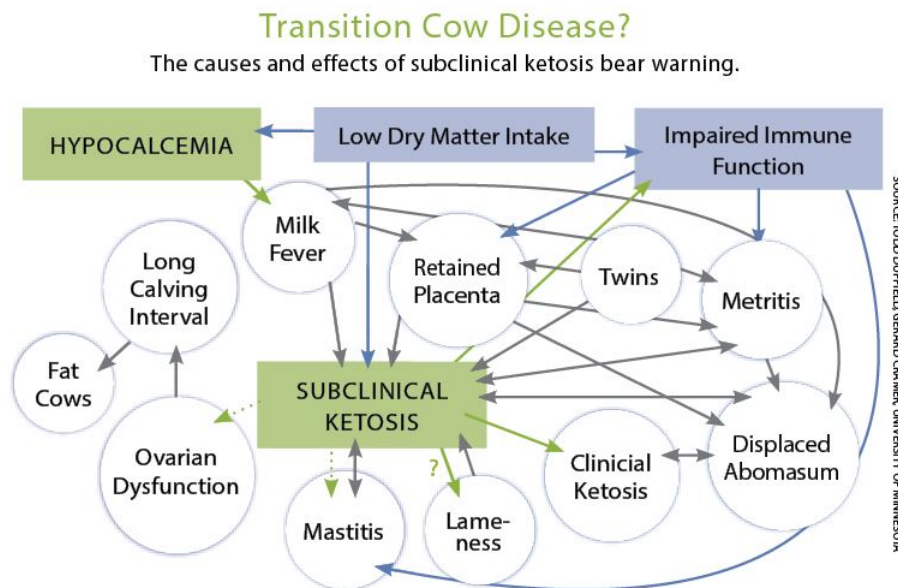


KETOSIS: A STRONG INDICATOR OF POOR TRANSITION

Ketosis typically occurs in dairy cows in early lactation and is most consistently characterized by decreased appetite and reduced milk production. Ketosis occurs in cows of all parities, but the risk increases with increasing parity. Historically, ketosis was thought not to have a genetic predisposition other than being associated with dairy breeds; however, specific genetic markers have been associated with ketosis risk, suggesting moderate heritability. Cows with excessive fat stores (body condition score ≥ 3.75 on 5-point scale) at calving are at a greater risk of ketosis than those with lower body condition scores. The development of ketosis is complicated and not completely understood.

Ketosis is an elevated concentration of ketone bodies (acetone, acetoacetate, beta-hydroxybutyrate) in all body fluids. Key clinical signs of ketosis are vague but include anorexia, decreased milk production, noticeable loss of body condition, firm dry feces, and, occasionally, neurologic signs (nervous ketosis). Ketosis, however, may be subclinical (or go unrecognized). Cows with ketosis can be identified via routine testing using appropriate cowside blood, milk, or urine tests.

A lot of producers only focus on the clinical cases of ketosis - those cows you only test for ketosis because they look a little off or something is noticeably wrong with them. Subclinical cases, however, can be more costly for your dairy than clinical cases. If you look at the diagram below, you'll see that subclinical ketosis can have many negative effects on a cow.



Why Should I Care About Ketosis?

Ketosis can be quite costly. Reductions in milk production in ketotic cows commonly range between 3% and 7%. A recent study at Cornell estimated an average cost of \$400 per incidence of subclinical ketosis. Along with production losses, affected cows are 3 to 19 times at a greater risk for a displaced abomasum. They also have three times the likelihood compared to unaffected cows of being culled in the first 30 days after calving. In addition, ketotic cows are between 20% and 70% less likely to conceive than unaffected ones at first breeding. Synchronization programs, however, can help reduce this gap in first service conception rate.

Given that ketosis is a costly disease and that treatment is beneficial, on-farm monitoring programs are cost-effective for most farms. Ketosis monitoring programs can help identify individual cows that need treatment as well as evaluate the prevalence of ketosis on your farm to determine the need for prevention strategies at the herd level. Sudden or prolonged elevation in herd prevalence of ketosis indicates a herd-level problem and should prompt a review of nutritional and cow management.

What Can I Do to Examine Ketosis on my Farm?

Monitor your fresh cows! Test fresh cows for ketosis between 5 and 30 DIM. We recommend testing each cow twice, one week apart. If normal both times, do not test her again. There are several different ways to test individual cows for ketosis:

- **Blood ketone tests** - this is the most preferable way to monitor ketones in cows. There are several different monitors that will test for blood ketones. A few of them are: Precision Xtra Freestyle, eBGK-VET and BHBCheck.
- **Milk tests** - these are less accurate than the blood ketone tests in that they do not give you firm numbers to work with. But they are still very useful if you do not feel comfortable trying to collect blood from a cow for the blood test. An example of this type of cowside test would be KetoTest strips.
 - **KetoScreen** (Lactanet) - Lactanet can test the milk collected during DHI sampling to test for ketosis. Although they give you results for each test as well as monitoring for herd trends, DHI testing is routinely done only every six weeks or more. So you will miss the critical time period of testing (between 5 - 15 DIM) for a lot of cows. Thus, we recommend this more for monitoring herd trends than for individual cows.
- **Urine tests** - these are also less preferable than the blood tests, but a good tool to use if you do not feel comfortable with the blood test. The tricky part with this test is that you either have to catch the cow urinating or try to get her to urinate, which may or may not work. An example of this test is KetoStix.

To monitor your farm on a herd level for ketosis, look at your milk components (fat and protein) or use Lactanet's KetoScreen. Cows with ketosis have a higher milk fat and lower milk protein. Milk fat to protein ratios greater than or equal to 1.4 are suggestive of ketosis. At this time, milk fat to protein ratios should be used to see if the herd has a problem.

What Do I Do with These Results?

Test Method	Normal	SubClinical Ketosis	Severe Ketosis
Blood	<1.2 mmol/L	1.2-2.9 mmol/L	>3.0 mmol/L
Milk	Normal (0-99 µmol/L) Weak Positive (100-199 µmol/L)	Positive (200-499 µmol/L)	Highly Positive (>500 µmol/L)
Urine	Negative (0 mg/dL) Trace (5 mg/dL)	Small (15 mg/dL) Moderate (40 mg/dL)	Large (>80 mg/dL)

If you have a cow with subclinical ketosis, treat with:

- **300 ml propylene glycol** - give orally once a day for 5 days

If you have a cow with severe ketosis, treat with:

- **300 ml propylene glycol** - give orally once a day for 5 days
- **10-20 ml Vitamaster (Multi-Vitamin) - or - 2 ml Vitamin B12** - give intramuscularly once daily for 5 days
- *NOTE* - there are mixed results in research for the use of insulin in treating severe cases. If you test for blood glucose with these cases and have a result of <2.1 mmol/L, you can give 500 ml 50% Dextrose IV once followed by 2 cc insulin under the skin, also just given once.

If your herd has a high rate of incidence of ketosis (>20%), consult your herd veterinarian to investigate the potential causes of this.