Use of Dry Period Intramammary Antibiotic Therapy and Other Forms of Mastitis Control in Dairy Cows: Survey Results

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Introduction

The use of intramammary antibiotic therapy at the beginning of the dry period is a standard recommendation for mastitis control in dairy cattle. Experimental studies have demonstrated that it is effective in decreasing the number of new cases of intramammay infections (IMI) caused by the contagious pathogens, *Staphylococcus aureus* and *Streptococcus agalactiae* and the environmental *Streptococci sp.* (5, 7). It also has been experimentally demonstrated that dry cow treatment (DCT) is effective in eliminating chronic infections of *Streptococcus agalactiae,* but less effective in eliminating the chronic IMI caused by *Staphylococcus aureus* (6, 2). The net effect of DCT is lower prevalence within a herd of IMI caused by the contagious pathogens.

Observational studies focusing on the economics have been less supportive of DCT. Recent studies using somatic cell counts (SCC) as the outcome were unable to find a positive effect of DCT in decreasing SCC (1, 3, 4). A shortcoming of these studies is that they had no data on the etiology of the infection. Previous evidence suggests that DCT effectiveness is conditional on the bacteria associated with IMI (7). By not specifying the type of bacteria associated with IMI, the results could suggest no effect when in fact the results were biased towards the result of no effect. Another concern in these studies is the lack of a specified induction time for the effect of DCT on rate of infection. On a herd level, induction time for the effect of treatment should be specified. Too short of an induction time will bias the study results towards no effect.

The objective of this report is to present preliminary results from a survey of producers regarding their use of mastitis control practices. However, the overall objective of a larger study, which will utilize the survey data summarized here, is to determine the economics of DCT. DCT economics will be considered conditional on the predominant mastitis agents in a herd. The study has three components: a microbiologic assessment of herd bulk tank samples, evaluation of herd SCC, and evaluation of herd mastitis control practices.

Materials and Methods

Study Population: Herds that were participants in the Ohio Dairy Herd Improvement Association SCC option (DHI-SCC) and members of Milk Marketing Inc. (MMI) in January of 1990 were included in the study. These criteria for participation were chosen so that individual cow SCC and bulk tank milk samples for culturing could be readily obtained.

Data Collection: A mail survey was designed to assess the methods of mastitis control used by participants. Using member rosters obtained from both DHI and MMI, a single mailing list was compiled.

The mail survey was implemented using the following protocol: Questions were pre-tested on a small sample of MMI members and MMI field personnel. Data from pretesting were analyzed to ensure that questions addressed the issues of mastitis control being investigated. Initial survey packets were mailed in May of 1990 and consisted of cover letter, questionnaire, and stamped return envelope. A reminder postcard was mailed one week after the initial mailing. A second survey packet was sent to non-responders three weeks following the initial mailing. A final survey packet was sent 7 weeks after the initial mailing. The target for the response rate was 80%.

Four areas of mastitis control were surveyed: 1) methods of DCT, 2) methods of pre- and post-milking teat antisepsis, 3) pre-milking preparation of the cow, concentrating on hygiene, and 4) strategy for handling cows with repeated episodes of mastitis, specifically culling strategies. Additionally, producers estimated the number of cows which had mastitis and which were treated for mastitis during the previous 30 days.

Data Analysis: Analysis consisted of calculating per-

cent of farms using various mastitis control methods. For each of the mastitis control practices, unadjusted risks for cows being treated for mastitis were calculated. Risk equaled the number of cows treated during the month prior to receipt of the questionaire divided by the number of lactating cows.

Results

Questionnaire Response Rate: A total of 1076 farms were identified as unique dairying units participating in DHI-SCC and MMI. Some of these farms had multiple DHI identification but were owned and operated by the same person. Consequently, 1032 questionnaires were mailed. A total of 877 of these surveys have been returned to date for a return rate of 84.9%.

Questionnaire Results: Univariate statistics summarizing the results of the mastitis control questionnaire are shown in Table 1:

Table 1: Mastitis control practices of 877 Ohio dairy farmers[1] as determined by mail survey, 1990.

Mastitis Control Practice	Percent
Method of Dry Cow Therapy	
Do not dry treat	3.1
Dry treat all cows	87.4
Selective dry treatment	9.5
Method of Pre- and Post-Milking Antisepsis	
NFo pre-milking teat dip	38.6
Always pre-dip	57.0
Selectively pre-dip	4.4
No post-milking teat dip	1.5
Always post-dip	91.8
Selectively post-dip	6.6
Products used for post-milking teat dip	
Iodine	61.4
Chlorhexidine	8.8
Hypochlorite solution	5.7
LDBSS	4.6
Teat barrier	11.1
Multiple products	8.4
Pre-milking Hygiene	
No cleaning	0.4
Wipe off dirt and pre-dip	31.2
Wipe off dirt only	2.0
Wash udder and teats[2]	12.5
Wash teats only[2]	48.3
Other methods	5.6
Drying following cleaning	
Air dry	13.1
Single towel used per cow	74.3
Same towel for more than one cow	12.6
Culling practices for cows with repeated mastitis problems	
Never cull	3.2
Sometimes cull	74.8
Always cull	22.0

[1] Members of Ohio Herd Improvement Association with somatic cell count option and Milk Marketing Incorporated
[2] Includes farms that wash and pre-dip

Relation of mastitis control practices and the risk of being treated for mastitis: Farmers that selectively dry treated a high proportion of their cows had a higher risk of treating cows for mastitis than farmers that either dry treated all cows or none. The lowest risk for treatment was observed for herds that did not dry treat (Table 2)

In herds that were not post-milking teat dipped, approximately 30% fewer cows were treated for mastitis than in herds where all cows were teat dipped after milking. In herds that teat dipped with exceptions (ie. no dipping in winter or on the coldest days) 20 % more cows were treated for mastitis compared to herds where all cows were always teat dipped (Table 2). Farmers who used a single teat dip product had a lower risk for treating cows than those farmers who used multiple products for teat dipping.

Farmers who selectively predipped their cows had a higher risk of treating cows for mastitis than farmers who pre-dipped either all or none of their cows (Table 2).

Table 2: Risk of cows of being treated for mastitis given different mastitis control practices from a survey of 877 Ohio dairy farmers, 1990.

Mastitis Control Practice	Number of Farms[1]	Median Risk[2]	Mean Risk	Range of Risk
% cows dry treated				
90	747	0.031	0.036	0-0.417
76-90	27	0.037	0.052	0-0.160
51-75	11	0.020	0.034	0-0.178
26-50	15	0.021	0.028	0-0.167
26	59	0.006	0.024	0-0.129
Post-milking teat dip				
no	13	0.0	0.012	0-0.038
selectively	57	0.031	0.044	0-0.160
yes	786	0.030	0.036	0-0.417
Pre-milking teat dip				
no	331	0.026	0.034	0-0.417
selectively	38	0.044	0.055	0-0.160
yes	489	0.030	0.036	0-0.178

[1] missing data not included
[2] Risk = No. Cows treated for mastitis / No. lactating cows

Discussion

These preliminary results show that most of the dairy farmers surveyed (DHI and MMI members) have adopted the conventional practices of mastitis control. Eighty-seven percent dry treat all cows, 92% post-milk teat dip, greater than 99% use some form of pre-milking cleaning protocol, and 74% use a single-use towel for drying. Fewer than 25% of farmers followed the practice of culling cows with repeat episodes of mastitis. A majority (57%) of farmers responding to this survey have adopted the practice of pre-dipping all cows.

The relationship of mastitis control practices and the risk of treating mastitis should be interpreted carefully. First, these data are derived from a cross-sectional study which do not allow conclusions regarding cause and effect. For example, farmers that use several products for post-milk teat dipping may do so because they are searching for an answer to their clinical mastitis problems as opposed to their problem being the result of the use of multiple products. Second, the data are based on farmers' perceptions of when a cow should be treated for mastitis, a subjective decision, and recall of the events. Third, only univariate analyses were presented here. Further analyses of these data will be conducted using multivariate methods to control for confounding factors.

Although these results are preliminary, they suggest that some mastitis control practices may not be efficacious. These data will be used in subsequent analyses in conjunction with bulk tank microbiology and SCC to examine the value of the mastitis control practices surveyed.

References

1. Barnum D.A. and A.H. Meek. 1982. Somatic cell counts, mastitis and milk production in selected Ontario dairy herds. Can J Comp Med 46:12. 2. Eberhart, R.J. 1986. Management of dry cows to reduce mastitis. J Dairy Sci 69:1721. 3. Howard, W.H., T.O. Knight, C.R. Shumway, R.W. Blake and M.A. Tomaszewski. 1987. Information and herd health management practices in Texas dairies. Southern J Agri Econ 19:1. 4. Miller, G.Y. and P.C. Bartlett. 1990. The economic effects of mastitis prevention strategies for dairy producers. Submitted. 5. Natzke, R.P., R.W. Everett, R.S. Guthrie, et al. 1972. Mastitis control program: Effect on milk production. J Dairy Sci 55:1256. 6. Smith, A., D.R. Westgarth, M.R. Jones, F.K. Neave, F.H. Dodd and G.C. Brander. 1967. Methods of reducing the incidence of udder infection in dry cows. Vet Rec 81:504. 7. Smith, K.L., D.A. Todhunter and P.S. Schoenberger. 1985. Environmental pathogens and intramammary infection during the dry period. J Dairy Sci 68:402.

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