Calving Management Practices for Dairy Herds

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Objectives

- Recognize the imminent signs of birth and calving progress
- Provide guidelines for calving management practices to reduce the prevalence of stillbirth and metritis under field conditions
- Be able to determine when first-calf heifers or cows need assistance at calving
- Be able to record calving-related events

Please note that the information provided herein may or may not apply to all situations. Consult with your herd veterinarian for more information.

Transition Period: What, How, Why, & When?

Dry Off & Late Gestation
- Prior lact history
- BCS
- Nutrition
- Health
- Immunizations
- Record-keeping
- Twin/Stillbirth

Calving
- VWP
- BCS
- Nutrition
- Environment
- Facilities/Design
- Overcrowding
- TMR
- Vit & Minerals
- Economics
- Genetics
- Synch protocols
- Diseases
- Heat detection
- Environment
- Compliance to protocols
- Record-keeping
- Sire Fertility
- Diseases
- Milk fever
- RP Mastitis/Lameness
- TMR
- Vit & Minerals
- People
- Record-keeping
- Economics
- Data management
- Feed Inventory/Delivery

Early lactation
- BCS
- Nutrition
- NEB
- VWP
- BCS
- Nutrition
- Environment
- Facilities/Design
- Overcrowding
- TMR
- Vit & Minerals
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Breeding & Lactation

Frequency of Dystocia

- Severe Dystocia
- Mild Dystocia
- No Dystocia but AI/Farrowing
- No Assistance

Percentage (%)
Maternity Pen or Area

- Guidelines:
  - At least 175 ft² (16 m²) per cow
  - Flooring: sand, dirt, or clay
  - Bedding: straw (6-10 in deep), change frequently to keep it dry and clean
  - Well-ventilated
  - Adequate lighting

Sizing the Close-Up Pen

- Example: 2000-cow herd
- Determine the time period (3 wks) and size of close-up pen (# of stalls)
  - 2000/365 = average 5.5 births per day
- How many calving per week?
  - 5.5 births/d * 7 d = ~38 births per week
- How long is the close-up period?
  - 38 births * 3 wks = ~115 births for the 3-wk close-up period

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Management of Close-Up Cows

- Although “average” births per week is a valuable metric, most producers are faced with calving “ranges”
- All these calculations assume cow grouping at dry-off and “calving date” is known
- Add additional challenges for no-calving dates (bull bred first-calf heifers or cow, missing records, or unknown pregnancy status)
**Parturition**

- Parturition is a process initiated by a cascade of hormonal and physical changes at the end of gestation (~280 days in cattle)
- **Three stages:**
  - Stage I (dilation of birth canal)
  - Stage II (labor or calf expulsion)
  - Stage III (passing fetal membranes)
- It progresses gradually from one stage to the next!

(Noakes et al., 2001; Schuenemann et al., 2013)

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**Stage I**

- **Stage I** consists of the dilation of the birth canal (soft tissues and ligaments)
- **Restless behavior:** Walk, transition from laying to standing positions, kick the belly, vocalization, tail raised, urinate, ...
- **Physical changes:** Udder is full, dilation of vulvar ring, ...
- It ends with a fully dilated cervix and the appearance of the amniotic sac (AS) or “water bag” outside the vulva

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**Stage II**

- **Stage II** begins with a fully dilated cervix, the appearance of the “water bag”, and abdominal contractions are evident

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**Stage III**

- **Stage III** (passing fetal membranes)
- Delivery

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Stage III

- **Stage III** is the expulsion of the fetal membranes, which occurs around 8-12 hours post calving. If >24 hours, it is considered retained fetal membranes. (Kelton et al., 1998)

Calf Delivery

- **Presentation:** It refers to whether the calf is coming forward (anterior), backward (posterior), or transverse
- **Position:** It refers to the calf’s position in relation to the cow
- **Posture:** It refers to how the calf’s head and limbs are in relation with its body

Normal Calf Delivery

- **Forward or Anterior:**
- **Backward or Posterior:**

<table>
<thead>
<tr>
<th>Estimated values</th>
<th>Forward or Anterior = 96%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Backward or Posterior = 4%</td>
</tr>
<tr>
<td></td>
<td>Multiple Births = 5%</td>
</tr>
<tr>
<td></td>
<td>Breech = 1%</td>
</tr>
</tbody>
</table>

Eutocic or Dystocic Births

- **Eutocic Birth:** Normal delivery of single or multiple calves
- **Dystocic Birth:** It is defined as a difficult birth resulting in prolonged calving or severe assisted extraction of the calf at birth
**Early Signs of Calving**

- Cow with enlarged vulva & mucus plug
- Cow with dilated vulva & enlarged udder

**Imminent Signs of Calving**

- Walking, pacing, sniffing, & tail-raised
- Lying down & showing feet of the calf outside the vulva

**Imminent Signs of Birth**

- Envelops outside the vulva & tail-raised
- Showing feet/nose of the calf outside the vulva

**Normal Delivery**

- The rear legs of the calf are still in the vulva of the cow, but birth is completed
- Cow recovers from labor, stand-up, & lick the calf

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Cows: Calving Progress for Unassisted Births

First-Calf Heifers: Calving Progress for Unassisted Births

First-Calf Heifers: Calving Progress for Assisted Births

Reference Signs and Values for Holstein Cattle

<table>
<thead>
<tr>
<th>Signs of Normal Births</th>
<th>Description</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance of the AS or feet of the calf outside the vulva</td>
<td>Landmark references</td>
<td>Noakes et al., 2003 Schuenemann et al., 2011a</td>
</tr>
<tr>
<td>Signs of calving progress</td>
<td>Occurred every 15-20 minutes</td>
<td>Schuenemann et al., 2011a</td>
</tr>
<tr>
<td>Mean time since the appearance of the AS outside the vulva to birth</td>
<td>70 minutes(*)</td>
<td>Noakes et al., 2003 Schuenemann et al., 2011a</td>
</tr>
<tr>
<td>Mean time since the appearance of the feet of the calf outside the vulva to birth</td>
<td>65 minutes(*)</td>
<td>Schuenemann et al., 2011a</td>
</tr>
<tr>
<td>Time that a cow or first-calf heifer is in labor (abdominal contractions)</td>
<td>≤2 hours</td>
<td>Gundelach et al., 2009 Schuenemann et al., 2011a</td>
</tr>
<tr>
<td>Frequency of observation</td>
<td>At least every 1 hour</td>
<td>Schuenemann et al., 2011a</td>
</tr>
</tbody>
</table>

(*) The mean times were estimated using the mean ± 2 SD (standard deviation).

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Cow Move into Maternity Pen

- Limited research studies on cow move around parturition vs stillbirth
- For herds that group cows according to expected calving date, periparturient cows should be moved from close-up to maternity pen prior to or at the onset of labor (appearance of AS outside the vulva)
- Frequency of observation and personnel skills

Cow showing “water bag” outside the vulva (Stage II or onset of labor)

Length of Time in Maternity Pen

- N = 3,988 births
- Range: 10 min to 23 h
- Average: 1.95 h
- Median: 1.67 h

Landmarks of Imminent Birth

- Appearance of the “water bag” outside the vulva
- Appearance of the feet of the calf outside the vulva

Is the Calf Coming Backward?

- Both rear legs or front legs?
- Will the calf fit into the birth canal?
- Monitor progress!
- ...
Monitor Calving Progress

Appearance of the "water bag"

Cow is sniffing the newborn calf

Birth is completed

Guidelines for Assisted Births

Parturition Begins

Normal Birth

No Calving Progress

Guidelines for Obstetrics

Guidelines for Hygiene Practices

Hygiene Practices

- Use clean, disposable, long-sleeve gloves
- Wash the perineum with clean water and soap-disinfectant, repeat if cow defecates!
- Sanitize obstetric chains before and after each intervention or use...
Most Transition Diseases are Associated with Excessive Negative Nutrient/Calcium Balance and Body Tissue Mobilization Prior to- or after Calving

Assessing hygiene score at calving: Picture shows an score 1

Score 1:
- Perineum region is free of dirt/manure (<2% of surface area)
- Complete dry

Score 2:
- Manure/dirt is visible around the perineum region
- <10% of surface area

Score 3:
- Perineum region is moderately covered with dirt/manure
- >11-30% of surface area (or greater)
Effect of Hygiene Scores on Metritis

(Adjusted by RFM, herd, stillbirth, parity, and calving difficulty)

<table>
<thead>
<tr>
<th>Score 1</th>
<th>Score 2</th>
<th>Score 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

When Should I Call for Help?

- Establish guidelines in your SOP
- Normal progression occurs every 15-20 minutes
- If no progress within 1 hour after the appearance of the water bag, intervention is required!
- When abnormal posture is evident (e.g., appearance of one foot outside the vulva) immediately after “water bag” appearance, or for uterine torsions (where the water bag or feet do not appear outside the vulva), obstetric intervention is rendered
- If there is no progress within 30 minutes of intervention, call for help!

Calving-Related Injury

- Vulvar or Perineal Laceration

Assist the Newborn

- Make sure the calf is breathing
- Check cow for any additional calf (twins)
- Feed colostrum to the calf within 3 hours of birth
- When the cow is able to stand and walk, move her to the fresh pen

Cow sniffing the newborn calf immediately after birth
Proper Sanitation

- Remove placenta from the maternity pen
- For assisted births, wash and sanitize obstetric chains and bucket before and after each use
- See link to CFSPH below for selected disinfectants

Link to the Center for Food Security & Public Health at Iowa State University:
http://www.cfsph.iastate.edu/Infection_Control/disinfectant-resources-for-veterinarians.php

Serum Ca\(^2+\) within 48 h after Calving

Prevention of Stillbirth

- At national level:
  - Selection program for sires with calving ease genetics

- At herd level:
  - Training of calving personnel & establish SOPs
  - Facilities & prevent hypocalcemia prepartum
  - Close monitoring of first-calf heifers
  - Calves born in backward presentations
  - Communication at the time of shift change of personnel
  - Length of time in dry pen
  - Use of sires with calving ease genetics
  - ...

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Effect of Calving Training to Dairy Personnel on Stillbirth?

- Additional Considerations
  - Early intervention has the potential to prevent stillbirth, but also has the potential for dam injury due to lack of soft tissue dilation
  - For backward presentations, help finish birth!
  - For first-calf heifers, once the nose/feet of the calf are outside the vulva, help finish the birth!
  - Calving protocols/data should be reviewed and adjusted (if necessary) at least twice a year
  - Make sure your calving personnel know what to look for/monitor before and during calving and why it is important

Personnel Feedback on Calving Management Practices

- Importance of open communication within the farm team (e.g., between workers at the time of work shift and when to call for help)
- Need for new or additional obstetric chains to assist difficult births
- Need for additional help to be able to assist more or multiple cases experiencing dystocia at the same time
- Importance of having established and written calving protocols (e.g., hygiene practices, what to look for, why it is important, and when it is appropriate to intervene)
- Animals with unknown anticipated calving dates (e.g., missing records or bull bred first-calf heifers)
- Use of defined events for record-keeping (e.g., scale used for ease of calving, stillbirth returned fetal membranes)
- Proper maintenance of calving or maternity pen (e.g., broken water hose or gate)

Record-Keeping

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### Degree of Assistance at Calving

<table>
<thead>
<tr>
<th>Scale</th>
<th>Description of Dystocia(1)</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>1: no assistance</td>
<td>Meyer et al., 2011</td>
</tr>
<tr>
<td></td>
<td>2: slight assistance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: moderate assistance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4: severe assistance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5: surgical procedure</td>
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</tr>
</tbody>
</table>

1. Description of scores used to determine the degree of assistance required to the degree of assistance required during dystocia in Holstein heifers.

### Contact Information

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### References

References


