


Calving Management Practices for Dairy Herds

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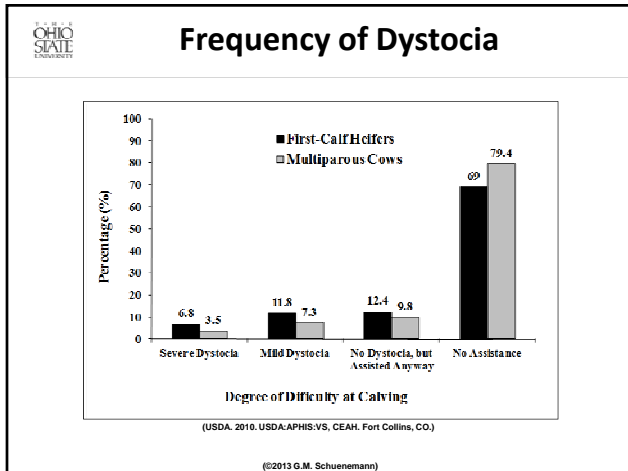
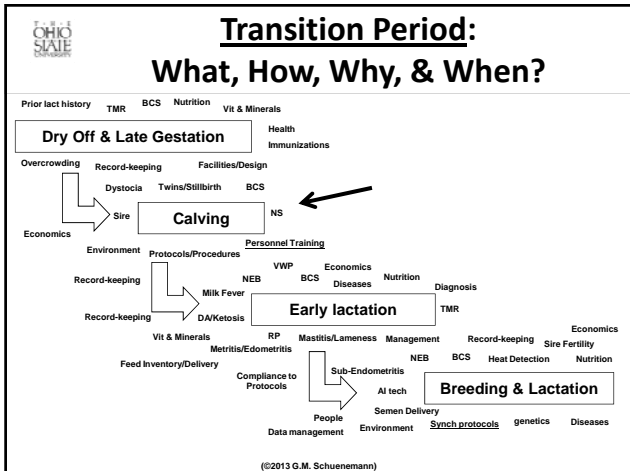
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Objectives

- 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.

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Maternity Pen or Area

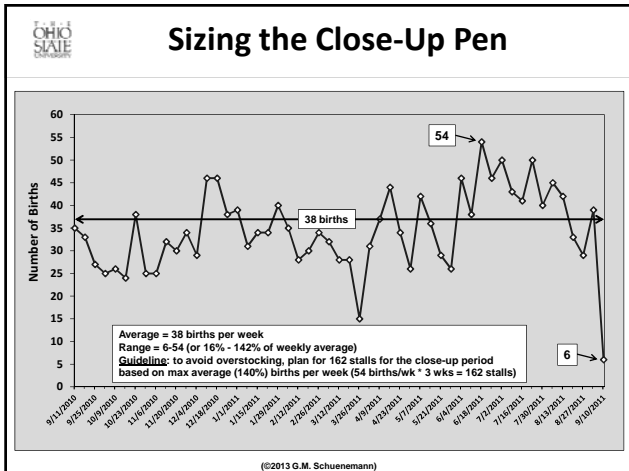
- **Guidelines:**
 - At least 175 ft² (16 m²) per cow
 - **Flooring:** sand, dirt, or clay
 - **Bedding:** straw (6-10 in deep), change frequently to keep it dry and clean
 - Well-ventilated
 - Adequate lighting

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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)

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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


Straining

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 (Ketton et al., 1996)



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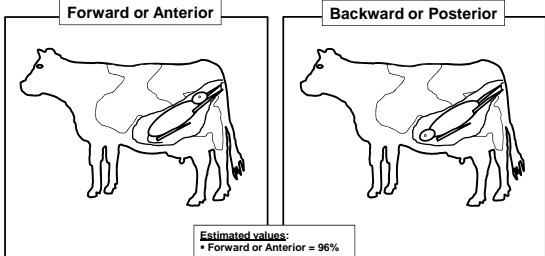
Calf Delivery

- **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

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

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Normal Calf Delivery



Estimated values:

- Forward or Anterior = 96%
- Backward or Posterior = 4%
- Multiple Births = 5%
- Breech = 1%

(Hunter et al., 2013)

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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


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Early Signs of Calving

Cow with enlarged vulva & mucus plug

Cow with dilated vulva & enlarged udder




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Imminent Signs of Calving

Walking, pacing, sniffing, & tail-raised

Lying down & showing feet of the calf outside the vulva




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Imminent Signs of Birth

Envelops outside the vulva & tail-raised

Showing feet/nose of the calf outside the vulva




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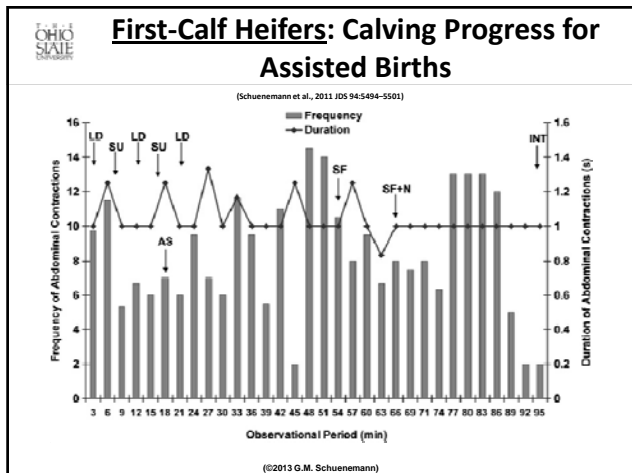
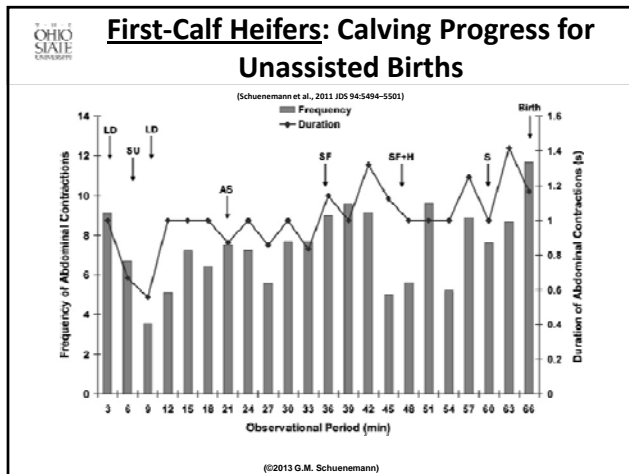
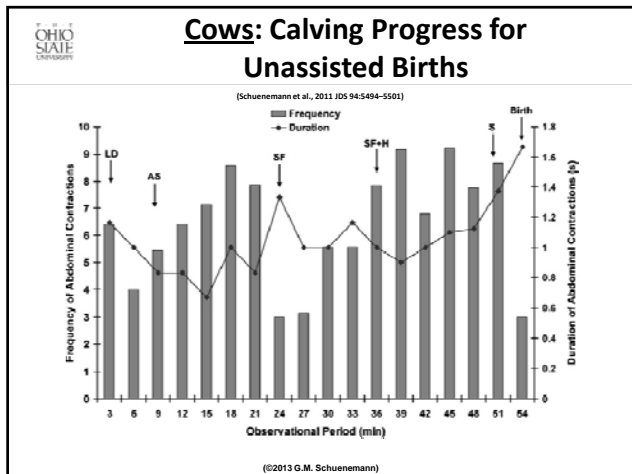
Normal Delivery

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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Reference Signs and Values for Holstein Cattle

Signs of Normal Births	Description	References
Appearance of the AS or feet of the calf outside the vulva	Landmark references	Noakes et al., 2001 Schuenemann et al., 2011a
Signs of calving progress	Evident every 15-20 minutes	Schuenemann et al., 2011a
Mean time since the appearance of the AS outside the vulva to birth	70 minutes(*)	Noakes et al., 2001 Schuenemann et al., 2011a
Mean time since the appearance of the feet of the calf outside the vulva to birth	65 minutes(*)	Schuenemann et al., 2011a
Time that a cow or first-calf heifer is in labor (abdominal contractions)	≤2 hours	Gundelach et al., 2009 Schuenemann et al., 2011a
Frequency of observation	At least every 1 hour	Schuenemann et al., 2011a


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

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Cow Move into Maternity Pen

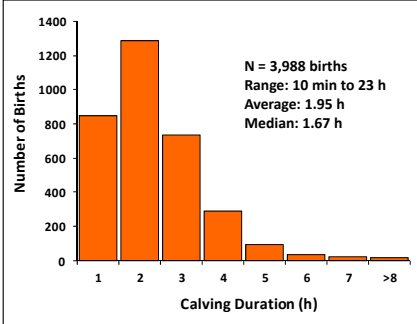
Cow showing "water bag" outside the vulva (Stage II or onset of labor)

- **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



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Length of Time in Maternity Pen




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

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Landmarks of Imminent Birth


Appearance of the "water bag" outside the vulva

Appearance of the feet of the calf outside the vulva



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Is the Calf Coming Backward?



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

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Monitor Calving Progress

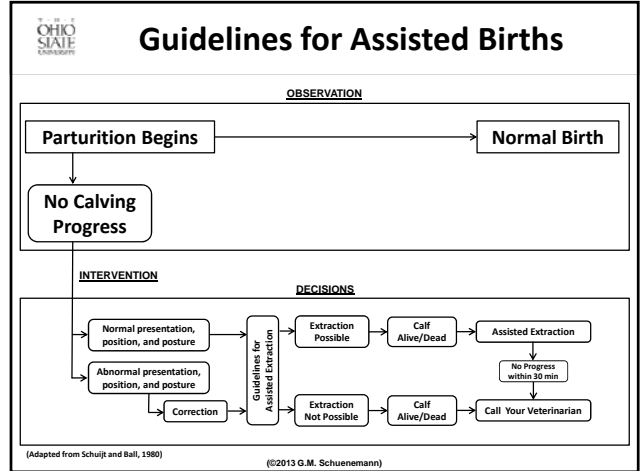
Appearance of the "water bag"

Showing feet/nose of the calf

Cow is sniffing the newborn calf

Birth is completed

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Guidelines for Obstetrics

the visual guide to bovine reproduction

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Link: http://www.drostproject.org/en_bovrep/guide.html

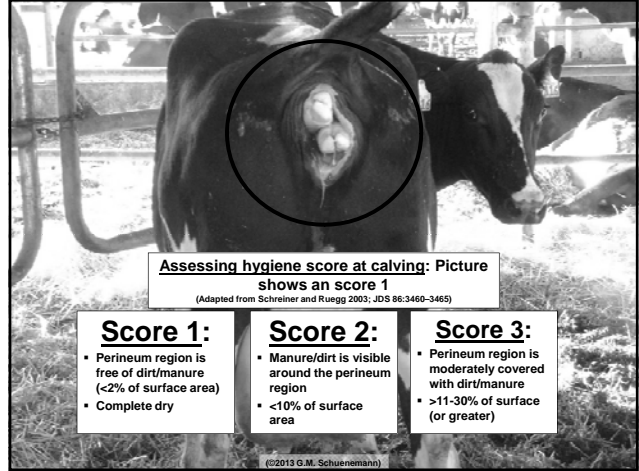
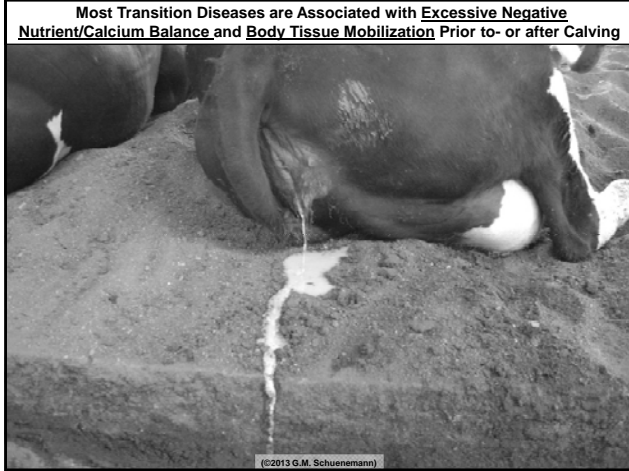
- Visual guide of calving management
- Calving supplies
- Abnormal postures or presentations
- Calving injuries
- ...

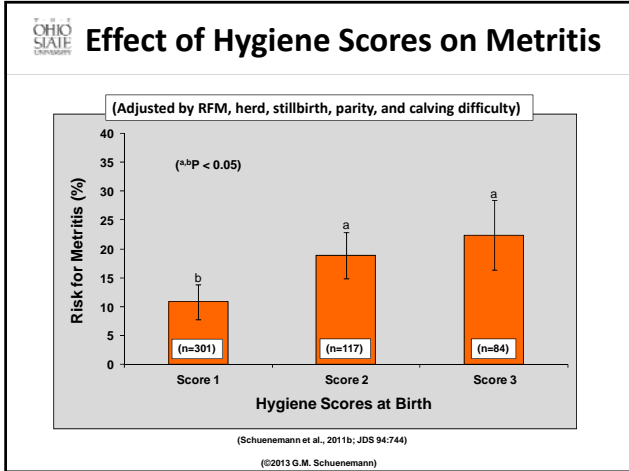
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Hygiene Practices

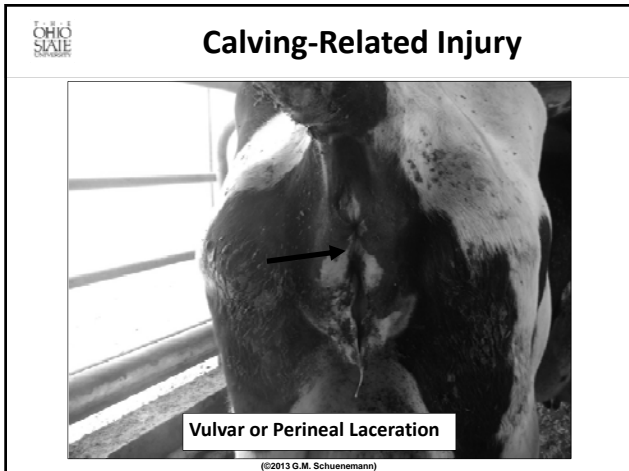
- Use clean, disposable, long sleeve gloves
- Wash the perineum with clean water and soap-disinfectant, repeat if cow defecates!
- Sanitize obstetric chains before and after each intervention or use

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- 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!
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- 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
-
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Degree of Assistance at Calving

Scale	Description of Dystocia ^(*)	References
1 to 3 scale	1 = no assistance 2 = slight assistance 3 = needed assistance	Meyer et al., 2001
1 to 5 scale	1 = no assistance 2 = assistance by one person without the use of mechanical traction 3 = assistance by 2 or more people 4 = assistance with mechanical traction 5 = surgical procedure	Dematawewa and Berger, 1997 Lombard et al., 2007 Schuenemann et al., 2011a
Combination of both	Description is based on calving difficulty	Mangurkar et al., 1984 Schuenemann et al., 2011a



(*)Description of scales used to determine the degree of dystocia according to the degree of assistance provided during parturition in Holstein herds.

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References

1. Barrier, A.C., M.J. Haskell, A.J. Macrae, and C.M. Dwyer. 2012. Parturition progress and behavior in dairy cows with calving difficulty. *Appl. Anim. Behav. Sci.* 139:209-217.
2. Boyle, A.R., C.P. Ferris, and N.E. O'Connell. 2013. Dose housing multiparous dairy cows with multiparous animals prior to calving influence welfare- and production-related parameters after calving? *Appl. Anim. Behav. Sci.* 143:1-8.
3. Dechamps, P., B. Nicks, B. Canart, M. Gielen, and I. Istasse. 1989. A note on resting behaviour of cows before and after calving in two different housing systems. *Appl. Anim. Behav. Sci.* 23:99-105.
4. Dematawewa, C.B.M., and P.J. Berger. 1997. Effect of dystocia on yield, fertility, and cow losses and an economic evaluation of dystocia scores for Holsteins. *J. Dairy Sci.* 80:754-761.
5. Gourhan, M.A., C.R. Curtis, H.N. Erb, R.D. Smith, C.J. Sniffen, L.E. Chase, and M.D. Cooper. 1990. Relationship of changes in condition score to cow health in Holsteins. *J. Dairy Sci.* 73:3132-3140.
6. Gundelach, Y., K. Essemeyer, M.K. Totscher, and M. Hoedemaker. 2009. Risk factors for perinatal mortality in dairy cattle: Cow and foetal factors, calving process. *Theriogenology* 71:903-909.
7. Hunter, A., M.G. Maguivar, S. Bai, J.D. Workman, and G.M. Schuenemann. 2013. Assessment of work shift transition of calving personnel on stillbirth in Holstein dairy cows. *J. Dairy Sci.* (Abstract).
8. Jensen M.B. 2011. The early behaviour of cow and calf in an individual calving pen. *Appl. Anim. Behav. Sci.* 134:92-99.
9. Jensen M.B. 2012. Behaviour around the time of calving in dairy cows. *Appl. Anim. Behav. Sci.* 139:195-202.
10. Johanson, J.M., and P.J. Berger. 2003. Birth weight as a predictor of calving ease and perinatal mortality in Holstein cattle. *J. Dairy Sci.* 86:3745-3755.
11. Killion, D.F., L.D. Utsemore, and R.E. Martin. 1998. Recommendations for recording and calculating the incidence of selected clinical diseases of dairy cattle. *J. Dairy Sci.* 81:2502-2509.
12. LeBlanc, S.J. 2008. Postpartum uterine disease and dairy herd reproductive performance: A review. *Vet. J.* 176:102-114.
13. Lombard, J.E., F.B. Curry, S.M. Tomlinson, and L.P. Garber. 2007. Impacts of dystocia on health and survival of dairy calves. *J. Dairy Sci.* 90:1751-1760.
14. Mangurkar, B.R., J.F. Hayes, and J.E. Moxley. 1984. Effects of calving ease-calf survival on production and reproduction in Holsteins. *J. Dairy Sci.* 67:1496-1509.
15. Mea, J.F. 2004. Managing the dairy cow at calving time. *Vet. Clin. North Am. Food Anim. Pract.* 20:521-546.
16. Mea, J.F. 2008. Prevalence and risk factors for dystocia in dairy cattle: A review. *Vet. J.* 176:93-101.
17. Meijering, A. 1984. Dystocia and stillbirths in cattle: A review of causes, relations and implications. *Livest. Prod. Sci.* 11:143.
18. Miedema, H.M., M.S. Cockram, C.M. Dwyer, and A.J. Macrae. 2011. Behavioural predictors of the start of normal and dystocic calving in dairy cows and heifers. *Appl. Anim. Behav. Sci.* 132:14-19.
19. Miedema, H.M., M.S. Cockram, C.M. Dwyer, and A.J. Macrae. 2011. Changes in the behaviour of dairy cows during the 24 h before normal calving compared with behaviour during late pregnancy. *Appl. Anim. Behav. Sci.* 131:8-14.
20. Meyer, C.L., P.J. Berger, K.J. Koehler, J.R. Thompson, and C.G. Sattler. 2001. Phenotypic trends in incidence of stillbirth for Holsteins in the United States. *J. Dairy Sci.* 84:515-523.
21. Noakes, D.E., T.J. Parkinson, and G.C.W. England. 2001. Dystocia and other disorders associated with parturition, 8th ed. *Arthur's Veterinary Reproduction and Obstetrics*, Saunders.
22. Proffendorf, L.L., M.B. Jensen, P.M.H. Heegaard, and M.A.G. von Keyserlingk. 2013. Effect of moving dairy cows at different stages of labor on behavior during parturition. *J. Dairy Sci.* 96:1638-1646.

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References

1. Reinhardt, T. A., J. D. Lippolis, B. J. McCluskey, J. 589, P. Goff, and R. L. Horst. 2011. Prevalence of subclinical hypocalcemia in dairy herds. *Vet. J.* 188:122-124.
2. Sheldon, I.M., J. Crozin, L. Goetze, G. Donofrio, and H.J. Schuberth. 2009. Defining postpartum uterine disease and the mechanisms of infection and immunity in the female reproductive tract in cattle. *Biol. Reprod.* 81:102F-103F.
3. Schuenemann, G.M., S. Bas, J. E. Gordon, and J. D. Workman. 2013. Dairy calving management: Description and assessment of a training program for dairy personnel. *J. Dairy Sci.* 96:2671-2680.
4. Schuenemann, G.M., I. Nieto, S. Bas, K.N. Galvão, and J. Workman. 2011a. Assessment of calving progress and reference times for obstetric intervention during dystocia in Holstein dairy cows. *J. Dairy Sci.* 94:5494-5501.
5. Schuenemann, G.M., I. Nieto, S. Bas, K.N. Galvão, and J. Workman. 2011b. II. Dairy calving management: Effect of perineal hygiene scores on metritis. *J. Dairy Sci.* Vol. 94:744 (E-Suppl. 3).
6. Schull G and Ball L. 1980. Delivery by forced extraction and other aspects of bovine obstetrics. In: *Current Therapy in Theriogenology*. 1st Ed. D.A. Morrow (Ed), W.B. Saunders Co. Philadelphia, p 251.
7. Steeneke, M., C. Bahr, D. Berckmans, I. Halaachni, A. Antler, and E. Maltz. 2012. Lying patterns of high producing healthy dairy cows after calving in commercial herds as affected by age, environmental conditions and production. *Appl. Anim. Behav. Sci.* 136:88-95.
8. USDA. 2010. Dairy 2007: Herd, Calf Health and Management Practices on U.S. Dairy Operations, 2007. USDA-APHIS-VS, CSAN, Fort Collins, CO.
9. The Center for Food Security and Public Health at Iowa State University. Link: http://www.cfsph.iastate.edu/Infection_Control/diseases/resources_for_veterinarians.php

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