400,000 |
| 5 | 2 | 50,000 |
| 6 | 2 | 50,000 |
| 7 | 2 | 50,000 |
| 8 | 2 | 50,000 |
| 9 | 2 | 50,000 |
| 10 | 2 | 50,000 |
| Avg. | 2.7 | 685,000 |

This cow had nine great SCC tests and one that popped up when she was challenged by an infection and fought it off. Except for one test, this animal was healthy. The average LS, which is less affected by one high count, better characterizes the quality of this animal's udder health than the average SCC Raw Count where one high score has a large influence.

**Manage cows, their environment**

Thinking in terms of the portion of a herd that's infected can improve your decision making. Think of how you can reduce the number of infected animals by managing cows and their environment.

We compared infection in fresh animals – less than 41 days in milk – with the whole herd's level of uninfected cows. The more mastitis is under control in a herd, the lower its percentage of infected fresh cows and its whole-herd infection percentage.

As herd average LS increases, there's a greater likelihood of animals being infected in later lactation relative to the fresh-cow rate. This is because the infection "challenge" is greater throughout the herd. Also, existing cases may be less likely to become cured in higher infection level herds. (Table 3)

Reduce the portion of your herd infected by:

### Table 3. Portion of animals infected by herd average SCC linear score
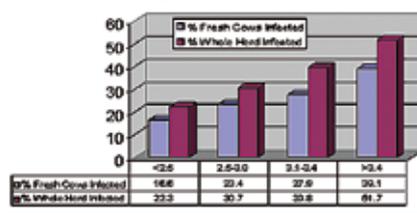


■ Managing the environment to minimize new infections.

■ Curing current infections.

■ Minimizing the sources of infection – animals shedding bacteria and the environment that harbors and facilitates bacteria to other animals.

■ Taking steps to keep animals comfortable and their immune system strong.

# Case study
## DHI report clarifies mastitis situation

What does the DHI Herd Summary of this 180-cow dairy tell you about the herd's mastitis circumstances? The herd had an overall average 3.1 LS. Yet of 25 fresh animals from one to 40 days in milk, only one (4 %) was infected. Overall, 25% of the herd is infected.

Despite having a higher average LS, the proportion of the animals infected is relatively low. This suggests that the herd's rate of infection is under control in the dry period and early lactation.

What about the group of animals running very high LS, particularly older lactation animals in late lactation? They have average LS values of 4.2 and 4.4, with 38% infected.

This herd will benefit from the manager closely investigating animals with high LS. My advice is to perform milk cultures on the high LS cows. Then map out a strategy for those specific animals and their infections. Your herd's SCC information is a gauge to help you see more closely how the cows' environment is supporting their udder health.

### Stage of Lactation Profile

**How to reach us...**

Jack Van Almelo works in the Dairy Management Resource group at Dairy One with a focus on the application of herd management information. His emphasis is on helping managers and their advisers use the best tools available for making good herd management decisions.

QMPS is a program within the Animal Health Diagnostic Center, a partnership between the New York State Department of Agriculture and Markets and the College of Veterinary Medicine at Cornell.

The QMPS staff of veterinarians, technicians and researchers works with New York dairies to improve milk quality by addressing high somatic cell counts, milking equipment and procedures, and milker training in English and Spanish. QMPS also conducts research and teaching programs.

Reach the four regional QMPS laboratories at:

■ Central Lab, Ithaca
877-MILKLAB (877-645-5522)
■ Eastern Lab, Cobleskill
877-645-5524
■ Northern Lab, Canton
877-645-5523
■ Western Lab, Geneseo
877-645-5525
QMPS website:
http://qmps.vet.cornell.edu

Dairy One is an information technology cooperative, providing DHI records services and herd management software to dairies throughout the Northeast and Mid-Atlantic region. A comprehensive laboratory network provides milk quality testing as well as forage, soil, manure and water testing.

Contact Dairy One Cooperative Inc. at 730 Warren Rd., Ithaca, N.Y. 14850. Tel: 800-344-2697. Email: dmr@dairyone.com

Website: www.dairyone.com

# Refine your mastitis assessment

Looking at the portion of the herd that is infected is far superior for managing mastitis than looking at the average Linear Score (LS), but we can refine that even further. The next steps you can take to quantify:

The portion of the herd chronically infected.

The rate at which animals are getting new infections.

The rate at which animals are cured.

If you have Dairy Comp 305, break these out further by using the command:

Plot LS=4.0 by LS\RY. (See Figure 1.) Then select the Report Tab, located between Grid and Graph towards the bottom of the screen, after running the command. (The Graph tab will be displayed first.) It will show you the overall infection rate for your herd, plus display the percentages of new and chronic infections.

The test dates across the top (Figure 1) show the most recent test to be 1.16 and the previous on 12.19. Based on the way we ran this command, animals are considered infected if they have a SCC LS greater than 3.9. The results on 1.16 show:

19% of the herd, or 90 animals, were high last month and this month. They're considered chronically infected.

10%, or 49 animals, were newly infected. They were low last month and are high this month.

5%, or 22 animals, were cured. They were high last month and low this month.

25% of the fresh cows were high on their first test after calving and 75% were low.

The current overall average LS is 3.0 on 547 animals, up from 2.7 the previous month.

## Figure 1. Sample Dairy Comp 305 report

Command : PLOT LS=4 BY LS\RY

DCFARM1 ----------------------- Dairy One ------------------------- 1/16---

```
            T E S T   D A T E S
        118  216  317  419  517  621  718  815  919 1017 1121 1219  116


Chronic %   12   12   13   13   15   15   15   13   14   17   14   15   19
        #   52   63   66   67   78   78   80   71   76   86   64   72   90
New Inf %    8    9    6   10    9   13    6   12   12   10   12   10   10
        #   36   46   33   49   45   65   34   63   64   51   54   47   49
Cured   %    7    7    7    5    5    8    8    8   10    7   10    9    5
        #   32   34   36   24   26   42   42   44   55   37   45   44   22
Clean   %   73   72   74   72   71   64   70   67   64   66   65   65   66
        #  329  371  380  365  369  328  370  365  342  335  306  306  318
HiFresh %   19   16   18   24   38   32   30   46   41   19   33   20   25
        #   21    9   11   15   23   24   16   25   14    6   16   10   17
LoFresh %   81   84   82   76   62   68   70   54   59   81   67   80   75
        #   91   49   51   48   37   52   37   29   20   25   33   40   51


Average    2.2  2.3  2.2  2.5  2.7  3.0  2.7  2.9  2.9  2.8  2.9  2.7  3.0
        #  561  572  577  568  578  589  579  597  571  540  518  519  547
```