



# Prevent Mastitis with Proper Milking Technique

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Proper management of cows during and between milkings is required if you want the maximum production from each of your cows. Veterinarians, feed sales individuals and individuals involved in sales of dairy equipment will comment that "proper milking technique" is important. This circular will discuss the steps needed for proper milking technique and explain why the steps are an important component of a mastitis control program. Each step is necessary, to reduce spread of mastitis-causing organisms and improve milk quality. Each step when carried out correctly, serves to reduce or minimize spread of mastitis causing bacteria from cow to cow, from cow to milker and milker to cow, and from cow to environment and environment to cow.

Mastitis is an inflammation of the mammary gland. Usually it is caused by bacteria which have penetrated the udder. These bacteria enter the udder through the teat end. They do not go from quarter to quarter without going out of the opening of one teat and into the opening of another. Proper milking procedures during each and every milking help to reduce transfer of bacteria to cows.

Bacteria responsible for mastitis can be placed in one of two groups. Bacteria which are spread from cow to cow during milking are responsible for contagious mastitis. *Staphylococcus aureus* (*S. aureus*) and *Streptococcus agalactiae* (*S. agalactiae*) are the two major contagious mastitis-causing bacteria infecting North Dakota dairy cows. Clinical mastitis caused by *S. aureus* or *S. agalactiae* usually is chronic and reoccurs frequently unless bacteria are eliminated.

**The war against these bacteria must be fought with proper milking procedures.** Each step involved in proper milking procedures must occur daily for each cow in the milk herd. There are no exceptions for best protection against mastitis. The technologies to eradicate mastitis caused by *S. aureus* and *S. agalactiae* have been available for more than 20 years, yet these destructive organisms still ruin thousands of cows annually.

## Handling Cows

**Move cows in a gentle manner.** For maximum production cows should have minimum stress. Stress reduces the milk letdown process. Handle cows calmly.

## Sanitation

**Prepare udders prior to attachment of the milk machine.** Clean and sanitize teats. Washing each teat aids in milk letdown and removes mud, dirt, manure, and other foreign objects on the skin of the udder if a towel is used. To wash udders, use a different towel for each cow. Drying off udders requires individual towels. Clean warm water, tap water or water with disinfectant may be used. If wash water is kept in a bucket be sure to replace it often. Milk and other contaminants from the milker's hand can contaminate the water used for rinsing udders. Use of one wash bucket is a common way to spread bacteria from cow to cow. Be sure that any sanitizer used for udder preparation is meant for that purpose. Do not use milk line sanitizer for an udder wash.

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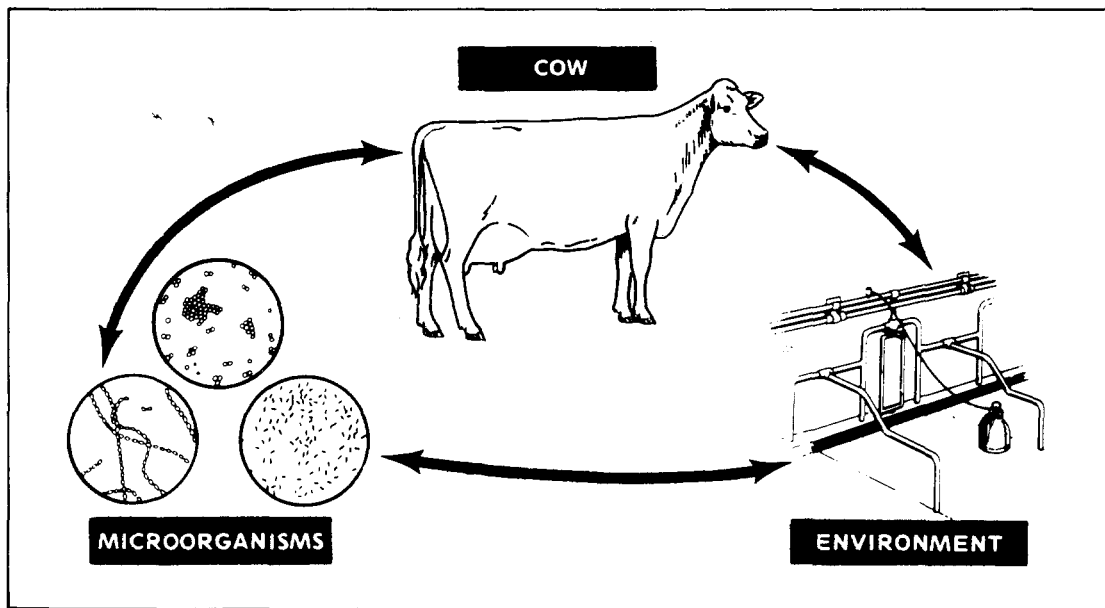


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The interrelationship of the three major factors involved in bovine mastitis: the cow, microorganisms and environment.

Many producers choose to use paper towels and dispose of each towel after it has been used on only one cow. Other producers use individual rags. Under no circumstances should a sponge or common rag be used to clean udders. A common rag is one rag used for all the cows at the same milking. Sponges and common rags can be responsible for spread of mastitis-causing organisms from one cow to another. Care must be taken if individual cloth rags are used. It is extremely important that these rags are sanitized between milkings and stored completely dry. Rags that are not sanitized completely or that are stored damp can provide an excellent environment for bacteria to grow in.

**Pre-strip each teat of each cow before each milking.** *Just because you don't look for clinical mastitis doesn't mean your cows don't have a problem with clinical mastitis.* As you remove the first few squirts of milk from the teats visually inspect the milk. If milk has flakes or clots in it, check further for additional signs of clinical mastitis. You may wish to use a black or metal strip cup to help identify abnormal milk. If a strip cup is used be sure it is washed off before and after it is used. Also, pay careful attention that the milker's hands are cleaned and dried after using a strip cup and before touching another animal. Milk from a cow with clinical mastitis may be crawling with bacteria. Allow minimal spraying of milk as it hits the strip cup. Bacteria in milk from cows infected with clinical mastitis are capable of infecting other cows. Special efforts should be made to clean anything that contaminated milk touched. Pre-stripping of each quarter also serves as another physical form of stimulation for milk letdown.

**Attach claw to clean, dry teats.** Milking machines were developed to stay securely on a dry udder. One way to demonstrate if moisture remains on an udder is to shine a flashlight on the udder. Moisture will be quite noticeable. When a machine is attached to a wet udder, liner-slips, squawking, and cluster fall-off occur far more frequently than when a machine is attached to a dry udder.

Squawking of liners and liner-slip are associated to some extent with cross quarter contamination. Cross quarter contamination occurs as bacteria from one quarter are forced into an opposite quarter during milking.

Another reason to dry teats before attaching the milking unit is to prevent contamination of milk. Any remaining water on the udder will automatically drip toward the teat end. Such water acts as a freeway for any bacteria on the outside of the udder to enter the milk line and subsequently the bulk tank when the claw is attached.

**Do not use excessive vacuum.** Stop teat end vacuum before removing the claw. By doing this less force is needed to remove a claw. This should help to minimize cross quarter contamination. Also, it will minimize adverse actions on the teat end. Be cautious not to overmilk cows. Overmilking of cows increases labor costs, slows the milking operation, and may cause udder irritations. Good milking management prevents overmilking. Overmilking can occur when inadequate stimulation precedes claw attachment. Never operate more milking units than you can handle. This number can range from three to 20 depending on the type of facility, degree of automation, and responsibilities of the milker.

**Dip teats immediately after the teat cups have been removed.** Dip all teats in an effective teat dip after every milking. Do not wait for all cows to complete milking before teats are dipped. Results from research trials indicate 50 percent reduction of new infections during lactation when teats are dipped in an effective dip after milking. Teat dips are most effective against *S. aureus* and *S. agalactiae* bacteria. Although many compounds are available commercially, chlorhexidine (0.5 percent), iodine (0.5 and 1 percent), and hypochlorite (4 percent) effectively reduce infection under controlled conditions. For iodine compounds to be effective they must be low in phosphoric acid. If hypochlorite is used be sure there is less than 0.05 percent sodium hydroxide (NaOH) to minimize the incidence of chapping and teat irritation.

If a dip with lanolin or glycerin is preferred by the person involved with the milking process, purchase a premixed dip. Under no circumstances should lanolin, glycerin, or any other mixture be added to teat dip. Addition of a chemical can bind the important components of a teat dip and render the dip less effective. Furthermore, there is a greater possibility of contaminating the teat dip by adding something to it. Commercially prepared dips with emollients usually have additional levels of the active ingredient to make up for the amount of that ingredient that will be unavailable due to the emollient.

If cattle are exposed to harsh winter conditions, continue dipping teats after each milking. Allow the dip to be in contact with the teat for one minute before drying the teats completely. Use of individual towels is important. Do not use a towel for more than one procedure on more than one cow during any given milking. If necessary, use additional towels to ensure that udders are dry. Chapping and burning from cold exposure happens to teats with any amount of moisture coming in contact with cold air and wind. If teats are not dipped and moisture is on the teats, they will chap when exposed to extreme cold temperatures. The key management practice during cold temperatures is to be sure udders are dry before exposing cows to the cold climate.

**Wear latex gloves and wash hands often during each milking.** Contagious pathogens can be transferred from cow to cow by milk droplets on the milker's hands. The surface of a latex glove is far less porous than skin and has fewer places for milk droplets and bacteria to hide in. Rinse gloves in a disinfectant solution between cows. Be sure that only gloved hands touch cows. Pay careful attention to cleanliness. Many milkers have problems with wearing gloves and chose to rinse hands between cows. If that is your preference, don't dry your hands on the sides of your coveralls. Clothes act as an excellent hiding place for bacteria.

## Detection of Clinical Mastitis

**Appropriate treatment of cows with clinical mastitis during lactation.** When a cow has clinical mastitis you may chose to treat her with an antibiotic. Consult your veterinarian before using a product. **Before infusing anything into a cow's udder, be absolutely positive that the product is intended for use in a lactating cow,** and that it is intended for use via the method you plan to use. **If you plan to infuse an antibiotic into the udder of a cow, be sure the product is approved for use as an intramammary treatment in lactating dairy cows. If it is not approved for use in that method, DON'T USE IT.** Read the package insert and follow all directions. If you don't follow directions you may do more harm to the cow. Clean and sanitize the teat end before infusing products. Avoid possible contamination by infusing only pharmaceutically prepared single service doses. Infuse an entire dose at a time. Do not save part of an infusion for future use. Do not infuse a product from a vial that has multiple doses. It is possible for bacteria to be introduced into such vials, and when the drug is infused into the udder, so are the bacteria.

The type of bacteria responsible for the mastitis will determine if the cow will respond to antibiotic treatment. If a cow does not respond to treatment, additional alternatives exist. Consult your veterinarian to determine which alternative is best for that particular cow.

**Treat each quarter of each cow at the end of each lactation with dry cow treatment.** Read all product labels prior to use. Pay careful attention to appropriate withdrawal periods for all medications used. Sanitation of the teat end is important prior to infusion. Care must be taken to scrub and clean the teat end with cotton and alcohol before infusing the dry cow treatment. After infusing the product, dip teats. Dry cow treatment is most effective against pathogens responsible for contagious mastitis and least effective against those pathogens harbored in the environment.

Unsanitary treatment procedures for lactation therapy or dry cow treatment can increase rather than decrease occurrence of mastitis.

**Milk cows in order.** Since bacteria can be spread from one cow to the next during a milking, milk uncontaminated cows first. This usually means to milk heifers and fresh (early lactation) cows first, older healthy (non clinical and low somatic cell count) cows next, followed by cows with high somatic cell counts and/or clinical signs of mastitis. You may wish to use individual cow somatic cell counts to determine milking order. Many producers claim they milk their cows in one group and can't afford to train the cows to milk in a particular order. The truth is if your cows have a mastitis problem you can't afford not to milk cows in order.

## Additional Components of Mastitis Prevention

**Maintain milking equipment.** Improperly functioning milking equipment has been associated with severity of mastitis within a herd. Liners should not be overused. Replace liners based on the manufacturer's recommendations. Cracked liners are more difficult to clean (generally harbor bacteria) and function incorrectly. Pulsators should be cleaned and evaluated frequently. If feed is fed around milking equipment it is especially important to clean pulsators on a monthly basis. Once each year you should have the pulsators and regulator evaluated to be sure the milking system is functioning properly. Vacuum levels should be between 11 and 15 inches of mercury, depending on the type of system, number of units on a single slope, and vacuum loss within the system.

**Maintain clean housing areas.** Non-contagious bacteria responsible for mastitis infections usually are harbored in the environment. It is critical to minimize exposure of cows to environmental bacteria. Again, these bacteria can infect a cow and cause mastitis. Such infections respond poorly to approved antibiotic treatment. It is best to provide cows with a clean dry environment and minimize their exposure to mud, manure, and dirty bedding.

## Other Management Practices

**Effectiveness of back flushing or sanitizing clusters between cows.** Laboratory studies conducted to investigate effectiveness of washing clusters have had varied results. Back flushing can be effective against *Mycoplasma* organisms, reducing the spread of *Mycoplasma* from cow to cow during milking. Back flushing has reduced the number of non-*Mycoplasma* organisms, but it is virtually impossible to eliminate non-*Mycoplasma* organisms under most farm conditions. Water would need to circulate through a cluster at 165 degrees Fahrenheit for three minutes or at 185 F

for five seconds to remove most organisms. In herds where teat dip and individual towels were used, pasteurization of inflations only reduced new infections slightly. Many producers may have a false sense of security by rinsing clusters between cows. If clusters are rinsed, it is important to remove excess water from the teat cup liners prior to attachment to the next cow.

Cleanliness of the outside of the milk claw is recommended. Maintain milk equipment free from debris and manure. Do not use excessive amounts of water to clean equipment during the milking process. Excess quantities of water on a cow serve as a means by which bacteria can be transported from one part of the animal to the udder.

**Pre-dipping.** The purpose of pre-dipping is to reduce infections caused by environmental bacteria. These bacteria come into the parlor affixed to the teats. It is important to minimize infection caused by environmental bacteria as they do not respond well to approved antibiotic therapy. Pre-dipping teats has been effective to reduce the number of new infections caused by environmental (non-contagious) bacteria. If environmental bacteria are not the cause of the infections in a herd, use of pre-dipping will not be very effective. Pre-dipping may be more effective during specific times of the year. For instance, if mastitis outbreaks are common during rainy seasons or other times when the cow lots are untidy, pre-dipping may be effective.

## Conclusion

Attention to udder care at each and every milking is an essential ingredient for production of quality milk. It is critical to reduce spread of mastitis causing bacteria from cow to cow. It is important to minimize possible reservoirs for bacteria in and around the barn yard. This will minimize potential contamination from environment to cow. It only takes a few seconds per cow per milking to eventually eradicate mastitis caused by *S. aureus* and *S. agalactiae*.

## Helping You Put Knowledge To Work