

AN EVALUATION OF EXISTING AND PROPOSED MASTITIS CONTROL PROGRAMS AND PROPOSALS OF THE NATIONAL MASTITIS COUNCIL¹

PREPARED BY THE COMMITTEE ON CONTROL PROGRAMS
AND PROCEDURES OF THE NATIONAL
MASTITIS COUNCIL

ORGANIZATION

In the spring of 1960, the executive board of the International Association of Milk and Food Sanitarians (IAMFS) appointed a special committee to organize an invitational meeting for the purpose of presenting a review of the problem of bovine mastitis to interested leaders in the dairy industry, to health and agriculture agencies of Federal, State, and local government, and to certain professional groups in the hope of initiating a uniform national effort for the control of this disease.

This special committee, known as the Mastitis Action Committee, was composed of representatives of the Farm Methods Committee of the IAMFS, the American Veterinary Medical Association, the American Farm Bureau Federation, the National Milk Producer's Federation, the U. S. Department of Agriculture, the U. S. Public Health Service, dairy trade publications, and dairy trade associations. This committee developed a conference which was held on October 29, 1960, in Chicago with over 200 people present, representing producers, processors, public health and regulatory agencies, and educational institutions. The conference program considered four areas:

1. The Public Health Problem
2. The Economic Problem
3. The Status of Research
4. The Regulatory Problem

From this meeting on October 29 came a directive to the IAMFS Farm Methods Committee to develop a continuing organization to serve as a national force in furthering mastitis research and control. The conference recommended that a national committee for mastitis action should be established composed of one to three representatives of appropriate organizations interested in the program.

Following the conference, the Farm Methods Committee of IAMFS took steps as directed to create a continuing national organization. A document of incorporation was established. Over a dozen organizations indicated a desire for membership. Officers were elected and standing committees established to begin the work of the new organization.

The National Mastitis Council is now incorporated in Illinois as a non-profit corporation. Its work is being done by representatives of its member organizations. Representatives of the U. S. Department of Agriculture and the U. S. Department of Health, Education, and Welfare serve as consultants without vote rather than as a part of the policy making body. The National Mastitis Council now has a President, Executive Secretary, and Treasurer. Standing committees have been appointed on finance, research, education, and programs and procedures.

THE PROBLEM

The problem caused by mastitis is one of many facets involving public health and economic considerations and unique requirements for the development of control programs.

Consider the public health problem. Human infection may result from the consumption of raw milk containing the organisms which are often involved in bovine mastitis. This group of organisms includes *Escherichia coli*, *Corynebacterium pyogenes*, *Pasteurella multocida*, *Salmonella* species, and certain streptococci. Food poisoning may result from enterotoxin which may be present as a result of the growth of *Staphylococcus aureus*. Such food poisoning outbreaks have been reported among people who have consumed foods made with spray-dried skim milk powder. These instances have occurred in England and Puerto Rico. Staphylococcus enterotoxin food poisoning has been reported in several midwestern States due to eating cheddar cheese containing the enterotoxin. Still another public health problem (although now under apparent control) is the presence of antibiotic residues in milk. Persons who develop sensitivities to certain antibiotics may experience severe allergic reactions after consuming milk or milk products containing antibiotic residues.

Consider the economic problem. Mastitis is the most costly disease affecting the dairy industry. Yet it may not be very dramatic or even particularly apparent to the individual dairyman. Although it may be constantly leaching away a dairyman's profits, it does not alert him in a dramatic way to the serious losses which he is constantly suffering as would the loss of a total herd from a positive tuberculin test or a positive blood agglutination test for Brucellosis. The U. S. Department of Agriculture publication, *Losses in Agriculture, 1954*, reported an estimated

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loss due to mastitis of \$225,805,000 per year. This figure represents only the loss of animals and milk. When you consider the cost of therapy, milk withheld following mastitis treatment, and the value of unsalable milk discarded because of untreated mastitis, the total annual loss will approach one-half billion dollars per year. This figure would be considerably higher if the time spent by the dairy farmer in feeding, raising feed, and other activities were given a dollar value and included in the total losses. The cost of therapy has been increasing. Bulk antibiotics increased 1.3 million dollars from 1958 to 1959. This may indicate an increased usage of antibiotics as well as an increase in the incidence of mastitis. It may also indicate that with greater availability, antibiotics have been used more freely and probably without the benefit of an accurate diagnosis.

Consider the control problem. Bovine tuberculosis and bovine brucellosis are diseases caused by specific organisms and lend themselves quite readily to specific test and elimination procedures. They can both be controlled primarily by the action of State and Federal government agencies. Control of these diseases is dependent upon a single test and upon elimination of the animals found to be infected on any given test. Mastitis is a disease caused by a variety of microorganisms and aggravated by a multitude of stress factors. The control of mastitis will depend primarily upon the dairyman and his management practices and, secondarily, upon the professional assistance he may be able to obtain.

PROGRAMS

The Committee on Programs and Procedures of the National Mastitis Council has attempted to make a study of what is currently being done in the field of mastitis control. In making this study, the Committee sent questionnaires to several potential sources of information in each State. These sources included the State Health Department, the State Department of Agriculture, Agriculture Experiment Station or Agriculture Extension Service, College of Agriculture, and College of Veterinary Medicine (17 States). The return from these questionnaires was very gratifying and shows a significant effort being made and widespread planning for further control activities. One must remember that this report is a strict evaluation of the information given in the replies to the questionnaire.

Most States have some type of educational program. These programs consist mainly of distributing educational literature containing information on suggested mastitis control measures. Many States conduct courses for county agricultural agents or agricultural leaders instructing them in control methods. States having schools of veterinary medicine periodi-

cally hold refresher courses for veterinarians.

Seven States have proposed programs. In these States committees have been formed, procedures outlined, and in some cases studies have been made of active programs in other States.

Ten States indicate that they have an active control program. However, none of these is capable of providing complete service to even the Grade A milk producers. These programs vary from a State-wide effort to research and control projects limited to small areas of the State. Just two States have what could be called a full-fledged program offering service to the entire State.

Eleven States reported funds available for mastitis control activities. Two of these did not indicate the amount of money. The remaining nine had funds ranging from \$1500 to \$235,000 per year.

Thirty-five States reported a total of 86 laboratories equipped to conduct mastitis diagnostic work. Sixty-three of these are State laboratories, 7 are operated by the dairy industry, and 16 are privately owned laboratories. Several of the States reporting active programs did not indicate that laboratory facilities were available. The existence of more facilities is possible.

Judging from the reports, two States have what the National Mastitis Council considers to be a State mastitis control program. Connecticut was the first State to develop a program having had State funds appropriated each year since 1940. The present budget is approximately \$75,000 per year. One laboratory at the University of Connecticut conducts the laboratory examinations on the quarter samples collected by trained field technicians. *Streptococcus agalactiae* is eliminated first and other organisms dealt with as they appear. The participating dairyman must work with a veterinarian to assure effective treatment and elimination of the disease. Educational activities are conducted through leaflets sent to dairymen.

New York's program organized in 1956 is quite similar to that of Connecticut, except that New York State may pay more attention to abnormal secretions or abnormal milk than does Connecticut. Both states have developed an impressive number of *Streptococcus agalactiae* free herds. Indication of the value of elimination of *S. agalactiae* is found in reports from Connecticut as well as New York State. Reports from Connecticut, a few years ago, revealed that a group of herds free of *S. agalactiae* produced an average of 10% more milk than they did when infected. The 1960 Annual Report of the New York State Veterinary College shows that in herds where 35% of the cows were infected with *S. agalactiae*, there was an incidence of 13% abnormal secretion; whereas, in the herds free of *S. agalactiae* the inci-

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dence of abnormal secretions was 6%. This is a very good example of the effect that the elimination of *S. agalactiae* can have on milk quality.

Another indication of milk quality in relation to mastitis control also appears in the 1960 New York State report. In 111 herds not under an organized mastitis control program, 70% delivered milk with 1 million or more leucocytes, whereas, 94 herds under a mastitis control program revealed 23% with a count of 1 million or more cells.

Some other States have programs that are not as extensive as those in Connecticut and New York. California has a mastitis control project involving 35 counties under the direction of the School of Veterinary Medicine and the Extension Service. This project provides services to 540 herds containing about 85,000 cattle. In this project the California Mastitis Test is used for screening purposes. Seventeen laboratories furnish the laboratory support for the project. Much attention is directed toward the milking equipment as the major source of stress predisposing the cow to mastitis. Funds for the project are obtained from fees charged for the California Mastitis Test. Training courses are available to veterinarians, extension personnel, and dairymen.

Florida has a mastitis prevention and control program stressing good herd management, milking techniques, and proper milking machine installation. This program is operated on a \$95,000 annual budget. One laboratory services the project.

Maine conducts surveys on milk as received at the dairy plant. Dairymen having positive samples are notified and advised to contact their local veterinarians. Dairymen with unusual problems may seek assistance from the State.

Michigan is beginning a State program consisting primarily of educational activity.

New Hampshire operates a small service program on a budget of \$11,000 per year, making a small charge for tests. Dairymen are currently demanding more service.

Vermont has a prevention and control program operated by the State extension service. Training sessions and demonstrations are provided which explain the California Mastitis Test, proper milking equipment operation, and good herd management practices. This work is conducted on a budget of \$3,500 per year.

Wisconsin has a program which is an extension of an experimental project originating at the University of Wisconsin. Consideration is currently being given to extending this project into a statewide program which will include checking milking equipment and milking procedures, along with the laboratory examination of quarter samples and providing advice to dairymen. This is a cooperative effort of the Uni-

versity of Wisconsin, the State dairy industry, and practicing veterinarians.

Puerto Rico does not have a program but it is interesting to note that in recent field surveys using the California Mastitis Test as many as 72% of the cattle in one area were positive.

In addition to State programs, several local attempts are being made. For instance, the New York City Department of Health, in cooperation with the New York State Mastitis Control Program and the New York State Veterinary Medical Society, has inaugurated a "screening" test for detection of inferior quality of milk due to mastitis or abnormal udder secretions. Modified Whiteside Tests were conducted on milk collected from bulk or weigh tanks delivered to six plants supplied by 640 farms. It was found that about 8% of the milk contained markedly abnormal secretions. Milk plant sanitarians are visiting farms where abnormal or high cell count is indicated. The dairyman is given 72 hours to correct the condition. If it is not cleared up in that time, he is then required to employ a veterinarian to make a mastitis examination of his herd and introduce such therapeutic and corrective measures as indicated. Repeat offenders or those with a very serious mastitis condition are required to utilize the New York State mastitis control program. This project is still in the experimental stage. However, the number of grossly abnormal samples were reduced during the 4-month test period.

It appears that a workable test which would identify mastitis through poor quality milk due to mastitis, followed by farm visits by the milk sanitarian, together with the dairyman's knowing that such a test is being used, creates a strong educational and psychological incentive that will lead to improved milk quality.

Saginaw, Michigan, also has what appears to be an excellent screening program having high potential. Milk samples are taken monthly from each producer's delivery. A microscopic examination of the milk is made for presence of leucocytes. Dairymen producing milk with a count in excess of 1,000,000 cells are notified that there is evidence of mastitis in their milk. They hope to reduce this eventually to a standard of 500,000 per ml. Farmers exceeding the one million count receive a written notice and, if repetition occurs during the following month, the producer receives a second notice together with a form for his veterinarian to use for reporting the results and action taken when he checks the herd. There is also provision for a third notice, but this is apparently seldom necessary. In addition to examining deliveries of milk at Saginaw, they also use the California Mastitis Test for examination of cows in herds showing an indication of mastitis.

As a comparison of work in the United States with

other countries, Dr. Hodges has made a personal inspection of control activities in Sweden, Denmark, and England. Mastitis workers in Sweden and Denmark also utilize a screening test for detecting abnormal milk. They use the California Mastitis Test on individual can samples. Presently, they are running these checks four times a year on a research basis. Dairymen producing abnormal or mastitic milk are given an opportunity to take advantage of a mastitis control service that is available through veterinary personnel of disease control laboratories. At the present, this is a voluntary program. However, within the next couple of years it will be mandatory that mastitis corrective procedures be taken, and in Denmark a financial penalty will be imposed. A reduction of as much as 15c per cwt. of milk when quality is inferior has been indicated.

Data obtained at the Royal Veterinary College at Stockholm covering examination of over 3000 cans of milk at three to six month intervals, delivered by farmers revealed 14-16% of the milk in the cell count range of 480,000 to 9 million per ml. This study, when classified according to dairies instead of cows, revealed 8% of the farms having poor quality milk. This is very similar to the results shown on the preliminary tests in the New York City milk supply.

In England, also, serious consideration is being given to the problem of inferior milk quality due to hemolytic staphylococci. Dr. C. D. Wilson at Weybridge, a very eminent mastitis researcher, stated that the Milk Marketing Board² in England is very much concerned about hemolytic staphylococcal mastitis and that as soon as the Ministry of Agriculture Veterinary Laboratory at Weybridge can develop a satisfactory approach to the problem, the Marketing Board will make it mandatory that dairymen put forth efforts to control this infection. Dairymen who fail will, according to Dr. Wilson, lose their milk market.

During the past several years there has been an increased interest by all segments of the dairy industry in mastitis control. The lack of similarity in existing programs and varying degrees of effectiveness indicates a very great need of serious consideration being given to development of uniform and practical approaches to the problem. It is recognized that certain areas of dairying have their own peculiarities, but basically the cow is the same and the disease mastitis is quite similar wherever we find it in the United States. No great success would have been achieved with tuberculosis or brucellosis had we not had a uniform and standard procedure of

control and elimination. Bovine mastitis as a disease is, to be sure, a much different condition but without a well designed and properly organized approach, we will not get far in combatting this disease.

Since the Mastitis Action Committee held its first meeting in Chicago in October 1960, there seems to have been a marked increase in the interest in mastitis programs in several States. This is an excellent and healthy development. However, there are certain points that we believe to be imperative when organizing a mastitis control program in any State. If we restrict a program to any one phase of the problem without giving attention to the over-all picture, definite limitations will occur.

A well balanced program should be based on several different factors or phases such as:

1. A well developed education program.
2. Screening tests through examination of milk supplies as an indication of the existence of mastitis in individual herds.
3. Diagnosis of mastitis either physically or bacteriologically in the herds indicated to have problems.
4. Installation of an over-all good management program to include regular inspection of the milking equipment by qualified technicians.

An approach which ignores any one of the above mentioned phases will have little success. If we should follow the diagnostic approach without any recognition given to management and prevention, our success would be nullified, because it takes something more than diagnosis and treatment to control bovine mastitis. On the other hand, if we approach it from management alone without giving recognition to the fact that bovine mastitis is a disease of the cow's udder and associated with many different types of bacteria, again our success will be limited. These organisms within the udder will continue to cause trouble unless they are recognized and dealt with in the manner indicated.

Furthermore, should we introduce an educational program without any attention given to recommendations for control programs, no great success can be expected.

The most practical approach to the problem is one of the well organized program no matter how small. At a meeting of the National Mastitis Council, the following recommendation was made:

"The States should establish committees with representatives of milk producers, milk processors, public health and agricultural agencies, veterinary medical associations, educational, and other allied groups to evaluate the extent of the mastitis problem; evaluate resources for mastitis control and research; actively encourage and support research in mastitis control; and perform such other functions as are recommended by the National Mastitis Council."

Here is a very definite need for an organization with aggressive leadership. One key participant is,

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²This in effect is a compulsory cooperative society of dairy farmers. It incidentally is quite apparent that adequate milk volumes are now being produced in England.

of course, the dairyman. Without his cooperation, participation and assistance, no program can be a success. There are great potentialities with proper leadership, proper organization, and a good relationship among these various groups, combined with a well organized approach to mastitis control.

No group is in a better position to assist with a mastitis control program than are milk sanitation agencies. Location of the herds with serious trouble with mastitis can best be accomplished through screening tests, such as the California Mastitis Test, or modified Whiteside Test, on bulk or weigh-tank milk samples. A mastitis program which combines physical examination, diagnosis and treatment has value; but bacteriological examination of carefully collected milk samples provides information on infection that gives the veterinarian a good indication of the most satisfactory control procedures. This approach must be preceded by a good educational program to teach dairy farmers better sanitation, management, and attention to the care of the cow's udder. Here is a wonderful opportunity for sanitarians to work in close cooperation with the Extension Service in teaching dairy farmers these important methods.

The use of demonstration herds has been one of the best educational tools in several programs. Herds

are used in demonstrations and meetings to point out to other dairy farmers the potential of mastitis control. For example, New York in the beginning of their program had very few demonstration herds, but today it is not difficult to find one in any neighborhood within the State.

We know that we do not have all the answers to the problems of mastitis, and there is a great need of more research activity than now exists. We not only need new research projects, but coordination of existing research. In this area, the Committee on Research of the National Mastitis Council will prove to be an invaluable tool to researchers in the field of mastitis.

The National Mastitis Council is a young organization struggling to give people in the United States a better concept of practical, workable mastitis control programs and such assistance as may be needed by States wishing to organize such programs. One pertinent activity is the preparation of information about successful programs and procedures for the benefit of States, organizations and individuals who wish to do something about the problem of bovine mastitis.

The National Mastitis Council stands ready to help you.

STATE MASTITIS PROGRAMS AND THE NATIONAL MASTITIS COUNCIL

HAROLD J. BARNUM

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I have been asked to talk to you a few minutes this evening on some of the successes and failures of the Colorado Mastitis Prevention Committee. I will also discuss some ways and means in which the National Council can be of assistance to State organizations and how the State organizations can, in turn, be of assistance to the National Council. I feel very strongly about this subject. I hope my thoughts and observations may be of some value to you in the development of your program.

Perhaps some background on the organization and early objectives of the Colorado group should be explained first. Nearly four years ago a small group of dairy industry and regulatory people saw the need for a representative committee to study and advise on ways and means of attacking what is considered by many as the number one problem in the dairy industry. It was apparent that the problem

of the promiscuous use of antibiotics in the treatment of mastitis would have to be faced and that no progress was being made in any manner to develop a program of education or help for producers or regulatory people. The need for such a group was recognized by all interested parties. Its purpose was simply to attempt to provide a service which was not available. The committee was made up of the following:

The Milk Producers Association	2 members
The Colorado Veterinary Medical Society.....	2 members
The Dairy Industry	2 members
Practicing Veterinarians	1 member
State Health Department	1 member
Local Health Departments	1 member
The State University Extension Veterinarian ..	1 member
The State University Dairy Specialist	1 member
The State Dairy Products Association	1 member

Our objectives were to take first things first. At the moment, the antibiotic problem seemed of uppermost importance. Our first efforts were directed toward the lessening of this problem through in-

¹Presented at the meeting of the National Mastitis Council, September 21, 1961 at Chicago, Illinois.