Thoughts on Bovine Mastitis Control Programs

Clarence J. Johanns
Iowa State University
Thoughts on Bovine Mastitis Control Programs
by Clarence J. Johanns, D.V.M.*

Various loss estimates due to mastitis in dairy herds are alarming. Figures given range from $100 per cow per year to ten percent loss of production and production potential. If due only to economic survival in this age, these losses must be recognized and minimized. In addition where there are so many starving people in the world, we are morally bound to be more efficient in the production of milk.

Regardless of the size of the production unit, its management must be willing to continually strive for efficiency and recognize practices that may eventually lead to a costly problem. This paper's objective is to summarize the steps necessary in a mastitis control program. Development of a program for mastitis control involves two people: the dairyman and the veterinarian.

THE DAIRYMAN AND HIS ROLE

The dairyman should have every reason to want the benefits of such a program. He must give cooperation and full participation. He must be broadminded enough to realize the different factors involved in mastitis and pledge to do his best, even if it means changing habits acquired from past years.

Since mastitis is primarily a management disease, the dairyman must continually develop and improve his sanitation and management. Records such as DHIA and cost per 100 pounds of milk produced should be used to measure success of the efforts made.

The major difficulties encountered in developing a control program for dairymen are the existing facility, equipment and, in some instances, the registered dairy herd. The losses incurred in an existing herd problem are due primarily to loss of production potential, production itself and the cost of therapy. However, it seems that the cost of changes are measured in real dollars and interest, whereas the production and its potential are theoretical and are on paper only.

An existing facility must be evaluated as to its contribution toward the mastitis problem. In some instances its faults are very obvious, yet at other times they are less conspicuous. Its role in the environment and its effects on mastitis are not completely understood. Good judgment is the most obvious tool used in these areas. Every effort should be made in the existing facilities to provide an environment which is clean, dry, pleasant, and in which minimal traumatic experiences may occur.

Some programs are short lived due to failure of the purebred breeder to remove certain members from the herd which are found to be chronic bacterial carriers of mastitis. These animals may be able to remain in the herd if certain measures are taken. This often requires extra work which may add to the already large burden of labor.

An existing herd problem often creates, in the mind of the dairyman and in his pocketbook, a financial loss. However, all other costs have remained nearly the same. The suggestions for lessening the effect of this existing problem may seem too costly

* C. J. Johanns, B.A., D.V.M., M.S., is Assistant Professor of Veterinary Clinical Science at Iowa State University, Ames, Iowa.
for the dairyman to completely agree with, particularly if he has already over extended himself and his funds. The success of such programs is limited to the source and amount of available capital. The dairyman who becomes aware of the necessity of such a program as a means for increasing production and therefore improving his management and sanitation procedures before a herd problem occurs, actually enjoys the larger benefit.

A major part of the program is one of continuing education and periodical evaluation.

THE VETERINARIAN AND HIS ROLE

The veterinarian, in most instances, is aware of the important role he has in such programs. A working knowledge of milking machines, practical procedures for bacterial isolations in his laboratory, and a thorough knowledge of the physiology and pathology of the mammary gland are necessary for full participation by the veterinarian. Insufficient time and lab facilities are the main obstacles to his participation.

Other limitations which affect the veterinarian’s participation and the program are:

1. limited scientific data on epidemiology of bacteria which have an important role in causing mastitis.
2. therapy limitations—resistant organisms and inadequate penetration of drug into foci of inflammation.
3. costs of such programs and their administration fees.
4. methods used to continually evaluate these programs.
5. a more exacting role of the milking machine and its influence on mastitis.

The most important aspect of the veterinarian’s work is his influencing role on the dairyman, encouraging him to improve his own procedures and to put into action those practices which are known to be effective. The team is formed. A more sound relationship develops. Together they seek to increase production. They cannot wait until every fact is known and researched. Life and its demands do not allow this.

INFECTIOUS MASTITIS

Our emphasis as veterinarians must be concerned with the control of udder infections and reduction of the transmission of infectious organisms. Since this is difficult, there is doubt as to the validity of such programs. However, each program must be directed toward this goal. In approaching the ideal, an outline is followed. Each step must accomplish its purpose before the next step can be taken, otherwise there is a wastage of time, money and effort.

Of all bacteria known to cause mastitis in dairy cows, *Streptococcus agalactiae* is the only species which can be totally eliminated from a herd. Its primary habitat is the epithelial surfaces of the mammary gland, particularly that of the ducts which transport milk from the alveoli to the gland cisterns. This bacteria is and remains sensitive to penicillin. These two facts explain why *Streptococcus agalactiae* can be totally eliminated from a herd. A re-introduction into the herd is brought about by an admittance of a carrier animal.

*Streptococcus agalactiae* has developed the ability to perpetuate and to survive the body’s defenses within the mammary glands. How it overcomes the body’s defenses and develops clinical mastitis is not clearly understood. The lesions produced are mainly proliferative and found in the ducts, alveoli and interstitial areas of the mammary gland.

In regard to *Streptococcus agalactiae* elimination, an organized program of culturing, therapy and reculturing must be undertaken at short intervals if the elimination attempt is to be successful. Once eliminated, periodic culturing of bulk milk samples could be used as a screen for the organism.

Other species of streptococci, *Staphylococcus aureus*, and the coliforms are implicated in infectious mastitis. These bacteria can only be controlled, as our knowledge of their ecology is limited. Our efforts must be directed toward improvement of management prac-
tices and sanitary procedures in regard to these organisms. Continued research in their epidemiological aspect is a necessity.

**STEPS IN INITIATION OF A CONTROL PROGRAM**

1. Regardless of the reason for the program, the veterinarian must acquaint himself with the aspects of management and nutrition of the herd. DHIA, existing herd production and health records must be evaluated. This can be done in the veterinarian's office or on the farm itself. A previously prepared questionnaire would allow these questions to be answered and recorded in an organized manner.11

2. An inspection trip to the farm at milking time will allow for an observation and evaluation of milking management, milking machine, and sanitation procedures. Quarter samples from 12–20 cows, with and without history of mastitis, should be collected. A screening test such as the CMT or the catalase on the quarter samples should be used. In this manner an abnormal leucocyte level in the milk will confirm the isolate as being from the milk rather than from the streak canal, skin surface or an air contaminant.4 This evaluation results in:

   a. comments, recommendations, or changes necessary in management, sanitation, or equipment. The milking machine representative may or may not be present on the initial visit, but he should be consulted if there are any questions or changes to be made in the equipment.

   b. the incidence and identification of the predominant organisms within the herd. This will aid in determining the prognosis and estimated cost of the program.

   c. teat dipping after milking with chlorhexadine or iodine solutions of 5,000 ppm. This procedure has been shown to reduce streak canal infections, control pseudo cowpox lesions and improve teat health.12

3. Management changes should be followed in 40 to 60 days by a complete herd culture. Previous to this culturing, non-lactating cows should be cultured and treated if found infected.5,10,16,24 Since the dry period is the most opportune time to treat, it is recommended regardless of the kind of program. Its benefit without herd culturing is limited.

The quarter sampling and bacteriological examination are not necessary unless:

   a. *Streptococcus agalactiae* is to be eliminated.

   b. other bacterial infections are to be controlled. Culturing without a specific preventive plan does not reveal its fullest value to the dairyman. Samples collected from entire herds and examined bacteriologically have revealed 60 to 70 percent of the cows infected in at least one quarter.11,20,23

A milking order can be determined with the aid of the screening tests, history and clinical signs. Culturing is a more exacting and expensive method of arriving at a milking order unless culturing fits into the overall goal.

Various reports1,2,5,6,10,16,18,20 indicate mastitis programs are being tried, evaluated, and put into practice throughout the world. In time, they will be accepted as a means of minimizing waste and insuring a larger return. The old saying “an ounce of prevention is worth a pound of cure” certainly applies to the prevention of mastitis, since in most cases the disease produces irreversible changes in the mammary gland.

**SUMMARY**

1. The loss of production and its potential must be minimized by the dairyman today if his dairy enterprise is to be profitable.

2. Major difficulties encountered in developing a mastitis program are the dairyman, the existing facilities, the registered herd, available capital, an

Continued on page 58

Iowa State University Veterinarian
6. Teat dipping has been shown to be highly effective in reducing mammary gland infections. Dry cow treatment has two important functions: to treat an existing bacterial infection and to decrease the incidence of dry cow mammary gland infections.

REFERENCES


EDITOR'S NOTE

Iowa State University has not included specific course offerings in laboratory animal medicine in the undergraduate veterinary curriculum. Graduate courses pertaining to anatomy, physiology, pathology, and surgery and medicine of laboratory animals are offered and some information on this topic is included in some presently existing undergraduate courses.

A symposium pertaining to the "Laboratory Animal Welfare Act" was presented in May of 1967 at Iowa State University and a University "Animal Welfare Committee" was named to study laboratory animal welfare for the Institution.

A staff position for a laboratory animal veterinarian has been created and future plans call for this person to assist in developing an "Animal Welfare Program" for the College of Veterinary Medicine and the University.

The statement above was prepared by W. M. Wess, D.V.M., Ph.D., Professor of Veterinary Medicine and Surgery, and Head of the Department of Veterinary Clinical Sciences at Iowa State University, Ames, Iowa.

Continued from page 38