

**Animal Health  
Fact Sheet**

# STAPH MASTITIS: HERD CONTROL PROGRAM

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July 1997

AH/Dairy/03

Mastitis caused by *Staphylococcus aureus* is a major problem for some dairy herds. It causes high Somatic Cell Counts (SCC), reduces milk quality, and may cause a loss of milk market. It limits milk production for the herd, reduces efficiency, and continues to spread to other cows.

Most herds have some Staph infected cows. But the Staph infection tends to spread and become much worse with poor milking-preparation procedures, frozen teats, severe malfunction of the milking machine, and deficiency of vitamin E or selenium. It is probably not possible to eradicate this organism from a herd, but it is extremely important to keep it under control.

Staph is the most common form of contagious mastitis. The reservoir of infection is the udder of infected cows, and the organism is spread from infected to clean cows, primarily during milking preparation and the milking process. It is easily carried on hands or equipment from one udder to another. Cows infected with Staph are often not evident and special testing is needed to identify them. Not all will have a high SCC (30% may be below 300,000).

There is great variation from herd to herd in the severity of mastitis, response to treatment, and benefit of vaccination.

## TEMPORARY VS CHRONIC INFECTION

About two-thirds of the cows which are initially infected will be able to rid themselves of the infection. However, if there is a herd problem, they may later become reinfected again.

The major problem with Staph is that some cows become chronically infected. Very small (micro) abscesses are formed in the glandular tissue, and this results in periodic shedding of bacteria, which can then infect other cows. It also causes scar tissue formation, which results in decreased milk production.

Staph infections usually occur during milking, when organisms penetrate the teat canal. Irregular vacuum fluctuations, caused by liner slips, flooded lines, etc., may cause a backflow of milk against the teat end, with sufficient force to impact any bacteria (from contaminated liners, dirty or wet teats, everted teat ends) deeply into the teat canal and into the teat cistern. Or, if a drop of infected milk is left on the teat end (without post-milking teat dipping), the bacteria may multiply and enter the teat canal. Lesions and damage to the teat provide sites for the bacteria to become established, and prevent them from being flushed out of the teat.

## IS STAPH A HERD PROBLEM?

1. Identify 6-10 cows with high SCC, either from the DHI report or by using the CMT test on individual cows.
2. Take milk samples from these cows for culture, especially for Staph. aureus. Individual quarter samples from affected quarters are the best samples, but a composite sample from all four quarters is acceptable.
3. If over 50% of the samples yield Staph, then it should be considered a herd problem.

## CONTROL OF STAPH

Several procedures are listed for use in control of Staph. Some of these are essential and must be done, while others are important and helpful, but not essential. They are listed under those headings below.

### A. Essential

1. Don't use ANY common sponges or rags for teat preparation for milking. Use only "single service" towels—paper or cloth.
2. Milking prep procedure: wear Nitrile or latex gloves and wash (disinfect) them often, especially after milking an infected cow. Forestrip and observe for abnormal milk (If the teats are really dirty, wash with a small stream of water, dry and then forestrip.) Predip (or spray from bottom with sanitizing teat dip), rub each teat; grasp teat between the thumb and index finger and rub vigorously down and back up, twice; rub across and back on the very end of the teat. Re-dip each teat, and after 15-30 seconds, wipe the teats dry, using the same motions with the towel that were used previously. Attach milker unit.
3. Minimize conditions that are associated with high impact force against the teat end, including liner slips, temporary vacuum losses, low vacuum reserve, inefficient vacuum regulation, and abrupt removal of milking unit. Shut off the vacuum before removing teat cups.
4. Dip teats, post milking, with a **germicidal** teat dip that has been shown to be effective against *Staph. aureus*. Keep all teat dip cups clean; dirty (contaminated) ones provide an easy means of Staph spread. If the cups can't be kept clean, it may be better to change to a spray bottle system, but most people do a poor job of teat coverage with these.
5. Clean the outside surfaces of the claws and CIP units. Provide good drainage, so they don't remain wet between milkings.
6. Regular preventive maintenance of milking equipment is essential. Clean vacuum controller (regulator), pulsators, and air filters monthly. Replace rubber parts that are cracked, flattened, or deteriorated. Replace teat cup liners on their designated schedule. Replace milk tubes when they begin to deteriorate and especially whenever they develop cracks/holes in them. Narrow bore liners tend to have fewer slips. Avoid excessively high vacuum levels.
7. Identify infected (or likely infected) cows and cull them to slaughter as soon as their milk flow drops below an economic level. DON'T keep them for another lactation.
8. Prevent teat damage due to freezing or harsh chemicals.
9. Maintain freestalls and housing so udders are clean. If open corrals are used, establish mounds and provide daily harrowing of the corral.
10. Separate all Staph infected cows into a separate corral and milk them last, or use a backflush system. Separation is helpful, even if only the majority of chronically infected cows are identified. The problem is identifying those which are actually

infected. The whole herd can be tested with the "ProStaph" test or by culture, but both will miss some cows that are infected. Both tests may also cause some cows to be separated which were only temporarily infected. A practical way to separate chronically infected cows is to identify cows with persistently high SCC, and then palpate the udders of these cows AFTER milkout. The idea is to identify those with scar tissue formation, and usually these will be the chronically infected Staph cows. They are the most likely to be shedders of the Staph organism, and it is certainly better if they are milked last. The milking order is: non-infected, first lactation cows; non-infected, older cows; fresh cows; infected cows; and finally treated cows. Even a manual, back-rinsing of the teat cups (with warm, not hot water) will be of some help, but an automatic system with rinse and sanitizer is much better.

## **B. Important and Helpful**

1. Consider early dry off for infected cows that are within 90–120 days of calving. Dry treat these cows.
2. Use claw designs which prevent mixing of milk in the claw to avoid reverse teat impacts.
3. Supplement vitamin E and selenium. Both of these antioxidants help protect the cow's body from damage caused by oxidation processes.
4. Flame or clip udders to remove long hair and aid in keeping them clean.
5. Vaccines have been helpful in some herds and not in others. Two vaccines are currently approved (LYSIGIN - BioCeutic and STAPHOID A-B - Cooper's Animal Health), and other products are being developed. There are some anaphylactic reactions with these products, so be prepared for those.

## **INFECTED HEIFERS**

Some areas of the U.S. are having high rates of Staph infection in their newly freshened heifers. The primary means of spread that has been identified so far, is flies. As the flies feed on infected milk and then roost on the teat ends, they transmit the bacteria to the calves. There is no indication of infection until after the heifers freshen.

Do NOT feed milk to calves in groups. They will nurse on each other and spread Staph infection from the milk, via their mouth to the udders of other heifers. Wean calves from milk for two weeks before grouping them together. It would be safest to avoid feeding mastitis milk to heifers, or to pasteurize it first.

Be cautious when buying cattle, even heifers. They may put your entire herd at risk. There is tremendous risk of bringing in Staph infection when purchasing older cows. Reviewing the DHI SCC may be of some help, but is certainly not foolproof. Any cows should be kept separate from the resident herd for 2–3 months after purchase and observed for SCC and any evidence of mastitis.

## **TREATMENT**

Early treatment is more likely to be of benefit, and that is one reason for forestripping and observing the milk, so cows with mastitis can be identified and treated. Antibiotic sensitivity testing on positive Staph cultures may help guide in selection of drugs. Those usually most effective are: cephalosporin, erythromycin, novobiacin + penicillin, cloxacillin, amoxicillin, and hetacin K. There is little value in treating chronic, recurrent cases.

## MONITORING HERD PROGRESS

It usually requires 6–24 months of concerted effort to get a Staph problem under control. It is important to check periodically to be sure that progress is being made, or to find problems that have developed. The universal complaint of dairymen who have dealt with Staph (and finally gotten it under control) is that they did not approach it aggressively enough, initially. Once they really applied a program, they were successful with progress and improved production.

Watch cows that have had low individual SCC's. If they stay low, the program is working. If some rise, Staph is still a problem. It is usually expected there will be a 9% decline in milk production per month of lactation. Recently infected Staph cows will usually have a jump in SCC and a more rapid drop in milk production. Be aware that the SCC tends to vary up and down in early infection, but then will rise and stay high.

## REFERENCES

1. Vestweber, J. G. *Staphylococcus aureus* mastitis. Part I. Virulence, defense mechanisms, and establishment of infection. Compendium on CE 15(#11):1561-1569 (Nov 1993).
2. Vestweber, J. G. *Staphylococcus aureus* mastitis. Part II. Diagnostic aids, therapy and control. Compendium on CE 16(#2):217-220 (Feb 1994).
3. Fox, L. *Staphylococcus aureus* mastitis in heifers and cows. Proceedings of National Mastitis Council 1994 Regional Meeting, Lansing, MI, Aug 18, 1994, Pg 39-43.
4. Saperstein, G., Hinckley, L. S., and Post, J. E. Taking the team approach to solving Staphylococcal mastitis infection. Vet Med (Sep 1988):939-947.

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert L. Gilliland, Vice-President and Director, Cooperative Extension Service, Utah State University, Logan, Utah. (EP/DF/07-97)