Behavioral Changes Around Calving and their Relationship to Transition Cow Health

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To develop practical solutions to improve the health, longevity, productivity and welfare of dairy cattle

Transition Cow Management

- Dry off; change diet & regroup
- Move to close up group; change diet
- Calving
- Separated from calf
- Lactation starts - introduction to the parlor for heifers
- Move to fresh group & change diet
- Move to high group & change diet

The Plan:

- The Problem/Challenges
- Recent findings
  - Understanding behavioral changes during transition (e.g. parturition, difficult calving?)
  - How can we use changes in behavior to identify sick cows (e.g. metritis, ketosis)?
  - How can changes in management practices help solve the problem?

What is the problem?

- ~ many cows become ill during the transition period
- Results in:
  - ↓ milk production
  - ↓ reproductive efficiency
  - ↓ longevity
  - ↑ involuntary culling
  - Lost $$

Disease during the transition phase is a serious welfare problem

What is the problem?

- From Gröhn et al., 2003

Graph showing lactational incidence (%) of various diseases:

- Lactation
- Metritis
- Cystic ovaries
- Metritis
- Retained placenta
- Placenta abnormally displaced
- Ketosis
- Milk fever
- Dystocia

0 10 20 30 40
Lactational Incidence (%)
Despite advances in nutrition, the incidence of post calving disease remains high. Can we identify cows at risk? Can changes in management help?

**Step 1**

Understanding how behavior changes during the transition period.

**Feeding behavior**

*Decreased ~ 25 min after calving*

**Drinking behavior**

*Time spent drinking increased 58% from day 2 to day 9 after calving*

**Standing time**

*Remained constant over the transition period*

**Standing bouts**

*...but the number of standing bouts changed dramatically on the days around calving*
Cows with difficult calvings eat less before parturition than cows requiring no assistance.

...and this decrease in DMI begins ~ 11 h before calving.

Cows experiencing a difficult calving are far more restless before calving...

Can we identify cows at risk for disease?

Metritis:

<table>
<thead>
<tr>
<th>VD=0</th>
<th>VD=1</th>
<th>VD=2</th>
<th>VD=3</th>
<th>VD=4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear or no discharge</td>
<td>Bloody or flecks of pus</td>
<td>less than 50% pus + bad smell or w/o fever</td>
<td>more than 50% pus + bad smell</td>
<td>Red/brown watery VD, rotting flesh + putrid smell + fever</td>
</tr>
</tbody>
</table>

Healthy

Mild Metritis

Severe Metritis
Identifying the cows at risk - metritis

Feeding behavior before calving identifies cows at risk for severe metritis

Adapted from Urton et al. 2005 J. Dairy Sci. 88:2843-2849

Assignment of cows to illness categories

- Healthy (n = 23)
- Mildly metritic (n = 27)
- Severely metritic (n = 12)
- No evidence of any other disease.
- Cows assigned to treatment and then behaviors looked at retrospectively.

Healthy cattle show declines in DMI the day before calving

Huzzey et al. 2007, J. Dairy Sci. 90: 3220-3233

Sick cows show declines in the week before calving

Huzzey et al. 2007, J. Dairy Sci. 90: 3220-3233
Healthy cows spent time at the bunk eating but also standing and not eating.

Healthy cows tended to displace other cows more often.

Identification of cows at risk - metritis

Very sick cows (after calving) showed the greatest drops in DMI before calving.

The odds of severe metritis increased by 2.87 for every 1 kg decrease in DMI during the close up period.

Sick cows eat less during peak feeding times.

Healthy cows eat more during peak feeding times.

Whereas sick cows spend most of their time at the feed bunk eating.

Healthy cows tended to displace other cows more often.

Feeding time (min/d)

Prepartum dry matter intake kg/d

days from calving

DMI (kg/d)

Clinical signs of infection

Healthy

Mildly Metritic

Severely Metritic

Healthy Cows

y = 9.3792x + 56.387

R² = 0.3643

Healthy Mildly Severely Metritic

Healthy Cows

y = 13.973x - 8.4635

R² = 0.6401

Healthy Mildly Severe Metritic

Healthy cows tend to displace other cows more often.

Healthy cows spend time at the bunk eating but also standing and not eating.

Healthy cows at risk of metritis.
**The consequences**

Healthy cows produce more milk!

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Healthy cows eat more before calving than cows diagnosed with sub clinical ketosis after calving

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Identifying the cows at risk - SCK

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Identifying the cows at risk – claw horn lesions

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55 multiparous Holstein dairy cows
Cows with claw horn lesions (diagnosed 12-15 weeks after calving) stand more before calving.

**Identifying the cows at risk – claw horn lesions**

**Step 3**

How best do we manage the transition cow?

**Overstocking**

Increased stocking density = shorter lying times

**Regrouping**

When regrouped, the social behavior in the group changes

Cows also spend less time eating and lying down on the day after regrouping and produce 4 kg (8.5 lbs) less milk.

**Overstocking**

Cows spend about half their time lying down - but this time is synchronized


Fregenosi et al., 2007 J. Dairy Sci. 90:3349-3354

Fregenosi et al., 2007 J. Dairy Sci. 90:3349-3354
**Regrouping**

**Social Profiles**

Weekly entries into pen

**Regrouping**

**Social Profile**

Daily entries into pen

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**Feed bunk management and design**

Feeding behavior

Social behavior

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*Competition reduced with headlocks*

Displacements/cow/day

% of recommended feed bunk space

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*When overstocked at the feeder, transition cows increase aggressive behavior by 65%…*

Displacements/cow/day

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*Huzzey et al., 2006. J. Dairy Sci. 89:126-133*

The transition period is a sensitive for dairy cows; many become ill during this period.

Changes in feeding behavior are associated with metritis, subclinical ketosis and mastitis.

Changes in standing behavior during transition is associated with hoof health later on in lactation.

Management practices, such as overstocking and regrouping, can alter the behavior of transition cows and increase risk of disease.

Solutions should be win-win (e.g. increased welfare and profit) and practical.

Good science helps lead to change.

Natural Sciences and Engineering Council of Canada, Dairy Farmers of Canada, Pfizer, Beef Cattle Development Council, BC Dairy Foundation, BC Milk Producers, Alberta Milk, Westgen, and many others listed at www.landfood.ubc.ca/animalwelfare/