Use of the Transition Cow Index™ as a Monitor of Herd Health

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**Transition Period**
- Period 3 weeks before and after calving
- Area of increased focus in studies of dairy herd management
- End of pregnancy and beginning of new lactation
- Period of tremendous hormonal and metabolic changes
- Also associated with the majority of disease events in a dairy cow’s life

**Milk Production Measures of Herd Transition Programs**
- Examples:
  - First Test Mature Equivalent Projection
  - Peak Milk Production
- Based on averages of cows calving in a short period of time
- Easily skewed by clusters of superior or inferior cows calving in a similar period

**Health Records would appear to be obvious monitor, but…**
- Diseases are variable and confounded
- Case-definition and diagnosis varies between people
  - Training, experience, variation in work-load, etc...
- Health records require constancy and diligence over time but are frequently inconsistent
- Most health events are recorded in on-farm software – less frequently submitted to databases
- Potential public accessibility of health trait and treatment data through a government database is an emerging concern to producers

Can we use early milk as an indicator of transition health?

**Onset of common dairy cow diseases**

Modified from Østergaard & Gröhn. 1999. JDS 82:1188
The “Transition Cow Index” (TCI™)

- Developed by researchers at the University of Wisconsin School of Veterinary Medicine
- AgSource data from 2001-2002 for approximately 500,000 cows
- Matched herds with Monsanto’s database of rBST purchase patterns
- Yield of over 4,000 herds matched
- Measured against on-farm health records recorded on Dairy Comp 305

TCI Variables:
- Prior milk production
- Lactation #
- Times milked
- Days dry
- SCC prior lactation
- Month of calving
- Days at 1st test
- Milking frequency
- SCC Prior Lactation
- Parity Number
- Breed
- rBST Use
   …and a number of other factors…

TCI is Based on Individual Cows

- Each cow serves as her own control – her expected performance based on previous lactation
- High TCI levels do not reflect the best cows, but rather the best transition programs
- Dairy operators with average cows can achieve positive TCI levels
- Some high production herds have poor (and expensive) transitions, but achieve high production through high peaks and persistency

Two cows – similar performance and expectations

<table>
<thead>
<tr>
<th></th>
<th>Elsie</th>
<th>Bessie</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Test</td>
<td>40 kg. at 20 DIM</td>
<td>20 kg. at 20 DIM</td>
</tr>
<tr>
<td>2nd Test</td>
<td>10,000 kg.</td>
<td>10,000 kg.</td>
</tr>
</tbody>
</table>

Variation from Prediction = TCI

TCI Simplified…

- TCI takes a cow’s ending 305 day production from the previous lactation
- Ending 305 is adjusted using TCI variables to predict “Expected Production” for next lactation
And Then…

- The cow freshens, the first test (5-40 DIM) is recorded and a “Projected Production” for that lactation is calculated.
- Projected Production minus Expected Production equals her Transition Cow Index.
- The cumulative value of all individual TCI’s for cows calving within a defined period allows herd trends in transition cow management to be measured.

What TCI Can Tell You…

- Compares fresh cow performance to industry benchmarks.
- Identifies the trend in fresh cow performance.
- Summarizes the net effects of preventative programs and disease management at the herd level.

TCI Validation

- Distribution of Herd Average TCI Values
  - Average = -37.3
  - 10th percentile = -1557.8
  - Median = -31.6
  - 90th percentile = 1481.7

Specific disease events and TCI™ (kg)

<table>
<thead>
<tr>
<th>Event</th>
<th>TCI™</th>
<th>Std. error</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>+ 62</td>
<td>39</td>
</tr>
<tr>
<td>Metritis</td>
<td>-245</td>
<td>274</td>
</tr>
<tr>
<td>Ketosis</td>
<td>-1,117</td>
<td>244</td>
</tr>
<tr>
<td>Lame</td>
<td>-1,286</td>
<td>298</td>
</tr>
<tr>
<td>Displ. Abomasum</td>
<td>-1,734</td>
<td>155</td>
</tr>
<tr>
<td>Off-feed</td>
<td>-2,746</td>
<td>468</td>
</tr>
</tbody>
</table>

Validation as Health Monitor?

- Secured DairyComp 305 records for 18,814 cows.
- Identified date of diagnosis of selected diseases relative to first test date.
- Compared cows with disease events to cows without noted disease.
SCC Linear Score
- 163,624 AgSource records were sorted by first test SCC linear score
- Each unit of SCC linear score was associated with a loss of 198 kg. TCI
- Very close to the -180 kg. Milk loss reported by Shook in 1982.

Opportunity for Milk Recording Organizations
- Immediate added value to dairy producers from milk recording services
- Reinforced benefit of central database to large, commercial herds using on-farm programs
- Time not required to produce historical trends
  - Not reliant upon accumulation of new data – basic information already available in historical databases
- Does not require additional component testing (e.g. MUN) – very cost-effective

TCI Packaged with Other Data
- A featured element of the AgSource “Fresh Cow Summary” released in January
  - Ratio of First Test Fat/Protein %
  - Udder Infection Summary
  - Cows Leaving Herd at <60 DIM
- “Fresh Cow List” with individual TCI’s released this month.

Summary
- Transition period is a new management focus with significant impact on herd performance
- Milk production measures and specific measurements of health traits have some fundamental limitations, even in the best circumstances
- TCI is a step forward in focusing not on the source of problems, but rather the end result of cow health – her own production

Summary
- TCI can be used to benchmark and monitor transition cow programs
- Many early adapters feel TCI has potential to transition cow programs what SCC is to mastitis control
- TCI adds value to milk recording services from data already available.

Can Milk Production be used as a measure of cow health?
- Yes!
  - Can also serve as a more efficient mechanism of measurement.
For More Information:
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Thank you!