AgSource Cooperative Services
A subsidiary of Cooperative Resources International

Transition Cow Index® Frequently Asked Questions

Are benchmarks calculated from all AgSource cows or just from those herds retaining the Fresh Cow Summary option?

AgSource calculates benchmarks using data from all herds.
AgSource Staff

I'm skeptical that TCI™ is really a monitor of cow health. Do you have any data showing high TCI cows have less health events than low TCI cows in the same herd?

Yes. We have matched the health records of approximately 12,000 cows in 30 Wisconsin dairy herds with the AgSource TCI values. The average TCI values of cows with disease events were negative, while cows without disease notations were positive. The School of Veterinary Medicine will be completing a formal study on the topic during the coming year.

At a single herd level, the trend is also apparent. Below are TCI, SCC, fat-protein ratios, and health records from cows in a Wisconsin dairy herd. The first disease event and the days in milk at which the disease was found are coded as Health 1 and DIM Health 1. If a cow had a second problem identified, that item is coded under Health 2 along with the DIM Health 2. "Met" represents metritis, "Ket" represents Ketosis, "Mast" is Mastitis, "MF" is milk fever, "RP" is retained placenta, "DA" is displaced abomasums, "Ent" is enteritis, and "Lame", "Twins", "Fever", and "Sold" are self-explanatory.

Table 1: Records from the 20 cows in the herd with the HIGHEST TCI scores

Barn name	First SCC	First Fat %	First FPR	TCI	Health 1	DIM Health 1	Health 2	DIM Health 2	Health 3	DIM Health 3	Health 4	DIM Health 4
1256	15	3.7	1.3	9,995								
1070	42	4.1	1.6	9,313								
1199	48	6.3	2.2	9,129	MET	3	LAME	16				
183	58	3.4	1.4	9,071	MET	1						
1761	9	2.7	1.0	8,932								
945	317	4.6	1.6	8,514	KET	5	LAME	9				
797	52	3.8	1.4	8,302	MET	7						
1406	64	3.9	1.5	7,649	LAME	3						
1699	59	3.1	1.1	7,543								
843	22	4	1.4	7,115								
1472	35	3.8	1.2	7,015	KET	17	ENT	24				
417	32	2.7	1.2	6,984	TWINS	0						
568	36	5	2.0	6,912	LAME	3						
1116	234	3.1	1.1	6,797	MET	6	LAME	15				
1248	10	4.5	1.7	6,778								
1870	27	3.9	1.5	6,666								
1719	78	4.5	1.5	6,568	MET	8						
1817	46	3.3	1.3	6,306								

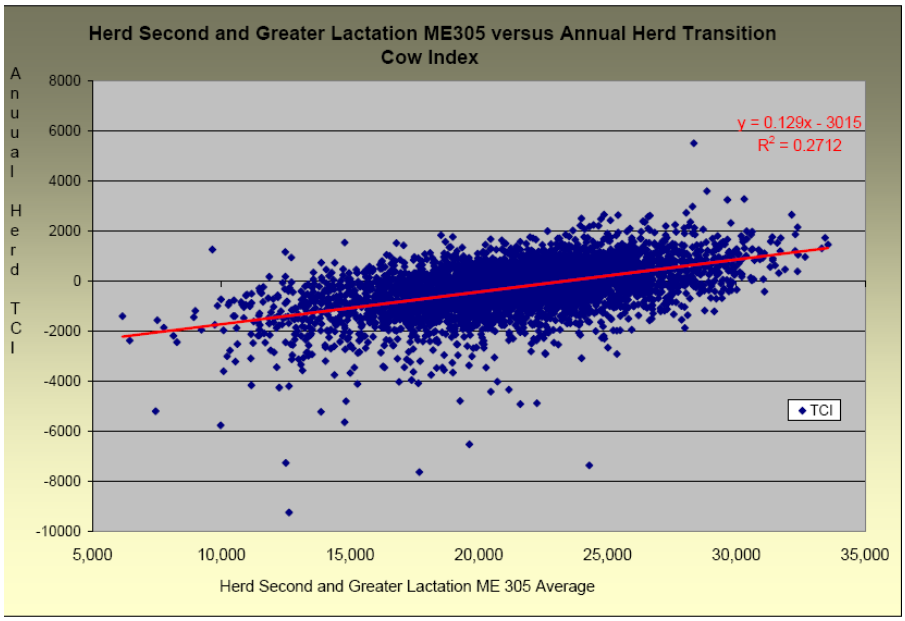
Table 2: Records from the 20 cows in the herd with the LOWEST TCI scores

Barn name	First SCC	First Fat %	First FPR	TCI	Health 1	DIM Health 1	Health 2	DIM Health 2	Health 3	DIM Health 3	Health 4	DIM Health 4
1207	125	6.6	2.5	-12,407	KET	3	DA	12				
1338	1612	5.8	1.9	-12,420	TWINS	0	RP	4	MET	4		
1184	2900	1.1	0.4	-12,504	MAST	36						
520	109	4.7	1.8	-12,569	MET	2	RP	3	ENT	17	SOLD	
898	724	5.2	1.5	-12,721	TWINS	0	MET	2	MF	3	KET	4
1480	59	5.2	1.8	-13,370	SOLD							
908	794	3.7	1.1	-13,493	TWINS	0	MF	1	RP	3		
235	106	5.4	2.2	-13,518	SOLD							
1701	128	3.6	1.1	-13,961	TWINS	0	RP	2	FEVER	5		
1120	33	0	0.0	-14,020								
1645	105	7	2.4	-14,378	TWINS	0	KET	5	SOLD			
1781	128	5.3	1.9	-14,433								
831	6170	3.6	1.4	-14,680	MET	4	LAME	12				
1093	101	4.6	1.9	-15,175	KET	7	DA	8				
120	932	4.6	1.7	-15,404	MAST	1						
1564	10	0	0.0	-15,968	MET	3	KET	13				
47	156	0	0.0	-16,293	KET	2	MET	6	MAST	40		
1438	348	6.8	2.3	-17,281								

Ken Nordlund, DVM, Nigel Cook, MMCRVS, and Tom Bennett
University of Wisconsin-Madison

Do high producing herds have higher TCI's than lower producing herds?

In the graph below, we took the ME305 Lactation average of second and greater lactation cows and plotted the herd's Average Annual TCI against it. Although there are some very high producing herds with negative Transition Cow Index's and there are some low producing herds with high TCI values, the trend clearly shows that higher Transition Cow Indexes are associated with higher producing herds.



AgSource staff

I have a 29,000 pound rolling herd average and my TCI is in the bottom 10th percentile. What gives?

What this is telling us is that you are doing a terrific job of rejuvenating fresh cows that are underperforming and that fixing the problems causing the low TCI are a real profit opportunity for you. Your TCI data indicates that identifying and solving problems in your dry cow, calving and early fresh cow areas of your operation would yield you healthier and faster starting cows.

AgSource's 25 highest Cheese Yield herds at the end of 2008 had an average TCI of 1,156 pounds. Only one herd in this group had a TCI less than 500 and the high herd in this group had a TCI of 2,129. Fixing your herd's transition and fresh cow problems are key to joining this elite group and

taking your herd to the next level. Healthier and more vigorous early lactation cows may also reduce your labor significantly. Preventing cow health problems, making more efficient use of drugs and increasing your profits are the goals both the University of Wisconsin School of Veterinary Medicine faculty and AgSource have for the Fresh Cow Summary.
AgSource staff

Will increasing my herd's Transition Cow Index actually translate into more milk for my herd?

On average, yes. New data using the TCI equation put into production on November 12, 2007 indicates raising your herd's Transition Cow Index one pound will, on average, increase ending lactation production 1.27 pounds for all cows, including those culled or that do not finish their lactation.
AgSource staff

Can my herd's Transition Cow Index predict my future daily milk production trends?

Yes, TCI is the fastest predictor of where your herd is going. Following is a graph from an AgSource member's herd of slightly less than a 1,000 cows.

Month	TCI	MLM	RHA
May	1376	98	25973
June	-232	96	26238
July	-21	95	26553
Aug	-334	94	26760
Sept	992	91	26991
Oct	-598	89	27281
Nov	-1247	88	27536
Dec	-2498	87	27798
Jan- 2006	-2114	88	27961

Notice how the dramatic TCI drop leads a similar drop in MLM. If the dairy operator simply watched their RHA, they wouldn't notice anything was wrong for months

TCI = Transition Cow Index
MLM = Management Level Milk (All cows are standardized to second lactation, 150 days in milk with 4.0% fat and 3.2% protein)
RHA = Rolling Herd Average

Both the Transition Cow Index and Management Level Milk were developed by Ken Nordlund, DVM
AgSource staff

Does the Transition Cow Index also do as well predicting future production trends in smaller herds?

Smaller herds have their Transition Cow Indexes calculated on a rolling 90 day average. However, the TCI can predict trends for these herds as well. The example below is from a very high producing herd of less than 50 cows.

Month	TCI	MLM	RHA
March	5723	107	34155
April	6123	112	34292
May	1502	113	34288
June	-1577	116	34218
July	-1999	108	34073
August	-2191	104	34308
September	-1489	106	34562
October	448	110	34435
November	81	108	34280

A drop in TCI led a very sharp drop in MLM.

As TCI starts increasing, MLM increases

AgSource Staff

Can you calculate income loss from TCI drops in real herds?

Yes, the herd income loss calculated below is from an AgSource member who had a large drop in his summer Transition Cow Index. His goal is to raise his May – October TCI to zero. The Milk Loss is calculated using the research data indicating that each TCI pound change will change end of lactation production by 1.27 pounds of milk.

Transition Cow Income Calculator

Month	Number Cows Freshening	Goal TCI	Actual TCI	TCI Pounds Difference From Goal	TCI Pounds lost X 1.27	Milk Loss X No. Cows	Milk price/pound	$ lost
May	24	0	-2288	-2288	-2906	-69738.2	$0.11	($7,671)
June	16	0	-3426	-3426	-4351	-69616.3	$0.11	($7,658)
July	18	0	-3503	-3503	-4449	-80078.6	$0.11	($8,809)
August	18	0	-2058	-2058	-2614	-47045.9	$0.11	($5,175)
September	16	0	-2023	-2023	-2569	-41107.4	$0.11	($4,522)
October	20	0	-978	-978	-1242	-24841.2	$0.11	($2,733)
Totals	113	0	-2379	2379	-18131	-332428		($36,567)

This producer has made numerous changes in his fresh cow facilities to prevent the $36,567 income drop he experienced last year from repeating itself in subsequent summers. Improving this herd's TCI would also lower their culling rate.
AgSource Staff

Is this report only for large herds?
Absolutely not! Transition and fresh cow management is equally important for all size herds. Even very small herds can use the AgSource Fresh Cow Summary to measure their transition cow management against an industry standard. They can also measure which direction their index is going on a monthly basis. This is essential information in managing a profitable dairy, regardless of size.

The opportunity to increase net income by 10% through better monitoring of fresh cow performance may actually be more important to smaller herd owners than large ones. The Fresh Cow Summary is size neutral and management type neutral. It is equally valuable for small grazing herds and large confinement operations. Any producer wanting to increase profits will find the Fresh Cow Summary invaluable.
AgSource staff

In Block A, it says I have no BST usage for my first lactation cows and also no BST usage for my second and greater lactation cows. However, I use BST at full label on both groups. What's going on here?
BST usage information needs to be inputted by your Field Technician. Be sure to provide this information on your next test day. The TCI on your next Fresh Cow Summary will reflect the new information on the current month's TCI. Past months are not affected.
AgSource staff

I had my field technician change my BST usage information to full label and my TCI barely changed. I don't understand this?

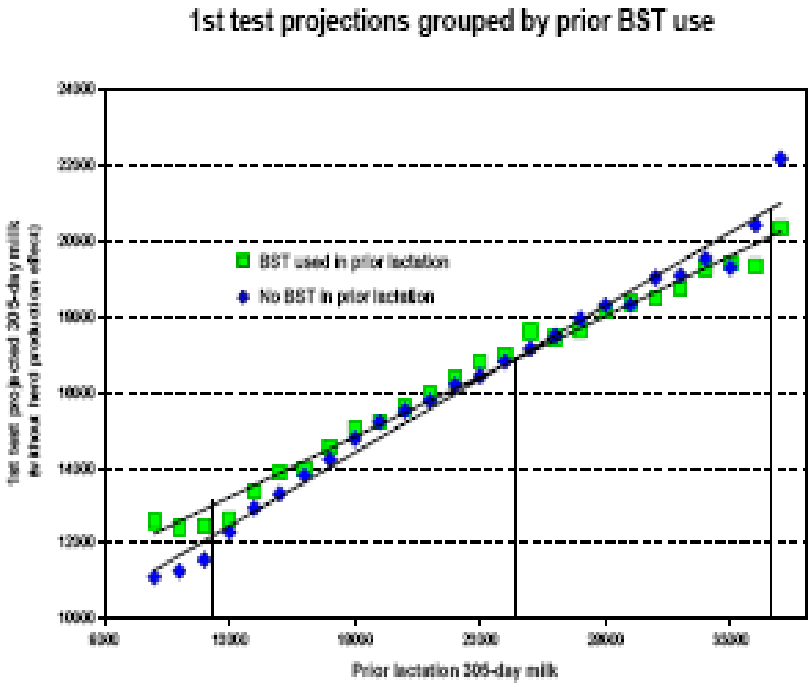
Effect of Posilac™ Use on the Transition Cow Index

Ken Nordlund, DVM
University of Wisconsin-School of Veterinary Medicine
January 29, 2006

There have been many inquiries about the effect of Posilac™ on TCI calculations. The TCI values AgSource calculated for your herd assumed there was no Posilac use in your herd unless you told your Field Technician otherwise. Since then, many of you have indicated that Posilac is used in your herd and have been surprised at how little the TCI values changed.

Research and experience has shown we can expect Posilac will yield a ton of milk or more over the course of a lactation. We expected that a 26,000 lb cow that received Posilac and a 24,000 lb cow that did not receive Posilac, provided that all other factors were similar, would have almost identical 1st test milk projections. Based upon that assumption, most of us expected big changes in the herd TCI values when calculated with or without Posilac use in the equations. Yet the values usually change relatively little. Why?

Let's look first at the data. Below is a graph that represents over 100,000 cows, 51,000 with no Posilac exposure and 54,000 with Posilac use in the previous lactation. These groups of cows were sorted by prior 305-day production records as shown on the horizontal scale of the graph. The first test 305-day projections of the new lactation are shown in the vertical scale of the graph.



The data shows that high producing cows, above 30,000 lbs, produce at their first test as expected. For example, the 35,000 lb cows on Posilac in their previous lactation start lower than 35,000 lbs cows without Posilac. However, at the 24,000 lb level, there is no difference at the first test of the next lactation, and at levels below 20,000 lbs, the cows on Posilac in the previous lactation appear to start higher in the new lactation.

Does this make any sense? Maybe. It is commonly thought Posilac can be used to generate more milk and prevent excess body condition from accumulating on lower producing cows that do not breed back promptly. If so, such cows might be less likely to have ketosis problems after calving, resulting in higher expected first test production than cows with more condition. The graph above does not prove this idea, but raises very interesting questions about potential unexpected beneficial effects of Posilac during the dry period.

Now, back to the question of why Posilac use appears to have a small effect on TCI. The first point is that many factors from each cow's record have gone into the equation. However, prior production has more impact on the first test projection than any other factor. Because Posilac already had an influence on prior production, some of its effect has already been taken into account. All other factors such as dry days, lactation number, days carried calf, milking frequency, and others also influence the predictions, and the statistical programs develop equations that take all of these factors into account to make the best prediction of the first test milk expectations.

Perhaps the take-home point is TCI equations do not represent the milk production effect of Posilac in your herd and they should not be interpreted that way. The TCI models compare the first test performance of your cows to the expected average performance of similar cows in the Wisconsin dairy industry at large, and should be used to objectively evaluate and monitor the overall performance of your transition management programs.

The red line in my Transition Cow Index block looks like a chart of daily temperatures in a Wisconsin March; it bounces all over. What does this mean?

Lots of factors could be involved, however this may indicate that standard operating procedures need to be implemented and followed on your dairy that involve dry cows, calving and fresh cows. Some months you are doing things well and other months not so well. Try and identify the procedures you used when the TCI was high and implement them on a continual basis.

Also, if the movement in your herd's monthly TCI reflects what your *herd* is doing from month to month and you are testing in the morning one month, afternoon the next month and night the month after that, TCI and your production reports are reflecting large variations in your protocols (milking, feeding, cow handling, etc.) during the day.

AgSource staff

The data in Block C makes it look like I have big time mastitis problems in my herd, but my SCC hardly ever goes over 150,000. Can you explain this?

It is always important to remember that the Fresh Cow Summary is just that – a very detailed analysis of your fresh cows. Fresh cows on this report represent about 8-10% of your herd if you have evenly distributed calving throughout the year. If 90% of your herd has very low SCC and 10% have high scores, your overall SCC could well be in the 150,000 range.

The Fresh Cow Summary Block C is indicating that the bottleneck to a lower SCC on your dairy is probably these early fresh cows and heifers. Obviously, with your low herd SCC, you are doing an excellent job of clearing up these mastitis cases. However, research has found that early lactation mastitis problems are the most expensive ones and also appear to have significant detrimental effects on reproductive performance.

Using AgSource individual cow culturing on infected fresh cows and heifers will help identify the causes of these cases. It is also important to determine if cows and heifers are freshening with mastitis or become infected between calving and the first test date. Developing a plan to prevent these infections will more than likely have a significant positive effect on your herd's TCI and profitability.

AgSource staff

Isn't TCI just the difference between a cow's ME 305 from the last lactation and her first ME 305 projection from the current lactation?

No, it's quite a bit more complicated than that. When AgSource and all other Dairy Records Processing Centers in the US calculate 305 day projections (ME or actual), there is a "herd factor" in the equation. The herd factor is an adjustment based on the production level of the herd the animal is in. If you have two Holstein cows each milking 85 pounds a day at 18 days in milk and one is in a herd with a 30,000 RHA and the other is in a herd with a 20,000 RHA, the first projection on the later cow will be about 5,000 pounds lower than the one in the higher producing herd.

This herd factor would skew Transition Cow Indexes on high producing herds much higher than they should be. Instead, the TCI equation takes the ending actual lactation production from the previous lactation and adjusts this with BST usage information, age, lactation number, breed, last SCC, days dry, times milked and a number of other factors to calculate an expected production for the next lactation. When this cow freshens and has her first test day, a 305 day projection (without the herd factor) is calculated based on her test day milk production and her days in milk. The difference between her expected 305 day production and the projection based off her actual first test day production is her TCI.

AgSource staff

Is the Ratio of First Test Fat % to Protein % (FPR) benchmarks valid for Jerseys and other breeds besides Holsteins?

The benchmarks should be valid for all breeds including cross-breds.

AgSource staff

I wish I knew which cows each dot on my TCI graph represented. If I knew that, I could try and figure out what we did right with cows with high TCIs versus the low ones. Why doesn't AgSource come up with a report like that?

AgSource offers the Fresh Cow List as another optional report. This report lists every cow that has a TCI in the current test day period along with projected 305 M.E.s for heifers and other animals that were sold or died. The report also lists all of the other individual cow Fat to Protein Ratios and SCC information used in the current month's Fresh Cow Summary.

AgSource staff

I think this Fresh Cow Summary and TCI are the greatest innovations I've seen in years, but I live in a state that AgSource does not have service in. Is there any way I can get this report?

AgSource can provide processing throughout the United States. Click on the "Comment/Question" button below and let us know your name, location, herd size and e-mail address and we'll research with your present DHI field service provider if we can provide processing and reply back to you. If this is possible, you would retain your present field technician and laboratory service and AgSource would simply process your DHI records.

AgSource is more than just TCI. We have an unparalleled reputation for maintaining data accuracy. We have also developed innovations like Management MUN reports that utilize the latest research to make all other MUN information obsolete. In addition, all AgSource records are available to you and your consultants via the Dairy Comp 305 Loop around the clock.

AgSource staff

I like your Fresh Cow Summary, but in this era of computers with artificial intelligence, why can't your cutting edge report tell me exactly what I need to fix in my management?

The "People Factor" is still the most important aspect of managing a dairy. All we can do with our reports is enhance the capability of the consultants and others you work with to make the right decisions faster and make you more money.

For example, if you want to improve a herd's fresh cow mastitis management, this could be as simple as using a test sealant at dry off or it could involve more frequent facility cleaning, better dry cow nutrition, eliminating a strain of contagious mastitis, testing all cows and selling Mycoplasma infected ones, remodeling stalls, ripping out concrete and mattresses and replacing with sand, eliminating mixing of fresh cows with sick cows or building a whole new facility to eliminate overcrowding. It is impossible for a computer generated report or any person to make these kinds of recommendations without knowing your facility and management.

However, using the Fresh Cow Summary along with AgSource's Udder Health Management Package and culturing services, an experienced management team that takes the time to breathe the air and look at cows can make a recommendation.

Using tools like the Fresh Cow Summary, you can be confident in determining if the changes worked and use this information to quantify the value of your dairy's advisors.

AgSource staff

What does the line in Block A, "Percent of mature fresh cows tested with a TCI" mean?

This is the number of cows freshening in the last 360 days that have a TCI divided by the number of cows freshening in the last 360 days. You would like to have this figure as close to 100% as possible, however percentages in the high 80s give reliable information. The main cause of a low number is a long testing interval causing many cows to be more than 40 days in milk when sampled. (TCIs are only calculated for cows 5-40 DIM.) Numerous cows dying or being sold before their first test day will also adversely affect this number.

AgSource staff

I milk my fresh cows four times a day for their first 30 days in milk. Will this affect my TCI?

Our first point is to be sure all four milkings of fresh cows are accurately recorded. Not including all milkings will make only a small difference in the cow's lactation total or in the comparison of DHI milk weight compared to milk shipped total. However, missing the recording of one milking of fresh cows' production will have a major affect on that dairy's TCI.

Concerning the big picture, if we can assume accuracy is not an issue, TCI is an excellent tool to evaluate if milking early lactation cows four or six times a day is a worth while practice. Try and maintain other factors as consistently as possible and either add or drop the extra milkings and monitor the effect on the herd's TCI.

AgSource staff

If I want to monitor the health of my fresh cows, why can't I just use my health records instead of buying this report?

Dairy farm health records are notoriously inconsistent. Except for death, diagnosis and identification of fresh cow maladies is very nebulous. For example, different people looking at the same ketotic cow will diagnose her differently. There is also the problem after diagnosis that different people have varying propensity for actually recording the event.

Because of these problems, disease occurrence comparisons, based on health records, between dairies have virtually no value. Even within dairy comparisons from month to month are very difficult if there is employee turnover and the new employee records differently than the previous one. Smaller dairies are faced with time constraints due to cropping that may dramatically affect disease recognition and recording at different times of the year.

The last problem with on farm health records is that in a sample group of 100 cows, if the displaced abomasum rate doubles from four to eight cases, there is only a 60% probability (slightly more than 50:50) that the cause is due to something other than chance.

The Transition Cow Index is a far more repeatable, unbiased and faster measurement of fresh cow health and the dry cow and transition management that contributed to that health than any other tool available.

AgSource staff

How do errors in data collection affect my herd's TCI?

Murphy's Law meets TCI

Ken Nordlund, DVM
University of Wisconsin-Madison
February 2, 2006

Some of you young people will not remember Murphy, but you old ones will. Murphy wrote the law, and the 358 variations of it, that states: "If anything can possibly go wrong, it will." As the Transition Cow Index is being applied to records across the state, Murphy decided to make an appearance with it.

There are fourteen different factors selected from each cow's historical record that are used to calculate the expected performance target for her, and her deviation from her expected target is the TCI value. Of the fourteen factors, the most important are days in milk at first test, prior production, prior days in milk, and whether the lactation starts with a normal calving vs. abortion.

7-day averages from parlors with daily milk recording

Because the effect of DIM at first test is very large, aberrations in that number can cause significant aberrations in the calculated TCI values. One of the issues that has emerged in the past month are the milk values reported from parlors with daily milk weights. Because of occasional cow ID errors, most of the parlor software is designed to report the average milk over a set period of days, i.e., a 7-day average. Obviously, if the milk of a fresh cow is increasing each day, the 7-day average will be lower than the most recent single day test weight. And if that 7-day average weight is reported

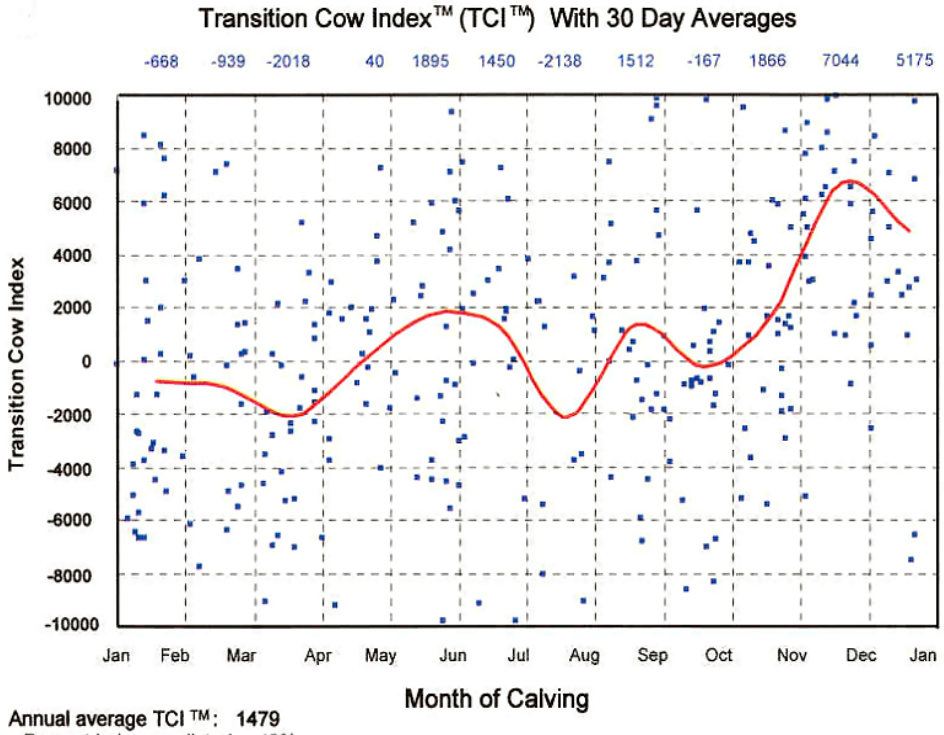
out on the last of the seven days, the actual performance of the cow will be underestimated and a lower TCI value will be calculated.

Another variation occurs when the parlor ID system fails to recognize a cow. In some cases, milk weights from before are averaged and used to replace a zero. In others, the zero remains and the milk weight for the day is recorded as "unknown". Each of these can affect TCI values.

Efforts are underway to make appropriate procedures to handle milk weights generated in these systems appropriately

How many times was that fresh cow milked today?

Like Paul Newman in "Cool Hand Luke", we sometimes have to deal with "a failure to communicate." For example, we are aware of a herd that used to milk the fresh cow string 3 times a day and was on AM-PM testing. The milk recorded from each cow was multiplied by approximately 3 to estimate the daily yield. In November, the farm switched the fresh cow group to 2X milking, but did not notify the DHIA tester. Suddenly, the yield from one of the two daily milkings was being multiplied by 3 to estimate daily milk. The failure to communicate resulted in one of the most amazing changes in TCI in the history of the western world. See the graph below.



Annual average TCI ™: 1479
Percent below predicted : 43%

Percent of mature fresh cows tested with a TCI ™ 81%

Assumptions:

No use of BST for first lactation cows.
No use of BST for second & greater lactation cows.

Interpretive comments:

TCI™ provides a quantitative measurement of the effectiveness of your dry and fresh cow management programs.

Industry benchmarks of average annual TCI ™ (90th percentile is desirable):

90th Percentile	Average	10th Percentile
> +1,570	-40	< -1,650

Summary

That's it for today, friends. However, every new day presents another opportunity for Murphy to visit another of our dairies and present interesting new questions. Remember, too, that Murphy was an optimist. Stay tuned.