Improving Health and Survival of Newborn Dairy Calves

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Heifer raising

- Number of animals
- Second largest dairy expense
- Profitability determinants
  - Rate of gain
  - Age at calving
  - Weight at calving

Food for Thought

- Despite the importance of calf health, and the high incidence of calf disease and death, this area receives limited attention from producers and veterinarians

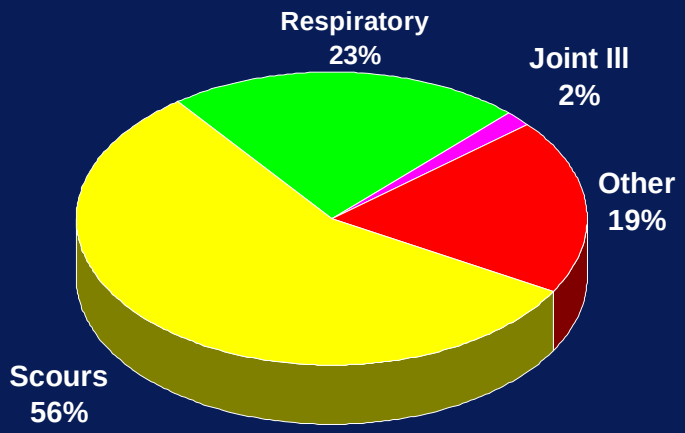
Business focus

- Low Cost
  - How do I get costs as low as possible?
- Investment quality
  - How do I run the highest quality business to get the best return on investment?

Causes of Deaths in Pre-weaned Calf

Mortality Rates

8.4% - (NAHMS, 1993); 10.8% - (NAHMS, 1996)
8.7% - (NAHMS, 2002); 7.8% - (NAHMS, 2007)



Neonatal Calf Losses

Focus mainly on infectious disease

More realistic = Wide spectrum of problems

Non - infectious ⇒ Scours/diarrhea ⇒Localized bacterial infection ⇒ ⇒ Septicemia

Adaptation to extrauterine life

- Tremendous physiologic transition
- Numerous influences
- Not always successful

Neonatal adaptation

Organ system changes

- Respiratory
- Cardiovascular
- Metabolic
- Fluid balance
- Thermoregulation
- Musculo-skeletal
- Neurologic

Thermogenesis = Body heat generation

- Non-shivering
- Shivering
- Physical activity

Failure to adapt adequately may not be obvious

- Adaptive processes interrelated
- Disturbances usually multiple
- Onset of problems may be delayed
- Problems usually subtle, nonspecific

Abnormal Neonatal Adaptation

Dystocia

Premature birth

Illness in dam

In-utero problems

Dystocia

- Defined as delayed or difficult parturition
  - Fetal-maternal size mismatch
  - Fetal malpresentation
  - Maternal causes
- Dystocia increases the degree of neonatal asphyxia and makes it harder for calves to adapt successfully

Food for Thought

- Dystocia is NOT perceived to be a major problem on Dairies, although it occurs at remarkably high rates.
- Non-infectious disease conditions of dairy calves, associated with dystocia, account for 1/3 to 1/2 of calf losses, but these losses are almost ignored.

Heifer and Cow Calving Difficulty

Calving Difficulty	Percent Heifers[1]	Std. Error	Percent Cows[2]	Std. Error
Severe dystocia (surgical or mechanical extraction)	6.8	(0.7)	3.5	(0.3)
Mild dystocia	11.8	(0.8)	7.3	(0.5)
No dystocia, but assistance provided anyway	12.4	(1.0)	9.8	(0.9)
No assistance	69.0	(1.4)	79.4	(1.3)
Total	100.0		100.0	

[1]As a percentage of dairy cow replacements entering the milking herd in 2006.
[2]As a percentage of cows on the operation at the time of VS Initial Visit interview.

2009. USDA:APHIS:VS:CEAH. Dairy 2007, Calf Health and Management Practices on U.S. Dairy Operations

Dystocia Prevalence Estimates

- Heifers 28.6% → 48.8%
- Cows 10.7% → 29.4%
- Overall 20-40%
- Dystocia is under-estimated and very common problem on dairy operations and has lasting effects

Stillbirths

- Calf delivered dead or dies w/in 48hrs
- Often not monitored/tracked on dairies
- Some genetic effects
- Some infectious issues – Coxiella, Neospora, Campylobacter, Leptospira
- Dystocia has major effect
  - Primiparous =12.6% Multiparous = 6.1% Overall 8.2%
- Compare with 7.8% to 11% reported preweaning heifer deaths – infectious dz

(Lombard –JDS 2007)

Perinatal Dairy Calf Death Losses

- Calf death before, during, or within 48 hours of calving = Stillborn
- Estimated between 7-8%
  - Meyer et al., 2000; Silva del Rio et al., 2007; USDA:APHIS:VS:CEAH. Dairy 2007
- Stillborns: 78.6% born dead; 21% born alive
  - 2009. USDA:APHIS:VS:CEAH. Dairy 2007, Calf Health and Management Practices on U.S. Dairy Operations
- ~90% of stillborns alive at start of calving
  - Mee JF. Vet Clin Food Anim. 24 (2008).

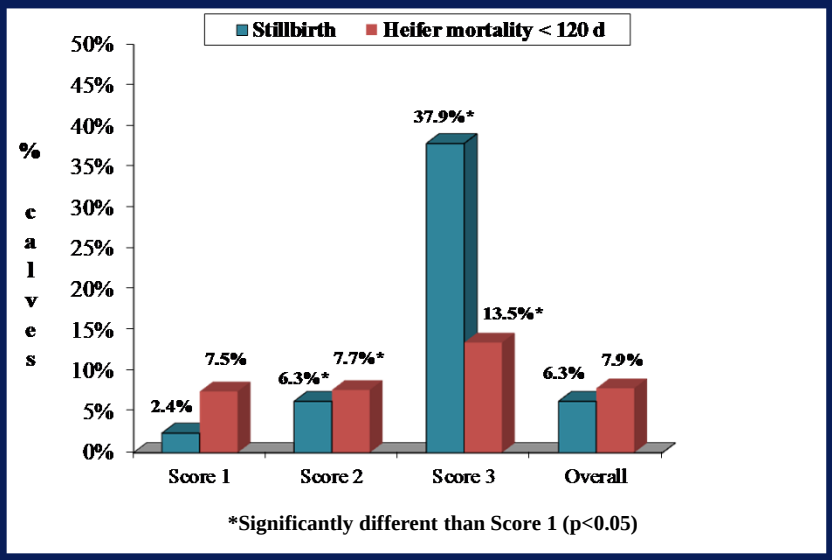
Dystocia Severity Scoring

Score 1 = No assistance

Score 2 = One person pull

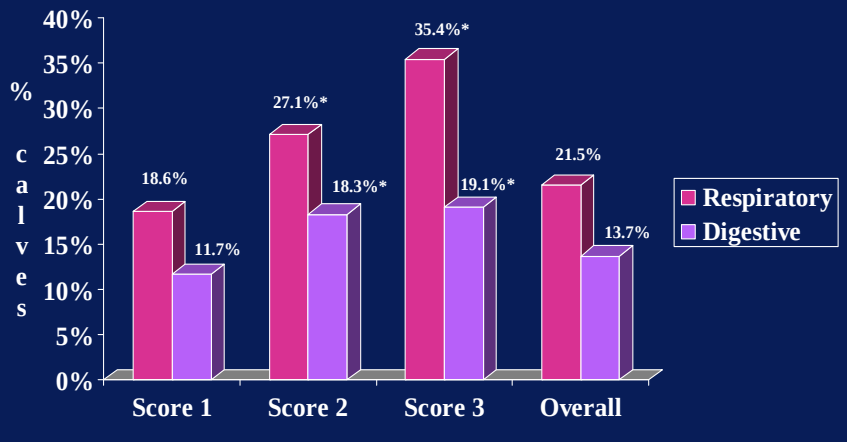
Score 3 = Severe traction or surgery

Effects on Heifer Calves – Deaths



Lombard, et al. JDS 2007

Effects on Heifer Calves – Disease



*Significantly different than Score 1 (p<0.05)

Lombard, et al. JDS 2007

Take Home Messages

- The most dramatic physiological changes occur during birth and death.

- Dystocia has an immediate and prolonged effect on the health and productivity of calves.
- Perinatal mortality due to dystocia accounts for about half of all calf deaths through weaning and increases risk of infectious disease.

Action Items

- Record dystocia using Calving Difficulty Scores 1, 2 and 3
- Record number of calves dead at delivery
- Record number of calves dying within 24 - 48 hours
- Be better than average

Food for Thought

- Simple management and husbandry practices can significantly reduce losses associated with dystocia

"If you always do what you always did, you'll always get what you always got."

Management to decrease dystocia losses

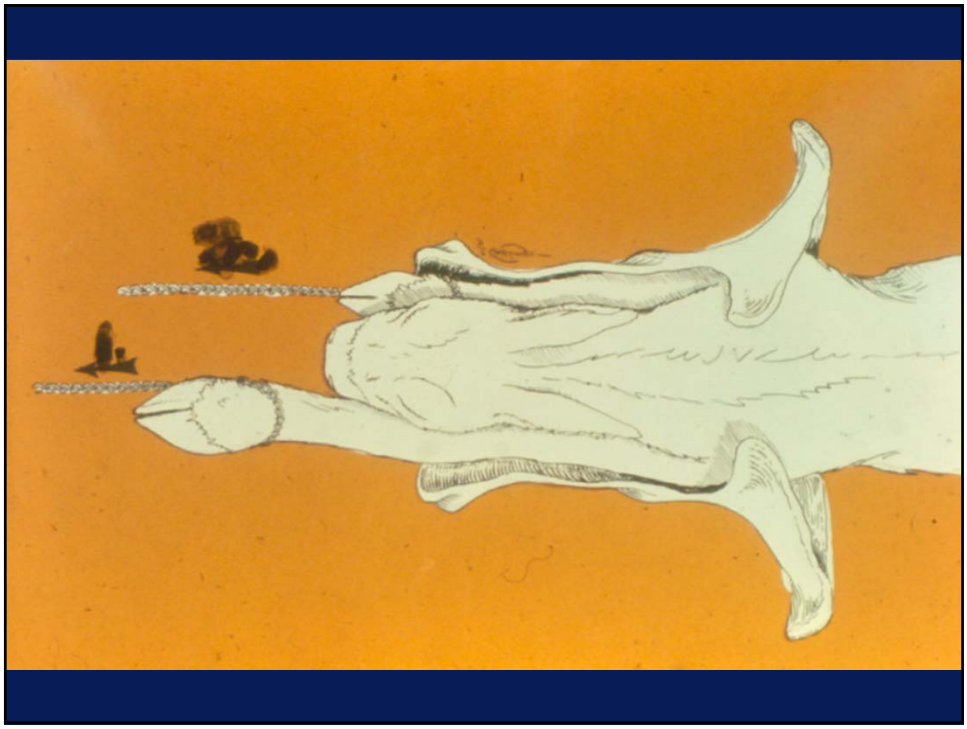
- Decrease occurrence of dystocia
- Manage dystocia to decrease impact on calves and dams
- Identify abnormal calves and provide more care

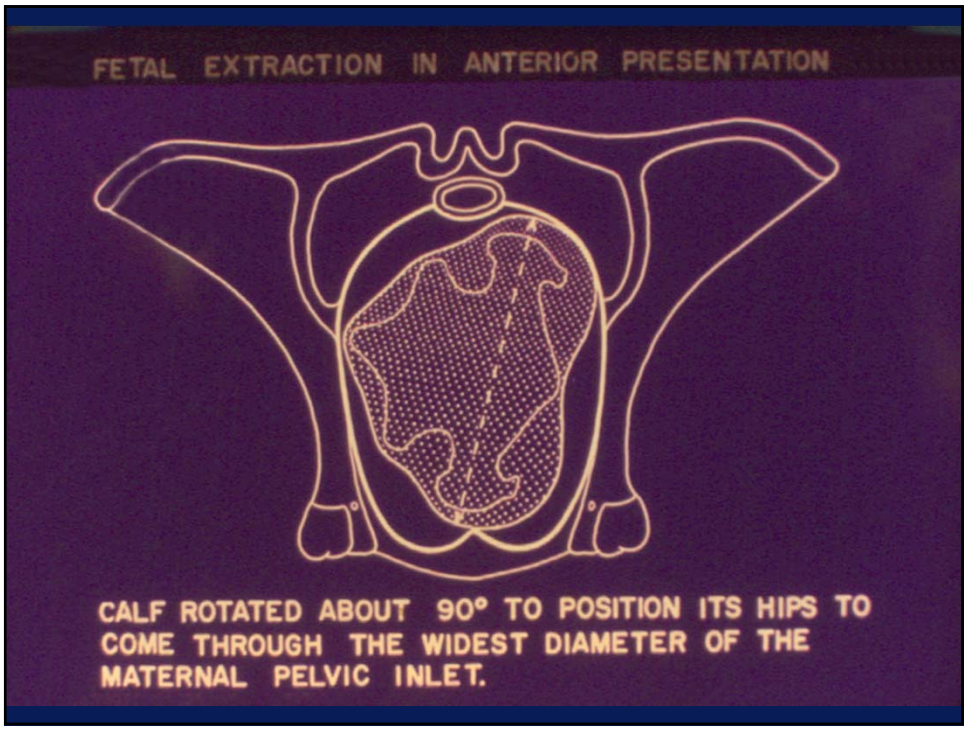
Minimizing Dystocia Impacts

- Calving
  - Stress free and comfortable, clean area
  - Monitor cow's progress
  - Assist appropriately when necessary
- Newborn Calf Care
  - Monitor all newborns
  - Provide assistance
  - Assume all dystocia calves need help

Calving management

- Frequent observation
- Note time
- 1st stage – 4 hrs
- 2nd stage –
  - Cow – 1 hr
  - Heifer- 2hr




FETAL EXTRACTION IN ANTERIOR PRESENTATION
CALF ROTATED ABOUT 90° TO POSITION ITS HIPS TO COME THROUGH THE WIDEST DIAMETER OF THE MATERNAL PELVIC INLET.

Calving and Calf Care on Dairy Farms

http://www.cvmbs.colostate.edu/ilm/

Integrated Livestock Management

Colorado State University

(Manual is located under ‘producer education’)

Minimizing Dystocia Impacts

- Calving
  - Stress free and comfortable, clean area
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Normal newborn calves

- Uncomplicated vaginal delivery
- Time to stand < 1 hour
- Good mothering
- Body temperature maintenance
- Active suckling < 2 hours
- Attentive, responsive, active

Neonatal Assistance

- Stimulate and enhance respiration
  - Assist in ventilation of the lungs (breathing)
  - Stimulate by rubbing / drying calf
- Maintain body temperature (thermoregulation)
  - Provide supplemental heat
- Increase blood volume and provide energy
  - Administer colostrum

Neonatal Assistance

- Stimulate and enhance respiration
  - Place in sternal recumbency
  - Remove mucus from airway
  - Stimulate nostrils
  - Vigorous drying/rubbing on chest
  - Provide positive pressure ventilation
  - Administration of oxygen

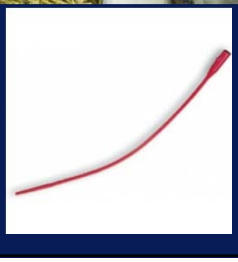
Assessment of Vigor

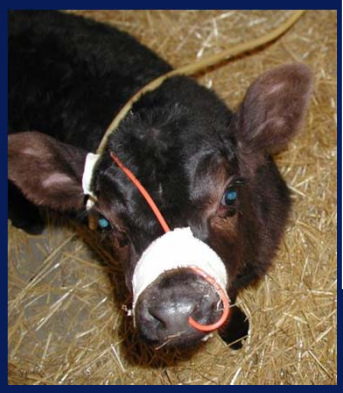
- Head-right, sternal recumbence, attempt to stand, standing
  - 3, 5, 20, 60 minutes, respectively
- ↑ 15 min to sternal =

  84% predictive of nonvitality
  - Schuijt G., Taverne MA. Vet Record. 1994; 135.


CALF
Medical
Fane Valley Stores

Oxygen Administration





O_2 flow rate= 2-4L/min

Neonatal Assistance

- Maintain body temperature (thermoregulation)
  - Calves generate heat (thermogenesis)via:
    - Physical activity – most important source of heat
    - Shivering – involuntary muscle contractions
    - Nonshivering (1° Brown fat)
  - Calves lose heat via:
    - Evaporation – reduce by drying calves (also stimulates respiration)
    - Conduction – reduce by providing straw or other bedding
    - Convection – reduce exposure to wind; dry calves

Neonatal Assistance

- Maintain body temperature
  - Supplemental heat sources
    - Heaters, hot water bottles; warming hut
    - Colostrum – also provides energy for activity
    - Calf jacket
  - If calf's temp is 100° or less – provide heat source

Food for Thought: Thermogenesis

- Infrared heater for 24 hrs postpartum
- Significant improvements to:
  - Rectal temp, So_2(%), tidal volume, dynamic lung compliance, & respiratory rate

Uystepruyst CH, et al. Vet J (2002) 52.

Neonatal Assistance

- Increase blood volume and provide energy

Non-immunoglobulin Components of Colostrum

- Other immune-active agents
- Optimum source of standard nutritional elements
- Concentrated energy, protein, vitamins, minerals
- Fluid, warmth

Neonatal Assistance

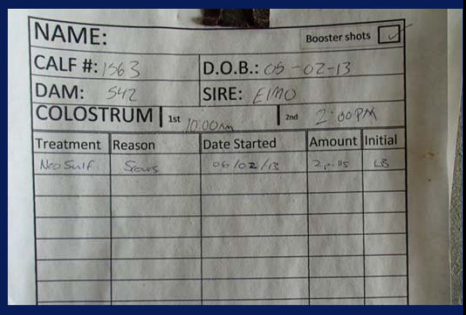
- Stimulate and enhance respiration
  - Sternal recumbency
  - Mechanical ventilation
  - Oxygen therapy
- Maintain body temperature
  - Heaters
  - Blankets
- Increase blood volume and provide energy
  - Colostrum

Take Home Messages

- Dystocia monitoring should be implemented on every dairy farm.
- Simple interventions for the first few hours after birth can make the difference between life and death.
- Dystocia and subsequent morbidity/ mortality are major economic AND animal-welfare issues for the dairy industry.

Calving/Dystocia Monitoring Program

- Record the following:
  - Date of birth
  - Dam / lactation # / Sire
  - Calf alive / dead
  - Singleton, twin, triplet
  - Gender
  - Dystocia score (1,2,3)
  - Calf vigor – time to stand and nurse
  - Colostrum quality / timing / volume



Action Items

- ✓ Ask your veterinarian for more education about calving management
- ✓ Evaluate your calving environment and calving management
- ✓ Record important features of calving and calf care
- ✓ Maintain excellent hygeine
- ✓ Provide the right environment for baby calves
- ✓ Be better than average

“Whatever you are,
be a good one.”

Abraham Lincoln