

Calving Ease

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Variation in Body Temperature

You undoubtedly remember that calves are warm-blooded mammals. That means a calf's core body temperature does not depend on her environment. It remains relatively constant. For dairy calves the commonly accepted range is between 101.5 and 102 F.

Why body temperature is significant for health care

One of the causes of variation in calf body temperature is an infection. In the first stages of an infection a calf's temperature may not be much above her normal level. During this initial infective stage (for example, with a pneumonia pathogen *Mannheimia Haemolytica*) we often observe that the calf is depressed, off-feed, and has a higher than normal pulse rate (above 60/minute). However, once the pathogen multiplies and gets itself established the calf's temperature goes up – a fever. The pulse remains above normal, the calf's body becomes dry and hot, and the respiration rate goes up also. The longer the fever persists the more likely the calf is to be severely depressed and unable to stand.

With the most common calf hood infections, especially pneumonia, this rise in temperature happens relatively soon after the pathogen gets a secure foothold in the calf's body. This is why an accurate and timely diagnosis of illness depends partly on knowing her body temperature.

But, what besides illness can cause variations in body temperature?

First, how much variation should I expect from calf to calf among healthy calves? Between August 8 and 22, 2006 Stacie Shafer, an intern at Attica Veterinary Associates, collected body temperatures from sixteen calves housed in a barn (age range from sixteen to sixty days) and thirty-five calves housed in hutches with tethers (age range from three to seventy-six days). Every calf was assessed for health each of the four days her temperature was taken (see endnote for scoring system). Only data from calves that were rated healthy all four days were included in Stacie's summary.

We know from previous work that small changes take place in temperature every day. During sleep it tends to go down. Strenuous activity will raise it. Among dairy calves body temperature tends to go up throughout the day peaking in mid-afternoon. However, environmental conditions may change these trends. High summer-time outdoor temperatures tend to raise calf temperatures usually peaking around 5:00 to 6:00 PM. Thus, Stacie established the goal of collecting her temperatures between 8:30 and 9:30 AM. With only a few exceptions of half an hour she was successful in meeting this goal.

Body Temperature of Holstein Calves in selected housing, Ages 3 to 76 days, August 2006 Genesee and Wyoming Counties, New York

Housing Type	No. Calves	Mean Temp	Range for 68% of calves	Range for 95% of calves	Range for 99.7% of calves
Barn	16	101.6	Low = 101.4 High = 101.8	Low = 101.2 High = 102.0	Low = 101.0 High = 102.2
Hutches	35	101.7	Low = 101.4 High = 102.0	Low = 101.1 High = 102.3	Low = 100.8 High = 102.6

Looking at these numbers I conclude that it should be quite unusual for a healthy calf's temperature to fall outside the range of 101 and 102.5. Additional analysis showed that variations in temperature among calves were not associated with age of the calf.

When we looked at variation from day-to-day (every calf had her temperature taken four times over a week) the median variation was 0.9°. One-half of the calves had less than 0.2° variations over the four observations. The overall message is that calf body temperatures when taken at the same time of day assuming consistent weather are quite uniform.

What does this tell me that is useful in diagnosing a sick calf?

1. Do a good job taking the temperature. With an electronic unit, especially those that have an audible or visual signal, leave the probe in place until the unit signals a stable reading. With an alcohol column glass thermometer clinical experience suggests at least two minutes of contact time. If in doubt, read the thermometer, place it back in the calf for another 30 to 45 seconds and see if it has changed.
2. Remember that a fever (usually defined at least above 103, often above 103.5) is just one indicator of illness. The calf needs to be examined carefully for additional symptoms in order to arrive at a diagnosis.
3. Remember that a normal temperature does not mean a calf is not ill. Some illnesses do not cause a measurable rise in body temperature. Others cause a spike early in the infection followed by a drop in temperature.
4. Take time to talk about diagnosing calf hood illnesses with your herd veterinarian. Ask specifically about how to use temperature as one indicator of health or illness.

Endnote: The preweaned calf health checklist included (1)activity level, (2)dehydration, (3)nasal discharge, (4)scours symptoms, and (5)respiration rate and volume scored on a three-point scale (1 = worst, 3 = best) with all calves failing to score less than 3 on every item excluded from analysis.

References: http://www.vetmed.ucdavis.edu/vetext/INF-BE_cca/INF-BE_cca01/INF-BE_cca0102.htm,
<http://www.cvmbs.colostate.edu/ilm/proinfo/calving/notes/monitoring.htm> ,
<http://www.exacon.com/Global/Global22/Global22FR2.html> . All accessed on 7/22/06.

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