

**Mastitis Control Program**

**for**

**Strep. ag.-Infected Dairy Cows**

by

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## **Introduction**

*Streptococcus* is a general name for a class of bacteria capable of causing mastitis (inflammation of the udder) in dairy cows. *Streptococcus agalactiae*, also called *Strep. ag.*, is a common cause of non-clinical mastitis infections in dairy cows. While the prevalence of *Strep. ag.* infections has been reduced by modern mastitis control programs, this bacterium remains a threat for all dairies that purchase cattle.

This bulletin will focus on the source of *Strep. ag.* infections within a dairy herd, and suggest useful control and prevention tips for dairy farmers.

## **Where can *Strep. ag.* be found on the farm?**

Infected heifers and cows are the source of *Strep. ag.* *Strep. ag.* only survives a short time outside the mammary gland, but it can survive indefinitely within the mammary gland. Cows infected by *Strep. ag.* often have more than one infected quarter.

## **How could *Strep. ag.* infections develop within my herd?**

Purchasing *Strep. ag.*-infected cows or heifers and adding them to a *Strep. ag.*-free herd can result in a high percentage of cows becoming infected within a few months. The rate of spread is more rapid in a herd without a mastitis control or biosecurity program.

Infections can also develop among group-penned heifer calves. A calf's mammary gland may become infected with *Strep. ag.* when it is suckled by a second calf that has been fed milk from a

*Strep. ag.*- infected cow. The infection can then remain indefinitely in the heifer's newly infected mammary gland.

An employee milks cows at two separate dairies. One of the dairy farms has a *Strep. ag.* problem. The employee potentially could spread *Strep. ag.* to the second herd at milking.

### **How do infections spread within my herds?**

Infections are spread from infected cows to non-infected cows during milking via milking machines, contaminated milkers' hands, and teat cleaning materials such as rags, towels and sponges that are used on several cows.

### **How widespread are *Strep. ag.* infections within a herd, and how severe are the results from such infections?**

It is not unusual to have 50 to 80 percent of cows within a herd infected by *Strep. ag.* The majority of these cases are non-clinical. Normally, *Strep. ag.*-infections account for only a small percentage of all clinical mastitis treatments. It has been estimated that a dairy farmer may be treating only one case of clinical mastitis for each 20 to 40 quarters or 20 to 40 cows that are actually infected with *Strep. ag.*

*Strep. ag.* infections are usually relatively mild when measured in terms of udder swelling, systemic cow problems or quarters lost. Normally, *Strep. ag.* infections do not result in acute mastitis cases or cow deaths. Some infected quarters, however, will cease production of milk.

## **What effect does a *Strep. ag.* infection have on milk quality and production?**

*Strep. ag.* is considered a leading cause of illegal somatic cell counts in bulk tank milk (counts greater than 750,000). In addition, some illegal bulk tank bacteria counts (greater than 100,000) can be traced to *Strep. ag.* infections.

As somatic cell counts rise from any cause of mastitis, milk quality decreases because milk solids such as lactose and casein decrease. Milk production from a cow with an infected quarter may decrease as much as 40 percent without the cow showing any apparent clinical signs of mastitis. A reduction in milk quality ultimately leads to loss of income for the dairy farmer as milk prices are tied to milk components and premiums are lost when SCC and bacteria counts increase. Premiums in some milk markets will be as much as 50 to 90 cents per cwt of milk.

## **What are some indications of a *Strep. ag.* problem in my herd?**

- Bulk tank milk or DHIA weighted somatic cell counts that are consistently greater than 400,000 with occasional counts reaching 700,000 and greater and only 40 to 60 percent of your herd showing cell counts of less than 200,000 (DHI linear score of 4). The monthly clinical infection rate only will be a maximum of 1 to 2 percent new cases. Clinical cases will be mild with abnormal milk and shrinking quarters as the two major signs.
- Clinical cases will have very little relationship to SCC. There will be many cows with DHI LS at 8 or 9 that show no clinical signs of mastitis.
- Heifers freshening with "blind" (non-functional) quarters.

- A decrease in herd milk production, despite good general herd management.
- Illegal bacteria counts greater than 100,000 in bulk tank milk, despite proper cleaning and sanitizing of milk equipment and cooling equipment, proper maintenance of rubber parts, proper milking procedures and adequate milk cooling.
- Good response (>70%) of clinical mastitis cases treated with penicillin or synthetic penicillin.
- Multiple quarters with SCC greater than 1,000,000 or CMTs of 1 and greater. It is not unusual to have quarters with SCC greater than 10,000,000 cells with no clinical signs.

No cow is immune to a *Strep. ag.* infection. Infections can develop in cows at any age and during any stage of lactation. However, the percentage of cows infected will usually increase in older cows and in cows that are more than 100 days in milk. Approximately, 25 to 33% of first lactation cows will be infected by 305 days in milk if they are milked with the older, infected cows. Under the same management, 75% or more of the third lactation or older cows will be infected with *Strep. ag.* Since most *Strep. ag.* infections are non-clinical, there will be no visual signs that will pinpoint differences between a *Strep. ag.*-infected quarter and a quarter infected with another mastitis-causing organism such as *Staphylococcus aureus* or environmental Streps.

### **What should I do if I recognize some or all of these situations within my herd?**

First, determine whether your herd has a *Strep. ag.* problem. Aseptically collect milk samples for culture tests from 15 percent of your herd (minimum of 10 to 20 lactating cows) that are 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 cooperative or association. Costs for culture tests may range from \$5 to \$10 per culture, depending on the organism responsible for the infection and the laboratory involved.

Bulk tank milk may also be cultured to determine if *Strep. ag.* is present within the herd. Finding only a few colonies of *Strep. ag.* on a bulk tank milk culture indicates that there is at least one infected cow within the herd. *Strep. ag.* cultured from a bulk tank milk sample had to originate from the mammary gland.

### **What will the results of the culture tests from my milk samples tell me about a possible problem within my herd?**

Isolating *Strep. ag.* from 30 to 40 percent or more of milk samples would indicate a significant non-clinical mastitis problem within your herd. Each cow with a somatic cell count greater than 200,000 should be considered infected. If an individual cow's SCC was high (greater than 500,000) but the milk was negative on culture for *Strep. ag.* *does not rule out Strep. ag. as the causative organism.* At the time of culture most of the *Strep. ag.* in the quarter or gland that was cultured may have been destroyed by leukocytes (white blood cells). However, culturing several cows with DHI L.S.>4 and culturing each new infection (DHI L.S.>4) will delineate the true prevalence of *Strep. ag.* within the herd.

Consult other bulletins within this mastitis control series if culture tests show additional organisms to the *Strep. ag.* The bulletins will outline appropriate control procedures for infections caused by those organisms. In herds with multiple organisms causing mastitis, it is best to eliminate *Strep. ag.* infections first and then deal with the other organisms.

### **What management steps should I take to solve a mastitis problem predominantly caused by *Strep. ag.*?**

There are several options to choose from in managing your *Strep. ag.* -infected herd. The urgency of your situation should dictate how quickly you begin an action program.

- 1) **Emergency Program:** If two of the last four consecutive bulk milk somatic cell counts were 750,000 or higher, and the high BTSCC was a result of *Strep. ag.* -infected cows, you need to begin an action program immediately. Consider following action program #1 to avoid suspension from the milk market.
- 2) **Short-Term Program:** If your last several bulk tank or DHIA cell counts were 200,000 to 300,00, and there are *Strep. ag.* infections within your herd, you may wish to implement action program #2.
- 3) **Long-Term Prevention/Control Program:** If you are interested in keeping a mastitis problem from recurring once it is under control, program #3 should be used IN COMBINATION with either the emergency program or the short term program.

## **EMERGENCY ACTION PROGRAM (PROGRAM #1)**

Example situation: Based on culture tests, 80 percent of your herd has *Strep. ag.* infections.

Your last three bulk tank somatic cell counts have averaged 1,000,000. In addition, your herd production has been approximately 50 pounds or less per cow per day.

### **What should I do?**

Set up an intensive *Strep. ag.*- eradication program. This program will include treatment of **all cows** and **all quarters**. Be sure to contact your milk cooperative and inform them of your plans before you begin treatment. Consult with your local veterinarian before beginning any treatment on your herd. In addition, start developing a long-term mastitis control program (see action program #3).

**DAY 0** - Cull all cows **five** years and older (3<sup>rd</sup> lactation and greater) that have these characteristics:

- 1) Positive culture results for *Strep. ag.* infections.
- 2) Somatic cell counts of 1,600,000 or higher (or linear score of 7 or higher) for three or more months.
- 3) A previous history of chronic clinical mastitis or cell counts that exceed 2,000,000.
- 4) Less than four functional quarters.
- 5) Clinical quarters that have been non-responsive to therapy.

- 6) Also consider reproductive status, milk production or other health issues.

In addition, dry off any cows that are within 80 days of calving and dry treat all four quarters with a commercially available dry cow antibiotic. Dip teats after milking (don't spray) with an effective teat dip such as 1% iodine with 10% glycerin or similar emollient.

Develop a detailed written record system to record and monitor all treatments and results of those treatments.

**DAY 1** -In consultation with your veterinarian, treat all quarters of all lactating cows with a commercially available, prepackaged drug formulated for lactating cows, (Penicillin is the preferred drug.) Follow directions on the drug label for proper treatment schedule. Cows that are within 80 days of calving should be treated with an approved dry cow antibiotic.

**DAY 2** - Continue treatment schedule according to label directions before beginning next step. At the end of the last treatment, continue prescribed withdrawal period. (NOTE: last treatment may not necessarily fall on Day 2.)

**DAYS 4-6** - Following prescribed withdrawal period (approximately 36- 96 hours). Withdrawal time is timed from the last treatment. The first tank of milk after the proper withdrawal time should be screened by your fieldperson for the drug that was used to treat the cows. Even if the tank is negative, continue to screen the tank for two additional milkings.

**DAY 21** –Re-culture the complete herd plus any heifers or cows that have freshened since Day 0.

**DAYS 24-25** - Based on culture results of samples taken on Day 21, re-treat (with same drug, as per day 1 instructions) any cows that tested positive for *Strep. ag.* and any cows with cell counts greater than 200,000 (linear score of 4). Keep your milk cooperative informed of the progress of your treatment program. You may ship milk from cows that cultured negative and had a somatic cell count less than 200,000. A CMT may be used to screen cows that were treated. However, the SCC may remain elevated (CMT >1) for up to 21 days after treatment. After 21 days, an elevated SCC (CMT>1) indicates a treatment failure.

At this time, it will be advantageous to segregate the herd into two groups and milk the cows that have been retreated last.

**DAYS 28-31** - Repeat schedule from Days 4-6 for cows that tested positive for a second time. Be sure to follow the prescribed withdrawal period.

**DAY 46** - Resample cows treated on Days 1 and 24-25, as well as heifers and dry cows that have freshened since Day 21. Any heifers and/or dry cows that culture positive for *Strep. ag.* should be treated according to instructions on Days 1 and 24-25.

No cows or heifers should be brought into the herd from off-farm sources during the treatment period. If cows or heifers are purchased, they should culture *Strep. ag.*-free before entering the

herd. Heifers could be treated with a lactating cow antibiotic if greater than 14 days from calving based on an accurate breeding date. Prepartum antibiotic treatment of heifers should be used with caution if accurate breeding dates are not available and/or the milk cannot be screened for antibiotics after calving. Alternatively, fresh purchased heifers could be milked last until a milk sample could be taken at the 3<sup>rd</sup> or 4<sup>th</sup> milking and cultured. Culture results would be available by the 7<sup>th</sup> or 8<sup>th</sup> milking. *Strep. ag.* negative first lactation cows can be moved to any lactation group and milked in any order. *Strep. ag.* positive first lactation cows should be treated and segregated (milked last) until two consecutive culture samples show no *Strep. ag.*.

### **What should I do with cows that do not respond after two series of treatment?**

Based on the culture results of samples taken on Day 46, cows that culture positive for the third time and/or that do not respond to antibiotic therapy should be culled. Culling non-responsive cows may be the best solution to eliminating a chronic *Strep. ag.* infection, but cash flow problems may require you to consider other solutions. If you must keep chronically infected cows in your herd:

- Identify them in a manner that is very obvious to the milkers.
- Milk them last in a group separate from the rest of the herd.

*Strep. ag.*-positive that are dry treated should be re-culture by the third or fourth milking of the next lactation. Cows that remain positive for *Strep. ag.* after dry cow antibiotic treatment should be culled immediately if they remain positive for *Strep. ag.* after dry cow treatment or the

positive cows could be milked separately (last) until production declines below breakeven point or milked last for the rest of their productive life.

**Even if I carefully follow a treatment plan, is it still possible for my herd to get re-infected? if so, how?**

One *Strep. ag.* infected cow can re-infect a high percentage of the herd within a few months. Thus, you cannot afford to maintain even one *Strep. ag.* -infected cow in your herd.

Once *Strep. ag.* infections are eliminated from a dairy herd, the only way re-introduction can occur is through the purchase and addition of infected heifers and/or cows to the herd. Other possible ways of re-infection would be from milking cows that left the dairy to be shown at a fair or exposition, were milked with common equipment and returned to the dairy infected with *Strep.ag.*

**ACTION PROGRAM #2 (SHORT-TERM)**

Example situation: Half (50 percent) or less of your herd is infected with *Strep. ag.*, and/or your herd's bulk tank DHIA weighted somatic cell count has been ranging from 300,000 to 600,000. You have confirmed cases of *Strep. ag.* infections.

**What should I do?**

If you have not already done so, have your complete herd cultured to identify all infected animals. With this action program, complete herds are not treated - only cows that culture positive for *Strep. ag.* or that have somatic cell counts greater than 200,000.

**DAY 0** - As with action program #1, identify and cull all cows that have a long-term history of mastitis and a continual cell count of 1,600,000 (linear score of 7 or higher). In addition, dry off and dry treat all cows that are within 80 days of calving.

**DAYS 1-46** - Follow the same treatment program described for Days 1-46 of action program #1. In addition, begin a long-term control program (action program #3). It is extremely important to **SEGREGATE TREATED COWS AND MILK THEM LAST**. Do not attempt to use "blitz" therapy treatment of the entire herd-for short-term control of *Strep. ag.* if you cannot segregate cows that need to be treated.

### **ACTION PROGRAM #3 (LONG-TERM PREVENTION AND CONTROL)**

Example situation: You have several confirmed cases of *Strep. ag.*-infected cows but relatively few clinical cases. In addition, your herd's bulk tank or DHIA weighted somatic cell count has been averaging 200,000 to 400,000.

#### **What should I do?**

Begin a long-term prevention/control program that includes basic management steps that prevents *Strep. ag.* infected cows from infecting non-infected cows and limits lactation therapy to clinical cases. In addition, this program contains valuable suggestions for preventing a *Strep. ag.* problem from recurring once it is alleviated.

Generally, the dairy farmer described in the above situation is not in trouble with the milk market, and a majority of cows in the herd are not infected. In this situation, *Strep. ag.* infections can be eliminated from the herd over a two to three-year period without extensive antibiotic therapy.

### **Is a long-term program really that important?**

As we have emphasized throughout this bulletin, a short-term program may improve a current problem, but unless a long-term program is started at the same time, the *Strep. ag.* problem you worked so hard to get rid of this year may return in full force next year. Consider following these steps toward long-term prevention of a *Strep. ag.*:

- Culture the complete herd and cull any *Strep. ag.*-positive cows.
- Culture all cows each month that have DHI SCC >200,000 (LS 4). Treat, dry off or sell positive *Strep. ag.* cows.
- Cull chronically infected cows that continually show somatic cell counts greater than 1,000,000 (or a linear score of 6 or higher) that have not responded to either lactation therapy or dry cow treatment.
- House calves individually when you feed them whole milk. Waste milk from treated cows should not be fed to calves.
- Culture newly purchased cows or cows that have been off the dairy before adding them to the milking string.
- Culture milk from purchased, bred heifers for presence of *Strep. ag.* by the third or fourth milking after calving before adding them to the milking string.

- Use well-designed milking equipment correctly, and keep it well maintained. Over-used inflations, grossly undersized vacuum pumps and malfunctioning pulsators can play a major role in aiding transfer of *Strep. ag.* infections from cow to cow.
- Follow a carefully planned milking routine to decrease the possibility of transferring infections during milking. Washing and drying teats for prepping should take a minimum of 15 to 20 seconds. Attach milking machine within 30 seconds after you finish prepping. At the end of the milk flow, use a positive vacuum-shutoff before removing the milking machine. Any infected cows or cows with SCC > 200,000 should be milked last until culture results are known.
- Teat dipping should be a regular part of your milking routine. Apply a post-milking sanitizer as soon as possible after removing the machine. Dipping (not spraying) should cover at least 60% of the total teat surface and all sides of the teat. The purpose of post-milking teat dipping is to kill Gram+ bacteria that are on the teat skin at the end of milking. Therefore, as more teat surface is covered the greater the kill that reduces the new infection rate. A 1% iodine dip with 10% glycerin or similar emollients continues to be the gold standard for effective teat dips.
- Dry treat all quarters of all cows with a commercially available antibiotic formulated specifically for dry cows.
- Culture all fresh cows by the 3<sup>rd</sup> or 4<sup>th</sup> -milking. Segregate, sell or treat all *Strep. ag.*-positive cows.
- Use DHI or a similar somatic cell count program to monitor each cow every month.
- Culture cows that have clinical mastitis and treat according to your veterinarian's instructions.
- Culture the bulk tank milk monthly or more frequently to monitor for *Strep. ag.* once an infection problem is under control.
- Consult with your local veterinarian to establish a continuous *Strep. ag.* prevention and control program.

**SOMATIC CELL COUNT'S AND EQUIVALENT DHIA LINEAR SCORES**

<b>Average Somatic Cell Count</b>	<b>DHIA Linear Score</b>
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

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