Losses of Cows from Herds

- **Voluntary (selective) Culls**
- **Involuntary (non-selective) Culls**
- **Death Loss**
Average Removal Rate
Godden et al., 2003

34%

- MN-DHIA records
- Reported as culled or died
- 718 Holstein herds
- Over 4 years of calvings
2002 USDA NAHMS Survey

- 76% of culls involuntary
  - 35% udder or mastitis problems
  - 35% reproductive problems
  - 25% lameness/injury
Death Losses

- **USDA NAHMS Survey**
  - 4.8%
  - National average

- **Stone et al., 2005**
  - 8.1% (3.5% to 16.8%)
  - 20 New York herds with >12,000 cows
When Cows Leave the Herd
(S. Stewart - MN DHIA 10/96 – 10/01)

624,614 Cows Leaving
5,749 Herds

Average Risk/Day of Leaving In a Period.

% Cows Leaving That Left in the 21 Day Period

Source: Kent Weigel

Data Source: Steve Stewart, U. of Minnesota
Culling Events by Days in Milk
(Calvings in 2001-2003 in Alta Genetics Advantage Herds)

59,390 cows leaving 151 herds

Source: Kent Weigel
Culling Events by Days in Milk
(Calvings from July 2003 to June 2004 in ATA herds)

308,585 total cows culled

Source: Kent Weigel
Culling Events by Days in Milk
(Calvings from July 2003 to June 2004 in ATA herds)

97,403 cows with culling reason = 5
(i.e., sold because of unspecified disease or injury)

Source: Kent Weigel
Culling Events by Days in Milk
(Calvings from July 2003 to June 2004 in ATA herds)

24,793 cows with culling reason = 4
(i.e., sold because of reproductive problems)

Source: Kent Weigel
41,109 cows with culling reason = 7
(i.e., sold because of mastitis or udder problems)

Source: Kent Weigel
Culling Events by Days in Milk
(Calvings from July 2003 to June 2004 in ATA herds)

53,785 cows with culling reason = 6
(i.e., died on the farm)

Source: Kent Weigel
Death Losses
Stone et al., 2005

- 10 New York herds with cause of death records
  - 28% calving- or transition-related
  - 10% mastitis related
Where to focus?

- Calving/Transition-Related Culls or Deaths
- Mastitis-Related Culls or Deaths
- Reproductive-Related Culls or Deaths
- Lameness-Related Culls or Deaths
Nutrition & Transition-Related Culls
Poor Transition Feeding and Management

- **Metabolic disorders** - milk fever, fatty liver, ketosis
- **Reproductive disorders** - RP & metritis
- **Digestive disorders** - SARA & DA
- Rapid and excessive loss of BCS
- Low peak milk yields
- Poor fertility
- High veterinary costs
- High involuntary cull rates
Transition Period

- 2 to 4 weeks pre-calving thru 2 to 4 weeks post
- Intake depression pre-calving
- Slow intake ascent post-calving
- Pre- & post-fresh feeding/management groups
Energy and Transition Cows

- 30% DMI decline pre-fresh
- Post-fresh DMI 20-30% below peak DMI
- Required energy for maintenance and pregnancy increases over last month pre-fresh
- Required energy for milk production increases abruptly after calving
- Mobilization of body fat
- Elevated NEFA & BHBA
- Elevated liver fat
- Elevated NEFA & BHBA risk factors for RP, ketosis, and DA
Energy and Transition Cows

- High Energy Intake
  - DMI
    - Feed quality
    - Feeding management
    - Cow management
  - Diet Energy Density
    - Feed quality
    - Diet formulation
      - C:F ratio
      - Starch vs. Fiber Content
      - Starch & Fiber Digestibility
- Glucose Precursors
  - PG, Ca-propionate, Sugar supplements
Rumensin® for Transition Cows

- Reduced plasma NEFA & BHBA
- Reduced clinical & sub-clinical ketosis
Other Transition-Cow Energy-Related Feed Additives

- Rumen-protected choline
- Niacin
- Chromium (unapproved)
- Buffers (post-fresh only)
- Yeast products
- DFM’s
Preventing Sub-Clinical & Clinical Milk Fever

- **Low or negative DCAD pre-fresh**
  - Restrict dietary K
  - Anionic salt products
Transition Cow
Management x Nutrition Interactions

- BCS at dry-off
- Dry period length
- Length of time on pre- & post-fresh diets
- Stall & bunk stocking densities
- Abrupt cow movement (facilities or pens)
- Feed mixing & delivery
- Feed quality
- etc., etc.
Nutrition & Mastitis-Related Culls
Nutrition & Mastitis Control

- Vitamin A, Beta-carotene
- Vitamin E
- Se
- Cu, Zn, Fe (excess), Mn
## Vitamin E supplementation and mastitis

Weiss and co-workers, JDS, 1997

<table>
<thead>
<tr>
<th></th>
<th>100 IU</th>
<th>1000 IU</th>
<th>4000 IU</th>
</tr>
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<tbody>
<tr>
<td>IU E/d Dry</td>
<td>100</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>IU E/d Prefresh</td>
<td>100</td>
<td>1000</td>
<td>4000</td>
</tr>
<tr>
<td>IU E/d Postfresh</td>
<td>100</td>
<td>500</td>
<td>2000</td>
</tr>
<tr>
<td>Clinical Mastitis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of quarters</td>
<td>25.0</td>
<td>16.7</td>
<td>2.6</td>
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Nutrition & Reproductive-Related Culls
Relationship between primary disorders at calving and secondary disorders during lactation (Britt, 1988)

<table>
<thead>
<tr>
<th>Secondary Disorder</th>
<th>Fatty Liver</th>
<th>Milk Fever</th>
<th>Dystocia</th>
<th>RP</th>
<th>Metritis</th>
<th>DA</th>
<th>Ketosis</th>
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<tbody>
<tr>
<td>Dystocia</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RP</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metritis</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>DA</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mastitis</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>?</td>
</tr>
<tr>
<td><strong>Low CR</strong></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Body Condition at Calving

- **Target = 3.5**

- **4+ cows**
  - > Intake depression prior to calving
  - Poor appetites in early lactation
  - More metabolic & digestive disorders
  - Poor fertility
### Effect of BCS change on reproduction

*(Smith and co-workers, 1986)*

<table>
<thead>
<tr>
<th>BCS loss 5 wk PP</th>
<th>1st Serv. CR</th>
<th>Days to 1st Ovulation</th>
<th>Days to 1st Estrus</th>
<th>Days to Conception</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; .4</td>
<td>65%</td>
<td>27</td>
<td>48</td>
<td>73</td>
</tr>
<tr>
<td>.5-1.0</td>
<td>53%</td>
<td>31</td>
<td>41</td>
<td>90</td>
</tr>
<tr>
<td>&gt;1.0</td>
<td>17%</td>
<td>42</td>
<td>62</td>
<td>116</td>
</tr>
</tbody>
</table>
Minimizing Rate & Extent of BW Loss

- High Energy Intake
  - DMI
    - Feed quality
    - Feeding management
    - Cow management
  - Diet Energy Density
    - Feed quality
    - Diet formulation
      - C:F ratio
      - Starch vs. Fiber Content
      - Starch & Fiber Digestibility
      - Fat Supplements
Fat Supplements

- Increase diet energy density and hopefully energy intake & energy balance

- Target specific fatty acids
  - EPA & DHA
  - Linoleic & linolenic acids
Impact of High Herd/Group MUN

> 14 mg%

- Poor body condition
- Poor fertility
- Low milk protein %
- Excess N excretion
What dietary factors related to high MUN?

- High CP
- High RDP
- High RUP
- Low NFC
- Low Ruminal NFC Degradability
Selenium & Vitamin E
Harrison et al., 1984

- **Dry period supplementation**
  - <RP’s>
  - <Metritis>
  - <Cystic Ovaries>
Nutrition & Lameness-Related Culls
SARA & Laminitis

- SARA a prevalent problem
- Laminitis
  - Major source of lameness
  - Linked to SARA
SARA
Sub-Acute Rumen Acidosis

>25% of cows sampled via rumenocentesis 4-8 hrs post TMR meal with pH < 5.5 (Nordlund, 2004)

- Ruminal pH function of (Allen, 1997)
  - VFA production from fermentation of CHO
  - VFA neutralization by salivary & dietary buffers
  - VFA removal by absorption or passage
Feeding Guidelines Aimed at Minimizing SARA

- Diet NDF & ADF formulation minimums
- Diet forage & NDF-forage formulation minimums
  - TMR particle size distribution
- Diet peNDF formulation minimums
- NFC & starch formulation maximums
  - Grain particle size distribution
Some Potential Errors in Feed Delivery & Bunk Management

- Feed sampling & analyses
- Ingredient dry matter adjustments
- TMR particle size
- Grain type, moisture, & processing
- Ingredient feeding rates
- Mixing errors & over-mixing
- Sorting
- Practices that promote slug feeding
Adverse Bunk Management Practices

- Limited bunk space (<1.5 ft. per cow)
- Limited feed access time (<16 - 20 h per day)
- Combination of above
- Combination of above with use of lock-ups
- Restricted feeding vs. feeding for refusal
- Inconsistent feeding schedule
- Infrequent TMR feeding or push-up
- Excessive bunk competition
<table>
<thead>
<tr>
<th>Cow Comfort</th>
<th>SARA</th>
<th>Likelihood of Laminitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Good</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Poor</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Poor</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>
Supplemental Dietary Biotin

- Improvements in hoof health at 20 mg/cow/d
  - Reduced WLS (Midla et al., 1998; Hedges et al., 2001)
  - Improved locomotion scores (Fitzgerald et al., 2000)
  - Reduced sole ulcers (Bergsten et al., 2003)
  - Improved sole ulcer healing (Licsher et al., 2002)
Visit UW-Madison Dairy Science Department’s Website

http://www.wisc.edu/dysci/