

Subclinical Ketosis Has Hidden Costs

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Ketosis is underrecognized on most farms. It has two forms; clinical (observed) and subclinical (unobserved). However, regardless of category, excess concentrations of ketones (also called hyperketonemia) in early lactation hurts cow health, milk production, and breeding.

Subclinical ketosis is created by an excessive demand for nutrients by the mammary gland to produce high quantities of milk, coupled with an inadequate feed intake to meet that demand. This situation creates a negative energy balance, and the cow responds by mobilizing body fat stores (nonesterified fatty acids or NEFAs). These NEFAs are transported to the liver where they are either used for energy, converted to ketones (beta-hydroxybutyrate, acetoacetate, acetone), or stored in the liver as fat (fatty liver). The process itself is a normal part of early lactation cow physiology. However, cows that have a poor adaptive response to negative energy balance have excess ketone production, excess fat storage in the liver, or both. These are the cows with subclinical ketosis.

The primary risk period for subclinical ketosis is the first two weeks of lactation. Occasionally, herds will have subclinical ketosis issues beyond this time period, but this is not common. There are several tests available to detect subclinical ketosis in either blood, milk, or urine. The gold standard is serum or blood beta-hydroxybutyrate (BHBA) measured at a laboratory.

Early studies from prior to and including 1995 using the gold standard test (lab - BHBA) reported incidence rates approaching 40 percent when measured during the first two months of lactation. More recently, a study conducted across North America in Ontario, New York, Minnesota, California, and Georgia showed the average herd incidence of subclinical ketosis for the first three weeks of lactation was 32 percent with ranges from 3 to 80 percent. This more recent data confirms that subclinical ketosis still is a common problem on most farms.

Several studies have now been conducted that illustrate the costs of subclinical ketosis. Cows with subclinical ketosis in early lactation are at greater risk of developing

displaced abomasum, metritis, clinical ketosis, and mastitis. Those cows produce significantly less milk at first DHI milk test (reductions of 2 to 7 pounds per day), and cows that had subclinical ketosis during the week after calving produced 660 pounds less milk for the full lactation.

Using recent estimates, an average herd of 100 cows would have a 30 percent incidence of subclinical ketosis, and this would cost the farm \$16,425 annually.

Cows with subclinical ketosis also have been shown to have a 40 percent reduction in the first service conception rate and are more likely to be culled during early lactation. Taken together, these costs are substantial. Using recent estimates, an average herd of 100 cows would have a 30 percent incidence of subclinical ketosis, and this would cost the farm \$16,425 annually.

All risk factors for subclinical ketosis relate back to the basic cause . . . dry matter intake and milk production potential. Cows or heifers with greater milk production potential are at a greater risk of subclinical ketosis. Therefore, older cows tend to be at higher risk than first-calf heifers.

Overconditioned cows tend to eat less. Therefore, cows with higher body condition scores before calving (especially above 3.5) are at a much higher risk. The same is true for first-calf heifers.

Herd risk factors include anything that could limit dry matter intake such as overcrowding, frequent mixing of transition cows, too few or too many transition diets, heat stress, limited bunk space, and so forth.

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