TECHNOTE: Fresh cow overview with DC305

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The period before and after calving (the transition period) is crucial for a cow’s health, longevity and for the profitability of the lactation. Calving is accompanied by the most significant endocrine changes at any point in time during the lactation cycle. In addition, cows going through the transition period shift from positive energy balance to negative energy balance and experience substantial immune suppression. Approximately 75% of disease in dairy cows occurs in the first 30 DIM and 30 to 50% of high-producing cows may be affected by some disease around calving (Vergara et al, 2014).

ABS now offers a very unique tool to help our customers prevent postpartum health disorders. TransitionRight™ genetics are a novel solution that most customers will happily use. But it begs the question, how do we best tailor TransitionRight™ to the customers who need it the most? DC305, the herd management software that assists us in properly assessing reproduction also can give valuable information regarding the transition period (with adequate record keeping).

The purpose of this Tech Note is to help you to run a few basic commands to understand the transition performance of a particular dairy. Five different metrics, calculation and result interpretation will be explained based on what the TS department uses regularly. This list is not comprehensive, nor has to be interpreted as the list of most important metrics to evaluate transition. A deeper analysis can be performed running GUIDE and doing so prior to making these calculations is advised in a case where the herd doesn’t have specific items that GUIDE will create temporarily. Caution is required in interpreting the results because dairies can vary tremendously in the way they define, diagnose and record fresh cow diseases. Thus, the use of a combination of metrics is advised to identify risk for a particular farm given that a single evaluation can be misleading. Additionally, tracking the event itself (EGRAPH, EVENT) is recommended as a replacement for item calculations (LIST or SHOW commands) as the first by default will include ARC files and track exactly the data of interest.

The Vet School of Cornell University’s webpage has a useful benchmark document for transition health disorders and is a recommended resource to help in interpreting the data from the DC305 evaluations. The benchmark refers to an alarm level, where action is required because an increased incidence of a negative disorder. Find the mentioned file at https://ahdc.vet.cornell.edu/Sects/NYSCHAP/docs/TransitionCowBenchmarks.pdf

1) Early removal rate: early culling or removal rate refers to the proportion of the herd that leaves the dairy by or before the second month after calving. There are multiple ways to calculate this, but perhaps the best proxy is to run EVENTS FOR LACT>0\6S1011415 that will give you the total culling sorted by DIM, in 30 days chunks. Caution in the interpretation is needed if the customer performs a good number of “dairy sales”, such as healthy cows that will be milked in another herd. With high beef prices several farmers will argue that selling cows that did not transition well was a good deal. We will not question his economic decision, but we will raise the question to better understand why an important number of cows did not transition well and therefore do not produce enough milk to make them more profitable than their beef price.

The table below exemplifies a particular dairy that is losing a huge amount of cows early in the first 2 months of lactation (16% accumulated by 60 DIM) obtained with the above command and later
summarized in Excel using the number of sold and dead cows by month after calving over the total freshening in the same period the table was created.

In order to eliminate the dairy sales, if you click on the sold row in DC305, a list of all sold events will expand. You will need further analysis in Excel to filter the events occurring in the first 30 or 60 days after calving and eliminating the dairy sales from the total calculation when required. The remark interpretation can be tricky and I would recommend asking the customer what specific remarks will identify dairy sales.

2) **Fresh cow’s disease incidence:** This epidemiological calculation of new cases of a particular disease requires definition of a population at risk to accurately assess the rate (risk). In this case, the population at risk are the cows that calved in a particular month, and the risk period ends after the last cow completed a month in milk (time when the disease is expected to happen). The command needed is uncommon and recently developed. It is included in the transition tab of the GUIDE under the summary evaluations. The specific command is `EVENTS\UD31W0` and will calculate the rates for you on the right X axis and a confidence interval at 95% (in the table and as whiskers in the graph) and 68% (represented by the color bar in the graph). From a clinical perspective, differences at the 68% level (color bar not overlapping) are enough to interpret the changes as significant. See graph below:

If you are interested in calculating the raw data and identifying your own rates, the following command will give you a table with similar number of events for the first 2 months using `EGRAPH`.

![Graph showing fresh cow’s disease incidence](image-url)
EC=01 MF RP METR MAST KETOSIS DA PNEU EC=14 EC=15 FOR LACT>0 DIM<61 FDAT>=13MON FDAT<01MON\430 \FN1, or for the first month after calving using the command EGRAPH EC=01 MF RP METR MAST KETOSIS DA PNEU EC=14 EC=15 FOR LACT>0 DIM<31 FDAT>=13MON FDAT<01MON\430 \FN1. Notice that early culling is included here as well. Some herds may have changed the standard names for various fresh cow diseases or you may want to include others, in that case you will need to find the event code (EC) for the specific disease in ALTER and then you will need to add that event into the command list using the format EC=nn

3) Risk factors: Calving abnormalities increase the risk of developing transition disorder by three times for multiparous cows and four times in primiparous cows (Vergara et al, 2014). Monitoring and recording these abnormalities is important. Unfortunately, calving difficulty is manipulated by employees and often does not correlate with other risk factors. Therefore, the evaluation of twin rate and stillbirth rate are recommended because records are more reliable. Run the command EVENTS FOR LACT>0 BY LCTGP\3SI to get the table below.

For stillbirth rate interpretation, refer to the Cornell benchmark, but always be mindful of the difference between male and female stillborns, especially for first lactation animals because an argument for sorted semen can be built. Typically, rates are higher in males (%M). Twin rate will be higher in older cows, but hopefully is less than the herd as a whole.

4) Fat:Prot ratio (FPR) on first milk test: To cope with milk production during transition, the dairy cow performs huge metabolic adaptations. Fat mobilization (NEFA) is one of them and may increase the fat content of the milk yield. Recently, the University of Minnesota confirmed the association between the FPR and NEFA and BHBA in a retrospective study showing a significant association [1]. If 40% or more of first test cows have a ratio >1.4, there is reason to sound the alarm. However, ensure that an appropriately representative subset of first test cows actually have that evaluation using the following command PCT TDY1=5-45 FAT1>0 FOR MYFSH=-
761 BY MYFSH \BL. The DC305 GUIDE will show the information on FPR in a complicated format. The graph below better shows if the alarm level has been reached using the command PLOT RAT1=1.4 FOR TDD1>761 TDY1=5-40 FAT1>0 PRT1>0 BY RAT1\RD761. The graph below demonstrates how consistently the alarm level has been reached in a particular dairy from February 2015 to July 2015.

5) First test mature equivalent 305-day Projected: DHIA offer projections of the expected lactation total 305 day milk production based on first test which can be graphed in DC305. A mature equivalent (ME) projection further refines this prediction by adjusting all cows to the same age to allow comparison of cows in different lactations. While this projection is not 100% accurate in predicting the final 305, a historic scatter graph of this prediction can show groups of cows starting with a low projection at first test (or high) identifying impacts of transition management changes (Eicker et al, 2001). In addition, a fitting line will help to read the trend. Despite the age standardization we recommend evaluating primiparous and multiparous separately because the two groups respond differently to management changes, have different metabolisms and are impacted by different risk factors. The command is GRAPH TME1 FOR MYFSH>-761 TDY1=5-45 MLK1>0 BY FDAT LGRP\BLRP4 and to confirm a representative number of cows have the projection, run the command PCT TDY1=5-45 MLK1>0 FOR MYFSH>-761 BY MYFSH \BL. In the example below, a group of second lactation fresh cows tested in late August/early September 2014 performed better than their cohort and moved the fit line up slightly.