The New Udder Health Management Summary and Report from AgSource Cooperative Services – A User Guide

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Aims

• To create a new set of reports that maximize the use of monthly SCC data
• Facilitate sorting the data to reduce the workload for the consultant/farmer
• Utilize data that was missing in previous reports due to CAR coding
• Describe the month by month changes in SCC and create individual cow reports to facilitate individual cow decisions
• Re-program to improve decision making
The new UHM Report does the work of classifying cows into risk groups for you.
Color coding is consistent with the UHM Summary (Red=chronic, Dark Blue=Lactating new, Dark Blue=Fresh new)

New UHM Cow Report

• A. Chronic Cow List
• B. Dry Period Failure to Cure List
• C. Dry Cow List
• D. Fresh Cow Infection List – Cows 5 to 40 DIM
• E. Lactating Cow New Infection List – Cows >40 DIM and beyond first test
• F. Response to New Infection List
• G. CAR (condition affecting record) Code List

You have to believe that a 200,000/ml threshold is predictive of infection status….

It all starts here …
Using SCC data to track changes in herd SCC over time – Why did my SCC change this month?

We are not trying to create a report that accurately predicts whether an individual cow is truly infected or not.
We are simply trying to explain why SCC might change over time.
What’s a weighted avge SCC?

- Sum of SCC x Milk for each cow test, divided by the sum of each cow’s milk
- Corrects for cows giving lots of milk with a low SCC and cows with a very high SCC that are giving only a small amount of milk
- Removes cows tested <5 DIM
- Includes CAR coded cows

### Weighted Average vs. Arithmetic Average SCC

<table>
<thead>
<tr>
<th>Cow ID</th>
<th>Milk lbs</th>
<th>SCC (’000/ml)</th>
<th>Milk x SCC</th>
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<tbody>
<tr>
<td>89</td>
<td>88</td>
<td>900</td>
<td>79200</td>
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<td>2800</td>
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<td>Arithmetic Average</td>
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<tr>
<td>Weighted Average</td>
<td>473</td>
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</table>

### Can I find it anywhere else?

Block G allows us to have access to two years worth of weighted SCC data in order to examine seasonal trends in herd SCC over time. The columns change to red when the month exceeds the annual weighted average.
So, what is the Bulk Tank SCC?

- This SCC average is still weighted, but may include cows <5 DIM if they are in the tank and may exclude CAR coded cows whose milk is being withheld
- Better predictor of actual bulk tank SCC than the weighted average SCC

The issue of CAR coded cows and SCC analysis is huge.

In the new UHM we wanted to try to use this missing data – because a lot of these cows are missing because of mastitis!

The CAR Code List allows you to tell DHIA which cows are in the tank

<table>
<thead>
<tr>
<th>CAR Code</th>
<th>Meaning</th>
<th>CAR Code</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Cow calved within 5 days of test date</td>
<td>Q</td>
<td>Unusable sample</td>
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<tr>
<td>M</td>
<td>Mastitis</td>
<td>T</td>
<td>Lab tech or equipment problem</td>
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<tr>
<td>S</td>
<td>Sickness</td>
<td>Z</td>
<td>No weight or sample</td>
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</table>

Where appropriate, the new UHM summary uses the data from CAR coded cows in the analysis.

High ≥200 = Herd Prevalence of cows ≥ the 200,000/ml SCC threshold used to predict infection status

Relationship between Prevalence of Infection and Weighted Herd SCC

\[ y = 0.0778x + 6.2277 \]

\[ R^2 = 0.8466 \]
Aim for 80% <200

Weighted annual average SCC is 473,000/ml in this 300 cow dairy

Herd Prevalence

- The cows testing ≥ 200 SCC belong to three main risk groups:
  - Fresh cows and heifers 5-40DIM ≥200 at first test
  - Lactating Cows >40DIM ≥200 at the current test that were <200 at the previous test
    - These are the NEW INFECTIONS
  - Cows that were ≥200 at the previous test that are ≥200 at the current test
    - These are the CHRONIC INFECTIONS

New Infection Comparison

<table>
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<tr>
<th>Old UHM</th>
<th>New UHM</th>
<th>DC305</th>
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<tbody>
<tr>
<td>Definition</td>
<td>&lt;200 at previous test and ≥ 200 at current test</td>
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<tr>
<td>New Infections allowed per lactation</td>
<td>1</td>
<td>≥ 1</td>
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<td>First test new infection risk denominator</td>
<td># cows 1-45 DIM (no reference to previous lactation)</td>
<td># cows tested 5-40DIM that tested &lt;200 last test before dry off</td>
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<tr>
<td>Denominator used in calculation of new infection risk %</td>
<td># cows on test</td>
<td># cows &lt;200 previous test</td>
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</table>

So, what’s a new infection?
Pros and Cons

• More likely to have better predictive value that any given individual cow is infected/uninfected if we confine NEW INFECTION to one test ≥ 200 SCC per lactation

• BUT, the downside to that approach is:
  – We lose the ability to track SCC change over time at the herd level – cannot answer the question why the SCC rose or dropped each month
  – Rates/Risks that use the whole herd on test as a denominator are insensitive to changes in new infection and cannot be compared across herds as the # infected cows varies widely between herds
  – We sensor 20-25% of the cows in the herd from ever having another new infection after first test and assume that all new infections fail to cure
  – The old new infection risk at first test for mature cows did not reference the last test of the previous lactation…

The Scatter-Plot

Graph lgscc for lact>0 by prvlg lctgp\zm

This is a fresh cow, correctly classified

This is a new infection, but she has a zero last test due to a CAR code. By chance, she is correctly classified as a new infection

This cow is mistakenly classified as a new infection because she had a zero at last test (CAR code). She had 9 tests >200 prior to that – so she is a CHRONIC!

Get rid of the zeros by removing the \z from the command

Graph lgscc for lact>0 by prvlg lctgp\m

or create a table….

What about herds where there are lots of chronic infections?

Sum lgscc=4 prvlg=4 for lgscc>0 prvlg>0

New Infection Rate is 6% right?

But 69/839=8.2%....

DC305 tells you the # New Infections expressed as a % of the cows on test

69/1065=6.5%

In this herd, 226/1065=22% cows were infected at the previous test and ineligible to become a new infection

New Infection Rate is quoted at 12%

Actual New Infection Rate is 40/185=22%

44% cows were ineligible to become a new infection!
In DC305, because of CAR coding, we lose a lot of data by removing the zeros from the analysis…. …13% of test data in the example herd.

Rates that use the # cows on test as a denominator cannot be used to compare across farms as the proportion of infected cows ineligible to become a new infection varies from month to month and farm to farm.

So what does the new UHM do?

There are 88 new infections with 1216 cows on current test in the new UHM (vs 69 new in 1065 cows in DC305...)

The risk of new infection is expressed as a proportion of the cows that were uninfected at the previous month’s test that received a current test:

New Infection Risk = 88/1218-278 = 9.4%

Because data is stored by test date, you can compare the current month new infection risk with that recorded 12 tests ago accurately and reliably!

Can DC305 Calculate a New Infection Risk %?

Plot lgscc=4 by lgscc for lact>0/ly

The red line is the new infection risk – similar to the new UHM.

What about the cows that DC305 struggles with?

Note that the report tab does not give a # or % for new infection risk. Instead it gives the % of new infections as a proportion of cows receiving a current and previous test.

Note that DC305 misses 18 new infections captured in the new UHM in this analysis in October and it is different from the 69 identified in the scatterplot analysis.

This cow is correctly classified as a new infection for the first time in her lactation in the new UHM.
This cow is correctly classified as a chronic cow in the new UHM.

The new UHM programming gives you the best bang for your buck by using the data from CAR coded cows appropriately and you don’t have to worry that you got the DC305 command correct!

Test data 12 tests ago is as reliable as the last test for comparison purposes!

Two groups of cows at risk of a new infection:
- Fresh cows at first test (5-40 DIM)
- Lactating cows >40 DIM (sub-groups 41-150, 151-240 and >240 DIM)

First Test New Infection Rate
- Only includes cows and heifers with a first test within a 5-40 DIM window
- If a cow receives her first test >40DIM, then this test is used in the next risk period of 41-150 DIM and it is not treated as a first test
- If a cow is ≥ 200 SCC at a first test <5 DIM, this test is ignored in this calculation
- If a cow receives 2 legitimate tests between 5 and 40 DIM, we use only the first test

Graph log1 for fdat>-366 fdat>ddat by drylg/mb

Sum log1=4 drylg=4 for fdat>-366 fdat>ddat log1>0 drylg>0 ftdim=5-40

DHIA counts 53 first test new infections vs DC305 counts 50

The Dry Period New Infection Rate is not 7%

It is 50/471 = 10.6%

Be Careful! You must filter first test day DIM, remove zeros from log1 and drylg and, because drylg is ascribed at dryoff usually in DC305, you must make sure that fdat is more recent than ddat.
The new UHM gives you accurate first test infection rates monthly and an annual average for L1 and >L1

First Test New Infection Rates

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<tr>
<th>TestDay</th>
<th>No Overlapping</th>
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<th>5%</th>
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</table>

... find these cows in Block D of the UHM Report

New Infection Analysis by Parity, Test Day and DIM

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<th>Parity</th>
<th>Test Day</th>
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But what about the problem of allowing repeat new infections?

- It would be nice to know many of the new infections occurred for the first time in a lactation – First New in Block C
- Epidemiologically, the timing of the first new infection is important – use Block E
- Deciding whether an individual cow is infected or not is an individual decision – use the UHM report

What if I want to know how many of the ‘new infections’ were first time new infections in a lactation?

‘First New’ provides the # of new infections that occurred for the first time in a lactation. Note that this is not expressed as a rate as in the old UHM.

In this herd, 46% of all new infections in L1 occur for the first time 0-30DIM

Block E expresses the timing (DIM) of the first time a cow is tested ≥ 200 SCC in a lactation as a proportion of all of the first time new infections occurring for all L1 and >L1 currently milking in the herd.
CHRONIC cows were ≥ 200 SCC at the previous test and ≥ 200 SCC at the current test.

The UHM Report Starts with the CHRONIC COW LIST

Use this list for culturing cows to identify infections that have failed to cure, short list cows for early dry off, culling or treatment.

Cows that dried off ≥ 200 SCC at the last test of the previous lactation that freshen ≥ 200 SCC at the first test are a SUBSET of the CHRONIC group. They are the Dry Period Failure to Cure cows.

They are not included as a First Test New Infection!
New vs Old First Test New Infections

10 new infections 1-45DIM in the old UHM =

3 true first test new infections +
2 second test new infection <45DIM +
1 first test new infection at 45DIM +
4 dry period fail to cure cows ….

Cows that have 7-14 tests ≥ 200 SCC in the last lactation should not be classified as a First Test New Infection!

Predict which cows will fail to cure in the dry period from the Dry Cow List … prepare to track these cows next lactation

Prevalence and Population Monitors

Block F in the new UHM utilizes similar prevalence data used in the old UHM in the previous block F for those that are familiar with the old report

- Block F is for those advisors that do not like the definition of new infections used and prefer the more traditional approach of recording the prevalence of infection (% High) in each DIM category
- Block F also provides the population at risk in each lactation group and DIM category at the current test
Benchmarks

- The rates used by the new UHM can be taken across herds for comparison with the best and worst herds in the industry – 20th and 80th percentile cut-points
- Provides strong motivation for change

Using Benchmarking

- Be smart!
- Set goals for useful parameters such as new infection rate at first test
- Don’t use benchmarks to set useless goals eg. chronic % or >240 DIM new infection rate
- Some benchmarks are presented so that you can tell when the data are outside the usual range observed

Summary I

- The new UHM summary and report function in tandem to describe herd level changes in SCC and provide the farm opportunities to make individual cow decisions
- It will take some getting used to!
- Use of color helps lead the reader through the reports

Summary II

- The problems that other programs have in summarizing test day information correctly have been addressed in the new UHM
- That doesn’t mean we don’t have to use DC305, PCDart or Dairy Wellness!
- Rather, we can use these programs to select sub-populations and look at individual cow data in more detail, while the UHM serves as a broad overview of herd level trends