



Mastitis Control Program for

Staph-Infected Dairy Cows

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Staphylococcus is a general name for a class of small, round bacteria capable of causing mastitis (inflammation of the udder) in dairy cows.

There are a number of primary species of *staphylococci*. Among these is *Staphylococcus aureus*, also referred to as *Staph. aureus* or "staph." *Staph. aureus* is the major cause of chronic or recurring clinical mastitis in dairy cows. Other species of *staphylococci* can be isolated from the cow's mammary gland, but their role in causing mastitis is not as well understood.

This bulletin will focus on the sources of *Staph. aureus* infections within a dairy herd, and suggest control and prevention tips for the dairy farmer.

Where can *Staph. aureus* be found on the farm?

The main sources are teat skin, teat sores and milk from infected cows. Chemical irritation, chapping and other physical damage to teats may increase the probability that staph infections will develop on the teats.

Purchased cows can be another major source of new staph infections within a herd.

How does the infection move from cow to cow once it develops?

Staph infections are usually transferred from infected cows to non-infected cows during milking via contaminated teat cup liners, milkers' hands, and common wash sponges or rags.

What kind of mastitis problems can *Staph. aureus* cause?

Because of its toxin (poison) production, *Staph. aureus* can cause mastitis problems ranging from non-clinical infections to clinical or gangrenous infections that may kill the cow. Once *Staph. aureus* gets into the mammary gland, it will invade deep into secretory cells and ductal tissue. Staph infections produce scar tissue and can cause small abscesses to form in the udder. Both may permanently limit an infected quarter's ability to produce milk.

How widespread can a staph problem be within a herd?

It is not unusual to find dairy herds in which 30 percent or more of lactating cows have two or more quarters infected with *Staph. aureus*. Cows that have been infected at least once have a greater chance of becoming reinfected, and the prob-

ability that staph infections will occur increases with cow age.

What signs might tip me off that a *Staph. aureus* problem is present in my herd?

These clues can indicate that a problem exists:

- Several cows in the herd have chronic clinical mastitis.

You should be aware that clinical cases caused by *Staph. aureus* can occur in any age cow and at anytime during lactation. Infected quarters will "flare up" at regular intervals (about every two weeks to one month). Milk produced from infected quarters will be watery or off-colored and will contain flakes and clots. Most infected cows will not run a fever. Udders will probably swell, and infections will respond very poorly to lactational antibiotic therapy.

Even with the use of good dry cow treatment products, you can expect that at least 30 to 50 percent of the cows infected during a lactation will still be infected, and possibly develop into chronic cases, during the next lactation.

- A herd somatic cell count or a DHIA weighted somatic cell count

ranging from 400,000 to 800,000 (linear score of 5 to 6) during the year.

If the bulk count rises high enough, it may result in a warning from your milk cooperative.

Usually, less than 10 percent of staph-infected cows within a dairy herd will have counts higher than 1,500,000. This is one way that staph infections differ from other mastitis infections. A dairy herd that contains the same percentage of *Streptococcus agalactiae*-infected cows, for example, will generally show much higher bulk tank somatic cell counts.

- Presence of pockets of scar tissue in infected quarters that can be detected by palpating (touching).
- An increase in the rate of chronic clinical mastitis within the herd following the purchase of lactating cows.
- Appearance of gangrenous mastitis in first-lactation fresh cows, especially during colder weather.

What should I do if one or more of the situations described above applies to my herd?

First, confirm the existence of the infection in your herd. Collect sterile milk samples for culture tests from 15 percent of your herd (or at least 10 to 20 lactating cows selected at random), or from a minimum of 20 cows with somatic cell counts of 400,000 or higher (linear score of 5). Have the samples cultured by a qualified microbiological laboratory. Your veterinarian may have the proper lab facilities, or you can submit samples to your state animal health diagnostic lab or your milk producers' association. Costs for the cultures may range from \$1 per cow to about \$10 per culture, depending on the organism responsible for the infection and the laboratory involved.

What kind of results from the culture tests would indicate a problem?

Positive results from 50 percent or more of the milk samples you had cultured for *Staph. aureus* would

indicate a significant problem within your herd. If less than 50 percent of the results are positive, but you have noticed some of the other above-mentioned symptoms, resample within two months the cows that produced positive cultures.

Assuming that I have confirmed the existence of mastitis problem caused by *Staph. aureus*, what management steps should I take to solve the problem?

Of course, the more severe your problem, the more quickly you need to put a control program into action. It is very important, however, to begin a long-term prevention program at the same time. A combination control/prevention program will keep the problem from recurring.

The urgency of your control program will depend on several things, including:

- Your bulk tank somatic cell count.
- The severity and rate of clinical mastitis within your herd.
- Your present cash flow situation.

You should begin a control program at once: If you are discarding more than 5 percent of your milk daily; if more than 5 percent of your herd is being treated for staph infections at a given time; and/or if your bulk tank somatic cell count is 400,000 or greater. Failure to act on the problem could result in a substantial financial loss.

STAPH CONTROL PROGRAM

- Cull chronically infected cows.

But which cows should I cull?

First priority for culling should be made for older cows that have these characteristics:

- Chronic clinical mastitis.
- Monthly somatic cell counts that remain higher than 400,000 (linear score of 5) over two lactations.
- More than three treatments during the present lactation.

The number of cows culled will depend on the availability of replacements and your cash flow situation.

- Segregate infected cows from non-infected cows during milking.

Which cows should be included in the segregated group?

The segregated infection group should include all cows that have been treated for mastitis during the present lactation, cows cultured positive for *Staph. aureus*, and cows that have a somatic cell count consistently above 400,000 or a linear score of 5.

What method should I use to separate the infected cows?

There are three options of free-stall housing you can use to segregate the infected and questionable cows from the non-infected cows during milking time:

OPTION 1—Establish a separate lot for staph-infected cows. Milk these cows last. Culture fresh cows before assigning them to either the infected lot or the non-infected lot. Treated cows should be included in the infected group.

Cows should leave the infected lot only through death or culling, or by producing a negative culture result following dry treatment. Because infected cows are more likely than the rest of the herd to become infected again, many farmers choose to keep the infected group separated on a permanent basis.

A cow would move from the non-infected lot to the infected lot either when a case of clinical mastitis occurs or when a milk culture is positive for *Staph. aureus*. Remember, a somatic cell count greater than 400,000 or a linear score of 5 from a cow that was previously considered non-infected indicates a need to culture a milk sample from that cow.

OPTION 2—Use separate milking equipment for treated and infected cows, if the number of infected cows is relatively low. The claw units used for infected cows should not be used to milk any non-infected cows. With this option, the infected cows would not have to be physically separated from non-infected cows, but they would need to be clearly identified at milking time.

Table 1
Backflush Routine

| STEP | APPROXIMATE TIME ALLOWED |
|----------------------------|--------------------------|
| 1. Running-water rinse | 10-15 sec. |
| 2. 25 ppm iodine flush | 45 sec.-1 minute |
| 3. Running-water rinse | 10-15 sec. |
| 4. Water removal from claw | |

OPTION 3—Backflush all milking units between cows. Table 1 outlines a true backflush routine.

Some dairy farmers backflush claw units manually between cows, but this is time consuming (2 to 3 minutes per unit). Commercial automatic backflush units are available and are very effective at removing staph organisms from teat cup liners. Most backflush units are installed in combination with automatic-removal milking units.

Though backflushing can eliminate the need to segregate cows, you should realize that the cost of installing backflush units can range from \$1,000 to \$2,000 per unit, plus costs for automatic takeoffs. Therefore, each farmer should determine the cost:benefit ratio of backflush units for his or her farm.

What other management steps should I take?

- Dry off infected, pregnant cows immediately if they are within 80 to 90 days of calving, and dry treat them.
- Postpone further purchases of cows.
- Perform a total evaluation of milking equipment functions, especially pump capacity, controller function, line sizes, vacuum level, pulsator function and inflation condition.
- Evaluate milking procedures.
- If you have not already done so, establish a teat dipping program, using a germicidal teat dip, and a dry cow treatment program, using a commercially available antibiotic designed specifically for dry cows.
- Provide adequate balanced rations for your herd, with special emphasis on vitamins and selenium.
- Evaluate housing conditions for bred heifers, dry cows, cows at calving and lactating cows, checking for potential sources of teat injury.

- Consider having your milkers wear disposable plastic gloves during daily milking routines. Culture tests can indicate the presence of *Staph. aureus* on the hands, but the bacteria are often hard to eliminate.

Would vaccinating my herd help?

A good general vaccination program is recommended for any dairy herd to combat diseases, but the vaccinations that are currently available will not prevent staph infections.

Is there anything I can do to prevent or reduce the chances of my herd becoming infected by *Staph. aureus*?

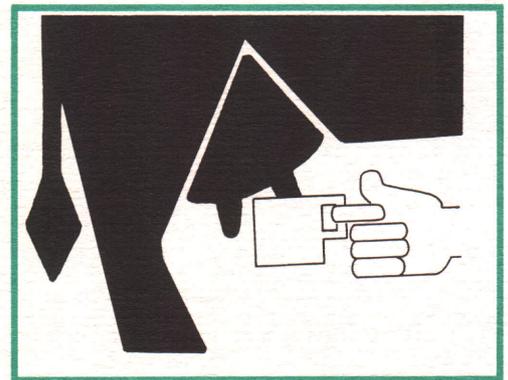
Yes. Naturally, a good prevention program begins with a dairy farmer or herdsman who is truly interested in milking cows. The statement that mastitis is a man-made disease is true for many farms.

Important measures you can take include:

- Proper nutrition and sound general vaccination programs for heifers and cows.
- Good sanitation in housing areas.
- Properly designed and maintained milking equipment, and proper usage of the equipment.
- Teat dipping.
- Dry treatment of all cows.
- Enrollment in the DHIA somatic cell count program.
- Culling of chronically infected cows.
- Limited, managed use of veterinarian-recommended antibiotics for treatment of mastitis during lactation. Treatment of staph infections during lactation will cure only 10 to 20 percent of infections; therefore, lactation therapy should be limited to severe clinical cases.

- Maintenance of a closed herd.
- Good calf management so adequate numbers of replacement heifers are available.
- Periodic bulk tank sampling to monitor somatic cell counts once the infection problem is under control.
- Cooperating with your local veterinarian to establish *Staph. aureus* control and prevention programs.

This is one in a series of bulletins on mastitis control in dairy herds. Contact your county Cooperative Extension Service office for information on other forms of mastitis and how to control them.



*Dip teats regularly after milking to reduce the risk of a *Staph. aureus* infection developing.*

SOMATIC CELL COUNTS AND EQUIVALENT DHIA LINEAR SCORES

| Average Somatic Cell Count | DHIA Linear Score |
|----------------------------|-------------------|
| 12,500 | 0 |
| 25,000 | 1 |
| 50,000 | 2 |
| 100,000 | 3 |
| 200,000 | 4 |
| 400,000 | 5 |
| 800,000 | 6 |
| 1,600,000 | 7 |
| 3,200,000 | 8 |
| 6,400,000 | 9 |

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