Why Cows Die On Dairies

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Integrated Livestock Management

How big of a problem is dairy animal mortality?

NAHMS Reported Death Losses

- Dairy 1996 – 3.8%
- Dairy 2002 – 4.8%
- Dairy 2007 – 5.7%

Percentage of Herd Removals by Cause for Western Dairy Herds

DHI Provo, 2005

Courtesy J Olson

DHI Provo - 8 Western States

Courtesy J Olson
Mortality data in the USA

- Data from the Dairy Records Management Systems in Raleigh, NC (used 9 states)
- Cows born since 1980 (calved '82-'05)
- 1.1 million cows from 2038 herds
- 29 herds with 35,000 cows for mixed Holstein & Jersey analyses
- Herds with 10 years or more years of continuous recording

How much death loss is “normal”?

Cattle death loss

- Cow-calf < 1%
- Feedlot ave. 1.5%
- Dairy ???
- 6 to 10% in Dairy herds
Overview of Literature
- Thomsen and Houe, Vet Quartely 2006, Dairy cow mortality, a review.
- 19 studies on dairy cow mortality
- 1965 – 2006
- 10 of 19 studies give information about causes of death
- Most studies from outside the US
  - 6 from US, 4 prior to 1978, 1 from 1992 and 1 from 1998 on culling
- Review suggests 1-5% mortality typical range

Data on ‘normal’ losses
- Very limited data
- No benchmarks
- Not carefully monitored
- Increasing over time - 8 to 10%
- Death is the most costly cause of ‘herd removal’
- Death losses reveal significant health and welfare issues

Has “Bad” become “Normal”?
Temple Grandin, CSU

Why do dairy cows die?
Holstein breeding program in USA

- Problems:
  - Many generations of intense selection for yield with no selection for health and fertility
  - Added productive life, somatic cell score in 1994
  - Added daughter pregnancy rate and calving traits in 2000s
  - Currently no breeding values based on disease recording for mastitis and diseases other than mastitis

Results from California, USA
(First lactation data courtesy of University of Minnesota)

<table>
<thead>
<tr>
<th>Breed</th>
<th>Before 1st recording (percent)</th>
<th>Calving to 305 days (percent)</th>
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<tbody>
<tr>
<td></td>
<td>Died</td>
<td>Culled</td>
</tr>
<tr>
<td>Pure Holstein</td>
<td>416</td>
<td>3.6</td>
</tr>
<tr>
<td>NormandeXHol</td>
<td>251</td>
<td>0.8</td>
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<tr>
<td>MontbeliardeXHol</td>
<td>503</td>
<td>1.0</td>
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<tr>
<td>Scand. RedXHol</td>
<td>321</td>
<td>0.9</td>
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</table>

Increasing dairy mortality
Producer responses
- “Pushing cows too hard”
- Stress
- Specific diseases
- Downers - euthanasia

Odds ratios for mortality in Holsteins compared with mortality in Jerseys by lactation number. Star indicates that the odds ratio was significantly > 1.0.

Literature
- Population characteristics
  - Parity, age, disease prevalence, DIM, pregnancy status
    - (Thomsen and Houe, 2006, Bed et al., 2004, DeChow and Goodhart, 2006, Miller et al., 2008, Pinedo et al., 2010)
- Management/Environmental factors
  - Herd size, SCC, 'open' herd status, seasonal patterns, nutrition
    - (Norgaard et al., 1999, Smith et al., 2000, Thomsen et al., 2004, Vedel et al., 2006, Pinedo et al., 2010)
- Genetics
  - Jersey & Crossbred vs. Holstein
    - (Bed et al., 2004, Rogers, 2009 ARA, 2008)
Death loss literature summary

- Not a single published study reports necropsy findings
- Only one study distinguishes euthanasia vs unassisted death
- Consistent use of categories
  - Category meaning and value?
  - Who assigns cows to categories?
  - Wide variation in category percentages

Death loss literature summary

- Accidents = 5-13%
- Udder/teat = 8-25%
- Metabolic = 8-18%
- Other known = 10-70%
- Unknown = 4-46%
- Euthanized cows grouped separately
  - Locomotor = 40%

Potential contributors to dairy cow death

- Subclinical disorders
  - Hypocalcemia, Rumen acidosis, Negative energy balance, Poor immune function, Feed problems
- Clinical disease
  - Calving injury, Ketosis/fatty liver, Mastitis, Milk fever, Infectious disease
- Disease ‘X’
- Downer cows

Dairy Information Systems

- Focused on reproduction and milk production
- Evaluate current status
- Generate ‘to do’ lists
- Health events poorly defined
- Not configured to analyze cause and effect
- NAHMS Dairy 2007 –
  - Necropsy on 13% operations, 4% dead cows

Learning issues

- Death loss is a big deal
- We have to pay more attention to subclinical disease monitoring
- We have to pay more attention to individual cows
- We have to improve the information that enters records
“What really matters is to make what really matters what really matters.”

Anonymous

Dairy necropsy

- Veterinary defined causes of death
- Are producer assessments accurate?
- Preventable causes

Deaths by Lactation and DIM

Deaths in the first 30 DIM

Colorado Dairy Health Management Survey

Producer vs. Necropsy

- Producer ‘reason’ reported before necropsy
- 24% of the cases were reported as unknown by the producer
- 4% were unknown after necropsy
Producer vs. Necropsy

- Of the causes given by the producer, 55% were correct
  - For accidents = 100% correct
  - Locomotor problems = 83% correct
  - Excluding accidents and locomotor, producer only correct 41%
  - Euthanasia – correct 79%
  - Unassisted deaths – correct 37%

“It’s not the things you don’t know that can hurt you as much as the things you are sure you know that aren’t true.”

Anonymous

Feedlot disease and death

- Respiratory disease 9X as common as digestive
  - BRD 15%, AIP 3% animals affected
  - Digestive 2% animals affected
- Death losses
  - Respiratory 61%
  - Digestive 22%
  - Other 17%
- Necropsy performed - 54% dead cattle  

USDA Feedlot ’99 study

Dairy complexity

- Dairies are complex
  - Personnel, facilities, animal groups, movement
- Dairy cows are complex
  - Life stages, behavior, nutritional demands
- Dairy mortality is complex
  - Multiple causes, organ systems, underlying features

Colorado Dairy Survey

- 14% don’t know how many cows were necropsied = very few
- 29% did no adult cow necropsies
- 70+% performed 10% or fewer

Why do dairy cows die?
Postmortem Findings from 94 Cows on a Colorado Dairy


Value of necropsy
- The good news
  - Only way to accurately assess proximate cause of death
  - Describe disease process
- The bad news
  - More detail than can be managed
  - Difficult to categorize
  - Does not include other critical information

Classification of Deaths

Organ system - all deaths

<table>
<thead>
<tr>
<th>% of deaths</th>
<th>25%</th>
<th>20%</th>
<th>15%</th>
<th>10%</th>
<th>5%</th>
<th>0%</th>
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<td>Cause</td>
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<tr>
<td>Cardiovascular</td>
<td>12%</td>
<td>13%</td>
<td>12%</td>
<td>15%</td>
<td>8%</td>
<td>6%</td>
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<tr>
<td>Respiratory</td>
<td>2%</td>
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<tr>
<td>Digestive</td>
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<td>Musculoskeletal</td>
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<td>Pediatria</td>
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<tr>
<td>Mammary</td>
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<tr>
<td>Liver</td>
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<td>Hepatic</td>
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<td>Uterine</td>
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<tr>
<td>Other</td>
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Death Categorization
- Directed management changes require information
- Proximate cause of death
- Historical events
- Analysis of individual animals

Mortality investigation
Who, What, When, Where, Why and How?
- Who and When – ID, lactation, DIM
  - Currently available
- What – causes of death
  - Poorly monitored
  - Incomplete, inaccurate
- Where, Why and How
  - Not really monitored
  - Difficult to find in current databases

Death Loss Recording Form
Conceptual model of mortality information
- Life history
  - Age, lactation, lactation status, repro status
  - Health events
  - Number and type of treatments
  - Result of treatment
- Necropsy findings
- Adjunctive diagnostics
- Operation and dynamic cow features
  - Weather, pen moves, crowding, time on dairy

Rationalize the outcome
- Who, what, when & where
- How did it happen…
  - Underlying process
- Why did it happen…
  - The rationale behind it

Case in point . . .
- Who
  - Tag 9813
  - 4th lactation
  - 13 DIM
- What
  - Spinal fracture
- When
  - 2nd milking
- Where
  - Parlor
- How
  - Crushed with hydraulic breast gate
- Why
  - Hurrying to push cows

Case in point . . .
- Who
  - Tag 732
  - 1st lactation (28 mo)
  - 13 DIM
- What
  - Recumbency following loss of condition
  - Bronchopneumonia
  - Hepatic lipidosis
  - Metritis
- When
  - Severe inclement weather
- Where
  - Purchased: overconditioned
- How
  - Multifactorial transition failure
- Why
  - Failure to intervene

“Don't tell people how to do things, tell them what to do and let them surprise you with their results.”

General George S. Patton

Category Themes
- Specific disease processes
  - Abomasal disease, infectious GI problems, Ulcers, Liver abscess, Lymphoma
- Failure of disease recognition or treatment
  - Lameness, mastitis, metritis, pneumonia
- Traumatic events
  - Calving, lameness, iatrogenic
- Multifactorial failures
  - Transition, negative energy balance
- Feed management
- Miscellaneous - unmanageable
Combating Mortality: Recommendations

- Acknowledge the importance of cow mortality
- Commit to evaluating, monitoring, decreasing occurrence

Formulate a strategy for performing thorough postmortem examinations
- Target deaths outside the obvious
- Make the time and effort worthwhile

Incorporate employees into the process
- Teaching tool
- Stimulate interest in addressing the problem
- Demonstrate poor outcomes from potentially poor decisions

Utilize hard copies to capture detail
- Record dynamic aspects
- Necropsy reports
- Digital photos for clarification
- Organized necropsy sheets and digital photography

http://www.cvmbs.colostate.edu/dvm/proinfo/necropsy/notes/index.html
Combating Mortality: Recommendations

- Standardize health event nomenclature
- Simple & consistent for ease of analysis
- Code deaths based on categories
  - Tailored to individual categories
- Record on on-farm computer systems

“Problems cannot be solved at the same level of awareness that created them.”

Albert Einstein