

# Bovine Mastitis

A PowerPage Presented By



Mastitis is defined as inflammation of the mammary gland and is most frequently caused by bacteria or mycoplasma. Mastitis is a very common problem for dairy farmers, and you should expect several questions on bovine mastitis on a board exam. This PowerPage reviews ways to detect and control mastitis and discusses the common contagious and environmental pathogens causing mastitis.

## Detection of Mastitis

With subclinical mastitis, the most common form, the infection and associated inflammatory process do not result in visible abnormalities in the milk; however, milk production is reduced and milk composition is altered.

With clinical mastitis, milk from the affected quarter is visibly abnormal, the gland may appear inflamed, there is a drop in milk production, and the cow may exhibit signs of systemic illness.

### Detection of Subclinical Mastitis

- Somatic cell count (SCC): A milk SCC of > 100,000 cells/ml is consistent with inflammation, but the threshold for determining that the quarter is infected is at or near 200,000 cells/ml
- California Mastitis Test (CMT): 2 to 3 ml of milk from each quarter is stripped into a paddle with 4 compartments. The CMT reagent is added to lyse the cells and cause gelling of the mixture. The degree of gelling is graded 0 to 3 and corresponds roughly to the number of cells present. A zero score indicates fewer than 200,000 cells/ml
- Electrical conductivity: With mastitis, there is an increase in sodium and chloride and a decrease in potassium concentration in the milk, resulting in an increase in electrical conductivity. This can be measured automatically while the cow is being milked, which results in early detection and treatment

### Detection of Clinical Mastitis

- With mild clinical mastitis, the milk is abnormal in viscosity, color, or consistency (flakes, clots)
  - Abnormal milk can be seen at each milking when milk is stripped onto the floor or onto a black surface called a strip plate
- With moderate clinical mastitis, the milk is similarly abnormal but gland is swollen, firm, red and painful. Milk production is decreased
- With severe clinical mastitis, the changes in milk and gland described above are seen, and the cow is systemically ill
- Milkers should routinely check every cow, and cows with clinical mastitis should be examined and treated promptly. Once infection is eliminated, SCC usually returns to normal within 2 weeks

## Contagious Mastitis

### Pathogens

- *Streptococcus agalactiae* and *Staphylococcus aureus* are the major contagious mastitis pathogens
  - Cause persistently elevated SCC and reduced milk yield
  - Primary reservoir is the infected mammary gland
  - Transmission occurs during milking
  - Fomites include the teat cups of the machine, milker's hands, and towels
- *Corynebacterium bovis* is a minor contagious pathogen with a lesser impact

- *Mycoplasma* sp. are carried in sites other than the mammary gland, but once they gain access to the mammary gland they become highly contagious

### Detection

- Bacteria are detected by culture of milk samples

### Control

- Routine use of post-milking teat dipping with a germicidal solution, usually iodine-based, helps prevent new infections
- Treating all dry cows with an intramammary antimicrobial product effectively controls existing infections with *S. agalactiae* and *C. bovis*
- *Staphylococcus aureus* and *Mycoplasma* are more difficult to eradicate, and animals infected with these pathogens are often culled. In some cases, cows with *Staphylococcus aureus* infection are treated and recultured, and cases still positive are culled
- Additional steps to help control contagious pathogens include:
  - Milkers wearing rubber gloves
  - A backflush system on the milking cluster
  - Heifers can be milked before cows to prevent heifers from becoming infected
  - In some cases, *S. aureus*-positive cows can be segregated into a separate string and milked last

## Environmental Mastitis

### Pathogens

The reservoir for these pathogens is the environment. Sources of infection include bedding, fecal material, soil, and contaminated water. The pathogens include coliforms and environmental streptococci (*S. uberis*, *S. dysgalactiae*, etc). Coliforms can be most severe and may result in death.

- Coagulase-negative Staph (*S. hyicus*, *epidermidis*, etc) can be either contagious or environmental pathogens
  - They are the most prevalent bacteria isolated from the milk of cows and heifers
- Other mastitis pathogens include *Arcanobacterium pyogenes*, *Prototheca*, yeasts, *Pseudomonas*, *Serratia*, *Nocardia*, *Mycobacterium*, and *Pasteurella*

### Control

- Frequent manure removal
- Using appropriate free stalls and managing the bedding
- Providing pastured cows with clean locations to lie down
  - Sand is a preferred bedding material
  - Wood products are to be avoided as they predispose to *Klebsiella* mastitis
- Pre-dipping teats and having clean dry udders at milking are important

Dry cows are often infected, so maintaining clean bedding areas for the herd must include the dry cows. Dry cow treatment with intramammary antimicrobials and a teat sealant are also useful.

