

A GUIDE TO SCC ANALYSIS USING DC305

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***Disclaimer:** The following analysis guide represents some of the reports and set-up used by the Food Animal Production Medicine group at the University of Wisconsin-Madison. All of the reports are standard DC305 outputs, and more information about each can be obtained using the DC305 help manual.*

Set Up for Milk Quality and Mastitis Analysis

You will need to familiarize yourself with the items and commands in each cow file before proceeding.

Look at the item definitions by typing:

Alter then clicking on:

2 Items

5 Examine/Modify an item

Items are listed in alphabetical order. What items are already present and which need to be added? To enter new items click on **Add an item**. Read the dialogue box and click on drop down menus to change item type, value etc. Follow the program as it guides you through to the point that you click Y to save item definition.

Items that we typically need to add or have in the system include the following:

SCC (or LGSCC or LOG)

type: 88 Test day SCC

which test: -1 (last test)

value:0 (or 1=decimal if a log score)

description: last test SCC

SCC_1 (PSCC) (or PRVLG, LOG_1)

type: 88 Test day SCC

which test: -2 (two from last)

value:0 (or 1=decimal if a log score)

description: SCC one test previous to last test

SCC_2 (PSCC2 or PPSCC or P3SCC) (or LOG_2)

type: 88 Test day SCC

which test: -3 (three from last)

value:0 (or 1=decimal if a log score)

description: SCC two tests previous to the last test

SCC1 (1SCC) (or LOG1 or LGSCC1 or LS1)

type: 88 Test day SCC

which test: 1

value:0 (or 1=decimal if a log score)
description: SCC at first test date

This will allow us to look at chronic cows >200 for at least the last three SCC tests and examine the cows that are >200 at first test.

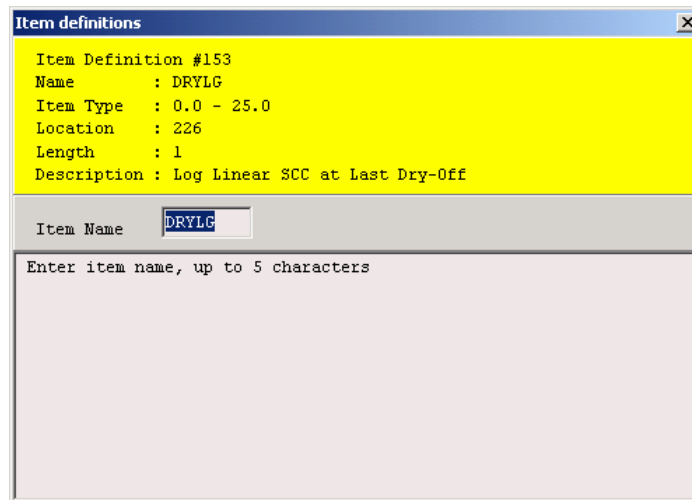
DC305 stores SCC data without any filtering. For example, cows tested on day 1-5 of lactation will have their data stored in DC305, but not in DHIA reports. In order to filter the data, we need to create an item to sort DIM at first test:

DIMT1 (FTDIM, 1DIMT, T1DIM)

type: 81 Test day days in milk
value: 1
description: Days in milk at first test date

Finally, to determine new infections around the dry period, we need to check and see if **DRYLG** is being used. This is an item that needs to be stored prospectively when a cow is dried off – by telling the computer to store the last linear score of the previous lactation. Unfortunately, if it is not in use, we cannot ask for it retrospectively, but we can set up the system to store the information in the future. This is done by using the following commands:

You must create the item DRYLG in the Alter menu if it is not already there, before the data can be stored:



You must then instruct DC305 to save the DRYLG when entering a dry off event by modifying the dry command:

- Type "Alter" in command line
- Choose 3. Commands
- Choose Exam/Modify a Command
- Choose Dry
- Enter information in Content line below:

ALTER3 : Command Abbreviations

Abbreviation:

Content:

Title (Optional):

OK

Cancel

This entry tells DC305 to store the last LGSCC score as an item called DRYLG.

Removal Reasons

We are frequently in need of more accurate culling information than that provided by DHIA. Information on mastitis related culls may be obtained by viewing the culling codes being used by entering:

Setup

Select disposal codes:

Eg: 1= sick, 2=dairy, 3=low production, 4=breeding, 5=injury, 6=died, 7=mastitis, 8=abort etc

View a histogram of each of the codes – record the count for code 7=mastitis:

Graph dcar for lact>0\d **(nb. sometimes dcar is just car)**

View the individual animals that left the herd:

Events id|i

Select sold and died

Similar to the list of mastitis events this will also list DIM at removal and the remark of the cull event. Some remarks may contain information on culling reason – look for mastitis reasons.

Cowvalue

It is useful to have Cowvalue activated when we are making lists of cows for culling. To make sure that Cowvalue is correctly set up, type in Cowval in the command line and click on 2. Edit parameters. View the data used to calculate cowval – have they been updated? If not, re-enter cowval in the command line and click on 4. Calculate parameter estimates. This option uses data from the cowfile to update the estimates. Once this has been done, the cwval number should be reasonably accurate for attributing a net present value term to each cow.

Pen Distribution

It is often necessary to identify the pens being used to group the animals and to count the number of cows in each pen. This can be done using the following command:

Sum by pen

Analysis of SCC Data

1. Summary Data

View average SCC and log linear score by lactation for all cows:

SUM SCC LGSCC BY LACT FOR LACT>0

```
- Command : SUM SCC LGSCC BY LACT FOR LACT>0
By LACT %COW #COW Av SCC AvLGSCC
-----
|      1  28  174   204   1.7
|      2  32  193   222   2.4
|      3  19  117   354   2.6
|      4  10   65   433   3.4
|      5   5   32   768   3.3
|      6   1   11   173   2.8
|      7   0    6    62   2.0
|      8   0    3   214   2.4
|      9   0    1    29   1.2
|     10   0    1   185   3.9
=====
Total      100  603   291   2.4
```

Create a table with herd average SCC for each test date for the last year:

PLOT SCC FOR MILK>0\RZ

```
- Command : PLOT SCC FOR MILK>0\RZ
SCC          T E S T   D A T E S
          120  216  316  416  517  614  716  816  917  1015  1115  1217  117

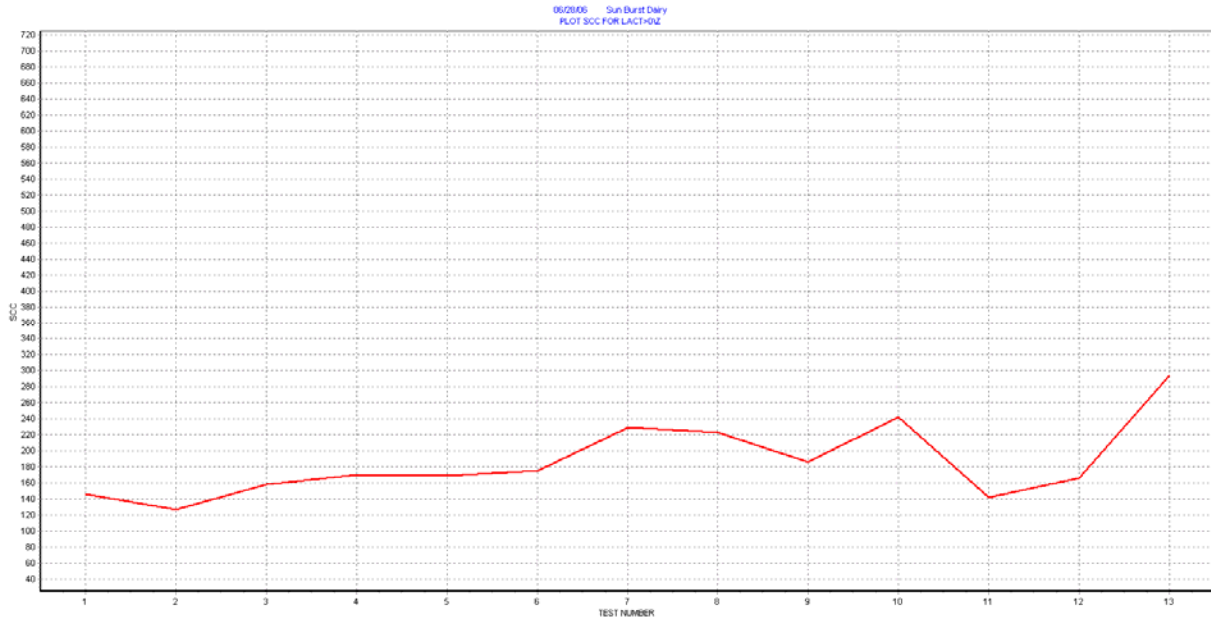
Average    185  314  201  238  304  302  258  354  288  253  233  230  291
#          58   76   95  122  150  170  209  256  301  344  401  460  517
```

The switch r orders the data by test day in reverse order and z creates a table of raw numbers. Note that the number of cows contributing to the average decreases as you go back in time. Cows are leaving the herd and calving again and the data is lost – so the averages are only reliable over the last 6 months or so. Note that these are arithmetic averages not weighted averages used by DHIA – so there will be large discrepancies between the two.

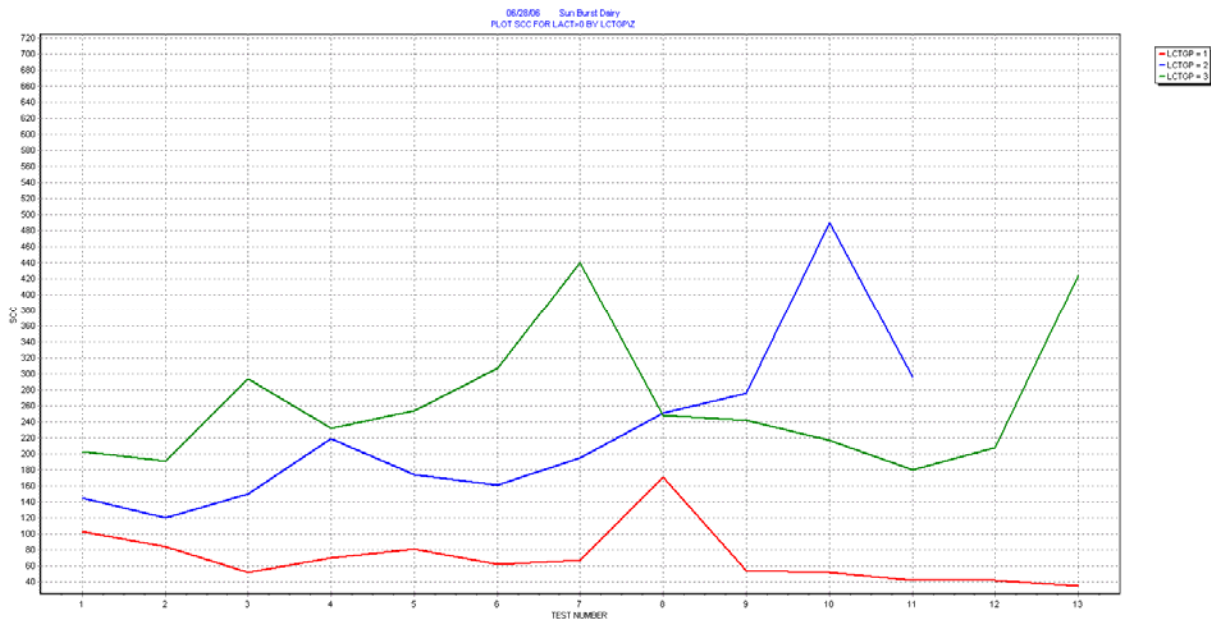
A similar command:

PLOT SCC FOR LACT>0\Z

-puts the averages in test date order from 1 to 13. This allows us to examine the change in SCC over the course of a lactation averaged across cows currently in the herd at different DIM.



By adding by lctgp after the for statement, the above graphs can be repeated for parity 1, 2 and 3 or above cows.



2. Chronic Cow List

Chronic cows are defined as cows >200 SCC at the last two or three tests. A problem cow list may include important elements of a cow's history which may aid a culling or treatment decision. A suggested command line would be:

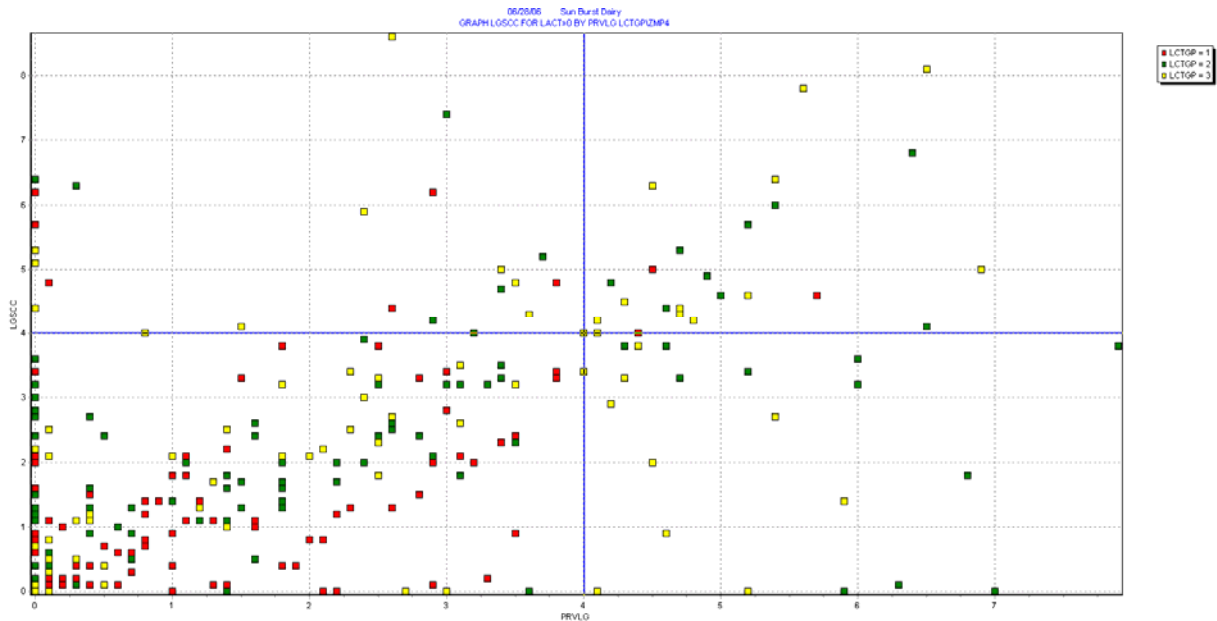
```
SHOW ID LACT DIM PEN MILK ME305 DCC TMAST DRYLG SCC_2 SCC_1  
SCC CWVAL FOR SCC_2>200 SCC_1>200 SCC>200 BY CWVAL
```

Listing the cows 'by cowval' orders the list of cows from least value to most value. You must make sure that cowvalue has been set up correctly in the file that you are using (see section on making sure that this is the case before using this command).

3. Scatter Graphs

New Infections, Cures and Chronic infection dynamics can be viewed for a herd each month using the commands below:

```
GRAPH LGSCC FOR LACT>0 BY PRVLG LCTGP\ZM
```



Switch Z includes zero values and M matches the x to the y axis. Double clicking on each dot will show the cow card and test history for that cow. You can put a cross hair on the graph by clicking the magnifying glass and locking the center of the lines to 4/4.

It is possible to view a 2x2 table of the above with calculated percentages by typing in:

```
SUM LGSCC=4 PRVLG=4 FOR LGSCC>0 PRVLG>0
```

In a scatter plot, the most recent LGSCC is on the y axis and the previous LGSCC is on the x axis. Split the plot into quadrants at linear score 4 (or SCC 200).

The lower left quadrant will be where cows should be – uninfected. The upper left quadrant are the new infections, the upper right quadrant are the chronics and the lower right quadrant are the cures.

In the example below, the new infection rate is calculated as follows:

The denominator is the population that tested LGSCC<4 at the previous test = 172

The numerator is the population LGSCC>4 at the current test = 17

Therefore, new infection rate is $17/172 = 10\%$

Note that this does not equal the new infection rate in the DC305 analysis ($8\% = 17/214$) as this percentage is the proportion of the total number of cows that had previous and current tests – including chronics.

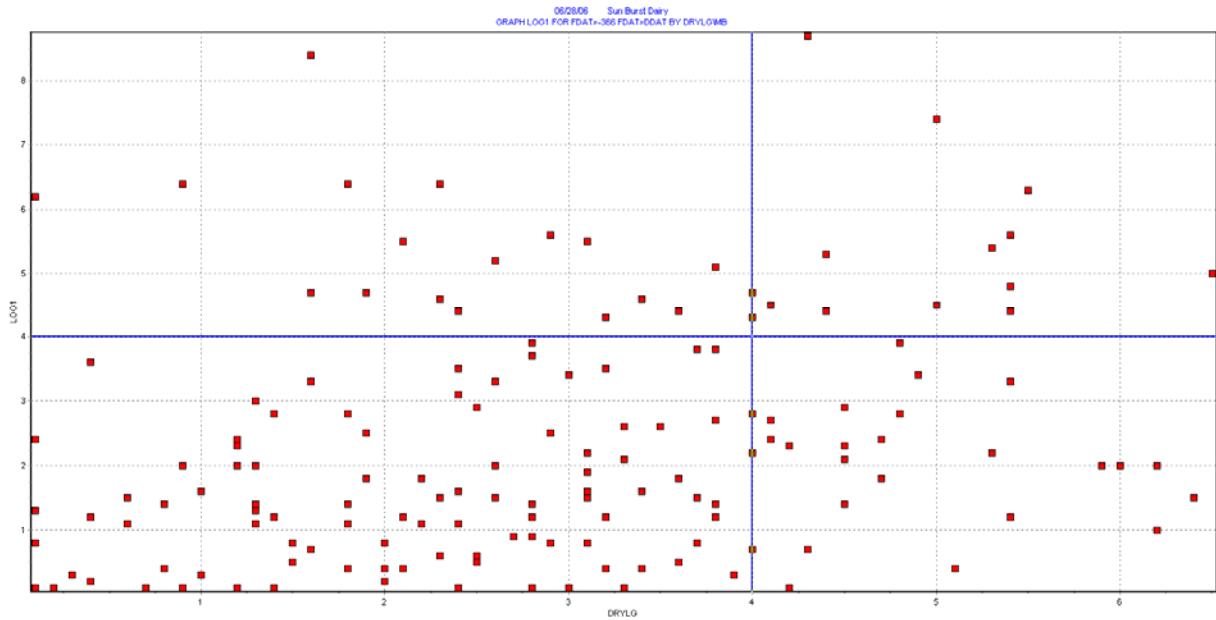
	PRVLG <4.0	PRVLG >=4.0	
LGSCC >=4.0	17 8%	25 12%	42 20%
----- + -----			
LGSCC <4.0	155 72%	17 8%	172 80%
===== =: ===== =====			
	172	42	214
	80%	20%	100%

These calculations may be done for parity groups in large herds, to make the data more manageable.

Provided that drylg (the last log linear score of the previous lactation) has previously been entered as an item, we can view a scatter plot of the last log score of the previous lactation and the 1st log score of the current lactation.

GRAPH LOG1 FOR FDAT>-366 FDAT>DDAT BY DRYLG\MB

The switch \B includes live and dead cows. The command makes sure that we exclude dry cows that have not yet freshened (as DRYLG is ascribed to the cow at DRY OFF not at FRESH) using FDAT>DDAT and we look at the last year using the FDAT selection range up to 366 days ago.



The data may be further refined using the selection at first test day to remove tests <5DIM.

GRAPH LOG1 FOR FDAT>-366 FDAT>DDAT FTDIM=5-40 BY DRYLG\MB

A table can be made as described above using the command:

SUM LOG1=4 DRYLG=4 FOR FDAT>-366 FDAT>DDAT LOG1>0 DRYLG>0 FTDIM=5-40\B

	DRYLG <4.0	DRYLG ≥4.0	
LOG1	16	13	29
≥4.0	11%	9%	20%
-----+-----			
LOG1	95	26	121
<4.0	63%	17%	80%
=====			
	111	39	150
	74%	26%	100%

Using the same principles as in the test day graph, new infections are in the top left quadrant and cures are in the bottom right. The first test new infection rate is 16/111 = 14%.

4. Infections at first test in heifers

View a list of first test data for heifers using the command:

**SHOW ID FDAT SCC1 LOG1 FTDIM FOR LACT=1 FTDIM=5-40 RC=1-5
DOWNBY LOG1**

Calculate the percent of heifers infected at first test using the command:

PCT LOG1>4 LACT=1 FOR FTDIM=5-40 LACT=1 RC=1-5\B

5. Infections at first test in mature cows uninfected at dry off

View a list of cows with new infections at first test that were uninfected at dry off

**SHOW ID FDAT DRYLG LOG1 FTDIM FOR FTDIM=5-40 RC=1-5 LOG1>=4
DRYLG<4 LACT>1 DOWNBY LOG1\B**

Calculate the proportion of clean cows at dry off, infected at first test using the command:

**PCT LOG1>=4 DRYLG=0.1-3.9 FDAT>DDAT LACT>1 FTDIM=5-40 FDAT>-366
FOR LOG1>0 DRYLG=0.1-3.9 FDAT>DDAT LACT>1 FTDIM=5-40 FDAT>-
366\B**

6. Miscellaneous complex commands

Create a listing of all SCC tests by cow id and test date. To order data by test date rather than DIM, use the switch \r.

PLOT SCC BY ID FOR LACT>0 \R

There is a cow number limitation to this command. Read the last id at the bottom of the data sheet and then repeat the command with a 'for' statement which would include id> the last id number on the first run. Repeat as necessary.

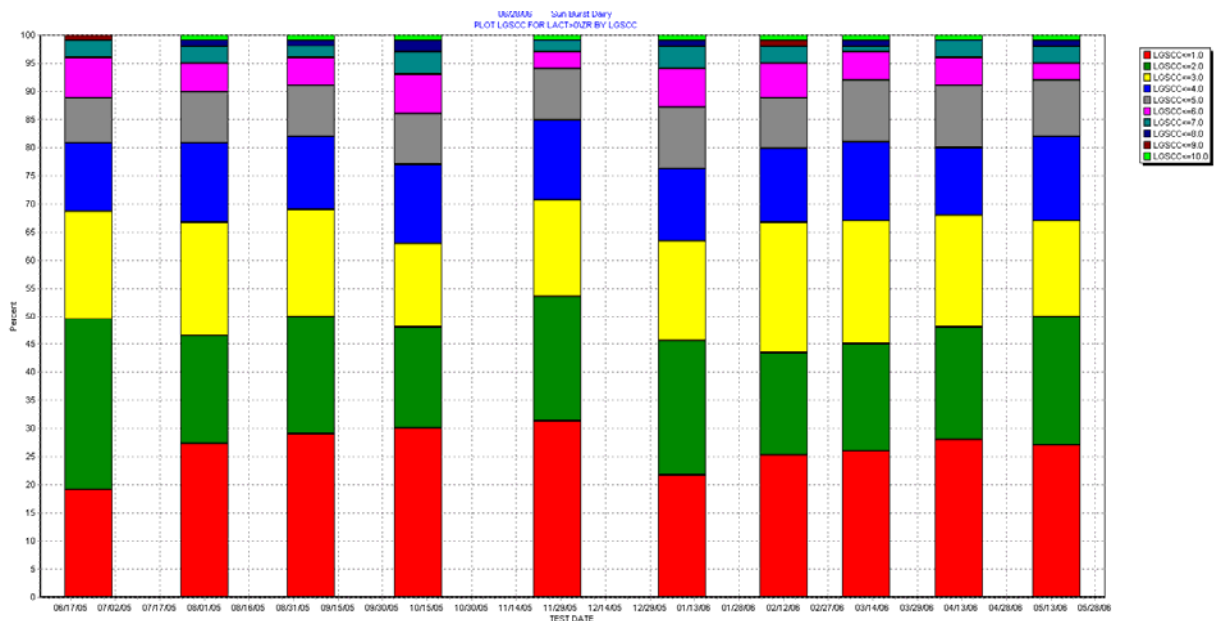
```

- Command : PLOT SCC BY ID FOR LACT>0 \R
SCC          T E S T   D A T E S
          311  4 7  5 6  6 3  715  812  9 9 10 7 11 4 1216  1 6  127  224
44          238  68  34  69  62  65  64  350  119
132          90  160  104  92  36  40  82  129  75
140          27  2407  206  332  73
142          86  42  65  46  42  51  182  127
170          16  512  78  149  40  114  117  170
189          22  29  26  33  42  12  65
204          21  12  17  18  28  39  43  111  116
212          33  24  14  22  23  112
224          85  113  596  273
232          59  4223  15  15  25  89  559  165  62  595  113  116
255          216  315  284  146  240  157  283  321  609  348  654
285          53  32  22  27  33  38  17  55  46
303          37  8  8  20  145  68
335          82  572  112  179  135  350
336          14  51  34  19  15  33  45  32  39  47  164
342          774  1669  101  5196  2727  407
370          328  385  203  379
410          66  20  39  15  42
418          15  13  11  13  90  41
419          91  29  97  28  39  41  105  118  100  285  145  113
420          114
424          14  21  15
433          22  27  18  19
436          2033  1626  1463  459  1256  959  475  205  430  190  2181

```

Make a plot of the distribution of all cows on test by linear score category.

PLOT LGSCC FOR LACT>0\ZR BY LGSCC



This plot answers the question – did the SCC increase because of an increase in a few very high SCC cows, or because of a large increase in many moderately high SCC cows. The switch \R uses test date rather than test number.

Create an analysis of new infections, chronics and cures by using the command:

PLOT LGSCC=4 BY LGSCC FOR LACT>0 \RY

The plot command is used to sort test day values. The switch \r uses test date to order the columns and the switch \y creates the calculations for new and cure etc. The report page is given below – with dates forming the columns and the calculations divided into % and # for each of the infection categories.

```

- Command : PLOT LOG=4 BY LOG FOR LACT>0 \RZY
LOG
      T E S T   D A T E S
      119 223 323 510 617 723 828 926 1031 12 7 113

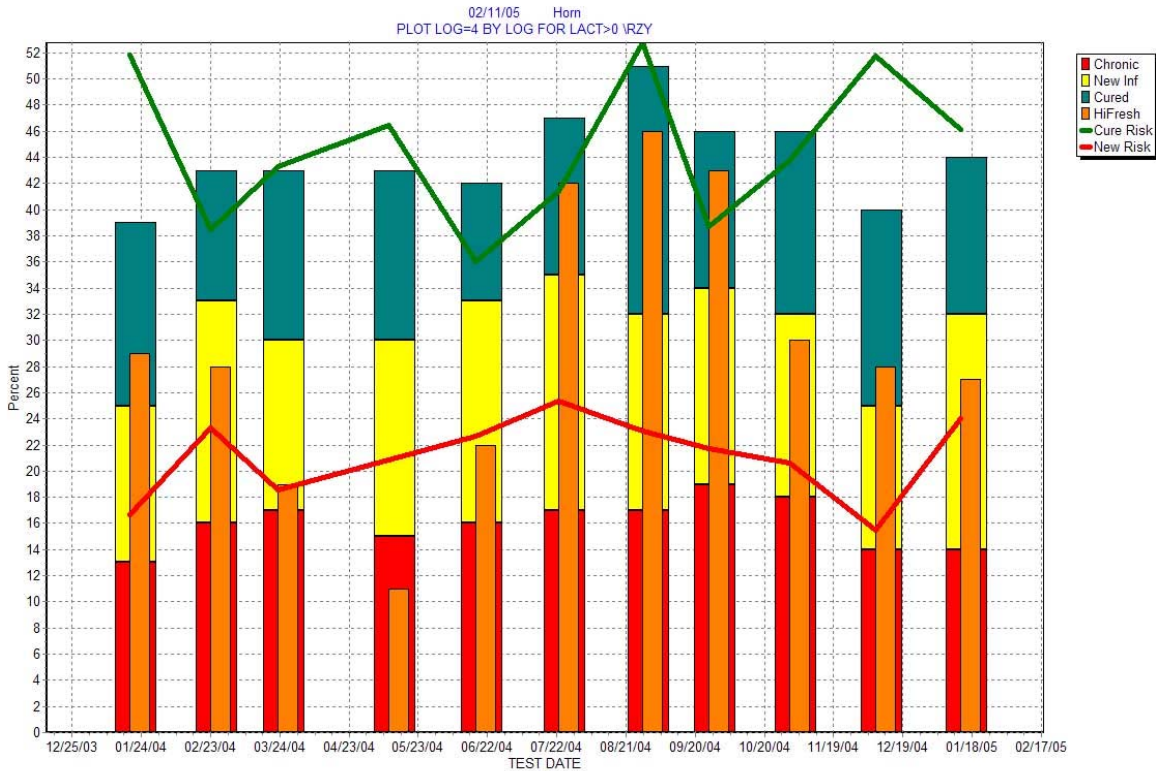
Chronic %      13 16 17 15 16 17 17 19 18 14 14
      #      44 59 64 57 60 60 62 75 70 55 59
New Inf %      12 17 13 15 17 18 15 15 14 11 18
      #      41 62 51 57 67 66 55 60 55 43 74
Cured %        14 10 13 13 9 12 19 12 14 15 12
      #        47 38 52 52 36 43 69 47 56 60 50
Clean %        60 56 57 57 58 53 50 54 54 60 57
      #       197 206 219 222 222 191 186 211 215 241 238
HiFresh %      29 28 19 11 22 42 46 43 30 28 27
      #       11 18 5 6 9 23 16 20 17 17 14
LoFresh %      71 72 81 89 78 58 54 57 70 72 73
      #       27 47 22 47 32 32 19 26 40 43 38

Average
      #       3.0 3.3 3.0 2.9 3.1 3.3 3.1 3.3 3.1 2.8 3.2
      #       367 430 413 441 426 415 407 439 453 459 473

```

The report page also generates a plot given below, tracking chronics, new infections and cures by month along with trend lines for cure rate and new infection risk. Use the FOR statement to look at the graph and calculations by parity groups separately and, if HiFresh is being looked at, sort the data by 1DIMT=5-40 to sift out cows tested outside the acceptable test range.

Note that although the Report page does not ascribe a number to the red line on the graph labeled ‘New Risk’, this is actually the true new infection risk as calculated by DHIA.



7. Bulk tank contribution

Type ECON in the command line, and click on 3. Edit milk prices. Make sure price and scc premiums are accurate before proceeding.

Then click on 6. Analyze bulk tank somatic cell counts. This will run a % contribution to the bulk tank estimate for the herd. Be careful interpreting the effect of the removal of one cow from the group as these calculations assume that SCC will be constant over time – which is often not the case.

Note that the Bulk Tank SCC recorded here is the only place in DC305 where we can find a weighted average SCC.

- Command : ECON

Analyzing 516 cows on Test Date 1/17/05

```
|-- Bulk Tank Today --|
Total Milk      42855      |----- Current Settings -----|
Average Milk    83        |Milk price  12.00
Bulk PctF       3.77      |Fat Base    3.5      Diff  0.07
Bulk PctP       3.18      |Ptn Base    3.2      Diff  0.12
                               |SCC Premiums enabled
```

```
Without any cows removed :      Bulk Tank SCC      227
                               Pay Price      12.66
                               Daily Income  5427.59
```

ID	MILK	Value	SCC	%Tank	Bulk Tank after			Bulk Tank after		
					Price	@SCC	Income	removing only this	removing cow and	all cows above it
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
1242	104	12.39	9999	10.6	12.66	204	5414.41	12.66	204	5414.41
2161	59	7.03	8914	5.4	12.67	215	5423.11	12.92	192	5516.66
1716	115	13.71	4334	5.1	12.66	216	5413.02	12.92	180	5501.80
2433	67	7.99	6908	4.7	12.66	217	5419.10	12.92	170	5493.14
2361	67	7.99	6737	4.6	12.66	217	5419.10	12.92	159	5484.48
1771	43	5.13	8970	3.9	12.66	219	5422.14	12.92	151	5478.93
1272	64	7.63	4732	3.1	12.66	221	5419.48	12.92	144	5470.66
2067	39	4.65	6220	2.5	12.66	222	5422.65	12.92	138	5465.62
2024	44	5.25	5009	2.3	12.66	223	5422.01	12.92	133	5459.93
1766	101	12.04	2134	2.2	12.66	223	5414.79	12.91	128	5443.93