# Use of pirlimycin in a *Streptococcus agalactiae* eradication protocol

**G.P. Keefe,** *DVM MSc*
*Department of Health Management*
*Atlantic Veterinary College*
*University of Prince Edward Island*
*Charlottetown, PE C1A 4P3*



*Streptococcus agalactiae* is a highly contagious obligate parasite of the bovine mammary gland. The epidemiology of the pathogen has been reviewed elsewhere.[1] *S. agalactiae* continues to be a prevalent pathogen in the dairy industry in Canada and across North America.[1] In Prince Edward Island (PEI), in 1994, 15% of herds were infected.[2] Prevalence rates in the late 1980s and early 1990s in other parts of Canada have ranged from 11% to 43%.[1] In 1993 PEI dairy herds, infected with *S. agalactiae*, were 4 times more likely to get a milk quality penalty and 8 times more likely to lose Class 1 shipping status, due to repeat penalization, than culture negative herds.[2] At that time, imposition of a milk quality penalty, on Class 1 shippers, cost average sized producers approximately $1150/month and loss of Class 1 status cost, on average, $10,000.[3]

In the case herd, Class 1 status had been maintained despite having *S. agalactiae* for at least 3 years (the herd was first identified in 1993 as part of a province wide survey). During the August 1, 1995 - August 1, 1996 dairy year BTSCCs were above 500,000 in January, February and May. As a result, the producer had received one quality penalty (2 consecutive months above 500,000)[3] and was at risk of losing his Class 1 licence (4 months above 500,000)[3] for the remainder of the current dairy year and the subsequent year.

The herd was a purebred Holstein breeder currently milking 45 cows in a tiestall barn. Milking equipment checks on the farm, by an independent udder health technician, did not reveal any abnormalities. Cows were washed in sanitizing solution and dried using single service paper towels. The farm had been employing total dry cow therapy (TDCT) for 5 years but was not currently using post milking teat dip (PMTD) and had done so only intermittently for the previous 5 years.

Because of the potential of losing Class 1 producer status, simply instituting a program of PMTD and continuing the TDCT was not an option. Upjohn sponsored field trials have shown pirlimycin to have an efficacy of 75-92% against clinical mastitis caused by *S. agalactiae*.[4] It was postulated that pirlimycin's reduced milk withhold might make therapy with this antibiotic a good option for an eradication protocol, if efficacy was similar to penicillin-containing products.

The eradication protocol was modeled after the methods previously described by Kirk and Mellenberger.[4] Animals were considered to be free of infection if they had 2 negative composite milk samples, greater than 3 w apart. As part of the eradication protocol, whole herd culture using composite samples was conducted on day 1. Bacteriology results were available on day 5 and *S. agalactiae* was cultured from 10 of 45 cows. At that time, all quarters on all culture positive cows were treated with pirlimycin hydrochloride (Pirsue®, Pharmacia & Upjohn, Orangeville Ontario) according to the label recommendations (1 tube/quarter repeated once at 24 hours). The herd milking order was changed to milk low SCC cows first, then high SCC cows and finally known infected animals. On day 9, the bulk tank was sampled to insure that there were no violative residues.

On the twenty-second day after the beginning of the protocol, milk cultures were repeated on all cows. Four cows were found to be infected; 2 "new" cases not previously identified and 2 cases which had been treated with pirlimycin on day 5. All culture positive cows were treated with pirlimycin according to the label recommendation. On day 44, any cow without 2 negative cultures (positive on day 1 or 22) was recultured. In total 12 cows were cultured and *S. agalactiae* was isolated from 2 cows. These 2 animals were the same 2 cows that had been refractory to the first treatment with pirlimycin. The producer was given the option of culling these animals, early dryoff and TDCT, or treating with a different lactational antibiotic. The farmer chose the latter and these 2 cases were treated with a penicillin containing intramammary infusion product (Special Formula 17900-Forte®, Pharmacia and Upjohn, Orangeville Ontario). On day 65, the entire herd was recultured and no animals were found to be infected. Three weeks later the 2 cows which were refractory to therapy on day 5 and 25 were cultured again and found to be negative. A final herd culture was conducted on

day 175 to insure that all cows, including those that were dry during the eradication protocol, were negative.

The producer was informed of the various possible routes of re-emergence of the pathogen on the farm. He has initiated a regular udder health management and monitoring program with his herd veterinarian and has adopted the major points of the 10 point mastitis program.

Bulk tank somatic cell counts (BTSCC) for 5 m prior and 6 m after initiation of the eradication protocol are given in Figure 1. In Ontario, Schukken *et al* found that for herds in a rolling 2 month penalty scheme (PEI system) with a penalty level of 500 X $10^3$, BTSCC goals should be set at 290 X $10^3$ or less to have a 99% chance of not incurring a penalty.[6] Since the month following the initiation of the eradication program the study herd has had BTSCC below this threshold.

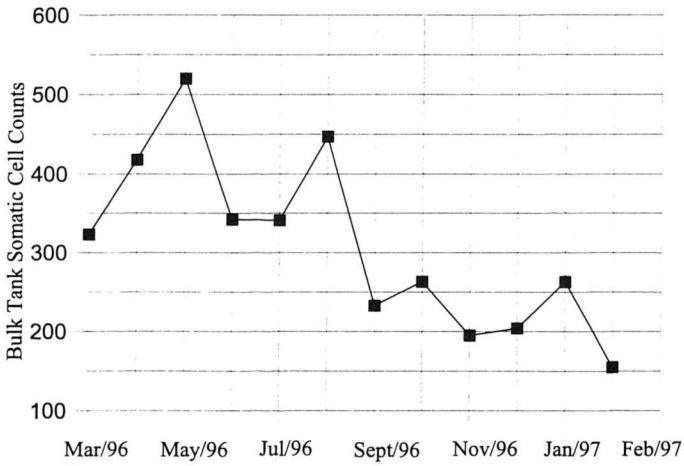


**Figure 1.** Monthly Bulk Tank Somatic Cell Counts

BTSCC is a useful measure of milk quality but, particularly in small herds, individual cow somatic cell counts (SCC) are more appropriate for calculation of the level of subclinical mastitis in the herd or the economic loss associated with subclinical mastitis.[7] The Animal Productivity and Health Information Network (APHIN), at the Atlantic Veterinary College includes a spreadsheet application which calculates anticipated milk production and economic losses associated with the distribution of individual cow SCC in the herd.[8] Individual cow SCC were available on the study herd on an approximately monthly (11X/year) basis. These data were downloaded from the Atlantic Dairy Livestock Improvement Corporation (ADLIC) to APHIN and a summary of the analysis for the 5 tests prior to the eradication program and the subsequent 5 tests is provided in Table 1. Yamagata *et al* found that cows with *S. agalactiae* returned to anticipated levels of production in the same lactation following treatment.[9] In the study herd, SCC and the predicted dollar losses associated with subclinical mastitis were lower after treatment ($p<.05$).

**Table 1.** APHIN Mastitis Analysis Before and After Eradication

| Test date | Number of cows tested | Percent with SCC above 200 X $10^3$ | Predicted Milk loss (L) per day | Predicted dollar loss per day |
|---|---|---|---|---|
| March '96 | 47 | 38.1 | 38.55 | 15.42 |
| April '96 | 45 | 52.3 | 52.50 | 21.00 |
| May '96 | 46 | 50.0 | 60.68 | 24.27 |
| June '96 | 43 | 51.2 | 50.12 | 20.05 |
| July '96 | 44 | 46.5 | 63.42 | 25.37 |
| Average (Before) | 45 | 47.7 | 53.05 | 21.22 |
| August '96 | 47 | 45.7 | 38.64 | 15.46 |
| October '96 | 46 | 30.4 | 19.80 | 7.92 |
| November '96 | 44 | 34.1 | 17.46 | 6.99 |
| December '96 | 45 | 29.3 | 12.55 | 5.02 |
| January '96 | 48 | 29.2 | 22.78 | 9.11 |
| Average (After) | 46 | 33.8 | 22.25 | 8.90 |

In this case study, pirlimycin efficacy was 80% on the initial course of therapy but it did not perform well in cases which had previously been refractory to treatment. Using Pirsue® (48h milk withhold) over Special Formula 17900-Forte® (72h milk withhold) saved the producer 10 cow-days of milk on the initial treatment. At the production levels in the study herd and current Canadian milk prices this would represent approximately $150. No positive control, using longer withhold penicillin containing products, was included in the study design. As a result, a complete economic analysis of the 2 protocols is not possible. However, in certain situations it may be beneficial to use pirlimycin as a first line of therapy to be followed by penicillin products for nonresponders.

*Pharmacia and Upjohn provided support, in the form of free product, to conduct this case study.*

## References

1.Keefe GP, *Streptococcus agalactiae* mastitis: A review. *Can Veterinary J* in press. 2. Keefe GP, Dohoo IR, and E. Spangler. 1997. Herd prevalence and incidence of *Streptococcus agalactiae* in the dairy industry of Prince Edward Island. *J Dairy Sci*; 80:464. 3. Keefe GP, 1995. Herd prevalence and incidence of *Streptococcus agalactiae* in Prince Edward Island and evaluation of an eradication extension program. MSc Thesis, University of Prince Edward Island, Charlottetown, PEI. 4. Hallberg JW, Henke CL and CC Miller. 1994. Intramammary antibiotic therapy: To treat or not to treat? Effects of antibiotic therapy on clinical mastitis. Page 28 in 33rd *Proc Natl Mastitis Counc,* Natl Mastitis Counc, Arlington, 5. Kirk J, and R Mellenberger. Mastitis control program for *Strep. ag.* infected dairy cows. North Central Regional Extension Publication No. 275. 6. Schukken YH, Leslie KE, Weersink AJ and SW Martin. 1992. Ontario bulk milk somatic cell count reduction program. 2. Dynamics of bulk milk somatic cell counts. *J Dairy Sci*; 75:3359. 7. Leslie KE, Dohoo IR, and AH. 1983. Somatic cell counts in bovine milk. *Compend Contin Educ Pract Vet*; 11:s601. 8. Dohoo IR. 1992. Dairy APHIN-an information service for the dairy industry in Prince Edward Island, Canada. *Prev Vet Med;* 12:259. 9. Yamagata M, Goodger WJ, Weaver L, and C Franti. 1987. The economic benefit of treating subclinical *Streptococcus agalactiae* mastitis in lactating cows. *J Am Vet Med Assoc* 191:1556.