TCI™ - An Objective Tool to Benchmark and Monitor the Effectiveness of Your Transition Management Program

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INTRODUCTION

Most dairy managers do not know how effectively their programs perform because of poor monitoring tools. Fresh cow disease event rates are poor monitors. Many dairy herd managers compare rates of displaced abomasum to those of their neighbor's herd. While a DA diagnosis may be quite consistent between dairies, it is a primitive monitor of transition health. The criteria for diagnosis of events such as metritis or ketosis and the recording practices are so different between dairies as to make herd comparison into a fool's errand.

Some dairy consultants monitor *Week Four* milk weights, and others 30-d milk weights, in efforts to monitor fresh cow performance; but these tests do not allow for benchmarking against the industry. Two herds may have identical *Week Four* milk weights, but one may have high genetic merit cows with a poor transition program, while the other may have average cows with an excellent transition program. These crude tests do not measure the quality of transition management.

Transition cow management programs are important and deserve sophisticated monitoring. More than 75 % of the disease events of a dairy cow occur in the transition period. I will try to make the point that the range between the most and least effective transition programs will exceed $300/cow/yr. For every 1,000 cows, the effectiveness of the transition management program is a $300,000/yr question. For most dairy managers, it is a big question to which they have only crude answers.

Transition Cow Index™ is a monitoring tool that overcomes many of the weaknesses of transition program monitors, such as disease rates and unadjusted milk metering programs. Until recently, it has been accessible on a regional basis through AgSource Cooperative Sources (Verona, WI) and Valacta (Sainte-Anne-de-Bellevue, Quebec, Canada). However, it has become much more widely available across the US through a program offered by Zoetis (Florham Park, NJ).

TRANSITION COW INDEX™

Transition Cow Index™ (**TCI**) is the difference between the actual milk produced and a predicted yield at first test day between 5 and 40 days in milk (**DIM**). The prediction component of TCI was developed using Dairy Herd Improvement Association (**DHIA**) data from approximately 500,000 cows in over 4,000 herds served by AgSource, Inc., a Wisconsin DHIA testing service. Variables used in the final model include DIM at first test (limited to the interval from 5 - 40 DIM), previous cumulative milk, DIM in prior lactation, start of current lactation as calving or abortion, start of prior lactation as calving or abortion, month of calving, SCC log score at last test of prior lactation, days dry, milking frequency current lactation, milking frequency prior lactation, parity number, breed, and Posilac® (Elanco Animal Health, Greenfield, IN) use at the herd level. Because data from the prior lactation is used

in the prediction equations, TCI™ values can only be calculated for cows in the second lactation or later.

There are two different indexes currently used in the industry. **TCI-D™**, which stands for Transition Cow Index-Daily Milk, has units of lb on first test day. If the cow produced 70 lb on her first test day and the models had predicted 80, that cow would have a TCI-D™ score of -10 lb. TCI™ has units of first test 305-d projected milk in pounds. If the cow has a first test 305-d, projection of 24,000 lb, and the model had predicted a first test 305-d projection of 26,000 lb, that cow would have a -2,000 lb TCI™ score. The remainder of this paper will refer to the TCI-D™ option.

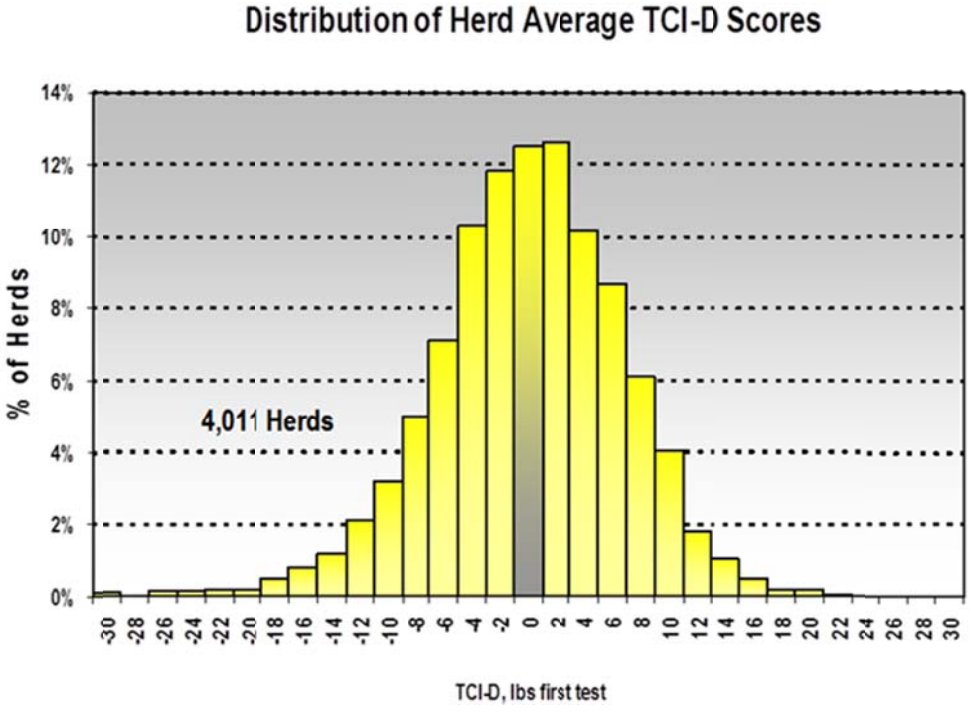
HERD AVERAGE TCI™

By averaging the TCI-D™ scores for all mature cows in a herd, the effectiveness of herd transition programs can be compared. Figure 1 shows the variation in annual herd average TCI-D™ scores. Omitting the extreme outlier values, the range of annual herd average TCI-D™ scores stretches from -16 to +16 lb. This suggests that a group of 100 cows could be assembled and there could be up to a 32 lb difference in their first test milk yield depending on which transition program they experience.

ECONOMICS OF HERD AVERAGE TCI™

We have examined associations of TCI-D™ of individual cows with subsequent survival and milk yield. Based upon records from approximately 200,000 cows, each additional pound of TCI-D™ is associated with an increased likelihood of surviving to calve again by 0.33 % and an increased milk yield of 176 lb in the current lactation. A herd with an annual average TCI-D™ that is 10 lb higher than another herd should realize a 3.3 % lower annual culling rate and an

Figure 1. Histogram of annual herd average TCI-D scores from 4,011 dairy herds in the AgSource DHIA record service.

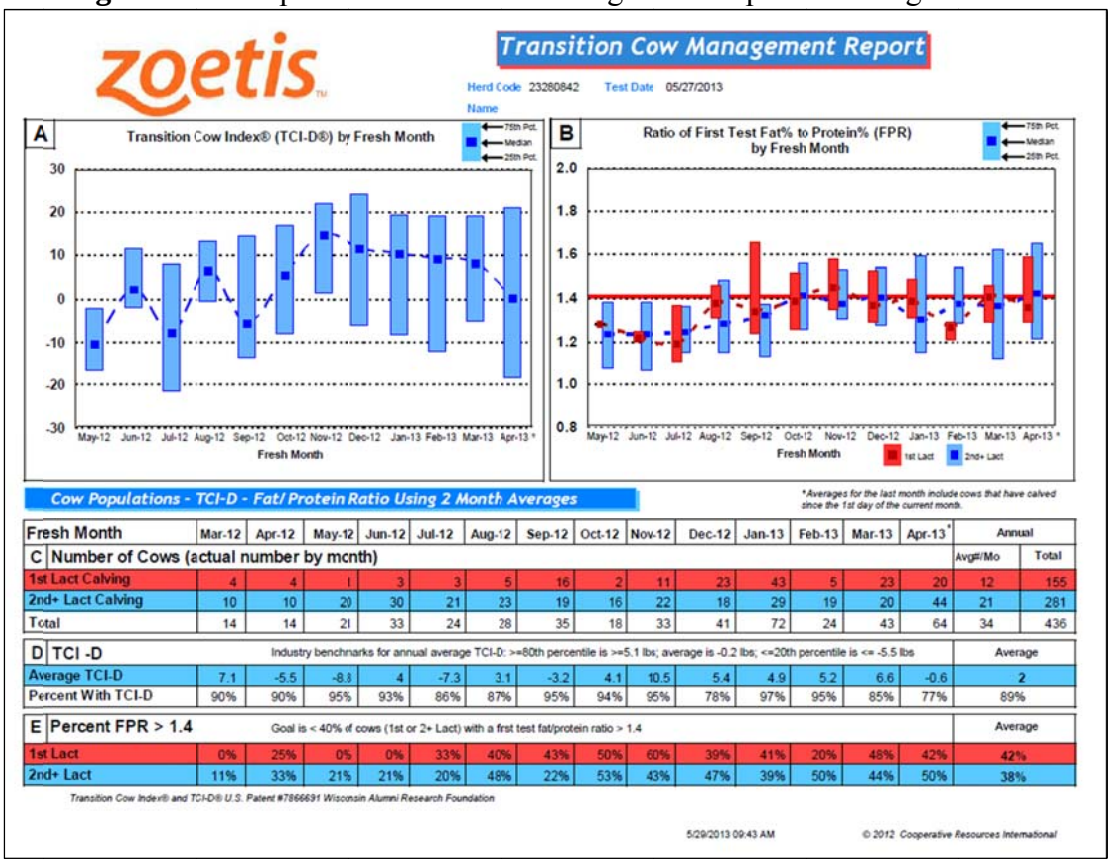


increased milk yield of 1,760 lb/cow due to the higher quality transition program. Over the full range of more than 30 lb TCI-D™, the quality of transition programs can determine the survival of more than 10 % of the herd each year and more than 5,000 lb of milk/cow. The economic effects of this culling and milk yield will vary by location and time, but these effects are of sufficient size to determine the survival or failure of a dairy.

AVAILABILITY OF HERD AVERAGE TCI™ RECORDS

Calculation of the TCI requires good quality DHIA records on individual cows. It does not require individual cow milk fat or protein percent records, but the variables listed in the description of the index earlier in this paper are used. The University of Wisconsin owns the patent on Transition Cow Index and has licensed it to AgSource based in Wisconsin, Valacta in eastern Canada, and to Zoetis in the US. The TCI™ is available to patrons of both AgSource and Valacta; whereas Zoetis will provide the report to dairies that have herd records from DRMS in Raleigh or Ames (Dairy Records Management System, Raleigh, NC) or Dairy Comp 305 (Valley Agricultural Software, Tulane, CA) records from certain testing systems. Provided the records meet some specific tests for quality, Zoetis can generate herd TCI-D™ values in their Transition Cow Management Report. An example is shown in Figure 2. By availing themselves of these records, herd managers can know

Figure 2. Example Transition Cow Management Report featuring TCI-D™



objectively the efficacy of the herd transition management program.

USING TCI-D™ TO MONITOR ON-GOING PERFORMANCE

Transition management is a complex area and involves many health and production factors. Obviously, nutrition is important, but field studies have shown that other management factors such as bunk space; freestall size; deep soft bedding under shades, in pens, or in freestalls; minimizing social rank disruptions in the week before calving; and effective fresh cow disease detection and treatment programs are extremely important, and there would be dozens of other potential issues. Because of the many factors that influence transition cows, it is valuable to be able to monitor change in results, both for the positive and the negative.

Table 1. Standard error of TCI-D scores depending upon the number of cows summarized

Number of cow TCI-D scores summarized	Standard error, TCI-D lbs
5	8.9
10	6.2
15	5.1
20	4.4
25	3.9
50	2.7
75	2.2
100	1.9
200	1.3
300	1.0
400	0.9
500	0.8
1,000	0.5
2,000	0.3

By having access to TCI-D™ record systems, the index can be used to monitor the effect of changes in transition management. When used to monitor change, it is important that sufficient numbers of cows are summarized in the index. In Table 1, the standard error of herd average TCI-D™ is shown for different numbers of cows summarized. The number summarized could be an annual average or it could represent the number of cows summarized for the past one month. For example, in a herd report where 20 cows are summarized in a one-month test period, changes of up to 4.4 lb compared to the prior month should be viewed as within the *normal* variation. In contrast, if the TCI-D™ average is based upon 100 cows, changes of more than 1.9 lb from the previous annual average are outside the expected variation. The larger the number of cows summarized, the more likely the score accurately reflects herd transition management. In large herds, a monthly report of the TCI-D™ scores is an effective method to monitor on-going performance of the herd transition management program.

SUMMARY

TCI-D™ offers dairy managers a system to benchmark the effectiveness of their transition cow management programs compared to the rest of the dairy industry and to monitor change in their program over time.