Milk Money Fact Sheet 03

Environmental Streps

Mike Maroney, DVM

Background:

Many Streptococcal species are present in the cow's environment. Sources of "environmental Streps." include manure, soil, bedding and many sites on the cows' body. Species of environmental Streps. include: *S. dysgalactiae*, *S. uberis, S. bovis* and *Enterococcus faecalis*. These bacteria are sometimes referred to as "non-ag." Streps. or Strep. species.

Symptoms:

All dairy herds must deal with mastitis caused by environmental Streptococcus because of their widespread presence in the environment. Herds that have controlled contagious mastitis may have more problems with environmental streps. Herds with environmental mastitis problems can have high bulk tank somatic cell levels and high levels of clinical cases.

Culturing of the bulk tank can indicate the level of streptococcal bacteria in the bulk tank. However the source of the bacteria can be from the teat skin (hygiene) or multiplication in the udder (mastitis). Bacterial Plate counts can be elevated due to cows with mastitis shedding very high numbers of this bacteria. Herds adopting a non-antibiotic treatment protocol for mild mastitis may experience elevated plate counts and an increase in the recurrence or relapse rate of clinical cases. The increase in relapse rate is due to the fact that the infection is never cured and clinical signs come and go.

Cows with mastitis caused by environmental Streps. generally have mild to moderate clinical signs. Their somatic cell count may be in the millions and can shed large numbers of bacteria into the bulk tank. This high level of shedding has led some researchers to believe that they can behave in a contagious manner.

Diagnosis:

Bacteriological culturing of the milk can be used to determine whether mastitis is caused by environmental Streptococcus. Some laboratories will report the results as non-ag Streps. or Strep. species. Other laboratories will report the species of Streptococcus present. This level of detail may be important in designing treatment protocols or assessing their effectiveness.

Treatment:

The spontaneous cure rate for subclinical mastitis caused by environmental Streps. has been reported to be around 65%. However spontaneous cures of clinical mastitis are reported to be low (<20%) and affected cows may have relapses if they do not receive appropriate antibiotic therapy.

Treat clinical cases of mastitis caused by environmental streps with approved intramammary antibiotic products for an appropriate number of treatments. Extended treatment periods (up to 6 days of intramammary treatment) to treat *Strep uberis* infections have been shown to result in cure rates that exceed 90%. In general environmental Streps. respond to penicillin-based antibiotics with the exception of some Enterococcus species.

Preventive Management:

The choice of bedding can influence the types of bacteria that your cows' udders are exposed to. Environmental streps. thrive in straw. They also thrive in cool, damp environments. Therefore grooming of stalls should be performed two to three times a day to remove manure and wet bedding.

For sand based stalls it is critical that the back 2 to 3 feet of each stall be cleaned and leveled at each milking. A weekly schedule of replacing sand in the freestalls will insure the stalls remain full of clean sand. Develop standard operating procedures for maintenance of clean comfortable stalls.

Make sure that employees responsible for stall maintenance and scraping alleys understand their role in mastitis prevention and control. Bedding cultures can be helpful to assess whether current practices are sufficient to keep environmental streptococcal counts low.

The dry period is a time when new subclinical infections can occur. The times of greatest risk for acquiring new infections during the dry period are two weeks after dry off and the prefresh/calving period.

Dry cow treatment will provide protection for the first two weeks of the dry period. The housing and bedding of the cows should be carefully scrutinized for the dry and prefresh groups and the calving pens. If a bedded pack is employed make sure not to overcrowd it. If pastures are used, make sure that they are in good condition.

Having multiple paddocks available allows grasses to recover after wet conditions. For the prefresh group, properly designed freestalls are usually more desirable than a bedded pack because you can control where the cow places her udder during this high-risk period.

Many farms are focusing on individual use calving pens with a complete change of bedding with each calving. Changing of the bedding with each calving does not allow the bacterial counts in the bedding to rise above acceptable levels. Internal teat sealants have been shown to be effective in limiting the amount of new infections during the dry period.

To minimize the risk that the milking machine could play a role in mastitis make sure to keep it properly maintained. Regular milking system analysis will ensure that the teat end vacuum is properly set and stable.

Stable teat end vacuum will reduce the chance of reverse jetting of bacteria into the mammary gland during milking. Proper premilking teat sanitation will decrease the amount of bacteria in the milk in the event that reverse jetting occurs. Good teat end stimulation (10-20 seconds) and a prep-lag time of one to two minutes will ensure good milk letdown and decrease overall machine on time. Keeping the inflations clean is also very important.

Milk Money Fact Sheet 04

Coliform Mastitis

Mike Maroney, DVM

Background:

Escherichia coli, *Enterobacter aerogenes*, *Klebsiella pneumoniae* and *Serratia marcesans* are four common coliform bacteria that cause mastitis. Coliform bacteria are normal inhabitants of soil, digestive tract and manure. They accumulate and multiply in contaminated bedding. Coliform numbers of 1,000,000 or more per gram of bedding increase the likelihood of an udder infection and clinical mastitis. *Klebsiella pneumoniae* is common in sawdust bedding, especially rough-cut sawdust that contains bark or soil.

Coliforms invade the udder through the teat sphincter when teat ends come in contact with coliform bacteria. Once coliform bacteria enter the mammary gland, they either multiply rapidly or remain dormant. As they are destroyed by the cow's immune system, coliforms release endotoxins (poisons) into the cow's body. These endotoxins cause many of the clinical signs associated with coliform mastitis such as high fever, depressed appetite, rapid weight loss, abnormal milk and decreased production.

There is a distinct seasonal pattern of new clinical infections associated with high temperatures, heavy rainfall and unstable weather conditions. Often severe cases occur in older high producing cows early in their lactation.

Symptoms:

All dairy herds have to deal with coliform mastitis to varying degrees due to their widespread existence in the environment. Even though coliforms may cause a high percent of all acute clinical cases, these organisms are responsible for less than five percent of the total infected quarters within a herd at any one time. In 5-15% of these cases, enough endotoxin is released to result in seriously ill cows and death.

Coliform bacteria are responsible for a great number of acute clinical mastitis cases in dairy cows. Severely affected cows may show signs of high fever, udder inflammation (swelling), depressed appetite, dehydration (sunken eyes), diarrhea, decreased production and abnormal milk. Abnormal milk may be watery with clots, however the appearance of abnormal milk is not a good indicator of what type of mastitis pathogen is present. Usually only one quarter per cow is clinically infected at a time. Coliform bacteria are also capable of producing subclinical infections that persist for longer periods of time. It is usually not effective to treat these infections because the majority are eliminated by the cows' immune system.

Diagnosis:

Bacteriological culturing of the milk can be used to determine if mastitis is caused by coliform bacteria. However, in severe clinical cases the results will not be known in time to affect the treatment. Results from previous severe cases can help the veterinarian or herdsperson make better treatment decision.

It is not uncommon to get no growth when culturing abnormal milk from coliform infections because the cow's immune system has destroyed the bacteria by the time the milk sample is collected. On farm culturing has been gaining popularity and allows for results within 24 hours. Other farms employ a culturing strategy where they screen their fresh cows with a CMT paddle and all positive quarters are cultured. If the cow comes down with clinical mastitis in the first ninety days of lactation they then treat according to their subclinical culture results and treatment protocol.

Treatment:

For severe cases, many farms call their herd veterinarian for treatment or to devise a treatment protocol. Intramammary antibiotic therapy has little, if any, effect on improving the outcome of clinical mastitis caused by coliform bacteria.

Most mastitis caused by Gram-negative bacteria (coliforms) is mild or moderate. The immune response of the cow is highly successful in destroying these bacteria. As the bacteria are destroyed, endotoxin, which is a component of their cell wall, is released. Treatment for severe cases generally includes: Fluid therapy, anti-inflammatories, steroids, and systemic antibiotics with Gram-negative activity. Systemic antibiotic are warranted because more than 40% of severely ill animals will experience bacteremia (bacteria circulating in the bloodstream). A recent study indicated more favorable clinical outcomes for cows with severe clinical coliform mastitis that received IM ceftiofur once daily as compared to cows that received only supportive therapy. Treatment with oxytocin and frequent milk out is commonly included in mastitis treatment protocols. However, research has not shown these practices to be effective.

Prevention:

Maintain an adequate amount of bedding in confinement stall barns to provide a dry, comfortable bed for the cows. Grooming of stalls should be performed two to three times a day to remove manure and wet bedding. For sand based stalls it is critical that the back 2 to 3 feet of each stall be cleaned and lev-

eled at each milking. A weekly schedule of replacing sand in the freestalls will ensure the stalls remain full of clean sand. Develop standard operating procedures for maintenance of clean comfortable stalls. Make sure that employees responsible for stall maintenance and scraping alleys understand their role in mastitis prevention and control. Bedding cultures can be helpful to assess whether current practices are sufficient to keep coliform counts low.

The dry period is a time when new subclinical infections can occur. Research indicates that 50% of the clinical coliform infections, occurring in the first 90 days of lactation, actually started in the dry period. The times of greatest risk for acquiring new infections during the dry period are two weeks after dry off and the prefresh/calving period. Therefore the housing and bedding of the cows should be carefully scrutinized for the dry and prefresh groups and the calving pens. If a bedded pack is employed make sure not to overcrowd it.

If pastures are used, make sure that they are in good condition. Having multiple paddocks available allows grasses to recover after wet conditions. For the prefresh group, properly designed freestalls are usually more desirable than a bedded pack because you can control where the cows places her udder during this high-risk period. Many farms are focusing on individual use calving pens with a complete change of bedding with each calving. Internal teat sealants have been shown to be effective in limiting the amount of new infections during the dry period.

To minimize the risk that the milking machine could play a role in coliform mastitis make sure to keep it properly maintained. Regular milking system analysis will ensure that the teat end vacuum is properly set and stable. Stable teat end vacuum will reduce the chance of reverse jetting of bacteria into the mammary gland during milking. Proper premilking teat sanitation will decrease the amount of bacteria in the milk in the event that reverse jetting occurs. Good teat end stimulation (10-20 seconds) and a prep-lag time of one to two minutes will ensure good milk letdown and decrease overall machine on time. Keeping the inflations clean is also very important.

J-5 and similar vaccines are beneficial in limiting the severity of clinical signs from coliform infections. For vaccines to be effective, label directions must be followed. Keep in mind that these vaccines do not prevent new infections and are not a substitute for proper management of housing areas.

Mycoplasma Mastitis
Can you Control it on Your Farm?

Pamela Ruegg, DVM, MPVM

Introduction

Mastitis is a well-recognized and costly disease of dairy cattle. Most farmers are well acquainted with traditional causes of mastitis such as *Staphylococcus aureus* and *Streptococcus agalactia*. The widespread adoption of standard mastitis control practices such as teat dipping, dry cow therapy, appropriate treatment, judicious culling and good milking preparation has allowed many dairy farmers to control contagious forms of mastitis. In a recent study, *Staph aureus* and *Strep ag* accounted for only 8% of clinical mastitis cases in Ontario dairy herds.[4] While these traditional forms of mastitis are now controllable, mastitis continues to require management attention.

Fig 2: Mycoplasma Diagnosis in Wisconsin

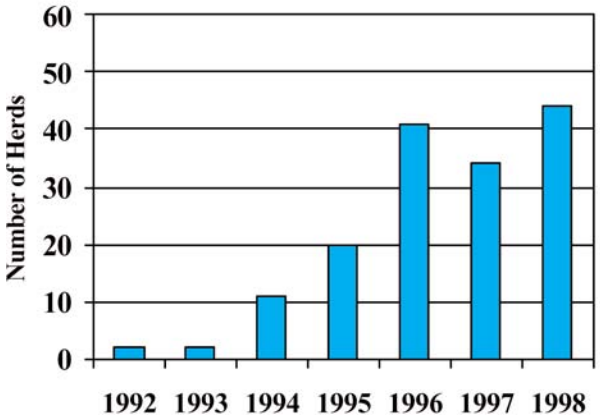
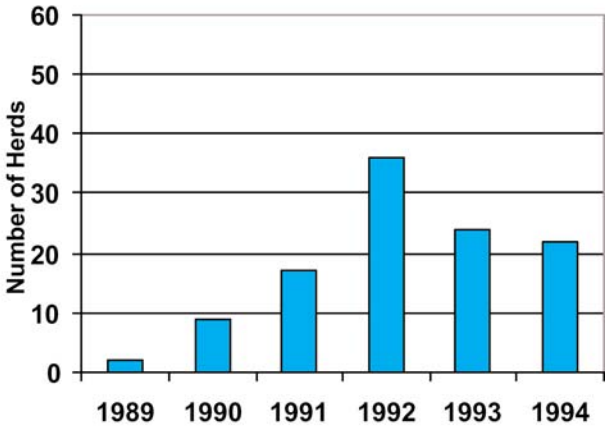


Fig 3: Mycoplasma Diagnosis in New York



Other organisms have emerged to fill the niche created by the control of contagious organisms. An organism that is increasingly isolated from clinical mastitis in Wisconsin is *Mycoplasma bovis* (Fig 2). Prior to 1992, there were only 2 confirmed herd outbreaks within Wisconsin, between 1992 and 1998 at least 140 herd outbreaks of that organism were reported.[5] A similar trend has been reported from dairies in New York (Fig 3).[2] Mycoplasma mastitis was once considered to be a disease of large western dairy herds. In recent years it has become recognized in Midwest and Northeastern dairy regions. This presentation will review basic facts about mastitis caused by mycoplasma and discuss control strategies to minimize the risk of an outbreak.

What is Mycoplasma?

Mycoplasmas are a group of very small organisms that can be cultured from multiple body sites of both sick and healthy cattle. Some common species of mycoplasma include *M. bovis* (most commonly cultured from the udder), *M. alkalescens* (commonly cultured from the respiratory tract, *M. bovigenitalium* (commonly cultured from reproductive tract) and *M. canadense* (commonly cultured from joints).

While many of these organisms have been isolated from bovine mastitis, *M. bovis* is the most common mycoplasma species isolated from milk samples in Wisconsin.

What diseases (other than mastitis) can be caused by Mycoplasma?

M. bovis lives naturally in the respiratory tract of cattle throughout the world.[3] Most respiratory tract colonizations of mycoplasma do not produce symptoms of disease but *M. bovis* is an important cause of respiratory disease in calves and feedlot cattle. Mycoplasma has also been implicated in joint infections, occasional abortions and ear infections in calves.

What Does Mycoplasma Mastitis Look Like?

The classic symptoms of mycoplasma mastitis have been described:[3]

- Multiple quarters involved
- Dramatically decreased milk production
- Cows appear otherwise healthy but have severe mastitis
- Milk has sandy or flaky sediments in watery or serous fluid

However, cows can develop subclinical infections with mycoplasma and have normal appearing milk.[1] These subclinically infected cows may have intermittent periods of abnormal milk or their milk may continually appear normal. Somatic cell counts of subclinically infected cows will be increased. Cows that have had mycoplasma cultured from their milk should be considered to be permanently infected regardless of the visual appearance of their milk.

How is Mycoplasma Mastitis Diagnosed?

Bacteriologic culture of milk is required for the diagnosis of mycoplasma mastitis. Milk samples from infected quarters, composite milk samples from infected cows or bulk tank samples can be submitted for culturing. Not every mastitis laboratory performs cultures for mycoplasma because special techniques must be used to grow this organism. The Wisconsin Animal Health Laboratory is one Wisconsin laboratory that performs mycoplasma cultures. Even at laboratories that offer mycoplasma culture, the culture is not performed unless it is specifically requested. To detect mycoplasma, milk is plated on different media and incubated for 7 days in a special incubator. In milk samples obtained from individual cows, a negative mycoplasma culture usually means that the organism is not present. However, intermittent shedding of the organism has been reported, so false negative cultures may rarely occur.[3]

Bulk tank culturing is a good way to monitor a herd for the introduction of mycoplasma mastitis. Detection of as few as one infected cow in bulk tank milk from a 1000 cow dairy has been reported.[1] Like cultures of individual cow milk samples, periodic shedding patterns may lead to an occasional false negative bulk tank sample in a herd with infected cattle.

How Does Mycoplasma Mastitis Spread?

Mycoplasma mastitis is classified as a contagious mastitis pathogen because the reservoir for the infection is other infected cattle, including calves. In contrast to other forms of contagious mastitis, mycoplasma infection can spread from the respiratory system to the udder. The spread can occur due to transmission through the air or through the blood stream. A history of respiratory disease or ear infections in calves occasionally precedes outbreaks of mycoplasma mastitis. A common source of infection is the purchase of cows subclinically infected with mycoplasma mastitis. Non-lactating animals are also at risk as they can be subclinically infected prior to freshening. After calving, these animals may never develop clinical mastitis but may shed high levels of mycoplasma organisms in their milk.[1] Transmission between cows can occur during the milking process or through contamination of cow contact areas in the environment.

How can Mycoplasma be Controlled?

The first step in controlling mycoplasma mastitis is recognizing that the disease is present in Wisconsin dairy herds. A strong association between the introduction of new cattle and outbreaks of mycoplasma mastitis has been reported.[1] Mastitis biosecurity programs can be used to decrease the risk of purchasing infected cattle. Bulk tank cultures from the herd of origin should be requested for non-lactating purchased cows and somatic cell counts and composite milk samples from individual cows should be reviewed prior to purchasing lactating cows. Cows that calve after purchase should be isolated until a negative composite milk sample is obtained. Herds that are routinely purchasing cattle should submit bulk tank milk for mycoplasma twice monthly.

The management of sick and fresh cows also contribute to the spread of this organism. Fresh cows should not be housed in the same pens or milked with the same equipment as sick cows. The feeding of waste milk to calves is another source of transmission of this disease throughout the herd. Calves fed infected milk may develop pneumonia, joint infections and head tilts related to ear infections.[1]

When mycoplasma is found in a bulk tank or individual cow culture, the number of infected cows must be determined. Depending upon herd size, there are several strategies that can be considered. If resources allow or the herd is small, composite samples from all cows should be submitted for culture. In larger herds, group milk samples can be submitted by sequentially culturing the bulk tank during milking. Individual milk samples can be obtained from cows only in the infected groups.

There is no treatment for cows that develop mycoplasma mastitis. Antibiotics are totally ineffective for this organism. Cows that are infected with mycoplasma should always be considered as infectious, regardless of their produc-

tion level, appearance of their milk or subsequent negative milk culture. In most cases, infected cows should be promptly culled. The only exception to this rule is when a culling is financially unacceptable because a large proportion of a herd is infected. In this case a herd specific strict segregation plan should be developed.

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Milk Money Fact Sheet 05

Mycoplasma Mastitis

Mike Maroney, DVM

Background:

Mycoplasma are bacteria-like organisms that can cause diseases in animals. They differ from most bacteria by the fact that they lack a cell wall; instead they are enveloped in a membrane. Mycoplasma species are capable of causing mastitis, arthritis, reproductive disease, ear infections and respiratory disease in dairy cattle. *Mycoplasma bovis* is the most common species of mycoplasma to cause mastitis in dairy cows.

Mycoplasma mastitis is classified as a contagious mastitis pathogen because the infection can be spread from cow to cow during milking. The reservoir for the infection is the udder and lungs of other infected cattle. Unlike other forms of contagious mastitis, mycoplasma infection can spread from the respiratory system via the blood or lymph system to the udder.

Symptoms:

Herds with mycoplasma infections may experience an increase in mastitis that does not respond to treatment. This may lead to an increase in the death loss or culling rate due to mastitis. New infections may occur after the herd has experienced an outbreak of pneumonia. Management factors associated with mycoplasma outbreaks include: purchasing heifers, use of multi-dose intramammary infusions and inadequate milking procedures.

Cows with clinical infections may have abnormal milk that is often brown to tan with flaky sediment. Some milk samples may appear to have a sandy, granular appearance when allowed to settle. The infection may spread from one infected quarter to multiple quarters despite treatment. Frequently the affected cows' milk production will drop dramatically. Clinical mastitis symptoms may follow an episode of pneumonia. Subclinical infections do occur with or without elevated somatic cell counts.

Diagnosis:

Bulk tank culturing is a good way to monitor a herd for the introduction of mycoplasma mastitis. Like *S. aureus,* shedding patterns may lead to a false negative bulk tank sample. The dilution effect may also limit the ability of detecting a mycoplasma positive cow from a large herd. For this reason it is recommended to sample pens of no larger than 200 cows. Several companies market an insert to place in the milk line with a sampling port.

Individual cows with clinical mastitis may be cultured for mycloplasma. In milk samples obtained from individual cows, a negative mycoplasma culture usually means that the organism is not present. However, a false negative from an individual cow milk sample can occur.

For individual milk samples to be tested for mycoplasma, it must be specifically requested. To detect mycoplasma, milk is plated on selective media and incubated for seven days in a carbon dioxide incubator. Freezing milk samples will reduce the sensitivity of culturing. The sensitivity of a test is it's ability to correctly identify all the positive samples. Therefore, whenever possible, submit chilled, fresh samples.

Treatment:

There is no approved intramammary antibiotic that is effective for treatment of mycoplasma mastitis. Penicillin-based antibiotics that attack the cell wall are ineffective for mycoplasma. Cull infected cows promptly or strictly segregate the infected group and milk them last.

Do not use treatments from multiple dose vials for intramammary infusion. Only use FDA approved individual dose antibiotic preparations for intramammary treatment. During several outbreaks the staff of the farms have spread mycoplasma infections because the organism contaminated medicine bottles.

Prevention:

Prevention starts with a well thought out milking routine and properly functioning milking system. Essential elements of the milking routine include pre and post milking teat disinfection and use of individual towels to clean and dry teats. Properly ventilated barns are critical for all classes of livestock, because mycoplasma is also a respiratory pathogen. Some parts of the country experience a seasonal increase in the amount of positive bulk tanks during the colder months.

If your farm hasn't experienced mycoplasma mastitis and you're considering expanding it is a good idea to prepare a biosecurity program. A mastitis biosecurity program can decrease the risk of purchasing infected cattle. Begin a surveillance program for mycoplasma by setting up a milk culturing routine. Animals to culture would include: all newly purchased animals, fresh heifers and cows and clinical cases of mastitis.

Request to examine bulk tank cultures from the herd of origin. If possible, isolate purchased cows after calving until a negative composite milk sample is obtained. Do not house and milk fresh cows with the sick cows. Herds that are routinely purchasing cattle should routinely submit bulk tank milk for mycoplasma culture.

Frequent bulk tank milk culturing will provide an early warning if mycoplasma infected cows have entered your herd. Once you have a positive bulk tank for mycoplasma, then you will want to identify the affected cows. Smaller herds may choose to culture all the milking cows. However this can be an overwhelming task for large dairies. Pen or string sampling is a good strategy for larger herds. Remember not to move animals in or out of the pens while you are waiting for culture results.

Once you have identified affected pens, then you can culture a smaller number of cows. Once the affected cows are identified remove them from the milking string and submit another bulk tank sample for analysis. Either cull culture positive animals or isolate them into a separate group to be milked last. Remember the infected cows serve as a source for new infections.

Calves fed infected milk may develop pneumonia, joint infections and head tilts related to ear infections. Properly pasteurized waste milk will reduce the amount of mycoplasma below infective levels. Housing calves in properly ventilated buildings or huts will decrease their exposure to this respiratory pathogen.

Milk Money Fact Sheet 01

Staphylococcus aureus

Mike Maroney, DVM

Background:

Staphylococcus is a general name for a class of bacteria capable of causing mastitis (inflammation of the udder) in dairy cows. Mastitis caused by *S. aureus* is described as contagious. Surveys have reported isolating *Staphylococcus aureus* from bulk tank milk cultures in 43 to 92 percent of sampled herds. Clinical signs can range from abnormal milk to gangrenous mastitis. These pathogens may cause periodic episodes of mild to moderate mastitis that seem to resolve with or without treatment.

However, bacteriological cure of the affected quarter is rarely achieved. Infections are spread from infected cows to non-infected cows during milking via milking machines, milkers' hands, and teat cleaning materials such as towels used on more than one cow. Contact with milk secretions in stalls and bedded packs are a potential point of infection. Flies can serve as vectors of *S. aureus*, transferring it from one animal to another.

Staphylococcus aureus can be isolated from many body sites, including the teat skin and nose. Once *S. aureus* gets into the mammary gland, it invades deep into secretory cells and ductal tissue. Staph infections produce scar tissue and cause abscesses in the udder. This tissue destruction limits an infected quarter's ability to produce milk and to respond to treatment efforts.

Symptoms:

Herds with moderate to high levels of *S. aureus* commonly have elevated bulk tank somatic cell counts in the 300,000 to 750,000 cells/ml range. The percent of cows infected significantly increases with age and days in milk. This is because the milking process provides an opportunity to spread the infection. A majority of infected quarters at dry off will remain infected into the next lactation. The relapse rate of cows treated during lactation is high.

Cows infected with *S. aureus* may have multiple clinical episodes during the same lactation. The milk from infected cows may appear normal or be off-colored with flakes and clots. Somatic cell counts often are normal (<200,000 cells/ml) or slightly elevated for much of the lactation. Chronically infected cows may have abscesses or "knots" in their quarters that can be felt when the udder is milked out. During clinical episodes, quarters can show mild to moderate swelling and their somatic cell value can rise above 1,000,000 cells/ml. Rarely, a cow or heifer will develop gangrene or "blue bag" from a *S. aureus* infection. Infections can occur in heifers and at any time during lactation.

Diagnosis:

Culture the bulk tank to determine if *S. aureus* infections are present in the herd. Regularly monitor the bulk tank because the presence of *S. aureus* is variable. The frequency of bulk tank culturing should depend on the herd size and whether the farm is purchasing new animals. If *S. aureus* is present in the bulk tank, culture individual cows with somatic cell counts greater than 200,000 cells/ml (DHI linear scores > 4.0.)

S. aureus infections are characterized by intermittent shedding. Bacteria are not always shed in the milk at levels detectable by bacteriological culturing. Therefore, negative culture results do not guarantee that a cow is free of infection. To increase the probability of identifying all the *S. aureus* cows in the herd, consider the following recommendations:

Inform the bacteriological laboratory you are screening for *S. aureus* infected cows or quarters because the lab will use a larger amount of milk for each sample. Freeze samples after collection. Consider sending quarter rather than composite samples.

Finally, the likelihood of correctly identifying *S. aureus* infected cows is improved by sending in multiple samples collected from different milkings. Correct identification increases from about 70 percent to 90 percent by submitting at least three samples taken at different milkings.

Treatment:

It's not usually cost-effective to treat for *S. aureus* during lactation because reported cure rates commonly are around 25 percent. However, reported cure rates do vary considerably (5 to 70%). Differences in *S. aureus* strains probably contribute to this discrepancy. Treatment is more likely to work in the following situations: new infections (less than two weeks), single quarter infections, first lactation animals and in front quarters. Extended duration intramammary therapy may further improve cure rates. Consult with your herd veterinarian to design a treatment protocol and decision tree for your farm.

Preventive Management:

The "five-point plan" for mastitis control developed in the 1970's is a proven and effective method for controlling contagious mastitis caused by *S. aureus*. The five points are:

1. Post milking teat disinfection.
2. Dry cow treatment with antibiotics on all quarters of all cows.
3. Prompt treatment of clinical case of mastitis with antibiotics.
4. Regular milking system analysis and maintenance.
5. Culling chronically infected cows.

Regular bulk tank culturing will provide an early warning if *S. aureus* infected cows have entered the herd. Culturing all new arrivals to the herd is also a good biosecurity practice to limit the damage of introducing this mastitis pathogen to your herd.

Milker training is very important in contagious mastitis control. The milkers need to understand how the bacteria is spread in order to ensure that their milking habits are not contributing to the problem. The use of latex or nitrile gloves allows the milkers to easily disinfect their hands. Proper milking procedures, employee training and teat dipping can reduce the spread of *S.aureus* within your herd. Use of a single-use paper or cloth towels during the milking preparation procedure is recommended.

Separating the infected cows from the uninfected cows can help reduce the rate of spread of this mastitis causing pathogen. Grouping infected cows together and milking those animals last keeps milk from infected cows away from uninfected cows. Another technique is designating separate milking unit(s) only for infected cows. If you must use the same milking units for both infected and uninfected cows, then backflush between cows.

Herds grouping on *S. aureus* status should develop a continual, systematic culturing program to insure that infected cows remain separate from the uninfected group. Examples of these programs include: culturing all cows after they freshen, monthly examination of somatic cell records and culturing of suspect cows, culturing clinical cases, or periodic culturing of the uninfected group. Your herd veterinarian can help you design a program that will work for your farm.

House calves individually and avoid feeding waste milk from treated cows. Properly pasteurized waste milk will reduce the amount of *S. aureus* below infective levels.

Milk Money Fact Sheet 02

Streptococcus agalactiae

Mike Maroney, DVM

Background:

Streptococcus is a general name for a class of bacteria capable of causing mastitis (inflammation of the udder) in dairy cows. *Streptococcus agalactiae* (commonly called "*Strep ag*") is a common cause of subclinical and mild to moderate clinical mastitis infections in dairy cows. With subclinical infections the cows have an elevated somatic cell count without abnormal milk. Cows infected by *S. agalactiae* often have more than one infected quarter. Mastitis caused by *S. agalactiae* is described as contagious. Infections are spread from infected cows to non-infected cows during milking via milking machines, milkers' hands, and teat cleaning materials such as towels used on more than one cow.

S. agalactiae survives a very short time in the environment, but it can persist indefinitely within the mammary gland. Infected heifers and cows are the reservoir of *S. agalactiae*. The number of herds infected by *S.agalactiae* has been reduced by modern mastitis control programs. *S. agalactiae* can be eradicated from dairy farms, however it remains a biosecurity threat for dairies that purchase cattle.

Symptoms:

Herds with *S. agalactiae* mastitis frequently have bulk tank milk or DHIA weighted somatic cell counts that are consistently greater than 400,000 cells/ml with occasional counts reaching 700,000 cells/ml and greater. The standard plate count may occasionally rise above 100 colony-forming units (CFUs) in bulk tank milk, despite proper cleaning and sanitizing of milking and cooling equipment. Despite these alarming results the herd may only experience a monthly clinical mastitis rate of one or two percent. Heifers may freshen with "blind" or non-functional quarters. The herd may experience a very high cure rate (>70%)of clinical mastitis cases treated with approved intramammary antibiotics. DHI records may indicate rising somatic cell counts as cows get older and milk later in their lactation.

Cows' with *S. agalactiae* mastitis usually have elevated somatic cell counts but normal milk. Occasionally the cow may progress from subclinical to clinical mastitis. During episodes of clinical mastitis the signs are usually limited to abnormal milk and udder swelling. Cows affected by *S. agalactiae* infections can shed very high levels of the bacteria into the bulk tank and cause elevated plate counts.

Diagnosis:

Culture the bulk tank to determine if *S. agalactiae* is present within the herd. If S. agalactiae is confirmed in the bulk tank, aseptically collect milk samples for bacteriological culture from individual cows with somatic cell counts of 200,000 or higher (linear score of 4). Isolating *S. agalactiae* from greater than 15 percent of milk samples indicates a significant non-clinical mastitis problem.

Treatment:

S. agalactiae only lives in the udder of cows and 85-95% of infected cows are often cured by intramammary treatment using penicillin type drugs. Herd managers have two treatment options when trying to eradicate *S. agalactiae* from the herd. The first is called "blitz therapy." In this treatment scheme you treat all quarters of all cows with a penicillin type intramammary antibiotic tube for three milkings. Consult your veterinarian for advice on which antibiotic preparation to use. The second option is to culture and treat all cows that are diagnosed with *S. agalactiae* infections.

The difference between the treatment options is the cost of discarded milk versus the cost of additional bacteriological cultures. To determine what these costs are you may want to consult with your veterinarian. It will also be helpful to examine individual cows somatic cell counts or culture a group of cows to estimate the number of cows infected in the herd. Be sure to test the bulk tank for antibiotic residues after observing the appropriate withdrawal time.

A small percentage (5-15%) of treated animals will not be cured. Therefore three weeks after treatment, cows that continue to have high SCC values should be cultured again. You may retreat a second time, but segregate cows that remain chronically infected from the herd to prevent reinfection. These non-responding cows should be culled when economically feasible.

Treatment of cows subclinically infected with *S. agalactiae* usually results in increased production and dramatic decreases in bulk tank SCC values. Virtually all mastitis experts agree that treating *S. agalactiae* infections is economically beneficial.

Preventive Management:

The "five-point plan" for mastitis control developed in the 1970's has proven to be very effective for controlling contagious mastitis caused by *S. agalactiae*. The five points are listed here:

1. Post milking teat disinfection.
2. Dry cow treatment with antibiotics on all quarters of all cows.
3. Prompt treatment of clinical case of mastitis with antibiotics.
4. Regular milking system analysis and maintenance.
5. Culling chronically infected cows.

Regular bulk tank culturing will provide an early warning if *S. agalactiae* infected cows have entered the herd. Culturing all new arrivals to the herd is also a good biosecurity practice to limit the damage of introducing this mastitis pathogen to your herd.

Separating the infected cows from the uninfected cows can help reduce the rate of spread of this mastitis causing pathogen. This can be accomplished by grouping, designating a separate unit for infected cows or backflushing. It is very important not to spread the bacteria by using a paper or cloth towel on more than one cow, during the milking preparation procedure.

Milker training is very important in contagious mastitis control. The milkers need to understand how the bacteria can be spread in order to ensure that their milking habits are not contributing to the problem. The use of latex or nitrile gloves allows the milkers to easily disinfect their hands. Proper milking procedures, employee training and teat dipping can reduce the spread of *S. agalactiae* within your herd.

House nursing calves individually and avoid feeding waste milk from treated cows.